Natural Resources and Environment
AGRICULTURE • RESOURCES • CONSERVATION • LAND MANAGEMENT

WELL SUMMARY

SEAHORSE-1 (W705)

1 Folio No	2 Referred to	3 Date	4 Clearing Officer's Initials	1 Folio No	2 Referred to	3 Date	4 Clearing Officer's Initials

W705

WELL COMPLETION REPORT

SEAHORSE-1

30 MAR 1979

GIPPSLAND BASIN - VICTORIA

OIL and GAS DIVISION

AUSTRALIA LTD

MARCH, 1979

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APPENDICES

ENCLOSURES

ATTACHMENTS

ESSO STANDARD OIL (AUSTRALIA) LTD.

COMPLETION REPORT

I WELL DATA RECORD

Date NOVEMBER 1978

LOCATION

WELL NAME	STATE	PERMIT or LICENCE	GEOLOGICAL BASIN	FIELD
SEAHORSE-1	VIC	VIC/P1	GIPPSLAND	-

CO-ORDINATES Latitude 38°11' 47.95"S Longitude 147°40' 22.35"E X = 558 919m E Y = 5 772 137m N	MAP PROJECTION AMG ZONE 55	GEOGRAPHICAL DESCRIPTION 10 km NNW of Barracouta-1

ELEVATIONS & DEPTHS

ELEVATIONS Ground MSL KB +25m RT Braden Head Top Deck Platform	WATER DEPTH 41.7m	TOTAL DEPTH M.D. 2304m T.V.D. Avg.Angle Vertical
	PLUG BACK DEPTH 1650m	REASONS FOR P.B. Abandonment

DATES

MOVE IN 29th July, 1978.	RIG UP 29th July, 1978.	SPUDDED 30th July, 1978.
RIG DOWN COMPLETE 2nd September, 1978.	RIG RELEASED 2nd September, 1978.	PROD.UNIT - Start Rigging Up 28/8/78
PROD.UNIT - Rig Down Complete 31/8/78	I.P. ESTABLISHED N/A.	

MISCELLANEOUS

OPERATOR Esso	PERMITTEE or LICENCEE Hematite Petroleum Pty. Ltd.	ESSO INTEREST 50%	OTHER INTEREST Hematite 50%
CONTRACTOR Australian Odeca Pty. Ltd.	RIG NAME Ocean Endeavour	EQUIPMENT TYPE Semi-Submersible Drilling Vessel	
TOTAL RIG DAYS 34.04	DRILLING AFE NO. 238-006	COMPLETION NO.	TYPE COMPLETION

LAHEE WELL CLASSIFICATION	Before Drilling	Wildcat.
	After Drilling	Plugged and abandoned oil well.

R. C. N. Thornton.
Geologist

WELL

II INITIAL PRODUCTION TEST

Date WELL COMPLETION AS: Plugged and abandoned oil well.
for latter subsea completion.

Choke size, inch	32		Calculated P.I.	23	
Length of Test	225 min.		Calculated A.O.F		
Oil, BPD	2044		Perforations	30	
Water, BPD	-		Shut-In BHP	2044.5	
Gas, MCFD	2300		Flowing BHP	1962.4	
Gas Liquids,BPD	-		Shut-In Tubing Press	823	
Gas-Oil Ratio	1110		Flowing-Tubing Press	734	
Gravity, API	53		Flowing Temperature	98°F	

PERFORATING RECORD (Prod.test, Completion, DST, FIT)

INTERVAL	HPF	TOTAL SHOTS	SERV. CO.	DIFF. PRESS.	PERFORATION FLUID	SIZE AND TYPE GUN
1431.5 - 1439	4	30	Schlumberger	330 psi	Diesel	$2^{1}/8$" Unijet Zero Phasing.

Engineer

SUM[illegible]Y OF SEAHORSE-1 WIRELINE TEST PROG[illegible]ME

TEST NO.	SEAT	DEPTH	CHAMBER	RECOVERY (1)				FORMATION PRESSURE		PERMEABILITY md	RESULT
				OIL	GAS	FORMATION WATER	FILTRATE	Mpag	Psig		
FIT 1		1465									Miss Run.
2		1464.5									Miss Run.
3		1465	1	Tr.		19	3				Water Test.
			2	0.05	4.25	1.8	-	14.28	2071	1900	
4		1432.5	1	9.25	1152.6	-	8	14.09	2044	90	Oil Test.
			2	2.14	-	-	-	14.09	2044	50	
5		1489.5									Dry Test.
6		1480									Tool Failure.
7		1523									Miss Run.
8		1522.5									Miss Run.
											Miss Run.
RFT 1	1	1432.5	2	-	-	-	1.25	14.07	2040	200-400	Blocked Chamber.
2	2	1432.5						14.04	2036		Blocked Chamber.
	3	1458.5									Blocked Tool.
	4	1457.8									Blocked Chamber.
	5	1465						14.31	2076		Blocked Chamber.
	6	1480						14.48	2100		Blocked Chamber.
3	7	1465	1	-	-	-	0.5	14.30	2074	20	Blocked Chamber.
			2	-	-	-	1.25	14.32	2076		
	8	1480						14.48	2100		No Seal.
	9	1411						14.11	2047		No Seal.
4	10	1449.3						14.12	2048		Blocked Chamber.
	11	1437						14.16	2054		Blocked Chamber.

SUM[illegible]Y OF SEAHORSE-1 WIRELINE TEST PROG[illegible]E

TEST NO.	SEAT	DEPTH	CHAMBER	RECOVERY (1)				FORMATION PRESSURE		PERMEABILITY md	RESULT
				OIL	GAS	FORMATION WATER	FILTRATE	Mpag	Psig		
	12	1460.7						14.28	2072		Blocked Chamber.
5	13	1449.3	1	14.0	1153	-	0.5	14.19	2058	80	Oil Test.
			2	-	-	-	0.95	14.18	2056	330	Segregator Failure.
	14	1448						14.19	2058		Pressure Test.
6	15	1458.5						14.16	2054		Dry Test or Plugged at Port.
	16	1458						14.19	2058		Dry Test or Plugged at Port.
	17	1460.7						14.35	2081		Dry Test or Plugged at Port.
	18	1437	1	13.5	1543	-	-	14.05	2038		Oil Test.
			2	-	-	-	1.3	14.05	2038		Segregator Failure.
7	19	1458.5						14.16	2053		Lost Seal.
	20	1459									Dry Test/Lost Seal.
	21	1458						14.28	2071		Lost Seal.
	22	1460.7						14.31	2075		Lost Seal.
	23	1461.4	1					14.32	2078		Lost Seal.
			2					14.31	2075		
8	24	1421.5									Dry Test/Plugged Tool.
	25	1437						14.11	2047		Dry Test.
	26	1426.8	1	6.35	915	-	-	14.07	2040		Oil Test.
			2	-	-	-	-	14.07	2040		Segregator Failure.
9	27	1458.5	1					14.20	2061		Plugged at Port/Lost Seal.
	28	1458.4	2	-	-	-	1.125				Plugged at Port.
10	29	1489.5						14.52	2106		Plugged Tool.

SUM[illegible]Y OF SEAHORSE-1 WIRELINE TEST PROG[illegible]ME

TEST NO.	SEAT	DEPTH	CHAMBER	RECOVERY (1)				FORMATION PRESSURE		PERMEABILITY md	RESULT
				OIL	GAS	FORMATION WATER	FILTRATE	Mpag	Psig		
	30	1480						14.57	2113		Plugged Tool/Lost Seal.
	31	1460.7						14.36	2084		Plugged Tool/Lost Seal.
11	32	1410.9						14.15	2053		Pressure Test.
	33	1458	1	-	-	-	22	14.33	2079	140	Water Test.
			2	-	-	1.5	-	14.34	2080		Segregator Failure.
12	34	1480	1					14.52	2106		Chamber Failed.
			2	-	-	-	0.5	14.52	2106		Too Open.
13	35a	1489.5						14.59	2114		Dry Test/Plugged Tool.
	35b	1490	1	-	-	5.5	6	14.60	2118	125	Water Test.
			2	-	-	1.35	-	14.61	2119	115	Segregator Failure.
14	36a	1411									Lost Seal.
	36b	1410.9									No Seal.
	36c	1411.5						14.17	2056		Tool Plugged at Port.
	37a	1460.75						14.33	2078		Tool Plugged at Port.
	37b	1460.8	1					14.18	2056		Chamber Plugged.
			2	-	-	-	1.5				Chamber Plugged.
15	38a	1514						14.86	2155		Chamber did not open.
	38b	1514	1	14.5	-	-	0.75	14.85	2154		Oil Test.
			2						2155		Segregator Failure.
16	39a	1521						14.99	2174		Blocked Line.
	39b	1520.8	1	0.75	-	-	1.25	14.94	2168		Blocked Line.
17	40	1609									No Seal.

SUM[illegible]Y OF SEAHORSE-1 WIRELINE TEST PROG[illegible]ME

TEST NO.	SEAT	DEPTH	CHAMBER	RECOVERY (1)				FORMATION PRESSURE		PERMEABILITY md	RESULT
				OIL	GAS	FORMATION WATER	FILTRATE	Mpag	Psig		
	41	1609 .2									No Seal.
	42	1608.5	1	13.25	793	-	5.25	15.75	2285		Oil Test.
			2					15.75	2284		Segregator Failure.
18	43	1627.5									No Seal.
	44	1628.0						15.90	2306		Tool Plugged at Port.
	45	1651.5						16.16	2343		Tool Plugged at Port.
19	46	1651.5						16.06	2330		Tool Plugged.
	47	1651	1	-	-	-	7.25	16.16	2343		Tool Plugged.
			2					16.15	2342		Segregator Failure.
20	48	1628									Equipment Failure.
21	49	1628									Equipment Failure.
22	50	1628	1	-	-	-	1.8	15.77	2287		Block Flow/Lost Seal.
	51	1628.5									No Seal.
	52	1627									No Seal.
23	53	1523	1	-	-	-	20.25	14.93	2166		Water Test.
			2					14.94	2167		Block Flow.

WELL

V CASING - LINER - TUBING RECORD

Type	Size	Weight	Grade	Thread	No. Joints	Amount	**Depth**
Pile Joint	24"	670#	-	CC	1	9.79 (32.12)	74.09 (243.08)
Cross Over	20"	106.5#	X-52	JV-CC	1	13.08 (42.92)	87.17 (286.00)
Conductor Casing	20"	94#	X-52	JV	7	86.97 (285.35)	174.14 (571.35)
Float Joint	20"	94#	X-52	JV	1	14.12 (46.00)	188.26 (617.68)
Casing Hanger	18-3/4" x 13-3/8"	-	-	-	1	0.71 (2.33)	66.22 (217.27)
Pup Joint	13-3/8"	54.5#	K-55	Butt	1	1.60 (5.25)	67.82 (222.52)
Surface Casing	13-3/8"	54.5#	K-55	Butt	71	895.23 (2937.25)	963.05 (3159.77)
Float Jnt. Shoe & Collar	13-3/8"	54.5#	K-55	Butt	1	14.61 (47.94)	977.66 (3207.70)
Casing Hanger	18-3/4" x 9-5/8"	-	-	-	1	0.71 (2.33)	65.01 (213.30)
Pup Joint	9-5/8"	47#	N-80	Butt	1	1.31 (4.30)	66.32 (217.60)
Intermed Casing	9-5/8"	47#	N-80	Butt	160	1589.46 (5215.02)	1655.78 (5432.61)
Float Joints	9-5/8"	47#	N-80	Butt	2	23.52 (77.17)	1679.30 (5509.78)

VI CEMENT RECORD

String	20" Conductor Csg.		13-3/8" Surface Csg.		9-5/8" Intermed. Csg.
Type of Cement	Aust. 'N' Neat + 12% Cel.	Aust.'N' Neat	Aust. 'N' Neat+12% Cel.	Aust.'N' Neat+1% $CaCl_2$	Aust. 'N' Neat
Number of FT^3	38.6 (1362)	11.4 (401)	23.1 (815)	9.2 (325)	20.1 (708)
Average weight of slurry	SG 1.45 (12.1 ppg)	SG 1.87 (15.6 ppg)	SG 1.45 (12.1 ppg)	SG 1.87 (15.6 ppg)	SG 1.8 7 (15.6 ppg)
Cement Top	Seafloor		496 (1627)		1029 (3376)
Casing Tested with	3448 kPa (500 psi)		10,342 kPa (1500 psi)		13,790 kPa (2000 psi)
Number of Centralizers	6		9		27
Number of Scratchers	-		-		-
Stage Collar etc.	-		-		-
Remarks					

G. W. WEYBURY.
Engineer

WELL

VII SAMPLES, CONVENTIONAL CORES, SW CORES

INTERVAL	TYPE	RECOVERED	INTERVAL	TYPE	RECOVERED	
			CONVENTIONAL CORES		%	M
200 - 990m	Cuttings (5 sets washed and dried; 1 set unwashed)	10m intervals	1411.0 - 1424.0m	1	57	7.4
990 - 1411m		5m intervals	1424.8 - 1439.0m	2	96.5	12.7
1480 - 2304m		5m intervals	1439.0 - 1453.0m	3	57	8.0
			1453.0 - 1465.6m	4	54	6.5
			1465.6 - 1479.6m	5	78.5	11.0
200 - 1411m 1480 - 2304m	Cuttings (1 set composite canned cuttings)	30m intervals				
SIDEWALL CORES	Run Shots					
990 - 210m	1 30	30				
1862 - 1366m	2 51	50				
1499.5 - 997.5m	3 30	28				
2296.0 - 1897.0m	4 30	30				

VIII WIRELINE LOGS AND SURVEYS (Incl. FIT)

Type & Scale	From To	Type & Scale	From To
ISF-Sonic		Velocity Survey	1864 - 350 37 shots.
2" and 5" = 100'			
Run 1	993.5 - 189.5m		
Run 2	1507.5 - 977.5m		
Run 3	1866.0 - 1350.0m		
Run 4	2304.0 - 1350.0m		
FDC- GR			
2" and 5" = 100'			
Run 1	993.5 - 189.5m	FIT's and RFT's see part III.	
FDC-CNL			
2" and 5" = 100'			
Run 1	1507.5 - 977.5		
Run 2	1866.0 - 1350.0		
Run 3	2299.0 - 1350.0		
HDT Run 1	967.0 - 1867.0m		
CST Run 1	990.0 - 210.0m		
2	1862.0 - 1366.0m		
3	1500.0 - 977.0m		
4	2296.0 - 1897.0m		

Geologist

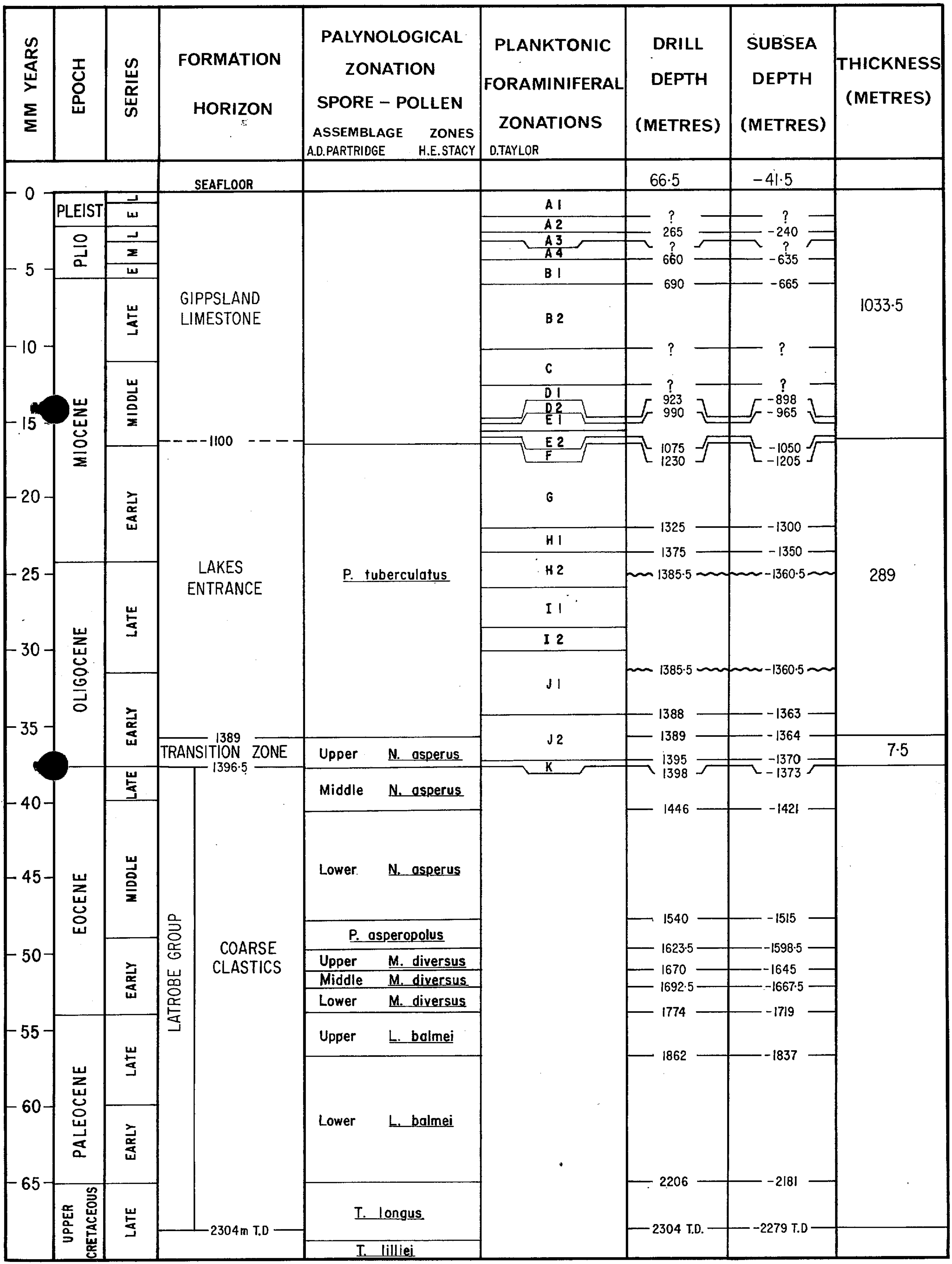
SEAHORSE-1

COMPARISON OF CORE DEPTHS AND LOG DEPTHS

B. Log Depths from Log Run No. 4

NO.	CORE DEPTHS		LOG DEPTHS	
	CORED INTERVAL	RECOVERED INTERVAL	CORED INTERVAL	RECOVERED INTERVAL
1	1411.0 - 1424.0	1411.0 - 1418.4	1412.0 - 1425.3	1412.0 - 1419.7
2	1424.8 - 1439.0	1424.8 - 1437.5	1425.3 - 1442.0	1425.3 - 1439.3
3	1439.0 - 1453.0	1439.0 - 1447.0	1442.0 - 1454.0	1442.0 - 1450.5
4	1453.0 - 1465.6	1453.0 - 1459.5	1454.0 - 1466.6	1454.0 - 1460.3
5	[illegible]465.6 - 1479.6	1465.6 - 1476.6	1466.6 - 1482.0	1466.6 - 1478.0

SEAHORSE - 1
STRATIGRAPHIC TABLE



MM YEARS	EPOCH	SERIES	FORMATION HORIZON	PALYNOLOGICAL ZONATION SPORE – POLLEN ASSEMBLAGE A.D. PARTRIDGE ZONES H.E. STACY	PLANKTONIC FORAMINIFERAL ZONATIONS D.TAYLOR	DRILL DEPTH (METRES)	SUBSEA DEPTH (METRES)	THICKNESS (METRES)
			SEAFLOOR			66·5	-41·5	
0	PLEIST	L	GIPPSLAND LIMESTONE		A 1			1033·5
		E			A 2	?	?	
	PLIO	L			A 3	265	-240	
		M			A 4	?	?	
5		E			B 1	660	-635	
	MIOCENE	LATE			B 2	690	-665	
10					C	?	?	
		MIDDLE			D 1	?	?	
					D 2	923	-898	
15					E 1	990	-965	
		EARLY	1100 LAKES ENTRANCE	*P. tuberculatus*	E 2	1075	-1050	289
					F	1230	-1205	
20					G			
					H 1	1325	-1300	
25	OLIGOCENE	LATE			H 2	1375	-1350	
						1385·5	-1360·5	
					I 1			
30					I 2			
		EARLY			J 1	1385·5	-1360·5	
35					J 2	1388	-1363	
			1389 TRANSITION ZONE	Upper *N. asperus*		1389	-1364	7·5
					K	1395	-1370	
	EOCENE	LATE	1396·5 LATROBE GROUP COARSE CLASTICS	Middle *N. asperus*		1398	-1373	
40		MIDDLE		Lower *N. asperus*		1446	-1421	
45								
				P. asperopolus		1540	-1515	
50		EARLY		Upper *M. diversus*		1623·5	-1598·5	
				Middle *M. diversus*		1670	-1645	
				Lower *M. diversus*		1692·5	-1667·5	
55	PALEOCENE	LATE		Upper *L. balmei*		1774	-1719	
				Lower *L. balmei*		1862	-1837	
60		EARLY						
65	UPPER CRETACEOUS	LATE		*T. longus*		2206	-2181	
			2304m T.D			2304 T.D.	-2279 T.D	
				T. lilliei				

Dwg. 1882/OP/15

SEAHORSE-1

DESCRIPTION OF LITHOLOGICAL UNITS

GIPPSLAND LIMESTONE (66.7m - 1100m KB)

188m - 600m	LIMESTONE: Interbedded Calcarenite and Calcisiltites. Calcarenite white to medium light grey, very fine to coarse carbonate grains, poorly sorted; subangular to subrounded grains in a calcareous matrix. Carbonaceous grains common. Some fossil fragments present, mainly echinoid spines and shell debris. Calcisiltite medium to light grey, firm, very fine to silt size carbonate grains slightly micromicaceous; carbonaceous grains common; fossiliferous. Fossil fragments mainly echinoid spines, corals and forams.
600m - 910m	LIMESTONE: Calcisiltite with minor sandstone beds. Calcisiltite argillaceous, fossiliferous, medium to light grey, firm. Very fine to silt size carbonate grains occassionally grading to fine to coarse sand size grains. Scattered fossil fragments, mostly benthonic forams, brachiopods, echinoid spines. Sandstone weakly calcareous quartzose, light grey, friable, fine to coarse grained, moderately sorted, rounded to subrounded grains. Traces of glauconite and carbonate grains. Matrix is a white to grey calcareous clay.
910m - 1100m	LIMESTONE: calcarenite grading to micrite with interbedded calcareous siltstone. Calcarenite light grey, very fine to fine, moderately sorted, subangular grains, mainly detrital, in calcareous cement. Very small amount of clay matrix, rare glauconite and carbonaceous specks throughout. Micrite light grey to brown, firm with finely disseminated pyrite and fossil fragments. Occasionally with sparry matrix. Siltstone calcareous. Argillaceous, medium grey to medium grey brown, firm, well sorted. 30-40% clay present. Micromicaceous, with very fine to silt sized fossil fragments - mainly forams.

LAKES ENTRANCE FORMATION (1100m - 1392m KB)

1100m - 1390m	MUDSTONE: light brown, firm, moderately to very calcareous disseminated forams, fossil fragments, pyrite and glauconite, micromicaceous.

TRANSITION ZONE (1392m - 1396.5m KB)

1392m - 1~~2~~396.5m	GREEN-SAND: Red brown to dark olive grey, friable to hard, comprising glauconite pellets, poorly sorted, well rounded and quartz grains, fine to very coarse, subangular to subrounded, poorly sorted, clear to smokey frosted grains set in 25-75% calcareous clay. Pyrite very common as lenses, nodules and disseminated in clay, trace mica, occasional fossil fragments.

LATROBE GROUP (1396.5m-2304m KB)

1396.5m-1548m	INTERBEDDED SANDSTONE, SILTSTONE AND COALS: Sandstone light grey to brown grey, quartzose, moderately friable. Interbedded fine and medium to coarse occasionally graded with beds, moderate to well sorted, subangular to subrounded grains. Porosity generally variable, averages 10-20%. Traces of mica, white clay matrix common often becoming siltstone or claystone stringers. Bioturbation common with coarser, better sorted material in burrows. Siltstone yellow brown to chocolate brown, micaceous and carbonaceous, pyritic, firm, laminated, often with thin sandstone laminae. Grades in places to very carbonaceous shale and coal. Coal Bitumenous, bright, pyritic, often with bitumenous shale laminae.

2/.....

LATROBE GROUP (Cont.)

1548m - 2304m Predominantly Sandstone with interbedded siltstone and claystone. Sandstone quartzose, light grey, unconsolidated to friable, fine to coarse grained, occasionally pebbly, angular to subrounded, poorly sorted, clear to milky, polished and frosted quartz grains, traces of carbonaceous material, occasional grains encrusted by pyrite. Claystone dark brown, firm, silty, carbonaceous and micaceous. Siltstone light grey to brown, soft to firm, quartz, silt, varying amounts of carbonaceous material, mica, pyrite with a clay matrix.

SEAHORSE-1

GEOLOGICAL AND GEOPHYSICAL ANALYSIS

STRATIGRAPHY

AGE	UNIT/HORIZON	DEPTH (m)			(m) THICKNESS
		PREDICTED	ACTUAL		
		KB	KB	SUBSEA	
Pliocene/Miocene	Gippsland Limestone	43	66.5	-41.5	1033.5
Miocene	Base of High Velocity Channel		1100.0	-1075.0	
Miocene/Eocene	Lakes Entrance Formation		1100.0	-1075.0	296.5
Eocene/Late Cretaceous	Latrobe Group	1440	1396.5	-1371.5	907.5+
	Fine Grained Marine Unit		1396.5	-1371.5	11.5
	Coarse Clastics	1440	1408.0	-1383.0	897.5+
	T.D.		2304.0		

GEOLOGICAL ANALYSIS

Seahorse-1 was drilled on a small fault-bound anticline, 11 km north of Barracouta-A platform. It intersected 907.5m of Latrobe Group sediments, and discovered oil in five separate zones.

The depositional environment of the uppermost Latrobe Group unit appears to have been transitional to that of the overlying Lakes Entrance Formation, although the sedimentation rate was reduced slightly (see Appendix 4). Consequently, the Top of Latrobe Group is not represented by a time break. In fact, deposition over the Seahorse discovery apparently was continuous from Late Cretaceous (*T.longus* Zone) through to Early Oligocene (*P.tuberculatus* Zone).

The oil bearing sands occur in five separate zones, related to three different oil/water contacts. The only economically significant sands are the three in the coal rich section at the top of the Latrobe Group, of Middle to Lower *N.asperus* in age. 8 km of net oil sand occurs within a 31m gross oil column. This section was fully cored, but the oil/water contact can not be located exactly because it occurs within the coal and shale sections at 1450m - 1456m. The reservoir properties of the oil sands reflect their point bar origin. Porosities average 24%, and water saturation 33%.

Two intra-Latrobe oil sands occur, each with its own oil/water contact. Both have small reservoir potential, however. The upper are of Lower *N.asperus* age, at 1512.5m - 1522.0m, is 9.5m thick and has excellent reservoir parameters, but sits on water. The Lower *P.asperopolus*, sand at 1608m - 1610m, is very thin and located between two coals.

GEOPHYSICAL ANALYSIS

The Seahorse prospect was mapped prior to the G77A survey using the existing grid of G76A and older seismic. This mapping was used to position a G77A line over the interpreted crest of the prospect and to site the well location on this line.

The original mapping predicted the Top of Latrobe Group to be at -1415m while the new G77A line produced a prediction of -1390m.

The well penetrated the top of Latrobe at -1371.5m, 43.5m high to the original prediction and 18.5m high to the prediction from the G77A line. In both cases the difference is caused by slight errors in both the time and velocity values at the well. The shape of the structure has been only slightly modified post-drill due to greater attention to the more subtle features seen on the seismic sections.

APPENDIX 1

VDME

SEAHORSE-1

LITHOLOGICAL DESCRIPTIONS

Page 1 of 38

CORELAB

1.8.78

DEPTH	%	DESCRIPTION
200m-210m	70%	Cement
	30%	Sandy Calcarenite - light grey to white, subrounded to subangular, very fine to fine grained, dirty, firm.
210m-220m	70%	Calcarenite - As above.
	10%	Shell Fragments - some very coarse, mostly coarse, calcareous.
	20%	Cement
220m-230m	50%	Calcarenite - As above.
	30%	Shell Fragments
	20%	Cement
230m-240m	10%	Cement - grey, very fine grained.
	60%	Calcarenite - As above.
	30%	Shell Fragments - Coarse.
240m-250m	20%	Cement
	30%	Shell Fragments - forams brachiopods, coral fragments, gastropods, echinoid spines, fossil fragments.
	50%	Calcarenite -white to light grey, subrounded to subangular, firm, calcareous cement.
		Trace Calcilutite, light to medium grey, firm. Quartz - subrounded to rounded.
250m-210m		As above.
260m-270m	10%	Cement
	10%	Shell Fragments
	80%	Calcarenite - very sandy.
270m-280m	30%	Shell Fragments
	70%	Calcareous Arenite
		Trace cement.
280m-290m	60%	Calcarenite - As above.
	40%	Shell and Fossil Fragments - As above.
		Trace Quartz, Calcilutite cement.
290m-300m	60%	Calcilutite - white to light grey, subangular to subrounded, very fine to coarse, firm, cemented with calcareous matter and fossil fragments inclusions, becoming glauconitic.
	40%	Shell Fragments - brachiopods, coral fragments, echinoid spines, gastropods, all sorts.

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LITHOLOGICAL DESCRIPTIONS

CORELAB

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DEPTH	%	DESCRIPTION
290m-300m		Continued/....
		Trace Calcilutite, quartz cement.
300m-310m	80%	Calcarenite - As above.
	20%	Shell Fragments - As above.
310m-320m	90%	Calcarenite - As above.
	10%	Shell Fragments - As above.
320m-330m	90%	Calcilutite - As above.
	10%	Shell Fragments - As above.
330m-340m	80%	Calcarenite - As above.
	15%	Shell Fragments - As above.
	5%	Sandstone - calcareous.
		Trace Quartz.
340m-350m	90%	Calcarenite - quite glauconitic in part.
	10%	Shell Fragments
350m-360m		As above.
360m-370m		As above.
370m-380m	90%	Calcarenite
	10%	Shell Fragments and Fossil fragments
		Trace Quartz.
380m-390m	90%	Calcarenite
	10%	Shell Fragments and Fossil fragments
		Trace Quartz Stone.
390m-400m		As Above.
400m-410m	80%	Calcarenite
	20%	Shell and Fossil Fragments
		Trace Quartz, argillaceous material, very soft, glauconitic, pyritic.
410m-420m	90%	Calcarenite - light grey to white, very fine to fine, some coarse, sample of glauconite, subrounded to subangular, firm to hard, fossil (form) debris included.
	10%	Shell and Fossil Fragments - coral, brachiopods, echinoid spines.
		Trace Glauconite, Pyrite.

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LITHOLOGICAL DESCRIPTIONS

CORELAB

1.8.78

DEPTH	%	DESCRIPTION
420m-430m		As above.
430m-440m	80%	Calcarenite
	20%	Fossil Fragments
		Trace Glauconite and Pyrite, quartz.
440m-450m	80%	As above.
	20%	
		Trace As above.
450m-460m	90%	Calcarenite - As above.
	10%	Fossil Fragments - As above.
		Trace Glauconite, pyrite and quartz.
460m-470m	100%	Calcarenite - As above.
		Trace Glauconite, Pyrite and Quartz.
		1.8.78 C.F.J. SWARBRICK
470m-480m	100%	Calcarenite - white to light grey brown, very coarse to fine, poorly sorted, calcareous matrix, hard, glauconite grains common, trace carbonaceous flecks, abundant fossil fragments - mainly corals, echinoid spines and indeterminate shell debris - loose and incorporated in calcarenite.
		Trace - dark grey chert, banded. Calcite crystals loose.
		1.8.78 J.D. ALDER
480m-490m	100%	Calcarenite - As above.
		Trace Quartz - clear, subrounded, medium grained to coarse, abundant fossils, shell debris, corals, echinoid spines, forams.
490m-500m	100%	Calcarenite - light to dark grey, very coarse to fine, poorly sorted, calcareous matrix, hard, quartz common, clear, angular to subrounded, medium grained to coarse, trace carbonaceous flecks, abundant fossils as above.
500m-510m	100%	Calcarenite - As above. Less Quartz.
510m-520m	100%	Calcarenite - As above. Trace Quartz.
520m-530m	100%	Calcarenite - light grey, very coarse to fine, poorly sorted, calcareous matrix, hard, trace carbonaceous flecks, trace pyrite. Abundant fossil fragments, mainly corals shell debris, echinoid spines.
530m-540m	60%	Calcarenite - light grey, very coarse to firm, poorly sorted.
	40%	Matrix - calcareous, firm. Trace carbonaceous flecks, trace pyrite, abundant fossil fragments, as above, some forams.

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LITHOLOGICAL DESCRIPTIONS

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DEPTH	%	DESCRIPTION
540m-550m	80%	Calcarenite - light grey, very coarse to fine grained, generally much finer than previous samples.
	20%	Matrix - As above.
550m-560m	90%	Calcarenite - light grey, very coarse to fine, poorly sorted.
	10%	Calcareous Matrix - much coarser than previous 2 samples as above.
560m-570m	80%	Calcarenite - white to light grey, very coarse to fine, poorly sorted, angular to subrounded.
	20%	Calcareous Matrix - firm, very rare, trace Carbonaceous specks and glauconite, abundant fossil fragments - mainly corals, echinoid spines and shell debris.
570m-580m	100%	Calcarenite - As above. Trace Glauconite. Trace Quartz - clear, subrounded.
580m-590m	100%	Calcarenite - As above, Quartz common.
590m-600m	100%	Calcarenite - white to yellow light grey, medium to coarse grained, moderately sorted, grey calcareous matrix, glauconite common as fossil impregnations. Quartz common approximately 5% abundant fossil fragments - shell debris, corals, echinoid spines, forams.
600m-610m	100%	Calcarenite - As above. Trace only Quartz and Glauconite.
610m-620m	100%	Calcarenite - As above. Trace Quartz, Glauconite.
620m-630m	95%	Calcarenite - white to light grey, very coarse to fine grained, poorly sorted, grey calcareous matrix, trace glauconite, rare carbonaceous flecks.
	5%	Quartz - clear, subrounded, abundant fossil fragments, shell debris, corals,echinoid spines.
630m-640m	100%	Calcarenite - As above.
640m-650m	100%	Calcarenite - As above. Quartz less common.
650m-660m	95%	Calcarenite - light grey to grey brown, very coarse to fine grained, poorly sorted, grey calcareous matrix, trace glauconite.
	5%	Quartz - clear, subrounded, abundant fossil fragments, as above.
660m-670m	100%	Calcarenite - light to medium grey, very coarse to fine grained, angular to rounded, firm to hard, glauconite grains common, trace carbonaceous flecks, trace Quartz, subrounded, clear. Abundant fossil fragments, corals, shell debris.
670m-680m	100%	Calcarenite - As above. Trace Pyrite. Fossil fragments includes corals, shell debris, echinoid spines, forams.
680m-690m	100%	Calcarenite - As above.
690m-700m	100%	Calcarenite - light to medium grey, very coarse to fine grained, angular to rounded, firm to hard, not as many loose

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LITHOLOGICAL DESCRIPTIONS

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DEPTH	%	DESCRIPTION
690m-700m		Continued/.... fragments, tends to be more cemented. Trace carbonaceous flecks. Trace Pyrite. Glauconite common. Rare Quartz fragments abundant fossils as above.
700m-710m	50%	Calcarenite - As above.
	50%	Limestone - (indurated Calcarenite), light grey to light grey brown, fine to medium grained, hard, subangular to rounded, poorly sorted, fossliferous, trace carbonaceous flecks. trace pyrite.
710m-720m	100%	Calcarenite - very fine to medium grained, approximately 10%, coarse to very coarse, indurated, hard to very hard, light grey, trace glauconite, trace carbonaceous flecks, trace Quartz, abundant fossil fragments, corals, shell debris.
[illegible]20m-730m	100%	Calcarenite - light grey to yellow grey, medium to very fine grained, 10% very coarse grained, some interbeds of calcisiltite, trace Glauconite, trace Quartz, trace Pyrite, fossil fragments common, corals, shell fragments.
730m-740m	100%	Calcarenite - As above.
740m-750m	95%	Calcarenite - white to light grey, medium to very fine grained, approximately 5% very coarse grained, subangular to rounded, moderately sorted, very hard, glauconite common, trace carbonaceous flecks, trace pyrite, occasional fossil fragments, corals, shell debris.
	5%	Calcisiltite - grey, fine grained, firm.
750m-760m	90%	Calcarenite - white to light grey, fine to very fine grained, 1% coarse grains, subangular to subrounded, moderately to poorly sorted, hard, glauconite common, trace carbonaceous flecks, trace pyrite, trace fossil fragments.
	10%	Calcisiltite - As above.
760m-770m	100%	Calcarenite - white to light grey brown, very coarse to fine grained, subangular to rounded, poorly sorted, fine grained, calcareous matrix, hard, glauconite grains, common, trace carbonaceous flecks, trace Quartz, clear rounded. Abundant fossil fragments, corals, shell fragments.
770m-780m	100%	Calcarenite - As above.
780m-790m	100%	Calcarenite - white to light yellow grey, very coarse to fine grained, angular to subrounded, poorly sorted, calcareous matrix, firm to hard, trace glauconite, trace carbonaceous flecks, abundant fossil fragments - corals, echinoid spines and shell debris.
790m-800m	100%	Calcarenite - As above.
800m-810m	100%	Calcarenite - white to light grey, medium to very fine grained, angular to subrounded, poorly sorted, calcareous matrix, hard to very hard, trace glauconite, trace carbonaceous flecks, fossil fragments, common, as above.

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LITHOLOGICAL DESCRIPTIONS

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DEPTH	%	DESCRIPTION
810m-820m	100%	Calcarenite - As above. Very coarse to fine grained, trace Pyrite.
820m-830m	100%	Calcarenite - white to light grey, very coarse to fine grained, angular to subrounded, poorly sorted, calcareous matrix, firm to hard, trace silty glauconite, pyrite and carbonaceous flecks, fossil fragments common, corals, echinoid spines, shell debris.
830m-840m	100%	Calcarenite - As above, medium to very fine grained.
840m-850m	95%	Calcarenite - white to light grey, medium to fine grained, 10% very coarse grained, angular to subrounded, poorly sorted, calcareous matrix, firm to hard, traces of glauconite, pyrite and carbonaceous grains.
	5%	Calcisiltite - grey, firm, fine grained.
850m-860m	90%	Calcarenite - As above.
	10%	Calcisiltite - As above.
860m-870m	100%	Calcarenite - white to medium grey, medium to very fine grained, subangular to subrounded, poorly sorted, calcareous matrix, hard, trace glauconite, trace carbonaceous flecks, some fossil fragments, corals, echinoid spines, shell debris and forams.
870m-880m	100%	Calcarenite - medium to very fine grained, 10% very coarse grained, as above.
880m-890m	80%	Calcarenite - white to light grey to brown, medium to very fine grained, subangular to subrounded, poorly sorted, calcareous matrix, very hard, trace glauconite, trace carbonaceous flecks, some fossil fragments, as very coarse loose grains, corals, echinoid spines, forams.
	20%	Calcisiltite - white to grey, firm to very hard, fine grained, carbonaceous grains, common.
890m-900m	90%	Calcarenite - white to medium grey, medium to very fine grained, subangular to subrounded, poorly sorted, firm to very hard, white hard calcareous matrix - 50% grey,firm, argillaceous matrix. - 50% trace of Glauconite, carbonaceous flecks and pyrite.
	10%	Calcisiltite - white to grey, firm to very hard, fine grained carbonceous grains, common calcareous and argillaceous cement.
		1.8.78 C.F.J. SWARBRICK
900m-910m	60%	Calcarenite - light grey to light grey brown, very fine to fine, subangular to subrounded, firm to hard, both argillaceous and carbonaceous matrix present, glauconitic in part, rare carbonaceous flecks.
	40%	Calcareous Siltstone - medium grey to medium grey brown, soft to firm, abundant fossil debris mainly up to 1mm in length, occasionally up to 2mm. Fossil debris aligned in sub-parallel fashion (bedding surfaces).
		Trace - Marl - white to light grey, very soft. Quartz- loose, angular, very coarse.

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DEPTH	%	DESCRIPTION
		Trace Pyrite - aggregates fine crystals. Loose Fossils - echinoid spines, corals and rare forams.
910m-920m	70%	Calcareous Siltstone - as above, grading to calcareous mudstone.
	30%	Calcarenite - As above.
		Trace Marl - As above. Loose Fossils - As above, plus corals and benthonic forams.
920m-930m	60%	Calcareous Siltstone - As above, grading to calcareous mudstone.
	40%	Calcarenite - light grey to light grey brown, rarely off-white, very fine to fine, subangular to subrounded, firm to hard, both argillaceous and calcareous matrix in approximate equal proportions, glauconitic in part, scattered carbonaceous flecks.
		Trace Loose fossils - As above. Pyrite
930m-940m	70%	Calcarenite - light grey to light grey brown, and off white, mainly very fine to fine, occasionally medium, poor sorting, subangular to subrounded, rarely glauconitic, common fine carbonaceous specks giving "salt and pepper" appearance, abundant fossil fragments make up bulk of larger grains in rock.
	30%	Calcareous Siltstone - as above, carbonaceous, pyritic in part.
		Trace Loose Fossils - As above. Pyrite - fine crystal aggregates.
940m-950m	50%	Calcarenite - As above.
	50%	Calcareous Siltstone - As above.
		Trace Loose Fossils - benthonic forams and coral debris. Pyrite Marl - white to light grey, soft, carbonaceous flecks, fossiliferous, (mainly forams).
950m-960m	60%	Calcareous Siltstone - As above, glauconitic in part, carbonaceous flecks, fossil fragments - mainly thin shell debris and echinoid spines.
	40%	Calcarenite - As above.
		Trace Loose Fossils - As above. Pyrite Marl
960m-970m	70%	Calcareous Siltstone - As above.
	30%	Calcarenite - As above.
		Trace Loose Forams and coral debris. Pyrite Marl
970m-980m	80%	Calcareous Siltstone - light grey brown to medium grey, firm, fossil debris common - mainly thin shell debris, forams and

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DEPTH	%	DESCRIPTION
970m-980m		Continued/.... echinoid spines, most less than 1mm in length. Carbonaceous flecks throughout, pyritic in part, trace glauconite.
	20%	Calcarenite - light grey to light grey brown and off-white, very fine to fine, subangular to subrounded, moderately sorted, glauconitic, carbonaceous in part, firm to hard. Trace Loose Fossils - mainly corals and forams. Loose Quartz - clear, angular. Pyrite
980m-990m	80%	Calcareous Siltstone - As above, trace chlorite.
	20%	Calcarenite - As above. Trace loose benthonic forams, coral debris.
990m-993m	80%	Calcareous Siltstone - As above.
BOTTOMS UP SAMPLE	20%	Calcarenite - As above. Trace loose benthonic forams. Pyrite Pulled out of hole 0300 hours, 2/8/78 to log prior to running $13^{3}/8$" casing. C.F.J. SWARBRICK 4.8.78
993m-995m	80%	Siltstone - calcareous, argillaceous, medium grey to medium grey brown, firm, slightly carbonaceous, contains approximately 35% clay,fossil fragments up to 1mm - most indeterminate. Trace Pyrite.
	20%	Calcarenite - slightly argillaceous, fossiliferous, light grey, speckled with carbonaceous flecks, mainly very fine, occasionally fine, with calcareous, slightly argillaceous cement. Moderately sorted and subrounded calcareous grains, probably reworked fossil fragments. Trace Pyrite Loose Quartz - very coarse, clear, occasionally milky, angular. Forams - benthonic, and rare solitary coral stems. J.D. ALDER
995m-1000m	90%	Siltstone - argillaceous, medium grey to medium grey brown, firm, slightly carbonaceous, calcareous fossil fragments, mostly indeterminate - some coral stems, trace pyrite, 40% clay.
	10%	Calcarenite - slightly argillaceous, light grey, speckled with carbonaceous flecks, mainly very fine, occasionally fine, with calcareous cement, moderately sorted, subrounded, calcareous grains, probably fossil fragments. Loose Quartz - very coarse, milky, occasionally clear, angular.

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LITHOLOGICAL DESCRIPTIONS

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DEPTH	%	DESCRIPTION
1000m-1005m	90%	Siltstone - As above.
	10%	Calcarenite - As above.
		Loose Quartz - very coarse, clear and milky, angular. Trace Pyrite Fossil Fragments - forams coral stems and other indeterminate fragments.
1005m-1010m	90%	Siltstone - argillaceous, as above.
	10%	Calcarenite - As above.
		Trace Pyrite, Trace Quartz.
		Loose Fossil Fragments mainly forams, common, some coral stems and shell debris. Some spotty yellow mineral fluorescence.
1010m-1015m	95%	Siltstone - argillaceous, calcareous, medium light grey brown, firm, approximately 40% clay. Trace carbonaceous fossil fragments, common, fine to very coarse forams, corals and shell debris, rare glauconite.
	5%	Calcarenite - As above.
		Loose Quartz - clear, angular, very coarse, loose fossil fragments, coarse to granular, mainly forams and coral stems.
1015m-1020m	95%	Siltstone - As above.
	5%	Calcarenite - As above.
		Loose Fossil Fragments - medium to very coarse, mainly forams. Some spotty yellow mineral fluorescence.
1020m-1025m	95%	Siltstone - calcareous, argillaceous, medium light grey brown, firm, approximately 40% clay. Trace carbonaceous material. Fossil fragments common, fine to medium grained, mostly forams corals and indeterminate debris.
	5%	Calcarenite - fossiliferous, white to light grey, speckled with carbonaceous and glauconite grains, mainly fine with calcareous cement.
		Trace Pyrite.
1025m-1030m	100%	Siltstone - calcareous, as above. Minor coarse to granule fossil fragments, mainly forams, trace pyrite. Large portion of sample coming up as fine clay and washing out of sieves.
1030m-1035m	100%	Siltstone - As above.
1035m-1040m	100%	Siltstone - calcareous, argillaceous, light grey brown, firm, fossil fragments, angular to granular, mainly forams, and corals, finer material indeterminate.
		Trace Pyrite. Large portion of clay being washed out of sieves.
1040m-1045m	70%	Siltstone - As above.
	30%	Limestone - white to cream, very fine grained, sparry in part. Trace carbonaceous flecks, hard, fossiliferous, mainly forams and indeterminate fragments. Loose forams common.

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LITHOLOGICAL DESCRIPTIONS

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DEPTH	%	DESCRIPTION
1040m-1045m		Continued/....
		Trace Pyrite. Spotty yellow mineral fluorescence.
1045m-1050m	85%	Siltstone - As above.
	15%	Limestone - As above.
1050m-1055m	100%	Siltstone - calcareous, argillaceous, medium light grey, firm, fossiliferous, fine to coarse, indeterminate grains, large portion of fine clay being washed out.
		Trace Limestone - As above. Glauconite common.
		Trace Pyrite.
1055m-1060m	100%	Siltstone - calcareous, argillaceous, medium to light grey, firm, fossliferous, fine to coarse, indeterminate grains, large clay portion being washed out of sieve.
		Trace Pyrite. Loose fossil fragments, coarse to very coarse, mainly forams and corals, spotty yellow mineral fluorescence.
1060m-1065m	60%	Siltstone - As above.
	40%	Limestone - white to cream, firm to hard, microcrystalline, trace carbonaceous flecks, glauconite common, fossiliferous, mainly forams, some coral stems and shell debris.
		Trace Pyrite.
1065m-1070m	90%	Limestone - white to cream, firm to hard, very fine grained, trace carbonate flecks, glauconite common, some fossil fragments, mainly shell debris, rare forams and corals.
	10%	Siltstone - As above.
1070m-1075m	90%	Limestone - As above.
	10%	Siltstone - calcareous, argillaceous, medium light grey, firm, fossiliferous, fine to coarse grains, mainly forams and shell debris.
1075m-1080m	30%	Limestone - As above.
	70%	Siltstone - Calcareous, argillaceous, medium light grey brown, firm, fossiliferous, fine to coarse indeterminate grains, large clay portion lost during washing, trace Pyrite, trace glauconite.
		Loose Fossil Fragments - mainly forams, spotty yellow mineral fluorescence.
1080m-1085m		Very poor sample almost entirely clay mud, large amount washed out in sieve.
	100%	Siltstone - As above.
		Trace Limestone - As above.

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LITHOLOGICAL DESCRIPTIONS

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DEPTH	%	DESCRIPTION
1085m-1090m		Sample, as above.
	100%	Siltstone - As above.
1090m-1095m	100%	Siltstone - medium light grey, firm, calcareous, argillaceous, trace pyrite, trace glauconite, fossiliferous, fine to granular grains of forams corals and shell debris. Large clay content lost during washing.
1095m-1100m		Poor sample almost entirely clay, probably 100% Marl - fragments medium to light grey, calcareous, trace carbonaceous flecks, loose fossil fragments, fine to granular, mainly forams and corals.
		Trace spotty yellow mineral fluorescence.
1100m-1105m	100%	Marl - clayey, calcareous, soft, fossiliferous, grains mainly forams and corals. Trace milky calcite grains.
105m-1110m	100%	Marl - calcareous, clayey, medium light grey green, soft to firm, fossil grains, fine to coarse, mainly forams and corals.
		Trace spotty yellow mineral fluorescence.
1110m-1115m	100%	Marl - As above. Rare quartz grains, coarse, rounded, clear.
1115m-1120m	100%	Marl - calcareous, clayey, medium light grey green, soft to firm, fossil grains, fine to granular, mainly forams and corals.
1120m-1125m	100%	Marl - As above.
1125m-1130m	100%	Marl - calcareous, clayey, medium light grey green, soft, fossil grains, fine to granular, mainly forams.
1130m-1135m	100%	Marl - As above.
		Trace Glauconite, carbonaceous flecks and pyrite. Some spotty yellow mineral fluorescence.
1135m-1140m	60%	Marl - As above.
	40%	Calcareous Mudstone - clay to silty, medium light grey brown, firm fossil grains, fine to granular, mainly forams and coral. 30% clay content. Spotty yellow mineral fluorescence.
1140m-1145m	90%	Marl - very fine grained, calcareous, light grey to medium light grey green, soft fossil grains, fine to granular, mainly forams.
	10%	Calcareous Mudstone - As above.
1145m-1150m	80%	Marl - very fine grained, calcareous, very light grey to medium light grey green, soft, trace glauconite, trace carbonaceous flecks. Fossil grains, fine to granular, mainly forams and corals.
	20%	Calcareous Mudstone - As above.
1150m-1155m	60%	Calcareous Mudstone - light grey green to light grey brown, firm, very fine grain.
	40%	Marl - As above.

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LITHOLOGICAL DESCRIPTIONS

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DEPTH	%	DESCRIPTION
1150m-1155m		Continued/.... Loose fossil fragments, medium coarse to granular, mainly forams. Traces of Glauconite, pyrite and carbonaceous flecks.
1155m-1160m	60%	Calcareous Mudstone - As above.
	40%	Marl - As above. Some spotty yellow mineral fluorescence.
1160m-1170m	80%	Calcareous Mudstone - light grey green to light grey brown, firm, very fine grain.
	20%	Marl - light grey, soft, calcareous, loose fossil fragments, mainly forams, corals and shell debris. Trace glauconite. Some spotty yellow mineral fluorescence. Sample quality poor as coarse sieve has been lost.
1170m-1180m	100%	Calcareous Mudstone - light green to medium light grey, light brown, clay to silty grain, trace glauconite, trace carbonaceous grains, trace pyrite, fossil fragments mainly forams. Some corals shell debris and bryozoa. Spotty yellow mineral fluorescence.
1180m-1185m	100%	Calcareous Mudstone - As above.
1185m-1190m	100%	Calcareous Mudstone - As above.
1190m-1195m	100%	Calcareous Mudstone - light green to medium light grey and light brown. Clay to silty grain, firm, trace glauconite, trace carbonaceous grains, fossil fragments mainly forams and corals. Approximately 25-35% clay content.
1195m-1200m	100%	Calcareous Mudstone - As above, trace pyrites.
1200m-1205m	100%	Calcareous Mudstone - As above.
1205m-1210m	100%	Calcareous Mudstone - medium to light grey to light grey green, clay to silty grain, firm, trace glauconite, trace carbonaceous flecks, approximate clay content 25-30%. Fossil fragments - mainly forams and coral.
1210m-1215m	100%	Calcareous Mudstone - As above.
1215m-1220m	100%	Calcareous Mudstone - medium to light grey to light green, clayey to silty grain, firm, trace glauconite, trace carbonaceous grains, fossiliferous with mainly forams and coral stems. 40% clay content.
1220m-1225m	100%	Calcareous Mudstone - As above.
1225m-1230m	100%	Calcareous Mudstone - As above.
1230m-1235m	100%	Calcareous Mudstone - As above.
1235m-1240m	100%	Calcareous Mudstone - medium light grey, light green to grey brown, firm, clayey to silty grain, trace glauconite, trace carbonaceous flecks, trace pyrite, fossiliferous with mainly forams and coral stems, approximately 30% clay content.
1240m-1245m	100%	Calcareous Mudstone - as above fossil fragments include forams, coral stems, shell debris and bryozoa.

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SEAHORSE-1

LITHOLOGICAL DESCRIPTIONS

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DEPTH	%	DESCRIPTION
1245m-1250m	100%	Calcareous Mudstone - As above.
1250m-1255m	100%	Calcareous Mudstone - As above, minor traces of siltstone. Calcareous light grey brown, firm, very fine grained, angular to subrounded, moderately sorted, trace pyrite.
1255m-1260m	100%	Calcareous Mudstone - medium light grey to light green, light brown, firm, clay to silt grain, minor siltstone. Present trace glauconite, pyrite and carboniferous grains, abundant fossil fragments, mainly forams and coral stems.
1260m-1265m	100%	Calcareous Mudstone - As above. No Siltstone present.
1265m-1270m	100%	Calcareous Mudstone - medium light grey to light green, light brown, firm clay to silt, fine grained, trace glauconite and carboniferous grains, pyrite common, abundant fossil fragments mainly forams and coral stems. Trace spotty yellow mineral fluorescence.
1270m-1275m	100%	Calcareous Mudstone - As above.
1275m-1285m	100%	Calcareous Mudstone - As above. C.F.J. SWARBRICK 4.8.78
1295m-1300m	85%	Calcareous Mudtone - medium light grey to light grey green, firm, chloritic in part, silty, rare pyrite in fine burrow fillings, rare bronze mica flakes, commonly containing fossil fragments.
	10%	Calcareous Siltstone - medium grey to medium grey brown, firm, argillaceous, fossiliferous, trace pyrite.
	5%	Calcarenite - light grey to off white, very fine to fine grained, white calcareous cement, glauconitic to fine grained, bright green, angular.
		Trace Loose forams, mainly benthonic but rare globular forams. Marl - light grey, soft, fossiliferous, slightly silty. No shows, no effective porosity.
		NOTE: This sample was recovered during efforts to clear blocked flowline and may not be entirely representative.
1300m-1305m	85%	Calcareous Mudstone - As above.
	15%	Calcareous Siltstone - As above.
		Trace Loose fossils - forams, coral stems and bryozoa.
		NOTE: Same comment applies as to sample above.
1305m-1310m	70%	Calcareous Mudstone - medium light grey and medium grey brown, firm, slightly silty, fossil fragments common, carbonaceous flecks.
	30%	Calcareous Mudstone - light grey green, soft to firm, chloritic, rare glauconitic grains, rare pyritiferous burrow fillings.
		Trace Loose benthonic and planktonic forams. No shows, no effective porosity.
1310m-1315m	100%	Calcareous Mudstone
	60%	Medium light grey and medium grey brown, as above.

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DEPTH	%	DESCRIPTION
1310m-1315m		Continued/....
	40%	Light grey green, as above.
		Trace loose benthonic and rare planktonic forams. Rare coarse glauconite grains, rounded to subrounded. No shows, no effective porosity.
1315m-1320m	100%	Calcareous Mudstone - medium light grey, medium light grey brown, light grey green, firm, occasionally soft, trace carbonaceous specks, fossiliferous, trace pyrite.
		Trace loose forams, benthonic and globular. No shows, no effective porosity.
1320m-1325m	90%	Calcareous Mudstone - As above.
	10%	Marl - light grey to off-white, soft to very soft, contains medium sand sized fossil fragments, rare glauconite grains up to coarse sand size. No shows, no effective porosity.
1325m-1330m	85%	Calcareous Mudstone - As above.
	15%	Marl - As above.
		Trace benthonic forams, coarse to very coarse glauconite grains. No shows, no effective porosity.
1330m-1335m	80%	Calcareous Mudstone - medium to light grey, medium to light grey brown and light grey green, as above.
	20%	Marl - As above.
		Trace Calcareous Siltstone, benthonic forams.
1335m-1340m	80%	Calcareous Mudstone - As above.)
	20%	Marl - As above.) - POOR SAMPLE
		No shows, no effective porosity.
1340m-1345m	70%	Calcareous Mudstone - As above.
	30%	Marl - As above.
1345m-1350m	80%	Calcareous Mudstone - As above.
	20%	Marl - As above.
		No shows, no effective porosity.
1350m-1355m	50%	Calcareous Mudstone - As above.
	50%	Marl - light grey and off-white, strongly calcareous, soft to firm, sparingly fossiliferous, trace glauconite, trace carbonaceous specks.
		Trace - loose foram fragments.
		No shows, no effective porosity.

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DEPTH	%	DESCRIPTION
1355m-1360m	60%	Marl - As above, slightly chloritic in part, increase in amount of glauconite over previous samples.
	40%	Calcareous Mudstone - As above, silty in part. Containing scattered glauconite grains and rare carbonaceous flecks. No shows, no effective porosity.
1360m-1365m	50%	Marl - light grey to light green grey, soft, occasionally firm, glauconitic, chloritic in parts, strongly calcareous.
	50%	Calcareous Mudstone - medium light grey and medium light grey brown, silty in part, glauconitic, very fossiliferous in part.
		Trace - loose coarse to very coarse glauconite grains, rounded. Loose benthonic forams. No shows, no effective porosity.
1365m-1370m	40%	Marl - As above.
	55%	Calcareous Mudstone - As above.
	5%	Glauconite - as single grains, medium to very coarse, or as grain aggregates in firm calcareous cement.
		Trace -loose forams almost entirely benthonic. No shows, no effective porosity.
1370m-1372.5m	20%	Marl - As above.
	75%	Calcareous Mudstone - siltier and more glauconitic than above.
	5%	Glauconite - As above. No shows, no effective porosity.
1372.5m-1375m	15%	Marl - As above.
	80%	Calcareous Mudstone - silty as above, glauconitic.
	5%	Glauconite - as loose, medium to very coarse grains and as aggregates in a silty calcareous cement.
		Trace - benthonic forams. No shows, no effective porosity.
1375m-1378.5m		As above.
		Trace pyritised burrows, benthonic forams. No shows, no effective porosity.
1378.5m-1380m	30%	Marl - As above.
(poor sample)	70%	Calcareous Mudstone - medium light grey, medium light grey green, medium light grey brown, firm, silty in part, very fossiliferous in part, chloritic in part, commonly glauconitic.
		Trace (< 5%) loose glauconite grains. loose benthonic grains. No shows, no effective porosity.
1380m-1382.5m	20%	Marl - As above.
	75%	Calcareous Mudstone As above.
	5%	Glauconite - mainly as loose rounded grains, dark green, hard,

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DEPTH	%	DESCRIPTION
1380m-1382.5m	5%	Continued/....
		brittle.
		Trace Pyrite, loose benthonic forams. No shows (very spotty dull mineral fluorescence, no cut), no effective porosity.
1382.5m-1385m	10%	Marl - As above.
	85%	Calcareous Mudstone - medium light grey, medium light grey green, medium light grey brown, firm, silty in part, very fossiliferous, and very glauconitic in part, slightly chloritic in part, commonly silty.
	5%	Glauconite - As above.
		Trace - loose forams, benthonic. No shows (very spotty dull mineral fluorescence, no cut) no effective porosity.
1385m-1387.5m	5%	Marl - As above.
	90%	Calcareous Mudstone - As above.
	5%	Glauconite
		Trace loose forams and coral stems.
1387.5m-1390m	5%	Marl - As above.
	90%	Calcareous Mudstone - As above.
	5%	Glauconite
		Trace loose forams, pyrite.
[illegible]390m-1392.5m	90%	Calcareous Mudstone - As above.
	5%	Marl - As above.
	5%	Glauconite - As above.
		Trace Calcareous Siltstone (cavings), Pyrite and loose benthonic forams. No shows, no effective porosity.
1392.5m-1395m (poor sample)	90%	Calcareous Mudstone - As above.
	10%	Glauconite - significant increases over previous samples.
		Trace loose benthonic forams. Trave very spotty dull mineral fluorescence, no cut. No effective porosity.
1395m-1400m	90%	Calcareous Mudstone - As above.
	5%	Glauconite
	5%	Siltstone - light to medium brown, speckled with glauconite grains of fine to medium grain size, glauconite is subrounded, occasionally subangular. Silt is moderately calcareous, firm, contains calcareous grains, very fine to fine size - possibly

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DEPTH	%	DESCRIPTION
1395m-1400m	5%	Continued/....
		fossil fragments.
		Two quartz grains - one very coarse, one coarse, rounded, no fluorescence, no effective porosity.
1400m-1402.5m (Sample circulated up from 1402.8m)	50%	Calcareous Mudstone - As above.
	45%	Siltstone - glauconitic, as above.
	5%	Glauconite - loose.
		10-12% quartz grains, very coarse to medium, rounded, clear, with inclusions. No fluorescence, little or no effective porosity.
		Trace Pyrite.
		Interpretation: This is Top of Gurnard Formation.
1402.5m-1405m	60%	Calcareous Mudstone - As above.
	20%	Siltstone - glauconitic, some heavily iron stained and iron cemented, brown with dark green, glauconitic specks and occasional very fine to fine quartz grains.
	10%	Coal - black, brittle, heavily coated with pyrite, subconchoidal fracture.
	10%	Quartz - colourless, some milky, granule to medium size, rounded to subrounded.
		Trace - loose forams and Pyrite.
1405m-1410m	50%	Calcareous Mudstone - medium light grey to medium light grey green, firm, subfissile, silty in part, chloritic in part.
	10%	Siltstone - brown, glauconite, iron stained.
	35%	Quartz Sand - clear, some milky, loose, granule - medium size, rounded to subrounded. Some grains with pyrite coatings.
	5%	Coal - As above. No fluorescence.
		50 units HW; effective porosity probably 10%.
1410m-1412m	50%	Calcareous Mudstone - As above (? cavings).
	40%	Quartz Sand - As above.
	5%	Siltstone - As above.
	5%	Coal - As above.
		No fluorescence.
		71 units HW; 14560 C_1, 1012 C_2, 616 C_3, 151 C_4, 17 C_5+ effective porosity probably 10%.

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SEAHORSE-1 C.F.J. SWARBRICK

LITHOLOGICAL DESCRIPTIONS 5.8.78

DEPTH	%	DESCRIPTION
		11.32 circulating, prior to pulling out of hole to run core barrel.
		9.8.78
		Reaming 8½" hole to 12¼". Trip Gas: 12 units HW. C_1 C_2 C_3 C_4 3712 1408 77 Tr
1480m-1485m	30%	Coal - black bituminous, blocky. Dull and bright.
	30%	Quartz - subangular to subrounded, fine to granular, milky, loose grains.
	40%	Siltstone - medium brown to light green, approximately 50% calcareous, carbonaceous in part, trace glauconite.
1485m-1490m	30%	Coal - black bituminous. Dull and bright.
	30%	Quartz - subangular to subrounded, fine to granular, milky to clear, loose grains.
	40%	Siltstone - As above. Pin point bright fluorescence.
1490m-1495m	15%	Coal - black, bituminous, blocky, dull and bright.
	40%	Loose - fine to granular Quartz, clear to milky, subangular to subrounded.
	45%	Siltstone - 30% light green to light brown, calcareous silty clay firm. 70% dark brown to dark grey, non-calcareous, silty to clay, firm, carbonaceous. Some bright yellow fluorescence giving a milky cut.
1495m-1500m	10%	Loose - fine to granular Quartz, as above.
	20%	Coal - black, as above.
	70%	Siltstone - chocolate brown to very dark brown, carbonaceous, firm, micaceous, trace pyrite, some bright yellow fluorescence giving strong milky cut.
1500m-1505m	10%	Quartz - As above.
	20%	Coal - As above.
	70%	Siltstone - As above. No fluorescence.
1505m-1510m	5%	Quartz - As above.
	15%	Coal - As above.
	80%	Siltstone - As above. No fluorescence.
		J.D. ALDER 14/8/78
1510m-1515m	15%	Loose Quartz - fine to granular, clear to milky, angular to subrounded.
	50%	Siltstone - light green, calcareous, trace glauconite, trace

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DEPTH	%	DESCRIPTION
1510m -1515m	50%	Continued/.... carbonaceous flecks.
	10%	Coal - black bituminous bright.
	25%	Siltstone - light to medium brown, non-calcareous, quartzose in part, trace carbonaceous matter. Some fine sand bands. Trace loose pyrite,fine grained.
1515m-1517.5m	95%	Loose Quartz - fine to granular, clear to milky, angular to subrounded, well sorted.
	5%	Siltstone - As above. Spotty yellow fluorescence,due to pipe dope after trip. Trace Coal.
[illegible]517.5m-1520m	95%	Loose Quartz - fine to granular, clear to milky, angular to subrounded, well sorted.
	5%	Siltstone - As above.
1520m-1525m	50%	Loose Quartz - As above.
	25%	Coal - black, bituminous, bright.
	25%	Siltstone - dark brown, non-calcareous, micaceous. Trace Pyrite, no fluorescence.
1525m-1530m	25%	Loose Quartz - As above.
	25%	Coal - black, bituminous, bright.
	40%	Siltstone - dark brown.
	10%	Siltstone - As above, light green, calcareous, trace glauconite trace carbonaceous flecks. Spotty yellow mineral fluorescence (calcite).
1530m-1535m	80%	Loose Quartz - granules, fine to granular, angular to subrounded, well sorted, clear to white, some calcite cemented aggregates.
	10%	Siltstone - dark brown, hard, micaceous, trace carbonaceous.
	5%	Coal - black, bituminous, bright.
	5%	Siltstone - light green, calcareous, firm, trace glauconite, trace pyrite,abundant dull yellow mineral fluorescence, no cut.
1535m-1540m	70%	Loose Quartz - As above.
	20%	Siltstone - dark brown, as above.
	5%	Coal
	5%	Siltstone - light green, as above. ABundant dull yellow mineral fluorescence.
1540m-1545m	15%	Loose Quartz - As above.
	40%	Coal

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SEAHORSE-1 J.D. ALDER

LITHOLOGICAL DESCRIPTIONS 14.8.78

DEPTH	%	DESCRIPTION
1540m-1545m	40%	Siltstone - dark brown, as above.
	5%	Siltstone - light green, as above. Abundant dull yellow mineral fluorescence.
1545m-1550m	90%	Loose Quartz Grains - fine to granular, angular to subrounded, moderate to well sorted, clear to milky. Some aggregates cemented with calcite (?).
	5%	Coal
	5%	Siltstone - dark brown, hard, trace carbonaceous.
		Trace Pyrite. Trace Siltstone - light green, calcareous, patchy dull yellow mineral fluorescence.
[illegible]550m-1555m	90%	Loose Quartz - As above.
	4%	Coal
	5%	Siltstone - dark brown, hard, carbonaceous, trace pyrite.
	1%	Siltstone - light green to light brown, calcareous, trace glauconite. Trace Pyrite. Patchy dull yellow mineral fluorescence.
1555m-1560m	55%	Loose Quartz - As above.
	8%	Coal
	2%	Siltstone - dark brown, as above.
	35%	Siltstone - light green to light brown, as above.
		Trace dull yellow mineral fluorescence.
1560m-1565m	95%	Loose Quartz Grains - fine to granular, subangular to subrounded, moderately sorted, clear to milky grains.
	5%	Siltstone - As above, both light green to brown and dark brown and Coal. Trace Pyrite.
1565m-1570m	95%	Quartz Grains - clear, minor milky, coarse grained to granule, predominantly very coarse grained to granule, moderately sorted, subangular to rounded.
	5%	Siltstone - dark grey to black, coal.
		Trace Pyrite.
1570m-1575m	90%	Quartz - As above.
	10%	Siltstone - both dark brown and light green, as above.
		Trace Pyrite.
1575m-1580m	70%	Quartz - As above.
	25%	Siltstone - light green to light brown, calcareous, trace glauconite, trace carbonaceous flecks.

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SEAHORSE-1 J.D. ALDER

LITHOLOGICAL DESCRIPTIONS 15.8.78

DEPTH	%	DESCRIPTION
1575m-1580m		Continued/....
	5%	Coal and Siltstone - dark brown to black. Pyrite common.
1580m-1585m	80%	Quartz - As above.
	15%	Siltstone - light green to light brown, as above.
	5%	Coal and Siltstone - dark brown to black. Pyrite common.
1585m-1595m	100%	Quartz - loose grains, fine to granular, predominantly very coarse to granular, subangular to rounded, moderately sorted, clear to milky. Trace of Coal and Siltstone. Pyrite common.
1595m-1600m	95%	Quartz - loose grains, as above.
	5%	Coal and Siltstone - dark brown to black, hard. Trace Pyrite.
1600m-1605m	30%	Loose Quartz Grains - As above.
	30%	Coal - black, bituminous, bright.
	40%	Siltstone - dark brown to black, hard, clayey to silty, pyrite common, carbonaceous.
1605m-1610m	70%	Loose Quartz Grains - fine to granular predominantly very coarse to granular up to 4mm long, subangular to subrounded, moderately sorted, clear to milky,
	20%	Siltstone - light green to light brown, calcareous.
	10%	Coal and Siltstone - dark brown to black, as above.
1610m-1615m	50%	Loose Quartz Grains - As above.
	50%	Coal - bright, bituminous, and siltstone -dark brown to black, hard, clay to silt, pyrite common, carbonaceous.
		R.C.N. THORNTON
1615m-1620m	80%	Coal - black, bituminous, shiny, conchoidal fractures, trace pyrite.
	20%	Quartz - grains, clear to milky, mostly frosted, subangular to subrounded, very coarse grained to granule, trace white clay matrix.
	<1%	Sandstone - light green, hard, calcareous cement, yellow mineral fluorescence, quartz, very fine grained.
		Trace Pyrite aggregates.
1620m-1625m	90%	Quartz Grains - As above.
	7%	Coal - As above.
	3%	Sandstone - light brown, hard, quartz, fine to medium grained, poorly sorted, angular to subrounded, clear polished grains, clear calcite cement, very strong bright yellow mineral fluorescence.
		Trace Pyrite, including pyrite cemented quartz sandstone.
1625m-1630m	90%	Quartz Grains - As above.
	10%	Coal - As above.

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DEPTH	%	DESCRIPTION
1625m-1630m		Continued/....
	<1%	Sandstone - As above.
		Trace Pyrite as above.
1630m-1635m	95%	Quartz Grains - As above.
	5%	Coal - As above.
		Trace Sandstone - As above, pyrite as above.
1635m-1640m	100%	Quartz Grains - As above.
		Trace Pyrite.
[illegible]640m-1645m	100%	Quartz Grains - As above.
		Trace-1% Pyrite.
1645m-1650m	100%	Quartz Grains - As above.
		Trace-1% Pyrite
1650m-1655m	95%	Quartz Grains - clear to milky, polished to frosted, very coarse grained to granule, subangular to subrounded, well sorted, trace white clay matrix.
	5%	Pyrite - encrusted on about half of the quartz grains.
1655m-1660m	99%	Quartz Grains - As above.
	1%	Pyrite - As above.
1660m-1665m	60%	Quartz Grains - As above.
	40%	Coal - black, in part pyritic.
		Trace Pyrite as above.
1665m-1670m	70%	Quartz Grains - As above.
	30%	Coal - As above.
		Trace Pyrite as above.
1670m-1675m	70%	Quartz Grains - As above.
	20%	Coal - As above.
	10%	(Cavings?) Mudstone - light green to grey, firm, very calcareous, ?forams.
		Trace Pyrite as above. Sandstone - light green to brown, hard, fine grained quartz, angular to subrounded, moderately sorted, clear to buff, calcareous cement, gold mineral fluorescence.
1675m-1680m	90%	Quartz Grains - As above.
	10%	Coal - As above.

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SEAHORSE-1 R.C.N. THORNTON

LITHOLOGICAL DESCRIPTIONS 15.8.78

DEPTH	%	DESCRIPTION
1675m-1680m		Continued/....
		Trace Pyrite, as above, Sandstone - as above, large white mica flakes.
1680m-1685m	100%	Quartz Grains - As above.
		Trace Coal - as above, Pyite, as above.
1685m-1690m	100%	Quartz Grains - As above.
		Trace Coal - as above, Pyrite as above.
1690m-1695m	70%	Quartz Grains - As above.
	30%	Coal - As above.
		Trace Pyrite - as above.
1695m-1700m	95%	Quartz Grains - As above.
	5%	Coal - As above.
		Trace Pyrite, as above, green, very hard, crystalline mineral, non-effervescing in cold HCl.
1700m-1705m	95%	Quartz Grains - As above.
	5%	Coal - As above.
		Trace Pyrite, as above. Clay, white soft to firm
1705m-1710m	95%	Quartz Grains - clear to milky, coarse grained to granule, mostly very coarse grained, frosted to polished, subangular to rounded, trace soft white clay matrix, pyrite encrusted.
	5%	Coal - black, pyritic.
		Trace Pyrite aggregates; Sandstone, clear to white, very hard, quartz in calcareous matrix, gold fluorescence.
1710m-1715m	95%	Quartz Grains - As above.
	5%	Coal - As above.
		Trace Pyrite as above; Sandstone - As above.
1715m-1720m	95%	Quartz Grains - as above, except well sorted, dominantly coarse grained and milky.
	5%	Coal - As above.
		Trace Pyrite, as above, large mica flake.
1720m-1725m	95%	Quartz Grains - As above, except coarse grained to granule.
	5%	Coal - As above.
		Trace Pyrite, mica.
		15.16 hours, pulled bit at depth 1737.6m. Circulating bottoms up.

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SEAHORSE-1 R.C.N. THORNTON

LITHOLOGICAL DESCRIPTIONS 15.8.78

DEPTH	%	DESCRIPTION
1725m-1730m	95%	Quartz Grains - As above.
	5%	Coal - As above.
		Trace Pyrite, Sandstone - as above.
1730m-1735m	95%	Quartz Grains - clear to milky, frosted to polished, subangular to rounded, coarse grained to granule, mainly very coarse grained, trace soft white clay matrix, pyrite encrusted.
	5%	Coal - black, bituminous, pyritic.
		Trace Pyrite aggregates, in part as cement to Sandstone, Siltstone dark brown, moderately hard, shale-very dark brown, moderately hard sandstone - light grey to brown, fine grained, hard, clear to white calcareous clay matrix, white mica.
1735m-1737.6m	95%	Quartz Grains - As above.
	5%	Coal - As above.
		Trace Pyrite - As above; Siltstone - As above; Sandstone - As above.
		TRIPPED FOR NEW BIT.
		J.D. ALDER 16.8.78
1737.6m-1740m	95%	Quartz Grains - As above.
	5%	Coal - As above.
		Trace Pyrite, Siltstone and Sandstone, as above.
1740m-1745m	90%	Quartz Grains - loose,clear to milky, frosted to polished, subangular to subrounded, moderately sorted, fine grained, mainly coarse grained, trace soft white clay matrix, pyrite encrusted.
	5%	Coal - black, bituminous, some resinous streaks.
	5%	Pyrite Aggregates in part as cement to Sandstone; Siltstone - dark brown, moderately hard; Shale - very dark brown, hard, light brown, light green, firm, calcareous. Sandstone - very fine to fine, light grey brown, light grey, hard, clay matrix,calcareous cement in part. Micaceous in part. Dull yellow mineral fluorescence. Bright white. Pipe dope fluorescence, no cut.
1745m-1750m	100%	Quartz Grains - As above. Pyrite common both as aggregates and coatings on quartz grains.
		Trace Coal and Siltstone as above.
		C.F.J. SWARBRICK 16.8.78
1750m-1755m		Not caught. New sample catcher.
1755m-1760m	95%	Quartz Sand - loose, colourless, occasionally milky, very coarse to medium, some grains showing rounding majority, subangular, poorly sorted, occasionally pyrite coatings and grain aggregates

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DEPTH	%	DESCRIPTION
1755m-1760m		Continued/....
		cemented by Pyrite, trace siliceous cement. Very porous.
	5%	Coal - black, bituminous, some grading to carbonaceous Mudstone.
		Trace Siltstone - brown, carbonaceous, loose Pyrite. No fluorescence.
1760m-1765m	90%	Quartz Sand - As above, very porous.
	10%	Coal - black.
		Trace Siltstone - As above, micaceous,loose pyrite. No fluorescence.
1765m-1770m	95%	Quartz Sand - As above, but higher proportion of coarse and very coarse grains indicating possible coarsening downward sequence. Very porous.
	5%	Coal - As above.
		Trace Siltstone - brown, as above. Loose Pyrite, no fluorescence.
1770m-1775m	95%	Quartz Sand - As above, pyrite coatings and pyrite cemented grain aggregates.
	5%	Coal - As above.
		Trace Pyrite.
		Very minor amount of Siltstone, brown,as above, no fluorescence.
		Circulated up drilling break at 1778.8m.
CIRCULATED SAMPLE 1775m-1777.6m	100%	Quartz Sand - As above, majority of grains are now milky (60%).
		Trace Pyrite, Coal, Siltstone. New lithology (trace proportions) is Siltstone, Quartzose, light grey to brown, soft to firm, white clay matrix, pyritic in part. Probably accounts for some of slow drilling above this break. No fluorescence.
1777.6m-1780m	70%	Coal - Black, bituminous.
	25%	Quartz Sand - As above. Trace white clay matrix.
	5%	Mudstone - dark brown, firm, carbonaceous.
		Trace Pyrite, Siltstone (as above). No fluorescence
CIRCULATED SAMPLE 1780m-1784m	80%	Coal - As above.
	15%	Quartz Sand - clear and milky.
	5%	Mudstone - As above, associated with coal.
		Trace as above. No fluorescence. 2 units gas hot wire.
1784m-1785m	70%	Quartz Sand - clear and milky, some frosted, very coarse to medium, moderate sorting, mainly subangular grains, with very coars grains show some rounding.

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SEAHORSE-1 C.F.J. SWARBRICK

LITHOLOGICAL DESCRIPTIONS 16.8.78

DEPTH	%	DESCRIPTION
1784m-1785m		Continued/....
		Trace white clay cement.
	20%	Coal - As above.
	10%	Mudstone - brown, as above.
		Trace Pyrite, no fluorescence.
1785m-1790m	100%	Quartz Sand - clear and milky, occasionally frosted grains, coarse to medium, well sorted, some subangular, but most subrounded grains, trace siliceous cement. Very porous.
		Trace Coal and Pyrite. No fluorescence.
790m-1795m	100%	Quartz Sand - As above.
		Trace Coal, Pyrite and Siltstone. No fluorescence.
1795m-1800m	95%	Quartz Sand - As above.
	5%	Coal - black, bituminous, dull lustre.
		Trace pyrite. No fluorescence.
		3 units HW 1801m C_1 1150, C_2 166, C_3 127.
1800m-1805m		7 units HW 1805m C_1 1532, C_2 161, C_3 158.
	60%	Quartz Sand - As above, pyritiferous aggregates.
	20%	Coal - As above.
	20%	Mudstone - tan, firm, micro-micaceous in part, finely carbonaceous. Trace pin point spotty pale yellow fluorescence on smaller sand grains. Slow crush cut.
		Also trace dull yellow fluorescence, no cut from calcareous fine grained Sandstone.
1085m-1810m	50%	Coal - As above.
	25%	Quartz Sand - As above.
	20%	Siltstone - light brown to tan, firm, micaceous, carbonaceous, pyritic in part.
	5%	Sandstone - light grey, very fine, quartzose, well sorted, well rounded grains, hard, slightly calcareous cement. No porosity
		Trace Pyrite.
		J.D. ALDER 16.8.78
1810m-1815m	5%	Coal - black, bituminous.
	10%	Siltstone - light brown to tan, firm, micaceous, carbonaceous, pyritic in part, trace Sandstone, very fine quartzose, well sorted,

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DEPTH	%	DESCRIPTION
1810m-1815m	10%	Continued/....
		subrounded grains, hard, slightly calcareous.
	85%	Quartz Sand - clear to milky, some with frosted surfaces, fine to coarse, subangular to subrounded, well sorted.
		Trace Pyrite.
1815m-1820m	95%	Quartz Sand - fine to coarse, as above.
	5%	Siltstone - As above.
		Trace Coal, Trace Pyrite.
1820m-1825m	95%	Quartz Grains - clear, polished, dominantly coarse grained and well sorted, subangular to rounded, pyrite encrusted, trace soft white clay matrix.
	5%	Siltstone - As above.
		Trace Coal, as above, pyrite.
1825m-1830m	95%	Quartz Grains - clear to milky, medium to granular, as above.
	5%	Siltstone/Sandstone - As above.
1830m-1835m	100%	Quartz Grains - clear to milky, polished, predominantly but occasionally frosted, medium to granular, predominantly granular. Angular to subrounded, well sorted, trace pyrite encrusting Quartz grains and in aggregates.
		Trace Coal and Siltstone - As above.
1835m-1840m	95%	Quartz Grains - As above.
	5%	Coal and Siltstone - light brown and light grey, firm.
		Trace Pyrite.
1840m-1845m	100%	Quartz Grains - As above.
		Trace Coal and Siltstone - As above.
1845m-1850m	80%	Quartz Grains - medium to coarse grains, as above.
	10%	Coal - black, bituminous.
	10%	Siltstone - brown to light grey, firm, micro-micaceous, carbonaceous, trace pyrite. Sandstone in part, very fine grained quartzose, white to light grey.
		Trace Pyrite.
1850m-1855m	10%	Coal - black, bituminous.
	20%	Quartz Grains - medium to granule, clear to milky, angular to subrounded, well sorted.
	70%	Siltstone - brown to light grey. Quartzose, firm, carbonaceous. Trace mica, trace pyrite. Sandstone in part very fine grained.

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SEAHORSE-1 J.D. ALDER

LITHOLOGICAL DESCRIPTIONS 16.8.78

DEPTH	%	DESCRIPTION
1855m-1860m	100%	Quartz Grains - As above.
		Trace Coal, trace Siltstone - as above.
1860m-1865m	95%	Quartz - As above.
	5%	Coal, Siltstone - As above.
		Trace Pyrite.
BOTTOMS UP	95%	Quartz Grains - clear to milky, mostly polished occasionally frosted, subangular to subrounded, moderately sorted, fine to granular. Trace Pyrite encrusting on grains.
	5%	Siltstone - light brown to light grey, firm, trace mica, carbonaceous, pyritic in part.
		Trace Pyrite.
		R.C.N. THORNTON 19.8.78
1865m-1870m	50%	Quartz Grains - clear, milky, loose, polished to frosted, subangular to rounded, very poorly sorted, medium grained to granule, in part pyrite encrusted.
	40%	Coal - black, hard in part, pyritic.
	10%	Siltstone - brown to dark brown, firm, carbonaceous, pyritic, abundant cavings.
1870m-1875m	50%	Quartz Grains - As above, except mostly well sorted, coarse grained.
	40%	Coal - As above.
	10%	Siltstone - As above.
1875m-1880m	40%	Quartz Grains - loose, clear to milky, polished to frosted, subangular to rounded, medium grained to granule, but dominantly well sorted, corase grained, in part pyrite encrusted.
	20%	Coal - black,hard in part, pyritic.
	20%	Siltstone - brown to dark brown, firm, quartz, dirty, pyrite, grading to
	20%	Siltstone - light grey, firm, quartz, clean.
1880m-1885m	70%	Quartz Grains - As above.
	20%	Siltstone - brown to dark brown, as above.
	10%	Siltstone - light grey, as above.
		Trace Coal.
1885m-1890m	70%	Quartz Grains - As above.
	10%	Siltstone - brown to dark brown, as above.

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DEPTH	%	DESCRIPTION
1885m-1890m		Continued/.....
	10%	Siltstone - light grey, as above, except trace cuttings with very strong, bright yellow fluorescence, immediate cut, with white fluorescence, heavy golden residue.
	10%	Coal - As above.
1890m-1895m	70%	Quartz Grains - As above.
	30%	Siltstone - As above, mainly dark brown, dirty, trace of spotty dull yellow fluorescence, with slow slight white cut.
		Trace Coal - as above; Sandstone - clear, quartz, very poorly sorted, fine to coarse grained, angular to subrounded, set in clear cement, with indication of dull yellow mineral fluorescence, pyrite aggregates.
1895m-1900m	80%	Quartz Grains - As above.
	10%	Coal - As above.
	10%	Siltstone - As above.
		Trace Sandstone - As above, pyrite, mica.
1900m-1905m	80%	Quartz Grains - As above.
	10%	Siltstone - As above.
	10%	Coal - As above.
		Trace Sandstone - As above, mica, pyrite; Claystone - pink, light grey, soft, carbonaceous, spotty dull yellow white mineral fluorescence.
1905m-1910m	80%	Quartz Grains - As above.
	15%	Siltstone - As above.
	5%	Coal - As above.
		Trace Sandstone - mica, pyrite, Claystone.
1910m-1915m	80%	Quartz Grains - As above.
	10%	Siltstone - As above.
	10%	Coal - As above.
		Trace Sandstone, Claystone, mica, pyrite.
1915m-1920m	90%	Quartz Grains - As above.
	10%	Siltstone - As above.
		Trace Sandstone, Claystone, coal, pyrite, mica.
1920m-1925m	90%	Quartz Grains As above.
	10%	Siltstone - As above.

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DEPTH	%	DESCRIPTION
1920m-1925m		Continued/....
		Trace Sandstone, Claystone, some white, coal, pyrite, mica.
1925m-1930m	80%	Quartz Grains - As above.
	20%	Siltstone - As above, especially brown, dirty, carbonaceous in part, forming a matrix for coarse grained, subangular to subrounded, quartz grains.
		Trace Sandstone, white Claystone, coal, pyrite.
1930m-1935m	100%	Quartz Grains - clear to milky, polished to frosted, loose, angular to subrounded, medium grained to granule, mostly well sorted, coarse grained and rounded, trace pyrite encrusted grains trace very soft white clay matrix.
		Trace Siltstone, dark brown, coal, black, pyrite.
1935m-1940m	100%	Quartz Grains - As above.
		Trace Siltstone, light grey, coal, pyrite.
1940m-1945m	80%	Quartz Grains - As above.
	15%	Siltstone - brown to dark grey, soft to firm, very carbonaceous, mainly in thin streaks, micromicaceous, pyritic.
	5%	Coal - black, hard in part, pyritic.
		Trace Pyrite aggregates, trace bright yellow fluorescence in impermeable ? oil stained, brown siltstone, very slow pale yellow cut, pale yellow residue.
1945m-1950m	70%	Quartz Grains - As above, except not so well sorted, more granule sized.
	20%	Siltstone - As above.
	10%	Coal - As above.
		Trace Pyrite, trace yellow fluorescence.
1950m-1955m	70%	Quartz Grains - mainly well sorted, coarse grained, very soft white clay matrix.
	20%	Siltstone - As above.
	10%	Coal - As above, grading to carbonaceous shale, brown to black, firm to hard.
		Trace Pyrite.
1955m-1960m	70%	Quartz Grains - As above.
	20%	Coal/Shale - As above.
	10%	Siltstone - As above.
		Trace Pyrite.

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SEAHORSE-1 R.C.N. THORNTON

LITHOLOGICAL DESCRIPTIONS 20.8.78

DEPTH	%	DESCRIPTION
1960m-1965m	90%	Quartz Grains - As above, mainly well sorted, coarse grained, subrounded to rounded, clear, polished, rare trace white clay matrix.
	5%	Siltstone - As above.
	5%	Coal/Shale - As above.
1965m-1970m	100%	Quartz Grains - As above.
		Trace Siltstone, as above, coal, pyrite.
1970m-1975m	80%	Quartz Grains - As above.
	10%	Siltstone - As above.
	10%	Claystone - light grey to brown, soft to firm, slightly carbonaceous, silty in part.
		Trace Pyrite, coal.
1975m-1980m	70%	Quartz Grains - As above.
	20%	Claystone - As above.
	10%	Siltstone - As above.
		Trace Pyrite, coal.
1980m-1985m	30%	Siltstone - light grey to light brown to dark brown, soft to firm quartz, plus varying amounts of carbonaceous material, pyrite, mica.
	30%	Claystone - white light grey to light brown, soft to firm, slightly silty in part, containing varying amounts of carbonaceous laminae, mica.
	30%	Quartz Grains - As above.
	10%	Coal - black, hard, pyritic in part.
		Trace Pyrite.
1985m-1990m	40%	Coal - As above.
	30%	Siltstone - As above.
	20%	Quartz Grains - As above.
	10%	Claystone - As above.
1990m-1995m	80%	Quartz Grains - As above, mainly coarse grained, subrounded to rounded.
	10%	Siltstone - As above.
	5%	Claystone - As above.
	5%	Coal - As above.
		Trace Pyrite.

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SEAHORSE-1 R.C.N. THORNTON

LITHOLOGICAL DESCRIPTIONS 20.8.78

DEPTH	%	DESCRIPTION
1995m-2000m	80%	Quartz Grains - As above.
	10%	Coal - As above.
	5%	Siltstone - As above.
	5%	Claystone - As above.
		Trace Pyrite.
2000m-2005m	90%	Quartz Grains - clear, loose, polished, subangular to rounded, mainly coarse grained, minor milky, subangular, granules, trace pyrite encrusted, trace soft white clay matrix.
	10%	Siltstone - claystone, coal, pyrite, as above.
2005m-2010m	95%	Quartz Grains - As above.
	5%	Siltstone, Claystone, Coal, Pyrite, as above.
2010m-2015m	95%	Quartz Grains - As above.
	5%	Siltstone, Claystone, Coal, Pyrite, as above.
2015m-2020m	95%	Quartz Grains - As above.
	5%	Siltstone, Claystone, Coal, Pyrite, as above.
2020m-2025m	60%	Coal - As above.
	20%	Quartz Grains - As above.
	20%	Siltstone, Claystone, Pyrite, as above.
2025m-2030m	95%	Quartz Grains - As above.
	5%	Siltstone, Claystone, Coal, Pyrite, as above.
2030m-2035m	95%	Quartz Grains - As above.
	5%	Siltstone, Claystone, Coal, Pyrite, as above.
		Trace dull yellow fluorescence in mud (?).
2035m-2040m	70%	Quartz Grains - As above.
	20%	Siltstone, Claystone, Pyrite, as above.
	10%	Coal - As above.
2040m-2045m	95%	Quartz Grains - As above.
	5%	Siltstone, Claystone, Coal, Pyrite, as above.
2045m-2050m	95%	Quartz Grains - As above.
	5%	Siltstone, Claystone, Coal, Pyrite, as above.
2050m-2055m	95%	Quartz Grains - As above.
	5%	Siltstone, Claystone, Coal, Pyrite, as above.

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SEAHORSE-1 R.C.N. THORNTON

LITHOLOGICAL DESCRIPTIONS 20.8.78

DEPTH	%	DESCRIPTION
2055m-2060m	95%	Quartz Grains - As above.
	15%	Siltstone, Claystone, Pyrite, mica, as above.
2060m-2065m	100%	Quartz Grains - As above.
		Trace Siltstone, Claystone, Pyrite, Coal, as above.
2065m-2071m	100%	Quartz Grains - As above, except that 10-20% are pyrite encrusted, and pyrite cemented aggregates are common.
		Trace Siltstone, Claystone, Pyrite, Coal, as above.
2071m-2075m	100%	Quartz Grains - As above, except very poorly sorted, medium grained to granule.
		Trace Siltstone, Claystone, Pyrite, Coal, as above.
2075m-2080m	60%	Quartz Grains - clear, minor milky, loose, polished, minor frosted, poorly sorted, coarse grained to granule, subangular to rounded, pyrite encrusted grains common, trace very soft white clay.
	20%	Claystone - white to light grey to green grey to brown to dark brown, soft to firm, slight to very carbonaceous, slightly pyritic.
	15%	Siltstone - very fine grained Sandstone, white to light brown to dark brown, soft to firm, slight to very carbonaceous, slight to very pyritic, white clay matrix.
		Trace Coal, black, hard, pyritic in part.
2080m-2085m	50%	Siltstone - As above, trace oil globule with bright light yellow fluorescence and immediate strong white cut.
	40%	Claystone - As above.
	10%	Coal - As above.
		Trace Quartz Grains - As above.
2085m-2090m	50%	Siltstone - As above.
	40%	Claystone - As above.
	10%	Quartz Grains - As above.
		Trace Coal, as above.
		21.8.78
2090m-2095m	85%	Quartz Grains - As above, mainly coarse to very coarse grained, except only trace pyrite.
	10%	Siltstone - As above.
	5%	Claystone - As above.
2095m-2100m	85%	Quartz Grains - As above.

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DEPTH	%	DESCRIPTION
2095m-2100m		Continued/....
	10%	Siltstone - As above.
	5%	Claystone - As above.
2100m-2105m	95%	Quartz Grains - As above.
	5%	Siltstone - As above; Claystone - As above.
2105m-2110m	90%	Quartz Grains - As above, mostly clear, subangular to subrounded, coarse to very coarse grained with almost no encrusted pyrite.
	10%	Siltstone - As above; Claystone - As above.
2110m-2115m	90%	Quartz Grains - As above, trace encrusted pyrite.
	10%	Siltstone - As above; Claystone - As above.
		Trace Sandstone, clear, hard, quartz, very poorly sorted, medium to very coarse grained, subangular to rounded, set in clear cement which gives a golden yellow mineral fluorescence ? dolomitic.
2115m-2120m	75%	Quartz Grains - As above.
	25%	Sandstone - As above.
2120m-2125m	40%	Quartz Grains - As above.
	20%	Sandstone - As above.
	20%	Siltstone - As above.
	20%	Claystone - As above.
		Trace Coal, black, hard.
2125m-2130m	50%	Quartz Grains - As above.
	20%	Sandstone - As above.
	15%	Siltstone - As above.
	15%	Claystone - As above.
		Trace Coal - As above.
2130m-2135m	80%	Quartz Grains - As above, 5% pyrite encrusted.
	10%	Sandstone - As above.
	10%	Siltstone - As above; Claystone - As above; Coal - As above; mica.
2135m-2140m	90%	Quartz Grains - clear, loose, coarse grained, minor very coarse grained, well sorted, subangular to rounded, 5% pyrite encrusted.
	10%	Sandstone - As above; Siltstone - As above; Claystone - As above, pyrite aggregates.

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DEPTH	%	DESCRIPTION
2140m-2142m	90%	Quartz Grains - As above.
	10%	Siltstone - As above; Claystone - As above; Sandstone - As above; Pyrite - As above.
2142m-2145m	90%	Quartz Grains - As above.
	10%	Siltstone - As above; Claystone - As above; Sandstone - As above; Pyrite - As above.
2145m-2150m	80%	Quartz Grains - As above.
	20%	Siltstone - As above; Claystone - As above; Sandstone - As above; Pyrite - As above.
2150m-2155m	60%	Quartz Grains - clear to milky, loose,medium grained to granule, mainly coarse to very coarse grained, subangular to rounded, trace pyrite encrusted.
	20%	Siltstone - very fine grained Sandstone - white to light grey, light to dark brown, soft to form, quartz plus varying amounts of carbonaceous material, mica, pyrite, ranging from clean to very dirty, set in clay matrix.
	20%	Claystone - white to light grey, light to dark brown, soft to firm with varying amounts of carbonaceous flecks and laminae, mica and pyrite.
		Trace Sandstone - clear, medium to coarse grained quartz, hard, set in calcareous cement with golden fluorescence; Coal - black, hard, mica flakes, pyrite aggregates.
2155m-2160m	60%	Quartz Grains - As above.
	15%	Siltstone - As above.
	15%	Claystone - As above.
	10%	Coal - As above.
		Trace Pyrite - As above; Sandstone - As above.
2160m-2165m	70%	Quartz Grains - As above, except many are fractured and broken, i.e., pebbles, trace blue to grey grains, encrusted with pyrite and silica cemented.
	20%	Claystone - As above.
	10%	Siltstone - As above.
		Trace Coal - As above, mica flake; Sandstone - As above.
2165m-2170m	70%	Quartz Grains - As above, except mostly milky, coarse to very coarse grained, and rounded.
	20%	Claystone - As above.
	10%	Siltstone - As above.
		Trace Coal, pyritic in part, pyritic black shale, pyrite aggregates

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SEAHORSE-1 R.C.N. THORNTON

LITHOLOGICAL DESCRIPTIONS 22.8.78

DEPTH	%	DESCRIPTION
2170m-2175m	85%	Quartz Grains - As above.
	10%	Claystone - As above.
	5%	Siltstone - As above.
		Trace Coal - As above, pyrite, as above.
2175m-2180m	95%	Quartz Grains - clear to minor milky, loose, polished to frosted, coarse grained to granule, mostly coarse to very coarse grained, trace encrusted pyrite.
	5%	Claystone - As above; Siltstone - As above; Pyrite.
2180m-2185m	95%	Quartz Grains - As above.
	5%	Claystone - As above; Siltstone - As above; Pyrite.
2185m-2190m	100%	Quartz Grains - As above, except 10% pyrite encrusted.
2190m-2195m	100%	Quartz Grains - As above.
		Trace Claystone - As above; Siltstone - As above; Pyrite.
2195m-2200m	100%	Quartz Grains - As above, except more fractured and broken, i.e., pebbles, and more pyrite.
		Trace Claystone - As above; Siltstone - As above; Coal - As above; Pyrite.
2200m-2205m	95%	Quartz Grains - As above, except mainly coarse to very coarse grained.
	5%	Claystone - As above; Siltstone - As above; Coal - As above pyrite aggregates.
2205m-2210m	95%	Quartz Grains - As above, except many fractured and broken, i.e., pebbles, plus pyrite.
	5%	Claystone - As above; Siltstone - As above; Coal - As above Pyrite.
2210m-2215m	90%	Quartz Grains - As above, except mainly coarse to very coarse grained.
	10%	Claystone - As above; Siltstone - As above; Coal - As above; pyrite.
2215m-2220m	95%	Quartz Grains - As above.
	5%	Claystone - As above; Siltstone - As above; Coal - As above; pyrite.
2220m-2225m	100%	Quartz Grains - As above.
		Trace Claystone - As above; Siltstone - As above; Coal - As above.
2225m-2230m	100%	Quartz Grains - As above.
		Trace Claystone - As above; Siltstone - As above; Coal - As above.

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SEAHORSE-1 R.C.N. THORNTON

LITHOLOGICAL DESCRIPTIONS 23.8.78

DEPTH	%	DESCRIPTION
2230m-2235m	100%	Quartz Grains - As above.
		Trace Siltstone - As above; Claystone - As above.
2235m-2240m	100%	Quartz Grains - As above.
		Trace Siltstone - As above; Claystone - As above.
2240m-2245m	90%	Quartz Grains - As above, except large amount of very coarse grained to granule size and many fractured and broken, i.e., pebbles.
	10%	Siltstone - light to dark brown, soft to firm, quartz and varying amount of carbonaceous material and laminae, mica, pyrite in clay matrix.
		Trace Claystone - As above.
2245m-2250m	60%	Quartz Grains - clear to milky, loose, polished to frosted, mainly coarse to very coarse grained, but some granules - pebbles, mostly subangular to subrounded, but broken pebble fragments angular and shattered, trace encrusted pyrite.
	30%	Siltstone - very fine grained Sandstone - white, light grey, light to dark brown, firm to soft, quartz plus varying amounts of carbonaceous material (either as specks or laminae), mica, pyrite, clay matrix.
	10%	Claystone - light grey, light to dark brown, firm, massive, trace amounts of carbonaceous flecks, mica, pyrite.
2250m-2255m	50%	Quartz Grains - As above.
	30%	Siltstone - As above.
	20%	Claystone - As above.
		Trace Pyrite aggregates; Coal - black, hard.
2255m-2260m	50%	Quartz Grains - As above, some broken pebbles.
	25%	Siltstone - As above.
	20%	Claystone - As above.
	5%	Coal - As above.
		Trace Pyrite.
2260m-2265m	100%	Quartz Grains - As above, except less well sorted, mainly coarse to very coarse grained.
		Trace Claystone - As above; Siltstone - As above; Coal - As above; Pyrite.
2265m-2270m	95%	Quartz Grains - As above, except mainly medium to coarse grained.
	5%	Claystone - As above; Siltstone - As above.
2270m-2275m	100%	Quartz Grains - As above, except mainly coarse to very coarse grained, minor pebbles.

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DEPTH	%	DESCRIPTION
2270m-2275m		Continued/....
		Trace Claystone - As above; Siltstone - As above.
2275m-2280m	100%	Quartz Grains - As above, except grain size in coarse to very coarse grained, minor granule and pebble. Minor blue to grey grains.
		Trace Siltstone - As above; Claystone - As above.
2280m-2285m	100%	Quartz Grains - clear to minor milky, trace blue to grey, loose quartz, coarse to very coarse grained, polished to minor frosted, angular to subrounded, trace encrusted pyrite.
		Trace Claystone - As above; Siltstone - As above; pyrite aggregates.
2285m-2290m	100%	Quartz Grains - As above.
2290m-2295m	100%	Quartz Grains - As above.
		Trace pyrite.
2295m-2300m	100%	Quartz Grains - As above, except slightly less well sorted, more broken grains, i.e., few pebbles.
		Trace Siltstone - As above; Claystone - As above; pyrite
2300m-2304m	95%	Quartz Grains - As above.
	5%	Sandstone - clear, hard, quartz, medium to coarse grained, subangular to subrounded, cemented by (?) clear dolomite cement, tight.
		Trace Pyrite.

APPENDIX 2

APPENDIX 2

OIL and GAS DIVISION

30 MAR 1979

W705

SEAHORSE - 1.

APPENDIX 2

CORE DESCRIPTIONS AND ANALYSIS

25 pages VDME

ESSO AUSTRALIA LTD.

CORE DESCRIPTION

SHEET 1 of 4

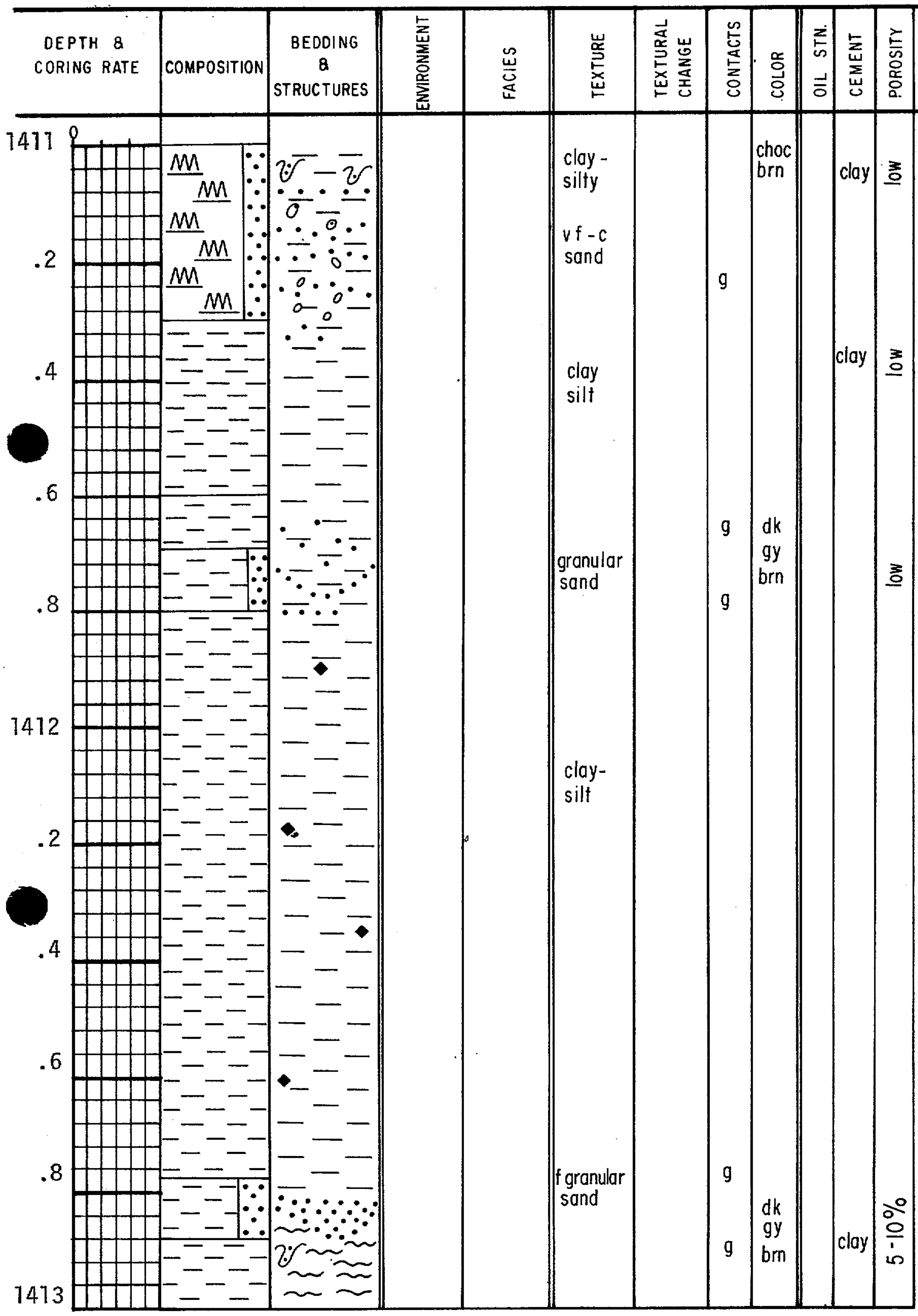
WELL SEAHORSE-1

SCALE 1:100

CORE No. 1

Interval Cored 1411-1424m **Cut** 13 **Recovered** 7.4 (57 %) **Fm.** LATROBE

Bit Type **Bit Size** in., **Desc by** J.D. Alder **Date** 8/8/1978



REMARKS

MUDSTONE: chocolate brown, clay-silt, micaceous, laminated, firm-hard laminae of sandstone, very fine grained medium sorted, cream. Laminae of siltstone, cream, quartzose, friable. Burrowed. Burrows filled with fine to granular quartz angular to subrounded, poorly sorted.

SILTSTONE: dark grey to brown, micaceous, carbonaceous, pyritiferous, firm. Very fine laminae of Coal occasionally. Coal bituminous, dull. Occasional siltstone laminae, cream, quartzose. Strong petroliferous odour.

SANDSTONE: fine to granular quartzose, med. sorted, silty, clay matrix, trace glauconite

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

CORE DESCRIPTION

SHEET 2 of 4

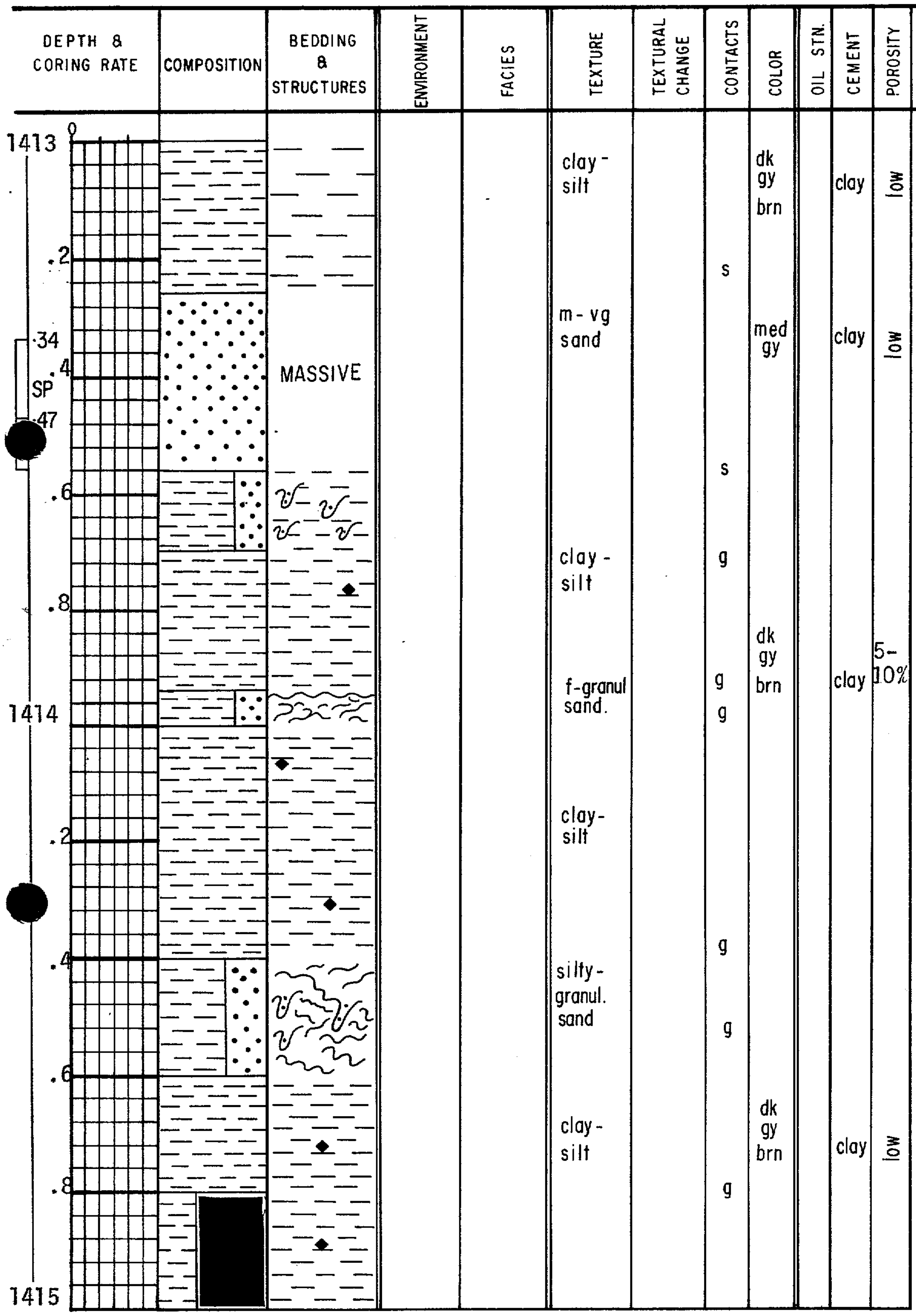
WELL SEAHORSE-1

SCALE 1:100

CORE No. 1

Interval Cored 1411-1424 Cut 13 Recovered 7.4 (57 %) Fm. LATROBE

Bit Type Bit Size in., Desc by J.D. ALDER Date 8.8.78



SANDSTONE: Med grey. Quartzose medium-v.coarse grain. Poorly sorted. Subangular to subrounded silty clay matrix, Quartz grains clear to milky, trace glauconite, friable. Strong Petroliferous odour.

SILTSTONE: Dark grey brown, carbonaceous, pyritiferous, micaceous, firm to hard, trace of fine laminae of dull bituminous Coal. Siltstone laminae, quartzose white to cream. Sandstone laminae - trace only quartzose, subcoarse, med. sorted. Strong petroliferous odour.

COAL: Bituminous, bright, beds up to 1cm thick.

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

CORE DESCRIPTION

SHEET 3 of 4

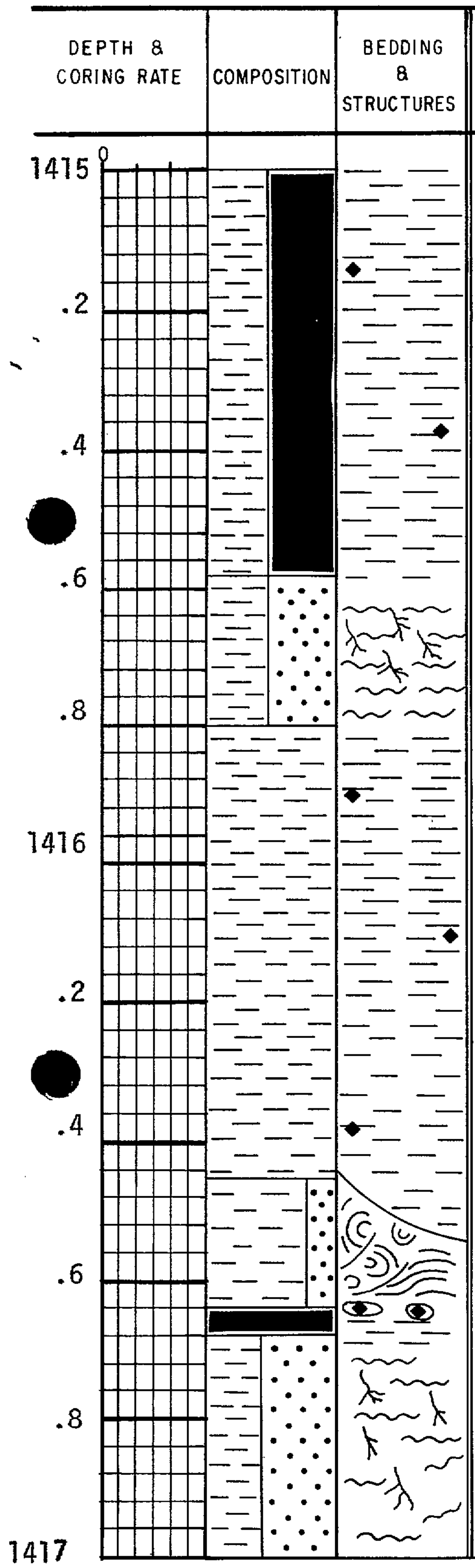
WELL SEAHORSE-1

SCALE 1:100

CORE No. 1

Interval Cored 1411-1424 Cut 13 Recovered 7.4 (57 %) Fm. LATROBE

Bit Type Bit Size in., Desc by J.D. ALDER Date 8.8.78



ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
		clay-silt			dk gy				
		v f sand clay-silt		g s	cream lt brn		clay	low	SANDSTONE: (seat earth) Silt. vf sand cream-lt brn firm to soft carbonaceous clay matrix.
		clay-silt			dk gy		clay	low	SILTSTONE: dk gy carbonaceous, micaceous pyritiferous, firm tr v.fine laminae of coal bituminous dull. Strong Petrol. odour.
		v f sand clay-silt		s g	cream lt brn		clay	low	SANDSTONE: (seat earth) V.fine sand cream to lt brown, firm carbon. silty clay matrix.

COAL: Bituminous Bright.

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

CORE DESCRIPTION

SHEET 4 of 4

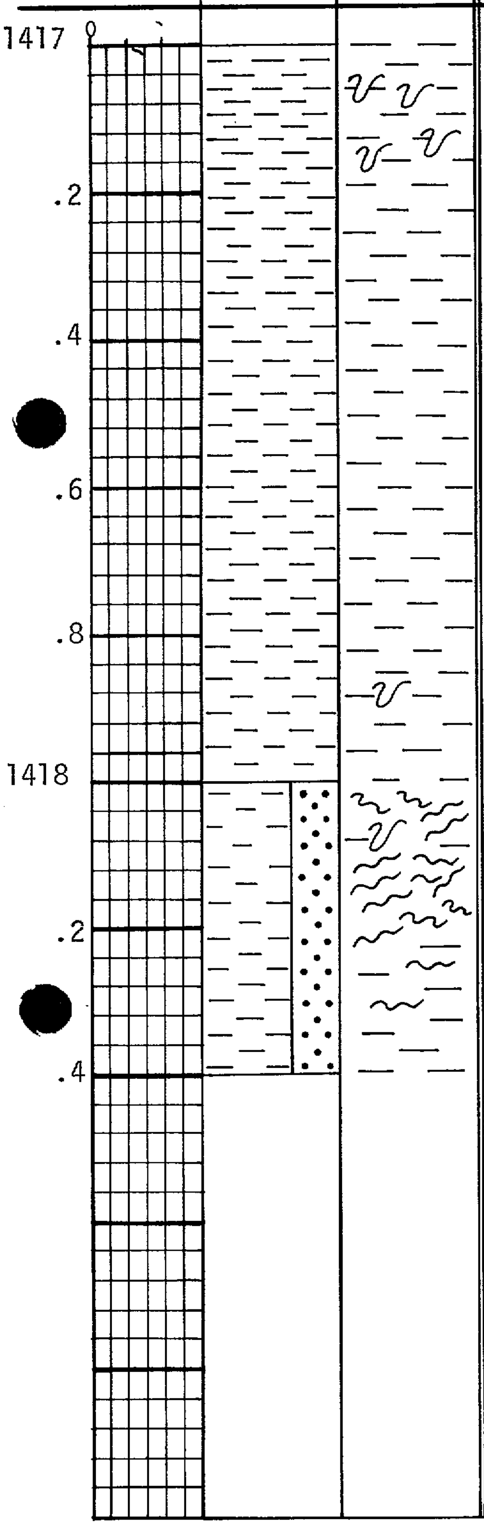
WELL SEAHORSE-1

SCALE 1:100

CORE No. 1

Interval Cored 1411-1424 **Cut** 13 **Recovered** 7.4 (57 %) **Fm.** LATROBE

Bit Type **Bit Size** in., **Desc by** J.D. ALDER **Date** 8.8.78

DEPTH & CORING RATE	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
					vf sand clay- silt			dk gy		clay	low	SILTSTONE: dk grey pyritiferous, carbonaceous micaceous firm finely laminated with quartzose siltstone and vf quartzose sandstone. White to cream. Medium sorted.
							g					

Dwg. 1107/OP/87

V DME

ESSO AUSTRALIA LTD. SHEET 1 OF 7

CORE DESCRIPTION

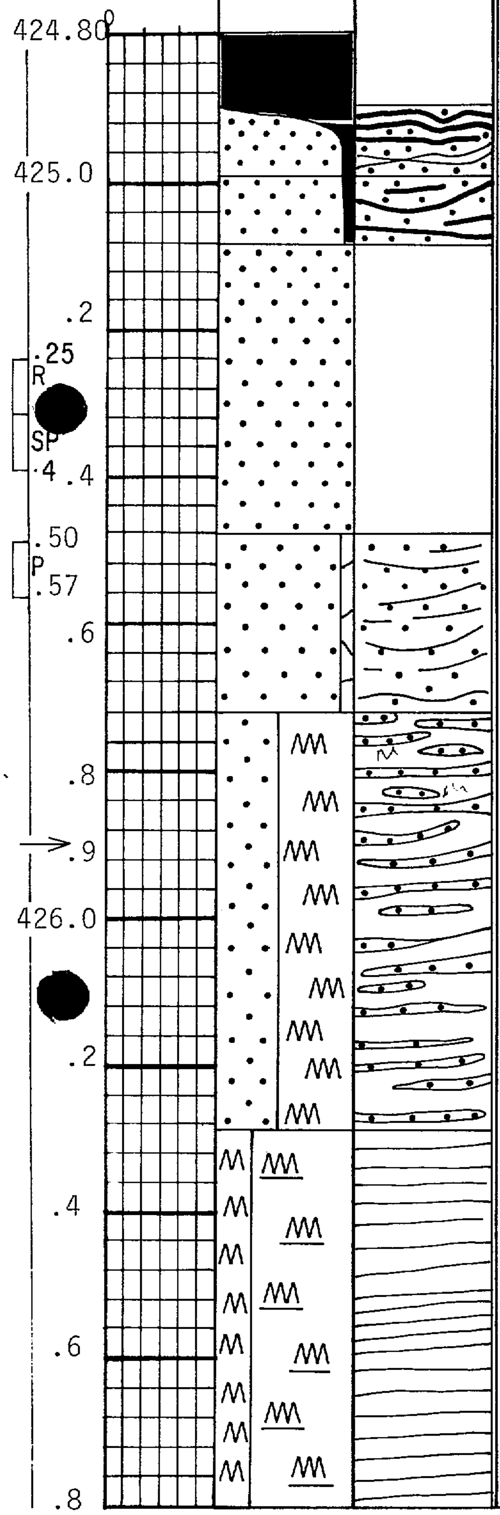
WELL SEAHORSE-1 **SCALE** 1:100

CORE No. TWO

Interval Cored 1424.8-1439.0 **Cut** 14.2m **Recovered** 13.7 (96.5 %) **Fm.** "Coarse Clastics"

Bit Type C20 **Bit Size** 8-15/32" in., **Desc by** J.D. Alder **Date** 8/8/1978

DEPTH & CORING RATE | COMPOSITION | BEDDING & STRUCTURES



ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY
NON MARINE		blocky		s	blk			
		c - f	inter-bedded	g	blk gy brn	○	cly	low
		vc - f	inter-bedded	s	blk gy brn	◌	cly	low
		vc - m	mass	s		◒	tr cly	good intergranular
		vf ss & carb streak	inter-bedded	g		○	cly	
		v thin - thin lams		g	dk gy & lt gy brn	◔		
		thin beds	inter-bedded		dk gy & dk gy brn			

REMARKS

Bitumenous coal, conchoidal fracture.

SANDSTONE: Coarsens downwards clay choked pores, very poorly sorted.

SANDSTONE: Quartzose, oil stained above 1425.39m. Mod-good sorting, deteriorates from top to bottom.

SANDSTONE: Well sorted, friable, muscovite common, some coal streaks.

SILTSTONE: Slight oil stain in upper sandier part.

Good odour on friable broken surfs. Pin point yellow fluorescence Pale Yellow cut.

SILTSTONE & MUDSTONE: Thin streaks up to 1mm, very fine sand and quartz silt.

Chips for Sydney : 1425.20, 1425.23 and 1425.60

R = analysis on rig

SP= Seal peel

P = Seal Peel for Perth.

→ Sample to Sydney 8/8/78

Dwg. 1107/OP/87

SHEET 2 of 7

ESSO AUSTRALIA LTD.

CORE DESCRIPTION

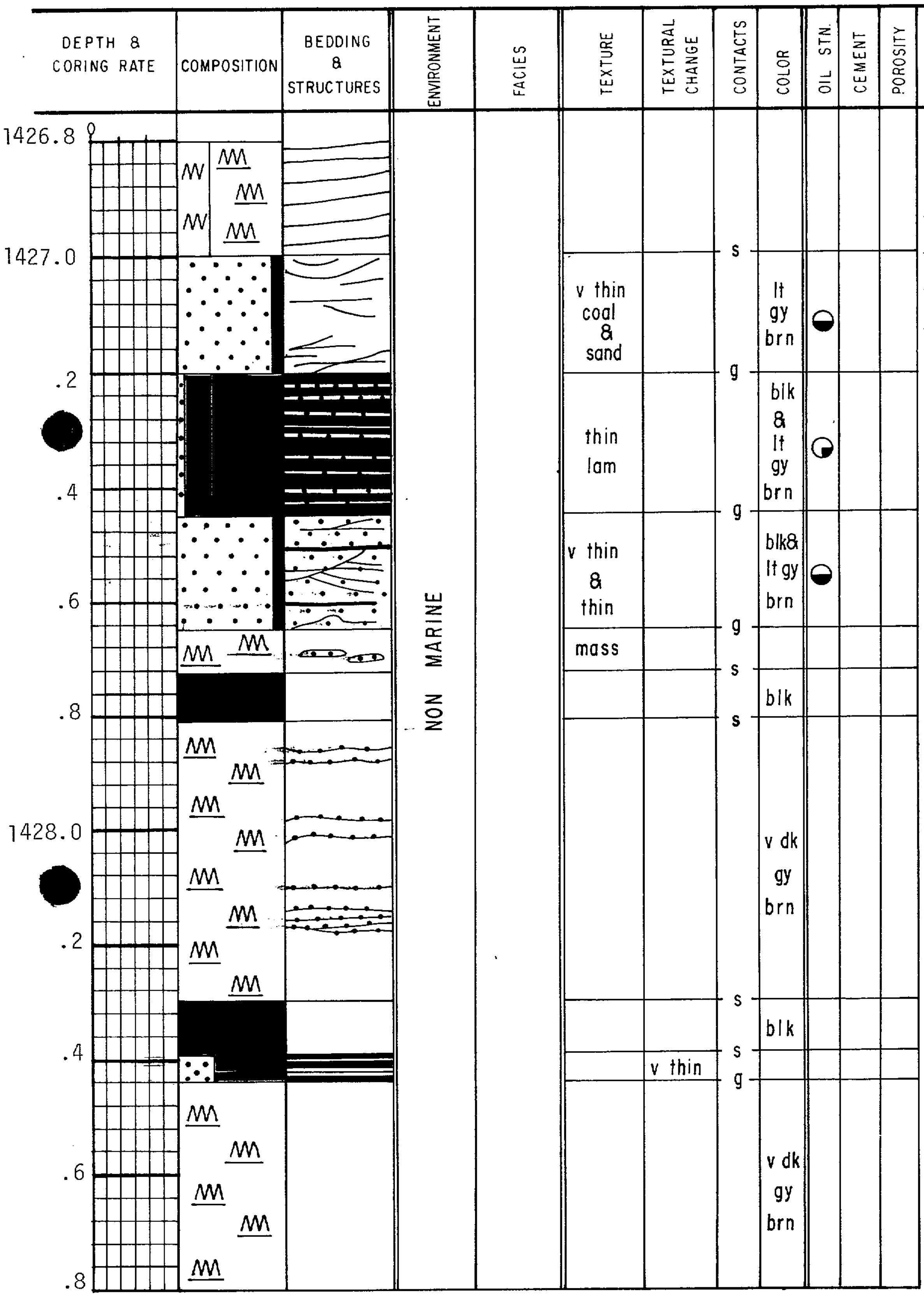
WELL SEAHORSE-1

SCALE 1:100

CORE No. TWO

Interval Cored 1424.8-1439.0m **Cut** 14.2m **Recovered** 13.7m (96.5 %) **Fm.** "Coarse Clastics"

Bit Type C20 **Bit Size** 8-15/32" in., **Desc by** J.D. Alder **Date** 8/8/1978



REMARKS

SANDSTONE:

Petroliferous odour.
Uniform pale yellow
fluorescence, pale
yellow cut.

Slight brown oil stain,
Coal fractured, bitumen
Trace brown oil stain.

Uniform weak pale yellow,
fluorescence, immediate
pale yellow cut.

SILTSTONE:

Very carbonaceous.
Strong odour on fresh
surfaces.

Quartz silt stringers.

COAL:

Quartz silt stringers.
Strong odour on fresh
surfaces.

Dwg. 1107/OP/87

SHEET 3 OF 7

ESSO AUSTRALIA LTD.

CORE DESCRIPTION

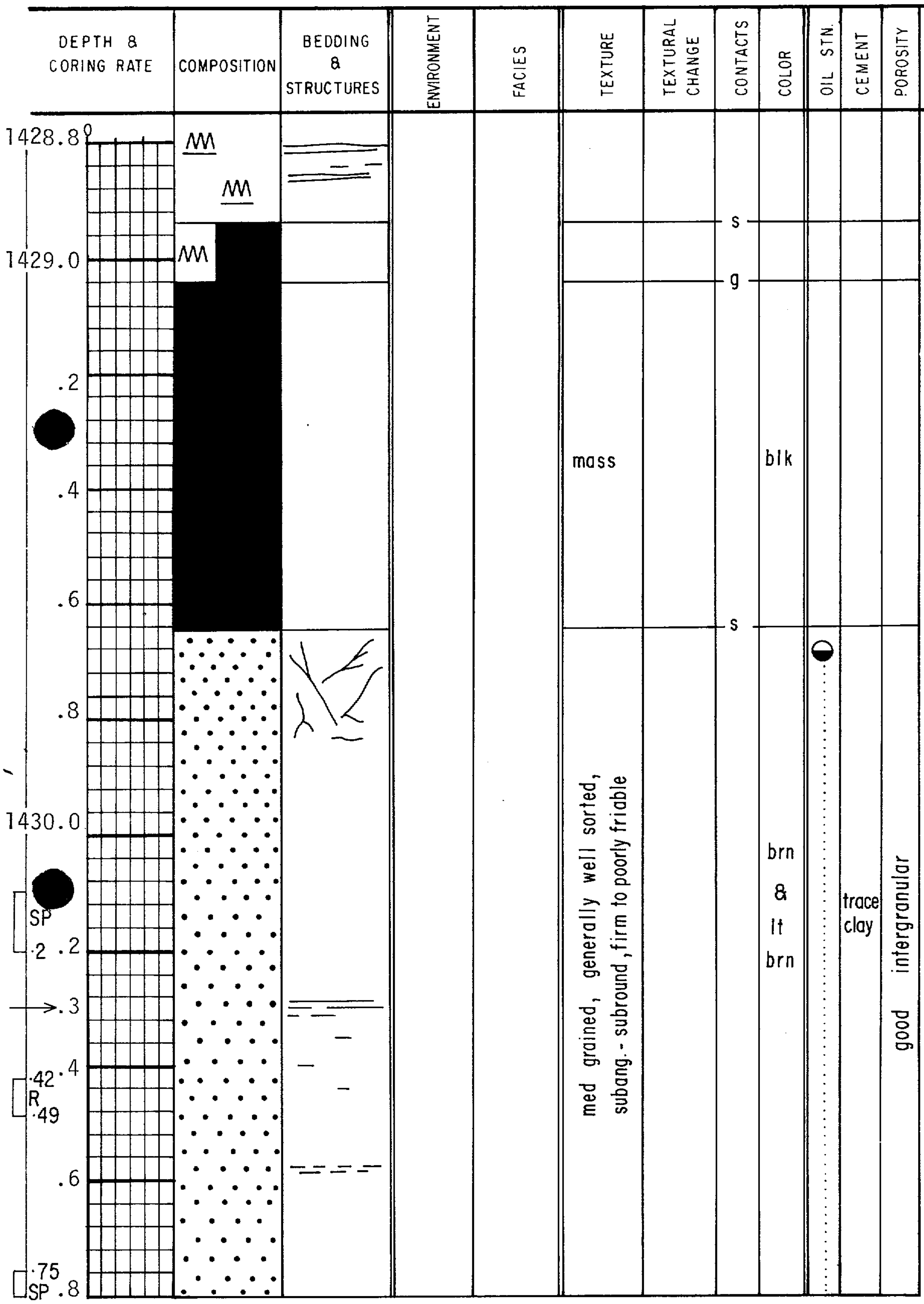
WELL SEAHORSE-1

SCALE 1:100

CORE No. TWO

Interval Cored 1424.8-1439.0m **Cut** 14.2m **Recovered** 13.7m (96.5 %) **Fm.**"Coarse Clastics"

Bit Type C20 **Bit Size** 8-15/32" in., **Desc by** J.D. Alder **Date** 8/8/1978



REMARKS

COAL:

Bitumenous.

Sub-conchoidal fracture.

Lustrous.

Undulating contact.

SANDSTONE:

Oil stained, particularly '29.80-'30.20 and '31.10-'31.60

Uniform spotty yellow fluorescence.

Pale Yellow streaming cut.

→ Sample to Sydney 8/8/1978

Sydney samples : 1430.0 and 1430.30.

SP = Seal Peel

P = Seal Peel for Perth

R = Analysis on rig.

* Blender sample 1430 : C_1 : 1528, C_2 : 528, C_3 : 1512, C_4 : 1159, C_5 : 684

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

CORE DESCRIPTION

SHEET 4 of 7

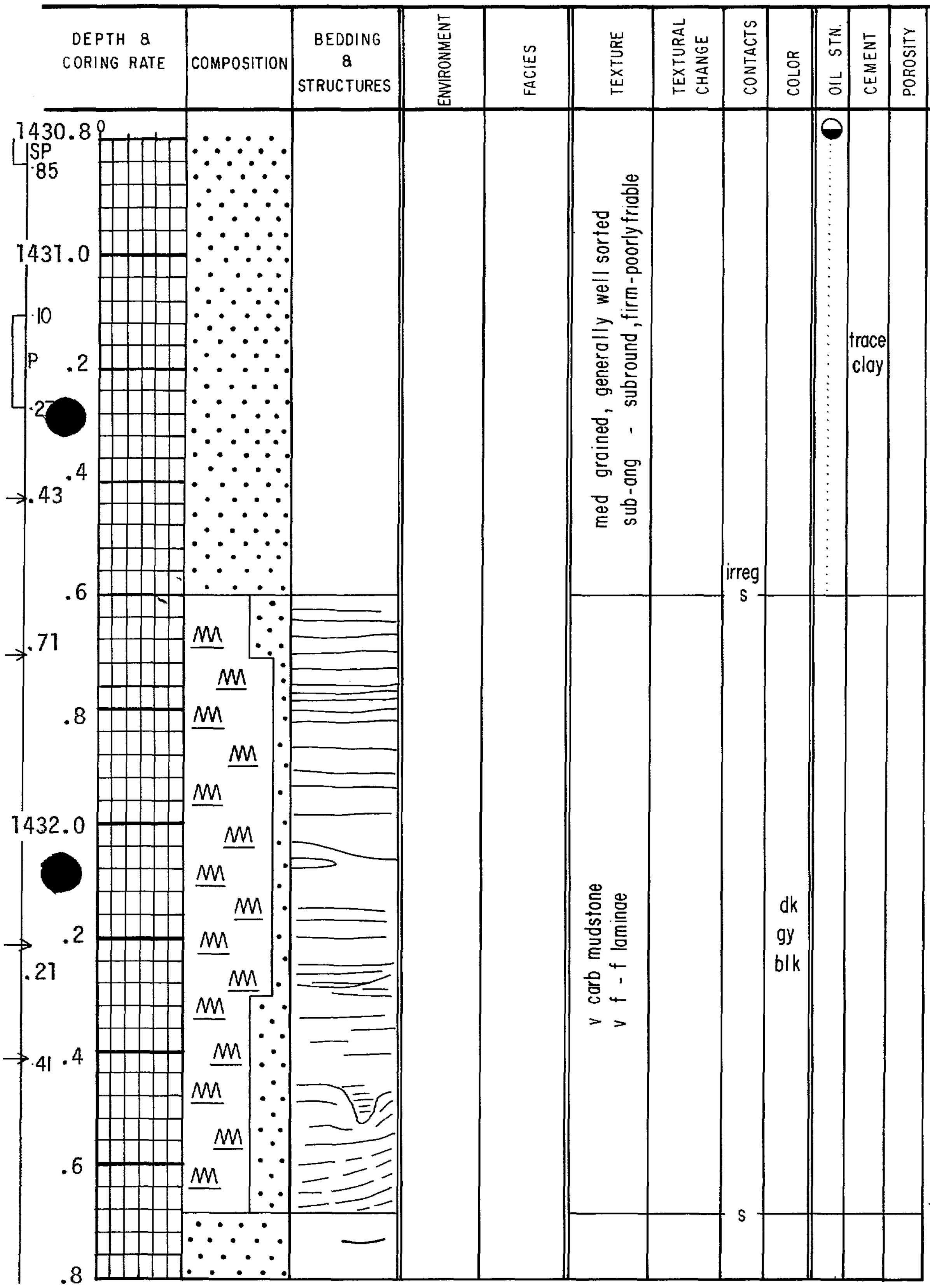
WELL SEAHORSE-1

SCALE 1:100

CORE No. TWO

Interval Cored 1424.8-1439.0m **Cut** 14.2m **Recovered** 13.7m (96.5 %) **Fm.** "Coarse Clastics"

Bit Type C20 **Bit Size** 8-15/32" in., **Desc by** J.D. Alder **Date** 8/8/1978



REMARKS

SANDSTONE:

Quartzose.

Strong odour.

Fluorescence and cut.

SILTSTONE:

6 cms Sandstone; light brown, well sorted, carbonaceous streaks at '32.30.

Very fine laminae, of very fine sandstone.

Scour and fill structures.

Top 3 cms light grey. Discontinuous coaly streaks.

→ Sample to Sydney 8/8/78

SP = Seal Peel

P = Seal Peel for Perth

R = Analysis on rig.

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

CORE DESCRIPTION

SHEET 5 OF 7

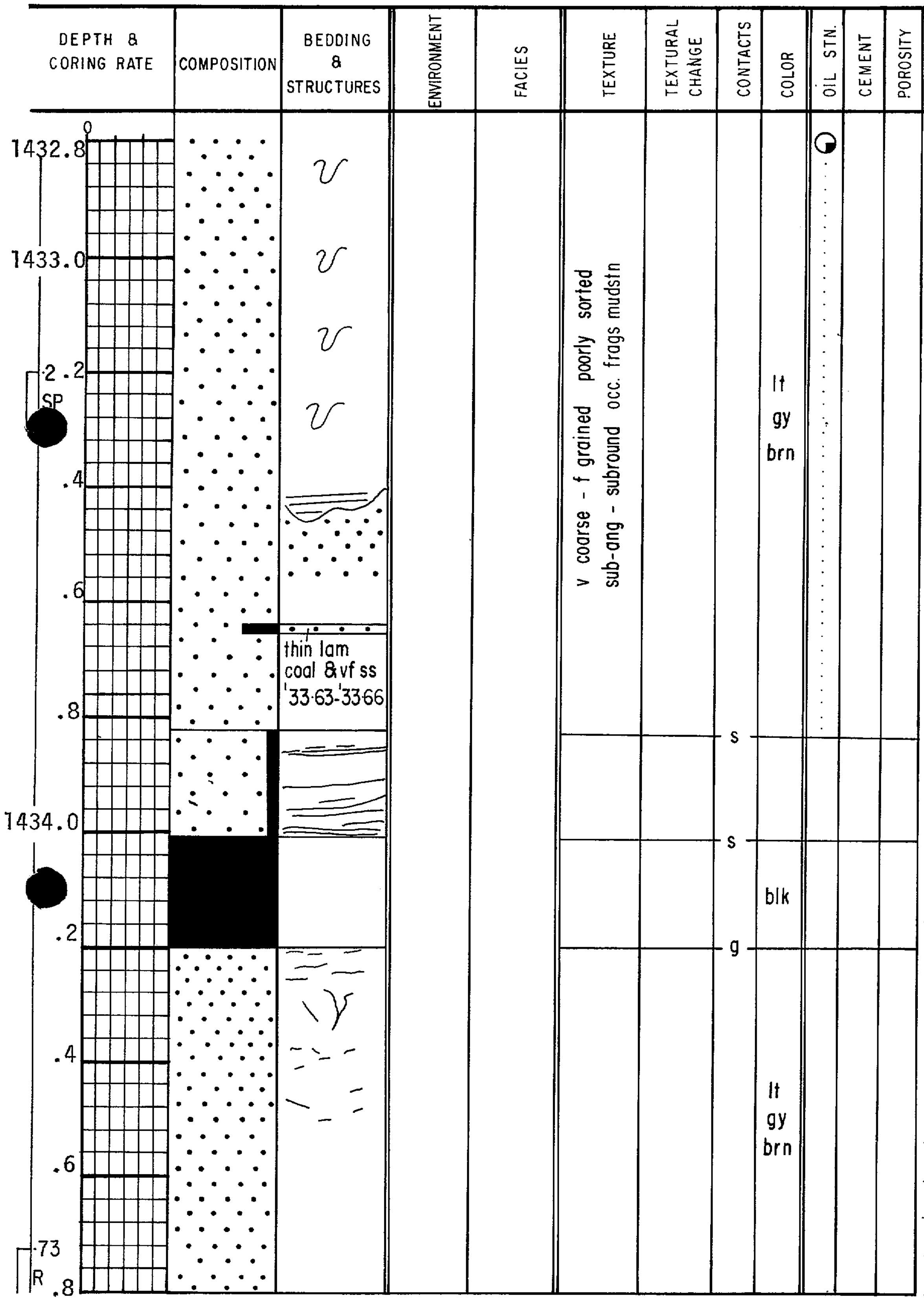
WELL SEAHORSE-1

SCALE 1:100

CORE No. TWO

Interval Cored 1424.8-1439.0 **Cut** 14.2m **Recovered** 13.7m (96.5 %) **Fm.** "Coarse Clastics"

Bit Type C20 **Bit Size** 8-15/32" in., **Desc by** J.D. Alder **Date** 8/8/78



REMARKS

SANDSTONE:

Carbonaceous.

Moderately friable.

Slight staining throughout (except top 3cms). Good odour, patchy pale yellow pin point fluorescence, streaming pale yellow cut.

Extensively burrowed.

Fine grained silty burrow linings.

Thin coaly streams, mostly continuous.

Brown oil staining.

Sydney sample chips 1433.07 and 1433.60m.

R = Sample analysis on rig.

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

CORE DESCRIPTION

SHEET 6 OF 7

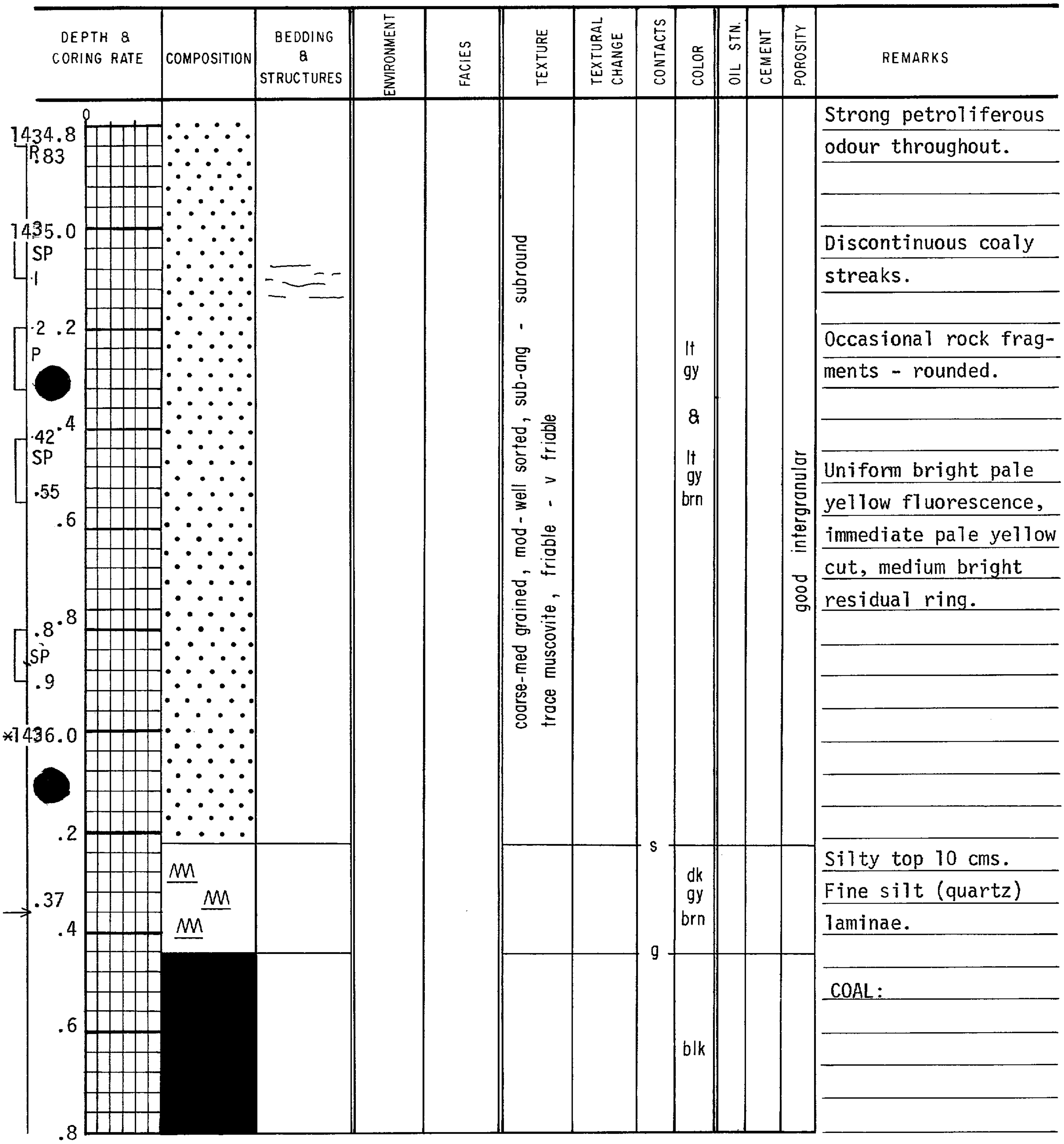
WELL SEAHORSE-1

SCALE 1:100

CORE No. TWO

Interval Cored 1424.8-1439.0m Cut 14.2m Recovered 13.7m (96.5%) Fm. "Coarse Clastics:

Bit Type C20 Bit Size 8-15/32" in., Desc by J.D. Alder Date 8/8/78



Strong petroliferous odour throughout.

Discontinuous coaly streaks.

Occasional rock fragments - rounded.

Uniform bright pale yellow fluorescence, immediate pale yellow cut, medium bright residual ring.

Silty top 10 cms. Fine silt (quartz) laminae.

COAL:

→ Sample to Sydney 8/8/78

Sydney sample chips 1435.05 and 1436.20m.

SP = Seal Peel

P = Seal Peel for Perth

R = Analysis on rig.

* Blender sample 1436.0 C_1 :1019, C_2 :737, C_3 :3956, C_4 :2066, C_5: 1915

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

CORE DESCRIPTION

SHEET 7 OF 7

WELL SEAHORSE-1

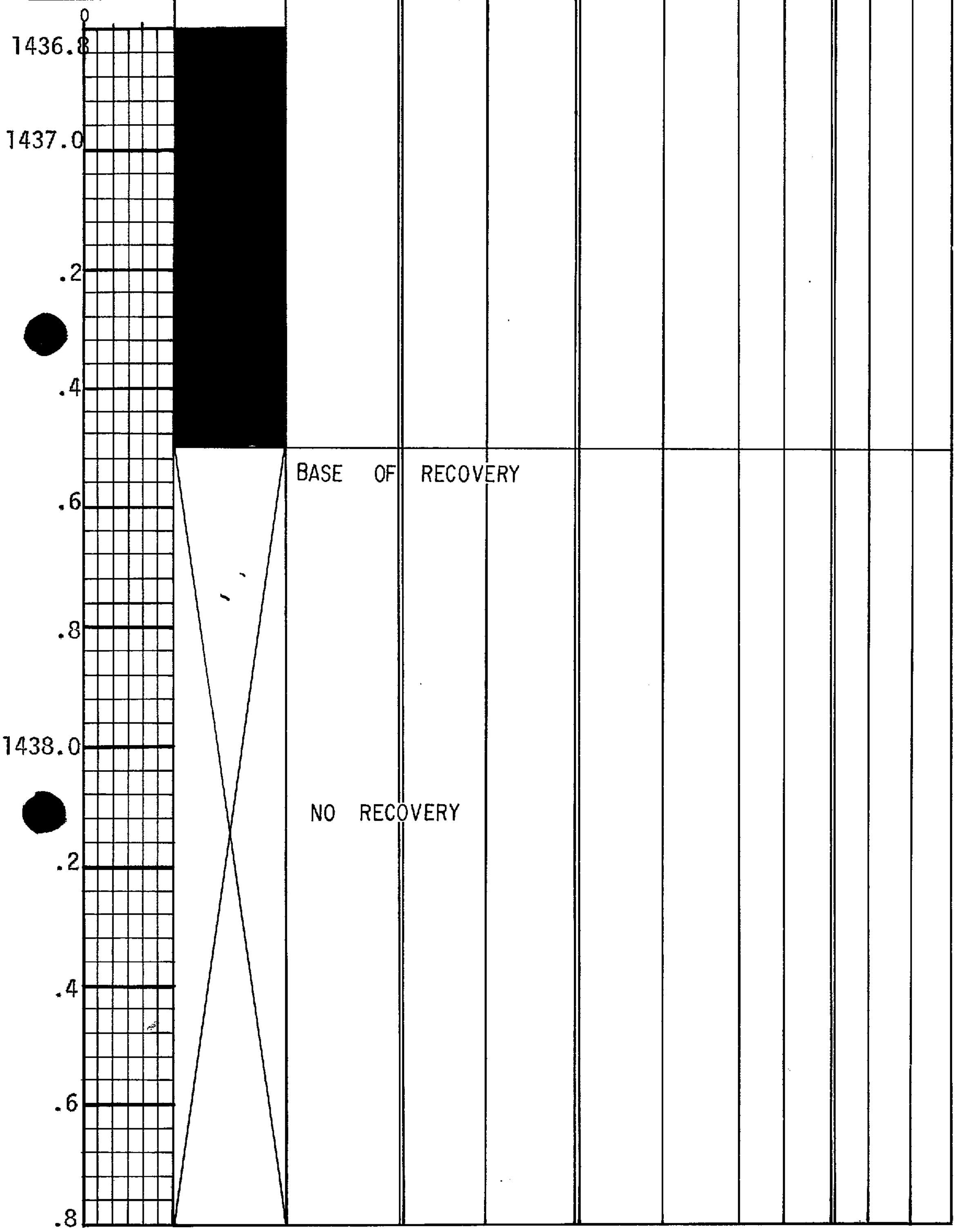
SCALE 1:100

CORE No. TWO

Interval Cored 1424.8-1439.0m Cut 14.2m Recovered 13.7m (96.5%) Fm "Coarse Clastics"

Bit Type C20 Bit Size 8-15/32" in., Desc by J.D. Alder Date 8/8/78

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



Bituminous.

Conchoidal fracture.

Lustrous.

Base of Interval cut = 1439.0m.

Dwg. 1107/OP/87

VDME

ESSO AUSTRALIA LTD.

CORE DESCRIPTION

SHEET 1 OF 4

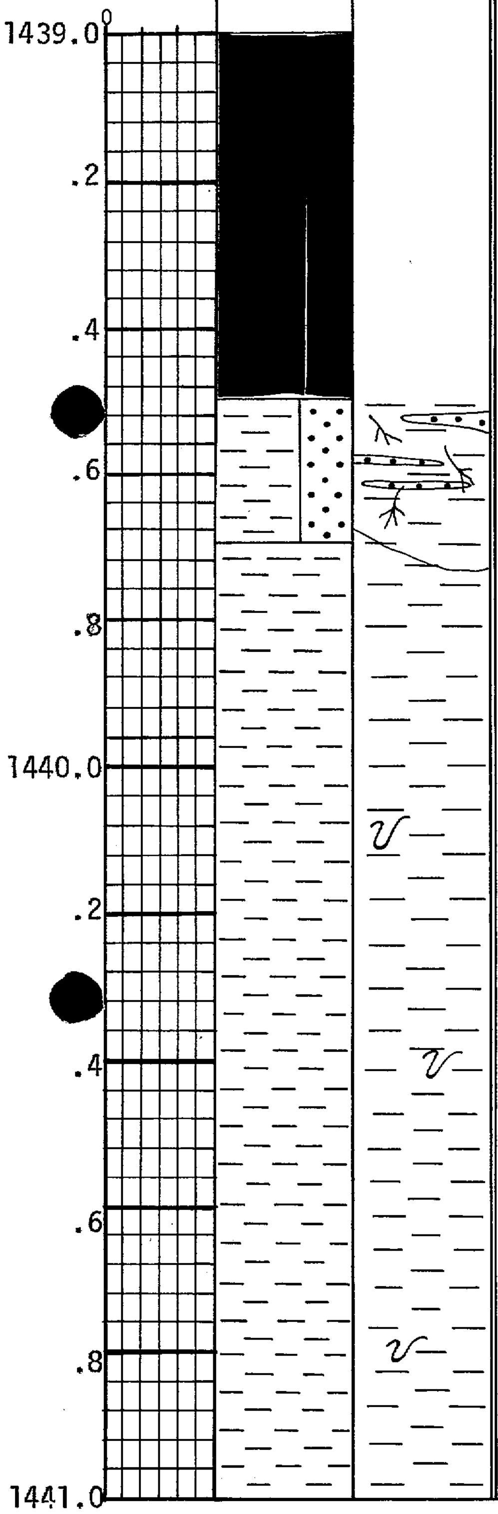
WELL SEAHORSE-1

SCALE 1:100

CORE No. THREE

Interval Cored 1439-1453m Cut 14.0m Recovered 8m (57 %) Fm. LATROBE

Bit Type ...., Bit Size .... in., Desc by J.D. Alder Date 9/8/78



DEPTH & CORING RATE	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
					blocky			blk				COAL : bituminous, bright.
					f sand silt	inter-bedded	s	choc brn		clay		SILTSTONE: Chocolate brown, micaceous, carbonaceous, pyritiferous, firm, some laminae of fine sand. Laminae disturbed by roots.
					silt clay	thin lam	s	white - lt gy med lt gy	◐	calc	low	SILTSTONE: white to light grey to medium light grey, micaceous, trace carbonaceous, calcareous, extremely hard. Dull yellow fluorescence, very slow milky cut. Burrows. Some colour motling due to cement content.

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

CORE DESCRIPTION

SHEET 2 OF 4

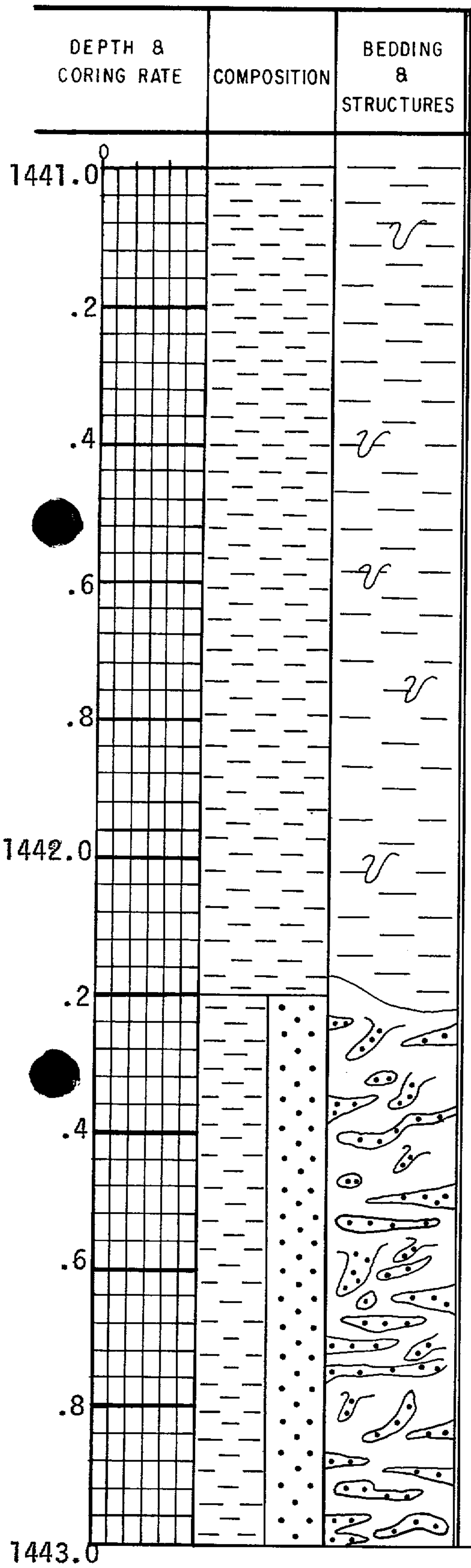
WELL SEAHORSE-1

SCALE 1:100

CORE No. THREE

Interval Cored 1439-1453m **Cut** 14.0m **Recovered** 8.0m (57 %) **Fm.** LATROBE

Bit Type .... **Bit Size** .... **in., Desc by** J.D. Alder **Date** 9/8/78



ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
		silt clay	thin lam		wht lt gy - med lt gy		calc	low	SILTSTONE : white to light grey -medium light grey, micaceous, trace carbonaceous, calcareous, extremely hard, burrowed. Some colour motling. Dull yellow fluorescence, very slow milky cut.
		f sand silt clay	inter-bedded	s	yellow brn lt gy brn	◕	clay	10%	SILTSTONE : yellow brown to light grey brown, micaceous, quartzose, slightly carbonaceous, firm, bioturbated, interbedded with SANDSTONE : fine quartzose, micaceous, slightly carbonaceous, angular to subrounded, well sorted firm. Petroliferous odour, uniform yellow dull fluorescence, pale yellow cut.

ESSO AUSTRALIA LTD.

CORE DESCRIPTION

SHEET 3 OF 4

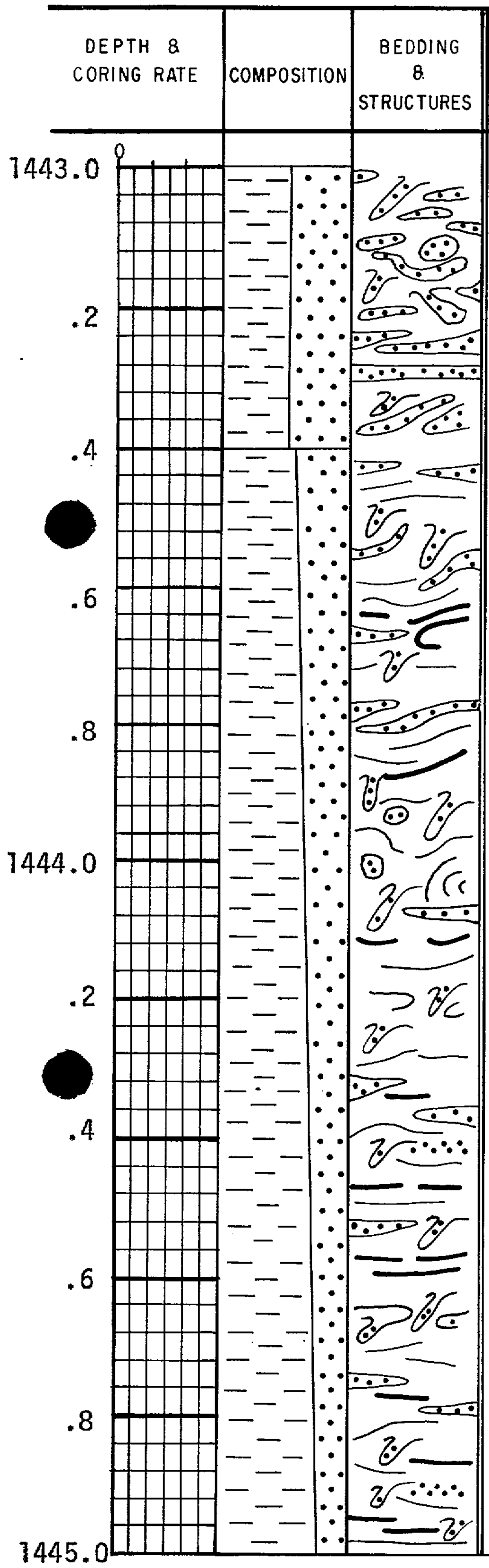
WELL SEAHORSE-1

SCALE 1:100

CORE No. THREE

Interval Cored 1439m-1453m **Cut** 14.0m **Recovered** 8.0m (57 %) **Fm.** LATROBE

Bit Type .... **Bit Size** .... in., **Desc by** J.D. Alder **Date** 9/8/78



ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
		f sand silt clay	inter-bedded		yellow brn lt gy brn		clay	10%	
		f sand silt clay	inter-bedded	g	lt gy brn med lt gy		clay	low	SILTSTONE : yellow brown to light grey brown to medium light grey, micaceous, quartzose, carbonaceous, increasing towards bottom, firm, bioturbated. Increasing clay content down. SANDSTONE : fine, quartzose, micaceous, slightly carbonaceous, angular to subrounded, well sorted to medium sorted, firm, increasing clay matrix towards bottom. Petroliferous odour. Fluorescence becoming spotty.

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

CORE DESCRIPTION

SHEET 4 OF 4

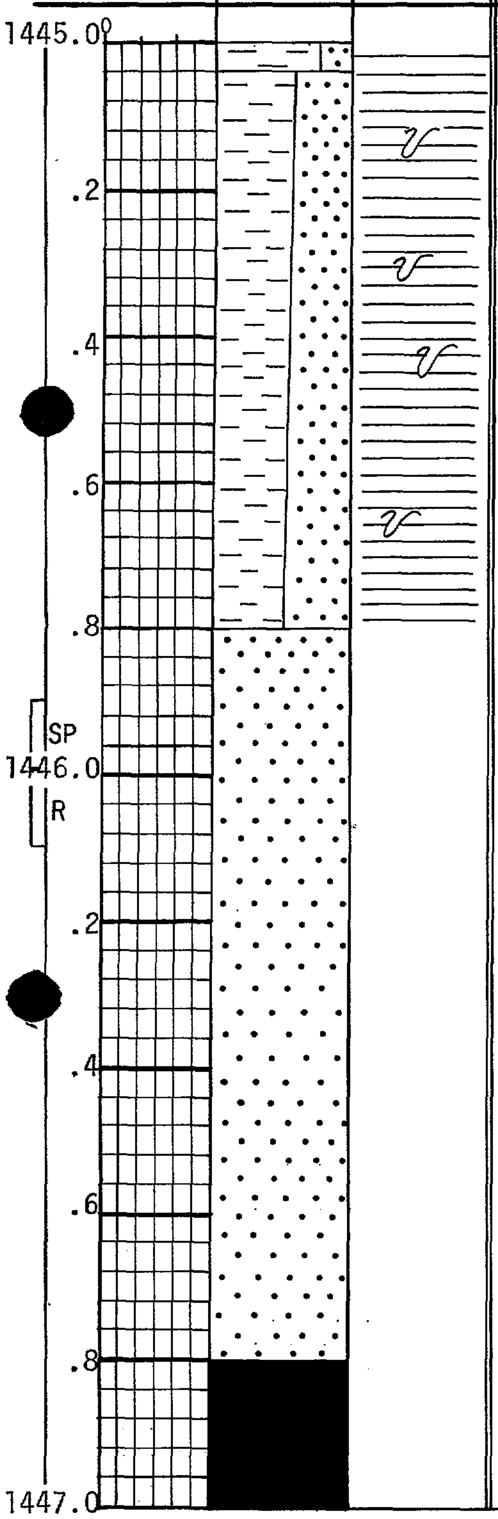
WELL SEAHORSE-1

SCALE 1:100

CORE No. THREE

Interval Cored 1439-1453m **Cut** 14.0m **Recovered** 8.0m (57 %) **Fm.** LATROBE

Bit Type .... **Bit Size** .... in., **Desc by** J.D.Alder **Date** 9/8/78



ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
		bioturbated		g					
		f sand silt clay	inter-bedded		yellow brn	◕	clay	low	SANDSTONE: Quartzose, very fine grained, subangular to subrounded, well sorted, firm, yellow brown, carbonaceous, SILTSTONE. Laminae, burrowed micaceous. Uniform dull yellow fluorescence - spotty bright fluorescence.
				s					
		f - med sand	mass			◔	clay		SANDSTONE : light grey to brown, fine to med. grained, well sorted, subangular to subrounded friable, strong odour. Bright pale yellow fluorescence. Rapid stream, pale yellow to milky cut.
				s					
		blocky			blk				COAL : Bitumenous, bright. SILTSTONE: dark grey, micaceous, pyritiferous, carbonaceous, laminae.

VDME

ESSO AUSTRALIA LTD.

CORE DESCRIPTION

SHEET 1 OF 4

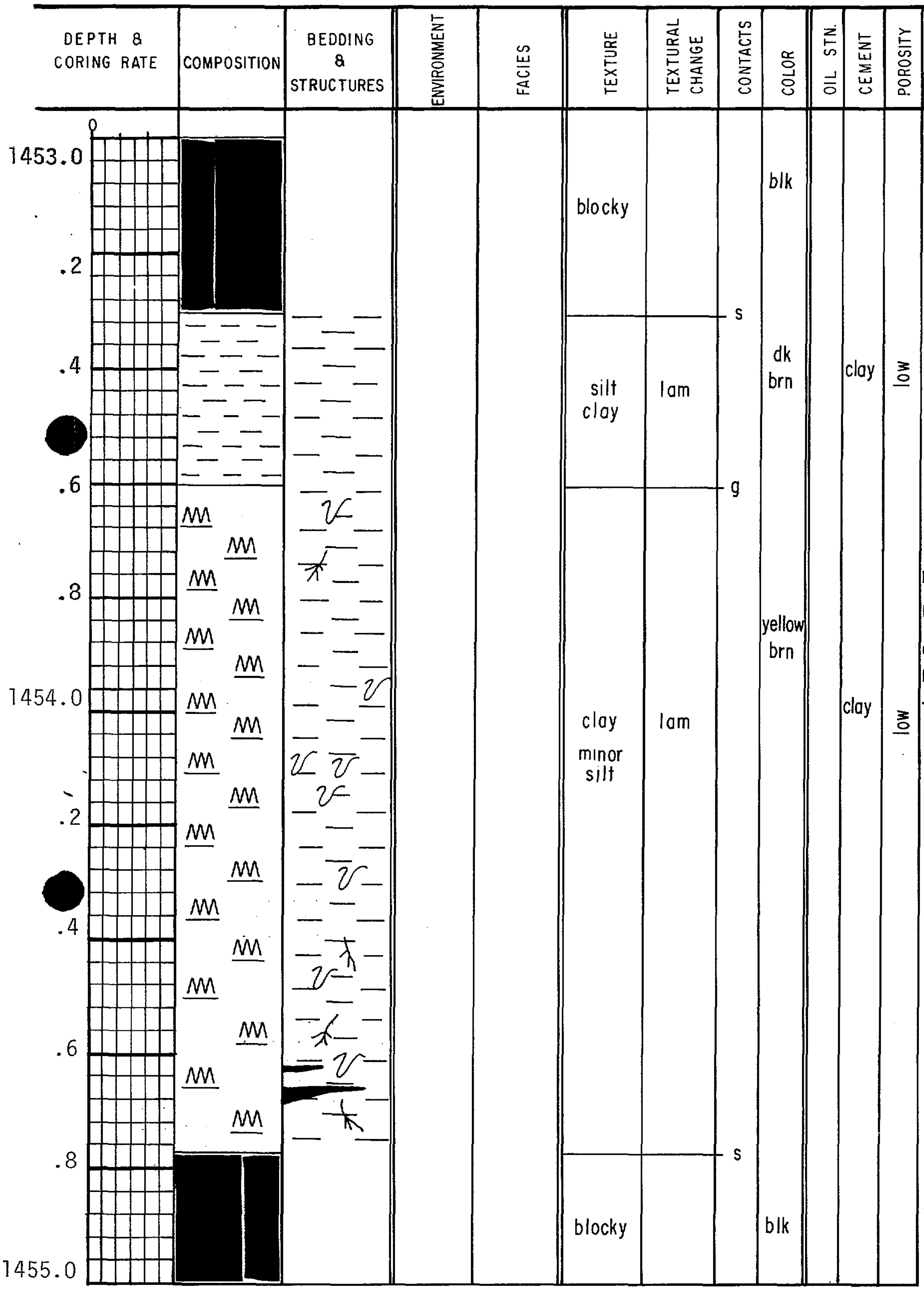
WELL SEAHORSE-1

SCALE 1:100

CORE No. 4

Interval Cored 1453-1465.6m **Cut** 12.6m **Recovered** 6.8m (54 %) **Fm.** LATROBE

Bit Type **Bit Size** in., **Desc by** J.D. Alder **Date** 9/8/78



REMARKS

SILTSTONE: Silt-clay firm dk brn carbonaceous micaceous. Laminated

CLAYSTONE: Yellow - brow firm carbonaceous. Minor mica flakes siltsize. Grading downwards to carbonaceous.

CLAYSTONE: dk grey laminated burrowed carbonaceous root. Traces bioturbated in part.

ESSO AUSTRALIA LTD.

CORE DESCRIPTION

SHEET 2 OF 4

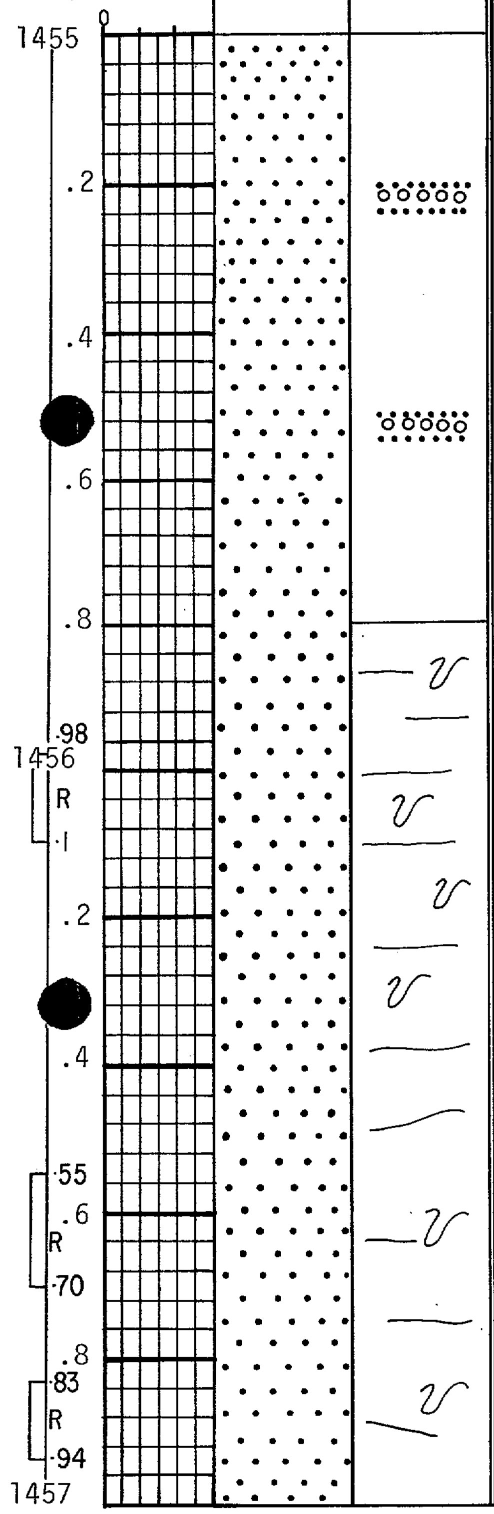
WELL SEAHORSE-1

SCALE 1:100

CORE No. 4

Interval Cored 1453-1465.6 **Cut** 12.6 **Recovered** 6.8 (54 %) **Fm.** LATROBE

Bit Type **Bit Size** in., **Desc by** J.D. Alder **Date** 9.8.78

DEPTH & CORING RATE	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
					vc - f sand	mass	s	yellow gy				
					vc-vf sand		g	yellow gy lt gy	◔			SANDSTONE: Quartzose Very coarse to fine, very poorly sorted towards base. Med to poorly sorted at top. small amount clay matrix. Thin porous streaks less than 1cm, sinuous. Patchy brown oil staining Carbonaceous, stringers in towards base. Upper section has indistinct bedding due to difference in grain size. Patchy but dense fluor. in porous streaks streaming pale yellow milky cut. Bright pale yellow residual ring

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

CORE DESCRIPTION

SHEET 3 OF 4.

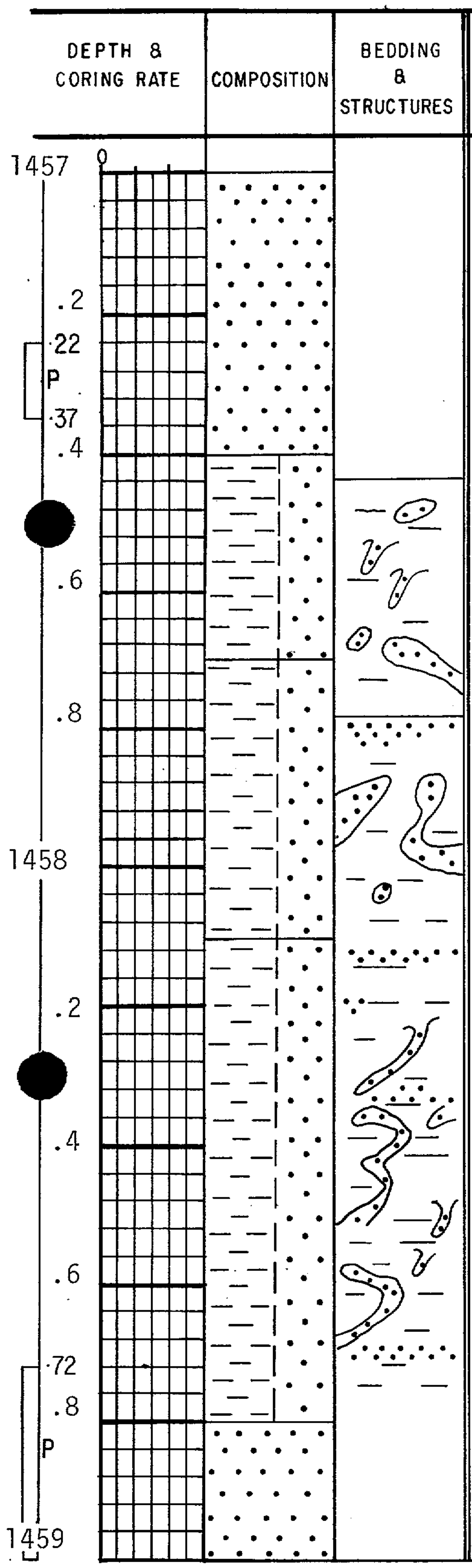
WELL SEAHORSE-1

SCALE 1:100

CORE No. 4

Interval Cored 1453-1465.6 **Cut** 12.6 **Recovered** 6.8 (54%) **Fm.** LATROBE

Bit Type .... **Bit Size** .... **in., Desc by** J.D. Alder **Date** 9.8.78



ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY
		med-c sand	mass	g	yellow gy	◔	clay	approx 25 %
		silt f-c sand	inter-bedded	s	med gy		clay	
		silt f-c sand	inter-bedded	g	med gy m dk gy		silica	
		silt f-c sand	lam	g	med gy		clay	
		m-c sand	mass					

REMARKS

SANDSTONE: Quartzose m.c. grains med sorted Sa-Sr friable slight brown oil stain. Trace fine muscovite mica. Porosity > 25%. Carbonaceous streaks. Uniform bright yellow fluor. Streaming pale yellow milky cut.

SILTSTONE: Medium grey to med. dark grey. Quartzose; Micaceous carbonaceous. Partly indurated and extreme hard remainder firm bioturbated. Sandstone filled burrows Fine to coarse sand Sa-Sr well sorted good porosity strong even fluorsence.

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

CORE DESCRIPTION

SHEET 4 OF 4

WELL SEAHORSE-1

SCALE 1:100

CORE No. 4

Interval Cored 1453-1465.6 **Cut** 12.6 **Recovered** 6.8 (54 %) **Fm.** LATROBE

Bit Type **Bit Size** in., **Desc by** J.D. Alder **Date** 9.8.78

DEPTH & CORING RATE	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
0 1459 SP ·1 SP .2 .4 ·42 SP .53 .6					m-c sand	mass		yellow gy	◔	clay		SANDSTONE: Quartzose Medium to coarse grain. Sand mod. sorted. Friable, brown stained oil ("oozing"?) strong odour uniform bright pale yellow fluor. Streaming pale yellow milky cut.

Dwg. 1107/OP/87

V D ME

ESSO AUSTRALIA LTD.

CORE DESCRIPTION

SHEET 1 OF 6

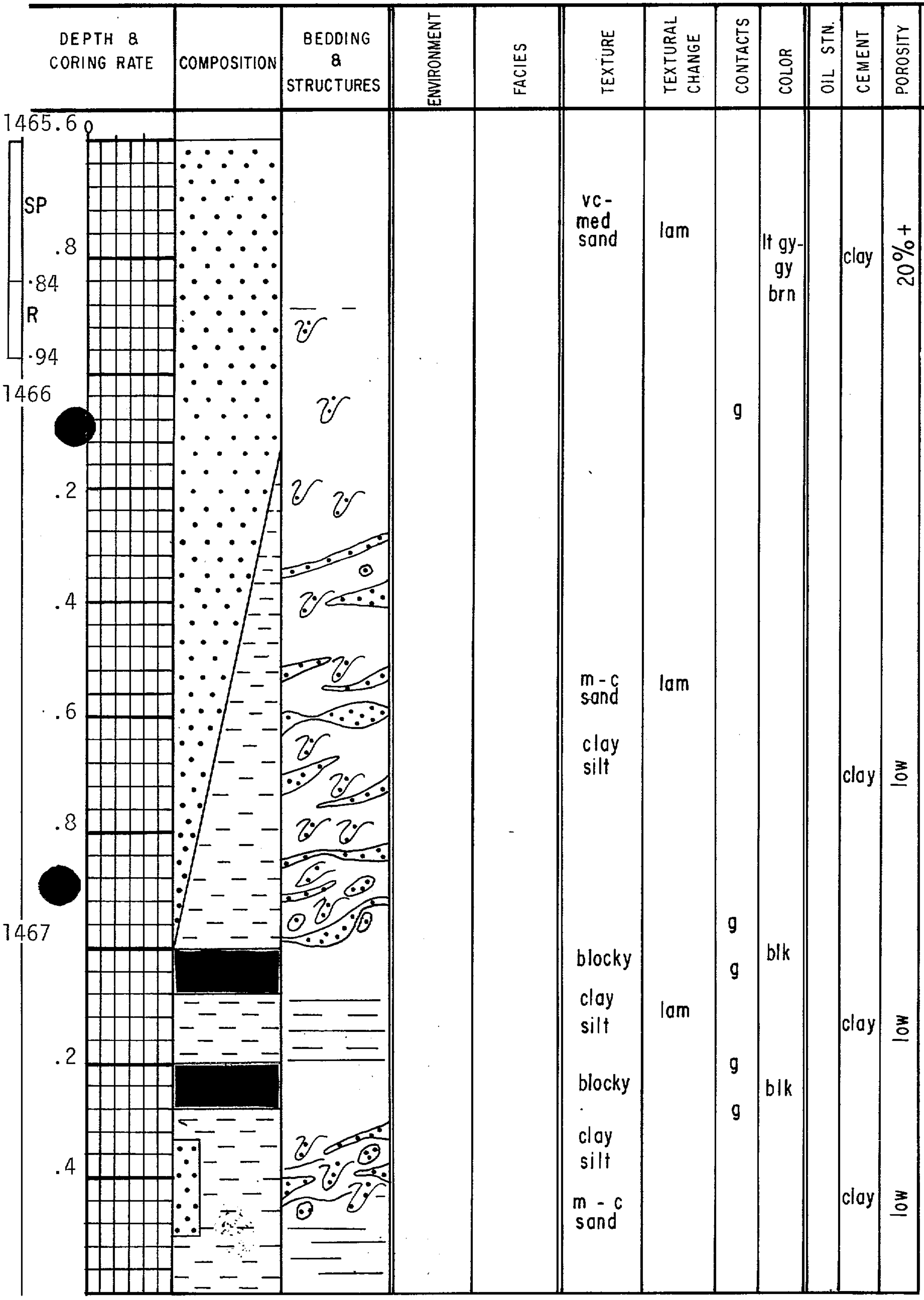
WELL SEAHORSE-1

SCALE 1:100

CORE No. 5

Interval Cored 1465.6-1479.6 Cut 14.0 Recovered 11.0 (78.5%) Fm LATROBE

Bit Type Bit Size in., Desc by J.D. Alder Date 11.8.78



REMARKS

SANDSTONE: Quartzose very coarse to medium well sorted but with some thin poorly sorted bands. Light grey and grey-brown friable. Trace muscovite medium grains subrounded. Coarser grains subangular Porosity 20%+ mild Petrol. odour rare pin point bright yellow fluorescence slight milky cut.

SILTSTONE: Dark brown to dark grey micaceous carbonaceous. Bioturbated. Bedding in places defined by micaceous laminae trace very thin pyrite.

COAL: Bituminous Bright.

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

CORE DESCRIPTION

SHEET 2 OF 6

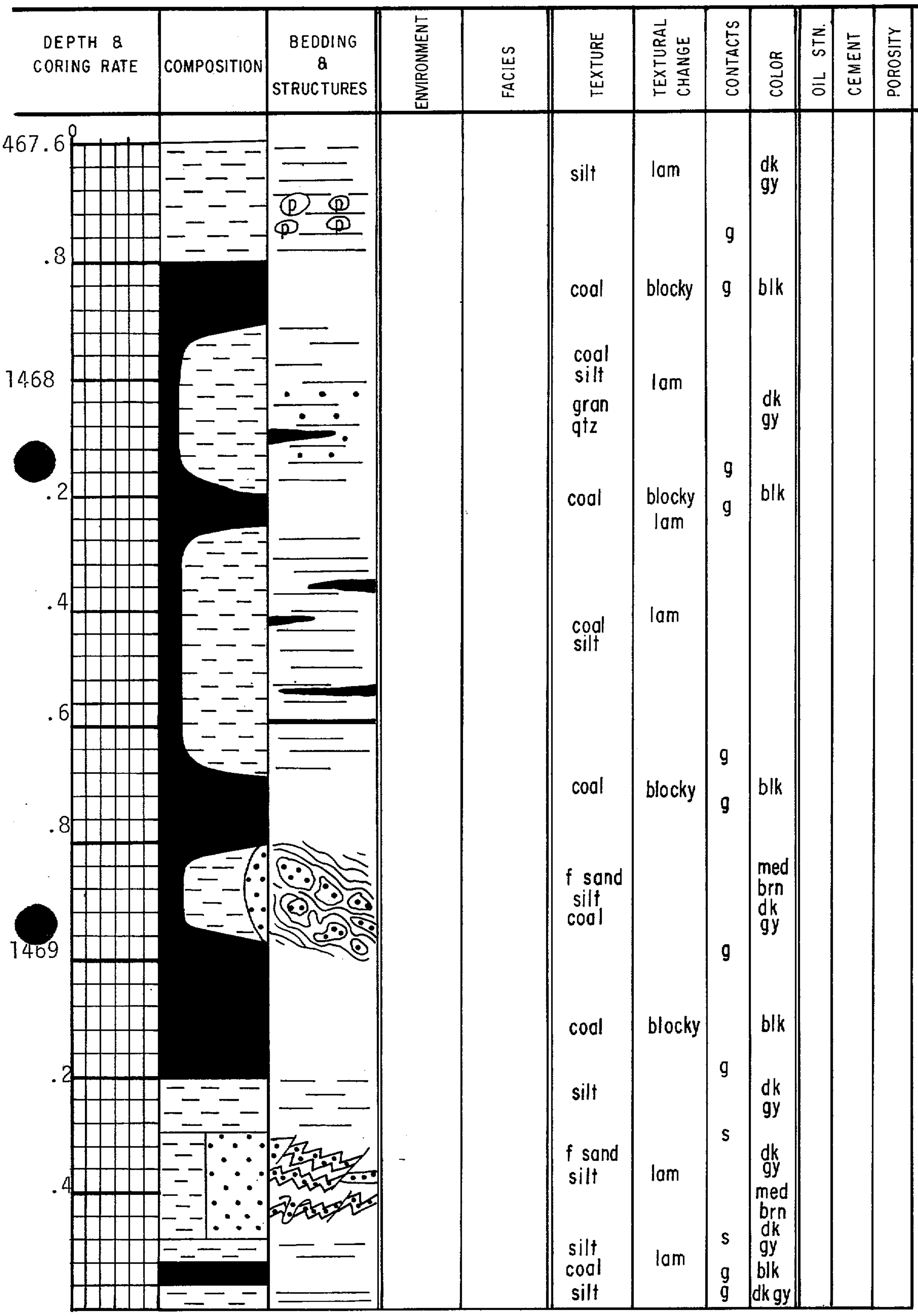
WELL SEAHORSE-1

SCALE 1:100

CORE No. 5

Interval Cored 1465.6-1479.6 **Cut** 14.0 **Recovered** 11.0 (78.5 %) **Fm.** LATROBE

Bit Type **Bit Size** in., **Desc by** J.D. Alder **Date** 11.8.78



REMARKS

SILTSTONE: Dark grey firm carbonaceous micaceous abundant nodules of pyrite 1-2 mm occur in upper siltstone. Loose granular quartz disseminated in second siltstone.

Bedding defined by coally laminae and lighter med-dark brown siltstone laminae.

SANDSTONE: Med brown firm Quartzose compact clay matrix.

Subangular to Subrounded

Poorly sorted beds contorted.

ESSO AUSTRALIA LTD.

CORE DESCRIPTION

SHEET 3 OF 6

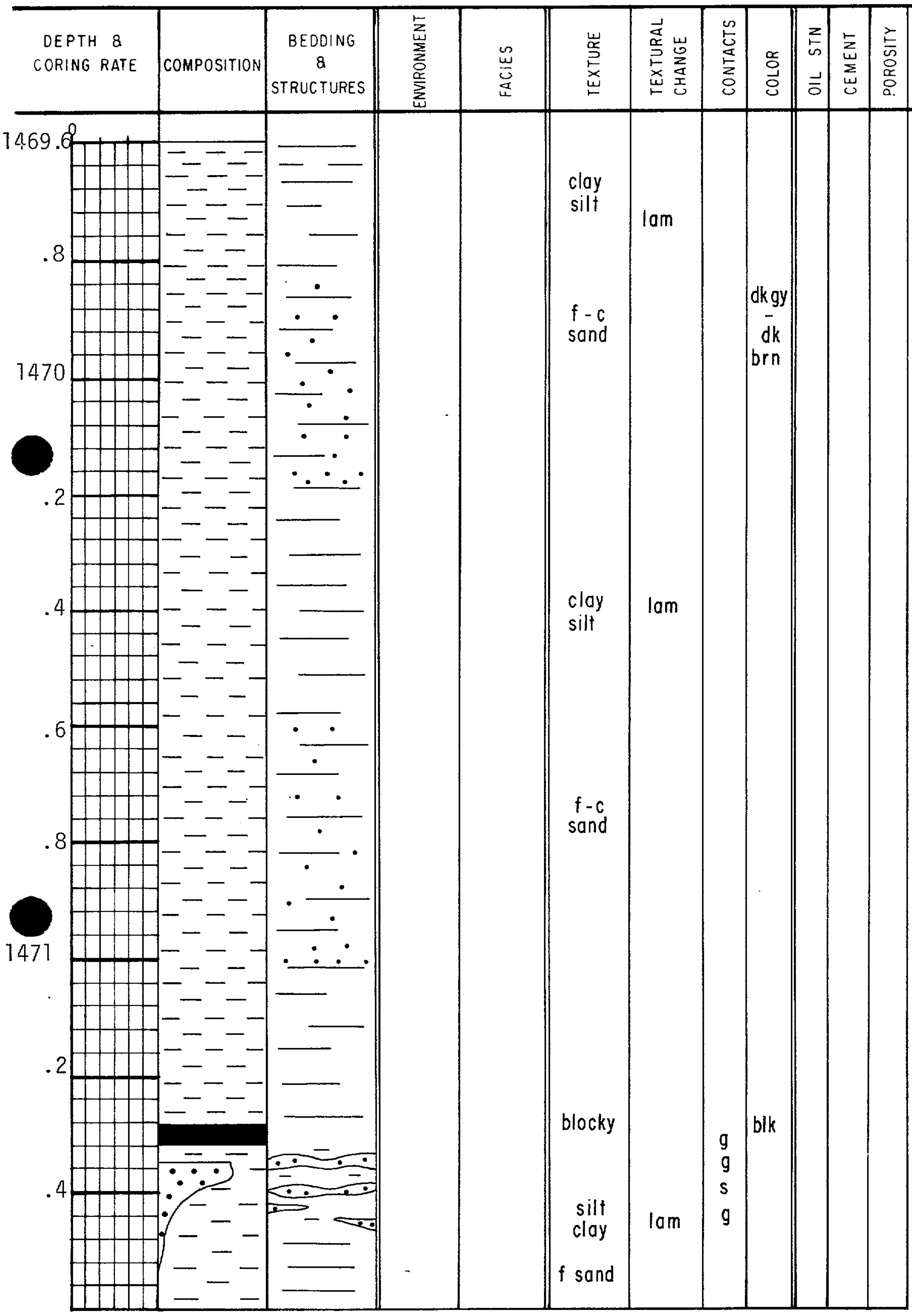
WELL SEAHORSE-1

SCALE 1:100

CORE No. 5

Interval Cored 1465.6-1479.6 **Cut** 14.0 **Recovered** 11.0 (78.5 %) **Fm.** LATROBE

Bit Type **Bit Size** in., **Desc by** J.D. Alder **Date** 11.8.78



REMARKS

SILTSTONE: Dark grey to dark brown, firm micaceous carbonaceous. Pyritiferous bedding defined by micaceous and coaly laminae. Rare very fine to granular sand showing grading coarser towards base.

SANDSTONE: Light brown fine subangular to subrounded. Well sorted Trace clay matrix.

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

CORE DESCRIPTION

SHEET 4 OF 6

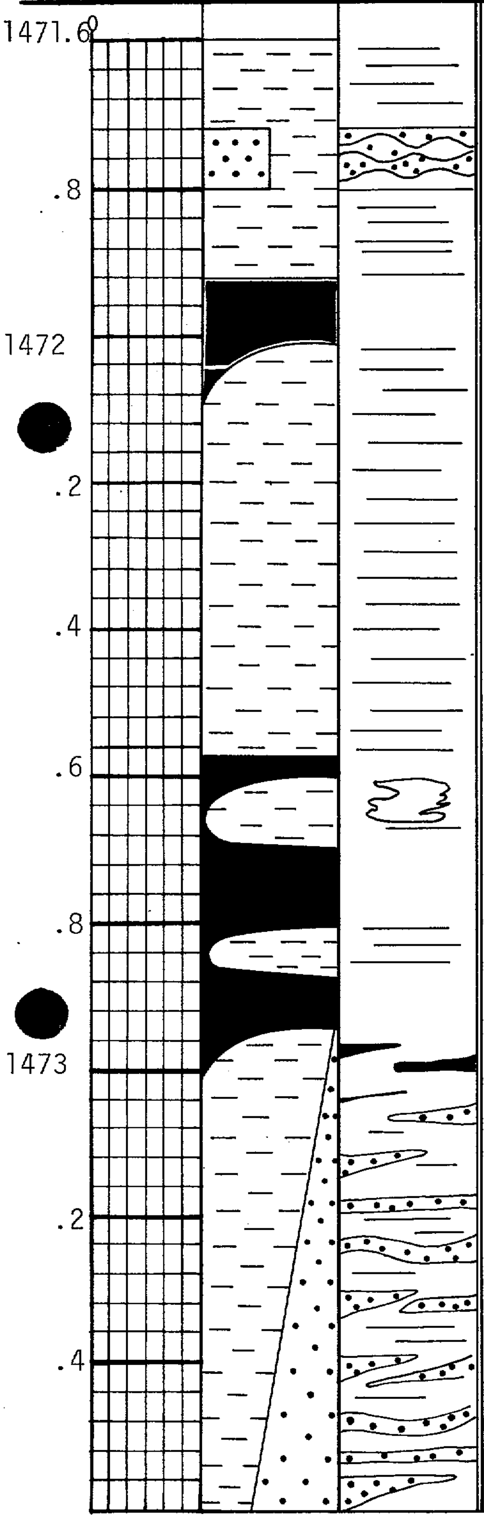
WELL SEAHORSE-1

SCALE 1:100

CORE No. 5

Interval Cored 1465.6-1479.6 **Cut** 14.0 **Recovered** 11.0 (78.5%) **Fm.** LATROBE

Bit Type .... **Bit Size** .... in., **Desc by** .... **Date** 11.8.78



DEPTH & CORING RATE	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
					silt							
					f sand	lam	g g	lt gy				SILTSTONE: Dark grey to dark brown - firm micaceous carbonaceous Pyritiferous.
					silt							
					coal	blocky	g g	blk				
					clay silt	lam		dk gy				
					coal silt	lam	g g	blk dk gy				Single large 2 cm pyrite nodule very fine grained.
					coal	blocky	g	blk dk gy				
					silt	lam	g					
					coal		g g	blk				
					f sand clay silt	lam	g	dk gy lt yell gy			low	SANDSTONE: Fine grained Sa-Sr med. sorted firm micaceous. Light yellow grey.

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

CORE DESCRIPTION

SHEET 5 OF 6

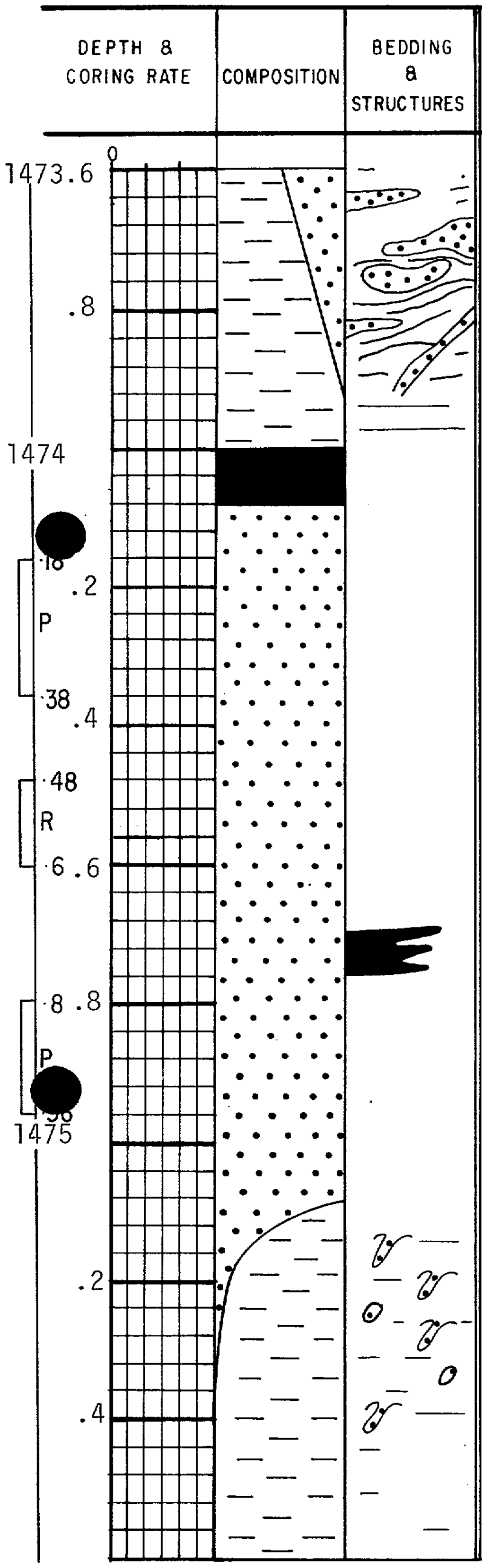
WELL SEAHORSE-1

SCALE 1:100

CORE No. 5

Interval Cored 1465.5-1479.6 **Cut** 14.0 **Recovered** 11.0 (78.5 %) **Fm.** LATROBE

Bit Type **Bit Size** in., **Desc by** J.D. ALDER **Date** 11.8.78



ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY
		f-c sand silt clay	lam	g	lt-dk gy			
				s				
		blocks		s	blk			
		f-c sand	bedded lam		lt gy			15-20%
				g				
		sand silt clay	lam		lt-dk gy			

REMARKS

SANDSTONE: Fine to Med. Grain Sa-Sr. Med to Well sorted. Light Grey Friable Carbonaceous with rare streaks and coally bands. Trace med grey silty laminae. Intergranular Porosity 15-20%. Mod. petrol. odour. Minor streaky patches dull yellow fluor streaming milky cut.

SILTSTONE: Dark grey to dark brown. Firm micaceous carbonaceous.

ESSO AUSTRALIA LTD.

CORE DESCRIPTION

SHEET 6 OF 6

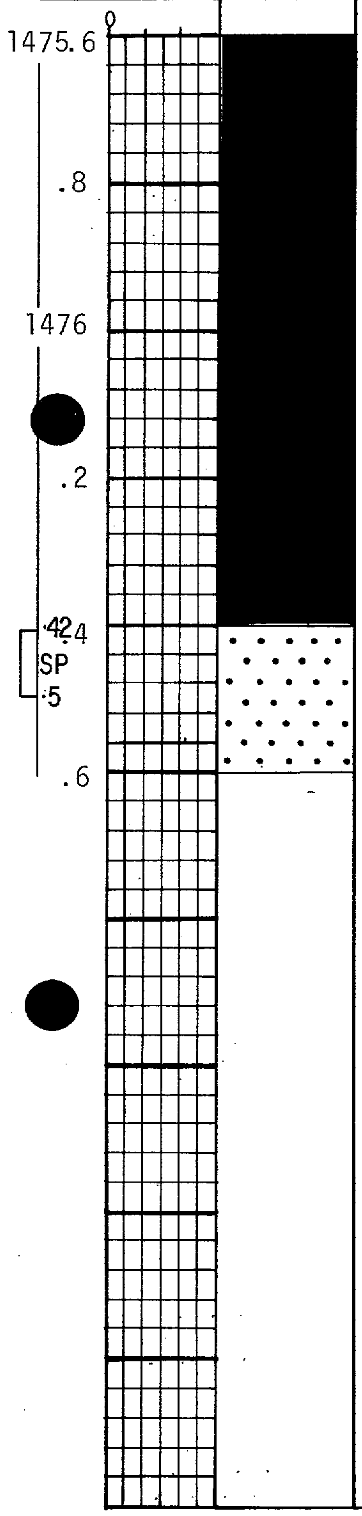
WELL SEAHORSE-1

SCALE 1.100

CORE No. 5

Interval Cored 1465.6-1479.6 **Cut** 14.0 **Recovered** 11.0 (78.5 %) **Fm.** LATROBE

Bit Type **Bit Size** in., **Desc by** J.D. Alder **Date** 11.8.78



DEPTH & CORING RATE	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
					blocky			blk				COAL: Bituminous. Bright. Some shaley laminae. Minor dull bands.
					mass gran sand		s	buff			25%	SANDSTONE: Quartz coarse to medium Sa to S medium well sorted. Very friable trace muscovite. No odour good porosity 25%. No fluorescence. No cut.

Dwg. 1107/OP/87

CL-811-1

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

Page No. 1

CORE ANALYSIS RESULTS

Company ESSO AUSTRALIA LTD. Formation ______ File WA-CA-18
Well SEAHORSE NO 1 Core Type CONVENTIONAL Date Report 14 AUG 78
Field WILDCAT Drilling Fluid ______ Analysts DS
County AUSTRALIA State VIC Elev. ______ Location BASS STRAIT

Lithological Abbreviations

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

SAMPLE NUMBER	DEPTH ~~FEET~~ M	PERMEABILITY MILLIDARCYS	POROSITY PER CENT	RESIDUAL SATURATION PER CENT PORE		SAMPLE DESCRIPTION AND REMARKS
				OIL	TOTAL WATER	
1	1425.5-1425.59m	82	24.2	14.1	42.7	SST:lt brnish gy,vf-f to occ med,gr firm-mod hd,mod sort,clay mtx, ang-subrnd,occ carb argill lams faint dull yell flu,instant milky wht yell cut.
2	431.1-1431.27m	286	23.5	13.5	45.5	SST:lt brn,vf-med grn,mod hd,poor sort,silty cly mtx,ang-subrnd,t mica,rare py,flu and cut a/a.
3	1435.54-1435.67m	112	21.4	9.1	32.6	SST:lt brnish gy,vf-crse grn,firm, poor sort,cly mtx silty in part ang-rnd,occ carb argill lams, lenses of pl brn siltstone and v/crse sand,flu and cut a/a.
4	1457.2-1457.4m	79	19.1	1.2	72.4	SST:lt gy,f-v/crse grn,v/friable,po sort,wht cly mtx silty in part, ang-rnd,v/faint dull yell flu, milky wht yell cut,probably flushed by drilling fluid.
5	1458-1458.15m	176	25.1	10.9	54.9	SST:v/lt gy,vf-fgrn rare v/crse grn friable,mod-well sort,clay mtx, dom subang,faint dull yell flu, instant milky wht yell cut.
6	474.18-1474.38m	39	21.2	5.3	72.2	SST:med gy,silty-vf grn,firm,mod hd, silty cly mtx,subang-subrnd,abun silty argill carb lams,tr mica,v, faint dull yell flu,milky wht ye cut.
7	1474.8-1474.96m	29	18.5	8.2	49.4	SST:med gy,silty-med grn occ crse, firm,v/poor sort,silty cly mtx, subang-subrnd,abunt silty carb argill lams,tr mica,flu&cut a/a

NOTE:Porosity and Permeability determined at overburden pressure.

Table II
Core Properties
Seahorse 1

Depth, m	Porosity % PV	Permeability, md		Grain Density gm/cc	Test
		k_o(cw)	k_a		
1413.36	17.8		72	2.67	P & P*
1413.40V	17.4		63	2.65	P & P
1425.34					Reserved for possible W-O Displacement, P & P
1425.37V	.55		.94	2.58	P & P
1430.13					Reserved for possible W-O Displacement
1430.15				Composite	
1430.17					P & P
1430.19					
1430.77					Reserved for possible W-O Displacement
1430.80					
1430.83					P & P
1433.23					Reserved for possible W-O Displacement
1433.28					Reserved for possible W-O Displacement, P & P
1435.03					Reserved for possible W-O Displacement
1435.07	25.0		870	2.59	P & P
1435.47	17.8		100	2.55	P & P
1435.52V	24.7		37	2.62	P & P
1435.84					
1435.89	27.4		3500	2.66	P & P
1459.03	25.2		287	2.62	P & P
1459.07V	26.4		233	2.40	P & P
1459.13	26.4		340	2.64	P & P
1459.17					
1459.46					
1459.50	25.3		285	2.63	P & P
1465.64					
1465.70	24.4		650	2.64	P & P
1465.78V	23.9		350	2.64	P & P

*Permeability and Porosity

Rec'd 2-8-79

1

WATERFLOOD PRODUCTION DATA

Field Seahorse Reservoir

Well 1

Test Condition 160°F 2000 psi

Core No., Depth, m.	Length cm	S_{cw} % P.V.	k_o (cw) md	μ_o/μ_w
Composite 1 1430	33.83	27.8	141	0.419

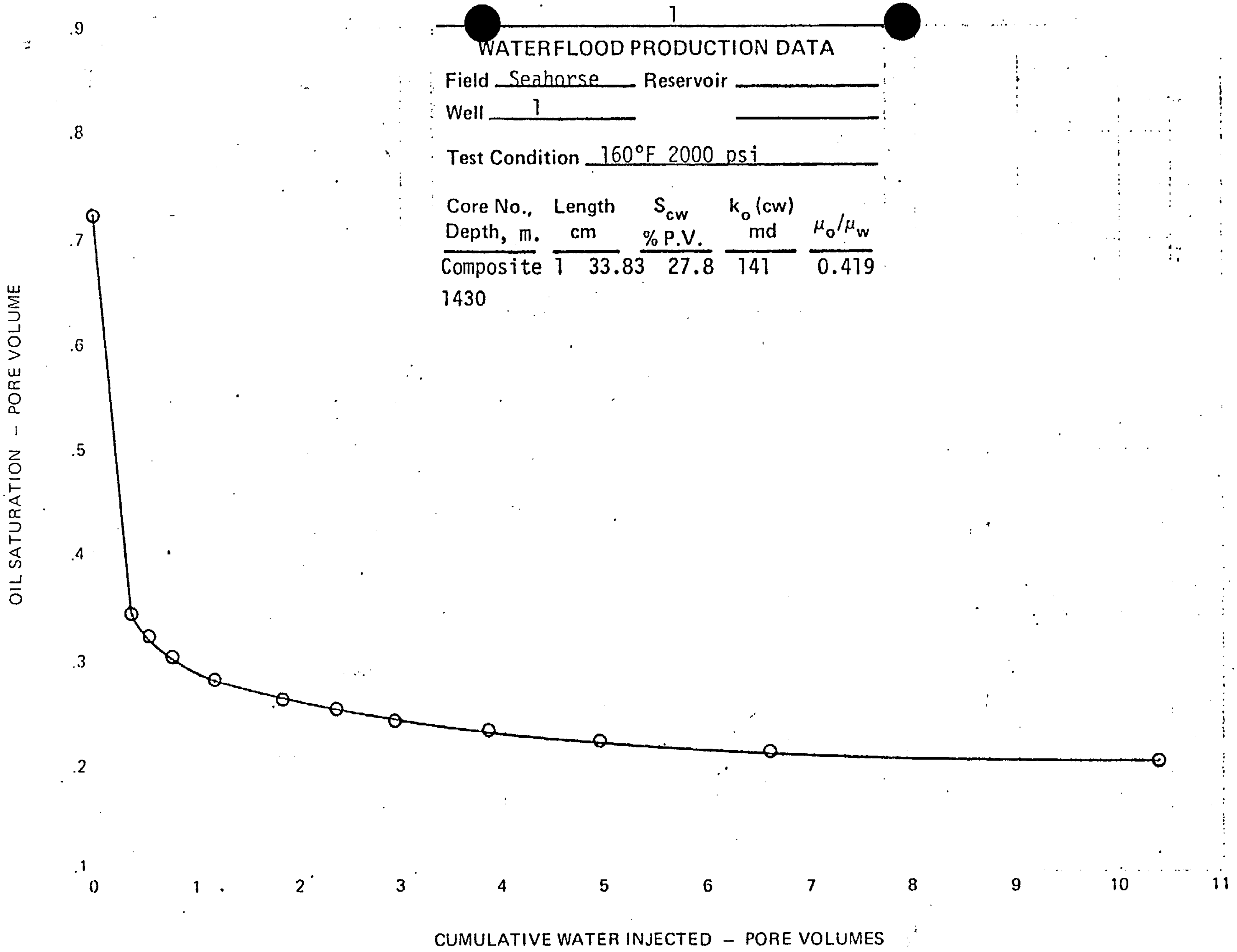


FIGURE 2

OIL-WATER RELATIVE PERMEABILITY BY WATERFLOOD

Field Seahorse Reservoir

Well 1

Core Composite 1

Depth, m. 1430

Permeability, k_o (cw), md 141

Connate Water, % P.V. 27.8

Porosity, % B.V. 24.2

Oil Viscosity, cp 0.197

Brine Viscosity, cp 0.470

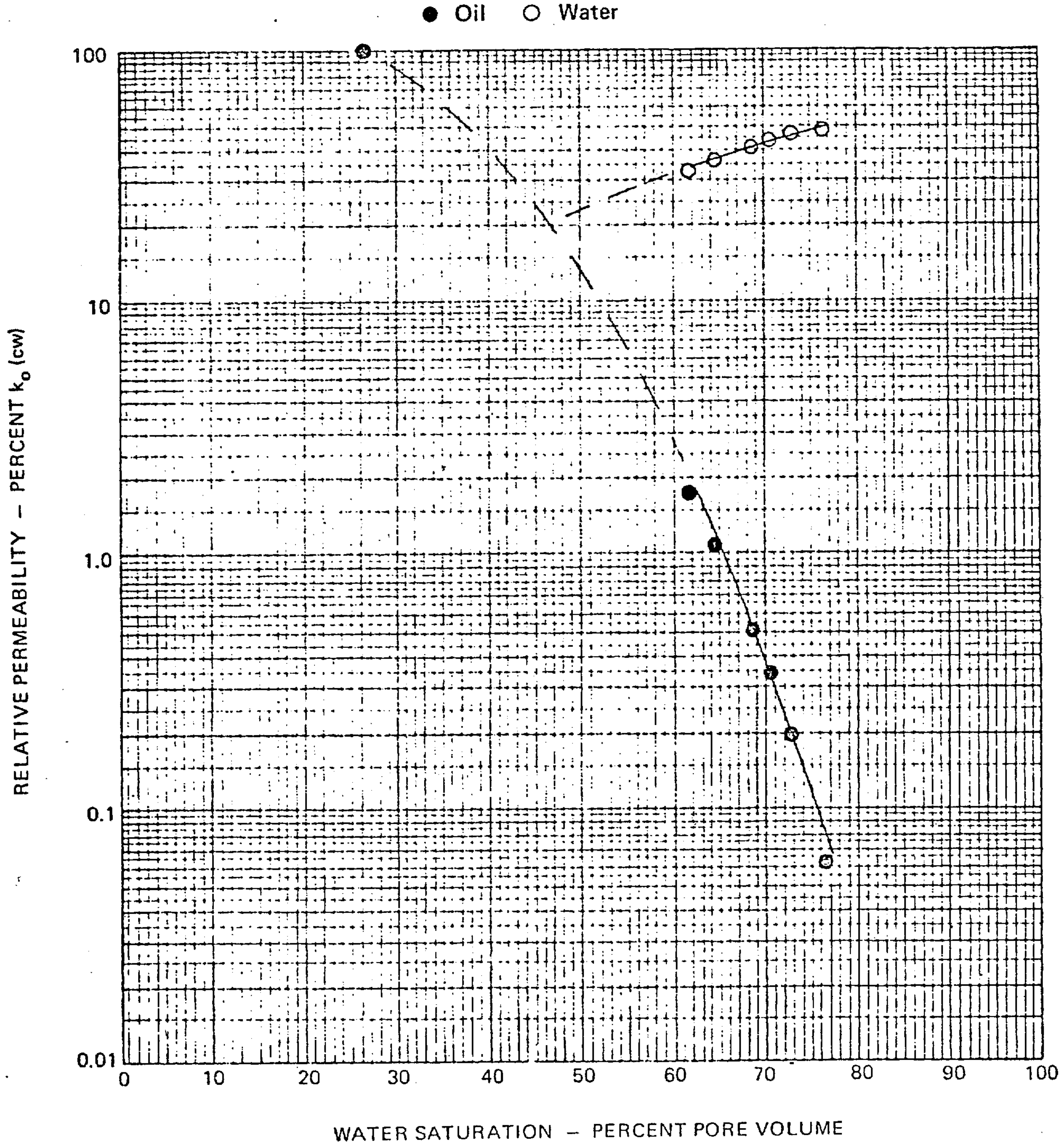


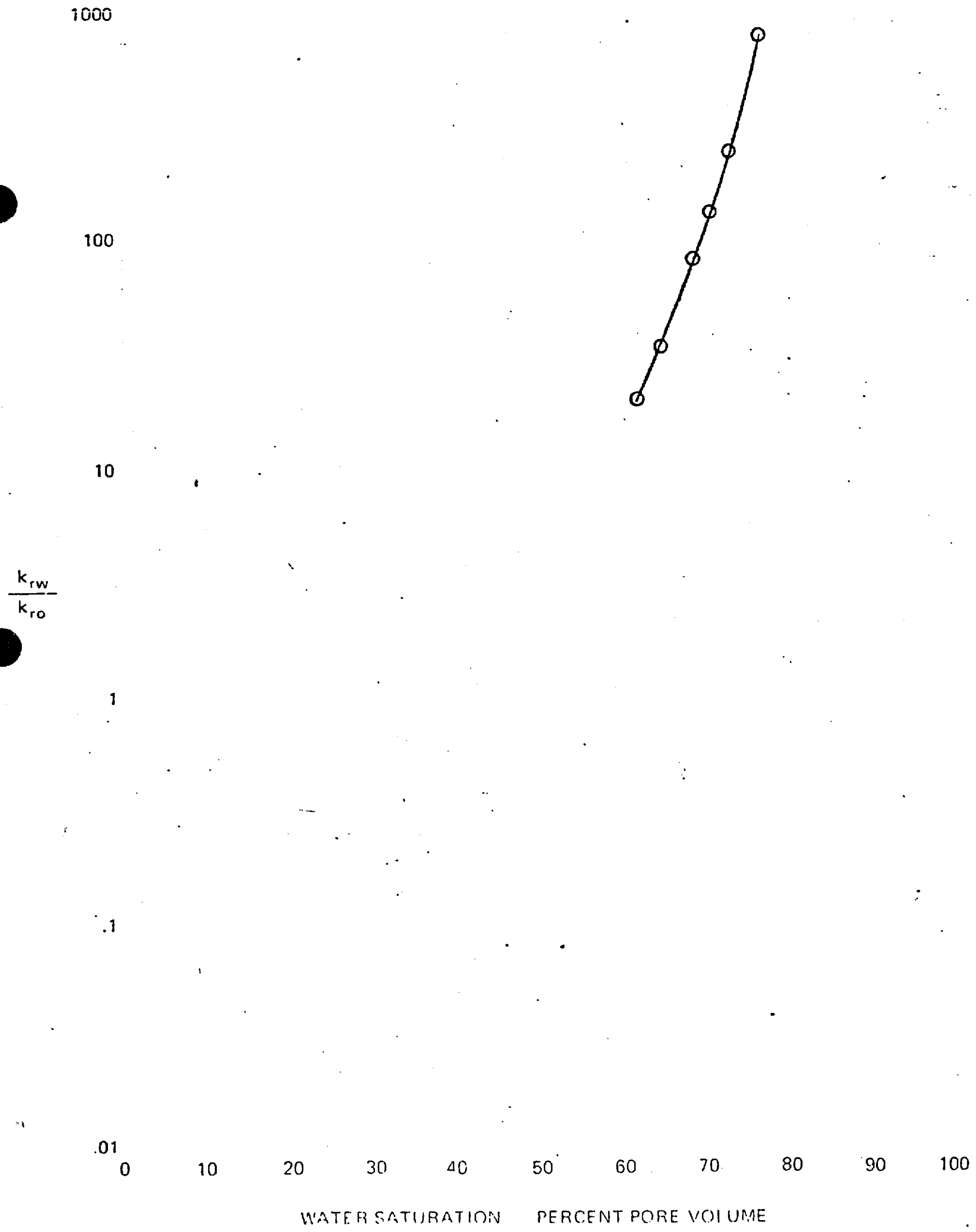
FIGURE 3

OIL-WATER RELATIVE PERMEABILITY RATIO

Field Seahorse Reservoir

Well 1

Core No.,	Depth, m.	Permeability k_o (cw), md	Connate Water % P.V.
Composite 1		141	27.8



Oil Analysis, letter 3-1-79.

REPORT No.: 8-17-78

NATA

ESSO AUSTRALIA LTD.

GIPPSLAND LABORATORY

COPY

Sample: SEA HORSE 1 CRUDE
Sample Source: #1 WELLHEAD
Date Sampled: 29.8.78
Pressure: 5674 kPa
Temperature: 20°C

COMPONENT	WEIGHT %	COMPONENT	WEIGHT %
Oxygen Nitrogen	0.076	Isobutane	2.217
Carbon Dioxide	0.202	*n*-Butane Neopentane	4.058
Methane	3.328	Isopentane	2.974
Ethane	2.734	*n*-Pentane	3.186
Propane	5.194	Hexanes and heavier *	76.031

** Density by Pycnometer ASTM D 1480-62 (Reapproved 1976)
0.7792 g/ml
*** Corrected to 60°F.

Remarks:
1. Although these results are reported to three and four decimal places, this bears no relationships to the accuracy of the analysis.
2. Chromatographic analysis in accordance with Esso Method GL 1.
3. Depentanisation in accordance with Esso Method GL 2.
*4. By difference assuming the balance is hexanes and heavier.
**5. Determined on depentanised fraction.
***6. Using ASTM - IP Petroleum Measurement Tables 1953.

Tested by
Checked by
Date of Testing 24.11.78
Approved Signatory
Date 4/12/78

This laboratory is registered by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its terms of registration.

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APPENDIX 3

APPENDIX 3

14 pages VDME

SIDEWALL CORE DESCRIPTIONS

C.F.J. SWARBRICK

SEAHORSE-1

3.8.78

SWC NO.	DEPTH	RECOVERED	DESCRIPTION
			RUN 1
1	990m	60mm	Calcarenite - light grey to off-white, speckled, very fine to fine, moderately sorted, subangular grains, mainly detrital, in calcareous cement, very small amount clay present, carbonaceous specks throughout, rare glauconite. No odour, trace mineral fluorescence.
2	975m	30mm	Siltstone - calcareous, argillaceous, medium grey to medium grey brown, firm, well sorted, 35-40% clay present, silt and very fine sized fossil fragments - mainly benthonic forams, micromicaceous. No stain, fluorescence, petroliferous odour or taste.
3	960m	16mm	Calcarenite - light grey to medium grey, speckled with fine carbonaceous flecks, very fine to fine silt, poorly sorted, strongly calcareous, ± 10% disseminated clay when dissolved with acid. No stain, fluorescence, petroliferous odour or taste.
4	945m	25mm	Calcarenite - medium grey to light grey, speckled, very fine to silt, moderately sorted, strongly calcareou 15% disseminated clay. No stain, fluorescence, petroliferous odour.
5	923m	45mm	Siltstone - argillaceous, calcareous, medium grey, firm, 30-35% clay abundant fossil fragments - forams, shell and coral debris, up to 1mm in length. Slightly micromicaceous. No stain, trace mineral fluorescence, no petroliferous odour.
6	895m	28mm	Siltstone - argillaceous, calcareous, medium grey, firm, ± 30% clay, fossil fragments common, types as above, up to 1mm in length, slightly micromicaceous. No stain, fluorescence or petroliferous odour.
7	870m	50mm	Calcarenite - white, speckled, friable, very coarse to fine, poorly sorted, subangular to subrounded, detrital grains composed of probable reworked fossil fragments and 10% quartz and glauconite grains. Rock fragments, rounded to subrounded, dark grey, hard, 5-10% of grains. Matrix is light grey to white, marly - could be heavily contaminated with mud cake. No stain, no fluorescence, or petroliferous odour.
8	840m	50mm	Siltstone - calcareous, argillaceous, fossiliferous, medium grey to medium grey brown, firm, contains abundant thin shell and foram fragments aligned subparrallel to bedding, shell fragments up to 5mm in length. Trace glauconite, slightly micro-micaceous. No stain trace mineral fluorescence, no petroliferous odour.
9	810m	55mm	Sandstone - weakly calcareous, glauconite, quartzose, light grey, friable, coarse to medium, moderately sorted, rounded to subrounded, intergranular porosity, white clay matrix is weakly calcareous, trace glauconite and carbonate grains. No stain, fluorescence, or petroliferous odour.
10	780m	53mm	Siltstone - calcareous, argillaceous, fossiliferous,

2/....

SWC NO.	DEPTH	RECOVERED	DESCRIPTION
10	780m	53mm	Continued/.... medium grey to medium grey brown, firm, contains abundant thin shell and foram fragments aligned sub-parrallel. Shell fragments - mainly brachiopods, up to 5mm long. Trace glauconite. No stain, fluorescence, or petroliferous odour.
11	750m	40mm	Limestone (Calcilutite) - argillaceous, fossiliferous, medium grey, firm, contains common foram, coral and echinoid debris, strongly calcareous, argillaceous, silty in part. No stain, dull spotty mineral fluorescence, no petroliferous odour.
12	720m	35mm	Limestone - argillaceous, fossiliferous, medium grey to medium light grey, firm, containing dispersed fossil fragments - mainly foram fragments and echinoid spines. Slightly silty in part, slightly micromicaceous. No stain, fluorescence, or petroliferous odour.
13	690m	33mm	Limestone (Calcisiltite) - argillaceous, medium light grey, firm, slightly micromicaceous. No stain, fluorescence or petroliferous odour.
14	660m	40mm	Limestone (Calcisiltite) - argillaceous, fossiliferous, medium light grey, firm, very fine to silt size carbonate grains, scattered fossil fragments, very coarse to granule size, mostly benthonic forams. 10-15% clay when dissolved in acid. No stain, fluorescence or petroliferous odour.
15	630m	50mm	Limestone (Calcarenite) - sandy, medium light grey to light grey, firm, very fine to fine carbonate grains, moderately sorted, subangular, in calcareous matrix. ± 10% of rock composed of very fine and silt size quartz, occasional glauconite grains and silt size carbonaceous flecks, micromicaceous. No stain, fluorescence or petroliferous odour.
			J.D. ALDER
16	613m	50mm	Sandstone - Quartzose, white to medium light grey, medium to coarse grained, rounded to subrounded, well sorted, friable, matrix is grey calcareous clay, trace carbonaceous flecks some carbonate grains. No stain, fluorescence or petroliferous odour.
17	595m	45mm	Limestone (Calcarenite) - medium light grey, firm, fine to very fine grained, subangular to subrounded, moderately sorted carbonate grains in calcareous matrix 5% of rock composed silt sized quartz. Traces of glauconite and carbonaceous flecks. No stain, fluorescence or odour.
18	570m	50mm	Limestone - argillaceous, medium grey to light grey brown, firm, very fine to silty, very calcareous, scattered medium to coarse carbonate grains 20% clay. Trace of fine grained pyrite nodules. No stain, fluorescence or odour.

3/....

SIDEWALL CORE DESCRIPTIONS J.D. ALDER

SEAHORSE-1 3.8.78

SWC NO.	DEPTH	RECOVERED	DESCRIPTION
19	540m	50mm	Limestone - argillaceous, medium grey, firm, slightly silty, slightly micromicaceous, some dispersed fossil fragments - mainly echinoid spines and foram fragments. No stain or odour, some faint yellow mineral fluorescence.
20	510m	50mm	Limestone - argillaceous, medium grey, firm, slightly micro-micaceous, some dispersed fossil fragments - mainly echinoid spines, no stain or odour, minor faint mineral fluorescence.
21	485m	20mm	Limestone - (Calcarenite) white to light grey, very fine to coarse carbonate grains, poorly sorted, subangular to rounded in calcareous matrix, carbonaceous grains common, some fossil fragments, mainly echinoid spines and shell debris. No stain or odour, spotty yellow mineral fluorescence.
22	450m	60mm	Limestone - argillaceous, medium grey, firm, slightly micro-micaceous, some dispersed fossil fragments, mainly echinoid spines. No stain, odour or fluorescence.
23	420m	55mm	Limestone - argillaceous, medium grey, firm, slightly micro-micaceous, trace glauconite, some dispersed fossil fragments, mainly echinoid spines, some hard cemented nodules up to 3mm. No stain, odour or fluorescence.
24	390m	50mm	Limestone - argillaceous, medium grey, firm, trace glauconite, some dispersed fossil fragments, mainly echinoid spines and corals. No stain, odour or fluorescence.
25	360m	60mm	Limestone - calcarenite, light grey, very fine to fine, subangular to subrounded, moderately sorted carbonate grains in calcareous matrix glauconite and carbonaceous grains, common, some fossil fragments mainly echinoid spines and corals. No stain, odour or fluorescence.
26	325m	60mm	Limestone (Calcisiltite) - medium light grey, fossiliferous, firm, very fine to silt size carbonate grains, scattered fossil fragments, coarse to granule, mostly forams, echinoid spines, corals. No stain, odour or fluorescence.
27	300m	50mm	Limestone (Calcarenite) - medium to coarse grained, medium light grey (salt and pepper appearance) subangular to rounded, well sorted, firm, fossiliferous, fossil fragments, mainly shell debris, glauconitic,abundant carbonaceous grains. No odour, fluorescence or stain.
28	265m	60mm	Limestone (Calcisiltite) - medium to light grey, fossiliferous, firm, very fine to silt size carbonate grains, abundant fossil fragments, coarse to very coarse size mainly shell debris. Trace of glauconite. Carbonaceous grains common. No odour, fluorescence or stain.
29	240m	40mm	Limestone (Calcarenite) - medium light yellow grey, very fine grained, subangular to subrounded, very well sorted carbonate grains, firm, trace glauconite and carbonaceous grains. Some fossil fragments mainly echinoid spines and shell debris. No odour, fluorescence or stain.

4/....

SEAHORSE-1 3.8.78

SWC NO.	DEPTH	RECOVERED	DESCRIPTION
30	210m	40mm	Limestone (Calcarenite) - medium to light yellow grey, very fine grained, subangular to subrounded, well sorted carbonate grains, firm, glauconite and carbonaceous grains common, some fossil fragments mainly echinoid spines and shell debris. No odour, fluorescence or stain.

VDME

SIDEWALL CORE DESCRIPTIONS

J.D. ALDER

SEAHORSE-1

21.8.78

SWC NO.	DEPTH	RECOVERED	DESCRIPTION
			RUN 2
31	1862m	35mm	Sandstone - very fine grained, white to light grey, quartzose, angular to subrounded, moderately sorted. 10-15% white clay matrix, micaceous, trace pyrite, slightly calcareous, minor band coal, black bituminous resinous. No fluorescence, no odour.
32	1852m	15mm	Sandstone - light to medium light grey, very fine to fine grained quartzose, angular to subrounded, moderately sorted, trace white clay matrix, slightly calcareous, micaceous, trace pyrite, carbonaceous streaks forming bedding laminae are common. No fluorescence, no odour.
33	1847.5m	30mm	Claystone - light grey clay, soft, silt size, micaceous flakes and fine grained pyrite nodules, trace carbonaceous flecks.
34	1839.8m	25mm	Siltstone - green grey quartzose, micaceous, firm, carbonaceous streaks along lamine and fossil roots. Trace pyrite, no fluorescence, no odour.
35	1824m	25mm	Sandstone - light grey quartzose, fine to medium grained, friable, subangular to subrounded, moderately sorted, slightly calcareous; grains are clear polished, occasional frosted grains, 5% white clay matrix, trace glauconite, no fluorescence, no odour. No reaction with alizarin red.
36	1805m	40mm	Siltstone - light to medium light grey, quartzose, firm, occasionally fine grained clear frosted, rounded to subrounded quartz grains, trace carbonaceous flecks, slightly calcareous, trace mica. No fluorescence, no odour.
	1790.2m	25mm	Sandstone - light grey quartzose, very friable, medium to fine grained, angular to subrounded, well sorted clear grains, polished, rarely frosted. Trace rock fragments, good intergranular porosity 20%+. No fluorescence, no odour.
38	1781m	20mm	Sandstone - white to light grey quartzose, very fine to fine grained, angular to subrounded, friable, moderately sorted, micaceous, occasional fine grained pyrite nodules. 10% white clay matrix interbedded with Mudstone - brown, micaceous, firm very finely laminated, slightly calcareous.
39	1778m	40mm	Coal - black, bituminous, dull, abundant pyrite. Trace resin, firm.
40	1773m	25mm	Siltstone - very light grey to white quartzose. Trace carbonaceous flecks, abundant pyrite, firm.
41	1762	30mm	Sandstone - light to medium light grey, medium grained-granule, subangular to subrounded, well sorted, clear to milky and frosted grains, unconsolidated, trace pyrite. Good intergranular porosity 20% +. No fluorescence, no odour.
42	1744m	30mm	Sandstone - quartzose, light grey to medium light grey,

2/....

SIDEWALL CORE DESCRIPTIONS J.D. ALDER

SEAHORSE-1 21.8.78

SWC NO.	DEPTH	RECOVERED	DESCRIPTION
42	1744m	30mm	Continued/.... fine to medium grained, subangular to subrounded, moderately sorted, clear to smokey and polished grains. Friable 5-10% white clay matrix. Trace mica, trace carbonaceous material. No fluorescence, no odour.
43	1723m	40mm	Sandstone - quartzose, very fine to fine grained, angular to subrounded, well sorted, clear polished grains friable 5% white clay matrix. Trace pyrite in general - pyrite vein bisects rock. No fluorescence, no odour.
44	1711.5m	25mm	Sandstone - light grey, very fine grained to silty, quartzose hard, moderately sorted, carbonaceous flecks, common, trace mica, trace pyrite, trace glauconite, very slightly calcareous. No fluorescence, no odour.
4	1705.5m	45mm	Sandstone - quartzose, light to medium grey, fine grained to pebbly (10mm) mainly medium to granular, very friable, angular to subrounded grains, poorly sorted clear to smokey frosted grains, slightly calcareous, good inter-granular porosity. 20% trace white clay matrix. No fluorescence, no odour.
46	1692.5m	25mm	Interbedded Sandstone and Siltstone Sandstone - light grey, very fine grained quartzose, micaceous, moderately sorted, friable. Siltstone - brown, micaceous, very finely laminated, firm, carbonaceous streaks along laminae. No fluorescence, no odour.
47	1690m	20mm	Sandstone - white to light grey, friable, fine to coarse grained, angular to subrounded, well sorted, clear to smokey frosted grains. 20% rock fragments - coal, quartzite and mudstone. 30% white clay matrix, low porosity. No fluorescence, no odour.
48	1670m	45mm	Siltstone - light to medium grey, firm, quartzose, carbonaceous in part, laminated. No fluorescence, no odour.
49	1657m	35mm	Sandstone - Quartzose, white to very light grey, friable, medium to very coarse grained, subangular to subrounded, well sorted clear frosted grains, trace of white clay matrix, trace of black coal grains. Good intergranular porosity. No fluorescence, no odour.
50	1645.5m	30mm	50% Pyrite 50% Quartz - white, clear to milky, fine to medium grained, angular to subangular, unconsolidated, moderately sorted, good porosity. No fluorescence, no odour.
51	1638.5m	35mm	Sandstone - light grey quartzose, friable, medium to very coarse grained, subangular to subrounded, well sorted, clear to smokey frosted grains. 5% white clay matrix, 20% pyrite, as loose grains and encrustations on quartz. Good intergranular porosity 20%. No fluorescence, no odour.

3/....

SIDEWALL CORE DESCRIPTIONS

J.D. ALDER

SEAHORSE-1

22.8.78

SWC NO.	DEPTH	RECOVERED	DESCRIPTION
52	1627.5m	35mm	Sandstone - buff quartzose, fine to very coarse grained, predominantly medium to coarse grained, subangular to subrounded, moderately sorted, clear to smokey frosted, occasional polished grains, friable 5% white clay matrix. Trace calcareous, trace Pyrite. Good intergranular Porosity 15-20%. No fluorescence - no odour.
53	1623.3m	20mm	Sandstone - very light grey quartzose, very fine to medium grained, subangular to subrounded, poorly sorted, clear to milky frosted grains, friable. 5% white clay matrix, 5% pyrite. Minor very thin laminae of siltstone, firm, brown carbonaceous,micaceous. Even dull blue white fluorescence with a slow dull milky cut.
54	1622.3m	25mm	Siltstone - cream to brown to black quartzose, finely laminated, firm, micaceous, carbonaceous with occasional laminae of coal. Coal is black bituminous and bright occasional pyrite nodules. No fluorescence, no odour.
55	1619.5m	15mm	Siltstone - very light grey quartzose, firm, trace - micaceous, trace carbonaceous flecks. No fluorescence, no odour.
56	1614.5m	50mm	Claystone - pale brown to brown, firm, contains random grains of coal and quartz which are subrounded up to ½mm diameter. Disseminated and nodular pyrite also occur. Some surfaces show slicken-slides. No fluorescence, no odour.
57	1609m	30mm	Sandstone - very fine to very coarse, subangular to subrounded, poorly sorted, clear to smokey frosted grains buff to very light grey quartzose, friable, occasional nodules of pyrite 5% white clay matrix. Low visual porosity spotty bright blue white fluorescence, very slow dull milky cut, faint petroliferous odour.
58	1605.5m	30mm	Sandstone - very fine to fine, subangular to subrounded moderate to well sorted, clear to smokey frosted grains, light grey to light yellow brown quartzose, friable, some carbonaceous and micaceous laminae, brown to black. The more quartzose beds give even faint blue white fluorescence with dull milky cut.
59	1591.5m	45mm	Sandstone - light grey quartzose, friable, fine to granule,predominantly medium to very coarse grained, subangular to subrounded, moderately sorted, clear to smokey frosted grains, trace white clay matrix, trace pyrite. Good intergranular porosity 25%. No fluorescence, no odour.
60	1583.6m	40mm	Sandstone - very light to light grey, very fine to fine grained friable quartzose, angular to subrounded, well sorted clear grains. Traces of mica, carbonaceous flecks and pyrite. No fluorescence, no odour.
61	1571m	35mm	Sandstone - medium grey quartzose, friable, very fine to fine grained, angular to subrounded, moderately sorted, clear to smokey, polished, occasionally frosted grains. Micaceous flakes common. No fluorescence, no odour.

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SIDEWALL CORE DESCRIPTIONS J.D. ALDER

SEAHORSE-1 22.8.78

SWC NO.	DEPTH	RECOVERED	DESCRIPTION
62	1553.5m	15mm	Siltstone - medium light grey quartzose, firm, trace micaceous, rare carbonaceous flecks. No fluorescence, no odour.
63	1540m	25mm	Mudstone - chocolate brown, hard, streaks of carbonaceous material define fine laminae. Traces of mica and quartzose silt. No fluorescence, no odour.
64	1533.5m		NO SAMPLE
65	1523.5m	30mm	Sandstone - buff, quartzose, very fine to very coarse grained, subangular to subrounded, poorly sorted, clear to smokey frosted, occasionally polished grains, friable, rare coal grains 5% white clay matrix, fair visual porosity 15%. No fluorescence, no odour.
66	1521m	20mm	Sandstone - light yellow brown quartzose, fine to medium grained, subangular to subrounded, well sorted, clear to smokey, rarely milky, frosted, occasionally polished grains, unconsolidated, occasional rock fragments quartzite shale. Good porosity 25%. Faint even blue white fluorescence, very slow, very faint milky cut, faint petroliferous odour.
67	1516.5m	20mm	Sandstone - light yellow brown quartzose, fine to coarse grained, rarely granular, subangular to subrounded, poor to moderately sorted, clear to smokey frosted grains, friable, 5% white clay matrix, low visual porosity. Even bright blue white fluorescence dull yellow cut. Trace very faint yellow residue. Faint petroliferous odour.
68	1513.5m	25mm	Sandstone - yellow grey quartzose, fine to granule, predominantly medium to very coarse grained, subangular to subrounded, moderate to well sorted, clear to milky, occasionally smokey frosted grains, unconsolidated. Good porosity 20%. Even bright blue white fluorescence, bright yellow cut, trace pale yellow residue. Petroliferous odour.
69	1511.5m	30mm	Sandstone - yellow grey quartzose, fine to medium grained, subangular to subrounded, well sorted, clear to smokey, occasionally milky frosted grains, friable to unconsolidated, good porosity. Even bright blue white fluorescence, bright yellow cut. Trace pale yellow residue. Petroliferous odour.
70	1424.6m	30mm	Coal - black, bituminous, bright, blocky conchoidal fracture.
71	1411m	30mm	Sandstone - dark olive grey quartzose, silty to very coarse grained, predominantly biomodal, fine and very coarse grained, subangular to rounded, poorly sorted, clear to smokey frosted grains, friable to hard. Glauconite common. Trace of disseminated pyrite. Trace mica. No fluorescence, no odour.
72	1406m	30mm	Sandstone - reddish brown, hard quartzose, silty to granular, predominantly biomodal, silt and coarse to granular, poorly sorted, coarse material is quartz, occasionally glauconite, angular to rounded, clear frosted grains, fine material is glauconitic, pyritiferous,

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SIDEWALL CORE DESCRIPTIONS

J.D. ALDER

SEAHORSE-1

22.8.78

SWC NO.	DEPTH	RECOVERED	DESCRIPTION
72	1406m	30mm	Continued/.... pyrite, occasionally occurring in nodules up to 10mm diameter, very carboniferous. No fluorescence.
73	1402m	40mm	Claystone - chocolate brown, firm to hard, abundant glauconite, disseminated and vein pyrite. Very calcareous. Isolated pebble of calcarenite, no fluorescence.
74	1398m	35mm	Claystone - chocolate brown, hard, abundant glauconite, pyrite, common, very calcareous. Glauconite, fine to granular rounded grains, rare rounded quartz grains, no fluorescence
75	1395m	40mm	Claystone - chocolate brown, hard, 5% glauconite, pyrite abundant, very calcareous, trace rounded quartz grains, no fluorescence.
7[illegible]	1390m	35mm	Claystone - brownish grey, firm, trace rounded quartz grains, very calcareous, about 5% glauconite, trace of pyrite, no fluorescence.
77	1386m	40mm	Claystone - brownish grey, hard, abundant glauconite, 30-40% occurring as medium to coarse, rounded grains, very calcareous, trace rounded quartz grains. No fluorescence.
78	1382m	35mm	Claystone - brownish grey, hard, abundant glauconite occurring as rounded, medium to coarse grains, very calcareous.
79	1378m	40mm	Claystone - very light grey, hard, very rare silt size grains of glauconite, very calcareous.
80	1372m	35mm	Claystone - green, grey, firm to hard, very calcareous, occasionally rounded granule to pebbles of calcarenite - pebbles also contain pyrite.
81	1366m	45mm	Calcarenite - green, grey, firm, very calcareous, fine to very coarse, rounded, poorly sorted. 60% coarse material consists of 30% fine to coarse rounded glauconite grains. 70% fine to very coarse rounded calcite grains and fossil fragments - mainly forams and coral stems. 40% fine material is calcareous clay.

VDME

SIDEWALL CORE DESCRIPTIONS

R.C.N. THORNTON

17.8.78

SEAHORSE-1

SWC NO.	DEPTH	RECOVERED	DESCRIPTION
			RUN #3
82	1499.5m	40mm	Sandstone - light grey, quartz, clear, polished, very poorly sorted, medium to very coarse grained, subangular to subrounded, unconsolidated, very high porosity, trace white mica, trace light grey, very soft clay matrix, no fluorescence.
83	1491.5m	20mm	Sandstone - light grey, quartz, clear, very fine grained, well sorted, subangular to subrounded, friable, micro-micaceous, bedding and cross-bedding etched out by innumerable very fine brown carbonaceous laminae, light grey clay matrix, porosity poor to fair, trace specks of yellow fluorescence in carbonaceous layers.
84	1487.5m	20mm	Siltstone - chocolate brown, firm, quartz, micro-micaceous, pyrite, trace carbonaceous, very minor lenses of very fine grained clear quartz Sandstone, no fluorescence.
85	1481.5m	35mm	Interbedded Sandstone - light grey, quartz, clear, very fine grained, well sorted, firm, carbonaceous streaks, poor porosity, and minor Siltstone - chocolate brown, firm, quartz, micro-micaceous, carbonaceous, no fluorescence.
86	1422.8m	40mm	Claystone - chocolate brown, firm, massive, micro-micaceous.
87	1409.5m	35mm	Sandstone - brown, quartz, clear, medium to coarse grained, very poorly sorted, angular to rounded, glauconite, pyrite aggregates, set in soft brown clay matrix, poor porosity, friable, clay > 25%, no fluorescence.
88	1404.5m	40mm	Greensand - brown, soft, comprising glauconite pellets, well rounded, well sorted, medium grained, set in 25% brown, calcareous clay, pyrite common, very poor porosity, no fluorescence.
89	1400.5m	0mm	EMPTY BULLET.
90	1396.0m	50mm	Greensand - brown, soft, comprising glauconite pellets, poorly sorted, well rounded, set in > 25% brown, calcareous clay, 5mm white shell fragment (?bivalve) in clay, very poor porosity, no fluorescence.
91	1392.0m	50mm	Mudstone - brown, firm, moderately calcareous, containing pyrite lenses and streaks, forams, (some pyrite infilled), shell fragments, trace mica.
92	1388.0m	50mm	Mudstone - brown, firm, moderately calcareous, containing 5% glauconite pellets, medium grained, pyrite lenses, trace mica disseminated throughout.
93	1384.0m	40mm	Mudstone - light brown, firm, very calcareous, very minor disseminated pyrite, trace mica.
94	1380.0m	45mm	Mudstone - light brown, firm, very calcareous, disseminated pyrite common, 1% medium grained glauconite pellets.

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SIDEWALL CORE DESCRIPTIONS R.C.N. THORNTON

SEAHORSE-1 17.8.78

SWC NO.	DEPTH	RECOVERED	DESCRIPTION
95	1375.0m	50mm	Mudstone - light grey to brown, firm, very calcareous, silty.
96	1369.0m	40mm	Mudstone - grey to brown, firm, very calcareous, containing 10-20% glauconite pellets, medium grained, forams, quartz silt.
97	1355.5m	60mm	Mudstone - light grey to brown, firm, very calcareous, silty, abundant disseminated forams, minor glauconite.
98	1319.5m	0mm	MISFIRE.
99	1294.0m	40mm	Mudstone - light brown, firm, very calcareous, disseminated forams, fossil fragments, pyrite.
100	1270.0m	35mm	Mudstone - light grey, firm, very calcareous, disseminated forams, fossil fragments, pyrite, micro-micaceous.
101	1245.0m	35mm	Mudstone - light grey to brown, firm, very calcareous, disseminated forams, pyrite.
102	1220.0m	50mm	Mudstone - light grey to brown, firm, very calcareous, 5-10% disseminated forams, glauconite, pyrite and lignite fragment 5 x 5mm.
103	1196.0m	40mm	Mudstone - light grey to brown, firm, very calcareous, minor disseminated forams, pyrite, micro-micaceous, trace glauconite.
104	1170.0m	50mm	Mudstone - light grey to brown, firm, very calcareous, minor disseminated forams, pryite.
105	1145.0m	40mm	Mudstone - light grey to brown, firm, very calcareous, minor finely disseminated, pyrite.
[illegible]	1120.0m	30mm	Marl - light grey to brown, firm, minor finely disseminated, pyrite.
107	1095.8m	20mm	Micrite - light grey to brown, firm, finely disseminated, pyrite.
108	1070.0m	5mm	Limestone - white, hard, forams and fossil fragments in sparry matrix.
109	1045.0m	25mm	Micrite - light grey to brown, firm, finely disseminated pyrite.
110	1020.0m	25mm	Micrite - light grey to brown, firm.
111	997.5m	30mm	Micrite - light grey to brown, firm, disseminated forams and fossil fragments.

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SIDEWALL CORE DESCRIPTIONS R.C.N. THORNTON

SEAHORSE-1 25.8.78

SWC NO.	DEPTH	RECOVERED	DESCRIPTION
			RUN #4
112	2296.0m	15mm	Sandstone - light grey, friable, clear to milky quartz, poorly sorted, very fine to medium grained, angular to subrounded, white clay matrix, minor pyrite.
113	2286.8m	20mm	Sandstone - light grey, unconsolidated, clear to milky quartz, polished, poorly sorted, medium to coarse grained, mostly medium to coarse grained, angular to subrounded, minor clay matrix, good porosity.
114	2272.8m	15mm	Sandstone - light grey, unconsolidated, clear to milky quartz, polished, poorly sorted, medium to very coarse grained and granule, mainly coarse to very coarse grained, angular to subrounded, clean, minor clay matrix, good porosity, trace patches stained brown by carbonaceous material.
1[illegible]	2250.5m	15mm	Sandstone - light grey, friable, clear quartz, finely disseminated, pyritic, carbonaceous material, clay rich, poor porosity.
116	2247.0m	15mm	Interbedded Sandstone/Siltstone - light to dark grey to brown, soft. Sandstone - light grey, clear quartz, very fine grained, micaceous, clay matrix. Siltstone - dark brown, carbonaceous, micaceous. Laminae gradational and 1-2mm thick.
117	2236.5m	20	Siltstone - dark brown, firm, carbonaceous, clay rich.
118	2206.0m	25	Claystone - dark brown, firm, silty, carbonaceous, minor interbeds of fine Siltstone - light grey.
119	2197.3m	20mm	Sandstone - light grey, friable, clear quartz, very poorly sorted, fine to coarse grained, mainly fine to medium grained, angular to subrounded, minor pyrite, clay matrix, porosity moderate to poor.
120	2181.5m	30mm	Sandstone - white to light grey, friable, clean quartz, poorly sorted, very fine to medium grained, angular to subrounded, clean, minor clay matrix, porosity moderate to poor.
121	2161.5m	30mm	Siltstone - light grey to brown, soft, very fine quartz silt, abundant clay, slightly micaceous, carbonaceous flecks.
122	2152.0m	20mm	Claystone - light grey to brown, soft, silty, slightly carbonaceous flecks, micaceous.
123	2117.0m	40mm	Claystone - light grey to brown, soft, silty, slightly pyritic, carbonaceous flecks.
124	2102.6m	20mm	Siltstone/Claystone - light grey, soft. Siltstone - quartz, mica, clay matrix. Claystone - silty, micaceous.

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SIDEWALL CORE DESCRIPTIONS

R.C.N. THORNTON

SEAHORSE-1

25.8.78

SWC NO.	DEPTH	RECOVERED	DESCRIPTION
125	2093.0m	35mm	Claystone - very dark grey to brown, firm, subfissile, very carbonaceous, slightly micaceous, pyrite, silty.
126	2081.0m	25mm	Claystone - light grey to brown, soft, slightly silty, micaceous.
127	2063.5m	20mm	Claystone - light grey to brown, soft, slightly silty, micaceous, carbonaceous.
128	2050.0m	15mm	Sandstone - light grey, friable, clear quartz, fine grained, well sorted, angular to subrounded, minor mica, carbonaceous flecks and laminae, clay matrix, moderate to poor porosity.
129	2025.0m	30mm	Sandstone - light grey, very friable, clear quartz, fine grained, well sorted, angular to subrounded, minor mica, clean, little clay matrix, good porosity.
130	2013.0m	20mm	Siltstone - light grey, soft, fine quartz, very clay rich, abundant mica plus red to brown ? carbonaceous specks.
131	2001.5m	15mm	Sandstone - light grey, friable, clean quartz, poorly sorted, fine to coarse grained, mainly medium grained, angular to subrounded, carbonaceous flecks and stringers mica, pyrite, minor clay matrix, moderate porosity.
132	1992.0m	20mm	Sandstone - light grey, friable, clear quartz, fine grained, well sorted, subangular to subrounded, mica disseminated throughout, clay matrix, poor porosity trace carbonaceous material.
133	1977.3m	30mm	Claystone - light grey to brown, soft, silty, slightly micaceous.
[illegible]	1973.0m	30mm	Claystone - light grey to brown, soft to silty, slightly micaceous, trace very thin carbonaceous laminae.
135	1965.0m	25mm	Sandstone - light grey, friable, very fine grained, subangular to rounded, well sorted, slightly pyritic, poor porosity, banded with 1-2mm bands of slightly darker grey.
136	1959.9m	35mm	Claystone - light grey to brown, soft, silty, slightly micaceous.
137	1952.5m	25mm	Sandstone/Claystone - finely (1-2mm) interlaminated. Sandstone - white, soft, quartz, well sorted, very fine grained, slightly micaceous, set in white clay matrix, tight. Claystone - dark brown, soft, very carbonaceous, pyrite and mica disseminated.
138	1943.5m	20mm	Claystone - dark brown, hard, silty, mica and pyrite, finely disseminated throughout, minor thin (1mm) laminae of white fine Siltstone.
139	1938.3m	25mm	Sandstone - white to light grey, hard, clear quartz,

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SWC NO.	DEPTH	RECOVERED	DESCRIPTION
139	1938.3m	25mm	Continued/.... very fine grained, well sorted, angular to subrounded, set in white clay matrix, poor porosity, interlaminated with very thin stringers and laminae, some dark brown carbonaceous material, which stains surrounding Sandstone, brown.
140	1924.0m	20mm	Siltstone - dark brown, hard, quartz and finely disseminated mica and pyrite in brown clay matrix.
141	1897.0m	25mm	Interlaminated Sandstone and Carbonaceous Laminae Sandstone - white to light grey, very fine grained, hard, white clay matrix, with laminae up to 3mm wisps, of dark brown, silty carbonaceous material, pyrite finely disseminated throughout. A few quartz grains, clear, subrounded, very coarse grained, scattered in the sandstone, which acts as a matrix.

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ESSO AUSTRALIA LTD.
SIDEWALL CORE DESCRIPTIONS

WELL SEAHORSE-1
GEOLOGIST SWARBRICK/ALDER
SERVICE CO. SCHLUMBERGER
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VDME

			ROCK	MODIFIERS			INDUR	GRAIN			DISS		FLOURESCENCE				CUT FLUOR.		CUT RESIDUE			PROB	REMARKS - GAS
NO. 1 a	DEPTH 1	REC 2	TYPE 3	4	CAL 5	COLOR 6	DEG 7	SIZE 8	SRTG 9	RND 10	CLAY 11	STAIN 12	% RK	DISTR 14	INTEN 15	COLOR 16	INTEN 17	COLOR 18	QUAN 19	COLOR 20	SHOW 21	PROD 22	23
1	990	60	LIME-STONE	carbonaceous	V	light grey	firm	very fine to fine	mod	sa	5%	-		NIL Trace mineral fluorescence			NIL		NIL				Palynology
2	975	30	SILT-STONE	argillaceous calcareous	V	medium grey	firm	silt	Good	-	35%	-		NIL			NIL		NIL				Palynology
3	960	16	LIME-STONE	carbonaceous	V	medium light grey	firm to soft	very fine to fine silt	Poor	sa	10%	NIL		NIL			NIL		NIL				Palynology
4	945	25	LIME-STONE	carbonaceous	V	medium light grey	firm to soft	very fine to silt	mod		15%	NIL		NIL			NIL		NIL				Palynology
5	923	45	SILT-STONE	argillaceous calcareous, fossiliferous	V	medium grey	firm	silt	mod	-	30%	NIL		NIL Trace mineral fluorescence			NIL		NIL				Palynology Slightly micro-micaceous.
6	895	28	SILT-STONE	argillaceous calcareous, fossiliferous	V	medium grey	firm	silt	mod	-	30%	NIL		NIL			NIL		NIL				Slightly micro-micaceous Palynology.
7	870	50	LIME-STONE	rock fragments	V	white speckled	friable	very coarse to fine	Poor	sa-sr	5%	NIL		NIL			NIL		NIL				Trace Quartz and Glauconite
8	840	50	SILT-STONE	calcareous, argillaceous fossiliferous	V	medium grey	firm	silt	mod	-	35%	NIL		Trace mineral fluorescence			NIL		NIL				Trace Glauconite.
9	810	55	SAND-STONE	Quartzose, glauconite.	V	light grey	friable	coarse to medium	mod	r-sr	10%	NIL		NIL			NIL		NIL				Intergranular porosity 10%
10	780	53	SILT-STONE	argillaceous fossiliferous	V	medium grey	firm	silt	-	-	30%	NIL		NIL			NIL		NIL				Palynology.
11	750	40	LIME-STONE	argillaceous fossiliferous	V	medium grey	firm	-	Poor	-	20%	NIL		Spotty mineral fluorescence			NIL		NIL				Palynology trace glauconite silty in part.
12	720	35	LIME-STONE	argillaceous fossiliferous	V	medium light grey	firm	-	-	-	15%	NIL		NIL			NIL			NIL			Slightly silty and micro-micaceous Palynology.

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ESSO AUSTRALIA LTD.
SIDEWALL CORE DESCRIPTIONS

WELL SEAHORSE-1
GEOLOGIST SWARBRICK/ALDER
SERVICE CO SCHLUMBERGER
IES RUN NO 1
SWC RUN NO 1
DATE 3.8.78
ATT 30 REC 30
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NO. 1 a	DEPTH 1	REC 2	ROCK TYPE 3	MODIFIERS 4	CAL 5	COLOR 6	INDUR DEG 7	GRAIN SIZE 8	SRTG 9	RND 10	DISS CLAY 11	STAIN 12	FLOURESCENCE % RK	FLOURESCENCE DISTR 14	FLOURESCENCE INTEN 15	FLOURESCENCE COLOR 16	CUT FLUOR. INTEN 17	CUT FLUOR. COLOR 18	CUT RESIDUE QUAN 19	CUT RESIDUE COLOR 20	SHOW 21	PROB PROD 22	REMARKS - GAS 23
13	690	33	LIME-STONE	argillaceous	V	medium to light grey	firm	silt	-	-	15%	NIL		NIL			NIL			NIL			Palynology Slightly micro-micaceous.
14	660	40	LIME-STONE	argillaceous fossiliferous	V	medium to light grey	firm	very fine to silt	-	-	10%	NIL		NIL			NIL			NIL			Palynology.
15	630	50	LIME-STONE	sandy	V	medium light grey	firm	very fine to silt	mod	sa	5%	NIL		NIL			NIL			NIL			
16	613	50	SAND-STONE	Quartz	MOD	medium light grey	fri-able	medium to coarse	well	r-sr	10%	NIL		NIL			NIL			NIL			
17	595	45	LIME-STONE	sandy	V	medium light grey	firm	very fine to fine	mod	sa-sr	5%	NIL		NIL			NIL			NIL			Trace glauconite.
18	570	50	LIME-STONE	argillaceous	V	medium light grey	firm	silt	-	-	20%	NIL		NIL			NIL			NIL			Trace Pyrite.
19	540	50	LIME-STONE	argillaceous	V	medium grey	firm	-	-	-	5%	NIL		Spotty mineral fluorescence						NIL			Micro-micaceous.
20	510	50	LIME-STONE	argillaceous	V	medium grey	firm	-	-	-	1%	NIL		Spotty mineral fluorescence						NIL			Micro-micaceous.
21	485	20	LIME-STONE	argillaceous carbonaceous grains.	V	white to light grey	firm	very fine to coarse	Poor	sa-r	5%	NIL		Spotty yellow mineral fluorescence						NIL			
22	450	60	LIME-STONE	argillaceous	V	medium grey	firm	-	-	-	10%	NIL		NIL			NIL			NIL			Micro-micaceous.
23	430	55	LIME-STONE	argillaceous	V	medium grey	firm	-	-	-	5%	NIL		NIL			NIL			NIL			Micro-micaceous Trace Glauconite.
24	390	50	LIME-STONE	argillaceous	V	medium grey	firm	-	-	-	10%	NIL		NIL			NIL			NIL			Trace Glauconite.
25	360	60	LIME-STONE	Calcareous argillaceous	V	light grey	firm	very fine to fine	mod	sa-sr	5%	NIL		NIL			NIL			NIL			Glauconite and carbonaceous grains
26	325	60	LIME-STONE	Calcareous silty	V	medium light grey	firm	silt	-	-	5%	NIL		NIL			NIL			NIL			Fossiliferous.
27	300	50	LIME-STONE	Calcarenite carbonaceous	V	medium light grey	firm	medium to coarse	well	sa-r	-	NIL		NIL			NIL			NIL			Glauconitic.
28	265	60	LIME-STONE	silty, carbonaceous	V	medium light grey	firm	silt	-	-	-	NIL		NIL			NIL			NIL			Trace Glauconite.

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ESSO AUSTRALIA LTD.
SIDEWALL CORE DESCRIPTIONS

WELL SEAHORSE-1
GEOLOGIST SWARBRICK/ALDER
SERVICE CO SCHLUMBERGER
IES RUN NO 1
SWC RUN NO 1
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ATT 30 REC 30
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NO. 1 a	DEPTH 1	REC 2	ROCK TYPE 3	MODIFIERS 4	CAL 5	COLOR 6	INDUR DEG 7	GRAIN SIZE 8	SRTG 9	RND 10	DISS CLAY 11	STAIN 12	FLOURESCENCE % RK	FLOURESCENCE DISTR 14	FLOURESCENCE INTEN 15	FLOURESCENCE COLOR 16	CUT FLUOR. INTEN 17	CUT FLUOR. COLOR 18	CUT RESIDUE QUAN 19	CUT RESIDUE COLOR 20	SHOW 21	PROD PROD 22	REMARKS - GAS 23
29	240	40	LIME-STONE	sandy	V	medium light yellow grey	firm	very fine	well	sa-sr	-	NIL		NIL			NIL		NIL				Trace Glauconite, Trace Carbonaceous
30	210	40	LIME-STONE	sandy	V	medium light yellow grey	firm	very fine	well	sa-sr	-	NIL		NIL			NIL		NIL				Glauconitic, Carbonaceous.

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ESSO AUSTRALIA LTD.
SIDEWALL CORE DESCRIPTIONS

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ATT 51 REC 50
DATE 22.8.78
SWC RUN NO 2
IES RUN NO 3

WELL SEAHORSE-1
GEOLOGIST J.D. ALDER
SERVICE CO. SCHLUMBERGER

VDME

NO. 1a	DEPTH 1	REC 2	ROCK TYPE 3	MODIFIERS 4	CAL 5	COLOR 6	INDUR DEG 7	GRAIN SIZE 8	SRTG 9	RND 10	DISS CLAY 11	STAIN 12	FLOURESCENCE % RK	FLOURESCENCE DISTR 14	FLOURESCENCE INTEN 15	FLOURESCENCE COLOR 16	CUT FLUOR. INTEN 17	CUT FLUOR. COLOR 18	CUT RESIDUE QUAN 19	CUT RESIDUE COLOR 20	SHOW 21	PROB PROD 22	REMARKS - GAS 23
31	1862	35	SANDSTONE	quartzose, micaceous	SL	white to light grey	friable	very fine	mod	a-sr	10-15%	-	NIL	-	-	-	-	-	-	-	-	-	Trace Pyrite.
32	1852	15	SANDSTONE	quartzose, micaceous, carbonaceous	SL	light to medium light grey	friable	very fine to fine	mod	a-sr	Tr	-	NIL	-	-	-	-	-	-	-	-	-	Trace Pyrite carbonaceous streaks.
33	1847.5	30	CLAYSTONE	micaceous	-	light grey	soft	clay	-	-	-	-	NIL	-	-	-	-	-	-	-	-	-	Pyritiferous trace carbonaceous
34	1839.5	25	SILTSTONE	quartzose	-	green to grey	firm	silt	-	-	-	-	NIL	-	-	-	-	-	-	-	-	-	Carbonaceous Trace Pyrite.
35	1824	25	SANDSTONE	quartzose	SL	light grey	friable	fine to medium	mod	sa-sr	5%	-	NIL	-	-	-	-	-	-	-	-	-	Trace Glauconite.
36	1805	40	SILTSTONE	quartzose	SL	light to medium to light grey	firm	silt	-	-		-	NIL	-	-	-	-	-	-	-	-	-	Trace carbonaceous
37	1790.2	25	SANDSTONE	quartzose	-	light grey	very friable	fine to medium	well	a-sr	-	-	NIL	-	-	-	-	-	-	-	-	-	Trace rock fragments. Good porosity 20%+
38	1781	20	INTERBEDDED SANDSTONE	quartzose	-	white to light grey	friable	very fine to fine	mod	a-sr	10%	-	NIL	-	-	-	-	-	-	-	-	-	PYRITIC
			AND SILTSTONE	micaceous	SL	brown	firm	clay to silt	-	-	-	-	NIL	-	-	-	-	-	-	-	-	-	
39	1778	40	COAL	pyrite bituminous	-	black	firm	-	-	-	-	-	NIL	-	-	-	-	-	-	-	-	-	Abundant Pyrite.
40	1773	25	SILTSTONE	quartzose	-	white to very light grey	firm	silt	-	-	-	-	NIL	-	-	-	-	-	-	-	-	-	Abundant Pyrite.

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SWC RUN NO 2
IES RUN NO 3

ESSO AUSTRALIA LTD.
SIDEWALL CORE DESCRIPTIONS

WELL SEAHORSE-1
GEOLOGIST J.D. ALDER
SERVICE CO. SCHLUMBERGER

NO. 1a	DEPTH 1	REC 2	ROCK TYPE 3	MODIFIERS 4	CAL 5	COLOR 6	INDUR DEG 7	GRAIN SIZE 8	SRTG 9	RND 10	DISS CLAY 11	STAIN 12	FLOURESCENCE				CUT FLUOR.		CUT RESIDUE		SHOW 21	PROB PROD 22	REMARKS - GAS 23
													% RK	DISTR 14	INTEN 15	COLOR 16	INTEN 17	COLOR 18	QUAN 19	COLOR 20			
41	1762	30	SANDSTONE	quartzose	-	light to medium to light grey	unconsolidated	medium to granule	well	sa-sr	-	-	NIL	-	-	-	-	-	-	-	-	-	Good intergranular porosity 20%+ Trace Pyrite.
42	1744	30	SANDSTONE	quartzose	-	light to medium to light grey	friable	fine to medium	mod	sa-sr	5-10%	-	NIL	-	-	-	-	-	-	-	-	-	Trace Pyrite. Trace carbonaceous
43	1723	40	SANDSTONE	quartzose	-	light to medium to light grey	friable	very fine to fine	well	a-sr	5%	-	NIL	-	-	-	-	-	-	-	-	-	Trace Pyrite.
44	1711.5	25	SANDSTONE	quartzose	Tr	light grey	hard	very fine to silty	mod	-	-	-	NIL	-	-	-	-	-	-	-	-	-	Slightly carbonaceous, trace pyrite, trace mica trace glauconite.
45	1705.5	45	SANDSTONE	quartzose	Tr	light to medium grey	very friable	fine to pebbly	poor	a-sr	Tr	-	NIL	-	-	-	-	-	-	-	-	-	Good intergranular porosity 20%.
46	1692.5	25	SANDSTONE	quartzose, micaceous	SL	light grey	friable	very fine	mod	-	-	-	NIL	-	-	-	-	-	-	-	-	-	Very finely laminated.
			INTERBEDDED SILTSTONE	quartzose, micaceous	SL	brown	firm	silty	-	-	-	-	NIL	-	-	-	-	-	-	-	-	-	Carbonaceous.
47	1690	20	SANDSTONE	quartzose	-	white to light grey	friable	fine to coarse	well	a-sr	30%	-	NIL	-	-	-	-	-	-	-	-	-	20% rock fragments
48	1670	45	SILTSTONE	quartzose	-	light to medium grey	firm	silt	-	-	-	-	NIL	-	-	-	-	-	-	-	-	-	Carbonaceous in part.
49	1657	35	SANDSTONE	quartzose	-	white to light grey	friable	medium to very coarse	well	sa-sr	Tr	-	NIL	-	-	-	-	-	-	-	-	-	Trace coal grains.
50	1645.5	30	SANDSTONE	pyritiferous quartzose	-	medium grey	unconsolidated	fine to medium	mod	a-sa	-	-	NIL	-	-	-	-	-	-	-	-	-	50% Pyrite.
51	1638.5	35	SANDSTONE	quartzose pyritiferous	-	light grey	friable	medium to very coarse	well	sa-sr	5%	-	NIL	-	-	-	-	-	-	-	-	-	20% Pyrite. Good porosity 20%

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SIDEWALL CORE DESCRIPTIONS

WELL SEAHORSE-1
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SERVICE CO SCHLUMBERGER
IES RUN NO 3
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NO. 1a	DEPTH 1	REC 2	ROCK TYPE 3	MODIFIERS 4	CAL 5	COLOR 6	INDUR DEG 7	GRAIN SIZE 8	SRTG 9	RND 10	DISS CLAY 11	STAIN 12	FLOURESCENCE % RK	FLOURESCENCE DISTR 14	FLOURESCENCE INTEN 15	FLOURESCENCE COLOR 16	CUT FLUOR. INTEN 17	CUT FLUOR. COLOR 18	CUT RESIDUE QUAN 19	CUT RESIDUE COLOR 20	SHOW 21	PROB PROD 22	REMARKS - GAS 23
52	1627.5	35	SANDSTONE	quartzose	Tr	buff	friable	fine to very coarse	mod	sa-sr	5%	-	NIL	-	-	-	-	-	-	-	-	-	Trace Pyrite. Good porosity 15-20%.
53	1623.3	20	SANDSTONE	quartzose	-	very light grey	friable	very fine to medium	poor	sa-sr	5%	-	100	Even	dull	blue white	dull	milky	-	-	-	-	5% Pyrite. Minor brown Siltstone laminae.
54	1622.3	25	SILTSTONE	quartzose, micaceous, carbonaceous	-	cream brown black	firm	silt	-	-	-	-	NIL	-	-	-	-	-	-	-	-	-	Pyrite nodules.
55	1619.5	15	SILTSTONE	quartzose	-	very light grey	firm	silt	-	-	-	-	NIL	-	-	-	-	-	-	-	-	-	Trace carbonaceous Trace micaceous.
56	1614.5	50	CLAYSTONE		-	brown	firm	clay	-	-	-	-	NIL	-	-	-	-	-	-	-	-	-	Trace of pyrite, Quartz and coal.
57	1609	30	SANDSTONE	quartzose	-	buff to very light grey	friable	very fine to very coarse	poor	sa-sr	5%	-	25	Spotty	bright	blue white	dull	milky	-	-	-	-	Pyrite nodules low visual porosity. Faint petroliferous odour
56	1605.5	30	SANDSTONE	quartzose	-	light grey to light yellow brown	friable	very fine to fine	mod to well	sa-sr	-	-	25	Spotty	faint	blue white	dull	milky	tr	yellow	-	-	Some carbonaceous and micaceous laminae.
59	1591.5	45	SANDSTONE	quartzose	-	light grey	friable	fine to granule	mod	sa-sr	Tr	-	NIL	-	-	-	-	-	-	-	-	-	Trace Pyrite. Good porosity 25%
60	1583.6	40	SANDSTONE	quartzose	-	light grey	friable	very fine to fine	well	a-sr	-	-	NIL	-	-	-	-	-	-	-	-	-	Traces of mica. Pyrite and carbonaceous.
61	1571	35	SANDSTONE	quartzose, micaceous	-	medium grey	friable	very fine to fine	mod	a-sr	-	-	NIL	-	-	-	-	-	-	-	-	-	
62	1553.6	15	SILTSTONE	quartzose	-	medium light grey	firm	silt	-	-	-	-	NIL	-	-	-	-	-	-	-	-	-	Trace micaceous.

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ESSO AUSTRALIA LTD.
SIDEWALL CORE DESCRIPTIONS

WELL SEAHORSE-1
GEOLOGIST J.D. ALDER
SERVICE CO. SCHLUMBERGER
IES RUN NO 3
SWC RUN NO 2
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NO. 1a	DEPTH 1	REC 2	ROCK TYPE 3	MODIFIERS 4	CAL 5	COLOR 6	INDUR DEG 7	GRAIN SIZE 8	SRTG 9	RND 10	DISS CLAY 11	STAIN 12	FLOURESCENCE				CUT FLUOR.		CUT RESIDUE		SHOW 21	PROB PROD 22	REMARKS - GAS 23
													% RK	DISTR 14	INTEN 15	COLOR 16	INTEN 17	COLOR 18	QUAN 19	COLOR 20			
63	1540	25	MUDSTONE	carbonaceous	-	brown	hard	clay silt	-	-	-	-	NIL	-	-	-	-	-	-	-	-	-	Trace of mica - quartz, silt.
64	1533.5	-		NO SAMPLE																			
65	1523.5	30	SANDSTONE	quartzose	-	buff	friable	very fine to very coarse	poor	sa-sr	5%	-	NIL	-	-	-	-	-	-	-	-	-	Fair porosity 15%
66	1521	20	SANDSTONE	quartzose	-	light yellow brown	unconsolidated	fine - to medium	well	sa-sr	-	-	50%	Even	faint	blue white	faint	milky	-	-	-	-	Good porosity 25%.
67	1516.5	20	SANDSTONE	quartzose	-	light yellow brown	friable	fine to coarse	poor to mod	sa-sr	5%	-	100%	Even	bright	blue white	dull	yellow	tr	pale yellow	-	-	Poor visual porosity.
68	1513.5	25	SANDSTONE	quartzose	-	yellow grey	unconsolidated	fine - to granule	mod to well	sa-sr	-	Tr of brown	100%	Even	bright	blue white	bright	yellow	tr	pale yellow	-	-	Good porosity 20%.
69	1511.5	30	SANDSTONE	quartzose	-	yellow grey	friable	fine to medium	well	sa-sr	-	Tr of brown	100%	Even	bright	blue white	bright	yellow	tr	pale yellow	-	-	Good porosity.
70	1424.6	30	COAL	bituminous	-	black	hard	-	-	-	-	-	NIL	-	-	-	-	-	-	-	-	-	
71	1411	30	SANDSTONE	quartzose, glauconitic	-	dark olive grey	hard to friable	silt to very coarse	poor	sa-r	-	-	NIL	-	-	-	-	-	-	-	-	-	Trace Pyrite, trac mica.
72	1406	30	SANDSTONE	quartzose, glauconitic, pyritiferous, carbonaceous.	-	reddish brown	hard	silt to granular	poor	a-r	-	-	NIL	-	-	-	-	-	-	-	-	-	Large Pyrite nodules.
73	1402	40	CLAYSTONE	glauconitic, pyritiferous	V	chocolate brown	firm to hard	clay	-	-	-	-	NIL	-	-	-	-	-	-	-	-	-	Abundant glauconit and pyrite. Pebble of calcarenite.
74	1398	35	CLAYSTONE	glauconitic, pyritiferous	V	chocolate brown	hard	clay	-	-	-	-	NIL	-	-	-	-	-	-	-	-	-	
75	1395	40	CLAYSTONE	pyritiferous, glauconitic	V	chocolate brown	hard	clay	-	-	-	-	NIL	-	-	-	-	-	-	-	-	-	5% glauconite.
76	1390	35	CLAYSTONE	glauconitic	V	brownish grey	firm	clay	-	-	-	-	NIL	-									Trace Pyrite Trace Quartz.

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ESSO AUSTRALIA LTD.
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IES RUN NO 3 SWC RUN NO 2

WELL SEAHORSE-1
GEOLOGIST J.D. ALDER
SERVICE CO. SCHLUMBERGER

													FLOURESCENCE				CUT FLUOR.		CUT RESIDUE				
NO. 1 a	DEPTH 1	REC 2	ROCK TYPE 3	MODIFIERS 4	CAL 5	COLOR 6	INDUR DEG 7	GRAIN SIZE 8	SRTG 9	RND 10	DISS CLAY 11	STAIN 12	% RK	DISTR 14	INTEN 15	COLOR 16	INTEN 17	COLOR 18	QUAN 19	COLOR 20	SHOW 21	PROB PROD 22	REMARKS - GAS 23
77	1386	40	CLAY-STONE	glauconitic	V	brownish grey	hard	clay	-	-	-	-	NIL	-	-	-	-	-	-	-	-	-	
78	1382	35	CLAY-STONE	glauconitic	V	brownish grey	hard	clay	-	-	-	-	NIL	-	-	-	-	-	-	-	-	-	
79	1378	40	CLAY-STONE		V	very light grey	hard	clay	-	-	-	-	NIL	-	-	-	-	-	-	-	-	-	
80	1372	35	CLAY-STONE		V	green grey	firm to hard	clay	-	-	-	-	NIL	-	-	-	-	-	-	-	-	-	Pebbles of calcarenite. Trace Pyrite. Fossil fragments rounded calcite grains.
81	1366	45	CALCA-RENITE	glauconitic	V	green grey	firm	fine to very coarse	poor	r	-	-	NIL	-	-	-	-	-	-	-	-	-	

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ESSO AUSTRALIA LTD.
SIDEWALL CORE DESCRIPTIONS

WELL SEAHORSE-1
GEOLOGIST R.C.N. THORNTON
SERVICE CO SCHLUMBERGER
IES RUN NO 3
SWC RUN NO 3
PAGE 1 OF 2
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NO. 1 a	DEPTH 1	REC 2	ROCK TYPE 3	MODIFIERS 4	CAL 5	COLOR 6	INDUR DEG 7	GRAIN SIZE 8	SRTG 9	RND 10	DISS CLAY 11	STAIN 12	FLOURESCENCE				CUT FLUOR.		CUT RESIDUE		SHOW 21	PROB PROD 22	VDME REMARKS - GAS 23
													% RK	DISTR 14	INTEN 15	COLOR 16	INTEN 17	COLOR 18	QUAN 19	COLOR 20			
82	1499.5	40	SAND STONE	quartz, micaceous	-	light grey	unconsolidated	medium to very coarse	very poor	sa-sr	5%	-	0										
83	1491.5	20	SANDSTONE	quartz, micaceous	-	light grey	friable	very fine	well	sa-sr	20%	-	Tr										
84	1487.5	20	SILTSTONE	quartz, micaceous, pyrite	-	chocolate brown	firm																
85	1481.5	35	SANDSTONE/ SILTSTONE	quartz, micaceous, carbonaceous	-	light grey/ chocolate	firm	very fine	well														
86	1422.8	40	CLAYSTONE	massive, micaceous	-	chocolate	firm																
87	1409.5	35	SANDSTONE	quartz, glauconite, pyrite.	-	brown	friable	medium to coarse	poor	a-r	25%	-	0										
88	1404.5	40	GREENSAND	glauconite, pyrite.	mod	brown	soft	medium	well	r	25%	-	0										
89	1400.5	0																					EMPTY BULLET.
90	1396.0	50	GREENSAND	glauconite	mod	brown	soft	fine to medium	poor	r	25%	-	0										
91	1392.0	50	MUDSTONE	pyrite, forams	mod	brown	firm																
92	1388.0	50	MUDSTONE	glauconite, pyrite	mod	brown	firm																
93	1384.0	40	MUDSTONE	Trace pyrite, mica.	V	light brown	firm																
94	1380.0	45	MUDSTONE	pyrite, glauconite	V	light brown	firm																
95	1375.0	50	MUDSTONE	silty	V	light grey to brown	firm																
96	1369.0	40	MUDSTONE	glauconite, silt, forams.	V	grey to brown	firm																
97	1355.5	60	MUDSTONE	forams, silt, glauconite.	V	light grey to brown	firm																
98	1319.5	0																					MISFIRE.
99	1294.0	40	MUDSTONE	forams, fossil, pyrite.	V	light brown	firm																

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SWC RUN NO 3
IES RUN NO 3

ESSO AUSTRALIA LTD.
SIDEWALL CORE DESCRIPTIONS

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

NO. 1 a	DEPTH 1	REC 2	ROCK TYPE 3	MODIFIERS 4	CAL 5	COLOR 6	INDUR DEG 7	GRAIN SIZE 8	SRTG 9	RND 10	DISS CLAY 11	STAIN 12	FLOURESCENCE % RK	FLOURESCENCE DISTR 14	FLOURESCENCE INTEN 15	FLOURESCENCE COLOR 16	CUT FLUOR. INTEN 17	CUT FLUOR. COLOR 18	CUT RESIDUE QUAN 19	CUT RESIDUE COLOR 20	SHOW 21	PROB PROD 22	REMARKS - GAS 23
100	1270.0	35	MUDSTONE	forams, fossils, pyrite, mica.	V	light grey	firm																
101	1245.0	35	MUDSTONE	forams, pyrite.	V	light grey to brown	firm																
102	1220.0	50	MUDSTONE	forams, pyrite, glauconite, lignite.	V	light grey to brown	firm																
103	1196.0	40	MUDSTONE	forams, pyrite.	V	light grey to brown	firm																
104	1170.0	50	MUDSTONE	forams, pyrite.	V	light grey to brown	firm																
105	1145.0	40	MUDSTONE	pyrite.	V	light grey to brown	firm																
106	1120.0	20	MARL	pyrite	V	light grey to brown	firm																
107	1095.8	20	MICRITE	pyrite	V	light grey to brown	firm																
108	1070.0	5	LIMESTONE	sparry, forams.	V	white	hard																
109	1045.0	25	MICRITE	pyrite	V	light grey to brown	firm																
110	1020.0	25	MICRITE		V	light grey to brown	firm																
111	997.5	30	MICRITE	fossils, forams	V	light grey to brown	firm																

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

ESSO AUSTRALIA LTD.
SIDEWALL CORE DESCRIPTIONS

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VDME

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	PROD PROD	REMARKS - GAS
1 a	1	2	3	4	5	6	7	8	9	10	11	12		14	15	16	17	18	19	20	21	22	23
112	2296.0	15	SANDSTONE	clay rich	-	light grey	friable	very fine to medium	poor	a-sr	25%												
113	2286.8	20	SANDSTONE	clean	-	light grey	unconsolidated	medium to very coarse	poor	a-sr	10%												
114	2272.8	15	SANDSTONE	clean	-	light grey	unconsolidated	medium to very coarse	poor	a-sr	5%												
115	2250.5	15	SANDSTONE	clay rich	-	light grey	friable	very fine			25%												
116	2247.0	15	SANDSTONE/	micaceous,	-	light grey	soft	very fine															
			SILTSTONE	carbonaceous micaceous	-	dark grey to brown	soft																
117	2236.5	20	SILTSTONE	clay rich, carbonaceous	-	dark brown	firm																
118	2206.0	25	CLAYSTONE	silty, carbonaceous	-	dark brown	firm																
119	2197.3	20	SANDSTONE	pyrite	-	white to light grey	friable	fine to coarse	mod poor	a-sr	10%												
120	2181.5	30	SANDSTONE	clean	-	white to light grey	friable	very fine to medium	poor	a-sr	10%												
121	2161.5	30	SILTSTONE	clay rich, micaceous, carbonaceous	-	light grey to brown	soft																
122	2152.0	20	CLAYSTONE	silty, carbonaceous micaceous.	-	light grey to brown	soft																
123	2117.0	40	CLAYSTONE	silty, pyrite, carbonaceous	-	light grey to brown	soft																
124	2102.6	20	SILTSTONE/	micaceous	-	light grey	soft																
			CLAYSTONE	micaceous		light grey	soft																
125	2093.0	35	CLAYSTONE	subfissile, carbonaceous, slightly pyritic, silty.	-	dark grey to brown	firm																
126	2081.0	25	CLAYSTONE	slightly silty, micaceous.	-	light grey to brown.	soft																

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ESSO AUSTRALIA LTD.
SIDEWALL CORE DESCRIPTIONS

SWC RUN NO 4
IES RUN NO 4

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

NO.	DEPTH	REC	ROCK TYPE	MODIFIERS	CAL	COLOR	INDUR DEG	GRAIN SIZE	SRTG	RND	DISS CLAY	STAIN	FLOURESCENCE				CUT FLUOR.		CUT RESIDUE		SHOW	PROB PROD	REMARKS - GAS
													%	DISTR	INTEN	COLOR	INTEN	COLOR	QUAN	COLOR			
1 a	1	2	3	4	5	6	7	8	9	10	11	12	RK	14	15	16	17	18	19	20	21	22	23
127	2063.5	20	CLAYSTONE	slightly silty, carbonaceous, micaceous	-	light grey to brown	soft																
128	2050.0	15	SANDSTONE	micaceous, carbonaceous	-	light grey	friable	fine	well	a-sr	25%												
129	2025.0	30	SANDSTONE	clean	-	light grey	very friable	fine	well	a-sr	10%												
130	2013.0	20	SILTSTONE	micaceous? carbonaceous	-	light grey	soft																
131	2001.5	15	SANDSTONE	micaceous, pyrite, carbonaceous	-	light grey	friable	fine to coarse	poor	a-sr	5%												
132	1992.0	20	SANDSTONE	micaceous	-	light grey	friable	fine	well	sa-sr	25%												
133	1977.3	30	CLAYSTONE	silty, slightly micaceous	-	light grey brown	soft																
134	1973.0	30	CLAYSTONE	silty, slightly micaceous	-	light grey to brown	soft																
135	1965.0	25	SANDSTONE	banded, slightly micaceous	-	light grey	friable	very fine	well	sa-r	25%												
136	1959.9	35	CLAYSTONE	silty, slightly micaceous	-	light grey to brown	soft																
137	1952.5	25	SANDSTONE/	slightly micaceous	-	white	soft	very fine	well		25%												
			CLAYSTONE	very carbonaceous, micaceous, pyrite.	-	dark brown	soft																
138	1943.5	20	CLAYSTONE	silty, pyrite, mica.	-	dark brown	hard																
139	1938.3	25	SANDSTONE	carbonaceous laminae	-	white to light grey	hard	very fine	well	a-sr	25%												
140	1924.0	20	SILTSTONE	mica, pyrite	-	dark brown	hard																
141	1897.0	25	SANDSTONE	carbonaceous laminae	-	white to light grey	hard	very fine	well	-	25%												

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APPENDIX 4

APPENDIX 4

W 705

SEAHORSE – 1

APPENDIX 4

PALYNOLOGICAL ANALYSIS

OIL and GAS DIVISION

30 MAR 1979

A PALYNOLOGICAL ANALYSIS OF SEAHORSE-1, GIPPSLAND BASIN

by

H.E. Stacy

and

A.D. Partridge

Esso Australia Ltd
Palaeontology Report 1978/27

Issued March 1, 1979.

INTRODUCTION

Sixty samples from Seahorse-1 were examined, consisting of forty-eight sidewall cores, eleven core chips and one cutting sample. Fossil recovery varied from none in a few cases, to adequate, up to abundant in many cases. Preservation, for the most part, was good.

Zones and environmental/lithological subdivision for the basal part of the Lakes Entrance Formation and Latrobe Group is given in the following summary. All samples examined are listed in Table 1 and the fossil distribution is recorded on the accompanying charts. Zone limits and confidence ratings are given on the accompanying Data Sheets.

SUMMARY

UNIT/FACIES	ZONE	DEPTH (in metres)
LAKES ENTRANCE FORMATION	*P. tuberculatus* and H2 Foram Zone	1375m - 1384m
	UNCONFORMITY AT	1385.5m
	P. tuberculatus and J1 Foram Zone	1386m - 1388m
1389m		
TRANSITION ZONE (Mudstone)	Upper *N. asperus* (J2 Foram Zone) (K Foram Zone)	1390m - 1396m (1390m - 1394m) (1395m)
1410m	Middle *N. asperus*	1398m - 1446m
LATROBE GROUP		
	Lower *N. asperus*	1454.5- ~~1446~~m 1540m
	P. asperpolus	1571m - 1622.3m
	Upper *M. diversus*	1623.3m
	Middle *M. diversus*	1670m
	Lower *M. diversus*	1692.5- 1744m
	Upper *L. balmei*	1773? - 1862m
	Lower *L. balmei*	1897m - 2206m
	T. longus	2236.5-2250.5m T.D. 2304m

GEOLOGICAL COMMENTS

1. Seahorse-1 location was apparently the site of continuous sedimentation from the Late Cretaceous (T. longus Zone) through to the early Oligocene (J-1 of the P. tuberculatus Zone). All palynologic zones are present and there is no evidence of any major break. Because of this apparent continuous sequence, depositional rates were calculated to see if any trends or useful information could be extracted from such data. The results are tabled below:

Zone	Thickness (m)	Time (MY)	CM/1000 Years	Remarks
Lower P. tuberculatus	4.5	3.5	.128	(Unconformity at top, not true thickness).
Upper N. asperus	7.5	1.7	.4	
Middle N. asperus	54.0	3.5	1.54	
Lower N. asperus	119.0	7.0	1.7	
P. asperpolus	52.5	1.5	3.5	
Upper-Middle M. diversus	67.5	2.0	3.37	
Lower M. diversus	82.0	2.5	3.25	
Upper L. balmei	118.0	3.6	3.27	
Lower L. balmei	345.0	8.0	4.31	

This shows a sharp change in the rate of sedimentation between the 3.5 to 4 cm/1000 years of the Paleocene and Lower to Middle Eocene (L. balmei to P. asperpolus Zones) and the 1.5 or less cm/1000 years of the Upper-Middle Eocene to Lower Oligocene (N. asperus and Lower P. tuberculatus Zones). It is of interest to note that in both log character and SWC descriptions the massive sands of the N. asperus zones are similar to those of the P. asperopolus and older zones. However with the slower sedimentation rates there is significantly more coal deposition in the younger units. The interval between 1410m and 1540m contains 35 metres of coal representing 27 percent of the section.

2. As would be expected from the shoreward position of this well, the marine transgressions, as demonstrated by the dinoflagellate zones, are not present in the older beds and only appear in the Middle N. asperus Zone.

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3. The Middle and Upper M. diversus and P. asperopolus Zones occur in a very sandy section and a number of the sidewall cores were unsuitable for palynology. These zones are consequently poorly documented. A conspicuous absence is the lack of any abundance of P. pachypolus and/or P. asperopolus as is characteristic of the P. asperopolus Zone in the Barracouta and Marlin Fields. (See Barracouta-4 report by Partridge, 1977). In this respect this section in Seahorse-1 more closely resembles the wells in the Snapper field than in the closer Barracouta field.

4. Difficulty was experienced in Seahorse-1 in picking the boundary between the Lakes Entrance Formation and Latrobe Group from either the lithology or the electric logs. The reason for this is that there is a continuous marine sequence in Seahorse-1 across the Eocene-Oligocene boundary. On electric log character comparing with other wells in the basin the base of the Lakes Entrance Formation would be taken at 1410 metres. However this lies within the Middle N. asperus Zone.

   To conform to the base of the Lakes Entrance Formation as mapped over most of the offshore Gippsland Basin the boundary should be placed at the base of the P. tuberculatus Zone which in Seahorse-1 is at 1388 metres at the base of the J1 foraminiferal zone. The underlying Upper N. asperus Zone which contains J2 and K foraminiferal faunas has previously always been restricted to Gurnard facies lithologies.

   In Seahorse-1 there is therefore a transition zone from 1388 to 1410 metres between the Lakes Entrance Formation and Latrobe Group. That this is a marine unit is clearly evident from the diverse dinoflagellate assemblages it contains. Calcareous marine fossils are not recorded however for the Late Eocene portion of this interval between 1398 and 1410 metres. The lack of calcareous marine fossils from Eocene and Paleocene sediments is a notable feature of these age sediments in the Gippsland Basin even though there is abundant evidence of marine conditions in the basin in the form of diverse assemblages of non-calcareous dinoflagellate cysts.

DISCUSSION OF ZONES

The presence and distribution of identified species are given in the distribution sheets. The basis for the biostratigraphic breakdown and zone identification is given below:

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Tricolpites longus Zone: 2236.5m to 2250.5m (Bottom Sample):

In addition to the nominated species, which occurs at 2236.5m, several other species, including Proteacidites otwayensis, P. gemmatus, Tricolpites confessus and T. waiparaensis confirm the presence of non-marine Late Cretaceous Maestrichtian sediments.

Lower Lygistepollenites balmei Zone: 1897m to 2206m.

The occurrence at 2206m of Australopollis obscurus, Proteacidites adenanthoides and Tetracolporites multistrixus and T. verrucosus (common) and the absence of any of the T. longus Zone species mentioned above is used to define the base of the Lower L. balmei Zone in this well. The The common occurrence of Lygistepollenites balmei and other species such Polycolpites langstonii, Gambierina edwardsii and G. rudata in the samples is also characteristic of this zone.

Upper Lygistepollenites balmei Zone: 1773m? to 1862m.

Overall assemblages from this subzone are similar to the underlying zone except for the first appearances of Proteacidites grandis, Verrucosisportes kopukuensis (both at 1862m) Banksieaeidites elongatus (at 1857m) and Proteacidites incurvatus (at 1805m) which are all diagnostic of the Upper L. balmei Zone. The highest sample at 1773m yielded only six fossils, one of which was Australopollis obscurus, and for this reason the sample is included in the Upper L. balmei Zone.

Lower Malvacipollis diversus Zone: 1692.5 to 1744m.

These two assemblages of rather limited diversity, but with common Proteacidites grandis are assigned to the Lower M. diversus on the basis of the negative evidence of the absence of the indicator species for the underlying L. balmei Zones and the absence of the species, given below, whose first appearances mark the bases of the overlying zones.

Middle Malvacipollis diversus Zone: 1670 metres.

The occurrence of Proteacidites tuberculiformis and P. plemmelus at 1670 metres but absence of Proteacidites pachypolus and Myrtaceidites tenuis is diagnostic of the Middle subdivision of the Malvacipollis diversus Zone.

Upper Malvacipollis diversus Zone: 1623.3 metres.

The first appearances of Proteacidites pachypolus and Santalumidites cainozoicus in the sample at 1623.3 metres is diagnostic of the Upper subdivision of the M. diversus Zone. The presence of S. cainozoicus would also suggest a position high in this zone.

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Non-marine dinoflagellates similar in shape to Deflandrea were observed rarely in all the subzones of the M. diversus Zone.

Proteacidites asperopolus Zone: 1571m to 1622.3 metres.

The first appearance of the nominated species is used to recognise the base of this zone in Seahorse-1. Important accessory species include Proteacidites leightonii, Tricolpites incisus, Proteacidites ornatus, Myrtaceidites tenuis and Intratriporopollenites notabilis. The last three species do not range above this zone and along with the change from the dominance of H. harrisii in this zone to the dominance of Nothofagidites in the overlying zone are used to mark the top of the P. asperopolus Zone.

Even though the P. asperopolus Zone can be recognised in Seahorse-1 it shows a marked difference to the same zone in the adjacent Barracouta Field (see especially Partridge 1977 on Barracouta-4), by lacking any abundance of either P. asperopolus or P. pachypolus. Since the distance between the two fields is only ten kilometres and the sampling in Seahorse-1 is as good as in Barracouta-4 some sort of ecological control on the plants that produced the pollen of P. pachypolus and P. asperopolus must be appealed to for explanation of the sporadic distribution of the abundances of these Proteacidites pollen.

Lower Nothofagidites asperus Zone: 1454.5 to 1540 metres.

The increase in Nothofagidites spp. and the occurrence of species such as Tricolpites simatus Nothofagidites asperus and Proteacidites recavus is used to define the base of this zone. The top of the zone and base of the succeeding zone is taken at the first appearance of Triorites magnificus.

Middle Nothofagidites asperus Zone: 1398 to 1445.5 metres.

Abundant yields and high diversity were characteristic of most samples in this zone. The key species was absent in some samples but quite common in others. The interval between 1398 and 1404.5 metres contained diverse dinoflagellate assemblages which could be referred to the Deflandrea extensa Dinoflagellate Zone.

Upper Nothofagidites asperus Zone: 1390 to 1396 metres.

The limits of this zone is defined on negative evidence. The base is taken as the first sample above the last appearance of Triorites magnificus Proteacidites leightonii and Deflandrea extensa which occurs in the highest sample of the underlying zone. The top of the Upper N. asperus Zone is similarly picked as the sample below the one containing the first appearance of Cyatheacidites annulatus. The assemblages from the zone itself can be

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characterised by such species as Proteacidites stipplatus, P. rectomarginis Verrucosisporites cristatus and the fairly common occurrence of the dinoflagellate Phthanoperidinium coreoides.

Proteacidites tuberculatus Zone: 1375 to 1388 metres.

Cyatheacidites annulatus and various species of dinoflagellates informally referred to as "Dinospheres" are present in most of the samples from this zone and demonstrate the post-Eocene age for this section.

REFERENCE

PARTRIDGE, A.D., 1977, Palynological Analysis Barracouta-4, Gippsland Basin. Esso Aust. Paleo. Rept. 1977/16.

TABLE 1

[illegible]UMMARY OF PALYNOLOGICAL ANALYSES, SEAHORSE-1, GIPPSLAND B[illegible]

SAMPLE	DEPTH (m)	DEPTH (ft)	ZONE	AGE	CONFIDENCE RATING	YIELD	DIVERSITY	COMMENTS
SWC 95	1375	4511	*P. tuberculatus*	Oligocene	1	Poor	Low	
SWC 94	1380	4528	*P. tuberculatus*	Oligocene	0	Fair	Moderate	
SWC 78	1382	4534	*P. tuberculatus*	Oligocene	0	Fair	Moderate	
SWC 92	1388	4553	*P. tuberculatus*	Oligocene	0	Fair	Moderate	Base of *C. annulatus*
SWC 76	1390	4560	Upper *N. asperus*	Late Eocene	0	Good	High	
SWC 91	1392	4567	Upper *N. asperus*	Late Eocene	1	Fair	Moderate	
SWC 75	1395	4577	Upper *N. asperus*	Late Eocene	0	Good	High	*P. stipplatus* present
SWC 90	1396	4580	Upper *N. asperus*	Late Eocene	1	Good	Moderate	*V. cristatus* present
SWC 74	1398	4587	Middle *N. asperus*	Late-Middle Eocene	0	Fair	Moderate	*T. magnificus*, *D. extensa* present
SWC 73	1402	4600	Middle *N. asperus*	Late-Middle Eocene	0	V.Good	High	*T. magnificus* present
SWC 88	1404.5	4608	Middle *N. asperus*	Late-Middle Eocene	0	V.Good	High	*T. magnificus*, *D. extensa* present
SWC 71	1411	4629	Middle *N. asperus*	Late-Middle Eocene	1	V.Good	High	*T. magnificus* present
Core-1	1411.32	4630	Middle *N. asperus*	Late-Middle Eocene	1	V.Good	High	*T. magnificus* present
Core-1	1417.9	4652	Middle *N. asperus*	Late-Middle Eocene	1	Good	Moderate	
SWC-70	1424	4672	Middle *N. asperus*	Late-Middle Eocene	1	Good	Moderate	
Core-2	1425.9	4678	Middle *N. asperus*	Late-Middle Eocene	1	Good	Moderate	
Core-2	1430.3	4693	Indeterminate	-	-	Barren	Barren	
Core-2	1432.21	4699	Middle *N. asperus*	Late-Middle Eocene	1	Good	Moderate	
Core-2	1436.37	4712	Middle *N. asperus*	Late-Middle Eocene	1	Good	Moderate	
Core-3	1441	4728	Middle *N. asperus*	Late-Middle Eocene	1	Fair	Moderate	Base of *T. magnificus*
Core-3	1445.64	4743	Middle *N. asperus*	Late-Middle Eocene	0	Excellent	V.High	*T. magnificus* in water mount
Core-4	1454.5	4772	Lower *N. asperus*	Middle Eocene	1	V.Good	High	
Core-5	1467.3	4814	Lower *N. asperus*	Middle Eocene	1	V.Good	High	
Core-5	1475.5	4841	Lower *N. asperus*	Middle Eocene	1	Excellent	V.High	*Spinidinium* spp.
SWC 84	1487.5	4880	Lower *N. asperus*	Middle Eocene	0	V.Good	High	*Spinidinium* spp. Lowest Marine Forms
SWC 83	1491.5	4893	Lower *N. asperus*	Middle Eocene	1	V.Good	High	
SWC 63	1540	5052	Lower *N. asperus*	Middle Eocene	1	Good	Moderate	Non-marine dinoflagellates
SWC 61	1571	5154	*P. asperpolus*	Early-Middle Eocene	1	Good	Moderate	Highest *P. asperpolus*
SWC 58	1605.5	5267	*P. asperpolus*	Early-Middle Eocene	1	Good	Moderate	
SWC 56	1614.5	5297	*P. asperpolus*	Early-Middle Eocene	2	Poor	Low	
SWC 55	1619.5	5313	Indeterminate	-	-	Barren	Barren	
SWC 54	1622.3	5323	*P. asperpolus*	Early-Middle Eocene	1	V.Good	High	Base of *P. asperopolus*
SWC 53	1623.3	5326	Upper *M. diversus*	Early Eocene	2	V.Good	High	Base of *P. pachypolus*
SWC 50	1645.5	5399	Indeterminate	-	-	Barren	Barren	
SWC 48	1670	5479	Middle *M. diversus*	Early Eocene	1	V.Good	High	Base of *P. tuberculiformis*
SWC 46	1692.5	5551	Lower *M. diversus*	Early Eocene	1	V.Good	High	
SWC 42	1744	5722	Lower *M. diversus*	Early Eocene	1	Good	Moderate	
SWC 40	1773	5817	Upper *L. balmei*?	Paleocene?	2	Poor	V.low	One *Australopolus obscurus*
SWC 39	1778	5833	Upper *L. balmei*	Paleocene	1	Good	Moderate	
SWC 36	1805	5922	Upper *L. balmei*	Paleocene	1	Good	Moderate	
SWC 34	1839.8	6036	Upper *L. balmei*	Paleocene	1	V.Good	High	
SWC 32	1852	6076	Upper *L. balmei*	Paleocene	1	Good	Moderate	
Cutting Sample	1857	6093	Upper *L. balmei*	Paleocene	1	V.Good	High	T.D. at third logging run.
SWC 31	1862	6109	Upper *L. balmei*	Paleocene	1	Good	Moderate	Lowest *P. grandis*
SWC 141	1897	6224	Lower *L. balmei*	Paleocene	1	Good	Moderate	
SWC 140	1924	6312	Lower *L. balmei*	Paleocene	1	V.Good	V.High	
SWC 138	1943.5	6376	Lower *L. balmei*	Paleocene	1	Good	Moderate	*Pesavis sp.*
SWC 136	1959.5	6429	Lower *L. balmei*	Paleocene	1	Good	Moderate	
SWC 134	1973	6473	Lower *L. balmei*	Paleocene	1	Good	Moderate	
SWC 127	2063.5	6770	Indeterminate	-	-	Barren	Barren	
SWC 126	2081	6827	Lower *L. balmei*	Paleocene	1	Fair	Moderate	
SWC 125	2093	6867	Lower *L. balmei*	Paleocene	1	Good	Moderate	*I. antipodus*
SWC 124	2102.6	6898	Lower *L. balmei*	Paleocene	1	Good	Moderate	
SWC 123	2117	6946	Lower *L. balmei*	Paleocene	1	Good	Moderate	
SWC 122	2152	7060	Lower *L. balmei*	Paleocene	1	V.Good	High	*I. antipodus*
SWC 121	2161.5	7092	Lower *L. balmei*	Paleocene	1	V.Good	High	Non-marine dinoflagellates present.
SWC 118	2206	7238	Lower L. balmei	Paleocene	1	V.Good	High	
SWC 117	2236.5	7336	*T. longus*	Maestrichtian	1	V.Good	High	*T. longus*, *P. otwayensis*, *T. waiparaensis* present.
SWC 116	2247	7372	*T. longus*	Maestrichtian	1	V.Good	High	
SWC 115	2250.5	7384	*T. longus*	Maestrichtian	1	Good	High	

PALYNOLOGY DATA SHEET

BASIN: GIPPSLAND
ELEVATION: KB: 25m GL: - 41.7m
WELL NAME: SEAHORSE #1
TOTAL DEPTH: 2304m

AGE	PALYNOLOGICAL ZONES	HIGHEST DATA					LOWEST DATA				
		Preferred Depth	Rtg	Alternate Depth	Rtg	Two Way Time	Preferred Depth	Rtg	Alternate Depth	Rtg	Two Way Time
NEOGENE	*T. pleistocenicus*										
	M. lipsis										
	C. bifurcatus										
	T. bellus										
PALEOGENE	*P. tuberculatus*	1375	1				1388	0			
	Upper *N. asperus*	1390	0				1396	1			
	Mid *N. asperus*	1398	0				1445	0			
	Lower *N. asperus*	1454	1				1540	1			
	P. asperopolus	1571	1				1622	1			
	Upper *M. diversus*	1623	2				1623	2			
	Mid *M. diversus*	1670	1				1670	1			
	Lower *M. diversus*	1692.5	1				1744	1			
	Upper *L. balmei*	1773	2	1778	1		1862	1			
	Lower *L. balmei*	1897	1				2206	1			
LATE CRETACEOUS	*T. longus*	2236.5	1				2250	1			
	T. lilliei										
	N. senectus										
	U. *T. pachyexinus*										
	L. *T. pachyexinus*										
	C. triplex										
	A. distocarinatus										
EARLY CRET.	*C. paradoxus*										
	C. striatus										
	F. asymmetricus										
	F. wonthaggiensis										
	C. australiensis										
PRE-CRETACEOUS											

COMMENTS: Deflandrea extensa Dinoflagellate Zone: 1398m - 1404m
All depths in metres.
T.D. 2304m

CONFIDENCE RATING:

- 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 spores and pollen or microplankton, or both.
- 4: Cuttings, No Confidence, assemblage with non-diagnostic spores, pollen and/or microplankton.

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

DATA RECORDED BY: H.E. STACY
DATE: DECEMBER 1, 1978.

DATA REVISED BY:
DATE:

Well Name SEAHORSE-1 **Basin** GIPPSLAND **Sheet No.** 1 of 10

SAMPLE TYPE *	S	S	S	S	S	S	S	S	S	S	S	S	C	C	S	C	C	C	C	C	C	C	C	C	S	S	S	S
DEPTHS / PALYNOMORPHS	1375	1380	1382	1388	1390	1392	1395	1396	1398	1402	1404.5	1411	1411.32	1417.9	1424	1425.9	1430.3	1432.21	1436.37	1441	1445.64	1454.5	1467.3	1475.5	1487.5	1491.5	1540	1571
A. qualumis																												
A. acutullus																												
A. luteoides																						/						
A. oculatus																												
A. sectus																												
A. triplaxis																												
A. obscurus																												
B. disconformis																					/							
B. arcuatus																												
B. elongatus																												
B. mutabilis																												
B. otwayensis																												
B. elegansiformis										/		/		/							/			/				
B. trigonalis									/			/				/					/							
B. verrucosus												/				/				/			/	/				
B. bombaxoides																												
B. emaciatus																												
C. bullatus																												
C. heskermensis																												
C. horrendus																												
C. meleosus																												
C. apiculatus																												
C. leptos																												
C. striatus																												
C. vanraadshoovenii																												
C. orthoteichus/major					/								/								/	/			/			
C. annulatus		/		/																								
C. gigantis																						cf						
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																												
L. florinii								/		/	/	/	/							/	/			/	/			/
M. diversus														/		/		/					/	/				
M. duratus																												
M. grandis																												
M. perimagnus																												

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

Well Name SEAHORSE-1 Basin GIPPSLAND Sheet No. 2 of 10

SAMPLE TYPE *	S	S	S	S	S	S	S	S	S	S	S	S	C	C	S	C	C	C	C	C	C	C	C	C	S	S	S	S
DEPTHS PALYNOMORPHS	1375	1380	1382	1388	1390	1392	1395	1396	1398	1402	1404.5	1411	1411.32	1417.9	1424	1425.9	1430.3	1432.21	1436.37	1441	1445.64	1454.5	1467.3	1475.5	1487.5	1491.5	1540	1571
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/jubatus																												
P. mawsonii			/	/			/	/		/	/	/	/	/		/		/	/		/	/		/	/	/		
P. reticulosaccatus																												
P. verrucosus																												
P. crescentis																												
P. esobalteus																			/						/		/	
P. langstonii																												
P. reticulatus																												
P. simplex																								?				
P. varus																												
P. adenanthoides (Prot.)											/		/	/				/	/		/	/	/	/				
P. alveolatus																												
P. amolosexinus																												
P. angulatus																												
P. annularis					/							/	/	/	/			/		/	/			/				
P. asperopolus																								/	/			/
P. biornatus																												
P. clarus																												
P. cleinei																												
P. confragosus																												
P. crassis										/	/	/	/	/		/			/	/	/		/	/	/			
P. delicatus													/								/			/				
P. formosus																												
P. grandis																												
P. grevillaensis																												
P. incurvatus/rectomarginis					/	/									/						/			/				
P. intricatus																												
P. kopiensis																					/				/			
P. lapis																							/	/				
P. latrobensis												/	/	/					/								/	
P. leightonii					RW		RW		/		/																	
P. obesolabrus															cf	cf		cf	cf									
P. obscurus			/									/	/										/	/	/	/		
P. ornatus																					cf							cf
P. otwayensis																												
P. pachypolus																		/			/	/	/		/		/	
P. palisadus																			/					/				
P. parvus																												
P. plemmelus																						/	/					
P. prodigus															/										/			
P. pseudomoides																						/	/	/				
P. recavus											/	/	/	/		/			/	/	/		/	/	/			

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

Well Name SEAHORSE-1 **Basin** GIPPSLAND **Sheet No.** 3 **of** 10

SAMPLE TYPE *	S	S	S	S	S	S	S	S	S	S	S	S	C	C	S	C	C	C	C	C	C	C	C	C	S	S	S	S
DEPTHS PALYNOMORPHS	1375	1380	1382	1388	1390	1392	1395	1396	1398	1402	1404.5	1411	1411.32	1417.9	1424-S	1425.9	1430.3	1432.21	1436.37	1441	1445.64	1454.5	1467.3	1475.5	1487.5	1491.5	1540	1571
P. rectomarginis			/			/	/	/					/								/	/						
P. reflexus												/		/		/								/				
P. reticulatus												/						/						/				
P. reticuloconcavus																												
P. reticuloscabratus								/					/															
P. rugulatus												/																
P. scitus																												
P. stipplatus							/													cf	cf							
P. tenuiexinus					/							/		/		/			/	/	/		/			/		/
P. truncatus																					?							
P. tuberculatus																					cf	cf		cf				
P. tuberculiformis																												
P. tuberculotumulatus																												
P. xestoformis (Prot.)																												
O. brossus																												
R. boxatus																												
R. stellatus																												
R. mallatus																								/				
R. trophus																								/	/			
S. cainozoicus												/	/	/		/					/			/				
S. rotundus																					/			/				
S. digitatoides																												
S. marlinensis												/																
S. rarus																												
S. meridianus														/														
S. prominatus																												
S. uvatus																												
S. punctatus										/														/				
S. regium																												
T. multistrixus (CP4)																												
T. textus																												
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						/		/	/									cf										
V. kopukuensis				/	/			/	/		/		/								/				/			/

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

Well Name SEAHORSE-1 Basin GIPPSLAND Sheet No. 4 of 10

SAMPLE TYPE *	S	S	S	S	S	S	S	S	S	S	S	S	C	C	S	C	C	C	C	C	C	C	C	C	S	S	S	S
DEPTHS PALYNOMORPHS	1375	1380	1382	1388	1390	1392	1395	1396	1398	1402	1404.5	1411	1411.32	1417.9	1424	1425.9	1430.3	1432.21	1436.37	1441	1445.64	1454.5	1467.3	1475.5	1487.5	1491.5	1540	1571
Dino. simplex	/																											
Achomosphaera sp.	/	/																										
Defl. phosphoritica		cf				/		/		/	/																	
Oper. centrocarpum		/	/	/	/	/		/	/	/	/																	
Spiniferites sp.		/	/	/			/	/		/											/					/		
Dino. pontus			/																									
Dino. mamilatus			/																									
Achom. ramulifera				/																								
Diphyes sp.				/																								
Leptodinium sp.				/	/	/				/	/																	
Syst. placacantha					/		/	/		/																		
H'kolp. rigaudae					/					/	/										/							
Eisenackia sp.					/																							
Defl. extensa						/			/		/																	
P'than. eocenicum							/																					
Spin. ramosa							/																					
Achom. alicornu								/																				
P'than. coreoides								/																				
Tectatodinium sp.									/																			
a. indentata										/															/			
l. pelegica										/																		
Histiocysta variata										/																		
Areosphaeridium arcuatum										/																		
Thalassiphora sp.										/																		
Spinidinium spp.										/	/		/							/	/			/	/			
Hystrichostrangolon sp.										/																		
Tect. marlum											/																	
Eisen. ornata											/																	
Corrud. incompositum											/																	
Corrud. corrugatum											/																	
Oper. brevum											/																	
Adnat. reticulense											/																	
Lejunia sp.												/																
Cord. fibrospinosum											/										/							
Nematosph. balcombiana																					/							
Homotryblium sp.																					/							
Defl. flounderensis																					/							
Nonmarine Dinoflagellates																											/	

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

Well Name SEAHORSE-1 · **Basin** GIPPSLAND **Sheet No.** 5 **of** 10

SAMPLE TYPE *	S	S	S	S	S	S	S	S	S	S	S	S	S	S	T	S	S	S	S	S	S	S	S	S	S	S	S	S
DEPTHS PALYNOMORPHS	1605.5	1614.5	1619.5	1622.3	1623.3	1645.5	1670	1692.5	1744	1773	1778	1805	1839.8	1852	1857	1862	1897	1924	1943.5	1959.5	1973	2063.5	2081	2093	2102.6	2117	2152	2161.5
A. qualumis																												
A. acutullus				/			/																					
A. luteoides																												
A. oculatus																												
A. sectus																												
A. triplaxis																												
A. obscurus									/	/			/		/	/								/				/
B. disconformis							/																		/			
B. arcuatus																												
B. elongatus															/													
B. mutabilis																												
B. otwayensis																												
B. elegansiformis																												
B. trigonalis																												
B. verrucosus																												
B. bombaxoides																												
B. emaciatus				/				/																				
C. bullatus																												
C. heskermensis																							/					
C. horrendus																											/	
C. meleosus																												
C. apiculatus																												
C. leptos																												
C. striatus																												
C. vanraadshoovenii																												
C. orthoteichus/major					/			/																				
C. annulatus																												
C. gigantis																												
C. splendens		/			/					/		/							/	/				/		/	/	
D. australiensis																												
D. granulatus							/												/						/			
D. tuberculatus								/								/				/								/
D. delicatus					/																							
D. semilunatus																												
E. notensis																												
E. crassiexinus																												
F. balteus								/																				
F. crater																												
F. lucunosus																												
F. palaequetrus																												
G. edwardsii													/			/				/				/			/	/
G. rudata													/					/		/				/	/	/	/	
G. divaricatus																												
G. gestus																												
G. catathus																												
G. cranwellae																												
G. wahooensis																												
G. bassensis																												
G. nebulosus																												
H. harrisii	/	/		/	/		/		/		/	/	/	/		/		/		/	/			/	/			/
H. astrus																												
H. elliottii																				/								
I. anguloclavatus				/				/																				
I. antipodus																			?					/			/	
I. notabilis				/			/																					
I. gremius					/		/																					
I. irregularis																												
J. peiratus																												
K. waterbolkii																												
L. amplus																							/					
L. crassus												/			/					/						/		
L. ohaiensis																											/	
L. bainii																												
L. lanceolatus																												
L. balmei											/	/	/	/	/	/	/	/	/	/	/		/			/	/	/
L. florinii				/				/	/		/			/	/		/	/					/			/		/
M. diversus	/						/						/															
M. duratus																												
M. grandis																												
M. perimagnus																												

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

Well Name SEAHORSE-1 Basin GIPPSLAND Sheet No. 6 of 10

SAMPLE TYPE *	S	S	S	S	S	S	S	S	S	S	S	S	S	S	T	S	S	S	S	S	S	S	S	S	S	S	S	S
DEPTHS PALYNOMORPHS	1605.5	1614.5	1619.5	1622.3	1623.3	1645.5	1670	1692.5	1744	1773	1778	1805	1839.8	1852	1857	1862	1897	1924	1943.5	1959.5	1973	2063.5	2081	2093	2102.6	2117	2152	2161.5
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/jubatus																												
P. mawsonii							/	/			/	/	/	/	/	/	/	/	/	/	/			/	/	/	/	/
P. reticulosaccatus														/														
P. verrucosus								/																				
P. crescentis																												
P. esobalteus															cv													
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	/	/		/	/										cv													
P. palisadus																	cf	cf		cf					cf			
P. parvus																												
P. plemmelus							/																					
P. prodigus	/							/				/	/					/										
P. pseudomoides	/				/			/							/	/												
P. recavus																												

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

Well Name SEAHORSE-1 **Basin** GIPPSLAND **Sheet No.** 7 **of** 10

SAMPLE TYPE *	S	S	S	S	S	S	S	S	S	S	S	S	S	S	T	S	S	S	S	S	S	S	S	S	S	S	S	S
DEPTHS PALYNOMORPHS	1605.5	1614.5	1619.5	1622.3	1623.3	1645.5	1670	1692.5	1744	1773	1778	1805	1839.8	1852	1857	1862	1897	1924	1943.5	1959.5	1973	2063.5	2081	2093	2102.6	2117	2152	2161.5
P. rectomarginis																												
P. reflexus															CV													
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)															cf			cf						cf			cf	
T. gillii																		/						/	/	/		/
T. incisus				/																								
T. longus																												
T. phillipsii												/						/							/		/	
T. renmarkensis																											/	
T. sabulosus																												
T. simatus															CV													
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				/			/							/		/												?

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

Well Name SEAHORSE-1 Basin GIPPSLAND Sheet No. 8 of 10

SAMPLE TYPE *	S	S	S	S
DEPTHS PALYNOMORPHS	2206	2236.5	2247	2250.5
A. qualumis				
A. acutullus				
A. luteoides				
A. oculatus				
A. sectus				
A. triplaxis				
A. obscurus	/			
B. disconformis				/
B. arcuatus				
B. elongatus				
B. mutabilis				
B. otwayensis				
B. elegansiformis				
B. trigonalis				
B. verrucosus				
B. bombaxoides				
B. emaciatus				
C. bullatus				
C. heskermensis				
C. horrendus			/	
C. meleosus				
C. apiculatus				
C. leptos				
C. striatus				
C. vanraadshoovenii				
C. orthoteichus/major				
C. annulatus				
C. gigantis				
C. splendens				/
D. australiensis				
D. granulatus				
D. tuberculatus				/
D. delicatus				
D. semilunatus				
E. notensis				
E. crassiexinus				
F. balteus				
F. crater				
F. lucunosus				
F. palaequetrus				
G. edwardsii	/		/	/
G. rudata	/	/	/	/
G. divaricatus				
G. gestus				
G. catathus				
G. cranwellae				/
G. wahooensis				
G. bassensis				
G. nebulosus				
H. harrisii				
H. astrus				
H. elliottii		/		
I. anguloclavatus				
I. antipodus				
I. notabilis				
I. gremius				
I. irregularis				
J. peiratus				
K. waterbolkii				
L. amplus		/		
L. crassus				
L. ohaiensis				
L. bainii				
L. lanceolatus				
L. balmei	/	/		
L. florinii				
M. diversus				
M. duratus				
M. grandis				
M. perimagnus				

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

Well Name SEAHORSE-1 Basin GIPPSLAND Sheet No. 9 of 10

SAMPLE TYPE *	S	S	S	S
DEPTHS PALYNOMORPHS	2206	2236.5	2247	2250.5
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/jubatus				
P. mawsonii	/	/	/	
P. reticulosaccatus				
P. verrucosus				
P. crescentis				
P. esobalteus				
P. langstonii				
P. reticulatus				
P. simplex				
P. varus				
P. adenanthoides (Prot.)	/			
P. alveolatus				
P. amolosexinus		/		
P. angulatus	/			/
P. annularis				
P. asperopolus				
P. biornatus				
P. clarus				
P. cleinei		/	/	
P. confragosus				
P. crassis				
P. delicatus				
P. formosus				
P. grandis				
P. grevillaensis				
P. incurvatus				
P. intricatus				
P. kopiensis				
P. lapis			/	
P. latrobensis				
P. leightonii				
P. obesolabrus				
P. obscurus				
P. ornatus				
P. otwayensis		/	/	/
P. pachypolus				
P. palisadus			/	
P. parvus				
P. plemmelus				
P. prodigus			/	
P. pseudomoides				
P. recavus				

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

Well Name SEAHORSE-1 **Basin** GIPPSLAND **Sheet No.** 10 **of** 10

SAMPLE TYPE *	S	S	S	S
DEPTHS PALYNOMORPHS	2206	2236.5	2247	2250.5
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				

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

APPENDIX 5

APPENDIX 6

Missing 13/5/99

LOG ANALYSIS

by S. Patniyot

APPENDIX 6

APPENDIX 7

APPENDIX 7

13 pages
1 of 13

OIL and GAS DIVISION

3 0 MAR 1979

W 705

SEAHORSE – 1

APPENDIX 7

VELOCITY SURVEY

2/13

VELOCITY SURVEY

Well ... SEAHORSE #1

Basin ... GIPPSLAND

INTRODUCTION

Esso personnel ... J. HUGHES, K. WOOD

Contractor ... VELOCITY DATA PTY. LTD.

Supplied (1) Instruments

(2) Personnel

Seismic Observer ... B. Potter

Marine Shooter ... R. Doyle

Dynamite ...

(3) Seismic Souce

Gas Gun

Gas Pressures ...

Oxygen ... 90 PSI

Propane ... 50 PSI

~~(3) Licenced Shooting Boat~~

~~name ...~~

~~date loaded ...~~

~~date released ...~~

~~Agent ...~~

~~amount of powder ... lbs~~

~~size of cans ... lbs~~

~~number of cans ...~~

~~number of caps ...~~

~~number of boosters ...~~

Personnel and Instruments

assembled at OCEAN ENDEAVOUR ... date 16/8/78

boarded (rig) OCEAN ENDEAVOUR ... date 16/8/78

date of survey 17/8/78

casing depth 20" @ 188.26m & 13-3/8" @ 977.66m

T.D. when shot 1867m ... FTD 2364m

water depth 41.7m

K.B. 25.3m

SURVEY PROCEDURE

Weather: sea ... 1m

rig movement slight

rig noise moderate

Hydrophones: number three

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

position 2 - 1m above bottom of gas gun

1 - in moon pool

~~Shot Positioning and Charges:~~

~~marker buoys (number ...~~

~~(distance ...~~

~~(direction ...~~

~~charge depth ... ft~~

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

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

~~number of misfires ...~~

Gas gun ~~amount of powder used ... lbs~~

No. of pops per level: 2 to 3 pops

amount of powder dumped.................lbs.

Well-phone positioning:

T-bar....-....................................

number of depths......15......................

Time: first shot......0718......................

last shot........1002..........................

rig time....2 hrs. 44 mins.....................

RESULTS

Quality of records(good.....8......................
(fair.....17.......................
(poor.....12.......................
(not used..-.....................

Comparison of Interval Times
with sonic log

/ /average...30.7...........microsec/~~foot~~ m

/ max/.......125..........microsec/~~foot~~ m

CONCLUSION

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

COMMENTS

1. Traces 1: Time break hydrophone
   2-5: Well geophone at 4 different gain settings
   6: Moon pool hydrophone
   7: Dead trace
   8: Time break hydrophone

2. The depth of check shots 26 and 27 is uncertain. The tool was opened at 1369m but would not lock in position so it was decided to shoot the level at 1381m. After trying to tie the sonic log with the check shots, it appears that the tool may have stuck at 1369m. and therefore this level has been left out of all calculations and the TD curve.

3 Check shots 24 and 25 were too close to shots 4,5,6 and 7 for the interval velocities to be of any use.

4. During the survey, the gas gun had to be brought back onboard twice, so that the crane would not interfere with the arrivals of helicopters.

5. Record Nos 36 and 37 show casing breaks. However, the true time break is sharp and easy to define.

Copy

4/13

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

DATE OF SURVEY 17 Aug 78
CLIENT ESSO
WELL SEAHORSE No 1.

OBSERVERS REPORT

ENERGY SOURCE Gas Gun RECORDING INSTRUMENTS RS44 LOGGER SCHLUMBERGER
GEOPHONES: WELL WLS 1000 REFERENCE Pressure SEA FLOOR — REFRACTION —
REFERENCE SENSOR OFFSET 5 m DEPTH 40 ft DRILL SHIP Ocean Endeavour SHIP HEADING —
WEATHER Very Windy, then Calm SEAS Moderate

DEPTH	Record ~~BEARING~~	CHARGE	SHOT DEPTH	SHOT LOCATION	SHOT OFFSET	AMPLIFIER GAIN		TIME	COMMENTS
998 M	1	20 Sec	40 ft	Port	150 ft	2/1	0	0718	Heavy Background noise
"	2			Crane			0	0719	
	3						0	0720	
1408.5 m	4						0	0731	
"	5						0	0732	
"	6						0	0733	
"	7						3	0734	
1[illegible]26.5 M	8						4	0744	
"	9						4	0745	
"	10						6	0746	
57 M	11						6	0803	
"	12						6	0804	
"	13						8	0805	
49 M	14						10	0815	
"	15						10	0816	
1864 M	16					3/2	5	0826	
"	17						3	0827	
"	18						3	0828	
744 M	19						4	0841	
"	20						4	0842	
"	21						4	0843	
15[illegible] M	22						7	0857	
"	23						7	0858	
1400.5 M	24						7	0907	
"	25						7	0908	
381 M	26						7	0920	
"	27						7	0921	
289 M	28						4	0930	
"	29						6	0931	
1141.5 M	30						7	0938	
"	31						7	0939	
800 M	32						7	0946	
"	33						7	0947	
600 M	34						7	0953	
"	35						7	0954	
350 M	36						4	1001	
"	37	↓	↓	↓	↓	↓	4	1002	

NUMBER OF RECORDS 37 EXPLOSIVES USED: CAPS — PRIMERS — EXPLOSIVE —
DEPART ~~BRISBANE~~ Perth 15 Aug 78 RETURN ~~BRISBANE~~ Perth 18 Aug 78 OBSERVER B K Potter

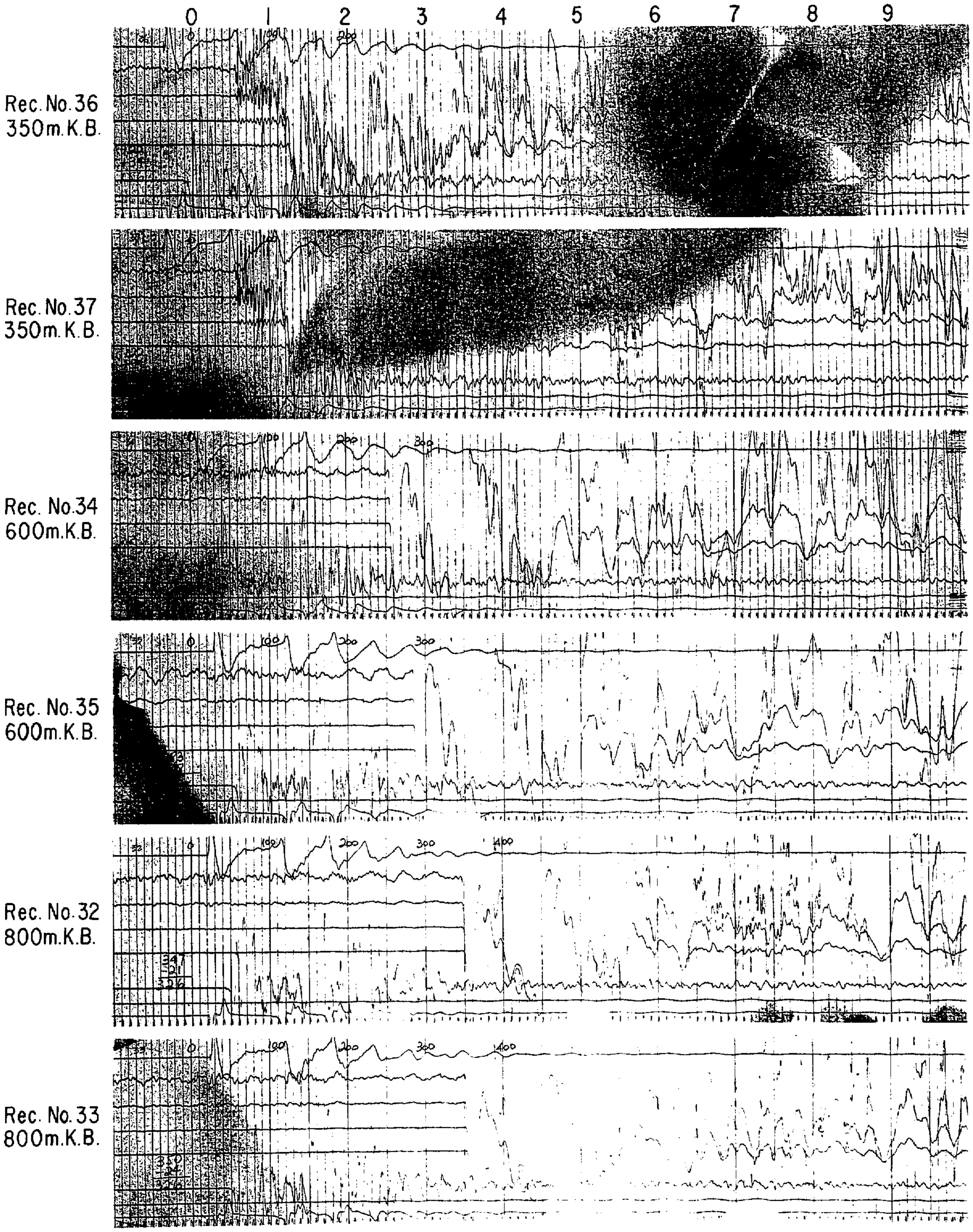
5/13

SEAHORSE – 1

WELL VELOCITY RECORD

AUGUST 1978

Sheet 1 of 6



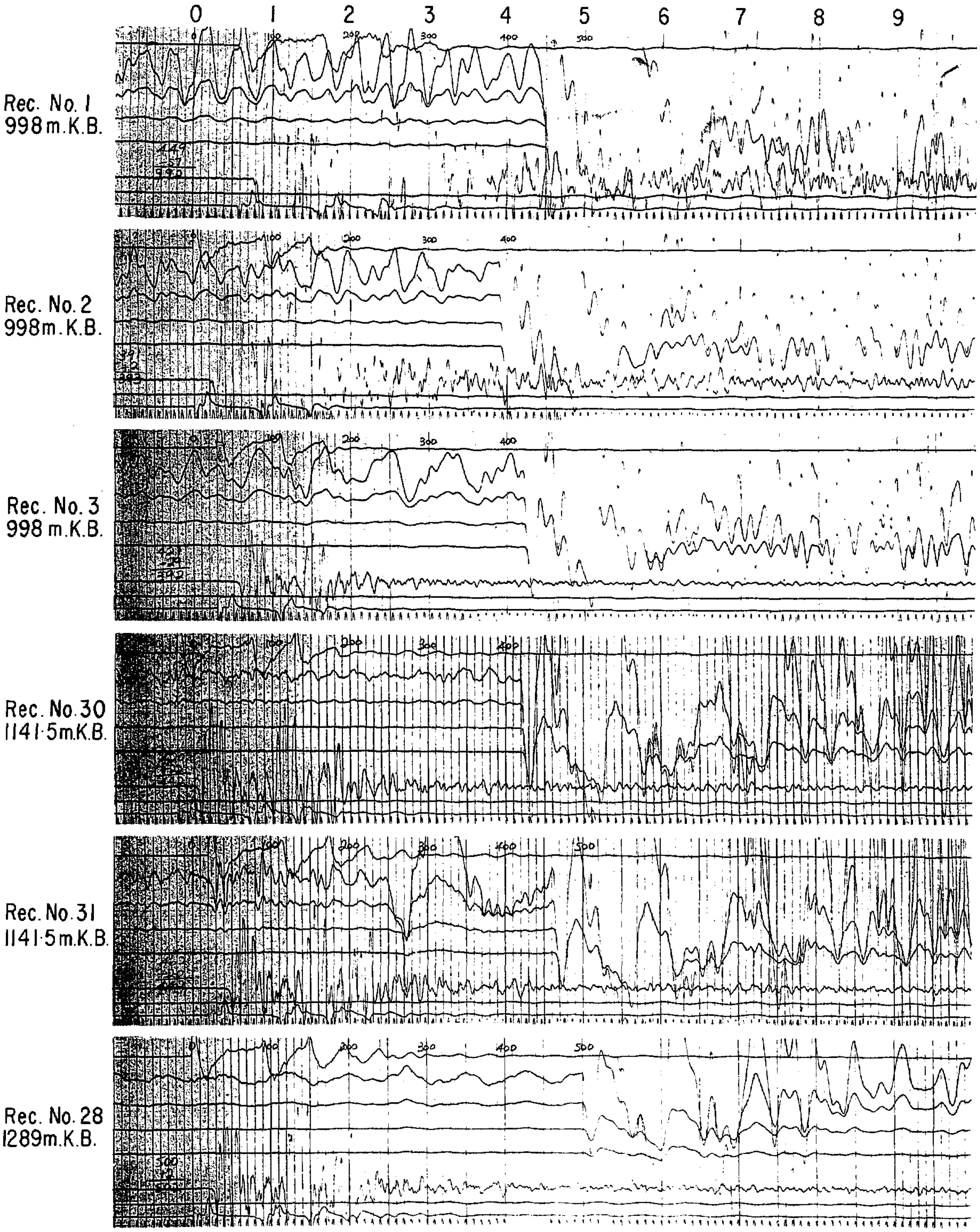
Dwg. 1882/OP/1

SEAHORSE -1

WELL VELOCITY RECORD

AUGUST 1978

Sheet 2 of 6



Dwg. 1882/OP/2

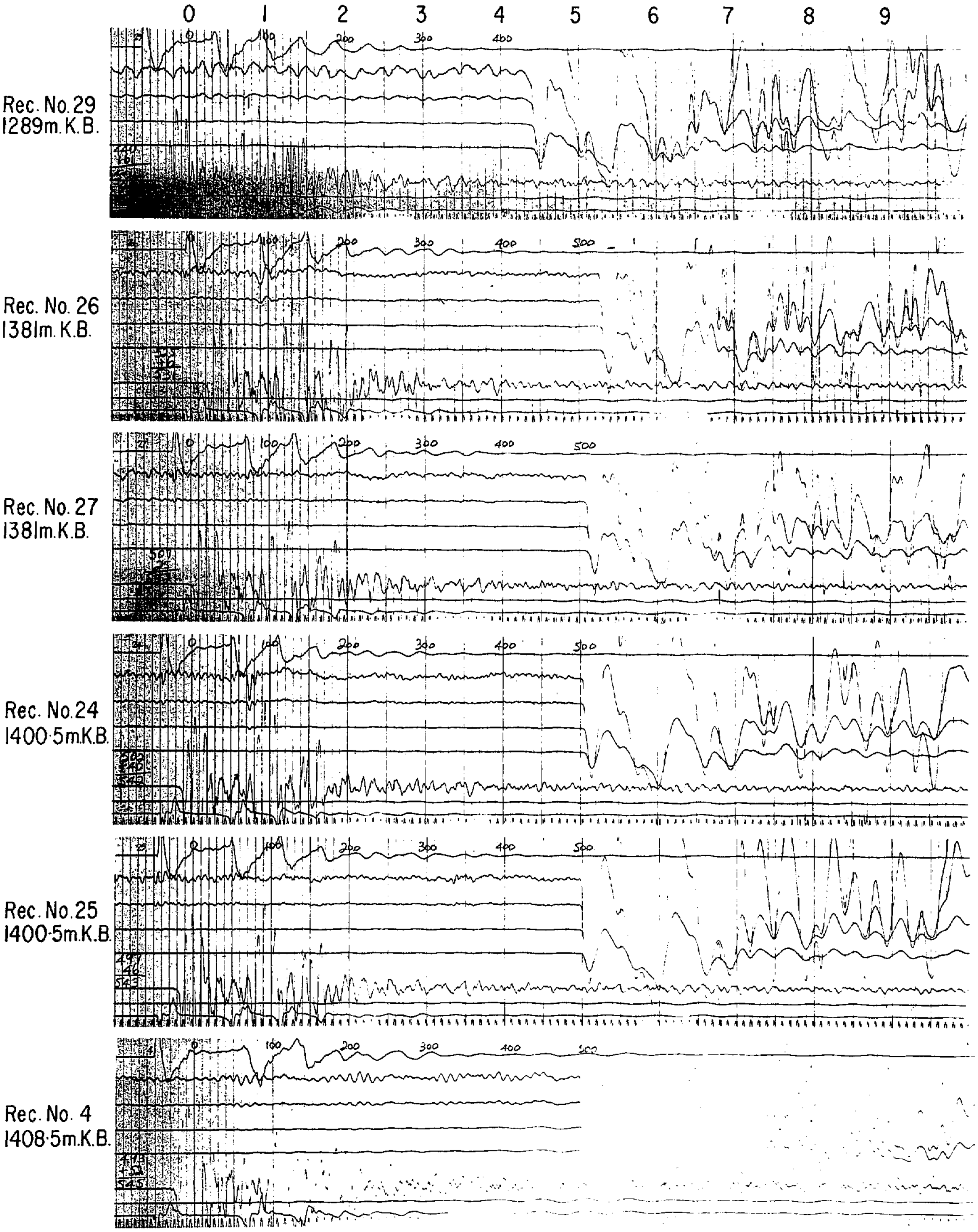
7/13

SEAHORSE – 1

WELL VELOCITY RECORD

AUGUST 1978

Sheet 3 of 6



Dwg. 1882/OP/3

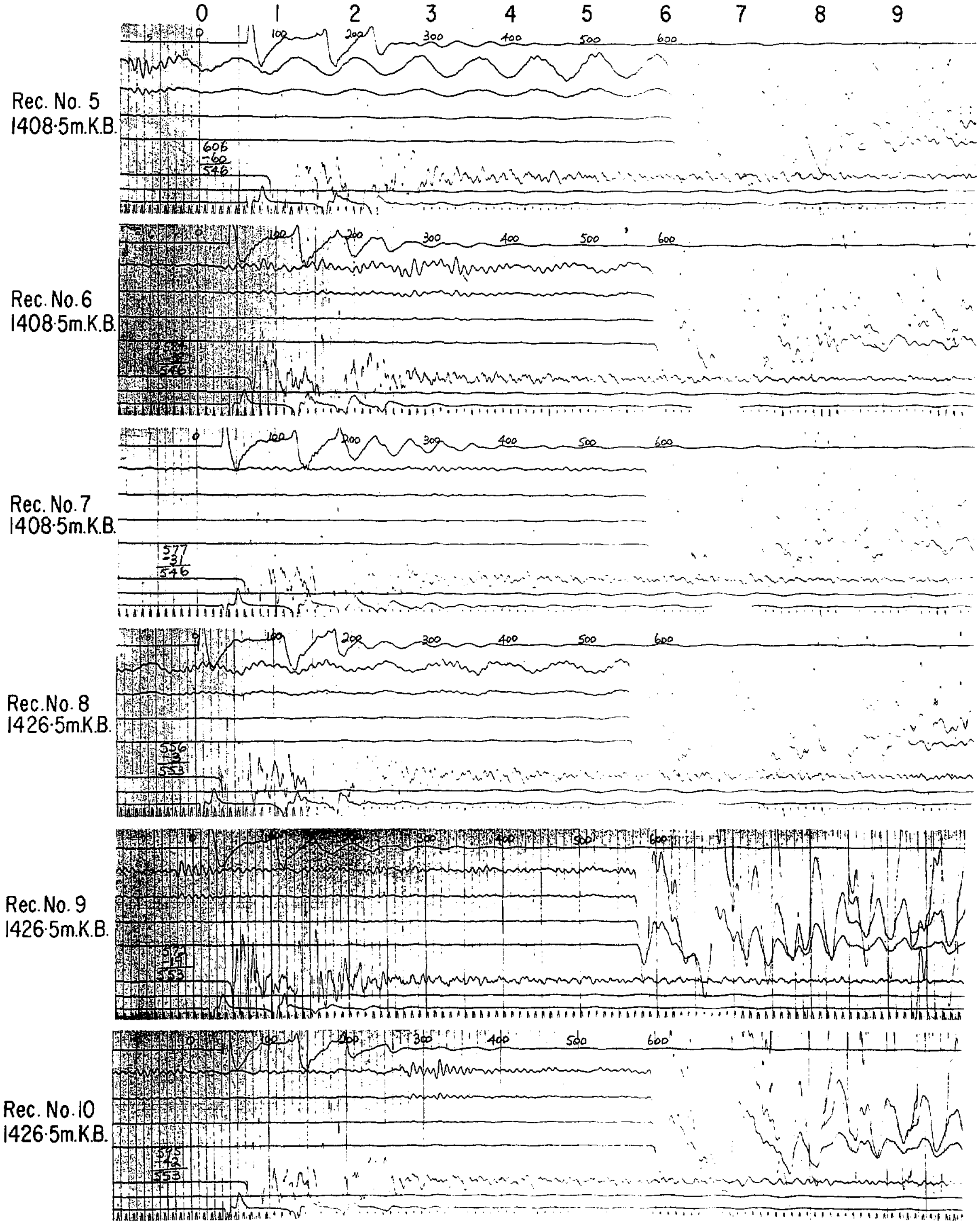
8/13

SEAHORSE -1

WELL VELOCITY RECORD

AUGUST 1978

Sheet 4 of 6



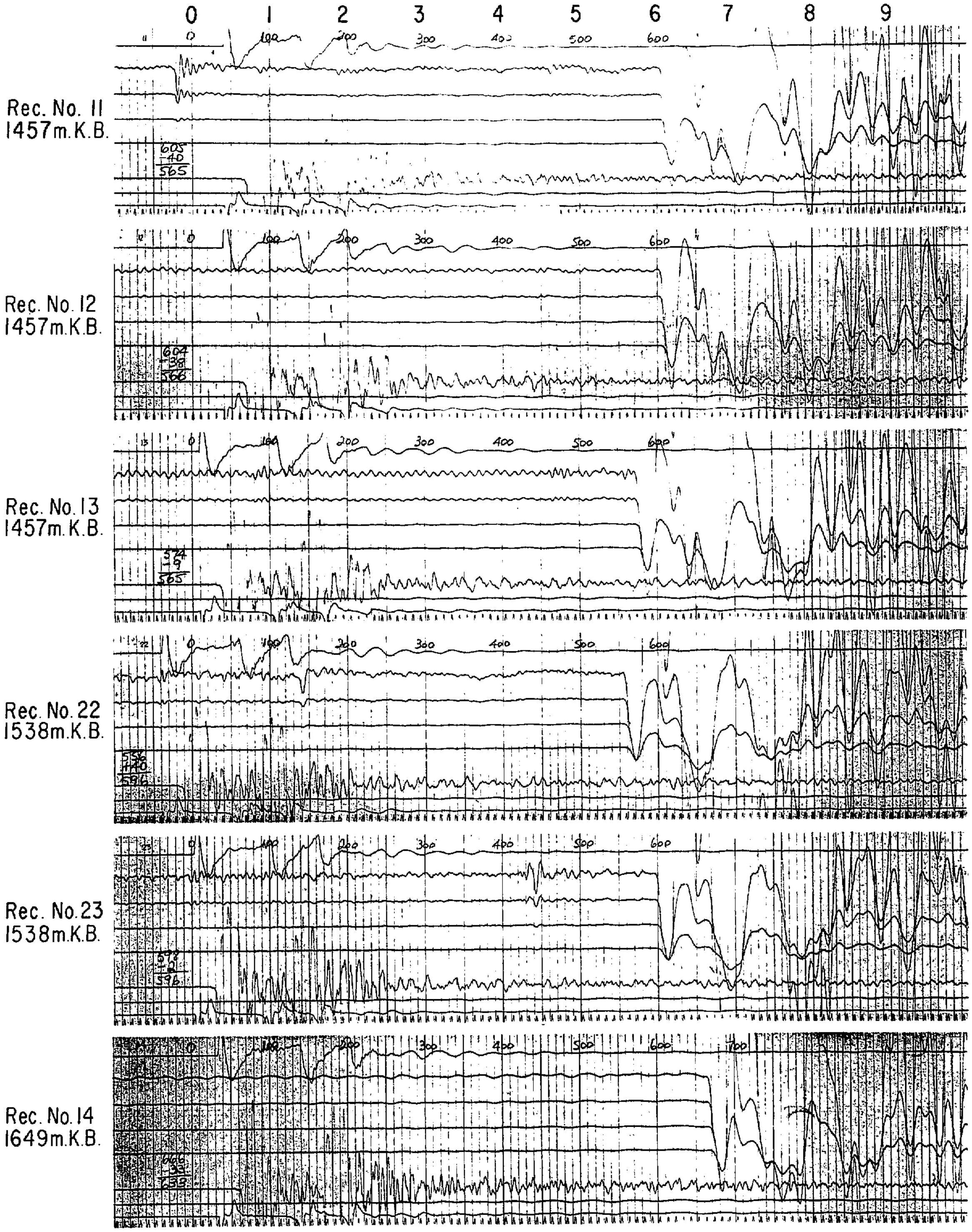
Dwg. 1882/OP/4

9/13

SEAHORSE -1

WELL VELOCITY RECORD

AUGUST 1978 Sheet 5 of 6



Dwg. 1882/OP/5

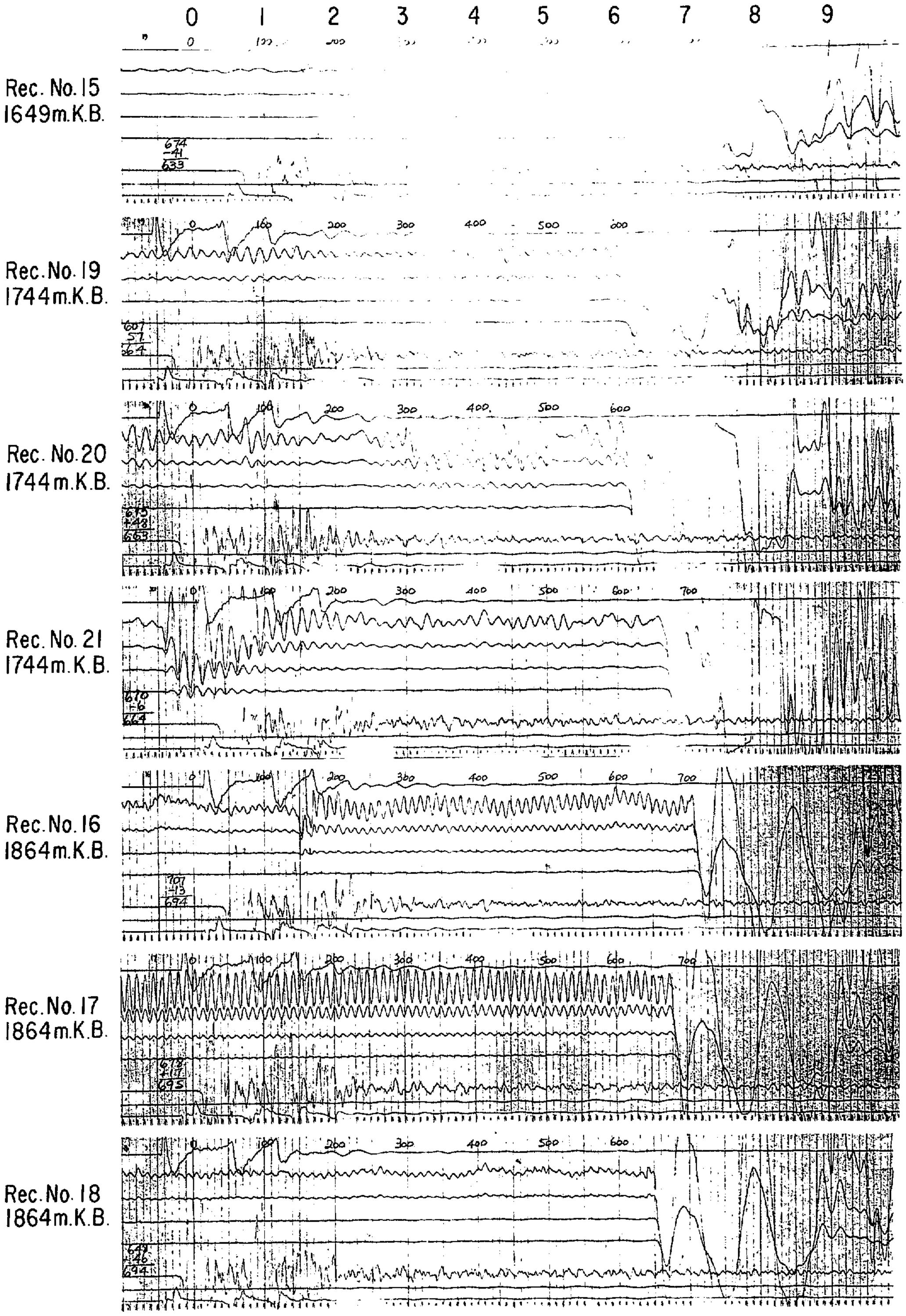
10/13

SEAHORSE – 1

WELL VELOCITY RECORD

AUGUST 1978

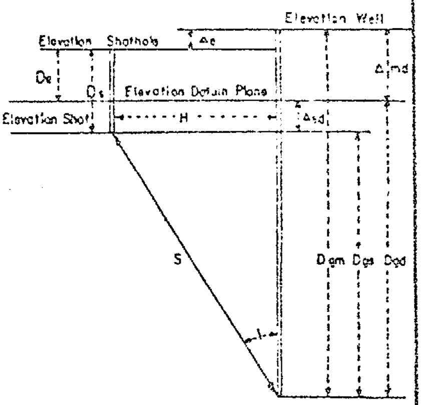
Sheet 6 of 6



Dwg. 1882/OP/6

Shothole Information:- Elevation, Distance & Direction from Well	Company	Well	Elevation (Derrick Floor)	Total Depth	LOCATION
	ESSO EXPLORATION AUSTRALIA INC.	SEAHORSE #1	25.3m		Coordinates Lat. 38°11'47.95"S Long.147°40'22.35"E Section, Township, Range County Area or Field GIPPSLAND BASIN DATUM : Mean sea level

Record Number	Shothole Number	Time of Shot	Dgm m	Ds	tus	tr	T Reading	T Polarity	T Grade	Dgs	H	TAN I	Cos I	Tgs	Δsd	Δsd/V	Tgd	Tgd Average	Dgd	ΔDgd	ΔTgd	Vi Interval Velocity	Va Average Velocity
36		1001	350	12.2	.008		.156			312.5	42.7	0.1366	.9908	.155	12.2	.008	.163	.163	324.7				1992
37		1002	350	"	"		.156			"	"	"	"	.155	"	"	.163			250	.099	2525	
34		0953	600	12.2	.008		.256			562.5	42.7	.0759	.9971	.255	12.2	.008	.263	.262	574.7				2193
35		0954	600	12.2	.008		.255			"	"	"	"	.254	"	"	.262			200	.071	2816	
32		0946	800	12.2	.008		.326			762.5	42.7	.0560	.9984	.325	12.2	.008	.333	.333	774.7				2326
33		0947	800	12.2	.008		.326			"	"	"	"	.325	"	"	.333	.		198	.067	2955	
1		0718	998	12.2	.008		.392			960.5	42.7	.0445	.9990	.392	12.2	.008	.400						
2		0719	998	"	"		.393			"	"	"	"	.393	"	"	.401	.400	972.7				2431
3		0720	998	"	"		.392			"	"	"	"	.392	"	"	.400			143.5	.050	2870	
30		0938	1141.5	12.2	.008		,442			1104	42.7	.0387	.9993	.442	12.2	.008	.450	.450	1116.2				2480
31		0939	1141.5	"	"		.442			"	"	"	"	.442	"	"	.450			147.5	.059	2500	
28		0930	1289	12.2	.008		.502			1251.5	42.7	.0341	.9994	.502	12.2	.008	.510	.509	1263.7				2482
29		0931	1289	"	"		.501			"	"	"	"	.501	"	"	.509			92	.030	3066	
26		0920	1381	12.2	.008		.531			1343.5	42.7	.0318	.9995	.531	12.2	.008	.539	.539	1355.7				2515
27		0921	1381	12.2	.008		.532			"	"	"	"	.532	"	"	.540			19.5	.011	1772	
24		0907	1400.5	12.2	.008		.542			1363	42.7	.0313	.9995	.542	12.2	.008	.550	.550	1375.2				2500
25		0908	1400.5	"	"		.543			"	"	"	"	.543	"	"	.551			8	.004	2000	
4		0731	1408.5	12.2	.008		.545			1371	42.7	.0311	.9995	.545	12.2	.008	.553						
5		0732	1408.5	12.2	.008		.546			"	"	"	"	.546	"	"	.554	.554	1383.2				2496
6		0733	1408.5	"	"		.546			"	"	"	"	.546	"	"	.554						
7		0734	1408.5	"	"		.546			"	"	"	"	.546	"	"	.554			18	.007	2571	
8		0744	1426.5	12.2	.008		.553			1389	42.7	.0307	.9995	.553	12.2	.008	.561						
9		0745	1426.5	12.2	.008		.553			"	"	"	"	.553	"	"	.561	.561	1401.2				2497
10		0746	1426.5	12.2	.008		.553			"	"	"	"	.553	"	"	.561			30.5	.012	2541	



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 ; $\tan i = \frac{H}{D_{gs}}$
Tgs = cos i T = Vert. travel time from shot elev. to geophone
$T_{gd} = T_{gs} \pm \frac{\Delta sd}{V}$ = " " " " datum plane " "
Dgd = Dgm - Δmd
Vi = Interval velocity = $\frac{\Delta D_{gd}}{\Delta T_{gd}}$
Va = Average = $\frac{D_{gd}}{T_{gd}}$

Surveyed by: J. Hughes, K. Wood
Date: 17/8/78
Weathering Data:

Casing Record 13-3/8" @ 977.66m
20" @ 1882.26m

11/13

DWG. 1107/OP/3

Shothole Information:- Elevation, Distance & Direction from Well

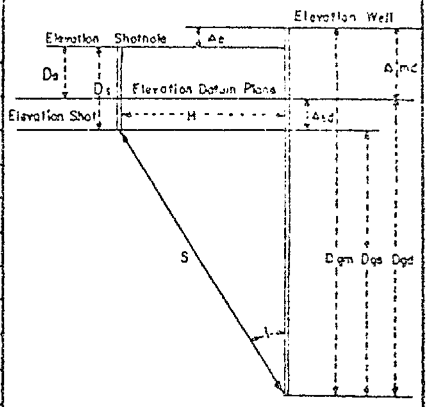
Company: ESSO EXPLORATION AUSTRALIA INC.
Well: SEAHORSE #1
Elevation (Derrick Floor): 25.3m
Total Depth:

LOCATION
Coordinates: Lat. 38°11'47.95"S
Long. 147°40'22.35"E
Section, Township, Range
County
Area or Field: GIPPSLAND BASIN
DATUM : Mean Sea Level

Record Number	Shothole Number	Time of Shot	Dgm	Ds	tus	tr	T Reading	T Polarity	T Grade	Dgs	H	TAN I	Cos I	Tgs	Δsd	Δsd/V	Tgd	Tgd Average	Dgd	ΔDgd	ΔTgd	Vi Interval Velocity	Va Average Velocity
11		0803	1457	12.2	.008		.565			1419.5	42.7	.0301	.9995	.565	12.2	.008	.573						
12		0804	1457	"	"		.566			"	"	"	"	.566	"	"	.574	.573	1431.7				2498
13		0805	1457	"	"		.565			"	"	"	"	.565	"	"	.573						
																				81	.031	2612	
22		0857	1538	12.2	.008		.596			1500.5	42.7	.0285	.9996	.596	12.2	.008	.604	.604	1512.7				2504
23		0858	1538	"	"		.596			"	"	"	"	.596	"	"	.604						
																				111	.037	3000	
14		0815	1649	12.2	.008		.633			1611.5	42.7	.0265	.9996	.633	12.2	.008	.641	.641	1623.7				2533
15		0816	1649	"	"		.633			"	"	"	"	.633	"	"	.641						
																				95	.031	3064	
19		0841	1744	12.2	.008		.664			1706.5	42.7	.0250	.9997	.664	12.2	.008	.672						
20		0842	1744	"	"		.663			"	"	"	"	.663	"	"	.671	.672	1718.7				2557
21		0843	1744	"	"		.664			"	"	"	"	.664	"	"	.672						
																				120	.030	4000	
16		0826	1864	12.2	.008		.694			1826.5	42.7	.0234	.9997	.694	12.2	.008	.702						
17		0827	1864	"	"		.695			"	"	"	"	.695	"	"	.703	.702	1838.7				2619
18		0828	1864	"	"		.694			"	"	"	"	.694	"	"	.702						

NOTE: Check shots 26 and 27 were omitted from the T.D. curve because the correct depth is uncertain

Check shots 24 and 25 were omitted because they were too close to the next level.



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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 - Da
Dgs = Dgm - Ds ± Δe ; $\tan I = \frac{H}{D_{gs}}$
Tgs = cos i T = Vert. travel time from shot elev to geophone
$T_{gd} = T_{gs} \pm \frac{\Delta sd}{V}$ = " " " " datum plane " "
Dgd = Dgm - Δmd
Vi = interval velocity = $\frac{\Delta D_{gd}}{\Delta T_{gd}}$
Va = Average " $\frac{D_{gd}}{T_{gd}}$

Surveyed by: J. Hughes, K. Wood
Date: 17/8/78
Weathering Data:

Casing Record
20" @ 188.26m
13-3/8" @ 977.66m

12/13

DWG. 1107/OP/3

SEAHORSE #1

VELOCITY SURVEY ERROR CHECK

Depth Rel.S.L.	Av. Vertical Travel Time (check shots)	Ti Check Shots (sec.)	Ti Sonic Log (sec.)	△ (Millisecs.) Ti Check — Ti Sonic	Depth Interval (~~ft.~~) m	Error (Microsec per ~~ft.~~) m
325	.163	.099	.094	5	250	20
575	.262					
575	.262	.071	.068	3	200	15
775	.333					
775	.333	.067	.064	3	198	15.2
973	.400					
973	.400	.050	.047	3	143.5	20.9
1116.5	.450					
1116.5	.450	.059	.055	4	147.5	27.1
1264	.509					
12[illegible]	.509	.041	.043	-2	111.5	17.9
* 1375.5	.550					
1375.5	.550	.004	.003	1	8	125
1383.5	.554					
1383.5	.554	.007	.007	0	18	0
1401.5	.561					
1401.5	.561	.012	.011	1	30.5	32.8
1432	.573					
1432	.573	.031	.029	2	81	24.7
15[illegible]	.604					
1513	.604	.037	.035	2	111	18
1624	.641					
1624	.641	.031	.030	1	95	10.5
1719	.672					
1719	.672	.030	.035	-5	120	41.7
1839	.702					
* 1356	.539	LEVEL 1381m (1356m Rel. S.L.) was left out of calculations - See comments				

APPENDIX 8

APPENDIX 8

APPENDIX 8

REPORT ON WELL TESTING

REPORT ON
SEAHORSE-1 WELL TESTING

Reservoir Engineering Section

September 1978

REPORT ON SEAHORSE-1 TESTING

SUMMARY

Well testing of the Seahorse-1 well incorporated 23 RFT runs, 8 FIT runs and a production test over the main area of interest from 1431.5-1439m KB. The production test provided the most useful data on sand permeabilities and well Productivity Index (P.I.) Major findings are:

1. Seahorse oil in the production-tested zone has a GOR of about 1100 SCF/STB, and the stabilized crude gravity is 53^{o}API.
2. The sands which were production-tested are capable of production at rates of 2040 STB/D. At stabilized flow conditions, well drawdown at this rate would be 89 psi, corresponding to a PI of 23 STB/PSI. Shut-in tubing head pressure is about 823 psig. Sand permeability is in the range 210-310 md.
3. For the oil sands found in Seahorse-1 between 1425.5 and 1449.5m KB, the OWC is estimated to be in the range 1450-1457m KB.

INTRODUCTION

This report presents the results of well tests on the Seahorse-1 exploration well. Seahorse-1 is located approximately 11 km north-west of the Barracouta 'A' platform in the Gippsland Basin on Permit Vic./P1 (Reference 1). It was drilled and tested during the period July 30 to September 2, 1978. to a total depth of 2304m KB (KB is 25m above mean sea level).

The well encountered three separate hydrocarbon intervals: 1425.5-1449.5m KB, 1512.5-1522m KB and 1608-1610m KB. Wireline formation tests were attempted in each of these zones, and a production test in part of the upper zone - over the interval 1431.5-2439m KB.

PRODUCTION TEST

(a) Test Description

Production test equipment on the Ocean Endeavour was set up as described in the submission of August 24, 1978, to the VDME (Reference 2).

The interval 1431.5-1439m KB was perforated at 1150 hrs. on August 29, 1978, and the well was opened for initial flow at 1300 hrs. Mud was first observed at the surface after 15 minutes of diesel flow, and after a further 5 minutes the well began to flow gas at a rate of about 1 MMSCF/D. At 1430 hours the well was shut in to run an HP pressure gauge. The well was opened again at 1630 hours for production testing. The test proceeded for 3 3/4 hours, after which the well was shut-in due to high concentration (300 ppm) of H_2S in the separator gas. During the test, at 1830 hours, the HP gauge failed, so pressures recorded after this time are from the Amerada pressure gauges run in tandem with the HP.

Two bottomhole samples for subsequent analysis were collected after the main test.

(b) Results and Interpretation

Oil (53°API) flowed during the test at an average rate of 2040 STB/D through a ½ inch choke. At shut-in, the cumulative oil and gas production was 319 STB and 384 MSCF respectively.

Figure 1 plots the pressure drawdown as recorded by the HP gauge at 1425m KB and Figure 2 gives the corresponding tubing head pressures (by dead weight tester). After allowing 20 minutes for the HP gauge to stabilize, a bottom-hole shut-in pressure of 2044.5 psia was recorded. Although the well flowed for 3 3/4 hours, drawdown data was obtained only during the first 130 minutes due to failure of the HP gauge. Data taken during the test are given in Appendix A.

It was determined that flow over this period had not yet reached stabilized conditions. Transient flow analysis resulted in two different permeabilities, 310 and 210 md, being calculated, indicating that the permeability-thickness product decreases away from the well-bore. Consistent with this interpretation, the calculated skin factor is negative, with a value of -4.6.

The only build-up data obtained was recorded by two Amerada gauges. Analysis of this data by the Horner Plot method gives formation permeability estimates of 193 md and 158 md. However, quantitative interpretation is not considered reliable because of lack of precision of the Amerada pressure data. Consequently, the drawdown analysis results are to be preferred. A skin factor of -4.8 was calculated from the build-up data and this is in good agreement with the drawdown analysis.

For an average k of 260 md, the calculated stabilized P.I. of the well is 23 STB/D/PSI. Using this P.I., the drawdown under stabilized conditions for the test flowrate of 2040 STB/D is calculated to be 89 psi. Corresponding tubing head pressure, based on a shut-in THP of 823 psig, is 734 psig.

WIRELINE FORMATION TESTING

A total of 8 Formation Interval Tester (FIT) and 23 Repeat Formation Tester (RFT) runs were attempted on Seahorse-1. Tables 1 and 2 summarize the recoveries achieved in these tests. Of the 8 FIT runs, 6 failed completely, either through inability to seat the tool at depth, or through blockage at the probe or within the tool. Of the 23 RFT runs, in which the tool was seated a total of 53 times, fluid was recovered in 16 cases, however in 4 of these cases recovery was too low to provide analysable data. Additionally, in 7 of these "successful" tests, segregator sampling was unsuccessful. Because of this, we have no full-well-stream samples of oil in the 1512.5-1522 and 1608-1610m KB zones, although samples of stabilized crude from these zones are available from the main chamber recoveries.

In a number of the RFT tests, successful sampling only occurred after one or two unsuccessful seating attempts, demonstrating the usefulness of the tool's multiple seating capacity versus the FIT's single seat limitation.

Table 3 summarizes permeability and formation pressure data interpreted from both segregator and main chamber build-ups. The results of the build-up tests not listed in Table 3 are considered to be invalid for a variety of reasons. The above permeability results assume that the height of the interval being tested is one foot.

The build-up results indicate permeabilities in the oil zones as:

1425.5-1449.5m KB : 50-400 md;
1512.5-1522m KB : 100 md;

however, these should be considered as rough guides only. For the upper zone, the production test results are considered more reliable.

From the respective oil and water recoveries of RFT-5 at 1449.3m and RFT-11 at 1458m (Table 3) and the pressure data of Table 3, the OWC for the sands in the upper zone lies in the range 1450-1457m KB.

KB = 25m

CONCLUSIONS

The following conclusions can be drawn from results and interpretation of the tests on Seahorse-1.

1. Seahorse oil in the upper sands has a GOR of about 1100 SCF/STB, and the stabilized crude gravity is 53°API.

2. The oil sands which were production tested (1431.5-1439m KB) can be produced at a stabilized flowrate of 2040 STB/D with a bottomhole drawdown of 89 psi. Well P.I. is 23 STB/D/PSI.

3. Shut-in tubing head pressure is about 823 psig, so at a flowrate of 2040 STB/D of oil, flowing tubing head pressure is 734 psig.

4. The (assumed common) OWC for the upper sands is in the range of 1450-1457m KB.

5. Permeability of the upper Seahorse sands was calculated as 210-310 md from the production test, and 50-400 md by RFT/FIT tests. These results indicate that wireline formation testing gives reasonable, but relatively qualitative estimates of sand permeabilities.

6. Permeability of the oil sands at 1512.5-1522m KB may be of the order of 100 md (from RFT data only).

7. In sands of the type encountered at Seahorse, the RFT tool is superior to the FIT tool because of its multiple seating capacity.

REFERENCES

1. Authorisation to Drill: Seahorse-1; April 1978.

2. Hematite to VDME, 24 August, 1978.

LIST OF FIGURES

LIST OF TABLES

TABLE 1: FIT TEST RECOVERIES - SEAHORSE-1

		SEGREGATOR RECOVERY			MAIN CHAMBER RECOVERY		
FIT NO.	DEPTH (m-KB)	OIL (CC)	WATER (CC)	GAS (SCF)	OIL (CC)	WATER (CC)	GAS (SCF)
1	1465		Test Failed			Test Failed	
2	1464.5		Test Failed			Test Failed	
3	1465	50	1800	.15	Trace	22,000	-
4	1432.5		Not Yet Opened(1)		9250	8,000	40.7
5	1489.5		Test Failed			Test Failed	
6	1480		Test Failed			Test Failed	
7	1523		Test Failed			Test Failed	
8	1522.5		Test Failed			Test Failed	

Note: (1) Sent to EPRCo for analysis.

TABLE 2: RFT TEST RECOVERIES - SEAHORSE-1

		SEGREGATOR RECOVERY			MAIN CHAMBER RECOVERY		
RFT NO.	DEPTH (m-KB)	OIL (CC)	WATER/MUD (CC)	GAS (SCF)	OIL (CC)	WATER/MUD (CC)	GAS (SCF)
1	1432.5	-	1250	-	-	-	-
2	1435		Test Failed			Test Failed	
3	1465	-	1250	-	-	500	-
4	(Various)		Test Failed			Test Failed	
5	1449.3	Trace	950	-	14,000	3,250	40.7
6	1437	Trace	1300	-	13,500	2,500	54.5
7	1461.4		Test Failed		Trace	7,700	-
8	1426.8		Test Failed		6,350	2,450	32.3
9	1458.4	-	1125	-	Trace	1,950	-
10	(Various)		Test Failed			Test Failed	
11	1458	-	1800	-	-	22,000	-
12	1480	-	500	-	-	200	-
13	1489.5	-	1350	-	Trace	11,500	-
14	1460.8	-	1500	-	-	50	-
15	1514		Test Failed		14,500	750	-
16	1521		Test Failed		750	1,250	-
17	1608.5		Test Failed		13,250	5,250	28
18	(Various)		Test Failed			Test Failed	
19	1651/1651.5		Test Failed		-	7,250	-
20	1628		Test Failed			Test Failed	
21	1628		Test Failed			Test Failed	
22	(Various)		Test Failed			Test Failed	
23	1523		Test Failed		-	20,250	-

TABLE 3: SEAHORSE-1

SUMMARY OF FIT/RFT BUILD-UP RESULTS

DEPTH	TEST	SEGREGATOR		CHAMBER	
	Test	Permeability*	Formation Pressure	Permeability*	Formation Pressure
(ft)		(md)	(psig)	(md)	(psig)
1432.5	RFT-1	200-400	2040	**	**
	FIT-4	50	2044	90	2044
1449.3	RFT-5	330	2056	80	2058
1458.0	RFT-11	***	***	140	2079
1465.0	RFT-3	**	**	20	2074
	FIT-3	1900	2071	***	***
1490.0	RFT-13	115	2119	125	2118

* Assumes "perforated interval" (h) = 1.0 ft.

** No fluid recovered

*** Results analysed, but interpretation uncertain.

APPENDIX A

SEAHORSE PRODUCTION TEST DATA

COMPLETION DATA

Well Seahorse-1 Test Production-1 Date 29 August, 1978

Company Supervisor Kimler/Needoba/Matthews

Test Engineer Koh/Yaxley

1. Interval 1431.5 to 1439m KB
2. Well loading fluid Diesel
3. Approximate Differential ($p_f - p_w$) 330 (psi)
4. Type of perforating gun 2 1/8" unijet, zero phase
5. Perforation density 4 (spf)
6. Mud weight 9.7 (ppg)
7. Cl⁻ of filtrate ______ (ppm)
8. Cl⁻ of mud filtrate at time of drilling 1900-2100 (ppm)

9. Casing:	10. Liner:	11. Tubing:
Size 9 5/8 (in.)	Size ______ (in.)	Size 3½ (in.)
Weight 47 (lb/ft)	Weight ______ (lb/ft)	Inside Diameter 2.992 (in.)
Grade N-80	Grade ______	Weight 9.3 (lb/ft)
Capacity 0.0732 (bbl/ft)	Capacity ______ (bbl/ft)	Grade N-80
Shoe 5509 (ft) KB	Top ______ (ft)	Capacity 0.00870 (bbl/ft)
	Shoe ______ (ft)	Connections ______
		Burst pressure 10160 psi

12. Plugged back total depth 1650m (XX)
13. Depth of packer 1412m (XX)
14. Tubing volume 40.6 (bbl)
15. Volume between packer and lowest perforation 6.5 (bbl)
16. Rathole volume 50.7 (bbl)
17. Depth of tailpipe 1418m (XX)
18. Location of pressure gauges: depth 1425m (XX) gauge number HP
    depth 1418+ m (XX) gauge number 2-Amerada
19. Initial WHP before well open 329 psi

INITIAL FLOW PERIOD DATA*

Well Seahorse-1 Test Production-1 Perforations ________ Date 29 August 1978

1. Wellhead pressure prior to opening well 327 (psi) Temp. 15°C
2. Time well opened 1300 hours
3. Initial choke size 32 (64ths) Changed to 16/64ths at 1320 hours.
4. Well response: Well (flowed, XXXXX)

   Time gas surfaced 1320 hrs
   Time mud surfaced 1315 hrs
   Time formation fluid surfaced ________
5. Well data just prior to shut in

   Flowing wellhead pressure 780 (psi)
   Choke size 16 (64ths)
   Pressure downstream of the choke ________ (psi)
   Rate ________ (B/D, MCFD) (measured, estimated)
6. Time of shut in 1421 hrs.
7. Total length of initial flow 81 (min, XX)
8. Cumulative production ________ (bbl, MSCF) (measured, estimated)
9. Description of produced fluids:

   Oil ________% ________ °API
   Water ________% Cl$^-$ ________ (ppm)
   Gas: Sp Gr ________
   C$_1$ ________ (ppm) C$_5^+$ ________ (ppm)
   C$_2$ ________ (ppm) CO$_2$ ________ (ppm, %)
   C$_3$ ________ (ppm) H$_2$S ________ (ppm, %)
   C$_4$ ________ (ppm)

---

*If extended initial flow (clean up) is run, enter production data at 30 min intervals on Production Test Data sheet (D-5).

If well is swabbed, fill out swab report (D-3).

PRODUCTION TEST DATA SHEET

WELL SEAHORSE TEST PRODUCTION PERFORATIONS 1431.5-1439m KB DATE 29/8/78

TEST 1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
DATE TIME	REMARKS	WELLHEAD PRESSURE PSI Tubing Head	WELLHEAD TEMPERATURE °F	CASING PRESSURE PSI	CHOKE 64TH	CUMULATIVE PRODUCTION			RATES			GOR OR CONDENSATE GAS RATIO	GRAVITY	
						Diesel XX STB	WATER BBLS	Est. GAS MSCF	Diesel XXX STB/D	Est. WATER B/D	Est. GAS MSCF/D		OIL °API @ 60°	GAS AIR = 1
1130	Well shut-in RIH to perforate	0	60	475	16	0	0	0	0	0	0	-		
1145		0	60	475	16	0	0	0	0	0	0	-		
1150		0	60	475	16	0	0	0	0	0	0	-		
1155	Perforated @ 1151 hours pulling tool out of hole	325	60	475	16	0	0	0	0	0	0	-		
1200		325	60	475	16	0	0	0	0	0	0	-		
1215		326	60	475	16	0	0	0	0	0	0	-		
1230	Close lubricator valve @ 1225 hrs. Change choke	327	63	475	32	0	0	0	0	0	0	-		
1245	size to 32/64 inch @ 1225 hrs.	328	65	475	32	0	0	0	0	0	0	-		
1255	Open lubricator valve to flow well to test tank	329	66	475	32	0	0	0	0	0	0	-		
1300		187	70	475	32		0	0		0	0			
1315	Mud detected at surface at 1315 hrs.	590	93	520	32	35			3360		0			
1320	Decrease choke size to 16/64 inch @ 1325 hrs.	592	93	545	32									
1330	Gas and mud detected at surface with diesel	790	93	545	16		2		111					
1345	"	785	82	550	16			32		44	906			
1400	"	784	81	565	16									
1415	"	786	81	575	16									
1420	"	786	73	590	16	40								

Switched → flow to test separator @ 1320 hrs.

PRODUCTION TEST DATA SHEET

WELL SEAHORSE 1 TEST PRODUCTION TEST PERFORATIONS 1431.5 - 1439m KB DATE 29/8/78

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
						CUMULATIVE PRODUCTION			RATES				GRAVITY	
DATE TIME	REMARKS	WELLHEAD PRESSURE PSI	WELLHEAD TEMPERATURE °F	CASING PRESSURE PSI	CHOKE 64TH	Diesel* OIL STB	WATER BBLS	Est. GAS MSCF	OIL STB/D	Est. WATER B/D	Est. GAS MSCF/D	GOR OR CONDENSATE GAS RATIO	OIL °API @ 60°	GAS AIR = 1
1420	Gas and mud detected at surface with diesel.	786	73	590	16	40*	2	32						
1421	Well shut in at surface.	786	73	590	16									
1430	"	790	70	-	16									
1445	"	785	67	-	16									
1500	"	783	61	-	16									
1515	"	781	57	580	16									
1530	"	776	57	580	16									
1545	"	777	56	580	16									
1600	"	778	55	580	16									
1615	"	780	55	580	16									
1629	Change choke size to 32/64 inch.	780	55	550	32	Oil STB								
1645	Open well for major flow period @ 1630 hrs.	733	79	580	32									
1700	Well open to test separator @ 1630 hrs.	737	82	620	32									
1715	First set of H2S and CO2 sample taken at 1645 hrs.	745	88	650	32									
1730	Zero hrs.; 0.35% CO2.	747	90	375	32									
1745	Second set of H2S and CO2 taken 100 ppm H_2S 0.5% CO2.	750	93	420	32									

PRODUCTION TEST DATA SHEET

WELL SEAHORSE 1 TEST PRODUCTION TEST 1 PERFORATIONS 1431.5-1439m KB DATE 29/8/78

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
DATE TIME	REMARKS	WELLHEAD PRESSURE PSI	WELLHEAD TEMPERATURE °F	CASING PRESSURE PSI	CHOKE 64TH	CUMULATIVE PRODUCTION			RATES			GOR OR CONDENSATE GAS RATIO	GRAVITY	
						OIL STB	WATER BBLS	GAS MSCF	OIL STB/D	WATER B/D	Est. GAS MSCF/D		OIL °API @ 60°.	GAS AIR = 1
1800	Separator flow condition not steady.	751	95	440	32	128			2048					
1815	"	751	95	450	32									
1830	"	752	97	480	32	170.9			2059		~2000	~970	57	0.75
1845	HP Gauge failed at 1840 hrs.	752	99	500										
1900	Separator conditions stabilizing	753	99	510	"	212.8			2011					
1915	Monitoring H_2S concn. used at least 3 types of	753	100	520	"									
1930	draegers and all con-firmed high H_2S concn.	754	102	550	"	255.0			2026					
1945	Started taking one liquid and one gas sep-	754	103	560	"									
2000	arator samples under pressure.	754	104	590	"	298.13			2070		~2300	~1110		
2014		754	102	600	"		2.5							
2015	Shut in well at surface due to high H_2S concn.	754	102	600	"									
2030	Well shut-in.	823	86	605	"									
2045	"	823	75	605	"									
2100	"	823	68	600	"									
2115	"	827	61	525	"									
2130	"	827	59	560	"									

PRODUCTION TEST DATA SHEET

WELL SEAHORSE TEST PRODUCTION TEST 1 PERFORATIONS 1431.5-1439m KB DATE 29/8/78

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
DATE TIME	REMARKS	WELLHEAD PRESSURE PSI	WELLHEAD TEMPERATURE °F	CASING PRESSURE PSI	CHOKE 64TH	CUMULATIVE PRODUCTION			RATES			GOR OR CONDENSATE GAS RATIO	GRAVITY	
						OIL STB	WATER BBLS	GAS MSCF	OIL STB/D	WATER B/D	GAS MSCF/D		OIL °API @ 60°	GAS AIR = 1
2145	Well shut-in.	829	59	550	32									
2200	"	830	57	545	32									
2215	"	830	55	525	"									
2230	Pull HP Amerada gauges out of hole.	832	54	510	"									
2245	Well shut in. Well closed in at lubricator valve.	832	52	500	"									

OIL RATE CALCULATIONS

WELL SEAHORSE 1.

TEST PRODUCTION TEST 1

DATE 29.8.78

MAJOR FLOW PERIOD DATA

1	2	3	4	5	6	7	8	9	10	11	12	13	14
DATE, TIME	Δ TIME	OIL								CORRECTED VALUES			REMARKS
		TEMP °F	GRAVITY °API @ 60°	METER READING BBLS	Δ BBLS	METER FACTOR	SHRINKAGE	TEMP. CORR.	1 - BSW %	CUM. PROD STB	RATE STB/D	GOR SCF/STB	
1630	Well open to separator and burners on 32/64" choke.												No complete data taken between 1630 hrs. - 1800 because no liquid level could be established and foaming problems in separator.
1800	90			381.1	381.1				BSW Trace 1.0	128.0	2048		
1830	30			430.2	49.1				1-Tr.	170.9	2059	970	
1900	30			478.3	48.1				1-Tr.	212.8	2011		
1930	30			526.8	48.5				1-Tr.	255.0	2026		
2000	30			576.4	49.6				1-Tr.	298.1	2070	1110	
2015	Well shut in due to high H_2S concentration in gas from separator.												

LIQUID SAMPLE FIELD ANALYSIS RECORD

WELL SEAHORSE 1 TEST PRODUCTION TEST 1 DATE 29/8/78

	1	2	3	4	5	6	7	8	9	10	
	TIME SAMPLED	SAMPLE POINT	SHAKE OUT			API° @ 60°F	Titration Cl^- (ppm)	WATER RES(Ωm)	pH	In Oil T (°C)	Sample No.3
			OIL	WATER	BS&W						
	1305	Choke				39				22.5	
	1320	"				28				20	
	1335	Separator				54				9.5	
	1340	"					2100	1.71	7		40
	1350	Sep./Choke*				57*	2200	1.76	7	6.0*	35
	1400	Sep.					2100	1.76	7		45
	1405	Choke				57.5				13	
	1410	Sep.					2200	1.79	7		40
	1420	Sep.					2500	1.80	7		35
	1430	Sep.					2500	1.82	7		35
M jor ow started @ 1630 h s →	1640	Sep.				53				18	
	1700	Sep.				53				15	
	1730	Sep.				54				13.5	
	1745	Sep.				53				13	
	1800	Sep.				53				13	
	1830	Sep.				54				16	
	1900	Sep.				54				14	
	1930	Sep.				53				12	
	2000	Sep.				53				13	
Shut in → ajor flow @ 2015 hrs.					Ca^{2+}						
	2200	Sep.Bottom		Water Sample	Ca^{2+} 320ppm		3900	1.12	7.5	13.5	Tr.

GAS SAMPLE FIELD ANALYSIS RECORD

WELL Seahorse 1 TEST Production Test DATE 29/8/78

1	2	3	4	5	6	7	8	9
TIME SAMPLED	SAMPLE POINT	COMPONENTS						
		C_1	C_2	C_3	C_4	C_5^+	H_2S ppm	CO_2 Vol.%
1320	Choke	139264	69611	83251	52990	3520		
1335	"	242320	46520	38850	36400	10400		
1350	"	206390	38040	36770	20530	14080		
1405	"	214460	54970	56195	24500	12320		
1645	Sep/Choke*	236750	57090	51340	14000	12320	Nil	0.35*
1700	Sep/Choke*	211680	46520	46480	5300	Tr.		0.5
1720	Separator	215800	58670	50000	7280	Tr.		
1730	"	216000	58600	50000	9000	Tr.		
1745	"	214500	58150	49900	7617	5720	~100	0.5
1800	"	214500	60250	50600	8611	7040	~300	0.65
1830	"	214500	59200	51340	8000	6600		
1900	"	214500	59200	51340	7286	7920		
1930	"	208900	45460	47175	5960	3740	~300	
2000	"	208900	51806	45100	7780	4400	~300	

Major flow period started @1630 hrs. →

SG=0.75

Shut-in Major flow period @2015 hrs. →

WELLBORE GRADIENT DATA

TAKEN DURING INITIAL SHUT-IN PERIOD

WELL SEAHORSE 1 TEST PRODUCTION TEST 1 DATE 29/8/78

BOTTOM-HOLE TEMPERATURE: 160 °F

TIME Hrs.	DEPTH XXX M KB	PSIA PRESSURE (psi) HP GAUGE	Δp (psi)	GRADIENT (psi/ft)	REMARKS
1603	1425	2044.4			HP Gauge data. Only 2 stops done to check for fluid gradient.
			9.2	0.28	
1607	1415	2035.2			

PRODUCTION TEST SUMMARY

Well SEAHORSE Test PRODUCTION TEST 1 Date 29/8/78

Test Data:

1. Interval 1431.5 - 1439m KB
2. Produced fluid Oil
3. Cumulative production 319 (STB, XXXXXX)
4. Average rate 2044 (STB/D, XXXXXXX)
5. Length of flow period 225 (XX, min)
6. Choke 32 (64ths)
7. Gravity of oil or condensate 53 (°API @ 60°F)
8. GOR XXXXXXXXXXXXXXXXXXXXXXXX 1110 (SCF/STB, XXXXXXXXX)
9. Water cut 0.17 (%)
10. Chlorides ____ (ppm)
11. H_2S 300 (XX, ppm)
12. CO_2 0.5 (%)
13. Average flowing wellhead pressure 752 (psi)
14. Average flowing wellhead temperature 98 (°F)
15. Wellhead pressure at end of buildup 832 (psi)
16. Initial reservoir pressure 2029.8 (psi) @ 4675 (ft) KB
17. Final flowing pressure 1962.4 (psi) @ 4675 (ft) KB
18. Productivity index (not stabilized) 30.3 $\frac{STB/D}{psi}$
19. Maximum bottom-hole temperature ____ (°F) @ ____ (ft)
20. Samples taken: ____
21. Remarks: ____

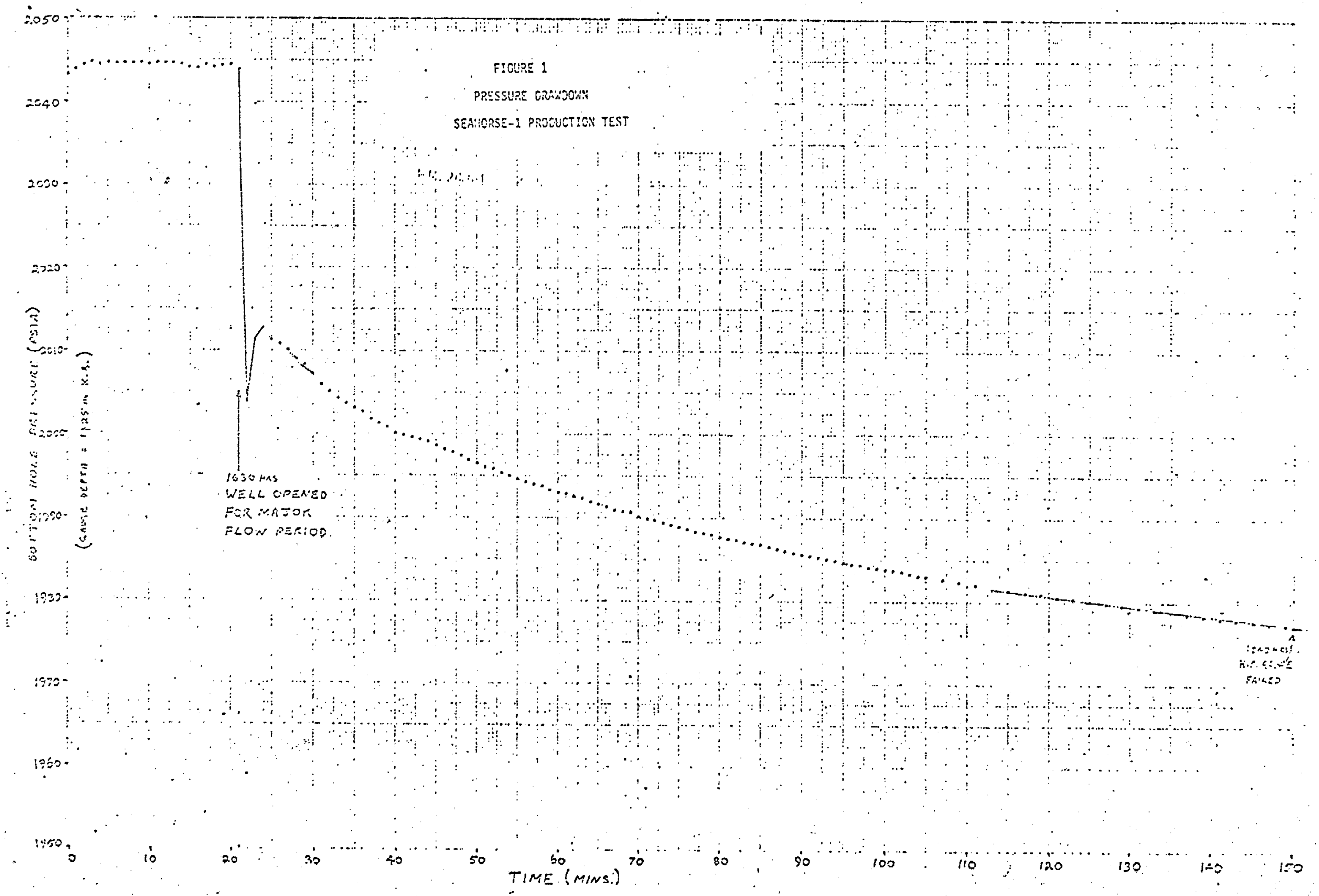


FIGURE 1

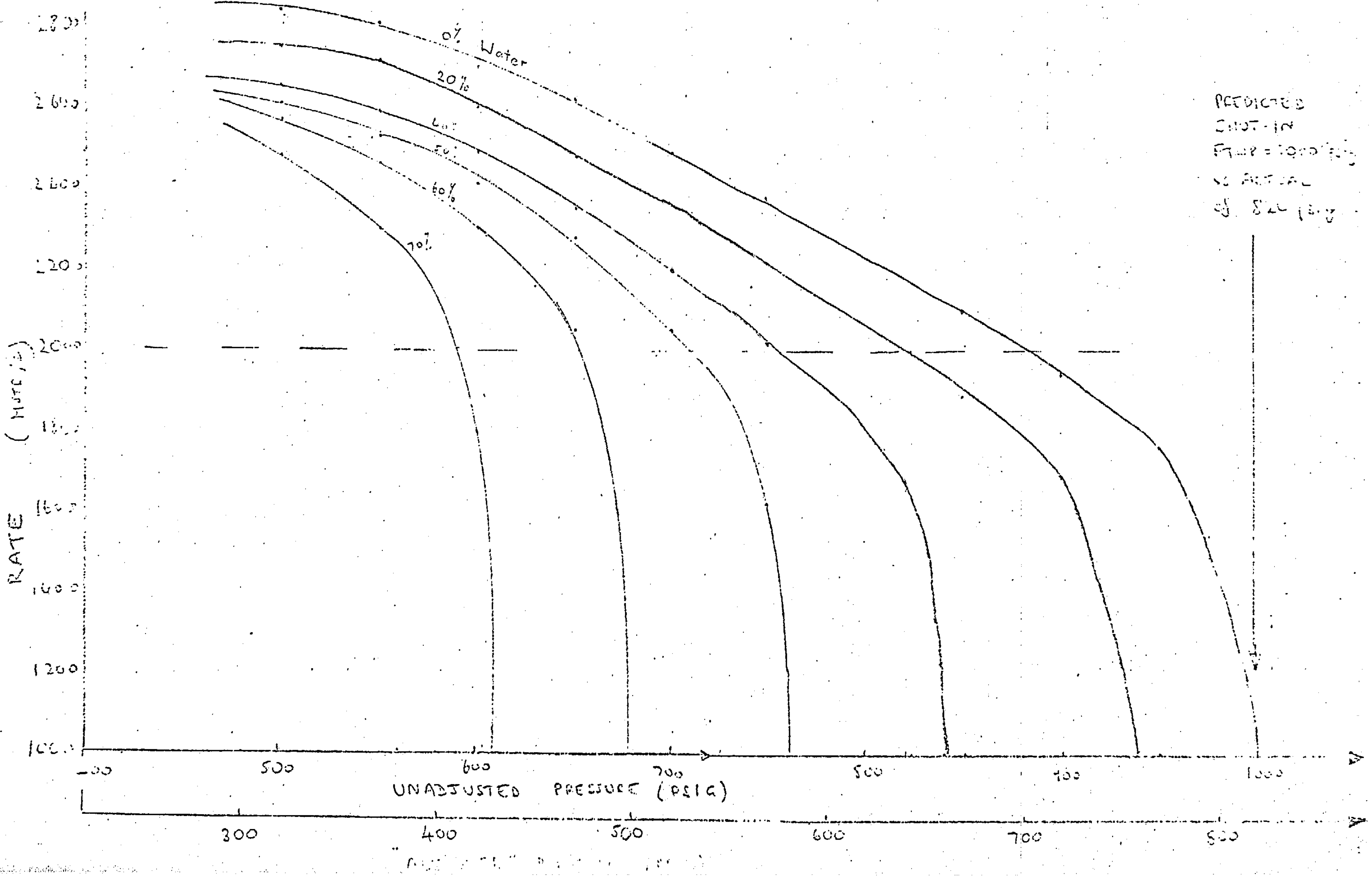
PRESSURE DRAWDOWN

SEAHORSE-1 PRODUCTION TEST

FIG. 2 : SEAHORSE WELL HYDRAULICS

SEAHORSE TO BARRACOUTA

(FOR PI = .23 STB/D/psi)



MEMORANDUM

DATE: September 27, 1978

YOUR REF.:

OUR REF.: DRL: 0205 GMW:am

SUBJECT: Seahorse-1 FIT
Segregator Transfers

To: R.L. Brown

The contents of eight segregators from wireline formation tests run in the Seahorse-1 exploration well have been transferred into sample containers for analysis.

Of the eight segregators it was found that three were empty, four contained basically water and one appeared to be a light oil, filtrate mixture.

The four water samples are being analysed at the Longford Laboratory while the oil sample, together with two bottom hole samples collected during the production testing on Seahorse-1, are being shipped to EPRCo in Houston for analysis.

Details of the samples and transfer conditions are summarized in the attached table.

N.M. Heath

N.M. Heath

Attach.
cc. S. Benedek
R.O. Wood

File: 6210-20-00

SEAHORSE-1 FORMATION TESTING SEGREGATOR SAMPLES

Test No.	Segregator No.	Segregator Press. (psig)	Transfer Press. (psig)	Transfer Temp ($^{\circ}F$)	Volume Transferred (CC)	Comments
FIT-4	2909	1550	2500	220	2100	Oil/filtrate transferred into ICC No. 74A 1885 for analysis at EPRCo.
RFT-5	3001	0	2000	220	950	Water: analysis at Longford
RFT-6	3002	0	2000	220	1305	Water: analysis at Longford
RFT-8	3003	0	-	-	0	Empty.
RFT-11	3004	0	-	-	1500	Water: analysis at Longford.
RFT-15	3008	0	2000	220	1350	Water: analysis at Longford
RFT-17	3005	0	-	-	0	Empty.
RFT-25	3006	0	-	-	0	Empty.

G.W. Weybury
27.9.78

APPENDIX 9

W705 Basic Data file.

OIL and GAS DIVISION
30 MAR 1979

APPENDIX 9

WIRELINE FORMATION TEST RECORDS

F.I.T. RECORD

GEOLOGIST/S: C.F.J. SWARBRICK

WELL: SEAHORSE-1 F.I.T. NO: 1 @ 1465 m (KB) DATE: 10/8/78

TEST RESULT: NO FLOW, NO RECOVERY - MISRUN TIME: 00:00:00 = 1030 hours

FIRING METHOD: ____ CHOKE SIZES: 0.030"

TIMES: Tool Set: ____ Tool Open: ____ Min.Open: ____

Shaped Charge Shot: Yes/No at: ____ Min. Open: ____ Full After: ____

Segregator Open: ____ Mins.Open: ____ Full After: ____

Tool Closed: ____ Tool Off: ____

Segregator Type: ____ Number: ____

Segregator opened/transferred container No.: ____

MUD DATA: In Hole

Resistivity Rmf ____ Ω @ ____ °C, Equiv. Na. Cl. ____ ppm

Titration Cl⁻: ____ ppm NO⁻3: ____ ppm

SAMPLE TAKEN AT END OF LAST CIRCULATION

RECOVERY - MAIN CHAMBER ____ kPa Surface Pressure

____ L. Gas ____ L. Filtrate

____ L. Oil ____ L. Mud

____ L. Formation Water ____ L. Other

PROPERTIES - MAIN CHAMBER

GAS	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

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

____ Colour; ____ Fluorescent Colour

____ G.O.R.

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

Titration Cl⁻: ____ ppm NO⁻3: ____ ppm

PRESSURES - MAIN CHAMBER

	Schlumberger		Hewlett Packard gauge MPa-g	Psig
Initial Hydrostatic				
Sampling				
Final Shut-in				
Hydrostatic				

Formation Pressure (Horner) ____ Sampling Time Min. ____

Shut-in Time Min. ____

(*Corrected for Atmospheric pressure)

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

MAX. DEPTH TOOL REACHED: ____ m

TIME SINCE CIRCULATION: ____ Hrs

FORMATION TEMPERATURE (HORNER) ____ °C

REMARKS:

F.I.T. RECORD

GEOLOGIST/S: C.F.J. SWARBRICK

WELL: SEAHORSE-1 F.I.T. NO: 2 @ 1464.5 m (KB) DATE: 10/8/78

TEST RESULT: NO FLOW, NO RECOVERY - MISRUN TIME: 00:00:00 = 1300 hours

FIRING METHOD: ______ CHOKE SIZES: 0.030"

TIMES: Tool Set: ______ Tool Open: ______ Min.Open: ______

Shaped Charge Shot: Yes/No at: ______ Min. Open: ______ Full After: ______

Segregator Open: ______ Mins.Open: ______ Full After: ______

Tool Closed: ______ Tool Off: ______

Segregator Type: ______ Number: ______

Segregator opened/transferred container No.: ______

MUD DATA: In Hole

Resistivity Rmf ______ Ω @ ______ °C, Equiv. Na. Cl. ______ ppm

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

SAMPLE TAKEN AT END OF LAST CIRCULATION

RECOVERY - MAIN CHAMBER ______ kPa Surface Pressure

______ L. Gas ______ L. Filtrate

______ L. Oil ______ L. Mud

______ L. Formation Water ______ L. Other

PROPERTIES - MAIN CHAMBER

GAS	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

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

______ Colour; ______ Fluorescent Colour

______ G.O.R.

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

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

PRESSURES - MAIN CHAMBER

	Schlumberger		Hewlett Packard gauge	
			MPa-g	Psig
Initial Hydrostatic				
Sampling				
Final Shut-in				
Hydrostatic				

Formation Pressure (Horner) ______ Sampling Time Min. ______

Shut-in Time Min. ______

(*Corrected for Atmospheric pressure)

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

MAX. DEPTH TOOL REACHED: ______ m

TIME SINCE CIRCULATION: ______ Hrs

FORMATION TEMPERATURE (HORNER) ______ °C

REMARKS:

F.I.T. RECORD

GEOLOGIST/S: C.F.J. SWARBRICK

WELL: SEAHORSE-1 F.I.T. NO: 3 @ 1465 m (KB) DATE: 11/8/78

TEST RESULT: VALID TEST GOOD RECOVERY TIME: 00:00:00 = 1600 hours

FIRING METHOD: NONE CHOKE SIZES: 0.030"

TIMES: Tool Set: 00:01:03 Tool Open: 00:03:07 Min.Open: 12:30

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

Segregator Open: 00:22:09 Mins.Open: 3:36 Full After: 00:03

Tool Closed: 00:25:45 Tool Off: 00:25:45

Segregator Type: Number:

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

MUD DATA: In Hole

Resistivity Rmf .68 Ω @ 17.8 °C, Equiv. Na. Cl. 9600 ppm

Titration Cl^-: 4000 ppm NO^-3: 110 ppm

SAMPLE TAKEN AT END OF LAST CIRCULATION

RECOVERY - MAIN CHAMBER (500) psi 3.447 MPa ~~kPa~~ Surface Pressure

-	L. Gas	3	L. Filtrate
Trace	L. Oil	-	L. Mud
19	L. Formation Water	-	L. Other

PROPERTIES - MAIN CHAMBER

GAS	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

OIL °API @ °F; Pour Point °F

Brown Colour; light pale yellow Fluorescent Colour

G.O.R.

RESISTIVITY WATER/FILTRATE 1.52 Ω @ 64 °F Equiv. Na. Cl. 4200 ppm

Titration Cl^-: 2300 ppm NO^-3: 10-15 ppm

PRESSURES - MAIN CHAMBER

	Schlumberger		Hewlett Packard gauge *	
			psig	Mpa-g
Initial Hydrostatic			2582.89	17.81
Sampling			1925.51-2061.70	13.28-14.21
Final Shut-in			2070.20	14.27
Hydrostatic				-
Formation Pressure (Horner)				

Sampling Time Min. 12:03

Shut-in Time Min. 11:46

(*Corrected for Atmospheric pressure)

TEMPERATURES: (max recorded) 64.4 °C 64.4 °C

MAX. DEPTH TOOL REACHED: 1465 m

TIME SINCE CIRCULATION: 4.5 Hrs

FORMATION TEMPERATURE (HORNER) 67.5 °C

REMARKS:

F.I.T. SEGREGATOR REPORT

GEOLOGIST/S: C.F.J. SWARBRICK

WELL: SEAHORSE-1 F.I.T. NO.: 3 @ 1465 m (KB) DATE: 11.8.78

SEGREGATOR TYPE: ________ NUMBER: 27

RECOVERY - SEGREGATOR (320 psi) 2.20 MPa ~~kPa~~ Surface Pressure

(.15 cu.ft) 4.25	L. Gas	-	L. Filtrate
.05	L. Oil	-	L. Mud
1.8	L. Formation Water	-	L. Other

PROPERTIES - SEGREGATOR NOT RETAINED

GAS	C_1	C_2	C_3	C_4	C_5	C_6	H_2S
	TOO SMALL	TO MEASURE	UNCONTAMINATED	SAMPLE			

OIL 10 °API @ 64 °F, Pour Point ________ °F

Brown Colour; light pale yellow Fluorescent Colour

________ G.O.R.

RESISTIVITY WATER/FILTRATE 2.00 / 2.24 Ω @ 64 / 58 °F Equiv. Na.Cl. 3000 ppm

Titration Cl^- 2200 ppm NO_3 10 ppm

PRESSURES - SEGREGATOR

	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Sampling			307.69-1967.52	2.12-13.57
Final Shut-in			2070.85	14.28
Formation Pressure (Horner)			2071	14.28
Sampling Time (Min)				00:03
Shut-in Time (Min)				03:36

REMARKS:

F.I.T. RECORD

GEOLOGIST/S: C.F.J. SWARBRICK

WELL: SEAHORSE-1 F.I.T. NO: 4 @ 1432.5 m (KB) DATE: 11.8.78

TEST RESULT: VALID TEST GOOD BUILD UP GOOD RECOVERY TIME: 00:00:00 = 1700 hours

FIRING METHOD: - CHOKE SIZES: 0.030"

TIMES: Tool Set: 00:01:01 Tool Open: 00:03:17 Min.Open: 23:33

Shaped Charge Shot: ~~Yes~~/No at: - Min. Open: - Full After: 09:33

Segregator Open: 00:27:10 Mins.Open: 03:10 Full After: 00:30

Tool Closed: 00:30:20 Tool Off: 00:30:30

Segregator Type: ______ Number: 2909

Segregator opened/transferred container No.: UNOPENED

MUD DATA: In Hole

Resistivity Rmf .68 Ω @ 17.8 °C, Equiv. Na. Cl. 9500 ppm

Titration Cl$^-$: 4000 ppm NO$^-$3: 110 ppm

SAMPLE TAKEN AT END OF LAST CIRCULATION

RECOVERY - MAIN CHAMBER (1020 psi) 7.032 MPa ~~kPa~~ Surface Pressure

~~(40.7cu.ft)~~ 1152.6	L. Gas	8.0	L. Filtrate/FMN water
9.250	L. Oil		L. Mud
-	L. Formation Water	.750 filtrate/water/oil emulsion	L. Other

PROPERTIES - MAIN CHAMBER

GAS	C_1	C_2	C_3	C_4	C_5	C_6	H_2S
TOP	487783	94848	8540	Tr			
BOTTOM a)	319677	235296	64763	19603	Tr		
b)	358259	255360	52664	30711 (N) 24504 (I)	1959		

OIL ± 55 °API @ 48 °F; Pour Point ______ °F

Brown Colour; Bright pale yellow Fluorescent Colour

______ G.O.R.

RESISTIVITY WATER/FILTRATE .827 Ω @ 64 °F Equiv. Na. Cl. 8400 ppm

Titration Cl$^-$: 4000 ppm NO$^-$3: Tr ppm

PRESSURES - MAIN CHAMBER

	Schlumberger		Hewlett Packard gauge * psig	Hewlett Packard gauge * Mpa-g
Initial Hydrostatic			2517.63	17.36
Sampling			76.36-1342.45	0.53-9.26
Final Shut-in			2038.94	14.06
Hydrostatic			2044	14.09
Formation Pressure (Horner)				

Sampling Time Min. 09:33

Shut-in Time Min. 14:00

(*Corrected for Atmospheric pressure)

TEMPERATURES: (max recorded) 64.4 °C 66.5 °C

MAX. DEPTH TOOL REACHED: 1432.5 m

TIME SINCE CIRCULATION: 7.83 Hrs

FORMATION TEMPERATURE (HORNER) ______ °C

REMARKS:

F.I.T. SEGREGATOR REPORT

GEOLOGIST/S: C.F.J. SWARBRICK

WELL: SEAHORSE-1 F.I.T. NO.: 4 @ 1432.5 m (KB) DATE: 11/8/78

SEGREGATOR TYPE: ______ NUMBER: 2909

RECOVERY - SEGREGATOR (1550 psi) 10.68 MPa KRM Surface Pressure

______ L. Gas ______ L. Filtrate

2.1 L. Oil & Filtrate ______ L. Mud

______ L. Formation Water ______ L. Other

PROPERTIES - SEGREGATOR

GAS	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

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

______ Colour; ______ Fluorescent Colour

______ G.O.R.

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

Titration Cl^- ______ ppm NO_3 ______ ppm

PRESSURES - SEGREGATOR

	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Sampling			657.24-1594.27	4.53-10.99
Final Shut-in			2039.46	14.06
Formation Pressure (Horner)			2044	14.09
Sampling Time (Min)			00:20	
Shut-in Time (Min)			02:20	

REMARKS: Transferred to ICC Container No. 74 A 1885.
Transfer pressure 15.85 KPa, 2300 psi.
Transfer temperature 220°F.

F.I.T. RECORD

GEOLOGIST/S: C.F.J. SWARBRICK

WELL: SEAHORSE-1 F.I.T. NO: 5 @ 1489.5 m (KB) DATE: 12/8/78

TEST RESULT: DRY TEST TIME: 00:00:00 = 2100 hours

FIRING METHOD: CHOKE SIZES: 0.030"

TIMES: Tool Set: 00:18:00 Tool Open: 00:20:18 Min.Open:

Shaped Charge Shot: Yes/No at: Min. Open: Full After:

Segregator Open: Mins.Open: Full After:

Tool Closed: Tool Off: 00:29:00

Segregator Type: Number:

Segregator opened/transferred container No.:

MUD DATA: In Hole

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

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

SAMPLE TAKEN AT END OF LAST CIRCULATION

RECOVERY - MAIN CHAMBER NIL kPa Surface Pressure

L. Gas L. Filtrate

L. Oil L. Mud

L. Formation Water L. Other

PROPERTIES - MAIN CHAMBER

GAS	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

OIL °API @ °F; Pour Point °F

Colour; Fluorescent Colour

G.O.R.

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

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

PRESSURES - MAIN CHAMBER

	Schlumberger		Hewlett Packard gauge *	
			psig	Mpa-g
Initial Hydrostatic			2658	18.33
Sampling			15	0.10
Final Shut-in				
Hydrostatic			2610	18.00
Formation Pressure (Horner)				

Sampling Time Min.

Shut-in Time Min.

(*Corrected for Atmospheric pressure)

TEMPERATURES: (max recorded) NOT RECORDED °C °C

MAX. DEPTH TOOL REACHED: m

TIME SINCE CIRCULATION: Hrs

FORMATION TEMPERATURE (HORNER) °C

REMARKS:

F.I.T. RECORD

GEOLOGIST/S: C.F.J. SWARBRICK

WELL: SEAHORSE-1 F.I.T. NO: 6 @ 1480 m (KB) DATE: 13/8/78

TEST RESULT: UNABLE TO GET SEAL; GAMMA RAY TOOL NOT WORKING TIME: 00:00:00 = 0300 hours

FIRING METHOD: CHOKE SIZES: 0.030"

TIMES: Tool Set: 00:05:49 Tool Open: 00:07:58 Min.Open: 00:53

Shaped Charge Shot: xxxs/No at: - Min. Open: - Full After: -

Segregator Open: 00:08:52 Mins.Open: 03:58 Full After: -

Tool Closed: - Tool Off: 00:12:51

Segregator Type: - Number:

Segregator opened/transferred container No.:

MUD DATA: In Hole

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

Titration Cl$^-$: 4000 ppm NO$^-$3: 105 ppm

SAMPLE TAKEN AT END OF LAST CIRCULATION

RECOVERY - MAIN CHAMBER kPa Surface Pressure

L. Gas L. Filtrate

L. Oil L. Mud

L. Formation Water L. Other

PROPERTIES - MAIN CHAMBER

GAS	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

OIL °API @ °F; Pour Point °F

Colour; Fluorescent Colour

G.O.R.

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

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

PRESSURES - MAIN CHAMBER

	Schlumberger		Hewlett Packard gauge * psig	Hewlett Packard gauge * Mpa-g
Initial Hydrostatic			2597.12	17.91
Sampling				
Final Shut-in				
Hydrostatic			2549.45	17.58
Formation Pressure (Horner)				

Sampling Time Min.

Shut-in Time Min.

(*Corrected for Atmospheric pressure)

TEMPERATURES: (max recorded) NOT RECORDED °C °C

MAX. DEPTH TOOL REACHED: m

TIME SINCE CIRCULATION: Hrs

FORMATION TEMPERATURE (HORNER) °C

REMARKS:

F.I.T. RECORD

GEOLOGIST/S: R.C.N. THORNTON

WELL: SEAHORSE-1 F.I.T. NO: 7 @ 1523 m (KB) DATE: 17/8/78

TEST RESULT: SEAL FAILURE. MUD TEST TIME: 00:00:00 = 2230 hours

FIRING METHOD: CHOKE SIZES: 0.030"

TIMES: Tool Set: 00:21:59 Tool Open: 00:24:00 Min.Open: 02:08

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

Segregator Open: 00:26:07 Mins.Open: 00:29 Full After: -

Tool Closed: Tool Off: 00:35:31

Segregator Type: Number:

Segregator opened/transferred container No.:

MUD DATA: In Hole

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

Titration Cl⁻: 3700 ppm NO⁻3: 100 ppm

SAMPLE TAKEN AT END OF LAST CIRCULATION

RECOVERY - MAIN CHAMBER kPa Surface Pressure

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

PROPERTIES - MAIN CHAMBER

GAS	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

OIL °API @ °F; Pour Point °F

Colour; Fluorescent Colour

G.O.R.

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

Titration Cl⁻: ppm NO⁻3: ppm

PRESSURES - MAIN CHAMBER

	Schlumberger		Hewlett Packard gauge * psig	Hewlett Packard gauge * Mpa-g
Initial Hydrostatic			2557.99	17.64
Sampling			2514.26-2550.63	17.34-17.59
Final Shut-in			2548.36	17.57
Hydrostatic				
Formation Pressure (Horner)				

Sampling Time Min.

Shut-in Time Min.

(*Corrected for Atmospheric pressure)

TEMPERATURES: (max recorded) 66.6 °C 66.6 °C

MAX. DEPTH TOOL REACHED: 1523 m

TIME SINCE CIRCULATION: 28.5 Hrs

FORMATION TEMPERATURE (HORNER) 72.5 °C

REMARKS: Seal failure.

F.I.T. SEGREGATOR REPORT

GEOLOGIST/S: R.C.N. THORNTON

WELL: SEAHORSE-1 F.I.T. NO.: 7 @ 1523 m (KB) DATE: 17/8/78

SEGREGATOR TYPE: NUMBER:

RECOVERY - SEGREGATOR kPa Surface Pressure

L. Gas L. Filtrate

L. Oil L. Mud

L. Formation Water L. Other

PROPERTIES - SEGREGATOR

GAS	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

OIL °API @ °F, Pour Point °F

Colour; Fluorescent Colour

G.O.R.

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

Titration Cl^- ppm NO_3 ppm

PRESSURES - SEGREGATOR

	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Sampling			2550.01-2552.84	17.58-17.60
Final Shut-in			2550.87	17.59
Formation Pressure (Horner)				
Sampling Time (Min)				
Shut-in Time (Min)				

REMARKS:

F.I.T. RECORD

GEOLOGIST/S: R.C.N. THORNTON

WELL: SEAHORSE-1 F.I.T. NO: 8 @ 1522.5 m (KB) DATE: 18.8.78

TEST RESULT: SEAL FAILURE. MUD TEST. TIME: 00:00:00 = 0032 hours

FIRING METHOD: CHOKE SIZES: 0.030"

TIMES: Tool Set: 00:15:40 Tool Open: 00:16:00 Min.Open: 3:00

Shaped Charge Shot: ~~Yes~~/No at: Min. Open: Full After:

Segregator Open: Mins.Open: Full After:

Tool Closed: 00:19:00 Tool Off: 00:29:20

Segregator Type: Number:

Segregator opened/transferred container No.:

MUD DATA: In Hole

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

Titration Cl$^-$: 3700 ppm NO$^-$3: 100 ppm

SAMPLE TAKEN AT END OF LAST CIRCULATION

RECOVERY - MAIN CHAMBER kPa Surface Pressure

L. Gas L. Filtrate

L. Oil L. Mud

L. Formation Water L. Other

PROPERTIES - MAIN CHAMBER

GAS	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

OIL °API @ °F; Pour Point °F

Colour; Fluorescent Colour

G.O.R.

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

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

PRESSURES - MAIN CHAMBER

	Schlumberger		Hewlett Packard gauge *	
			psig	Mpa-g
Initial Hydrostatic			2559.51	17.65
Sampling				
Final Shut-in				
Hydrostatic				

Formation Pressure (Horner) Sampling Time Min.

Shut-in Time Min.

(*Corrected for Atmospheric pressure)

TEMPERATURES: (max recorded) NOT RECORDED °C °C

MAX. DEPTH TOOL REACHED: m

TIME SINCE CIRCULATION: Hrs

FORMATION TEMPERATURE (HORNER) °C

REMARKS: Mud test.

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 1 GEOLOGIST/S: C.F.J.SWARBRICK DATE: 10/8/78
TIME: 00:00:00 = 1600 hours

Seat No: 1 Depth: 1432.5m Blocked chamber Pretest: 2026.85 Chamber: ________
13.97
Seat No: ________ Depth: ________ ________ Pretest: ________ Chamber: ________
Seat No: ________ Depth: ________ ________ Pretest: ________ Chamber: ________
Seat No: ________ Depth: ________ ________ Pretest: ________ Chamber: ________
Seat No: ________ Depth: ________ ________ Pretest: ________ Chamber: ________

TIMES: CHAMBER 1

Depth: 1432.5 Tool Set: 00:00:30 Pretest Open: 00:00:35 Min.Open: 2:42
Chamber Open: 00:03:25 Min.Fill: - Chamber Full: -
Buildup Starts: - Min.Buildup: 05:24 Seal Chamber: Final 00:21:34
~~Pull off Tool~~: 00:26:58 Total Time: 00:26:28
End build up:

CHAMBER 2

Depth: 1432.5 Tool Set: - Pretest Open: - Min.Open: -
Chamber Open: 00:27:04 Min.Fill: 00:40 Chamber Full: 00:27:44
Buildup Starts: 00:27:45 Min.Buildup: 01:48 Seal Chamber: 00:29:33
Pull off Tool: 00:31:10 Total Time: 00:03:06

RECOVERY: CHAMBER 1 Surface Pressure: ________ kPa
Gas: ________ L. Filtrate: ________ L.
Oil: ________ L. Mud: ________ L.
Formation Water: ________ L. Others: ________ L.

RECOVERY: CHAMBER 2 Surface Pressure: 0 kPa
Gas: ________ L. Filtrate: 1.25 L.
Oil: ________ L. Mud: ________ L.
Formation Water: ________ L. Others: ________ L.

PROPERTIES: CHAMBER 1

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

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

WATER/FILTRATE: RESISTIVITY: ________ Ω @ ________ °C, Equivalent Na. Cl.: ________ ppm
Titration Cl^-: ________ ppm., NO_3: ________ ppm

PROPERTIES: CHAMBER 2

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

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

WATER/FILTRATE: RESISTIVITY: ________ Ω @ ________ °C, Equivalent Na. Cl.: ________ ppm
Titration Cl^-: ________ ppm., NO_3: 110-115 ppm

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 1 GEOLOGIST/S: C.F.J. SWARBRICK DATE: 10/8/78

MUD IN HOLE: Weight 10.2ppg1.22 Sp gr. Calculated Hydrostatic: 2487.4psi 17.15 MPa

Titration Cl⁻ 4400 ppm NO$_3$ 115 ppm

PRESSURES IN psig & Mpa-g

CHAMBER 1	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial			2515.43	17.34
Pretest			2026.86	13.97
Sampling Range			335.94-1976.94	2.31-13.63
Final Shut-in			2038.47	14.05
Hydrostatic Final				
Formation Pressure (Horner)				

PRESSURES IN psig & Mpa-g

CHAMBER 2	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial				
Pretest			2038.38	14.05
Sampling Range			116.49-2033.74	0.80-14.02
Final Shut-in			2039.33	14.06
Hydrostatic Final			2516.67	17.35
Formation Pressure (Horner)			2040	14.07

TEMPERATURES

Maximum Recorded 64.4 °C Formation Temperature (Horner) ______ °C

Depth Tool Reached 1470 m

Time Since Circulation 28.51/60 hours

REMARKS: Blockage in chamber while Chamber 1 was open prevented it from filling. Three attempts made to fill chamber.

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 2 GEOLOGIST/S: C.F.J. SWARBRICK DATE: 10.8.78

TIME: 00:00:00 = 2030 hours 10.8 11.8.78

Seat No: 2 Depth: 1432.5m blocked chamber Pretest: 2023.23 13.95 Chamber:

Seat No: 3 Depth: 1458.5m blocked tool Pretest: - Chamber:

Seat No: 4 Depth: 1457.8m blocked chamber Pretest: - Chamber:

Seat No: 5 Depth: 1465m blocked chamber Pretest: 2076.21 14.31 Chamber:

Seat No: 6 Depth: 1480m blocked chamber Pretest: 2099.78 14.48 Chamber:

TIMES: CHAMBER 1

Depth: Tool Set: Pretest Open: Min.Open:

Chamber Open: Min.Fill: Chamber Full:

Buildup Starts: Min.Buildup: Seal Chamber:

Pull Off Tool: Total Time:

CHAMBER 2

Depth: Tool Set: Pretest Open: Min.Open:

Chamber Open: Min.Fill: Chamber Full:

Buildup Starts: Min.Buildup: Seal Chamber:

Pull off Tool: Total Time:

RECOVERY: CHAMBER 1 Surface Pressure: kPa

Gas: L. Filtrate: L.

Oil: L. Mud: L.

Formation Water: L. Others: L.

RECOVERY: CHAMBER 2 Surface Pressure: kPa

Gas: L. Filtrate: L.

Oil: L. Mud: L.

Formation Water: L. Others: L.

PROPERTIES: CHAMBER 1

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

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

G.O.R.: Other Observations:

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

Titration Cl^-: ppm., NO_3: ppm

PROPERTIES: CHAMBER 2

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

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

G.O.R.: Other Observations:

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

Titration Cl^-: ppm., NO_3: ppm

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 2 GEOLOGIST/S: C.F.J. SWARBRICK DATE: 10/8/78

MUD IN HOLE: Weight 10.2ppg 1.22Sp gr. Calculated Hydrostatic: 2569.8 psi 17.72 MPa 1480m

Titration Cl⁻ 4400 ppm NO_3 115 ppm

PRESSURES IN psig & Mpa-g #2: 1432.5 #3: 1458.5 #4: 1457.8 #5: 1465

CHAMBER 1	Hewlett Packard gauge				Hewlett Packard gauge			
	Psig	MPa-g	Psig	MPa-g	Psig	MPa-g	Psig	MPa-g
Hydrostatic Initial	2518.12	(17.36)	2577.39	(17.77)	2572.53	(17.74)	2589.84	(17.86)
Pretest	2023.23	(13.95)	-		-		2076.21	(14.31)
Sampling Range	-		-		-		-	
Final Shut-in	2036.21	(14.04)	-		-		2099.98	(14.48)
Hydrostatic Final	2585.92	(17.83)	2573.43	(17.74)	2570.40	(17.72)	2610.56	(18.00)
Formation Pressure (Horner)	No drawdown		No drawdown		No drawdown		No drawdown	

PRESSURES IN psig & Mpa-g #6: 1480

CHAMBER 2	Hewlett Packard gauge		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial	2612.51	(18.01)		
Pretest	2099.78	(14.48)		
Sampling Range	-	-		
Final Shut-in	2076.44	(14.32)		
Hydrostatic Final	2589.53	(17.85)		
Formation Pressure (Horner)		No drawdown		

TEMPERATURES

Maximum Recorded 64.4 °C Formation Temperature (Horner) 67.5 °C

Depth Tool Reached 1480 m

Time Since Circulation 28.85 hours

REMARKS: NO RECOVERY.

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 3 GEOLOGIST/S: C.F.J. SWARBRICK DATE: 11/8/78

MUD IN HOLE: Weight 10.2ppg 1.22 Sp gr. Calculated Hydrostatic: 2543.8 psi 17.54 MPa

1465m

Titration Cl^- 4400 ppm NO_3 115 ppm

PRESSURES IN psig & Mpa-g

CHAMBER 1 #7: 1465m	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial			2579.81	17.79
Pretest			2061.16	14.21
Sampling Range			1467.60-1573.40	10.12-10.85
Final Shut-in			2074.34	14.30
Hydrostatic Final			2589.75	17.86
Formation Pressure (Horner)			2074	14.30

PRESSURES IN psig & Mpa-g

CHAMBER 2	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial			-	-
Pretest			-	-
Sampling Range			810.39-1006.80	5.59-6.94
Final Shut-in			2076.34	14.32
Hydrostatic Final			2589.75	17.86
Formation Pressure (Horner)			-	

TEMPERATURES

Maximum Recorded NOT RECORDED °C Formation Temperature (Horner) ______ °C

Depth Tool Reached 1480 m

Time Since Circulation ______ hours

REMARKS:

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 4 GEOLOGIST/S: C.F.J. SWARBRICK DATE: 11/8/78
TIME: 00:00:00 = 0450 hours.

Seat No: 10 Depth: 1449.3m blocked chamber Pretest: 2047.69 14.12 Chamber:
Seat No: 11 Depth: 1437m blocked chamber Pretest: 2053.77 14.16 Chamber:
Seat No: 12 Depth: 1460.7m blocked chamber Pretest: 2071.74 14.28 Chamber:
Seat No: Depth: Pretest: Chamber:
Seat No: Depth: Pretest: Chamber:

TIMES: CHAMBER 1

Depth: 1449.3m Tool Set: 00:08:16 Pretest Open: 00:08:20 Min.Open: 02:39
Chamber Open: 00:10:59 Min.Fill: - Chamber Full: -
Buildup Starts: - Min.Buildup: - Seal Chamber:
Pull Off Tool: Total Time:

CHAMBER ~~2~~ 1

Depth: 1460.7m Tool Set: 00:06:12 Pretest Open: 00:06:17 Min.Open: 00:57
Chamber Open: 00:07:14 Min.Fill: - Chamber Full: -
Buildup Starts: - Min.Buildup: - Seal Chamber: 00:12:20
Pull off Tool: 00:13:50 Total Time:

RECOVERY: CHAMBER 1 Surface Pressure: kPa
Gas: L. Filtrate: L.
Oil: L. Mud: L.
Formation Water: L. Others: L.

RECOVERY: CHAMBER 2 Surface Pressure: kPa
Gas: L. Filtrate: L.
Oil: L. Mud: L.
Formation Water: L. Others: L.

PROPERTIES: CHAMBER 1

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

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

WATER/FILTRATE: RESISTIVITY: Ω @ °C, Equivalent Na. Cl.: ppm
Titration Cl^- : ppm., NO_3: ppm

PROPERTIES: CHAMBER 2

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

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

WATER/FILTRATE: RESISTIVITY: Ω @ °C, Equivalent Na. Cl.: ppm
Titration Cl^- : ppm., NO_3 : ppm

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 4 GEOLOGIST/S: C.F.J. SWARBRICK DATE: 11/8/78

MUD IN HOLE: Weight: 10.2ppg (1.22 Sp gr.) Calculated Hydrostatic: 2516.5 psi 17.51 MPa

Titration Cl⁻ 4000ppm NO$_3$ 115 ppm

PRESSURES IN psig & Mpa-g

CHAMBER 1

	#10: 1449.3m		#11: 1437m Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial	2556.71	17.63	2540.37	17.52
Pretest	2047.69	14.12	2053.77	14.16
Sampling Range	-	-	-	-
Final Shut-in	2047.99	14.12	-	-
Hydrostatic Final	2555.73	17.62	2538.96	17.51
Formation Pressure (Horner)				
		No flow		No drawdown. No flow..

PRESSURES IN psig & Mpa-g

CHAMBER ~~2~~ 1

	Schlumberger		#12: 1460.7m Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial			2584.57	17.82
Pretest			2071.74	14.28
Sampling Range			-	-
Final Shut-in			2072.18	14.29
Hydrostatic Final			2579.96	17.79
Formation Pressure (Horner)				
				No flow.

TEMPERATURES

Maximum Recorded NOT RECORDED °C Formation Temperature (Horner) ______ °C

Depth Tool Reached ______ m

Time Since Circulation ______ hours

REMARKS:

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 5 GEOLOGIST/S: C.F.J. SWARBRICK DATE: 11/8/78

TIME: 00:00:00 = 2130 hours.

Seat No: 13 Depth: 1449.3m Oil test, Segregator not open. Pretest: 2041.19 14.07 Chamber: 2052.29 14.15

Seat No: 14 Depth: 1448.0m Pressure test Pretest: 2058.45 14.19 Chamber:

Seat No: Depth: Pretest: Chamber:

Seat No: Depth: Pretest: Chamber:

Seat No: Depth: Pretest: Chamber:

TIMES: CHAMBER 1

Depth: 1449.3m Tool Set: 00:07:18 Pretest Open: 00:07:22 Min.Open: 02:49

Chamber Open: 00:10:11 Min.Fill: 11:59 Chamber Full: 00:22:10

Buildup Starts: 00:22:10 Min.Buildup: 12:10 Seal Chamber: 00:34:20

Pull Off Tool: - Total Time: 00:27:02

CHAMBER 2 Segregator No. 3001 did not fill. Contained 950cc water.

Depth: 1449.3m Tool Set: - Pretest Open: - Min.Open: -

Chamber Open: 00:34:30 Min.Fill: 00:40 Chamber Full:

Buildup Starts: - Min.Buildup: - Seal Chamber: 00:35:10

Pull off Tool: 00:37:50 Total Time: 00:03:20

RECOVERY: CHAMBER 1 Surface Pressure: (720)psi 4964 kPa

Gas: (40.7 cu.ft.) 1153 L. Filtrate/Water: 0.5 L.

Oil: 14.0 L. Mud: 2.75 L.

Formation Water: - L. Others: L.

RECOVERY: CHAMBER 2 Surface Pressure: 0 kPa

Gas: L. Filtrate: L.

Oil: L. Mud: L.

Formation Water: L. Others: .95 make up water? L.

PROPERTIES: CHAMBER 1

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S
	462,336	58,368	10,675	2,611	Tr		
	490,539	80,256	17,080	4,247(N)	1,959		
				4,737(I)			

OIL: 52 °API @: 51.8 °F, Colour: brown, Fluorescence: light pale yellow

G.O.R.: Other Observations: Oil is slightly lighter in colour than that from FIT 4.

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

Titration Cl⁻: 4000 ppm., NO_3: 5 ppm

* unable to get uncontaminated sample.

PROPERTIES: CHAMBER 2

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

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

G.O.R.: Other Observations:

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

Titration Cl⁻: ppm., NO_3: ppm

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 5 GEOLOGIST/S: C.F.J. SWARBRICK DATE: 11/8/78

MUD IN HOLE: Weight: 10.2ppg (1.22 Sp gr.) Calculated Hydrostatic: 2516 psi (17.51) MPa

Titration Cl^- 4000 ppm NO_3 105 ppm

PRESSURES IN psig & Mpa-g

CHAMBER 1 #13: 1449.3m

	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial			2524.84	17.41
Pretest			2041.19	14.07
Sampling Range			471.02-1015.92	3.25-7.00
Final Shut-in			2052.29	14.15
Hydrostatic Final			-	
Formation Pressure (Horner)			2058	14.19

PRESSURES IN psig & Mpa-g

CHAMBER 2

	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial			-	
Pretest				
Sampling Range				
Final Shut-in			2055.51	14.17
Hydrostatic Final			2528.80	17.44
Formation Pressure (Horner)			2056	14.18

TEMPERATURES

Maximum Recorded 64.4 °C Formation Temperature (Horner) 66.5 °C

Depth Tool Reached 1449 m

Time Since Circulation 11.25 hours

REMARKS:

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 6 GEOLOGIST/S: C.F.J. SWARBRICK DATE: 12/8/78

TIME: 00:00:00 - 0230 hours.

Seat No: 15 Depth: 1458.5m Dry pressure test Pretest: 2054.23 14.16 Chamber:

Seat No: 16 Depth: 1458m Dry pressure test Pretest: 2058.48 14.19 Chamber:

Seat No: 17 Depth: 1460.7m Dry pressure test Pretest: 2080.61 14.35 Chamber:

Seat No: 18 Depth: 1437m Oil test Pretest: 2159.17 14.89 Chamber:

Seat No: Depth: Segregator not open. Pretest: Chamber:

TIMES: CHAMBER 1

Depth: 1437m Tool Set: 00:03:37 Pretest Open: 00:03:40 Min.Open: 01:36

Chamber Open: 00:05:16 Min.Fill: 09:54 Chamber Full: 00:15:10

Buildup Starts: 00:15:10 Min.Buildup: 13:08 Seal Chamber: 00:28:18

Pull Off Tool: - Total Time: 24:41

CHAMBER 2 Segregator No. 3002 did not open. Contained 1350cc of water.

Depth: 1437m Tool Set: - Pretest Open: - Min.Open: -

Chamber Open: 00:28:18 Min.Fill: 00:02 Chamber Full: 00:28:20

Buildup Starts: 00:28:20 Min.Buildup: 01:50 Seal Chamber: 00:30:10

Pull off Tool: 00:30:20 Total Time: 00:02:02

RECOVERY: CHAMBER 1 Surface Pressure: (900)psi6205.28 kPa

Gas: (54.5 cu.ft.) 1543 L. Filtrate: - L.

Oil: 13.5 L. Mud: - L.

Formation Water: - L. Others: Emulsion 2.5 L.

RECOVERY: CHAMBER 2 Surface Pressure: 0 kPa N^o^ 3002 NOT OPENED

Gas: L. Filtrate: L.

Oil: L. Mud: L.

Formation Water: L. Others: 1.305 make up water. L.

PROPERTIES: CHAMBER 1

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S
TOP	881,869	145,920	29,891	(N) 4,411	3,265	Tr	
				(I) 5,718			
BOTTOM	870,845	167,808	33,805	(N) 4,900	-	-	
				5,528			

OIL: + 55 °API @: 49.1 °F, Colour: brown , Fluorescence: bright pale yellow

G.O.R.: Other Observations:

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

Titration Cl$^-$: 4000 ppm., NO_3: 30 ppm

PROPERTIES: CHAMBER 2

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

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

G.O.R.: Other Observations:

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

Titration Cl$^-$: ppm., NO_3 : ppm

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 6 GEOLOGIST/S: C.F.J. SWARBRICK DATE: 12/8/78

MUD IN HOLE: Weight: 10.2ppg (1.22) Sp gr. Calculated Hydrostatic: 2495 psi 17.02 MPa 1437m

Titration Cl⁻ 4000 ppm NO_3 105 ppm

PRESSURES IN psig & Mpa-g

CHAMBER 1 Seat #18

	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial			2525.45	17.41
Pretest			2159.17	14.89
Sampling Range			456.51-1522.37	3.15-10.50
Final Shut-in			2038.32	14.05
Hydrostatic Final			-	-
Formation Pressure (Horner)				

PRESSURES IN psig & Mpa-g

CHAMBER 2

	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial			-	
Pretest			-	
Sampling Range			1535.19-1920.14	10.58-13.24
Final Shut-in			2037.79	14.05
Hydrostatic Final			2504.29	17.27
Formation Pressure (Horner)				

TEMPERATURES

Maximum Recorded 65 °C Formation Temperature (Horner) 67.5 °C

Depth Tool Reached 1470 m

Time Since Circulation $14^3/4$ hours

REMARKS: Gas chromatograph results appear anomalous but test procedures check and there was no possible confusion of samples.

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 7 GEOLOGIST/S: C.F.J. SWARBRICK DATE: 12/8/78

TIME: 00:00:00 = 0800 hours.

Seat No: 19 Depth: 1458.5m Lost seal Pretest: 2053.26 14.16 Chamber:

Seat No: 20 Depth: 1459.0m Dry test, Lost seal. Pretest: - Chamber:

Seat No: 21 Depth: 1458m Lost seal. Pretest: 2070.61 14.28 Chamber:

Seat No: 22 Depth: 1460.7m Lost seal. Pretest: 2074.78 14.31 Chamber:

Seat No: 23 Depth: 1461.4m Segregator not open. Lost seal. Pretest: 2077.58 14.32 Chamber:

TIMES: CHAMBER 1

Depth: 1461.4m Tool Set: 00:02:48 Pretest Open: 00:02:52 Min.Open: 02:22

Chamber Open: (first) 00:05:14 Min.Fill: - Chamber Full: -

Buildup Starts: - Min.Buildup: - Seal Chamber: (final) 00:04:4

Pull Off Tool: - Total Time: 00:14:26

CHAMBER 2 Segregator did not open.

Depth: 1461.4m Tool Set: - Pretest Open: - Min.Open: -

Chamber Open: 00:00:00 Min.Fill: - Chamber Full: -

Buildup Starts: - Min.Buildup: - Seal Chamber: 00:00:54

Pull off Tool: 00:00:54 Total Time: 00:00:54

RECOVERY: CHAMBER 1 Surface Pressure: 0 kPa

Gas: L. Filtrate/Water 2.1 L.

Oil: Tr L. Mud: 5.6 L.

Formation Water: L. Others: L.

RECOVERY: CHAMBER 2 Surface Pressure: 0 kPa

Gas: - L. Filtrate: - L.

Oil: - L. Mud: - L.

Formation Water: - L. Others: - L.

Plugged and empty.

PROPERTIES: CHAMBER 1

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

OIL: °API @: °F, Colour: brown film, Fluorescence: light pale yellow

G.O.R.: Other Observations:

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

Titration Cl^-: 3800 ppm., NO_3: 80 ppm

Weight: 10 ppg

PROPERTIES: CHAMBER 2

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

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

G.O.R.: Other Observations:

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

Titration Cl^-: ppm., NO_3 : ppm

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 7 GEOLOGIST/S: C.F.J. SWARBRICK DATE: 12/8/78

MUD IN HOLE: Weight: 10.2ppg 1.22 Sp gr. Calculated Hydrostatic: 2537.5 psi 17.49 MPa
1461.4m

Titration Cl⁻ 4000 ppm NO$_3$ 105 ppm

PRESSURES IN psig & Mpa-g

CHAMBER 1 Seat #23	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial			2561.81	17.66
Pretest			2077.58	14.32
Sampling Range			-	
Final Shut-in			-	
Hydrostatic Final			-	
Formation Pressure (Horner)			-	

PRESSURES IN psig & Mpa-g

CHAMBER 2	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial			-	
Pretest			-	
Sampling Range			-	
Final Shut-in			2075.33	14.31
Hydrostatic Final			-	
Formation Pressure (Horner)			-	

TEMPERATURES

Maximum Recorded 64.2 °C Formation Temperature (Horner) 67.5 °C

Depth Tool Reached 1461 m

Time Since Circulation 20¼ hours

REMARKS: HP Gauge clogged during test - read constant pressure, returned to normal during segregator sampling; no build up results.

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 8 GEOLOGIST/S: C.F.J. SWARBRICK DATE: 12/8/78

TIME: 00:00:00 = 1500 hours.

Seat No: 24 Depth: 1421.5m Blocked line Dry test. Pretest: - Chamber:

Seat No: 25 Depth: 1437m Pressure only. Pretest: 2046.85 14.11 Chamber:

Seat No: 26 Depth: 1426.8m Oil test, loosing seat. Pretest: 2038.73 14.06 Chamber:

Seat No: Depth: segregator not open. Pretest: Chamber:

Seat No: Depth: Pretest: Chamber:

TIMES: CHAMBER 1

Depth: 1426.8m Tool Set: 00:04:38 Pretest Open: 00:04:44 Min.Open: 03:09

Chamber Open: (Ist) 00:07:53 (2nd) 00:13:34 Min.Fill: 29:26 Chamber Full: -

Buildup Starts: 00:42:59 Min.Buildup: 12:47 Seal Chamber: 00:55:46

Pull Off Tool: - Total Time: 00:51:08

CHAMBER 2 Segregator opened later.

Depth: 1426.8m Tool Set: - Pretest Open: - Min.Open: -

Chamber Open: 00:55:47 Min.Fill: 00:05 Chamber Full: 00:55:52

Buildup Starts: 00:55:52 Min.Buildup: 04:36 Seal Chamber: 01:00:28

Pull off Tool: 01:00:28 Total Time: 00:04:41

RECOVERY: CHAMBER 1 Surface Pressure: (520) psi 3585.28 kPa

Gas: (32.3) 914.74 L. Filtrate/Water .4 L.

Oil: 6.350 L. Mud: 2.05 L.

Formation Water: L. Others: L.

RECOVERY: CHAMBER 2 Surface Pressure: EMPTY kPa N° 3003

Gas: L. Filtrate: L.

Oil: L. Mud: L.

Formation Water: L. Others: L.

PROPERTIES: CHAMBER 1

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S
TOP	305,234	61,788	50,534	7,197 (N) 9,329 (I)	352	-	
MIDDLE	305,234	59,581	41,871	3,732 (N) 4,265 (I)	2,132	4,440	
BOTTOM	66,770	75,028	80,855	23,457 (N)	35,640	1,056	
				23,452 (I)			

OIL: 51 °API @: 48.2 °F, Colour: brown, Fluorescence: light yellow

G.O.R.: Other Observations: Gas coming out of solution. Flowline cold.

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

Titration Cl⁻: ppm., NO_3: ppm

PROPERTIES: CHAMBER 2

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

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

G.O.R.: Other Observations:

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

Titration Cl⁻: ppm., NO_3 : ppm

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 8 GEOLOGIST/S: C.F.J. SWARBRICK DATE: 12/8/78

MUD IN HOLE: Weight: 10.2ppg 1.22Sp gr. Calculated Hydrostatic: 2477.4 psi 17.08 MPa 1426.8m

Titration Cl⁻ 4000 ppm NO_3 105 ppm

PRESSURES IN psig & Mpa-g

CHAMBER 1 Seat #26	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial			2494.95	17.20
Pretest			2038.73	14.06
Sampling Range			458.32-973.13	3.16-6.71
Final Shut-in			2040.08	14.07
Hydrostatic Final			-	
Formation Pressure (Horner)			-	

PRESSURES IN psig & Mpa-g

CHAMBER 2	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial			-	
Pretest			-	
Sampling Range			1708.89-2021.52	11.78-13.94
Final Shut-in			2040.40	14.07
Hydrostatic Final			-	
Formation Pressure (Horner)			-	

TEMPERATURES

Maximum Recorded 64 °C Formation Temperature (Horner) 66.5 °C

Depth Tool Reached 1437 m

Time Since Circulation 26¼ hours

REMARKS: Oil very cloudy 2¼ hours after opening chamber due to either gas coming out of solution or presence of fine suspension of mud. No indication of clearing at top.

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 9 GEOLOGIST/S: C.F.J. SWARBRICK DATE: 12/8/78

TIME: 00:00:00 = 1700 hours.

Seat No: 27 Depth: 1458.5m Plugged at Port Pretest: 2061 Chamber:

Seat No: 28 Depth: 1458.4m Plugged tool. Pretest: 14.2 Chamber:

Seat No: Depth: Pretest: Chamber:

Seat No: Depth: Pretest: Chamber:

Seat No: Depth: Pretest: Chamber:

TIMES: CHAMBER 1 Plugged at port.

Depth: 1458.5m Tool Set: 00:03:53 Pretest Open: 00:03:56 Min.Open: 04:35

SEAT #27 Chamber Open: (1st) 00:08:31 (2nd) 00:16:10 Min.Fill: - Chamber Full: -

Buildup Starts: - Min.Buildup: - Seal Chamber: 00:19:40

Pull Off Tool: 00:19:40 Total Time: 00:16:47

CHAMBER 2 Plugged at port. Lost seal.

Depth: 1458.4m Tool Set: 00:23:20 Pretest Open: 00:23:40 Min.Open: 00:30

SEAT #28 Chamber Open: (1st) 00:24:10 (2nd) 00:29:20 Min.Fill: - Chamber Full: -

Buildup Starts: - Min.Buildup: - Seal Chamber: 00:35:10

Pull off Tool: 00:35:10 Total Time: 00:11:50

RECOVERY: CHAMBER 1 Surface Pressure: 0 kPa

Gas: - L. Filtrate/Water - L.

Oil: Tr L. Mud: 1.95 L.

Formation Water: - L. Others: L.

RECOVERY: CHAMBER 2 Surface Pressure: 0 kPa

Gas: - L. Filtrate/Water 1.125 L.

Oil: - L. Mud: - L.

Formation Water: - L. Others: - L.

PROPERTIES: CHAMBER 1

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

OIL: - °API @: - °F, Colour: brown, Fluorescence: light pale yellow

G.O.R.: Other Observations:

WATER/FILTRATE: RESISTIVITY: 1.26 Ω @ 12.2 °C, Equivalent Na. Cl.: 6000 ppm

Titration Cl^-: 3000 ppm., NO_3: 95 ppm

PROPERTIES: CHAMBER 2

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

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

G.O.R.: Other Observations:

WATER/FILTRATE: RESISTIVITY: 2.43 Ω @ 12.2 °C, Equivalent Na. Cl.: 3000 ppm

Titration Cl^-: 2800 ppm., NO_3: 95 ppm

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 9 GEOLOGIST/S: C.F.J. SWARBRICK DATE: 12/8/78

MUD IN HOLE: Weight: 10.2ppg 1.22 Sp gr. Calculated Hydrostatic: 2532.3 psi 17.5 MPa
1458.4m

Titration Cl$^-$ 4000 ppm NO$_3$ 105 ppm

PRESSURES IN psig & Mpa-g

CHAMBER 1 Seat #27

	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial			2544.45	17.54
Pretest			2060.90	14.21
Sampling Range			40.61-2041.47	.28-14.08
Final Shut-in			-	
Hydrostatic Final			-	
Formation Pressure (Horner)				

PRESSURES IN psig & Mpa-g

CHAMBER 2 Seat #28

	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial			-	
Pretest			-	-
Sampling Range			35.66-2153.39	0.25-14.85
Final Shut-in			-	-
Hydrostatic Final				
Formation Pressure (Horner)				

TEMPERATURES

Maximum Recorded 64 °C Formation Temperature (Horner) 67.5 °C

Depth Tool Reached 1458.5 m

Time Since Circulation 30½ hours

REMARKS:

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 10 GEOLOGIST/S: C.F.J. SWARBRICK DATE: 12/8/78

Seat No: 29 Depth: 1489.5m Plugged tool Pretest: 2105.84 and 2113.98 Chamber:
14.52
Seat No: 30 Depth: 1480m Plugged tool, Lost seal. Pretest: 2112.63 Chamber:
14.57
Seat No: 31 Depth: 1460.7m Plugged tool. Pretest: 2083.78 Chamber:
14.37
Seat No: Depth: Loosing seat. Pretest: Chamber:
Seat No: Depth: Pretest: Chamber:

TIMES: CHAMBER 1 NO SAMPLES OTHER THAN PRETESTS.

Depth: Tool Set: Pretest Open: Min.Open:
Chamber Open: Min.Fill: Chamber Full:
Buildup Starts: Min.Buildup: Seal Chamber:
Pull Off Tool: Total Time:

CHAMBER 2

Depth: Tool Set: Pretest Open: Min.Open:
Chamber Open: Min.Fill: Chamber Full:
Buildup Starts: Min.Buildup: Seal Chamber:
Pull off Tool: Total Time:

RECOVERY: CHAMBER 1 Surface Pressure: kPa

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

RECOVERY: CHAMBER 2 Surface Pressure: kPa

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

PROPERTIES: CHAMBER 1

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

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

WATER/FILTRATE: RESISTIVITY: Ω @ °C, Equivalent Na. Cl.: ppm
Titration Cl^- : ppm., NO_3: ppm

PROPERTIES: CHAMBER 2

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

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

WATER/FILTRATE: RESISTIVITY: Ω @ °C, Equivalent Na. Cl.: ppm
Titration Cl^- : ppm., NO_3 : ppm

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 10 GEOLOGIST/S: C.F.J. SWARBRICK DATE: 12/8/78

MUD IN HOLE: Weight: 10.2ppg 1.22 Sp gr. Calculated Hydrostatic: 2586.3 psi 17.83 MPa 1489.5m

Titration Cl^- 4000 ppm NO_3 105 ppm

PRESSURES IN psig & Mpa-g Seat #29: 1489.5m Seat #30: 1480m

CHAMBER 1

	Hewlett Packard gauge		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial	2595.49	17.90	2589.04	17.85
Pretest	2105.84 2113.27	14.52 14.57	2112.63	14.57
Sampling Range				
Final Shut-in				
Hydrostatic Final				
Formation Pressure (Horner)				
	NO FLOW		NO FLOW	

PRESSURES IN psig & Mpa-g Seat #31: 1460.7m

CHAMBER 2

	Hewlett Packard gauge		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial	2597.16	17.91		
Pretest	2083.78	14.36		
Sampling Range				
Final Shut-in				
Hydrostatic Final				
Formation Pressure (Horner)				
	NO FLOW			

TEMPERATURES

Maximum Recorded NOT RECORDED °C Formation Temperature (Horner) - °C

Depth Tool Reached 1489.5 m

Time Since Circulation ______ hours

REMARKS:

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 11 GEOLOGIST/S: R.C.N. THORNTON DATE: 14/8/78

Seat No: 32 Depth: 1410.9m Pressure test. TIME: 0500 hours. Pretest: 2052.99 14.15 Chamber:
Seat No: 33 Depth: 1458.0m Water test. Segregator not open. Pretest: 2070.30 14.27 Chamber:
Seat No: Depth: Pretest: Chamber:
Seat No: Depth: Pretest: Chamber:
Seat No: Depth: Pretest: Chamber:

TIMES: CHAMBER 1

Depth: 1458.00m Tool Set: 00:31:05 Pretest Open: 00:31:09 Min.Open: 03:28
SEAT #33 Chamber Open: 00:34:31 Min.Fill: 15:39 Chamber Full: 00:50:10
Buildup Starts: 00:50:10 Min.Buildup: 19:56 Seal Chamber: 01:10:06
Pull Off Tool: - Total Time: 01:39:01

CHAMBER 2

Depth: 1458m Tool Set: - Pretest Open: - Min.Open: -
Chamber Open: 01:10:06 Min.Fill: 00:05 Chamber Full: 01:10:11
Buildup Starts: 01:10:11 Min.Buildup: 06:26 Seal Chamber: 01:16:37
Pull off Tool: 01:16:37 Total Time: 00:06:31

RECOVERY: CHAMBER 1 Surface Pressure: 0 kPa

Gas: L. Filtrate/Water 22 L.
Oil: L. Mud: L.
Formation Water: L. Others: L.

RECOVERY: CHAMBER 2 Surface Pressure: 0 kPa NOT OPENED SEGREGATOR Nº 3004.

Gas: L. Filtrate: L.
Oil: L. Mud: L.
Formation Water: ?Transferred 1.5 L. Others: L.

PROPERTIES: CHAMBER 1

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

OIL: °API @: °F, Colour: Rust brown to tan Fluorescence: Yes
G.O.R.: Other Observations: oily scum, strong gaseous odour.

WATER/FILTRATE: RESISTIVITY: 1.52 Ω @ 15 °C, Equivalent Na. Cl.: 4200 ppm
Titration Cl⁻: 2000 ppm., NO_3: 70-55 ppm
TWO TEST METHODS

PROPERTIES: CHAMBER 2

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

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

WATER/FILTRATE: RESISTIVITY: Ω @ °C, Equivalent Na. Cl.: ppm
Titration Cl⁻: ppm., NO_3 : ppm

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 11 GEOLOGIST/S: R.C.N. THORNTON DATE: 14/8/78

MUD IN HOLE: Weight: 10.2ppg 1.22Sp gr. Calculated Hydrostatic: 2531.6 psi 17.54 MPa
1458m

Titration Cl⁻ 4000 ppm NO_3 100 ppm

PRESSURES IN psig & Mpa-g

CHAMBER 1 Seat #33	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial			2569.50	17.72
Pretest			2070.30	14.27
Sampling Range			360.26-2070.38	2.48-14.27
Final Shut-in			2077.62	14.32
Hydrostatic Final			-	
Formation Pressure (Horner)			2079	14.33

PRESSURES IN psig & Mpa-g

CHAMBER 2	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial			-	
Pretest			-	
Sampling Range			1801.40-2047.16	12.42-14.11
Final Shut-in			2079.90	14.34
Hydrostatic Final			-	
Formation Pressure (Horner)				

TEMPERATURES

Maximum Recorded 46.1 °C Formation Temperature (Horner) 67.5 °C

Depth Tool Reached 1458 m

Time Since Circulation 6¼ hours

REMARKS:

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 12 GEOLOGIST/S: R.C.N. THORNTON DATE: 14/8/78
TIME: 00:00:00 = 0800 hours.

Seat No: 34 Depth: 1480.0m Chamber not open Pretest: 2107.14 Chamber:
Seat No: Depth: Segregator not open Pretest: 14.53 Chamber:
Seat No: Depth: Pretest: Chamber:
Seat No: Depth: Pretest: Chamber:
Seat No: Depth: Pretest: Chamber:

TIMES: CHAMBER 1

Depth: 1480m Tool Set: 00:08:20 Pretest Open: 00:09:00 Min.Open: 01:43
Chamber Open: 00:10:43 Min.Fill: - Chamber Full: -
Buildup Starts: - Min.Buildup: - Seal Chamber: 00:33:39
Pull Off Tool: - Total Time: 00:25:19

CHAMBER 2

Depth: 1480m Tool Set: - Pretest Open: - Min.Open: -
Chamber Open: 00:33:40 Min.Fill: - Chamber Full: ?
Buildup Starts: - Min.Buildup: - Seal Chamber: 00:34:50
Pull off Tool: 00:34:50 Total Time: 01:10

RECOVERY: CHAMBER 1 Surface Pressure: 0 kPa

Gas: L. Filtrate: L.
Oil: L. Mud: .2 L.
Formation Water: L. Others: L.

RECOVERY: CHAMBER 2 Surface Pressure: 0 kPa

Gas: L. Filtrate/Water .5 L.
Oil: L. Mud: L.
Formation Water: L. Others: L.

PROPERTIES: CHAMBER 1

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

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

WATER/FILTRATE: RESISTIVITY: Ω @ °C, Equivalent Na. Cl.: ppm
Titration Cl^-: ppm., NO_3: ppm

PROPERTIES: CHAMBER 2

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

OIL: °API @: °F, Colour: buff, Fluorescence: Yes
G.O.R.: Other Observations: Contaminated drilling mud.

WATER/FILTRATE: RESISTIVITY: 2.96 Ω @ 16.7 °C, Equivalent Na. Cl.: 2100 ppm
Titration Cl^-: 1900 ppm., NO_3: 30-40 ppm

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 12 GEOLOGIST/S: R.C.N. THORNTON DATE: 14/8/78

MUD IN HOLE: Weight 10.2ppg 1.22 Sp gr. Calculated Hydrostatic: 2569.8 psi 17.72 MPa
1480m

Titration Cl⁻ 4000 ppm NO_3 100 ppm

PRESSURES IN psig & Mpa-g

CHAMBER 1	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial			2606.99	17.97
Pretest			2107.14	14.53
Sampling Range			-	
Final Shut-in			2106.30	14.52
Hydrostatic Final			-	
Formation Pressure (Horner)			-	

PRESSURES IN psig & Mpa-g

CHAMBER 2	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial			-	
Pretest			-	
Sampling Range			2106	14.52
Final Shut-in			2106.35	14.52
Hydrostatic Final			2585.75	17.83
Formation Pressure (Horner)				

TEMPERATURES

Maximum Recorded 50 °C Formation Temperature (Horner) 70.0 °C

Depth Tool Reached 1480 m

Time Since Circulation $8^3/4$ hours

REMARKS:

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 13 GEOLOGIST/S: R.C.N. THORNTON DATE: 14/8/78

TIME: 00:00:00 = 1045 hours.

Seat No: 35a Depth: 1489.5m Dry test Pretest: 2113.66 / 14.59 Chamber:

Seat No: 35b Depth: 1490.0m Water test Pretest: 2119.49 / 14.61 Chamber:

Seat No: Depth: Segregator probably did not open Pretest: Chamber:

Seat No: Depth: Pretest: Chamber:

Seat No: Depth: Pretest: Chamber:

TIMES: CHAMBER 1

Depth: 1490.0m Tool Set: 00:25.31 Pretest Open: 00:25:36 Min.Open: 03:26

Seat#35b Chamber Open: 00:28:59 Min.Fill: 14:31 Chamber Full: 00:43:30

Buildup Starts: 00:43:30 Min.Buildup: 17:18 Seal Chamber: 01:00:48

Pull Off Tool: - Total Time: 00:35:17

CHAMBER 2

Depth: 1490.0m Tool Set: - Pretest Open: - Min.Open: -

Chamber Open: 01:00:48 Min.Fill: 00:05 Chamber Full: 01:00:53

Buildup Starts: 01:00:53 Min.Buildup: 03:57 Seal Chamber: 01:04:50

Pull off Tool: 01:05:00 Total Time: 04:12

RECOVERY: CHAMBER 1 Surface Pressure: (4 psi) 27.6 kPa

Gas: - L. Filtrate: 6 L.

Oil: Trace oil scum L. Mud: - L.

Formation Water: 5.5 L. Others: - L.

RECOVERY: CHAMBER 2 Surface Pressure: kPa NOT OPENED Nº 3008.

Gas: L. Filtrate: L.

Oil: L. Mud: L.

Formation Water: L. Others: 1.35 make up water. L.

PROPERTIES: CHAMBER 1

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

OIL: °API @: °F, Colour: , Fluorescence: yellow brown

G.O.R.: Other Observations: very gassy; strong odour.

WATER/FILTRATE: RESISTIVITY: 2.26 Ω @ 16.7 °C, Equivalent Na. Cl.: 2700 ppm

Titration Cl^-: 2000 ppm., NO_3: 60 ppm

PROPERTIES: CHAMBER 2

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

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

G.O.R.: Other Observations:

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

Titration Cl^-: ppm., NO_3 : ppm

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 13 GEOLOGIST/S: R.C.N. THORNTON DATE: 14/8/78

MUD IN HOLE: Weight: 10.2ppg 1.22 Sp gr. Calculated Hydrostatic: 2586 psi 17.83 MPa 1489.5m

Titration Cl⁻ 4000 ppm NO_3 100 ppm

PRESSURES IN psig & Mpa-g Seat #35b

CHAMBER 1	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial			2585.58	17.83
Pretest			2119.49	14.61
Sampling Range			1040.15-2090.72	7.17-14.41
Final Shut-in			2116.06	14.59
Hydrostatic Final			-	-
Formation Pressure (Horner)			2118	14.60

PRESSURES IN psig & Mpa-g

CHAMBER 2	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial			-	
Pretest			-	
Sampling Range			1987.71-2102.09	13.70-14.49
Final Shut-in			2117.24	14.6
Hydrostatic Final			2594.59	17.89
Formation Pressure (Horner)			2119	14.61

TEMPERATURES

Maximum Recorded 54.4 °C Formation Temperature (Horner) 70.0 °C

Depth Tool Reached 1490.0 m

Time Since Circulation $11^3/4$ hours

REMARKS:

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 14 GEOLOGIST/S: R.C.N. THORNTON DATE: 17/8/78

TIME: 00:00:00 = 1500 hours.

Seat No: 36a Depth: 1411.0m Lost seal. Pretest: 2048.42 14.12 Chamber:

Seat No: 36b Depth: 1410.9m No seal. Pretest: - Chamber:

Seat No: 36c Depth: 1411.5m Tool plugged at port. Pretest: 2055.77 14.17 Chamber:

Seat No: 37a Depth: 1460.75m Tool plugged. Segregator not open. Pretest: 2078.43 14.33 Chamber:

Seat No: 37b Depth: 1460.8m Tool plugged. Segregator plugged. Pretest: 2056.39 14.18 Chamber:

TIMES: CHAMBER 1

Depth: 1460.8m Tool Set: 00:00:10 Pretest Open: 00:00:22 Min.Open: 01:58

SEAT#37b Chamber Open: (1st) 00:02:20 (2nd) 00:04:01 Min.Fill: - Chamber Full: -

Buildup Starts: - Min.Buildup: - Seal Chamber: 00:07:10

Pull Off Tool: - Total Time: 00:07:00

CHAMBER 2

Depth: 1460.8m Tool Set: - Pretest Open: - Min.Open: -

SEAT#37b Chamber Open: 00:07:10 Min.Fill: - Chamber Full: -

Buildup Starts: - Min.Buildup: - Seal Chamber: 00:07:47

Pull off Tool: 00:07:47 Total Time: 00:00:37

RECOVERY: CHAMBER 1 Surface Pressure: 0 kPa

Gas: L. Filtrate: L.

Oil: L. Mud: .05 L.

Formation Water: L. Others: L.

RECOVERY: CHAMBER 2 Surface Pressure: 0 kPa

Gas: L. Filtrate/Water 1.5 L.

Oil: L. Mud: L.

Formation Water: L. Others: L.

PROPERTIES: CHAMBER 1

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

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

G.O.R.: Other Observations: Almost clear buff liquid.

WATER/FILTRATE: RESISTIVITY: 3.3 Ω @ 17.2 °C, Equivalent Na. Cl.: 1850 ppm

Titration Cl^-: 1800 ppm., NO_3: 20 ppm

PROPERTIES: CHAMBER 2

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

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

G.O.R.: Other Observations:

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

Titration Cl^-: ppm., NO_3: ppm

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 14 GEOLOGIST/S: R.C.N. THORNTON DATE: 14/8/78

MUD IN HOLE: Weight: 10.2ppg 1.22 Sp gr. Calculated Hydrostatic: 2536.5 psi 17.49 MPa
1460.8m

Titration Cl⁻ 4000 ppm NO_3 100 ppm

PRESSURES IN psig & Mpa-g Seat #37b

CHAMBER 1	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial			2517.79	17.36
Pretest			2056.39	14.18
Sampling Range			108.27-871.35	0.75-6.01
Final Shut-in			-	
Hydrostatic Final			-	
Formation Pressure (Horner)				

PRESSURES IN psig & Mpa-g Seat #37b

CHAMBER 2	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial			-	
Pretest			-	
Sampling Range			247.06-256.57	1.70-1.77
Final Shut-in				
Hydrostatic Final			2508.92	17.30
Formation Pressure (Horner)				

TEMPERATURES

Maximum Recorded 55.5 °C Formation Temperature (Horner) 67.5 °C

Depth Tool Reached 1461 m

Time Since Circulation $15^3/4$ hours

REMARKS:

1411m:	Unable to obtain seat.
1410.9m:	Very tight, but not blocked since pressure built up when chamber closed. No sample.
1411.5m: (Seat 36)	Tight test. Anomalously high pressure was due to tight formation. Opened main chamber - no flow, no sample.
1460.75m:	Many sealing problems sampling started but apparently blocked by sand (no build up when closed).
1460.8m: (Seat 37)	Attempt sampling and blocked attempted sample several times.

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 15 GEOLOGIST/S: R.C.N. THORNTON DATE: 17/8/78

TIME: 00:00:00 = 1612 hours.

Seat No: 38a Depth: 1514m Chamber did not open Pretest: 2155.44 / 14.86 Chamber: ____

Seat No: 38b Depth: 1514m oil test chamber plugging segregator not open. Pretest: 2155.84 / 14.86 Chamber: -

Seat No: ____ Depth: ____ Pretest: ____ Chamber: ____

Seat No: ____ Depth: ____ Pretest: ____ Chamber: ____

Seat No: ____ Depth: ____ Pretest: ____ Chamber: ____

TIMES: CHAMBER 1

Depth: 1514m Tool Set: a: 00:32:23 b: 01:10:34 Pretest Open: a: 00:32:26 b: 01:11:52 Min.Open: a: 2:41 b: 1.52

Chamber Open: a: 00:35:08 b: 01:13:45 Min.Fill: 17.25 Chamber Full: b: 01:31:19

Buildup Starts: b: 01:31:20 Min.Buildup: 6.10 Seal Chamber: 02:00:00

Pull Off Tool: - Total Time: 1:27:37

CHAMBER 2

Depth: 1514m Tool Set: - Pretest Open: - Min.Open: -

Chamber Open: 02:00:34 Min.Fill: - Chamber Full: -

Buildup Starts: - Min.Buildup: - Seal Chamber: 02:04:52

Pull off Tool: 02:06:27 Total Time: 5:53

RECOVERY: CHAMBER 1 Surface Pressure: 4 psi 27.58 kPa

Gas: ____ L. Filtrate: 0.75 L.

Oil: 14.5 L. Mud: ____ L.

Formation Water: ____ L. Others: ____ L.

RECOVERY: CHAMBER 2 Surface Pressure: ____ kPa

Gas: ____ L. Filtrate: ____ L.

Oil: ____ L. Mud: ____ L.

Formation Water: ____ L. Others: ____ L.

PROPERTIES: CHAMBER 1

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

OIL: 50 °API @: 20°C °F, Colour: dark brown, Fluorescence: very pale yellow

G.O.R.: ____ Other Observations: Foaming (like Guinness)

WATER/FILTRATE: RESISTIVITY: 1.55 Ω @ 15 °C, Equivalent Na. Cl.: 4400 ppm

Titration Cl¯ : 1800 ppm., NO_3: 60 ppm

PROPERTIES: CHAMBER 2

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

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

G.O.R.: ____ Other Observations: ____

WATER/FILTRATE: RESISTIVITY: ____ Ω @ ____ °C, Equivalent Na. Cl.: ____ ppm

Titration Cl¯ : ____ ppm., NO_3 : ____ ppm

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 15 GEOLOGIST/S: R.C.N. THORNTON DATE: 17/8/78

MUD IN HOLE: Weight: 9.7ppg1.16 Sp gr. Calculated Hydrostatic: 2499.99 psi 17.24 MPa
1415m

Titration Cl^- 3600 ppm NO_3 100 ppm

PRESSURES IN psig & Mpa-g

CHAMBER 1	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial			2542.42	17.53
Pretest			a. 2155.44 b. 2155.84	14.86 14.86
Sampling Range			b. 877.23-1618.70	6.05-11.16
Final Shut-in			b. 2153.99	14.85
Hydrostatic Final			-	
Formation Pressure (Horner)				

PRESSURES IN psig & Mpa-g

CHAMBER 2	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial			-	
Pretest			-	
Sampling Range			2151.84-2155.07	14.84-14.86
Final Shut-in			2155.07	14.86
Hydrostatic Final			2533.63	17.47
Formation Pressure (Horner)				

TEMPERATURES

Maximum Recorded 81 °C Formation Temperature (Horner) - °C

Depth Tool Reached 1514 m NOTE: Thermometer not shaken.

Time Since Circulation 24.5 hours

REMARKS: Choke 0.020" with flow restrictor.

Main chamber opened 00:35:08. Blocked flowline.
sealed 01:10:33
Main chamber reopened 01:13:45. Pressure drop.
from 01:37:40 is hard to explain; appears to be
pulsing.

Lack of pressure drop on opening Chamber 2 indicates that something in the chamber is preventing it from filling.

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 16 GEOLOGIST/S: R.C.N. THORNTON DATE: 17/8/77

TIME: 00:00:00 = 1947 hours.

Seat No: 39a Depth: 1521m blocked flowline Pretest: 2174.21 14.99 Chamber:

Seat No: 39b Depth: 1520.8m blocked flowline Pretest: 2168.01 14.94 Chamber:

Seat No: Depth: Pretest: Chamber:

Seat No: Depth: Pretest: Chamber:

Seat No: Depth: Pretest: Chamber:

TIMES: CHAMBER 1

Depth: 1521m Tool Set: 00:40:20 Pretest Open: 00:40:40 Min.Open: 1:17

SEAT#39a Chamber Open: 00:41:57 Min.Fill: - Chamber Full: 3 attempts blocked flowline

Buildup Starts: - Min.Buildup: - Seal Chamber:

Pull Off Tool: 00:50:41 Total Time: 00:10:21

CHAMBER X 1

Depth: 1520.8m Tool Set: 00:52:45 Pretest Open: 00:52:48 Min.Open: 1:16

SEAT#39b Chamber Open: 00:54:10 Min.Fill: - Chamber Full: 2 attempts blocked flowline

Buildup Starts: - Min.Buildup: - Seal Chamber:

Pull off Tool: 00:57:25 Total Time: 00:04:40

RECOVERY: CHAMBER 1 Surface Pressure: 4 psi kPa

Gas: L. Filtrate: 1.25 L.

Oil: 0.75 L. Mud: L.

Formation Water: L. Others: L.

RECOVERY: CHAMBER 2 Surface Pressure: kPa

Gas: L. Filtrate: L.

Oil: L. Mud: L.

Formation Water: L. Others: L.

PROPERTIES: CHAMBER 1

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

OIL: 49 °API @: 18.9°C XX, Colour: dark brown, Fluorescence: very pale yellow

G.O.R.: Other Observations:

WATER/FILTRATE: RESISTIVITY: 1.44 Ω @ 15 °C, Equivalent Na. Cl.: 4600 ppm

Titration Cl⁻: 2000 ppm., NO_3: 65 ppm

PROPERTIES: CHAMBER 2

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

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

G.O.R.: Other Observations:

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

Titration Cl⁻: ppm., NO_3 : ppm

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 16 GEOLOGIST/S: R.C.N. THORNTON DATE: 17/8/78

MUD IN HOLE: Weight: 9.7ppg 1.16 Sp gr. Calculated Hydrostatic: 2511.6 psi 17.32 MPa
1521m

Titration Cl⁻ 3600 ppm NO_3 100 ppm

PRESSURES IN psig & Mpa-g

CHAMBER 1 #39a	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial			2560.43	17.65
Pretest			2174.21	14.99
Sampling Range			-	-
Final Shut-in				
Hydrostatic Final			2573.50	17.74
Formation Pressure (Horner)				

PRESSURES IN psig & Mpa-g

CHAMBER ~~2~~ 1 #39b	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial			2573.50	17.74
Pretest			2168.01	14.94
Sampling Range			-	
Final Shut-in			-	
Hydrostatic Final			-	
Formation Pressure (Horner)				

TEMPERATURES

Maximum Recorded NOT RECORDED °C Formation Temperature (Horner) - °C

Depth Tool Reached 1521 m

Time Since Circulation 27.25 hours

REMARKS: 1521m: Main chamber - flowline blocked. Made 3 attempts to flow before reseating the tool at:

1520.8m: Pretest did not seat very satisfactorily, as shown by fluctuating pressures. Main chamber - flowline blocked. Made 2 attempts to flow before pulling off.

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 17 GEOLOGIST/S: R.C.N. THORNTON DATE: 18/8/78

TIME: 00:00:00 = 0107 hours.

Seat No: 40 Depth: 1609.0m No seal Pretest: ______ Chamber: ______

Seat No: 41 Depth: 1609.2m No seal Pretest: ______ Chamber: ______

Seat No: ______ Depth: ______ ______ Pretest: ______ Chamber: ______

Seat No: 42 Depth: 1608.5m Oil test Pretest: 2284 Chamber: 2278 (15.7)

Seat No: ______ Depth: ______ segregator not open Pretest: 15.75 Chamber: ______

TIMES: CHAMBER 1

Depth: 1608.5m Tool Set: 00:59:00 Pretest Open: 00:59:14 Min.Open: 1:10

SEAT #42 Chamber Open: 01:00:26 Min.Fill: 5:01 Chamber Full: ______

Buildup Starts: 01:05:26 Min.Buildup: 9:54 Final Seal Chamber: 01:42:35

Pull Off Tool: - Total Time: 43:35

CHAMBER 2 - Segregator did not open.

Depth: 1608.5m Tool Set: - Pretest Open: - Min.Open: -

Chamber Open: 01:43:12 Min.Fill: 4 seconds Chamber Full: 01:43:17

Buildup Starts: 01:43:17 Min.Buildup: 1:23 Seal Chamber: 01:44:40

Pull off Tool: 01:46:05 Total Time: 2:43

RECOVERY: CHAMBER 1 Surface Pressure: 320 psi 2206.3 kPa

Gas: 28 cu.ft. 792.96 L. Filtrate/Water 5.25 L.

Oil: 13.25 L. Mud: - L.

Formation Water: - L. Others: - L.

RECOVERY: CHAMBER 2 Nil Surface Pressure: 0 kPa

Gas: ______ L. Filtrate: EMPTY L.

Oil: ______ L. Mud: ______ L.

Formation Water: ______ L. Others: ______ L.

PROPERTIES: CHAMBER 1

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S
TOP	240,538	49,856	40,573	13,915	2,373	-	
MIDDLE	302,899	75,392	63,114	15,877	1,865	-	
BOTTOM	204,902	138,624	99,180	44,243	3,390	-	

OIL: 53 °API @: 22.2 °F, Colour: dark brown, Fluorescence: very pale yellow

G.O.R.: ______ Other Observations: Guinness foaming froth.

WATER/FILTRATE: RESISTIVITY: 1.5 Ω @ 15 °C, Equivalent Na. Cl.: 4500 ppm

Titration Cl^-: 1600 ppm., NO_3: 30 ppm

PROPERTIES: CHAMBER 2

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

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

G.O.R.: ______ Other Observations: ______

WATER/FILTRATE: RESISTIVITY: ______ Ω @ ______ °C, Equivalent Na. Cl.: ______ ppm

Titration Cl^-: ______ ppm., NO_3: ______ ppm

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 17 GEOLOGIST/S: R.C.N. THORNTON DATE: 18/8/78

MUD IN HOLE: Weight: 9.7ppg 1.16 Sp gr. Calculated Hydrostatic: 2656.9psi 1609m 18.32 MPa

Titration Cl⁻ 3600 ppm NO_3 100 ppm

PRESSURES IN psig & Mpa-g

CHAMBER 1 SEAT #42	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial			2693.46	18.57
Pretest			2283.76	15.75
Sampling Range			47.73-769.18	0.33-5.3
Final Shut-in			2284.70	15.75
Hydrostatic Final			-	
Formation Pressure (Horner)			2284.85	15.75

PRESSURES IN psig & Mpa-g

CHAMBER 2	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial			-	
Pretest			2284.03	15.74
Sampling Range			591.22-2284.50	4.08-15.75
Final Shut-in			2284.16	15.75
Hydrostatic Final			2691.10	18.55
Formation Pressure (Horner)				

TEMPERATURES

Maximum Recorded ____________ °C Formation Temperature (Horner) ____________ °C

Depth Tool Reached ____________ m

Time Since Circulation ____________ hours

REMARKS:	DEPTH	RESULT	TIME
	1609.0m	Pretest tight	03:07:04
	1609.2m	No seal	03:47:00
		Reset - no seal	03:48:45
	1608.9m	No seal	03:51:00
		Reset - no seal	03:52:50
		Reset - no seal	03:55:30
	1608.5m	Good test.	
Seat #40:	1609.0m	No seal Retracted	
Seat #41:	1609.2m	No seal Retracted	
Seat #42:	1608.5m	Pretest OK Open main chamber for 5:01 mins; shut in for 9:54 mins; reopened main chamber for further 37:09 mins.	

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 18 GEOLOGIST/S: R.C.N. THORNTON DATE: 18/8/78

TIME: 00:00:00 = 1600 hours.

Seat No: 43 Depth: 1627.5m No seal Pretest: - Chamber:

Seat No: 44 Depth: 1628.0m Tool plugged at Port Pretest: Av. 2306.02 15.90 Chamber:

Seat No: 45 Depth: 1651.5m Tool plugged at Port Pretest: 2343.27 16.16 Chamber:

Seat No: Depth: Pretest: 2301.77 15.87 Chamber:

Seat No: Depth: Pretest: Chamber:

TIMES: CHAMBER 1 #43; #44

Depth: 1627.5m Tool Set: 00:50:30 00:58:40 Pretest Open: 00:59:10 Min.Open:

Chamber Open: Min.Fill: Chamber Full:

Buildup Starts: Min.Buildup: Seal Chamber:

Pull Off Tool: 01:13:15 Total Time: 00:22:45

CHAMBER ~~XX~~ 1 #45

Depth: 1651.5m Tool Set: 01:23:30 Pretest Open: 01:24:00 Min.Open:

Chamber Open: Min.Fill: Chamber Full:

Buildup Starts: Min.Buildup: Seal Chamber:

Pull off Tool: 01:26:40 Total Time: 00:03:10

RECOVERY: CHAMBER 1 Surface Pressure: kPa

Gas: L. Filtrate: L.

Oil: L. Mud: L.

Formation Water: L. Others: L.

RECOVERY: CHAMBER 2 Surface Pressure: kPa

Gas: L. Filtrate: L.

Oil: L. Mud: L.

Formation Water: L. Others: L.

PROPERTIES: CHAMBER 1

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

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

G.O.R.: Other Observations:

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

Titration Cl^-: ppm., NO_3: ppm

PROPERTIES: CHAMBER 2

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

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

G.O.R.: Other Observations:

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

Titration Cl^-: ppm., NO_3: ppm

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 18 GEOLOGIST/S: R.C.N. THORNTON DATE: 18/8/78

MUD IN HOLE: Weight: 9.7ppg 1.16 Sp gr. Calculated Hydrostatic: 2727 psi 1651.5m 18.8 MPa

Titration Cl⁻ 3100 ppm NO$_3$ 120 ppm

PRESSURES IN psig & Mpa-g #43: 1627.5m #44: 1628.0m

CHAMBER 1	Hewlett Packard gauge		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial	2377.63	16.39	2735.64	18.86
Pretest			Av. 2306.02	15.90
Sampling Range				
Final Shut-in				
Hydrostatic Final				
Formation Pressure (Horner)				

PRESSURES IN psig & Mpa-g #45: 1651.5m

CHAMBER ~~2~~ 1	Hewlett Packard gauge		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial	2779.52	19.16		
Pretest	a. 2343.27	16.16		
~~Sampling Range~~	b. 2301.77	15.87		
Final Shut-in				
Hydrostatic Final				
Formation Pressure (Horner)				

TEMPERATURES

Maximum Recorded 62.2 °C Formation Temperature (Horner) 80.0 °C

Depth Tool Reached 1651.5 m

Time Since Circulation 6 hours

REMARKS:

SEAT #43: 00:00:00

3 attempts to seat tool - no pretest - abort.

SEAT #44: 00:58:00

Seat satisfactory - 6 attempts to flow main chamber - blocked flowline - abort.

Pressures: Initial Hydrostatic Pressure = 2735.6 (18.86)

Pretests :	2305.81	(15.9)	2306.10	(15.9)
	2305.93	(15.9)	2306.76	(15.9)
	2304.88	(15.89)	2306.66	(15.9)

SEAT #45: 01:16:00

Seat satisfactory - 2 attempts to flow main chamber - blocked flowline - abort.

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 19 GEOLOGIST/S: R.C.N. THORNTON DATE: 18/8/78

TIME: 00:00:00 = 1845 hours.

Seat No: 46 Depth: 1651.5m Tool plugged Pretest Av.2330.01 16.06 Chamber:

Seat No: 47 Depth: 1651.0m Tool plugging segregator did not open. Restricted flow. Pretest: a:2336.69 16.11 Chamber:

Seat No: Depth: Pretest: b:2309.92 15.92 Chamber:

Seat No: Depth: Pretest: Chamber:

Seat No: Depth: Pretest: Chamber:

TIMES: CHAMBER 1 #47

Depth: 1651.0m Tool Set: a: 00:47:50 b: 00:52:50 Pretest Open: a: 00:48:00 b: 00:53:10 Min.Open: a: 00:20 b: 00:10

Chamber Open: a: 00:48:30 b: 00:53:30 Min.Fill: b: 05:10 Chamber Full: -

Buildup Starts: b: 00:58:50 Min.Buildup: b: 09:55 Seal Chamber: a: 00:51:40 b: Final 01:09:30

Pull Off Tool: - Total Time: 00:21:40

CHAMBER 2

Depth: 1651.0m Tool Set: - Pretest Open: - Min.Open: -

Chamber Open: 01:09:55 Min.Fill: 00:05 Chamber Full: 01:10:00

Buildup Starts: 01:10:00 Min.Buildup: 04:01 Seal Chamber: 01:14:01

Pull off Tool: 01:17:40 Total Time: 00:07:45

RECOVERY: CHAMBER 1 Surface Pressure: 0 kPa

Gas: L. Filtrate: 7.25 L.

Oil: L. Mud: L.

Formation Water: L. Others: L.

RECOVERY: CHAMBER 2 Surface Pressure: kPa

Gas: L. Filtrate: L.

Oil: L. Mud: L.

Formation Water: L. Others: L.

PROPERTIES: CHAMBER 1

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

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

G.O.R.: Other Observations:

WATER/FILTRATE: RESISTIVITY: 1.85 Ω @ 12.2 °C, Equivalent Na. Cl.: 4100 ppm

Titration Cl^- : 1500 ppm., NO_3: 5 ppm

PROPERTIES: CHAMBER 2

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

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

G.O.R.: Other Observations:

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

Titration Cl^- : ppm., NO_3 : ppm

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 19 GEOLOGIST/S: R.C.N. THORTNON DATE: 18/8/78

MUD IN HOLE: Weight: 9.7ppg 1.16 Sp gr. Calculated Hydrostatic: 2726.2 psi 18.8 MPa 1651m

Titration Cl⁻ 3100 ppm NO_3 120 ppm

PRESSURES IN psig & Mpa-g

CHAMBER 1 #47 a & b.	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial			a: 2776.37	19.14
Pretest			a: 2336.69	16.11
Sampling Range			b: 45.14-1359.56	0.31-9.37
Final Shut-in			b: 2343.35	16.16
Hydrostatic Final			-	
Formation Pressure (Horner)				

PRESSURES IN psig & Mpa-g

CHAMBER 2	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial			-	
Pretest			-	
Sampling Range			-	
Final Shut-in			2342.34	16.15
Hydrostatic Final			2770.61	19.10
Formation Pressure (Horner)				

TEMPERATURES

Maximum Recorded 65.5 °C Formation Temperature (Horner) 80.0 °C

Depth Tool Reached 1651.5 m

Time Since Circulation 8.25 hours

REMARKS:

SEAT 46: Blocked flowline into main chamber - no flow on second and third attempts - retract.

SEAT 47a: Blocked flow; attempted to resample before retracting.

SEAT 47b: Flow for 5 minutes 00:53:30 - 00:58:40
Flowed partially blocked.
Built up pressure for 9:55 mins: 00:58:40-01:08:35
Reopened main chamber - no flow.
Opened segregator 01:09:55
No recovery flow blocked.
Closed segregator 01:15:12
Attempted to reopen main chamber, no flow. Retracted.

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 20 GEOLOGIST/S: R.C.N. THORNTON DATE: 18/8/78

TIME: 00:00:00 = 2133 hours.

Seat No: 48 Depth: 1628m Equipment failure Pretest: Chamber:
Seat No: Depth: Pretest: Chamber:
Seat No: Depth: Pretest: Chamber:
Seat No: Depth: Pretest: Chamber:
Seat No: Depth: Pretest: Chamber:

TIMES: CHAMBER 1

Depth: 1628m Tool Set: 00:53:00 Pretest Open: Min.Open:
Chamber Open: Min.Fill: Chamber Full:
Buildup Starts: Min.Buildup: Seal Chamber:
Pull Off Tool: 00:53:30 Total Time: 53:30

CHAMBER 2

Depth: Tool Set: Pretest Open: Min.Open:
Chamber Open: Min.Fill: Chamber Full:
Buildup Starts: Min.Buildup: Seal Chamber:
Pull off Tool: Total Time:

RECOVERY: CHAMBER 1 Surface Pressure: kPa

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

RECOVERY: CHAMBER 2 Surface Pressure: kPa

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

PROPERTIES: CHAMBER 1

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

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

WATER/FILTRATE: RESISTIVITY: Ω @ °C, Equivalent Na. Cl.: ppm
Titration Cl^-: ppm., NO_3: ppm

PROPERTIES: CHAMBER 2

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

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

WATER/FILTRATE: RESISTIVITY: Ω @ °C, Equivalent Na. Cl.: ppm
Titration Cl^-: ppm., NO_3 : ppm

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 20 GEOLOGIST/S: R.C.N. THORNTON DATE: 18/8/78

MUD IN HOLE: Weight: 9.7ppg 1.16 Sp gr. Calculated Hydrostatic: 2688 psi 18.5 MPa

Titration Cl^- 3100 ppm NO_3 120 ppm

PRESSURES IN psig & Mpa-g

CHAMBER 1	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial			2738.92	18.88
Pretest				
Sampling Range				
Final Shut-in				
Hydrostatic Final				
Formation Pressure (Horner)				

PRESSURES IN psig & Mpa-g

CHAMBER 2	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial				
Pretest				
Sampling Range				
Final Shut-in				
Hydrostatic Final				
Formation Pressure (Horner)				

TEMPERATURES

Maximum Recorded NOT RECORDED °C Formation Temperature (Horner) ______ °C

Depth Tool Reached ______ m

Time Since Circulation ______ hours

REMARKS: Equipment failure following 45 minutes stabilisation period.

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 21 GEOLOGIST/S: R.C.N. THORNTON DATE: 18/8/78

TIME: 00:00:00 = 2330 hours 18/8/78. 19/8/78

Seat No: 49 Depth: 1628.0m Equipment failure Pretest: Chamber:

Seat No: Depth: Pretest: Chamber:

Seat No: Depth: Pretest: Chamber:

Seat No: Depth: Pretest: Chamber:

Seat No: Depth: Pretest: Chamber:

TIMES: CHAMBER 1

Depth: 1628.0m Tool Set: 00:58:19 Pretest Open: Min.Open:

Chamber Open: Min.Fill: Chamber Full:

Buildup Starts: Min.Buildup: Seal Chamber:

Pull Off Tool: 01:10:00 00:58:04 Total Time: 01:10:00

CHAMBER 2

Depth: Tool Set: Pretest Open: Min.Open:

Chamber Open: Min.Fill: Chamber Full:

Buildup Starts: Min.Buildup: Seal Chamber:

Pull off Tool: Total Time:

RECOVERY: CHAMBER 1 Surface Pressure: kPa

Gas: L. Filtrate: L.

Oil: L. Mud: L.

Formation Water: L. Others: L.

RECOVERY: CHAMBER 2 Surface Pressure: kPa

Gas: L. Filtrate: L.

Oil: L. Mud: L.

Formation Water: L. Others: L.

PROPERTIES: CHAMBER 1

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

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

G.O.R.: Other Observations:

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

Titration Cl^-: ppm., NO_3: ppm

PROPERTIES: CHAMBER 2

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

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

G.O.R.: Other Observations:

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

Titration Cl^-: ppm., NO_3: ppm

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 21 GEOLOGIST/S: R.C.N. THORNTON DATE: 18/8/78 19/8/78

MUD IN HOLE: Weight: 9.7ppg 1.16 Sp gr. Calculated Hydrostatic: 2688 psi 18.5 MPa

Titration Cl$^-$ 3100 ppm NO$_3$ 120 ppm

PRESSURES IN psig & Mpa-g

CHAMBER 1	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial			2746.29	18.93
Pretest			-	
Sampling Range			-	
Final Shut-in			-	
Hydrostatic Final				
Formation Pressure (Horner)				

PRESSURES IN psig & Mpa-g

CHAMBER 2	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial				
Pretest				
Sampling Range				
Final Shut-in				
Hydrostatic Final				
Formation Pressure (Horner)				

TEMPERATURES

Maximum Recorded NOT RECORDED °C Formation Temperature (Horner) ________ °C

Depth Tool Reached ________ m

Time Since Circulation ________ hours

REMARKS: Equipment failure following 58 minutes stabilisation period.

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 22 GEOLOGIST/S: R.C.N. THORNTON DATE: 19/8/78

TIME: 00:00:00 = 0137 hours.

Seat No: 50 Depth: 1628.0m Blocked tool lost seal. Pretest: 2311.25 Chamber:

Seat No: 51 Depth: 1628.5m No seal. Pretest: 15.9 - Chamber: -

Seat No: 52 Depth: 1627.0m No seal. Pretest: - Chamber: -

Seat No: Depth: Pretest: Chamber:

Seat No: Depth: Pretest: Chamber:

TIMES: CHAMBER 1

Depth: 1628.0m Tool Set: 00:16:00 Pretest Open: 00:16:04 Min.Open: 03:55

#50 Chamber Open: 00:20:00 Min.Fill: - Chamber Full:

Buildup Starts: - Min.Buildup: - Seal Chamber: Final: 00:31:57

Pull Off Tool: 00:33:02 Total Time: 00:17:02

CHAMBER 2

Depth: Tool Set: Pretest Open: Min.Open:

Chamber Open: Min.Fill: Chamber Full:

Buildup Starts: Min.Buildup: Seal Chamber:

Pull off Tool: Total Time:

RECOVERY: CHAMBER 1 Surface Pressure: kPa

Gas: L. Filtrate/Water 1.825 L.

#50 Oil: L. Mud: Tr L.

Formation Water: L. Others: L.

RECOVERY: CHAMBER 2 Surface Pressure: kPa

Gas: L. Filtrate: L.

Oil: L. Mud: L.

Formation Water: L. Others: L.

PROPERTIES: CHAMBER 1

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

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

G.O.R.: Other Observations:

WATER/FILTRATE: RESISTIVITY: 1.47 Ω @ 12.2 °C, Equivalent Na. Cl.: 5100 ppm

Titration Cl^-: 2100 ppm., NO_3: 80 ppm

PROPERTIES: CHAMBER 2

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

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

G.O.R.: Other Observations:

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

Titration Cl^-: ppm., NO_3: ppm

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 22 GEOLOGIST/S: R.C.N. THORNTON DATE: 19/8/78

MUD IN HOLE: Weight:9.7ppg1.16 Sp gr. Calculated Hydrostatic: 2688 psi 18.5 MPa

Titration Cl⁻ 3100 ppm NO$_3$ 120 ppm

PRESSURES IN psig & Mpa-g

CHAMBER 1 #50	Hewlett Packard gauge		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial			2734.96	18.86
Pretest			2311.25	15.94
Sampling Range			138.08-257.89	0.95-1.78
Final Shut-in			2287.24	15.77
Hydrostatic Final			2725.91	18.79
Formation Pressure (Horner)				

PRESSURES IN psig & Mpa-g

CHAMBER XX 1	#51: 1628.5m Hewlett Packard gauge		#52: 1627m Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial	2747.11	18.94	2743.47	18.92
Pretest				
Sampling Range				
Final Shut-in				
Hydrostatic Final				
Formation Pressure (Horner)				

TEMPERATURES

Maximum Recorded 70.6 °C Formation Temperature (Horner) 78.5 °C

Depth Tool Reached 1628 m

Time Since Circulation 15 hours

REMARKS:

SEAT 50: Opened flow chamber - near complete blockage.
Reset 3 more times, all blocked or partially blocked flow.

SEAT 51: No pretest - no seal.

SEAT 52: No pretest - no seal - on 2 attempts.

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 23 GEOLOGIST/S: R.C.N. THORNTON DATE: 19/8/78

TIME: 00:00:00 = 0330 hours

Seat No: 53 Depth: 1523m water test blocked Pretest: 2168.92 Chamber:

Seat No: Depth: Segregator not open Pretest: 14.95 Chamber:

Seat No: Depth: Pretest: Chamber:

Seat No: Depth: Pretest: Chamber:

Seat No: Depth: Pretest: Chamber:

TIMES: CHAMBER 1

Depth: 1523m Tool Set: 00:24:58 Pretest Open: 00:25:01 Min.Open: 3:46

Chamber Open: 00:28:49 Min.Fill: 05:07 Chamber Full: -

Buildup Starts: 00:33:58 Min.Buildup: 10:11 Seal Chamber: Final: 01:05:57

Pull Off Tool: - Total Time: 30:59

CHAMBER 2 - Segregator did not take sample.

Depth: 1523m Tool Set: - Pretest Open: - Min.Open: -

Chamber Open: 01:05:58 Min.Fill: 00:03 Chamber Full: 01:06:01

Buildup Starts: 01:06:01 Min.Buildup: 04:09 Seal Chamber: 01:10:10

Pull off Tool: 01:11:47 Total Time: 00:05:49

RECOVERY: CHAMBER 1 Surface Pressure: 100 psi 689.48 kPa

Gas: L. Filtrate: 20.25 L.

Oil: L. Mud: L.

Formation Water: L. Others: L.

RECOVERY: CHAMBER 2 Surface Pressure: kPa

Gas: L. Filtrate: EMPTY L.

Oil: L. Mud: L.

Formation Water: L. Others: L.

PROPERTIES: CHAMBER 1

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

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

G.O.R.: Other Observations:

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

Titration Cl$^-$: 1300 ppm., NO_3: 5 ppm

PROPERTIES: CHAMBER 2

GAS (PPM)	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

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

G.O.R.: Other Observations:

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

Titration Cl$^-$: ppm., NO_3: ppm

R.F.T. RECORD

WELL NAME: SEAHORSE-1 RUN NO: 23 GEOLOGIST/S: R.C.N. THORNTON DATE: 19/8/78

MUD IN HOLE: Weight: 9.7ppg 1.16 Sp gr. Calculated Hydrostatic: 2514.9psi 17.34 MPa
1523m

Titration Cl⁻ 3100 ppm NO_3 120 ppm

PRESSURES IN psig & Mpa-g

CHAMBER 1	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial			2569.03	17.71
Pretest			2168.92	14.95
Sampling Range			26.54-1019.14	0.18-7.03
Final Shut-in			2166.38	14.93
Hydrostatic Final			-	-
Formation Pressure (Horner)				

PRESSURES IN psig & Mpa-g

CHAMBER 2	Schlumberger		Hewlett Packard gauge	
	Psig	MPa-g	Psig	Mpa-g
Hydrostatic Initial			-	
Pretest			-	
Sampling Range				
Final Shut-in			2167.30	14.94
Hydrostatic Final			2547.71	17.57
Formation Pressure (Horner)				

TEMPERATURES

Maximum Recorded 68.9 °C Formation Temperature (Horner) 72.5 °C

Depth Tool Reached 1523 m

Time Since Circulation 17 hours

REMARKS: Opened chamber 1 for 5:07 minutes: 00:28:49-00:33:56.
Closed chamber 1 for 10:11 minutes: 00:37:57-00:44:08.
Reopened chamber 1: blocked flowline; resealed and reopened twice more, and flowline became unblocked.
Chamber 1 full at 01:01:19; buildup of 4:38 minutes.

APPENDIX 10

APPENDIX 10

APPENDIX 10

PALEONTOLOGICAL REPORT

THE FORAMINIFERAL SEQUENCE IN SEAHORSE-1

GIPPSLAND BASIN

by

David Taylor, Consultant

ESSO AUSTRALIA LTD MARCH 22, 1979

PALAEONTOLOGY REPORT 1979/2

FORAMINIFERAL SEQUENCE

- SEAHORSE # 1

by David Taylor
Consultant

February 14, 1979,

Submitted March 22, 1979

Esso Australia Ltd.
Paleontology Report : 1979/2

SUMMARY

The sequence commenced at 1395 with a transgression in latest Eocene times. The Zone K/J-2 boundary can at last be adequately defined faunally and an accurate trans-Tasman correlation made. Shallow water "Greensand" sedimentation continued during the early Oligocene (J-2 & J-1). The record is disrupted between 1386 & 1384 by a mid Oligocene (Zone I) sequence break, coinciding with the Cobia Event.
Sedimentation resumed in latest Oligocene (Zone H-2) and has a deep water aspect with the addition of allochthonous grains from the older "Greensand". The causal mechanisms for the break and subsequent depositional depth discordance and erosive cycle are confused by an apparent overprint of an eustatic sea level cycle on structural readjustment of the shelf edge.
Normal shelf accretion and gradual shallowing was evident from Zone G (Early Miocene) to the modern sea floor.

INTRODUCTION

Sixty four sidewall cores were examined from SEAHORSE # 1. No planktic faunas were found in the seven basal samples between 1411 and 1396. Planktic fauna at and above 1120 were intermittent and often too poorly preserved for specific determination, thus the mid Miocene to Pliocene portion of the sequence is poorly documented.

All sample depths are in metres, as labelled on sample bags. Between 1384 & 1355.5, it is considered that the mixing of Zone J faunas into younger Zone H sediment was genuine reworking and not due to contamination.

Data is collated on the following sheets.

FACTUAL Biostratigraphic Data Sheet

FACTUAL Five Sample Data Sheets

FACTUAL Distribution Chart Sheet 1 -	showing planktic foraminiferal distribution for all samples and basis of biostratigraphic breakdown.
FACTUAL Distribution Chart Sheet 2 -	Benthic foraminiferal distribution from 1395 to 1145 (=21 SWCs).
FACTUAL Distribution Chart Sheet 3 -	Residue grain analysis from 1395 to 1294; distinguishing autochonous from allochthonous grains.
INTERPRETIVE Palaeobathymetry - Sheet 4 -	Interpreted depth of deposition of individual sidewall cores plotted on log-normal scale.

BIOSTRATIGRAPHY.

The planktic foraminiferal sequence did not commence till 1395, although there were rare arenaceous benthics, *Haplophragmoides* sp., at 1404.5.

LATE EOCENE - ZONE K - 1395 - Previous to Seahorse, the top of, and often the presence of Zone K was designated on the LAD*or even solitary appearance of *Subbotina linaperta* in a Gippsland sequence. Such a designation was recognised as grossly inadequate, as at its range top *S. linaperta* morphologically blends with *S. angiporoides* and this subsequent species

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*LAD = Last Appearance Datum.

continues to the top Zone J. In SWC 1395 these two closely related "subbotinid" forms are associated with *Globigerinatheka index,* as well as with *Globorotalia gemma (="Tenuitella" gemma),* common *Globigerina (="Praegloboquadrina") tripartita* Gp. (sensu Stainforth et al), *Globigerina brevis* and an intergradation of *"G". ampliapertura* with *"G". euapertura. S. linaperta* and *G. index* were absent 3 metres higher (in SWC 1392) thus the LAD for these two forms is placed between 1395 & 1392. Thus this *G. index* association at 1395 correlates with the lower portion of the New Zealand *G. brevis* Zone (Jenkins 1974); being the overlap span between the *G. brevis* FAD*and the *Globigerinatheka* spp. LAD. Jenkins (l.c.) equates the *Globigerinatheka* spp. LAD in the cool temperate Austral Region, with the Eocene/Oligocene boundary, by regarding *Globigerinatheka* as a Paleogene homomorph of the Tropical Neogene *Globigerinoides* spp. This is a fairly valid paleoclimatological assumption although the rapid oceanic temperature deterioration in the Southern Ocean appears to have occurred a little later than the *G. index* LAD as is shown by Kennett & Shackleton (1976) who also coincide this LAD with Eocene/Oligocene boundary. This New Zealand practice of boundary placement is followed here for convenience, though in reality this boundary could well be diachronous as suggested by Kennett & Shackleton. But the *Globigerinatheka* LAD is the only available criteria in the Austral region for biostratigraphic approximation of the Eocene/Oligocene boundary.

EARLY OLIGOCENE - ZONES J-2 & J-1 - 1392-1386:- The association of *Globigerina brevis* with *Subbotina angiporoides, Globorotalia gemma* and *G. munda* without *Globigerinatheka index* and *Subbotina linaperta* is indicative of Zone J-2 and clearly correlates with the upper portion of the New Zealand *G. brevis* Zone (= the *G. brevis/G. gemma* subzone of Jenkins, 1974). It is noteworthy that a firm biostratigraphic boundary between K and J-2 has been at last established. However this boundary, in all probability, is recognisable only because of a paleoclimatological event.

The placement of the lowest J-1 fauna, at 1388, is more on absences of *Globorotalia gemma, G. munda* and *Globigerina brevis* than on the appearance of any new species. The *Globorotalia extans* and *G. textarugosa* LADs at 1388 are probably significant, but the record is too sketchy to say they immediately succeed the *G. brevis* LAD.

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*FAD = First Appearance Datum.

MID OLIGOCENE SEQUENCE BREAK - between 1386 & 1384 - The rapid passage from Zone J-1 planktics at 1386 to a total Zone H-2 planktic association at 1384 indicates a sequence break, as the Zone I association of *Globorotalia opima opima* and *Globigerina euapertura* was not recorded. Furthermore the following observations strongly substantiate a sequence break and subsequent erosive event in that -

i) Zone J planktics are mixed with typical Zone H planktic associations between 1382 and 1355.5 (see Distribution Chart, sheet 1).

ii) Shallow water "Jan Juk" benthics were displaced into the deep water Zone H sediments at and above 1384. (see Distribution Chart, sheets 2 & 3).

iii) The shallow water "Jan Juk", Zone J "Greensand" were slumped into the deeper water biogenic carbonates at and above 1382 (see Distribution Chart, sheet 3).

To avoid subsequent repetition, the possible causal mechanisms will be outlined later in this report;

LATEST OLIGOCENE - ZONE H-2 - 1384 to 1375 - The presence of *Globigerina woodi woodi* at and above 1384 is the diagnostic characteristic of Zone H-2. Its association with *G. euapertura* at 1384 could indicate the very base of Zone H-2. But as other reworked planktic species are apparent in Zone H-2 samples above, the few specimens of *G. euapertura* may also have been reworked.

It is noted that Zone J-1 and I planktics were allochthonous elements in the Zone H-2 faunas at 1382, 1380 & 1375.

EARLIEST MIOCENE - ZONE H-1 - 1372 to 1355.5 - The *Globigerina woodi connecta* and *G. ciperoensis* association is typical of Zone H-1. However, the association lacks the usual diversity in deep water situations, as such forms as *Globorotalia bella, G. kugleri, G. praescitula, G. zealandica* and *Globoquadrina dehiscens* (S.S.) are absent, thus reducing the biostratigraphic quality of the samples. These noteworthy absences of proto-Tasman Sea planktics or warmer waters (as indicated by *Globorotalia kugleri*), suggests an inhibiting factor to total penetration of all strata of the adjacent oceanic water column.

All H-1 samples contain elements of the *Globigerina brevis* association of Zone J-2. It is significant that older autochonous planktic assemblage (Zone H-2) contain the younger allochthonous elements (Zones J-1 & I), whilst the reverse is observed in the younger autochonous planktic assemblage (Zone H-1) which contains the older allochthonous elements (Zone J-2). This superposition of older reworked fauna upon younger is rational as it would be the ordered, downwards erosive cycle in structurally, undisturbed biostratigraphic succession. A similar "stripping pattern" of benthic specimens will be discussed later. These patterns constitute almost undeniable evidence that the Zone J faunas mixed with Zones H-2 and H-1 faunas were due to a natural event and were not due to contamination during sampling and preparation.

EARLY MIOCENE - ZONES G, F & E - 1294 to 1120 - Unfortunately there is a sampling gap between 1355.5 and 1294 so that the Zone H-1/Zone G boundary cannot be fixed accurately, nor can the top of the allochthonous grain components be established.

The SWC at 1294 contains a probably G fauna, but preservation did not permit the positive indentification of *Globigerinoides trilobus*. The sample at 1270 definitely contains *G. trilobus*, but as in Zone H-1 the typical Austral *Globorotalia* spp. are absent from the association.

These Austral *Globorotalia* spp. (e.g. *G. bella, G. praescitula* & *G. zealandica*) make their appearance at 1220 in association with *Globigerinoides sicanus G. ruber*. Thus 1220 was the base of Zone F and the base of the influx of warm temperate Tasman waters.

Faunal quality, relative specimen count and planktic diversity deteriorates markedly above 1145 so that no zonal designations can be assigned to SWCs at 1120, 1095.8, 1070, 1045 & 1020.

The sample at 997.5 contains a single specimen of *Praeorbulina glomerosa* in a low diversity planktic fauna which lacks *Orbulina* spp. any member of the *Globorotalia foshi* Gp. (sensu Stainforth et al) or definite *Praeorbulina glomerosa curva*. This sample may represent Zone E-2 and thus the top of the early Miocene. However as *Orbulina universa* occurs at 990 (= Zone D-2) there is little vertical space for Zone E-1 with the initial appearance of *Orbulina* spp. as *O. suturalis*. The absence of *Orbulina* spp. below 990 could be a function of inhibited water mass penetration, so that the early/mid Miocene boundary could be below the interval 997.5 to 990.

MID MIOCENE - ? 990 to 923 to ? - As mentioned above, the initial appearance of *Orbulina* spp. in this sequence may have been delayed, so that base mid Miocene cannot be fixed with any certainty.

The faunas between 990 and 923 are low diversity ones with very sparse *Globorotalia* spp. The recognition of Zone D-2 is based solely on the presence of *Globigerinoides* spp. which normally don't extend above Zone D-2.

LATE MIOCENE - ? - not designated in Seahorse because of poor quality faunas being positive mid Miocene at 923 and Pliocene at 690.

PLIOCENE - ? to 690 to 265 to ? - The presence of *Globorotalia conomiozea* at 690 identifies the sample as being within Zone B-1 near base Pliocene. Diversity then declines with planktic specimens absent or indeterminate over the interval 630 to 300. The only occurrence of *G. puncticulata* was at 265. The only other planktic species in this sample were *Globigerina bulloides* and *G. decoraperta*. A low quality pick of Zone A-4 has been made, mainly on the absence of *Globorotalia inflata* in the presence of *G. puncticulata*.

No planktic foraminifera were found above 265.

BIOFACIES SEQUENCE of
LATE EOCENE to MID MIOCENE - 1395 to 960.

As coded on Distribution Chart, sheet 2, the benthic foraminifera form a pattern of three distinct assemblages with a fourth group of environmentally ubiquitous forms, which in the most part have been omitted from the chart. These three assemblages are each diagnostic of a recognisable biofacies documented in a number of sequences elsewhere in the Gippsland Basin.

Two of these biofacies in fact contain the identical benthic species of two of Crespin's (1943) Gippsland "Stages". These were, by definition, "Kleinpellian* Stages", so as in the Californian Miocene these units are excellent expressions of biofacies in an environmental context, without any real "time" or "rock" connotations. Crespin recognised her units on their benthic fossil content as a set sequence of events, repeated in a number of sequences. She attempted to place them in a time framework, but because of worldwide lack of knowledge, she made little attempt to use planktic fossils*. However, subsequent authors (including D.T.) had not fully appreciated these points and have confused the issue by forcing these "stages" into the modern concepts of bio and chrono-stratigraphy - (e.g. Abele et al, 1976, fig. 8.21).

The Crespin "Stages" were by necessity, defined from onshore Gippsland sequences, particularly around Lakes Entrance, where the greatest pre-WW2 petroleum exploration activity took place. These were sequences of shallow water sediments. With drilling extending further offshore, the benthic faunas characteristic of Crespin's "stages" could no longer be recognised, as hitherto unseen units of "Basin Deep" sediments, including slope canyon fills, were developed (e.g. Kingfish, Halibut, Mackerel and Cobia structures).

* from KLEINPELL, R.M., 1938 - Miocene Stratigraphy of California *A.A.P.G. Spec. Publ.* Crespin (1943, p.3) acknowledges use of the "Kleinpellian" concept. It is noted that planktic foraminifera are absent in the Miocene Coastal Basins of California. Only with the recent advances of Diatom biostratigraphy has the real nature of the Californian "Kleinpellian Stages" been recognised as diachronous biofacies.

Seahorse # 1 has proved to be a transitional sequence with a "Basin Deep" biofacies sandwiched between two shallow water, "Crespin" biofacies. The two shallow water units have been given the Crespin "Stage" geographic prefixes, without the "ian" suffixes. These have been recognised by comparison with the extensive lists of Crespin (1943, pp. 77-101) and Taylor's Gippsland distribution charts. The intermediate biofacies has been established by comparison with species lists from Esso's "Basin Deep" wells. To reiterate, it is emphasised that biofacies identity was purely by comparison of benthic faunal content of a number of documented sequences with the Seahorse sequence. In descending order, the Seahorse biofacies sequence was:-

3) "Longford" Biofacies - 1294 to 960 to ? Benthic foraminifera were not abundant but there was a noteable dominance of large sized, robust *Cibicides* spp. and *Anomalinoides* spp. Few of the elements of the "Jan Juk" Biofacies and none of the "Basin Deep" Biofacies extended into this unit. Bryozoa only became a significant constituent towards the top of the unit.

2) "Basin Deep" Biofacies - 1384 to 1355.5. The presence of such forms as *Sigmoidopsis schlumbergi, Karreriella bradyi* and *Martinotiella communis* indicate the "Basin Deep" facies by comparison with other wells, although the absence of other species (e.g. *Cibicides wuellerstorfi*) could indicate that depositional depth was not as great as during the early Miocene of Kingfish.
Mixed with the "Basin Deep" fauna are elements of the shallow water "Jan Juk" biofacies (1), which was developed directly beneath biofacies (2) in Seahorse. As the mixing of deepwater sediment into shallow water is incongruent with the regional setting, it is safe to assume that the shallow water "Jan Juk" faunas were allochthonous. This assumption is supported by the benthonic distribution pattern on Sheet 2, which suggests that the "Jan Juk" succession was eroded from top to bottom; that is in the normal stripping pattern as also deduced from plantkonic species reworking in this interval.

1) "Jan Juk" Biofacies - 1395 to 1386. Most of the species listed in

the "Jan Juk" Biofacies on Sheet 2 (species 1 through 34) are listed as occurring in the "Jan Jukinan Stage" by Crespin (1943, p.77-101). *Victoriella plecte* was not sighted, but the large sized and distinctively ornamented *Vaginulinopsis gippslandica* was present and can be regarded as an immediate indicator of the shallow water "Jan Juk".

The species distribution (sheet 2) shows a definite uphole sequence of incomings. This benthonic species occurrence pattern is similar to that in the "Greensand" and basal "Marls" of the onshore Lakes Entrance "Platform". This pattern gives the appearance of being a biostratigraphic one, but is in fact "Kleinpellian"; being diachronous and thus a biofacies expression. This increasing diversity coincides with increasing depth and greater availability of $CaCO_3$ in a transgressive situation.

From Sheet 2 it is noted that some "Jan Juk" species extend up into the "Longford" Biofacies (3), which is consistent with Crespin's (l.c.) observations.

ENVIRONMENTAL SEQUENCE

Events over the late Eocene to basal mid Miocene sequence in Seahorse # 1 (from 1395 to 960) were:-

1) Transgression in latest Eocene at 1395.

After a weak marine influence between 1404.5 and 1396, the full thrust of the "Lakes Entrance" transgression was evident at 1395, with a very shallow water "Jan Juk" benthos. Planktonic comprised 50% of the microfauna, which is characteristic at the "foot" of this transgression. This event was slightly earlier than on the onshore Lakes Entrance platform where *Globigerinatheka index* has not been reported and where my earlier reports of *Subbotina linaperta* are dubious.

2) Gradual enroachment and deepening in early Oligocene from 1392 to 1386.

A faunal succession similar to that onshore was noted in that at 1392, *Cibicides* spp. became the cominant element. This was followed with a dominance of arenaceous species and nodosarids at 1390. The rapidity of faunal response to obvious environmental pressures continues with a *Cibicides/Anomalinoides* at 1388 with a more diverse fauna at 1386.

The environmental pressures were apparently increases in depth and fluctuations in supply of oxygen and nutrients during the transgression. But in no sample are there indications that the depth was greater than 50 metres and it was considerably less than that at 1392. Judging from planktonic percentages, the penetration of oceanic water onto the shallow shelf platform were not strong; apart from at the foot of the transgression.

3) Sequence break in mid Oligocene between 1386 and 1384.

4) "Basin Deep" type sedimentation with reworking of older sediment grains; 1384 to 1355.5 - Late Oligocene to Early Miocene.

The "Basin Deep" assemblages suggest a topographic situation on the upper slope, probably at the foot of a cliff - like outer shelf edge of "Jan Juk" sediment. On analogy with present depth distribution of Gippsland seafloor foraminifera, the minimum paleo-depth would have been 300m increasing to a greater depth at 1380, because of the presence of *Epistiminella exigua*. As already noted, by comparison, the Seahorse "Basin Deep" sediments were deposited in shallower water than such wells as Kingfish which have a more diverse deep water benthonic component.

This event took place during a period of extremely low eustatic sea levels and paleotemperature so compensating adjustments must be made. For instance, the paleotemperature in early Miocene was $5^{o}C$ less than present. Scaling off the temperature graph at 26 m.y. (Zone H-2 - latest Oligocene) it would have been approximately 3°C less than present. Modern temperature stratification in open ocean column is a temperature decline of 1°C per 50m of descending depth. Therefore at 26m.y. a benthonic fauna at 150m would have similar temperatures and probably other parameter, which today support a similar fauna at 300m. A similar paleodepth of 150m is obtained from the sea level adjustment, assuming that the maximum eustatic low at 30m.y. was -220m. However the principle of faunal elevation assumes elevation of physico-chemical factors, with depth only acting as a scale and not as a distribution mechanism in itself.

5) Progradation onto continental shelf, early Miocene to Present; from 1294. There is a gradual trend in decreasing depth which suggests progradation of the continental shelf over the depositional site. The site was always some distance from the open ocean, inhibiting penetration of the diverse "Austral" globorotalid planktonic fauna.

OLIGOCENE TO EARLY MIOCENE GEOLOGICAL HISTORY.

The established pattern of the gradual late Eocene to early Oligocene marine transgression into the Gippsland Basin Margins is clearly documented in the Seahorse sequence. However this pattern of shallow water biogenic carbonate sedimentation following "greensand" deposition was disrupted in Seahorse with a sequence break of some 6m.y. This sequence break at top of Zone J-1 (at 1386) coincides with the maximum sea level low stand. In all probability the J-1 surface was exposed (?) aerially (?).

The presence of allochthonous grains of the older "Jan Juk" shallow water facies in the late Oligocene to early Miocene deep water facies, support exposure and thus erosion of the sediment and dispersal down slope. As discussed earlier the pattern of distribution of the allochthonous elements into the younger sediments, indicates a natural cycle of erosive stripping from the top to bottom of the older sediment. A possible model (refer Sheet 4) was that the "Jan Juk Biofacies" had a sloping depositional surface from the northern margin to south of Seahorse. The slope would have been less than 1° as there were no appreciable facies differences in the "Jan Juk" biofacies between Lakes Entrance and Seahorse. On the other hand the transgression was diachronous; being earlier at Seahorse. The transgressive pattern was identical, but not synchronous. This surface was then exposed at 30 m.y.. With inundation of the surface with rising sea level, there was progradation of sediment, mainly from reworking of the unconsolidated earlier "Jan Juk" at the shore line. The inshore part of every foreset bed would be flat and relatively long with a short steep distal end. This abrupt distal face would inhibit the upwards penetration of cold bottom waters and thus exaggerate the depth differences between the Seahorse site and those towards the northern margins.

However contradicting this model is its requirement that the "Jan Juk Greensand" sediment of Zone J be exposed to the north and northeast of Seahorse in late Oligocene Zone H-2 times. This implies complete exposure of the shelf margins for some 4 m.y. or removal of sediment deposited during that time span (i.e. Zones I-2 & I-1). Evidence does not provide this requirement as Zone I-1 and sometimes I-2 sediment is present shorewards of Seahorse. For instance Jenkins (1960) records a 77.5m range for *Globorotalia opima opima* in the Lakes Entrance Oil Shaft.

Refuting the progradation model leaves the possibility of downfaulting of the Seahorse site with exposure of the allochthonous source; the "Jan Juk" sequence. The elevational difference need only have been a little greater than 40m; comprising 10m exposure of "Jan Juk" with 30m to accommodate the Oligo/Miocene fill at Seahorse. This 40m need not have been instantaneous, but more gradual down warping on the shelf edge with periodic slumping. Such a model would create a pattern of shelf edge destruction and then accretion, especially during a period of rising sea level (see models on Sheet-4).

The faulting or buckling began at the base of H-2 (approximately 26 m.y.) and ceased in H-1 times. This corresponds with a fairly rapid rise in sea level and incoming of colder and thus denser bottom water (see above regarding paleotemperature). This incoming rising water may have provided a shelf undercutting and erosion mechanism, coincidental with structural adjustment. To the north, energy conditions affecting shelf sedimentation were placid, as evident by predomination of biogenic material with little terrestial detritus.

Supporting this model is the presence of Zone I fossils (e.g. *Globorotalia opima opima)* in the Zone H-2 sediment. Also there are the granitic sands with fresh feldspar at 1380 and 1369, suggesting rapid and short distance dispersal of grains.

However the preconceptions of the regional structural history preludes this shelf edge destruction/accretion cycle model.
Be that as it may!

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JENKINS, D. Graham, 1960a - Planktonic Foraminifera from the Lakes Entrance Oil Shaft, Victoria, Australia. *Micropaleontology, 6(4): 345-371.*

JENKINS, D. Graham, 1974 - Paleogene Planktonic Foraminifera of New Zealand and the Austral Region. *Journ. Foram. Res., 4(4): 155-170.*

MICROPALEONTOLOGICAL MATERIAL

WELL NAME AND NO: SEAHORSE # 1. *DATE:* 15.1.1979.

PREPARED BY: DAVID TAYLOR *SHEET NO:* 1 of 5.

DRAW:

DEPTH IN METRES	*SAMPLE TYPE*	*SLIDES*	*ADDITIONAL INFORMATION*
1411	SWC 71	N.F.F. f-m ang - subrd qtz. - some pitted texture - ? wind blown. R. rock frags.	
1409.5	SWC 87	N.F.F. 70% c-m ang-subrd qtz. 30% muddy, f qtz. sdst + finely d pyrite.	
1406	SWC 72	N.F.F. lignitic c-m ang-subrd. qtz sdst.	
1404.5	SWC 88	*Haplophragmoides* sp. (2 specs): 80% apple green ? glauc pellets + clay: 20% c subrd qtz + rock frags - r. pyrite.	
1402	SWC 73	*ibid*	
1400.5	SWC 89	NO REC.	
1398	SWC 74	N.F.F. 60% dark gn pellet glauc. 40% orange clayey + qtz sdst r c subrd qtz.	
1396	SWC 90	N.F.F. 90% dk gn pellet glauc. 10% orange f-m ang qtz sdst _ r c ang qtz.	
1395	SWC 75	K(0); 90% apple gn glauc, r rock frags & c-m r qtz "Jan Juk" Benthics.	
1392	SWC 91	J-2(1) 60% calc f qtz; 20% apple gn glauc; 20% foram comprising 80% "Jan Juk Benthics".	
1390	SWC 76	J-2(0); 90% apple gn glauc, 10% forams comprising 90% "Jan Juk" Benthics.	
1388	SWC 92	J-L(0); 80% apple gn. glauc. 20% forams comprising 90% "Jan Juk" Benthics.	
1386	SWC 77	J-1(1); 70% apple gn glauc. 30% forams comprising 80% "Jan Juk" Benthics.	
1384	SWC 93	H-2(0); 50-50 biogenic carb & forams r glauc, ech spines, worn bry. Forams 40% plank; the remaining benthics consist of 50-50 "Jan Juk" & "Deep Water".	
1382	SWC 78	H-2(1) + 20% J. 80% glauc, r rock frags. 50-50 plank/benth. Benthics 20% "Jan Juk" & 80% "Deep".	

MICROPALEONTOLOGICAL MATERIAL

WELL NAME AND NO: SEAHORSE # 1.

DATE: 15.1.1979.

PREPARED BY: DAVID TAYLOR

SHEET NO: 2 of 5.

DRAW:

DEPTH IN METRES	SAMPLE TYPE	SLIDES	ADDITIONAL INFORMATION
1380	SWC 94	? H-2(2) + 100% J; 30% glauc, 20% granitic sd, 10% rock frags, 5% worn bryo, r. ang. qtz. 70% of Benthics "Jan Juk" coated with lim. clay, 30% "Deep Water" benthics. SLUMP.	
1378	SWC 79	H-2(O); 90% forams; (count 5000) r c-f ang qtz. bry, ech & ost. 90% planks; of 10% benthics 5% "Jan Juk" rest "Deep".	
1375	SWC 95	H-2(0) + 1% I; 95% (count 3000) forams, r ang qtz, fish teeth, bry, ech. 80% planks - mixed benthics.	
1372	SWC 80	H-1(1) + 50% J-2; 80% forams (count 5000), 20% lst with orange clay, fish teeth, bry. 90% planks. 95% "Jan Juk" Benthics. SLUMP.	
1369	SWC 96	H-1(1) + 30% J-2; 50% glauc, 20% granitic sd with fresh feldspars, r. fish. 30% forams - 50% planks, Benths 80% "Jan Juk". SLUMP.	
1366	SWC 81	H-1(1) + 20% J; 40% glauc, r c ang qtz. r glauc moulds, ech, bryo. 60% forams (count 1000) = 50% planks - benths 80% "Jan Juk".	
1355.5	SWC 97	H-1(1) T 25% J-2; 20% glauc + r glauc moulds & c ang qtz. 80% forams (count 300) = 20% planks. Benths 20% "Jan Juk", the 80% "Deep" are compressed.	
1319.5	SWC 98	NO RECOVERY	
1294	SWC 99	G(2); 100% forams (count 2000, 75% planks) r ech spines, rads. "Longford" benths.	
1270	SWC 100	G(1); *ibid* - "Longford" Benths.	
1245	SWC 101	G(1); 100% forams (count 10,000, 92% planks) Pres. Excellent. "Longford" Benths.	
1220	SWC 102	F(1); 100% foram macrite (count 15,000 planks 90%) r. rads & gastr. Pres. excellent - some glauc infilling "Longford Benthics"	

MICROPALEONTOLOGICAL MATERIAL

15.1.1979.

WELL NAME AND NO: SEAHORSE # 1. *DATE:*

PREPARED BY: DAVID TAYLOR *SHEET NO:* 3 of 5.

DRAW:

DEPTH IN METRES	*SAMPLE TYPE*	*SLIDES*	*ADDITIONAL INFORMATION*
1196	SWC 103	F(2); limonitic foram micrite (count 4500, planks 90%). worn ech common, r. ost. Pres poor - recrystallized "Longford Benths".	
1170	SWC 104	F(2); foram micrite (count 1800 - 50% planks). Pres. poor. "Longford Benths".	
1145	SWC 105	F(1); foram micrite (count 4000, 80% planks) "Longford Benths".	
1120	SWC 106	? - v. r. forams (=5) in recrystal. limonite. Only *G. trilobus* & *G. bulloides*.	
1095.8	SWC 107	? - v. r forams (=10) in recrystal. micrite. Only *G. bulloides*.	
1070	SWC 108	? - v. r. forams (=10) in recrystal.micrite. nil planks.	
1045	SWC 109	? *ibid*	
1020	SWC 110	? *ibid*	
997.5	SWC 111	E-2. limonitic, partly recry. micrite. foram count 900 - 50% planks "Longford Benths".	
990	SWC 1	D-2 (1). recrys. micrite r. ech, bry. foram count 150. "Longford" & "Balcomb" Benths.	
975	SWC 2	D-2(1) *ibid*	
960	SWC 3	D-2(2); limonitic recryst. micrite r. ost. & forams. Preservation v poor. Only *G. bulloides* & *Globorotalia* spp?	
945	SWC 4	D-2(2); limonitic recry. flaky micrite. v.r. forams. Pres. poor. Only *Globorotalia* sp?	
923	SWC 5	D-2(1); *ibid* , forams more abundant than in SWC 3 & 4 as count = 250 (planks 50%).	
895	SWC 6	D-2(2); limonitic biogenic calcarenite with bryo (D), ost. & charophytes. forams r (count 30). "Balcomb" Benthics.	

MICROPALEONTOLOGICAL MATERIAL

WELL NAME AND NO: SEAHORSE # 1

DATE: 19.1.1979.

PREPARED BY: DAVID TAYLOR

SHEET NO: 4 of 5

DRAW:

DEPTH IN METRES	*SAMPLE TYPE*	*SLIDES*	*ADDITIONAL INFORMATION*
870	SWC 7	?;	biog. bry. recry. calcarenite with r. qtz. Almost barren of forams - Pres. lousy.
840	SWC 8	??	limonitic bio. calcarenite. r bry & ost., v.r. forams + r. ang qtz.
810	SWC 9	??	clean, m. ang. qtz. v rare bent forams.
780	SWC 10	??	limonitic bio. calcarenite, v. worn bry. ech. forams corroded, count 500 (5% planks). "Balcomb" benths.
750	SWC 11	??	bry. calcarenite r ost. Pres lousy. forams r (count 50-20% planks).
720	SWC 12	??	*ibid*
690	SWC 13	B-1 (1)	r c bry. recry. calcarenite. r. ost. ech. forams (count 80 - 30% planks).
660	SWC 14	B-1 (2).	coarse bry. calcarenite. r. ost. foram count 120 (15% planks).
630	SWC 15	??	sugary bry. calcarenite v.r. ech & forams. Lousy pres.
613	SWC 16	??	m. rd. qtz. (sphericity variable) r. worn bry. ech & forams.
595	SWC 17	??	f. bry. (v. worn) calcarenite. r. ost. Foram count 200 - Pres. Lousy.
570	SWC 18	??	bry. calcarenite. r. ech. spines. Foram count 500. Pres. Lousy.
540	SWC 19	??	C. bry. limonitic calcarenite. r. forams. Pres. Lousy.
510	SWC 20	??	*ibid*- all biogenic grains corroded & limonitic stain.
485	SWC 21	??	coarse bry. calcarenite. v. r. forams - Pres. poor.
450	SWC 22	??	*ibid*
430	SWC 23	??	f bry. calcarenite. Foram count 500 all v. small indet specs.

MICROPALEONTOLOGICAL MATERIAL

WELL NAME AND NO. SEAHORSE # 1.

DATE: 23.1.1979.

PREPARED BY: DAVID TAYLOR.

SHEET NO. 5 of 5.

DRAW:

DEPTH IN METRES	*SAMPLE TYPE*	*SLIDE*	*ADDITIONAL INFORMATION*
390	SWC 24	?? c. bry. calcarenite. Foram count 750 (planks @%). "Mitchell" & "Kalimnan" Benthics.	
360	SWC 25	?? v. coarse bry. dominant calcarenite. Foram count 750 (planks 2%). "Mitchell" & "Kalimnan" Benthics.	
325	SWC 26	?? *ibid*	
300	SWC 27	?? glauc. bry. calcarenite with qtz. r. forams (count 200) - worn & sugary glauc moulds common.	
265	SWC 28	A-3(2). biogenic lst (r. macro-clasts). r. bry. ost. ech. Foram count 3000 (planks 1%). "Kalimnan"Benthics.	
240	SWC 29	?? f. ang. qtz. with c. macro-clasts. Foram count 100 (planks nil.) Note *Ammonia aeotinus* with Dom. *Cibicides* spp. - "Innermost Shelf/Estuarine".	
210	SWC 30	?? f. ang. qtz. with r. macroclast sparse small specs of plank. benth. forams.	

MICROPALEONTOLOGICAL DATA SHEET

BASIN: GIPPSLAND

ELEVATION: KB: +25m GL: -41.7m

WELL NAME: SEAHORSE # 1

TOTAL DEPTH: 2304m

AGE		FORAM. ZONULES	HIGHEST DATA					LOWEST DATA				
			Preferred Depth	Rtg	Alternate Depth	Rtg	Two Way Time	Preferred Depth	Rtg	Alternate Depth	Rtg	Two Way Time
PLEISTOCENE		A_1										
		A_2										
PLIOCENE		A_3	265	2				265	2			
		A_4										
MIOCENE	LATE	B_1	660	2				670	2			
		B_2										
		C										
	MIDDLE	D_1										
		D_2	923	2				990	2			
		E_1	997.5	2				997.5	2			
		E_2										
	EARLY	F	1145	1				1220	1			
		G	1245	1				1294	2	1270	1	
		H_1	*1355.5	1				1372	1			
OLIGOCENE	LATE	H_2	1375	1				*1384	0			
		I_1										
		I_2										
	EARLY	J_1	1386	1				1388	0			
		J_2	1390	0				1392	1			
EOCENE		K	1395	0				1395	0			
		Pre-K										

COMMENTS: * Interval 1384 to 1355.5 contains reworked zones J and/or I elements within Zone H fauna; also displaced shallow water benthonic elements in deeper water environment. Refer Esso Aust. Paleont. Rep. 1979/2.

All depths in metres.

CONFIDENCE RATING:

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

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

DATA RECORDED BY: David Taylor

DATE: FEBRUARY 26, 1979

DATA REVISED BY:

DATE:

SEAHORSE # 1

Sheet 1 of 4.

° = 1-20
I = 20
D = >60% of planktics

c.f. = not identical
? = indefinite

N.P.F. = no planktics
N.F.F. = no foraminifera

Allochthonous fauna

Sidewall cores depth in metres not to scale	210	240	265	300	325	360	390	430	450	485	510	540	570	595	613	630	660	690	720	750	780	810	840	870	895	923	945	960	975	990	997.5	1020	1045	1070	1095.8	1120	1145	1170	1196	1220	1245	1270	1294	1355.5	1366	1369	1372	1375	1378	1380	1382	1384	1386	1388	1390	1392	1395	1396	1398
PLANKTIC FORAMINIFERA																																																											
GLOBIGERINA BULLOIDES	N	N	°	N				N		N	°			N	N	N	I	I		°	I	N	?	N	°	I		°	°	I	I	N	N	N	°	°	I	I	I	I	I	I	°															N	N
G. DECORAPERTA			°	p	°	°	°				°						I		°											?							I		I																				
GLOBOROTALIA PUNCTICULATA	P	P	°	F				P		P				P	P	Pcf.						P		P								P	P	P																								F	F
ORBULINA UNIVERSA	F	F			I	°	°	F	I	F		°	°	F	F	F	I	I	I	°		F		F		I			°	I		F	F	F																								F	F
GLOBIGERINOIDES TRILOBUS					°												?	?					?		°					°	I					°	I	I	?	I	?	°	°																
GLOBIGERINA FOLIATA							°																																			?																	
G. sp. indet									°			°																																															
GLOBOROTALIA SP. indet									°										°		°							°																															
G. OBESA																	°									°												°	°	°		°	°						°			°							
G. CONOMIOZEA																	?	°																																									
G. CONTINUOSA																	?		?																		°	°		°	°	?	°						°			°							
G. PRAESCITULA																		cf								?					°						°		°	°																			
GLOBIGERINOIDES RUBER																		°							?												°	°	°	°	°																		
GLOBOQUADRINA DEHISCENS (S.S.)																				°											cf						?	°		I	I	°																	
G. WOODI WOODI																					°		cf			I					?						I	I	D	I	I	I	°	°	°	°		cf	°		°	°							
GLOBOROTALIA PRAEMENARDII																							cf				?		°								°	°	?																				
G. SCITULA																									cf																																		
G. MIOZEA MIOZEA																										°											°	°	°																				
PRAEORBULINA GLOMEROSA																										°					°																												
GLOBIGERINA QUINQUELOBA																													°										°	°		°	°																
GLOBIGERINOIDES SICANUS																															°						°			?																			
GLOBOROTALIA PANDA																																					°																						
G. ZELANDICA																																							?	°																			
GLOBOQUADRINA ALTISPIRA																																							°	°	°	°																	
CATAPSYDRAX DISSIMILIS																																								°																			
GLOBIGERINA WOODI CONNECTA																																								°	?	°	?	°	°	°	°												
GLOBOROTALIA BELLA																																								°					°														
GLOBIGERINA PREBULLOIDES																																											°		°		°	D	°	°	°	°		°			°		
GLOBOQUADRINA DEHISCENS (S.L.)																																											°			°			°										
GLOBIGERINOIDES spp.																																												°		°	°												
GLOBOROTALIA OPIMA NANA																																												°	°	°							°	°	°				
GLOBIGERINA CIPEROENSIS																																												°			°	°											
G. ANGUSTIUMBILICATA																																															°												
GLOBOQUADRINA ALTISPIRA GLOBOSA																																																°											
G. ADVENA																																																	°			°							
GLOBOROTALIA MUNDA																																																					°		°				
GLOBOROTALIA OPIMA OPIMA																																																°											
GLOBIGERINA BREVIS																																												°		°	°								°	°	°		
GLOBIGERINA EUAPERTURA																																												°	°	°		°		°	°	°cf		°					
G. AMPLIAPERTURA-EUAPERTURA																																																		°			°		°	°	°		
SUBBOTINA ANGIPOIDES																																												°	°		°				°		°	I	°	I	°		
CHILOGUEMBELINA CUBENSIS																																															°			°									
GLOBOROTALOIDES TESTARUGOSA																																															°							°					
GLOBOROTALIA EXTANS																																															°				°		°	°		°			
GLOBIGERINA TRIPARTITA gp.																																																						I	°		I		
Indeterminate depauperate planks .2mm																																															D			D									
GLOBOROTALIA GEMMA																																																							°		°		
SUBBOTINA LINAPERTA																																																									°		
GLOBIGERINATHEKA INDEX																																																									°		
ALLOCTHONOUS OLDER PLANKTIC FAUNA	NIL									NIL											NIL							NIL										NIL				NIL		J-2	J	J-2	J-2	I		J-1	J-1?		NIL		NIL		NIL		
Depth to base of AUTOCHONOUS ZONE	265 → ? A-3				?			?			?			?		690 B-1				?			?					990 → D-2			E		?		?			1220 F				1294 G			1372 → H-1					1384 → H-2			1358 J-1		1392 J-2		1395 K		

PE906381

This is an enclosure indicator page.
The enclosure PE906381 is enclosed within the container PE906376 at this location in this document.

The enclosure PE906381 has the following characteristics:

ITEM_BARCODE = PE906381
CONTAINER_BARCODE = PE906376
NAME = Benthic Distribution Diagram
BASIN = GIPPSLAND
PERMIT = VIC/L1
TYPE = WELL
SUBTYPE = DIAGRAM
DESCRIPTION = Benthic Distribution and Environmental Interpretation for Seahorse-1
REMARKS =
DATE_CREATED =
DATE_RECEIVED =
W_NO = W705
WELL_NAME = SEAHORSE-1
CONTRACTOR =
CLIENT_OP_CO = ESSO AUSTRALIA LIMITED

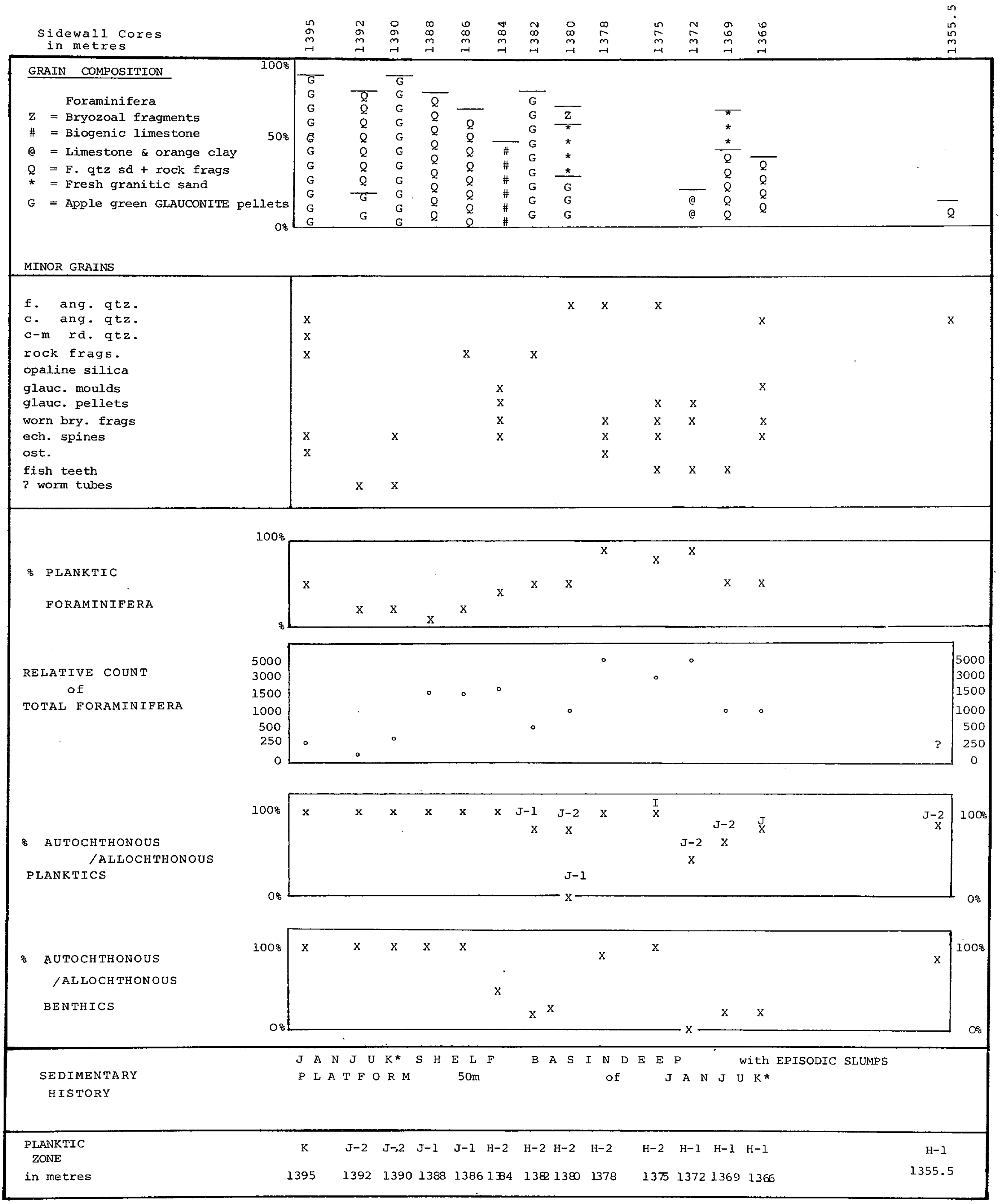
(Inserted by DNRE - Vic Govt Mines Dept)

SEAHORSE # 1

Sheet 3 of 4

GRAIN ANALYSIS

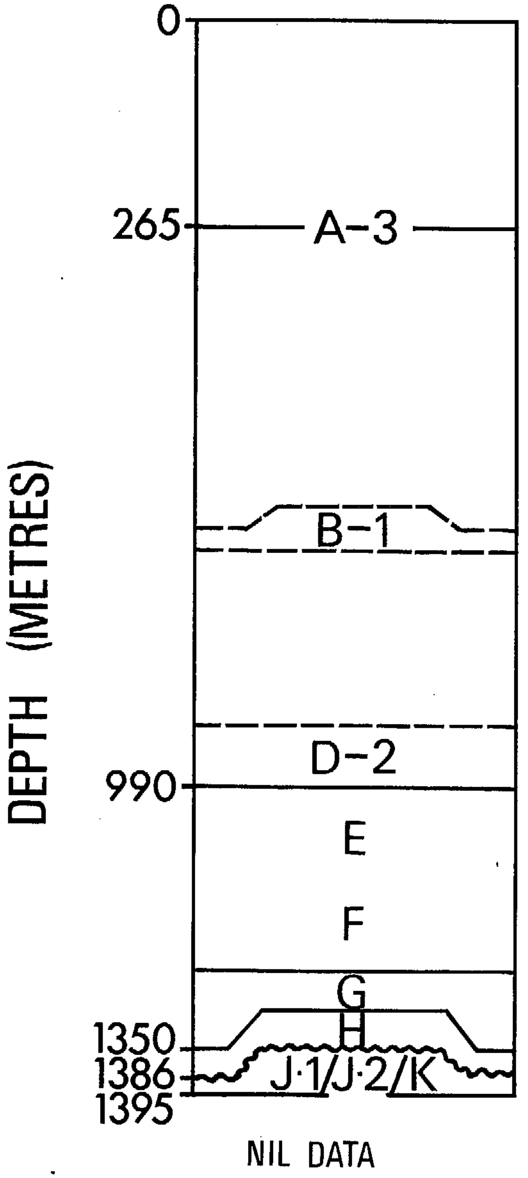
UP HOLE →

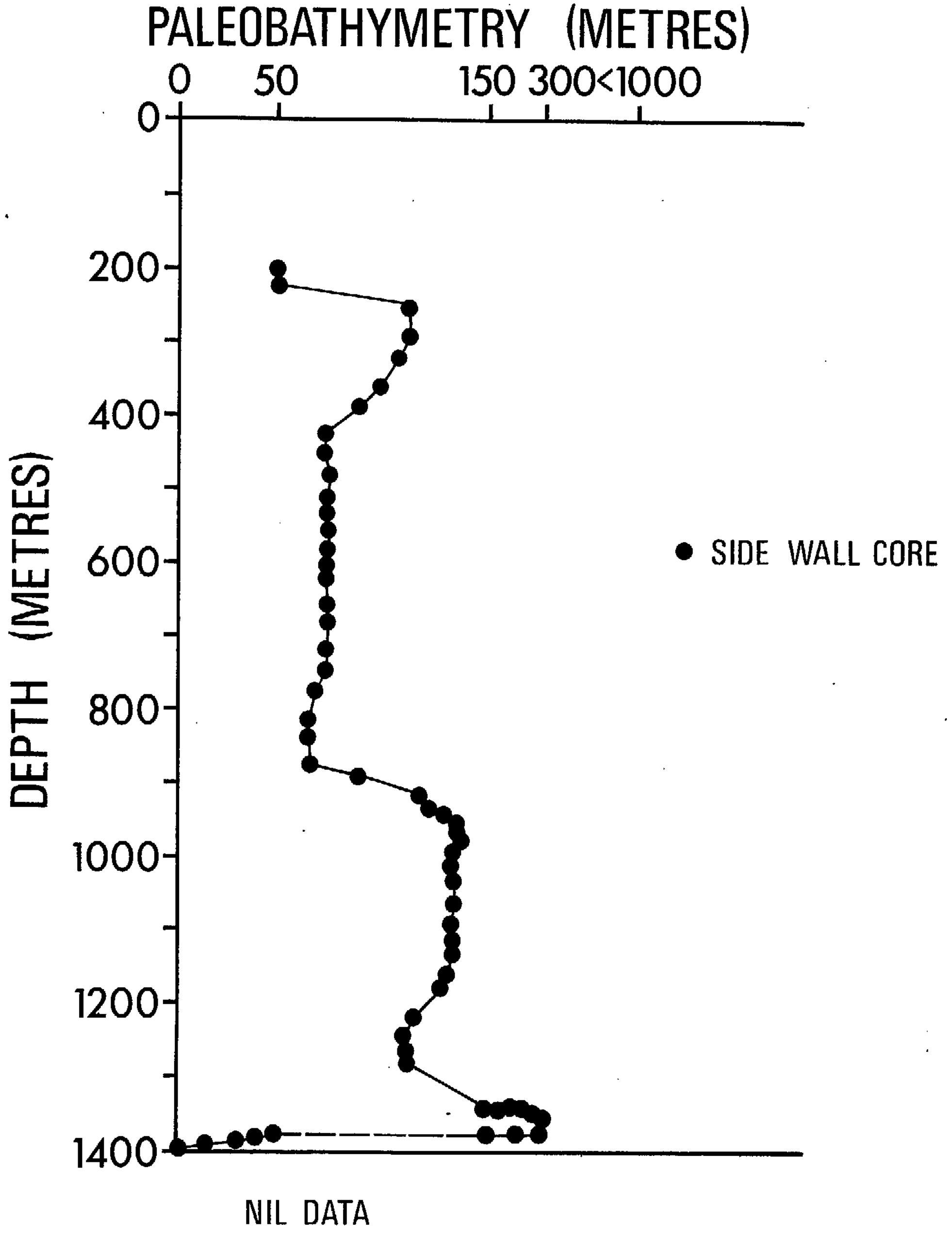


* *sensu* Crespin, 1943: *non* Carter, Hocking *et seq*.

SHEET 4 OF 4

SEAHORSE-1





Dwg.1882/OP/16

SPECIES LIST

ESSO SEAHORSE NO 1

DESCRIPTION:

DINOFLAGELLATES

CHECKLIST OF PRESENCE/ABSENCE BY LOWEST APPEARANCE

	APTEODINIUM AUSTRALIENSE CF.	AREOSPHAERIDIUM ARCUATUM CF.	VOZZHENNIKOVIA EXTENSA	OPERCULODINIUM CENTROCARPUM	AREOSPHAERIDIUM ARCUATUM	CORDOSPHAERIDIUM FIBROSPINOSUM	DYPHES COLLIGERUM	SPINIFERITES RAMOSUS	ALISOCYSTA ORNATUM	CORRUDINIUM INCOMPOSITUM	DEFLANDREA SP.NOV.	IMPAGIDINIUM DISPERTITUM	LINGULODINIUM MACHAEROPHORUM	DEFLANDREA PHOSPHORITICA CF.	HYSTRICHOKOLPOMA RIGAUDAE	PARALECANIELLA INDENTATA	SYSTEMATOPHORA PLACANTHA	THALASSIPHORA PELAGICA	TECTATODINIUM SP.	ACHOMOSPHAERA CF.SAGENA	ACHOMOSPHAERA RAMULIFERA	APTEODINIUM AUSTRALIENSE	EATONICYSTA SP.	PHTHANOPERIDINIUM COMATUM	SPINIFERITES CINGULATUS	IMPAGIDINIUM VICTORIANUM	PENTADINIUM LATICINCTUM	STEPHODINIUM SPINIFERUM	TECTATODINIUM PELLITUM	IMPAGIDINIUM SP.	OPERCULODINIUM ACUTULUM
1380.0M	·	·	·	■	·	·	·	■	·	·	·	·	■	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	■	■
1382.0M	·	■	·	■	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
1388.0M	·	·	·	■	■	·	·	■	·	·	·	·	■	·	■	·	■	·	·	■	■	·	·	·	·	■	■	■	■	·	·
1390.0M	·	·	·	■	·	·	·	■	·	·	·	·	·	·	■	·	■	·	·	·	·	·	·	·	·	·	·	·	·	·	·
1392.0M	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	■	·	·	·	·	·	·
1395.0M	·	·	·	■	·	·	·	■	·	·	·	■	·	·	·	·	·	·	·	·	■	·	■	■	·	·	·	·	·	·	·
1396.0M	·	·	·	·	·	·	·	■	·	·	·	·	·	·	·	·	■	·	■	■	■	■	·	·	·	·	·	·	·	·	·
1398.0M	·	·	■	■	■	·	·	■	·	·	·	·	·	·	·	·	·	·	■	·	·	·	·	·	·	·	·	·	·	·	·
1402.0M	·	·	■	·	·	·	·	■	■	·	·	■	·	■	■	■	■	■	·	·	·	·	·	·	·	·	·	·	·	·	·
1404.5M	·	·	■	■	■	·	·	■	■	■	■	■	■	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
1411.32M	·	·	■	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
1445.6M	·	·	·	■	■	■	■	■	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
1475.5M	·	·	·	■	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
1487.5M	■	■	■	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·

PE906382

This is an enclosure indicator page.
The enclosure PE906382 is enclosed within the container PE906376 at this location in this document.

The enclosure PE906382 has the following characteristics:
ITEM_BARCODE = PE906382
CONTAINER_BARCODE = PE906376
NAME = Species List
BASIN = GIPPSLAND
PERMIT = VIC/L1
TYPE = WELL
SUBTYPE = DIAGRAM
DESCRIPTION = Species List (Spores-Pollen) for Seahorse-1
REMARKS =
DATE_CREATED =
DATE_RECEIVED =
W_NO = W705
WELL_NAME = SEAHORSE-1
CONTRACTOR =
CLIENT_OP_CO = ESSO AUSTRALIA LIMITED

(Inserted by DNRE - Vic Govt Mines Dept)

SUBSEA WELL COMPLETION REPORT

PETROLEUM DIVISION

03 OCT 1990

ATTACHMENT 1

ESSO AUSTRALIA LTD

SUBSEA WELL COMPLETION REPORT

SEAHORSE - 1

SEPTEMBER, 1990

ATTACHMENT 1

ESSO AUSTRALIA LTD

SUBSEA WELL COMPLETION REPORT

SEAHORSE - 1

LOCATION DETAILS

WELL NAME: SEAHORSE - 1

STATE: VICTORIA

PERMIT: VIC/L1

CO-ORDINATES: Latitude 38 deg 11 min 47.95 sec S

Longitude 147 deg 40 min 22.35 sec E

X = 558 919 m E

Y = 5 772 137 m N

MAP PROJECTION: AMG Zone 55

ELEVATIONS AND DEPTHS

REFERENCE: MSL

RKB: +21 m

WATER DEPTH: 43 m

PLUG BACK DEPTH: 1625 mSS

AVERAGE ANGLE: Vertical

INSTALLATION DETAILS

TUBING SPOOL INSTALLATION DATES

RUN ANCHORS: 22 Aug, 1989

PULL ANCHORS: 31 Aug, 1989

SUBSEA TREE INSTALLATION DATES

RUN ANCHORS: 9 Dec, 1989

PULL ANCHORS: 30 Dec, 1989

CONTRACTOR: South Seas Drilling Company

RIG NAME: Southern Cross

EQUIPMENT TYPE: Oilwell E-2000

TOTAL RIG DAYS: 30.6

DRILLING AFE No.: 767 007

PRODUCTION TEST DETAILS

Details of the production tests conducted during the installation of the subsea equipment are provided in Appendix 1.

Fluid sample analyses are provided in Appendix 2A.

PERFORATION DETAILS

INTERVALS PERFORATED:	N-1	1404.6 - 1417.8 mSS 1424.7 - 1428.6 mSS
	N-2.6	1491.6 - 1495.6 mSS

SERVICE COMPANY: Schlumberger

DIFFERENTIAL PRESSURE: Approximately 300 psi

PERFORATION FLUID: Diesel

SIZE & TYPE OF GUN: TCP, 7", 12 spf, 30 deg phasing, 37 gm RDX charges

SUBSEA EQUIPMENT DETAILS

Details of the subsea equipment installed on the well are provided in Appendix 3.

APPENDIX 2A

ESSO AUSTRALIA LTD

SUBSEA WELL COMPLETION REPORT

FLUID SAMPLE ANALYSES

Seahorse - 1

47 Woodforde Road, Magill,
South Australia, 5072
P.O. Box 410,
Magill, South Australia, 5072

PETROLAB

Fax: 364 1500
Telex: AA88214
Tel: (08) 364 1500
(08) 333 0787

Reservoir Fluid and Core Services, Laboratory Consulting and Analysis

Adelaide, March 21 1989
P. O. Box 410
Magill, S. A. 5072

Esso Australia Ltd.
70 Foster Street
Sale, Vic. 3850

Subject: Reservoir Fluid Study
Well : Seahorse # 1
File : E - 89042

Attention: Mr. Philip Reichardt

Dear Sirs,

Please find enclosed our results of reservoir fluid analyses performed on surface samples from the subject well.

Two sets of primary separator gas and liquid samples and two separator liquid samples, taken while production testing two zones, were received in our laboratory in Adelaide and subjected to standard quality checks.

The single phase opening pressures of the gas samples were determined at approximately 10°C higher than separator temperature to see if any leakage had taken place during transportation prior to compositional analyses by means of gas chromatography.

The validity of the separator liquid samples was determined by measuring their bubble point pressures at room temperature and correlate these pressures with gas opening pressures and field separator pressure.

The best most representative samples of each production test were then used for extended compositional analyses.

We thank Esso Australia Ltd. for the opportunity to be of service. If there remain any questions or if we can assist you in any other way please do not hesitate in contacting us.

Sincerely Yours,

Jan G. Bon

PETROLAB

Company : Esso Australia
Well : Seahorse # 1
File : E-89042

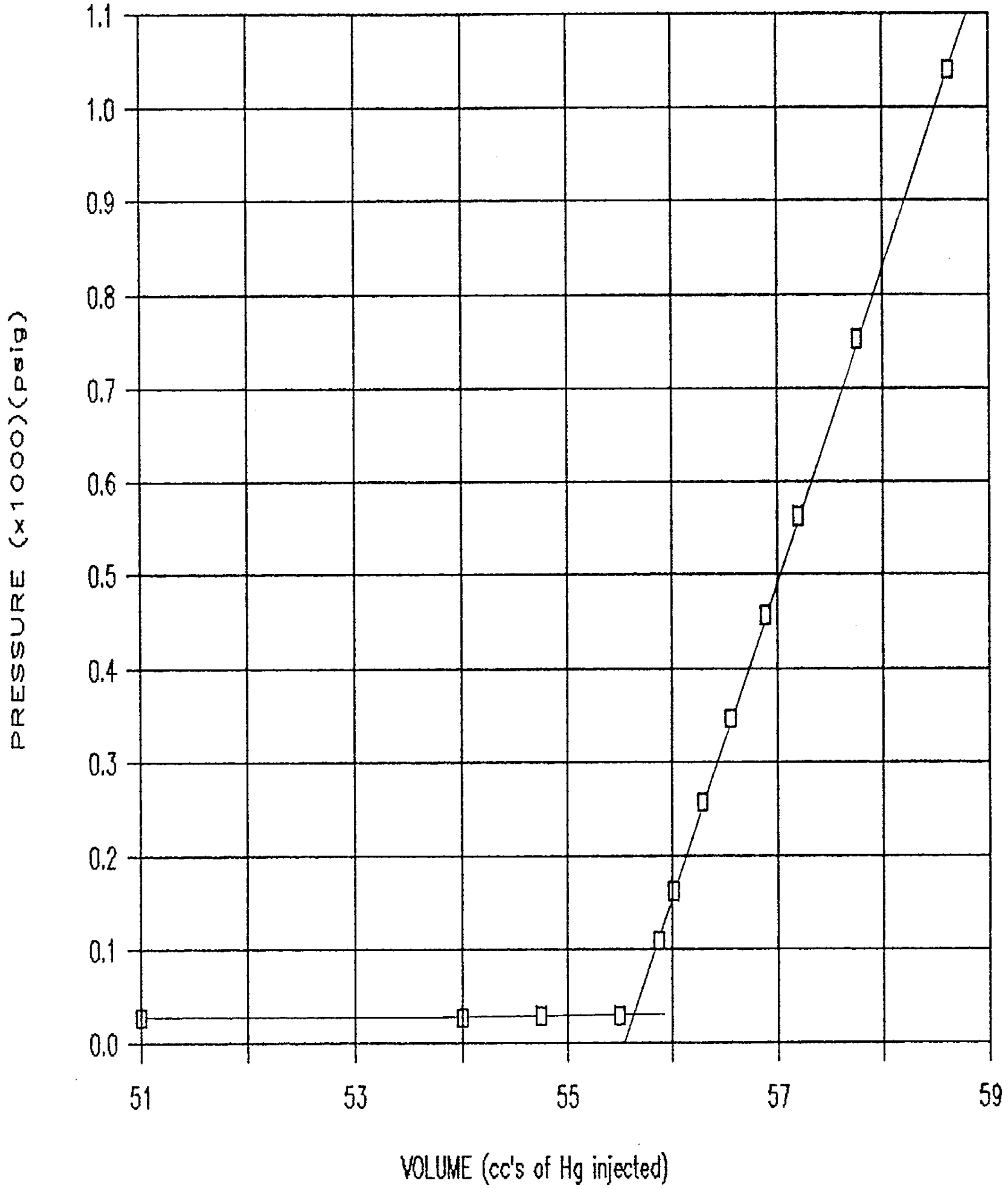
Surface Sample # 1 N-2·6

Sampling Conditions
Date : December 23 1989
Pressure : 80 psig
Temperature : 90 deg F

Cylinder # : L-37 (liquid)
Opening Pressure : 20 psig @ 68 deg F

Volume (cc's)	Pressure (psig)
51.00	27
54.00	28
54.75	29
55.50	29
55.88	109
56.02	162
56.29	258
56.55	347
56.89	457
57.19	563
57.76	753
58.63	1040

Saturation Pressure : 29 psig @ 68 deg F.



PETROLAB

Company : Esso Australia
Well : Seahorse # 1
File : E-89042

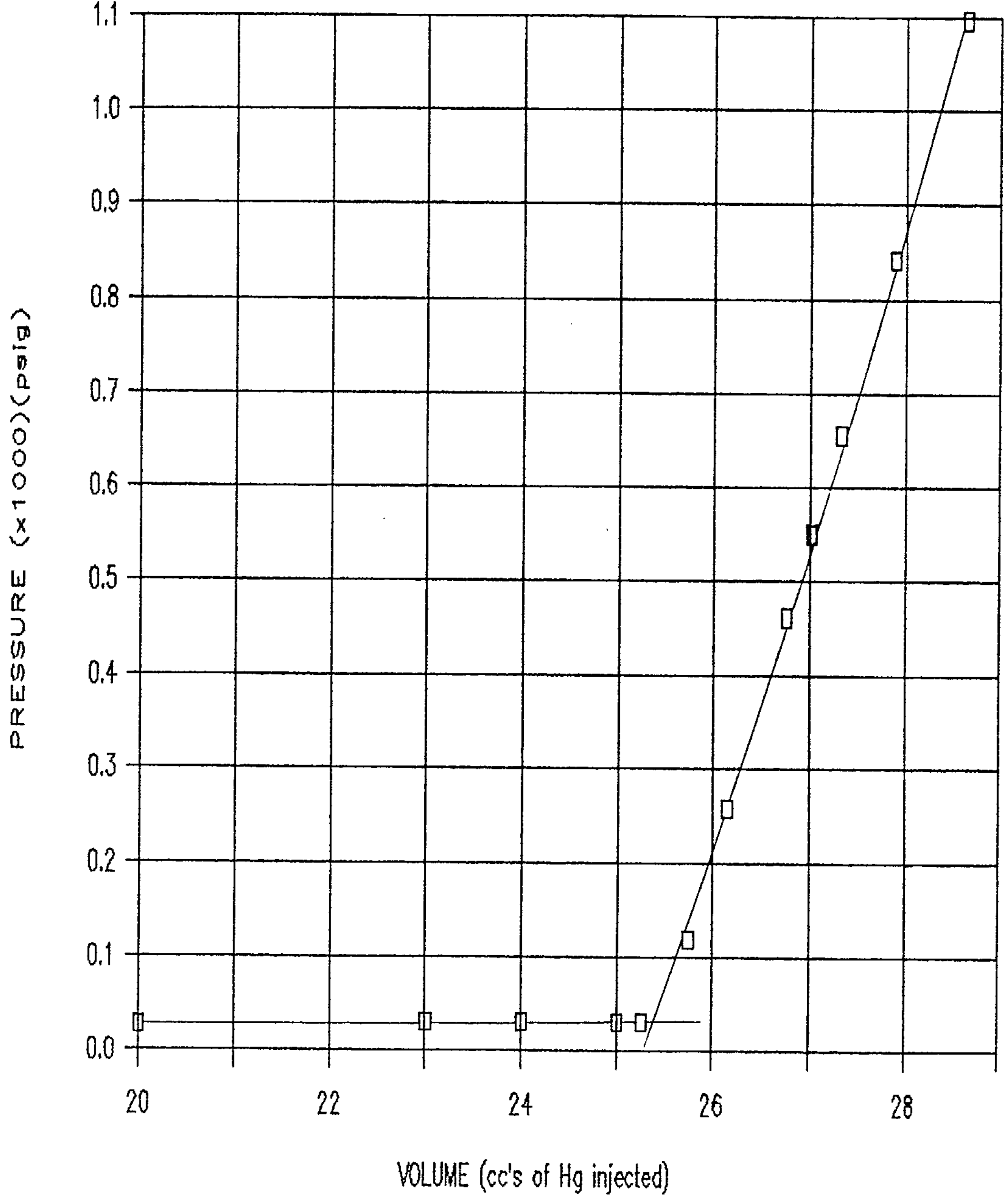
Surface Sample # 2 N-26

Sampling Conditions
Date : December 23 1989
Pressure : 60 psig
Temperature : 90 deg F

Cylinder # : L-33 (liquid)
Opening Pressure : 22 psig @ 68 deg F

Volume (cc's)	Pressure (psig)
20.00	28
23.00	30
24.00	30
25.00	31
25.25	31
25.75	119
26.15	258
26.75	462
27.02	550
27.33	656
27.89	841
28.66	1096

Saturation Pressure : 31 psig @ 68 deg F.



N - 2.6

HIGH TEMPERATURE DISTILLATION OF STOCK TANK LIQUID SAMPLE

(Hexanes to Dodecanes Plus)

Flashed from Separator Liquid Cylinder # L - 37

	Cut (Deg C)	Mol %	Mol Weight	Weight %	Density (gm/cc)	Volume %	API Gravity
	IBP 28						
Hexanes	59 - 84	9.09	84	4.67	0.6703	5.55	79.4
Heptanes	85 - 112	15.78	96	9.33	0.7266	10.21	63.1
Octanes	113 - 138	10.45	109	6.99	0.7421	7.49	59.0
Nonanes	139 - 162	7.46	122	5.59	0.7555	5.89	55.6
Decanes	163 - 185	7.71	134	6.34	0.7726	6.53	51.5
Undecanes	186 - 206	5.17	147	4.67	0.7847	4.73	48.7
Dodecanes Plus	> 206	44.34	229	62.41	0.8325	59.60	38.3
		100.00		100.00		100.00	

N-2.6

PETROLAB

Company: Esso Australia
Well : Seahorse # 1, N.2.6

Page: 4 of 11
File: E 89042

COMPOSITIONAL ANALYSIS OF
RECOMBINED SEPARATOR LIQUID

Cylinder # L-37

Component		Stock Tank Liquid Mol %	Stock Tank Gas Mol %	Separator Liquid Mol %
Hydrogen Sulphide	H2S	0.00	0.00	0.00
Carbon Dioxide	CO2	0.05	3.34	0.15
Nitrogen	N2	0.01	8.38	0.25
Methane	C1	0.16	26.73	0.93
Ethane	C2	0.34	9.23	0.60
Propane	C3	2.35	17.55	2.79
Iso-Butane	iC4	3.41	9.94	3.60
N-Butane	nC4	6.11	12.29	6.29
Iso-Pentane	iC5	5.67	4.25	5.63
N-Pentane	nC5	5.88	3.41	5.81
Hexanes	C6	6.91	3.11	6.80
Heptanes	C7	12.00	1.07	11.68
Octanes	C8	7.95	0.55	7.73
Nonanes	C9	5.67	0.15	5.51
Decanes	C10	5.86	0.00	5.69
Undecanes	C11	3.93	0.00	3.82
Dodecanes Plus	C12+	33.71	0.00	32.72
TOTAL		100.00	100.00	100.00
Ratios				
Molar Ratio :		0.9709	0.0291	1.0000
Mass Ratio :		0.9911	0.0089	1.0000
Liquid Ratio (bbl/bbl):		1.0000 @ SC	--	1.0078 @ PT*
Gas Liquid Ratio :		1.0000 bbl @ SC	22 SCF	--
Stream Properties				
Molecular Weight :		138.8	41.48	136.0
Density obs. (gm/cc) :		0.7670 @ 60 F	--	0.7680 @ PT*
Gravity (AIR = 1.000) :		52.8 API @60F	1.452	--
GHV (BTU/scf) :		--	2185.0	--
Hexanes Plus Properties				
Mol % :		76.03	4.88	73.95
Molecular Weight :		162.8	90.4	162.6
Density (gm/cc @ 60 F):		0.7952	0.6757	0.7951
Gravity (API @ 60 F):		46.3	77.7	46.3
Heptanes Plus Properties				
Mol % :		69.12	1.77	67.15
Molecular Weight :		170.6	101.5	170.6
Density (gm/cc @ 60 F):		0.8026	0.6911	0.8025
Gravity (API @ 60 F):		44.6	73.0	44.7
Decanes Plus Properties				
Mol % :		43.50	0.00	42.23
Molecular Weight :		208.8	--	208.8
Density (gm/cc @ 60 F):		0.8238	--	0.8238
Gravity (API @ 60 F):		40.1	--	40.1
Undecanes Plus Properties				
Mol % :		37.64	0.00	36.54
Molecular Weight :		220.5	--	220.5
Density (gm/cc @ 60 F):		0.8290	--	0.8290
Gravity (API @ 60 F):		39.0	--	39.0
Dodecanes Plus Properties				
Mol % :		33.71	0.00	32.72
Molecular Weight :		229.0	--	229.0
Density (gm/cc @ 60 F):		0.8325	--	0.8325
Gravity (API @ 60 F):		38.3	--	38.3

* (P)ressure 80 psig, (T)emperature 90 deg.F

PETROLAB

Company : Esso Australia
Well : Seahorse # 1 N-1
File : E-89042

Surface Samples Set # 1

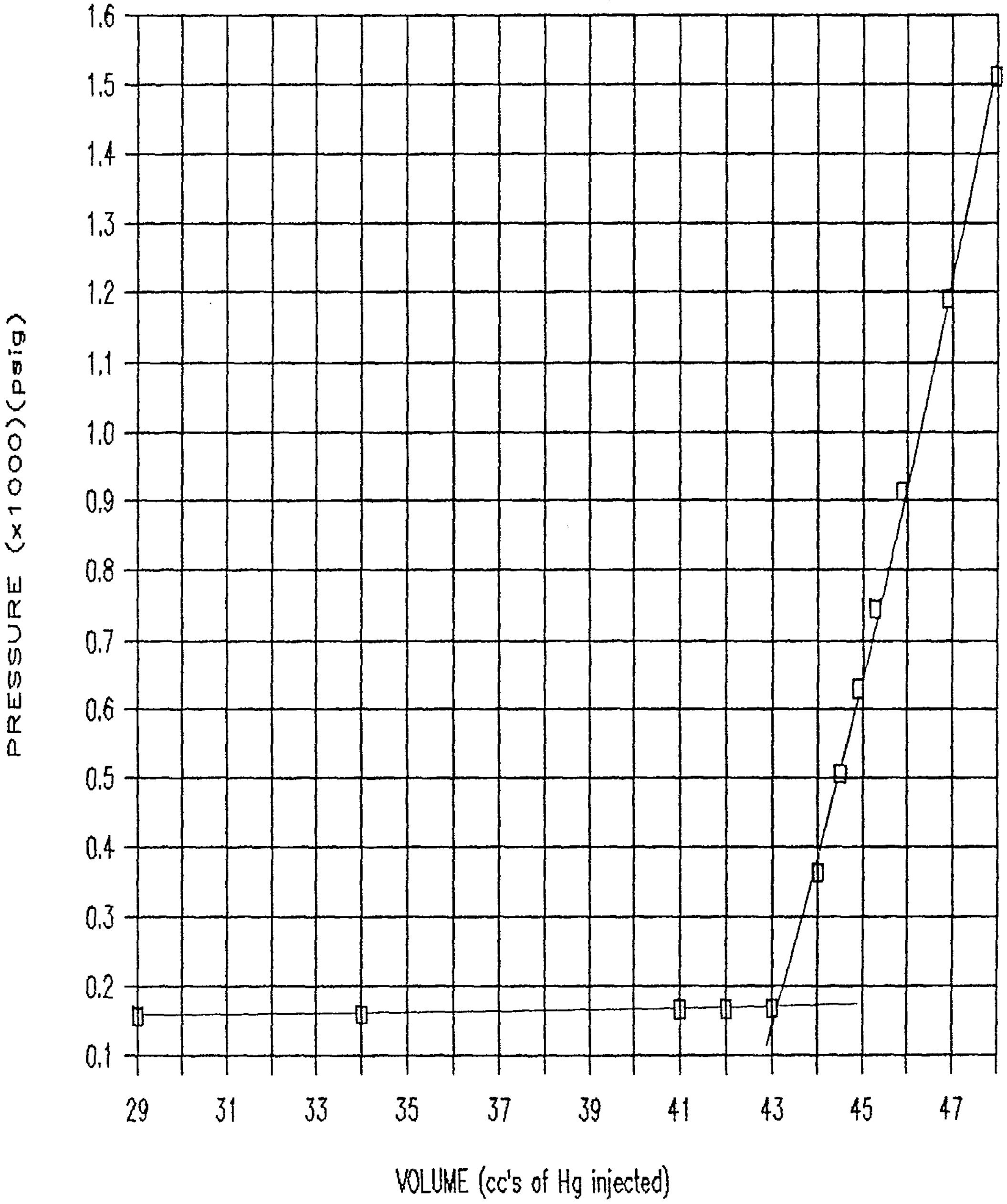
Sampling Conditions 25
Date : December ~~23~~ 1989
Pressure : 450 psig
Temperature : 66 deg F

Cylinder # : ED 5579 (gas)
Opening Pressure : 460 psig @ 93 deg F

Cylinder # : L-36 (liquid)
Opening Pressure : 155 psig @ 68 deg F

Volume (cc's)	Pressure (psig)
29.00	157
34.00	160
41.00	167
42.00	167
43.00	168
44.00	364
44.50	507
44.89	630
45.27	745
45.87	914
46.89	1192

Saturation Pressure : 168 psig @ 68 deg F.



PETROLAB

Company : Esso Australia
Well : Seahorse # 1 N-1
File : E-89042

Surface Samples Set # 2

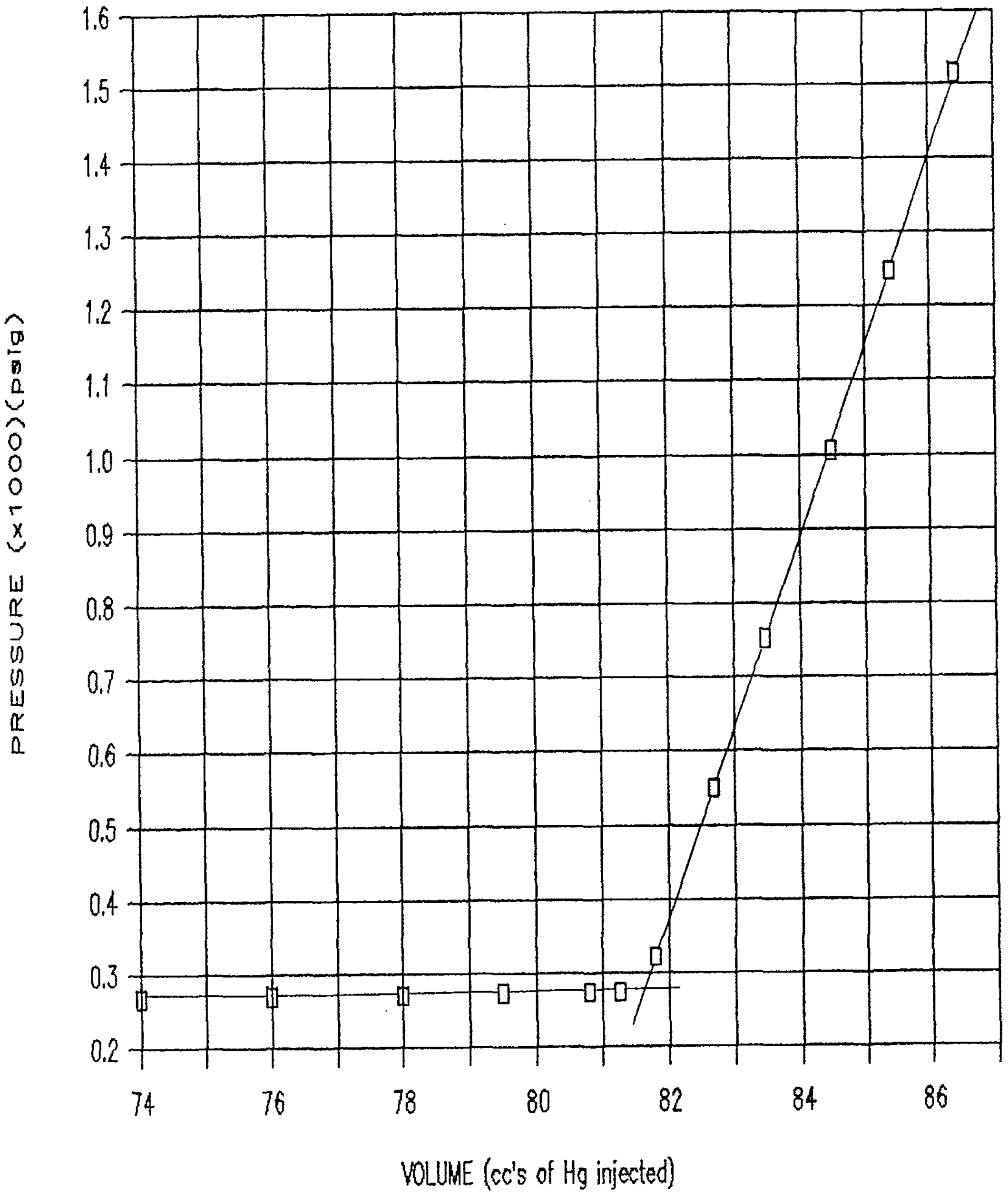
Sampling Conditions
Date : December ~~23~~ 25 1989
Pressure : 280 psig
Temperature : 59 deg F

Cylinder # : ED 5577 (gas)
Opening Pressure : 280 psig @ 93 deg F

Cylinder # : L-32 (liquid)
Opening Pressure : 245 psig @ 68 deg F

Volume (cc's)	Pressure (psig)
74.00	267
76.00	269
78.00	271
79.50	273
80.80	274
81.25	274
81.80	322
82.68	551
83.46	753
84.48	1006
85.40	1248
86.42	1514

Saturation Pressure : 274 psig @ 68 deg F.



PETROLAB

Company: Esso Australia
Well : Seahorse # 1, N.1

Page: 7 of 11
File: E 89042

COMPOSITIONAL ANALYSIS OF

SEPARATOR GAS

Cyl. # EC - 5579

Component	Mol %	GPM
Hydrogen Sulphide	0.00	
Carbon Dioxide	1.01	
Nitrogen	1.64	
Methane	81.03	
Ethane	9.33	2.497
Propane	4.37	1.205
Iso-Butane	0.74	0.242
N-Butane	0.87	0.275
Iso-Pentane	0.23	0.084
N-Pentane	0.20	0.072
Hexanes	0.26	0.101
Heptanes	0.13	0.055
Octanes	0.10	0.045
Nonanes	0.05	0.025
Decanes	0.04	0.022
Undecanes	0.00	0.000
Dodecanes Plus	0.00	0.000
TOTAL	100.00	4.623

Pressure Base : 14.696
Zsc: 0.997

Mol Weight : 20.45
Gas Gravity: 0.708
Pc : 664.9
Tc : 389.2

Mol Weight C6+ : 97.3
Density C6+ : 0.6855

Mol Weight C7+ : 108.1
Density C7+ : 0.6994

Mol Weight C10+: 134.0
Density C10+: 0.7278

Mol Weight C11+: --
Density C11+: --

Mol Weight C12+: --
Density C12+: --

Heating Value (BTU/ft3)
Gross: 1201
Nett: 1089
Wobbe Index: 1428

Zpt*: 0.905

* Remarks: Pressure 450 psig, Temperature 66 deg F

Laboratory Opening Pressure - 460 psig @ 93 deg F

Company: Esso Australia
Well : Seahorse # 1, N.1

Page: 8 of 11
File: E 89042

COMPOSITIONAL ANALYSIS OF

SEPARATOR GAS

Cyl. # EC - 5577

Component	Mol %	GPM
Hydrogen Sulphide	0.00	
Carbon Dioxide	1.08	
Nitrogen	2.42	
Methane	77.78	
Ethane	10.52	2.816
Propane	5.19	1.431
Iso-Butane	0.85	0.278
N-Butane	1.06	0.335
Iso-Pentane	0.27	0.099
N-Pentane	0.23	0.083
Hexanes	0.32	0.124
Heptanes	0.15	0.063
Octanes	0.07	0.032
Nonanes	0.06	0.030
Decanes	0.00	0.000
Undecanes	0.00	0.000
Dodecanes Plus	0.00	0.000
TOTAL	100.00	5.291

Pressure Base : 14.696
Zsc: 0.997

Mol Weight : 21.11
Gas Gravity: 0.731
Pc : 663.4
Tc : 395.1

Mol Weight C6+ : 93.4
Density C6+ : 0.6801

Mol Weight C7+ : 104.1
Density C7+ : 0.6944

Mol Weight C10+: --
Density C10+: --

Mol Weight C11+: --
Density C11+: --

Mol Weight C12+: --
Density C12+: --

Heating Value (BTU/ft3)
Gross: 1223
Nett: 1109
Wobbe Index: 1430

Zpt*: 0.934

* Remarks: Pressure 280 psig, Temperature 59 deg F

Laboratory Opening Pressure - 280 psig @ 93 deg F

Company : Esso Australia
Well : Seahorse # 1

HIGH TEMPERATURE DISTILLATION OF STOCK TANK LIQUID SAMPLE

(Hexanes to Dodecanes Plus)

Flashed from Separator Liquid Cylinder # L - 32

	Cut (Deg C)	Mol %	Mol Weight	Weight %	Density (gm/cc)	Volume %	API Gravity
	IBP 28						
Hexanes	59 - 84	22.84	89	13.80	0.6922	15.55	72.7
Heptanes	85 - 112	11.00	100	7.49	0.7308	7.99	61.9
Octanes	113 - 138	14.03	110	10.48	0.7381	11.07	60.0
Nonanes	139 - 162	8.47	122	7.04	0.7494	7.32	57.1
Decanes	163 - 185	8.48	136	7.83	0.7646	7.98	53.4
Undecanes	186 - 206	6.50	153	6.74	0.7785	6.75	50.1
Dodecanes Plus	> 206	28.68	239	46.62	0.8394	43.34	36.9
		100.00		100.00		100.00	

PETROLAB

Company: Esso Australia
Well : Seahorse # 1, N.1

COMPOSITIONAL ANALYSIS OF
RECOMBINED SEPARATOR LIQUID

Cylinder # L-32

Component		Stock Tank Liquid Mol %	Stock Tank Gas Mol %	Separator Liquid Mol %
Hydrogen Sulphide	H2S	0.00	0.00	0.00
Carbon Dioxide	CO2	0.01	0.76	0.24
Nitrogen	N2	0.00	0.21	0.07
Methane	C1	0.15	25.46	7.96
Ethane	C2	0.69	19.93	6.63
Propane	C3	3.32	26.51	10.48
Iso-Butane	iC4	2.12	6.71	3.54
N-Butane	nC4	4.65	10.23	6.37
Iso-Pentane	iC5	3.66	3.04	3.47
N-Pentane	nC5	4.09	2.65	3.65
Hexanes	C6	18.57	2.53	13.62
Heptanes	C7	8.95	1.03	6.50
Octanes	C8	11.41	0.57	8.06
Nonanes	C9	6.89	0.27	4.84
Decanes	C10	6.90	0.08	4.79
Undecanes	C11	5.29	0.02	3.66
Dodecanes Plus	C12+	23.32	0.00	16.12
TOTAL		100.00	100.00	100.00
<u>Ratios</u>				
Molar Ratio	:	0.6912	0.3088	1.0000
Mass Ratio	:	0.8791	0.1209	1.0000
Liquid Ratio (bbl/bbl)	:	1.0000 @ SC	--	1.1976 @ PT*
Gas Liquid Ratio	:	1.0000 bbl @ SC	344 SCF	--
<u>Stream Properties</u>				
Molecular Weight	:	130.9	40.30	102.9
Density obs. (gm/cc)	:	0.7578 @ 60 F	--	0.7212 @ PT*
Gravity (AIR = 1.000)	:	55.0 API @60F	1.412	--
GHV (BTU/scf)	:	--	2327.0	--
<u>Hexanes Plus Properties</u>				
Mol %	:	81.32	4.50	57.59
Molecular Weight	:	147.1	93.0	145.8
Density (gm/cc @ 60 F)	:	0.7799	0.6796	0.7782
Gravity (API @ 60 F)	:	49.8	76.5	50.2
<u>Heptanes Plus Properties</u>				
Mol %	:	62.75	1.97	43.97
Molecular Weight	:	164.4	104.7	163.5
Density (gm/cc @ 60 F)	:	0.7961	0.6951	0.7951
Gravity (API @ 60 F)	:	46.1	71.9	46.3
<u>Decanes Plus Properties</u>				
Mol %	:	35.50	0.10	24.57
Molecular Weight	:	206.3	136.6	206.0
Density (gm/cc @ 60 F)	:	0.8220	0.7303	0.8220
Gravity (API @ 60 F)	:	40.5	62.1	40.5
<u>Undecanes Plus Properties</u>				
Mol %	:	28.61	0.02	19.78
Molecular Weight	:	223.2	147.0	223.1
Density (gm/cc @ 60 F)	:	0.8312	0.7400	0.8312
Gravity (API @ 60 F)	:	38.6	59.5	38.6
<u>Dodecanes Plus Properties</u>				
Mol %	:	23.32	0.00	16.12
Molecular Weight	:	239.1	--	239.1
Density (gm/cc @ 60 F)	:	0.8394	--	0.8394
Gravity (API @ 60 F)	:	36.9	--	36.9

* (P)ressure 280 psig, (T)emperature 59 deg.F

Company: Esso Australia
Well : Seahorse # 1, N.1

File: E 89042

COMPOSITIONAL ANALYSIS OF
RECOMBINED RESERVOIR FLUID

Component		Cyl. # L-32 Separator Liquid Mol %	Cyl. # EC-5577 Separator Gas Mol %	Reservoir Fluid Mol %
Hydrogen Sulphide	H2S	0.00	0.00	0.00
Carbon Dioxide	CO2	0.24	1.08	0.53
Nitrogen	N2	0.07	2.42	0.89
Methane	C1	7.96	77.78	32.33
Ethane	C2	6.63	10.52	7.99
Propane	C3	10.48	5.19	8.63
Iso-Butane	iC4	3.54	0.85	2.60
N-Butane	nC4	6.37	1.06	4.52
Iso-Pentane	iC5	3.47	0.27	2.35
N-Pentane	nC5	3.65	0.23	2.46
Hexanes	C6	13.62	0.32	8.98
Heptanes	C7	6.50	0.15	4.28
Octanes	C8	8.06	0.07	5.27
Nonanes	C9	4.84	0.06	3.17
Decanes	C10.	4.79	0.00	3.12
Undecanes	C11	3.66	0.00	2.38
Dodecanes Plus	C12+	16.12	0.00	10.50
TOTAL		100.00	100.00	100.00
Ratios				
Molar Ratio	:	0.6509	0.3491	1.0000
Mass Ratio	:	0.9009	0.0991	1.0000
Gas Liquid Ratio	:	1.0000 bbl @ PT*	500 SCF**	--
Stream Properties				
Molecular Weight	:	102.9	21.11	74.38
Density obs. (gm/cc)	:	0.7212 @ PT*	--	--
Gravity (AIR = 1.000)	:	--	0.731	--
GHV (BTU/scf)	:	--	1223.0	--
Hexanes Plus Properties				
Mol %	:	57.59	0.60	37.70
Molecular Weight	:	145.8	93.4	145.5
Density (gm/cc @ 60 F)	:	0.7782	0.6801	0.7778
Gravity (API @ 60 F)	:	50.2	76.4	50.2
Heptanes Plus Properties				
Mol %	:	43.97	0.28	28.72
Molecular Weight	:	163.5	104.1	163.3
Density (gm/cc @ 60 F)	:	0.7951	0.6944	0.7948
Gravity (API @ 60 F)	:	46.3	72.1	46.4
Decanes Plus Properties				
Mol %	:	24.57	0.00	16.00
Molecular Weight	:	206.0	--	206.0
Density (gm/cc @ 60 F)	:	0.8220	--	0.8220
Gravity (API @ 60 F)	:	40.5	--	40.5
Undecanes Plus Properties				
Mol %	:	19.78	0.00	12.88
Molecular Weight	:	223.1	--	223.1
Density (gm/cc @ 60 F)	:	0.8312	--	0.8312
Gravity (API @ 60 F)	:	38.6	--	38.6
Dodecanes Plus Properties				
Mol %	:	16.12	0.00	10.50
Molecular Weight	:	239.1	--	239.1
Density (gm/cc @ 60 F)	:	0.8394	--	0.8394
Gravity (API @ 60 F)	:	36.9	--	36.9

* (P)ressure 280 psig, (T)emperature 59 deg F
** 501 SCF / SEP BBL @ PT = 600 SCF / ST BBL
** GOR corrected for Fpv and Fg found in laboratory.

APPENDIX 1

ESSO AUSTRALIA LTD

SUBSEA WELL COMPLETION REPORT

PRODUCTION TEST DETAILS

Seahorse #1 and Tarwhine #1 Production Tests

Production tests were carried out on the Seahorse N-1 and N-2.6 zones on December 23-26, 1989, and on the Tarwhine N-1 zone on January 13-14, 1990.

The build-up test on the Seahorse N-2.6 zone, performed on 24/12/89 was characterised by oscillations in the pressure response and the pressure beginning to decline at the end of the buildup test. As a consequence no results have been inferred from this test. The tests on the Tarwhine N-1 zone and the Seahorse N-1 zone gave some more meaningful results.

The build-up tests were analysed using the EPS software package "PANSYSTEM". After the data points were reduced down to a manageable number, the program placed a line of best fit onto a Horner plot, from which the permeability thickness, the skin factor and the extrapolated shut-in pressure were able to be determined. The productivity index was also determined using PANSYSTEM. However, due to the fact that PANSYSTEM uses a maximum of three production test points to determine the productivity index, it was also calculated by a linear regression on all available test points using Lotus.

In order to calculate the permeabilities, a net oil column was assumed for each zone. The values used were:

Tarwhine N-1 : 40.2 feet (11.2 metres)
Seahorse N-1 : 22.0 feet (6.7 metres)

Table 1 summarizes the production test results obtained from the PANSYSTEM and Lotus analyses. Figures 1 and 2 are the Horner plots for the Tarwhine N-1 and Seahorse N-1 zones, respectively, and Figures 3 to 5 are the plots of bottomhole pressure vs. flowrate used to obtain the productivity indices for the Tarwhine N-1, Seahorse N-1 and Seahorse N-2.6 zones.

The negative skin factors obtained from the Seahorse N-1 production test are attributed to the perforations. The API rating for the arrangement used is 1/2" dia. holes with 29" perforation, which would help account for the skin.

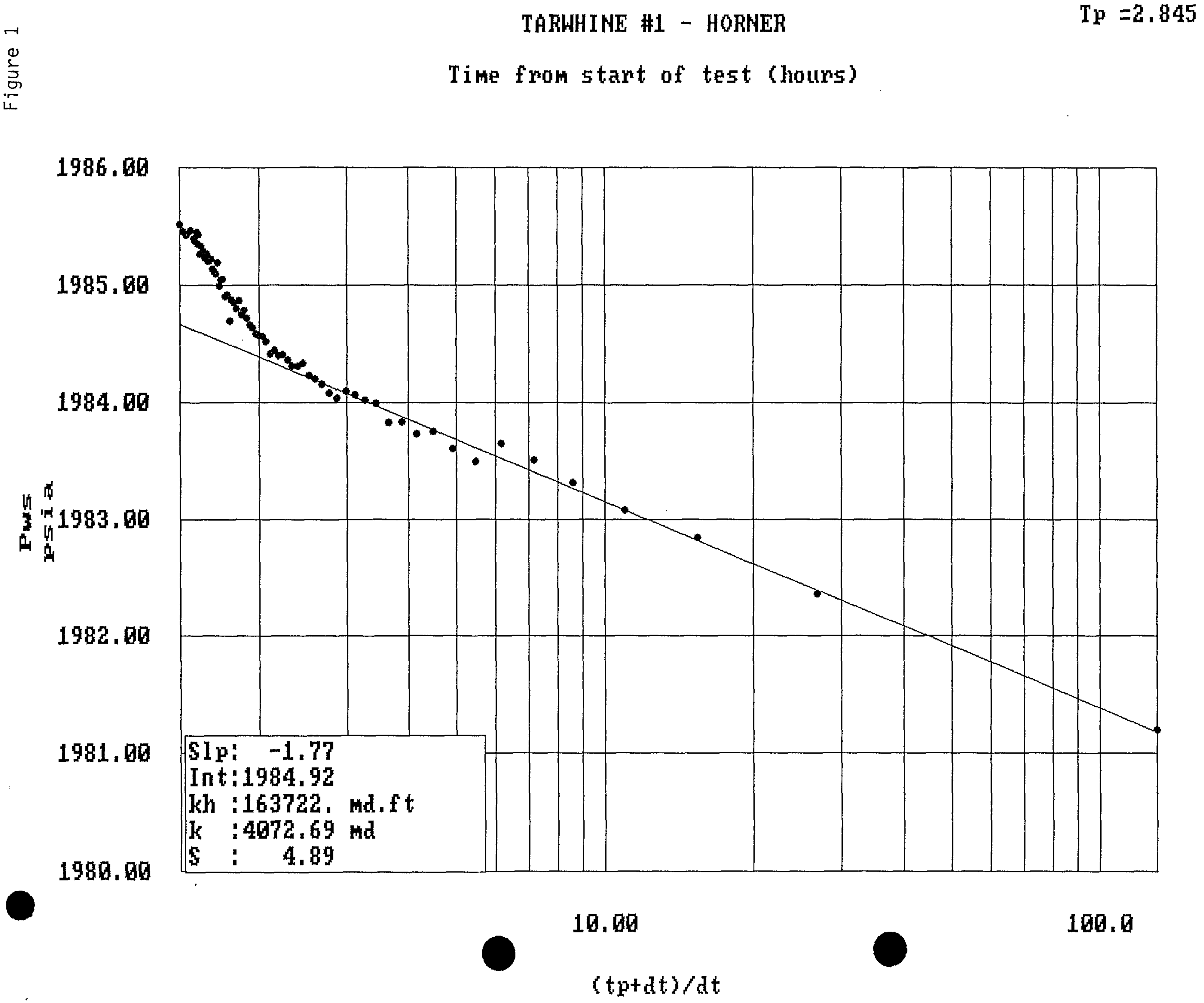
There is good agreement between the bottomhole shut in pressures obtained from the production tests, and static BHP and RFT pressures.

The results obtained are consistent with separate analysis performed by Philip Reichardt on the production tests.

Table 1 - Production Tests Results

	Tarwhine N-1	Seahorse N-1	Seahorse N-2.6
Perm thick. kh (md.ft)	167696	26675	-
Permeability (md)	4172	325	-
Skin Factor	-6.11	0.464	-
Flow efficiency	3.48	0.92	-
Extrap. SI press. (Horner) (psi)	1984.9	2088.6	-
PI (PANOIL) (Stb/psi/day)	208.9	113.7	183.2
PI (Lotus L.R.) (stb/psi/day)	205.8	109.8	204.2
Extrap. SI press. (Lotus L.R)(psi)	1984.5	2075.6	2093.3

Figure 1



TARWHINE #1 - HORNER
Tp =2.845
Time from start of test (hours)
1986.00
1985.00
1984.00
1983.00
1982.00
1981.00
1980.00
Pws
psia
Slp: -1.77
Int:1984.92
kh :163722. md.ft
k :4072.69 md
S : 4.89
10.00
100.0
(tp+dt)/dt

Figure 2

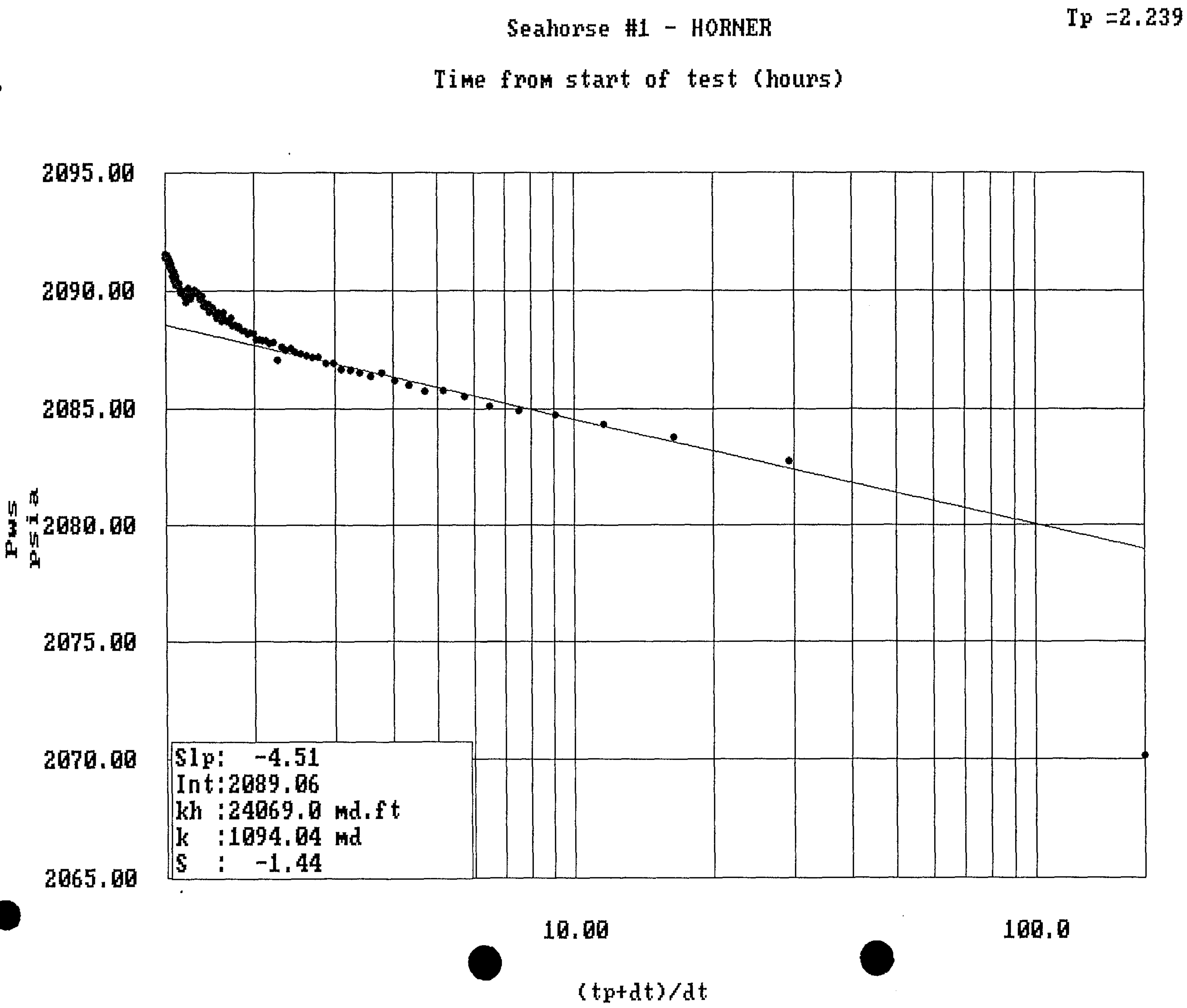

Seahorse #1 - HORNER
Tp =2.239
Time from start of test (hours)
Pws
psia
2095.00
2090.00
2085.00
2080.00
2075.00
2070.00
2065.00
10.00
100.0
(tp+dt)/dt
Slp: -4.51
Int:2089.06
kh :24069.0 md.ft
k :1094.04 md
S : -1.44

Figure 3

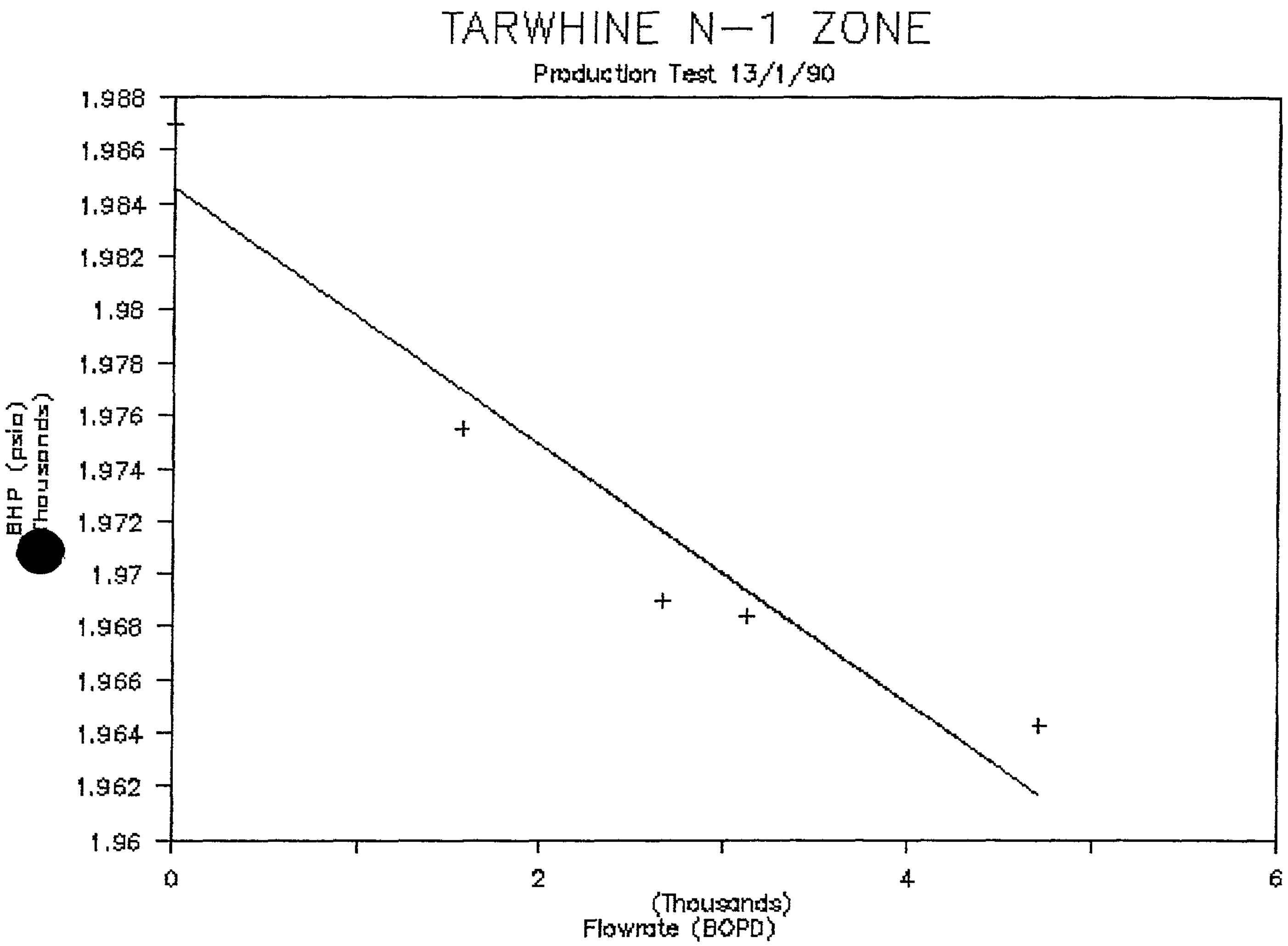
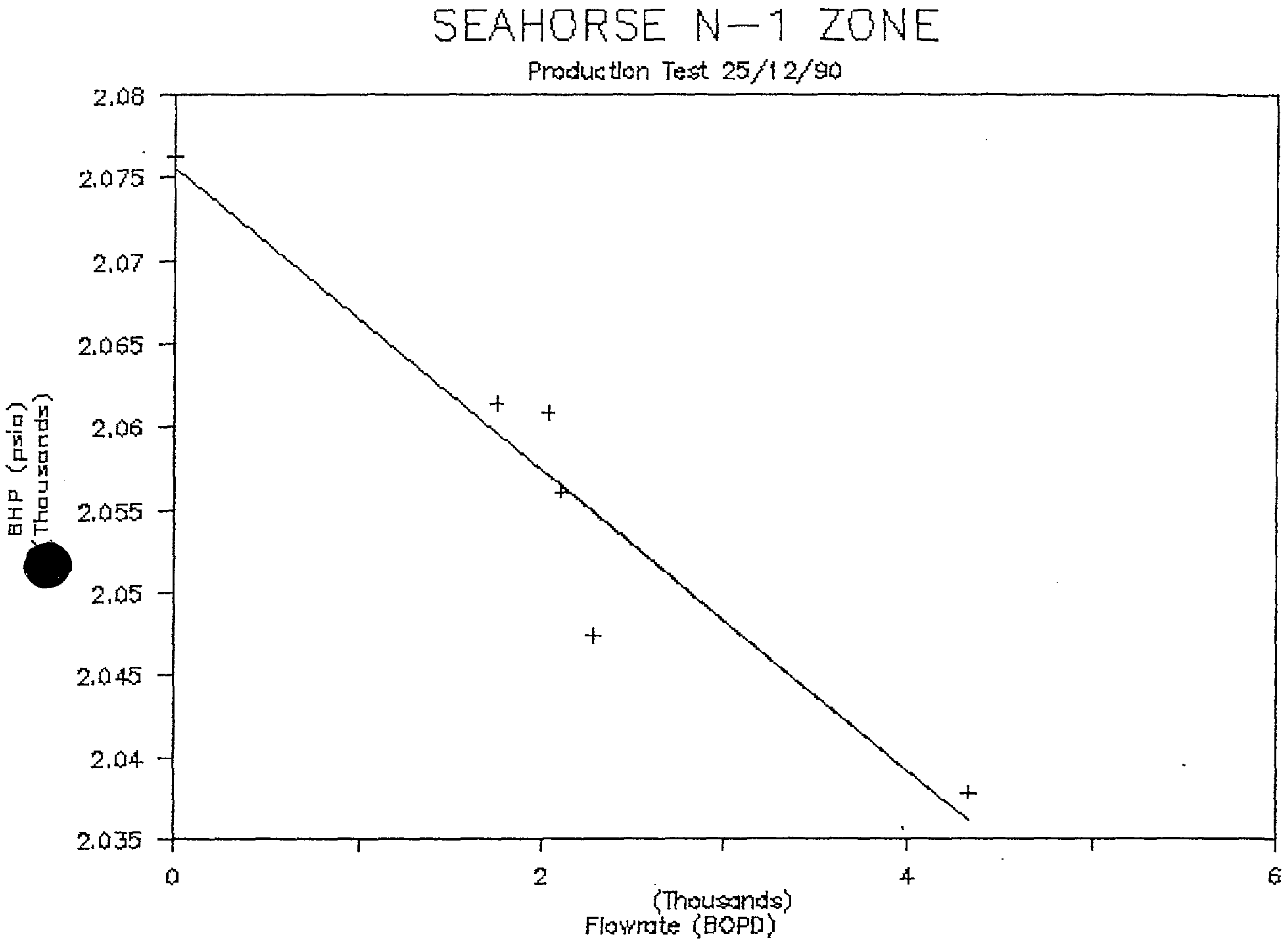
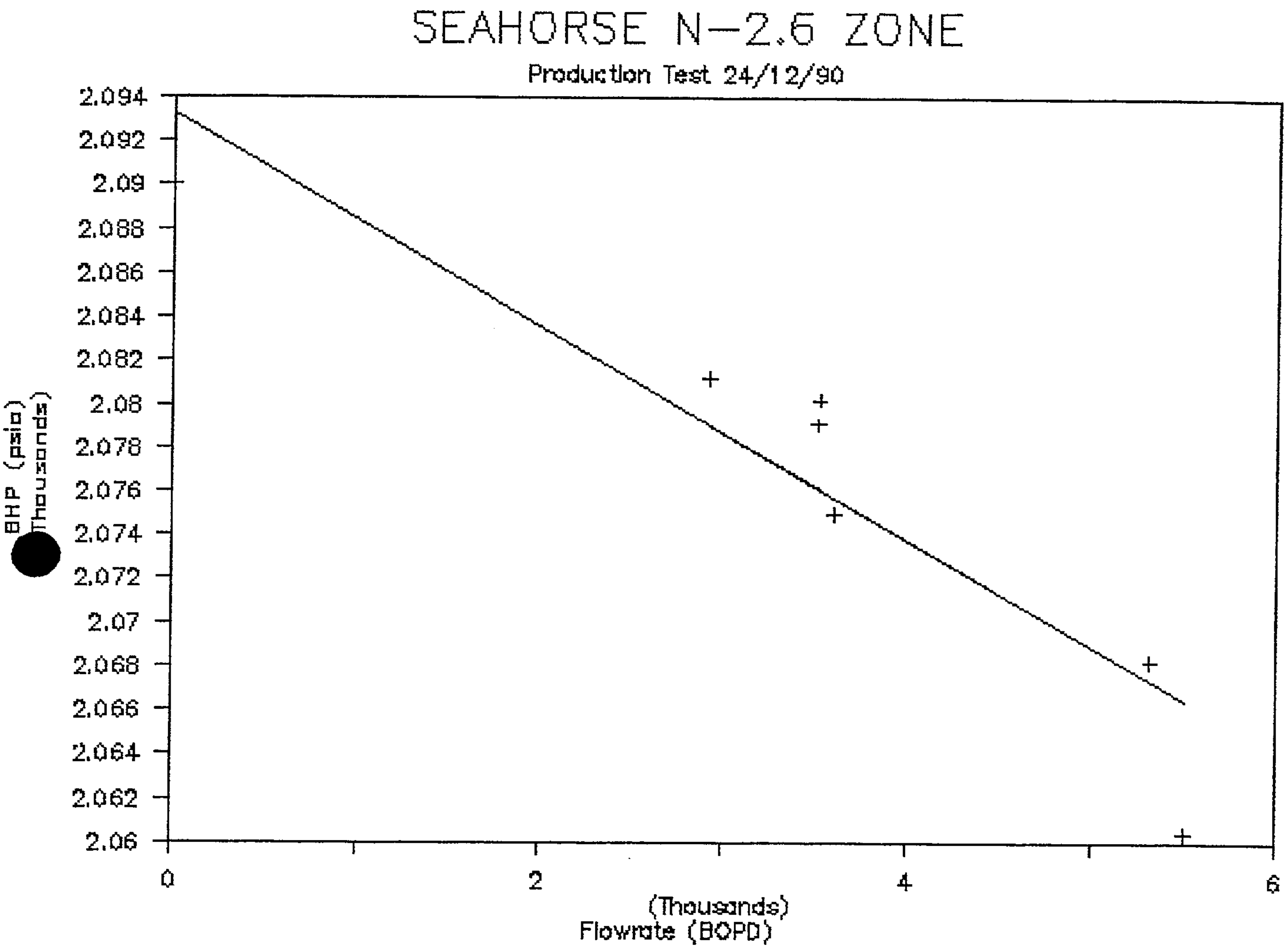

TARWHINE N-1 ZONE
Production Test 13/1/90
1.988
1.986
1.984
1.982
1.98
1.978
1.976
1.974
1.972
1.97
1.968
1.966
1.964
1.962
1.96
BHP (psia) (Thousands)
0
2
4
6
(Thousands)
Flowrate (BOPD)

Figure 4


SEAHORSE N-1 ZONE
Production Test 25/12/90
BHP (psia)
(Thousands)
2.08
2.075
2.07
2.065
2.06
2.055
2.05
2.045
2.04
2.035
0
2
4
6
(Thousands)
Flowrate (BOPD)


SEAHORSE N-2.6 ZONE
Production Test 24/12/90
BHP (psia)
(Thousands)
2.094
2.092
2.09
2.088
2.086
2.084
2.082
2.08
2.078
2.076
2.074
2.072
2.07
2.068
2.066
2.064
2.062
2.06
0
2
4
6
(Thousands)
Flowrate (BOPD)

APPENDIX 3

ESSO AUSTRALIA LTD

SUBSEA WELL COMPLETION REPORT

SUBSEA EQUIPMENT DETAILS

ESSO AUSTRALIA LTD

SUBSEA WELL COMPLETION REPORT

SUBSEA EQUIPMENT DETAILS

1 SYSTEM OVERVIEW

Both of the Seahorse-1 (SHS-1) and Tarwhine-1 (TWN-1) subsea wells produce to the existing Barracouta platform. A common control system operators console, hydraulic power unit and chemical injection skid have been installed on Barracouta along with common process equipment.

Both the Seahorse and Tarwhine crudes are light and relatively gassy.

Both subsea completions were installed on previously drilled exploration wells.

1.1 Downhole Equipment

The downhole completions for Seahorse-1 and Tarwhine-1 are simple 4-1/2 inch single production tubing strings with a short 2-3/8" annulus tubing string as shown in Figures 1 thru 4.

Seahorse-1 produces oil from two discrete reservoir units, commingled downhole via a sliding sleeve.

The Tarwhine-1 completion produces oil from a single zone.

A single gas lift mandrel has been provided in each completion string to enable gas lift via the production annulus.

Two tubing retrievable subsurface safety valves have been installed in tandem in each completion string. Each safety valve has an operating control line and a permanent lock-out line. It is intended to use the upper safety valve as the operating safety valve with the lower safety valve provided as a standby.

In the event of the operating safety valve failing it would be permanently locked out of service and the standby valve used. The permanent lock-out line cannot be accessed by the operating control system and requires a Remote Operated Vehicle (ROV) intervention. A communication nipple accessing the lower SCSSV control line has also been provided to enable a wireline insert sub-surface safety valve to be installed should both tubing retrievable safety valves fail.

1.2 Subsea Tree

Both the Seahorse and Tarwhine subsea christmas trees are 4 inch x 2 inch non-TFL 5000 psi MWP trees. A schematic of the trees is shown in Figure 5. Figure 6 shows a cross-section through the trees.

Each tree incorporates a tubing spool which was installed on the existing 18-3/4 inch Cameron Iron Works wellhead. A flowline retainer system has been provided on the tubing spool to retain the production line and annulus line in place when the tree is disconnected from the tubing spool. The tree is a single solid block type which provides vertical access to both the production and annulus bores. Both trees have a dual bore, orienting type tubing hanger which locks down in the tubing spool. The drift I.D. through the production and annulus bores in the tree/tubing hanger is 3.879 inches and 1.656 inches respectively.

Most valves on the subsea trees are hydraulically actuated with manual overrides. Some ROV actuated valves are also provided.

Control lines to the various valve actuators are routed over the tree cap to enable the tree running tool to have direct access to the valve actuators during installation and workover. This allows the subsea control module (SCM) to remain in place on the tree during installation and workovers.

The running tools for the tubing hanger, tree and tree cap are hydraulically actuated. The running tools provided for Seahorse and Tarwhine are common to both wells and are also suitable for use on other subsea wells which may be subsequently installed.

Seahorse and Tarwhine both require pipeline pigging facilities. These facilities have been provided in the form of an on-tree pigging manifold.

Both trees provide a tie-in point for a potential second well. This "tie-in point" consists simply of some additional piping on the tubing spool and a junction box (currently in storage at BBMT) for the connection of a jumper umbilical to a second well.

1.3 Control System

The operating control system for Seahorse and Tarwhine employs a multiplexed electro-hydraulic control system capable of expansion to control three additional wells. The electronics are housed in a one atmosphere chamber in the subsea control module (SCM).

An overview of the control system is shown in Figure 7.

A dual pressure hydraulic system has been provided with 3000 psi and 5000 psi nominal pressures to actuate the tree valves and subsurface safety valves respectively.

The control system requires the hydraulic fluid cleanliness to be maintained to NAS 1638 Class 8. The control system senses the production and annulus pressures, the production temperature, inferred valve position and a number of system parameters.

1.4 Umbilicals

Two chemical injection lines (1 x 3/4 inch and 1 x 1 inch), two hydraulic supply lines (1 x 1/2 inch x 3000 psi and 1 x 3/8 inch x 5000 psi) and electrical power and signal cables (plus redundant back-up cables) have been installed to both wells. The chemical injection lines, hydraulic supply lines and electrical cables are installed in a single composite armoured thermoplastic umbilical.

The chemical injection lines, two hydraulic supply lines and electrical cables are all connected to the umbilical junction plate mounted on the subsea tree and thence by hard pipe/wiring to the SCM mounting base.

1.5 Flowlines

Seahorse produces 11.3 km to Barracouta via a 6 inch flowline insulated to prevent wax deposition as the crude cools. A 2 inch annulus (gas lift) line has also been installed to provide gas lift gas from Barracouta.

Tarwhine produces 17.4 km to Barracouta via an 8 inch flowline, insulated to prevent hydrate formation. A 2 inch annulus (gas lift) line has also been installed to provide gas lift gas from Barracouta.

The production lines and annulus lines are connected to the flowline retainer piping on the tubing spools with flexible pipe spools.

2 PHASES OF OPERATION

The subsea equipment provided for the Seahorse-1 and Tarwhine-1 subsea wells was designed to support a number of different phases of operation including initial installation, production and a range of interventions, as outlined below.

2.1 Installation

Seahorse-1 and Tarwhine-1 were both originally drilled as exploration wells, in 1978 and 1981 - 82 respectively. Both wells used Cameron Iron Works WS-I marine wellheads.

In order to facilitate early tie-in of the pipelines to the subsea completions, the tubing spools (supplied by Vetco Gray) were installed at the Seahorse-1 and Tarwhine-1 well locations in August - September 1989.

The pipelines were then laid by the "Apache" reel ship and the flexible jumpers were connected to the hard piping on the tubing spools by divers working from the Stena "Seahorse-II" dive support vessel.

The downhole equipment (supplied by Sumitomo, Camco and Otis) and the subsea trees (supplied by Vetco Gray) were installed in December 1989 - January 1990.

The tubing spools and subsea trees were all installed using the semi-submersible drilling rig "Southern Cross", after which the umbilicals were connected to the trees by divers working from the Stena "Seahorse-II" dive support vessel.

2.2 Production

Production activities for the subsea wells will include regular subsurface safety valve leak tests, kick-off of gas lift operations, monitoring of production data, and pigging operations.

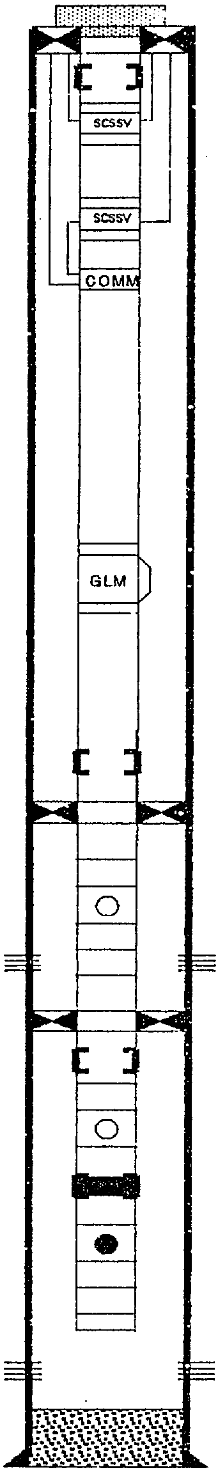
2.3 Interventions

A range of interventions may be required during the productive life of these subsea wells including; repair of the SCM, wireline workovers, tubing workovers, ROV override of an hydraulically actuated valve, operation of an ROV actuated valve or ROV lockout of a subsurface safety valve.

FIGURE 1

SEAHORSE 1

PRODUCTION COMPLETION SCHEMATIC



DESCRIPTION	APPROXIMATE DEPTH (mSS)
4" x 2" TUBING HANGER	40
4 - 1/2" DB-6 LANDING NIPPLE (3.812")	54
4 - 1/2" SURFACE CONTROLLED SUB-SURFACE SAFETY VALVE (SINGLE CONTROL LINE , DEDICATED HYDRAULIC LOCK LINE)	274
4 - 1/2" SURFACE CONTROLLED SUB-SURFACE SAFETY VALVE (SINGLE CONTROL LINE , DEDICATED HYDRAULIC LOCK LINE)	290
4 - 1/2" COMMUNICATION NIPPLE	305
4 - 1/2" TUBING	
4 - 1/2" SIDEPOCKET GAS LIFT MANDREL	896
4 - 1/2" DB-5 LANDING NIPPLE (3.687")	1369
9 - 5/8" OTIS HB HYDRAULIC SET PACKER	1370
CAMCO SLIDING SIDE SLEEVE (LEFT OPEN) (CAN BE USED FOR LANDING SEPARATION TOOL)	1391
PERFORATIONS	1401 TO 1424
9 - 5/8" OTIS HB HYDRAULIC SET PACKER	1450
4 - 1/2" DB-6 LANDING NIPPLE (3.563")	1458
OTIS SLIDING SIDE DOOR (LEFT OPEN)	1462
3 - 1/2" "XN" LANDING NIPPLE (2.750") - LEFT BOTTOM HALF OF PLUG IN PLACE	1467
SCHLUMBERGER ONE SHOT SLIDING SLEEVE (LEFT CLOSED)	1471
BULL NOSE	1482
NEW PERFORATIONS	1487 TO 1491
PBTD	1625
9 - 5/8" PRODUCTION CASING	1654

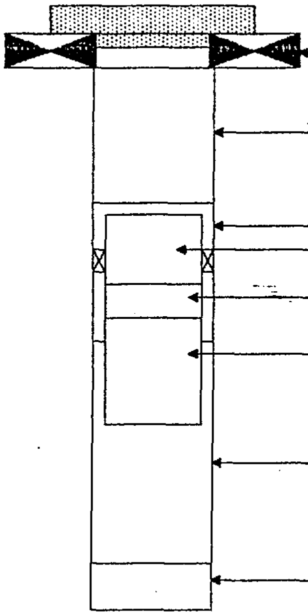
DEPTHS SHOWN ARE TO BOTTOM OF EACH ITEM.

REV 15

FIGURE 2

SEAHORSE 1

ANNULUS COMPLETION SCHEMATIC

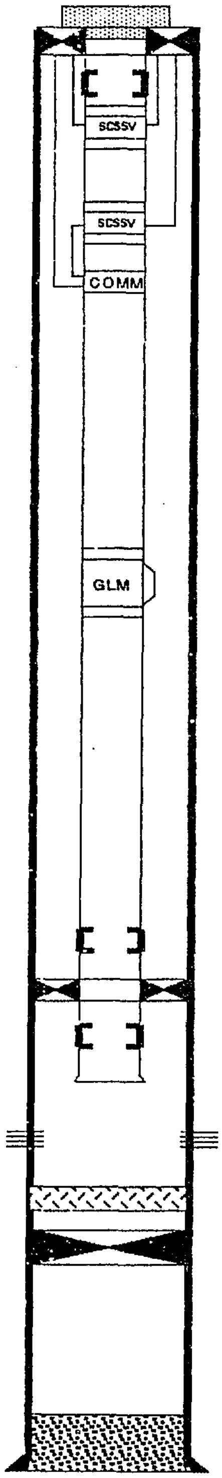


DESCRIPTION	APPROXIMATE DEPTH (mSS)
4" x 2" TUBING HANGER	40
2-3/8" SUB	
2-3/8" D LANDING NIPPLE	41
2-3/8" CC LOCK	
1-3/4" TYPE "J" EQUALIZING SUB	
2-3/8" A-3 SAFETY VALVE	
2-3/8" PUP JOINT	
2-3/8" PLUG CATCHER (PORTED)	42

FIGURE 3

TARWHINE 1

PRODUCTION COMPLETION SCHEMATIC



DESCRIPTION	APPROXIMATE DEPTH (m SS)
4" x 2" TUBING HANGER	39
4 - 1/2" LANDING NIPPLE (3.812")	53
4 - 1/2" SURFACE CONTROLLED SUB-SURFACE SAFETY VALVE (SINGLE CONTROL LINE , DEDICATED HYDRAULIC LOCK LINE)	270
4 - 1/2" SURFACE CONTROLLED SUB-SURFACE SAFETY VALVE (SINGLE CONTROL LINE , DEDICATED HYDRAULIC LOCK LINE)	286
4 - 1/2" COMMUNICATION NIPPLE	301
4 - 1/2" TUBING	
4 - 1/2" SIDEPOCKET GAS LIFT MANDREL	889
4 - 1/2" TUBING	
4 - 1/2" LANDING NIPPLE (3.687")	1338
9 - 5/8" HYDRAULIC SET PACKER	1339
4 - 1/2" LANDING NIPPLE (3.563")	1357
WIRELINE RE - ENTRY GUIDE	1358
PERFORATIONS	1366 TO 1380
REMAINS OF MODEL D PACKER	1420
EZSV	1429
PBTD	2873
9 - 5/8" PRODUCTION CASING	2909

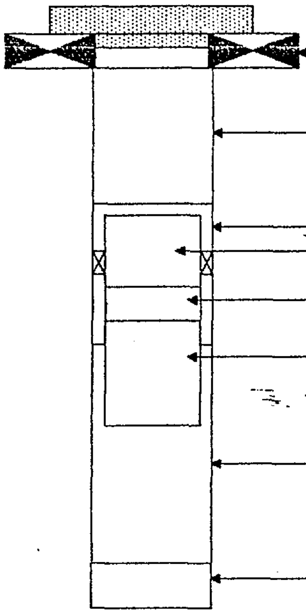
DEPTHS SHOWN ARE TO BOTTOM OF EACH ITEM.

REV 9

FIGURE 4

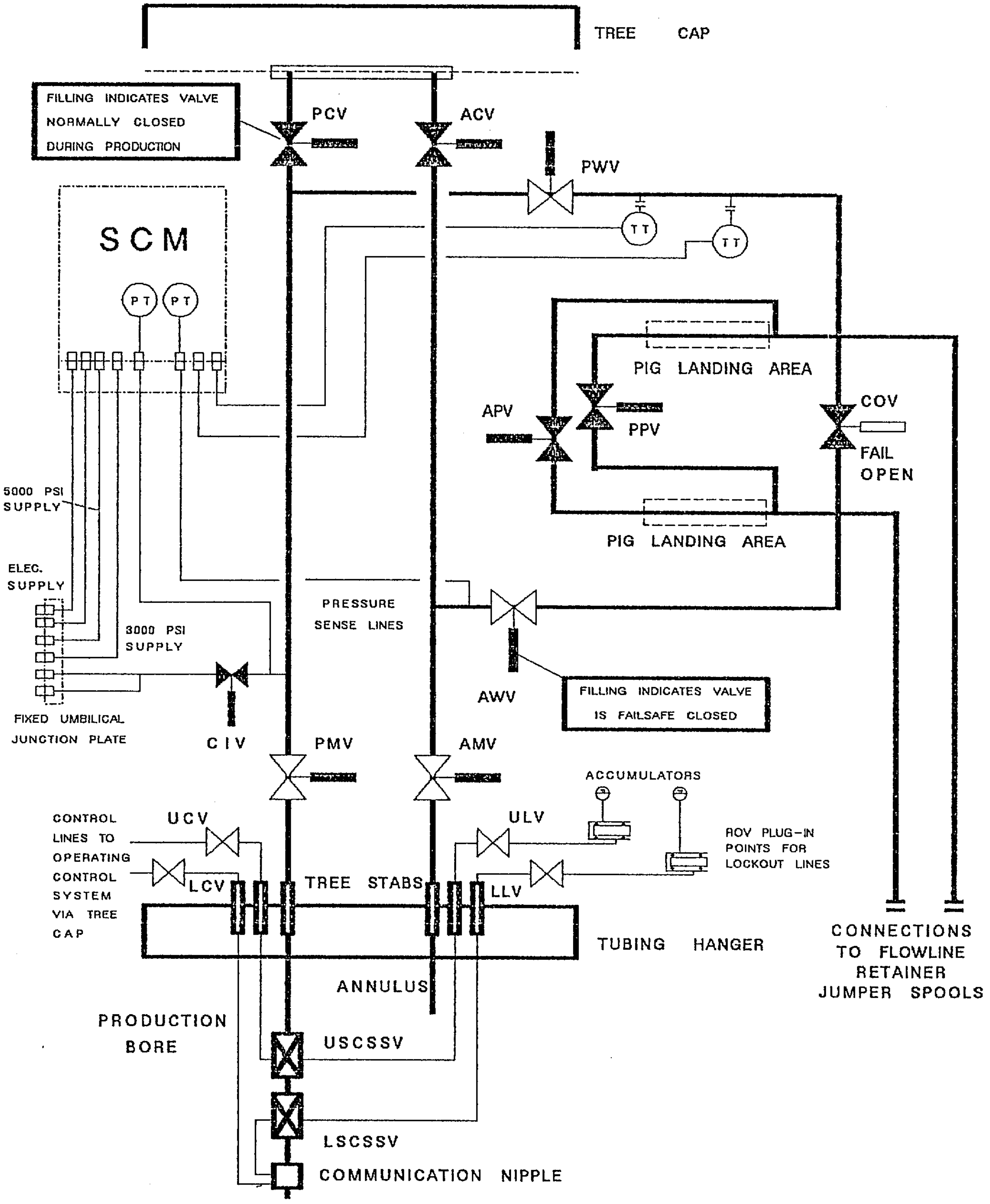
TARWHINE 1

ANNULUS COMPLETION SCHEMATIC



DESCRIPTION	APPROXIMATE DEPTH (mSS)
4" x 2" TUBING HANGER	39
2-3/8" SUB	
2-3/8" D LANDING NIPPLE	40
2-3/8" CC LOCK	
1-3/4" TYPE "J" EQUALIZING SUB	
2-3/8" A-3 SAFETY VALVE	
2-3/8" PUP JOINT	
2-3/8" PLUG CATCHER (PORTED)	41

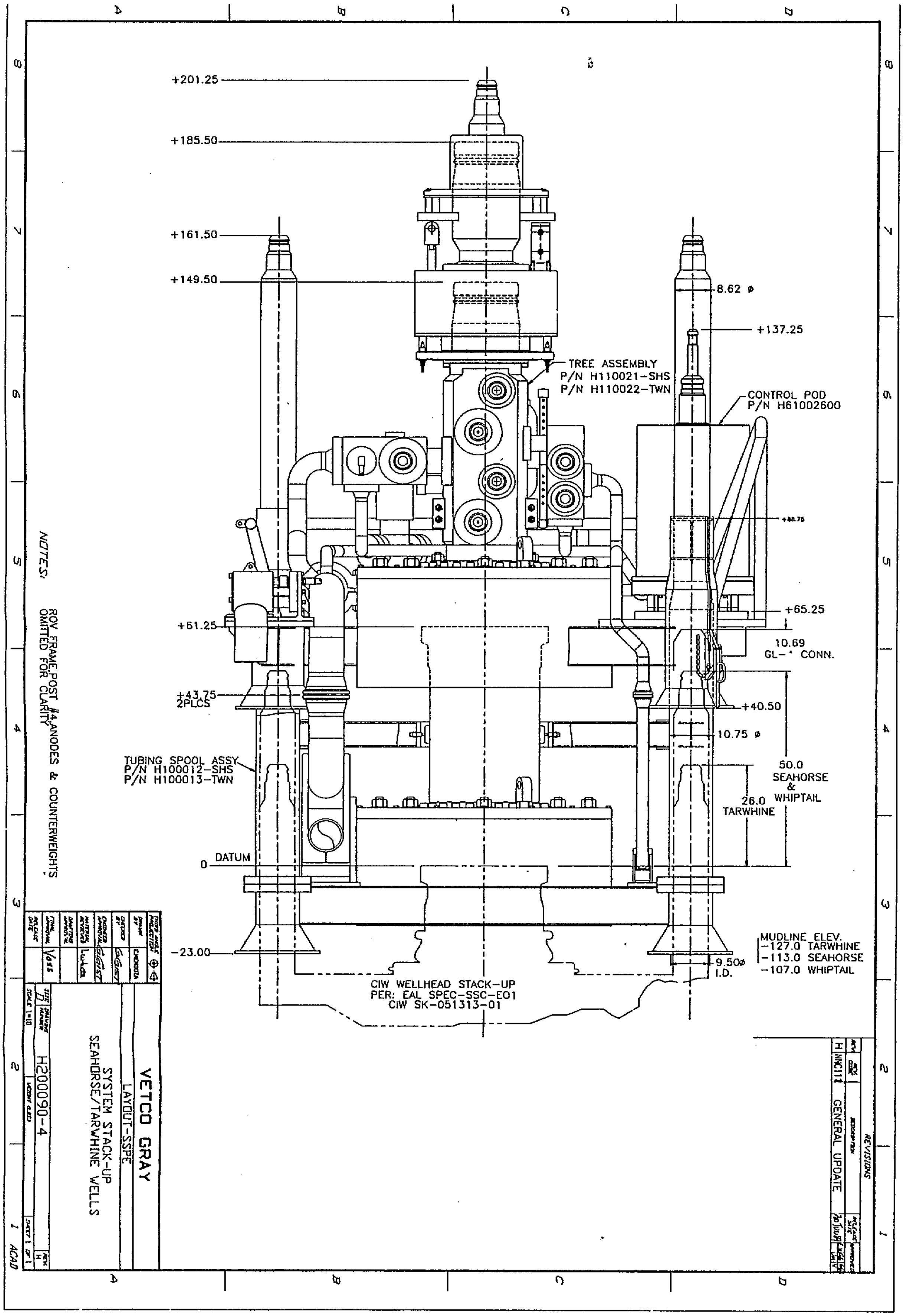
FIGURE 5



SUBSEA TREE SCHEMATIC

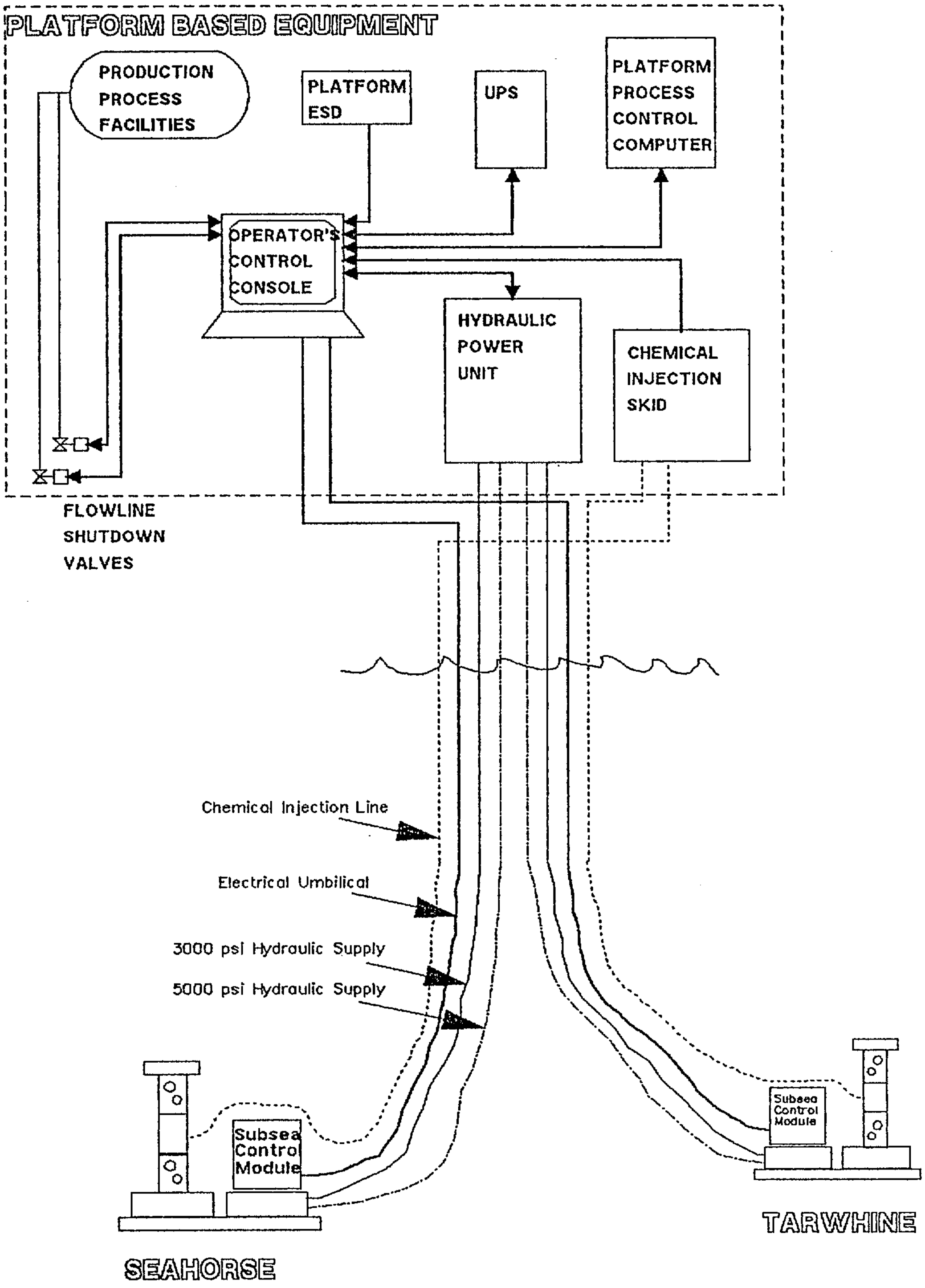
REV. 6

FIGURE 6



+201.25
+185.50
+161.50
+149.50
8.62 ø
+137.25
TREE ASSEMBLY
P/N H110021-SHS
P/N H110022-TWN
CONTROL POD
P/N H61002600
+65.25
+61.25
10.69
GL-* CONN.
+43.75
2PLCS
+40.50
10.75 ø
TUBING SPOOL ASSY
P/N H100012-SHS
P/N H100013-TWN
50.0
SEAHORSE
&
WHIPTAIL
26.0
TARWHINE
DATUM
D
-23.00
9.50ø
I.D.
MUDLINE ELEV.
-127.0 TARWHINE
-113.0 SEAHORSE
-107.0 WHIPTAIL
CIW WELLHEAD STACK-UP
PER: EAL SPEC-SSC-E01
CIW SK-051313-01
NOTES:
ROV FRAME,POST #4,ANODES & COUNTERWEIGHTS
OMITTED FOR CLARITY.
VETCO GRAY
LAYOUT-SSPE
SYSTEM STACK-UP
SEAHORSE/TARWHINE WELLS
H200090-4
D
SCALE 1=10
REV H
ACAD
REVISIONS
H
GENERAL UPDATE

FIGURE 7



CONTROL SYSTEM OVERVIEW
ELECTROHYDRAULIC SYSTEM

REVISION 1
FIG14
31-MAY-88

ENCLOSURES

ENCLOSURES

PE902691

This is an enclosure indicator page.
The enclosure PE902691 is enclosed within the container PE906376 at this location in this document.

The enclosure PE902691 has the following characteristics:

ITEM_BARCODE = PE902691
CONTAINER_BARCODE = PE906376
NAME = Time Structure Map
BASIN = GIPPSLAND
PERMIT =
TYPE = WELL
SUBTYPE = HRZN_CNTR_MAP
DESCRIPTION = Time Structure Map Top of Latrobe Group(enclosure from WCR) for Seahorse-1
REMARKS =
DATE_CREATED = 30/09/78
DATE_RECEIVED =
W_NO = W755
WELL_NAME = SEAHORSE-1
CONTRACTOR =
CLIENT_OP_CO = ESSO STANDARD OIL AUSTRALIA LTD

(Inserted by DNRE - Vic Govt Mines Dept)

PE902694

This is an enclosure indicator page.
The enclosure PE902694 is enclosed within the container PE906376 at this location in this document.

The enclosure PE902694 has the following characteristics:

ITEM_BARCODE = PE902694
CONTAINER_BARCODE = PE906376
NAME = Structure Map
BASIN = GIPPSLAND
PERMIT =
TYPE = WELL
SUBTYPE = HRZN_CNTR_MAP
DESCRIPTION = Structure Map Top of Coarse Clastics (enclosure from WCR) for Seahorse-1
REMARKS =
DATE_CREATED = 31/10/78
DATE_RECEIVED =
W_NO = W755
WELL_NAME = SEAHORSE-1
CONTRACTOR =
CLIENT_OP_CO = ESSO STANDARD OIL AUSTRALIA LTD

(Inserted by DNRE - Vic Govt Mines Dept)

PE902693

This is an enclosure indicator page.
The enclosure PE902693 is enclosed within the container PE906376 at this location in this document.

The enclosure PE902693 has the following characteristics:

ITEM_BARCODE = PE902693
CONTAINER_BARCODE = PE906376
NAME = Structure Map Coal Near Base of Lower N Asperus
BASIN = GIPPSLAND
PERMIT =
TYPE = WELL
SUBTYPE = HRZN_CNTR_MAP
DESCRIPTION = Structure Map Coal Near Base of Lower N Asperus
REMARKS =
DATE_CREATED = 1/09/78
DATE_RECEIVED =
W_NO = W755
WELL_NAME = SEAHORSE-1
CONTRACTOR =
CLIENT_OP_CO = ESSO STANDARD OIL AUSTRALIA LTD

(Inserted by DNRE - Vic Govt Mines Dept)

PE902692

This is an enclosure indicator page.
The enclosure PE902692 is enclosed within the container PE906376 at this location in this document.

The enclosure PE902692 has the following characteristics:
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CONTAINER_BARCODE = PE906376
NAME = Structure Map
BASIN = GIPPSLAND
PERMIT =
TYPE = WELL
SUBTYPE = HRZN_CNTR_MAP
DESCRIPTION = Structure Map Top of Latrobe Group (enclosure from WCR) for Seahorse-1
REMARKS =
DATE_CREATED = 31/10/78
DATE_RECEIVED =
W_NO = W755
WELL_NAME = SEAHORSE-1
CONTRACTOR =
CLIENT_OP_CO = ESSO STANDARD OIL AUSTRALIA LTD

(Inserted by DNRE - Vic Govt Mines Dept)

PE902695

This is an enclosure indicator page.
The enclosure PE902695 is enclosed within the container PE906376 at this location in this document.

The enclosure PE902695 has the following characteristics:

ITEM_BARCODE = PE902695
CONTAINER_BARCODE = PE906376
NAME = Sonic Calibration Curve
BASIN = GIPPSLAND
PERMIT =
TYPE = WELL
SUBTYPE = VELOCITY_CHART
DESCRIPTION = Sonic Calibration Curve (enclosure from WCR) for Seahorse-1
REMARKS =
DATE_CREATED = 30/09/78
DATE_RECEIVED =
W_NO = W755
WELL_NAME = SEAHORSE-1
CONTRACTOR =
CLIENT_OP_CO = ESSO STANDARD OIL AUSTRALIA LTD

(Inserted by DNRE - Vic Govt Mines Dept)

PE906380

This is an enclosure indicator page.
The enclosure PE906380 is enclosed within the
container PE906376 at this location in this
document.

The enclosure PE906380 has the following characteristics:
ITEM_BARCODE = PE906380
CONTAINER_BARCODE = PE906376
NAME = Time-Depth Curve
BASIN = GIPPSLAND
PERMIT = VIC/L1
TYPE = WELL
SUBTYPE = VELOCITY_CHART
DESCRIPTION = Time-Depth Curve (basic) for Seahorse-1
REMARKS =
DATE_CREATED = 17/08/78
DATE_RECEIVED = 30/03/79
W_NO = W705
WELL_NAME = SEAHORSE-1
CONTRACTOR =
CLIENT_OP_CO = ESSO AUSTRALIA LIMITED

(Inserted by DNRE - Vic Govt Mines Dept)

PE603786

This is an enclosure indicator page.
The enclosure PE603786 is enclosed within the container PE906376 at this location in this document.

The enclosure PE603786 has the following characteristics:

ITEM_BARCODE = PE603786
CONTAINER_BARCODE = PE906376
NAME = Well Completion Log
BASIN = GIPPSLAND
PERMIT = VIC/L1
TYPE = WELL
SUBTYPE = COMPLETION_LOG
DESCRIPTION = Well Completion Log for Seahorse-1
REMARKS =
DATE_CREATED = 2/09/78
DATE_RECEIVED =
W_NO = W705
WELL_NAME = SEAHORSE-1
CONTRACTOR =
CLIENT_OP_CO = ESSO AUSTRALIA LIMITED

(Inserted by DNRE - Vic Govt Mines Dept)