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32 pages

ESSO

MUSSEL-1

WELL COMPLETION REPORT

by

C.K. LUNT

January 13, 1970.

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The location of Mussel-1 was chosen to test the Waarre Formation at its highest structural position in a large fault block where the sand interval is thrust upward against overlying marine Belfast Shale. At the same time the location permitted the evaluation of Tertiary sands (Eocene Mepunga and Dilwyn Formations). Minor structural closure was observed within and at the top of this sequence.

III W E L L H I S T O R Y

1. General Data.

(a) Well Name and Number
Esso Mussel-1

(b) Name and Address of Operator

Esso Exploration and Production Australia Inc.
G.P.O. Box 4249,
SYDNEY NSW 2001.

(c) Name and Address of Tenement Holder

Hematite Petroleum Pty.Ltd.
G.P.O. Box 2752,
MELBOURNE VIC 3001

(d) Petroleum Tenement

Shot Point 6063 P.E.P. No.40 - held by Hematite Petroleum Pty.Ltd.

(e) District

Offshore Otway - SW Victoria

(f) Location

Latitude	38°	57'	45.993" south
Longitude	142°	46'	21.676" east

(g) Elevation datum

Rotary Table 99 feet above mean sea level

(h) Water depth

280'

(i) Total depth

8038'

(j) Date Drilling Commenced

August 18, 1969.

(k) Date Total Depth Reached

September 7, 1969.

(l) Date Well Abandoned

September 14, 1969

1. (m) Date Rig Released

September 16, 1969

(n) Drilling Time in Days to Total Depth

23.4 days (31.8 days to release)

(o) Status

Plugged and abandoned.

(p) Total Cost

To be submitted at a later date

2. Drilling Data

(a) Name and Address of Drilling Contractor

Ocean Drilling and Exploration Company (Aust) Ltd.
180 Russell St.,
Melbourne, VIC 3000

(b) Drilling Plant

Make:	EMSCO
Type:	A1500E
Rate Capacity:	20,000 feet with 5" drill pipe.
Motors:	2-1000HPDC Electric Motors with Dynamtic 6032 brakes.

(c) Mast/derrick

Lee C. Moore 40' x 40' x 142' Cantilever mast, 1,000,000 lb. hook load capacity.

(d) Pumps

Make:	EMSCO	EMSCO
Type:	D1350	D1350
Size:	8" x 18"	
Motor:	D.C. Electric direct drive 1350 H.P.	

Electric Power

Two (2) Fairbanks Morse Model 38 D-8-1/8 O.P. diesel engines, each rated 1800 HP at 720 RPM, each drving 2-1200 KW D.C. generators and one KVA volt alternator. One (1) Fairbanks Morse Model 38 D-8-1/8 O.P. Diesel engine rated at 18-0 H.P. at 720 RPM driving 3-1200 KW D.C. generators and one 300 KVA 440 volt alternator.

(e) B.O.P. Rquipment

Make:	Hydril Cameron Tripe "U"
Size:	16¾"(GK)
Working Pressure:	5,000 P.S.I.

(f) Hole Sizes and Depths

(Kelly Bushing Measurement)

36"	to	435'
26"	to	920'
17½"	to	2250'
12¼"	to	8038'

2. (g) Casing and Cementing Details

Size:	30"	20"	13-3/8"
Weight:	30' of 300lb/ft.	60' of 167 lb/ft. Remainder 150 lb/ft.	54.5lb/ft.
Grade:	B	H	J-55
Range:	3	3	
Set:	410.55'	882'	2200'
Shoes:	None	882'	2200'
Collars:	None	None	2017
Centralizers:	None	None	2st, 2nd, 4th, 6th & 8th jt.

Note: Cemented 20" with 30" pile joint attached with 1100 sx. Australian "N" + 2% pre-hydrated gel. followed by 500 sx. Australian "N" + 2% $CaCl_2$. Cemented 13-3/8" with 325 sx Australian "N" followed by 325 sx Australian "N" + 2% $CaCl_2$.

(h) Weekly Summaries of Mud Properties

	Week of Aug. 28	Week of Sept. 5	Week of Sept. 12
Wt.	10.8 ppg	10.4 ppg.	10.5 ppg
Visc.	48 sec.	43 sec.	44 sec.
Fluid loss	14.5 cc	10.8 cc	8.6 cc
% Sand	1¼	1/8	1
% Solid	14	15	16
Oil	-	-	-
P.H.	11.0	9.0	9.5
Alk.	0.03	0.10	0.15

(i) Water Supply

Fresh water transported by Smit-Lloyd vessels Nos. 12, 14 and 33 from Barry Beach Marine Terminal.

(j) Perforations

None

(k) Plugs

	No.1	No.2	No.3	No.4
Depth	7508-7390	6936-6725	2262-2023	609-504
Cement sacks	100	150	225	75
type	Aust "N" + 2%$CaCl_2$	Aust."N" + 2%$CaCl_2$	Aust."N" + 2% $CaCl_2$	Aust."N" + 2%$CaCl_2$

(l) Fishing Operations

Fifteen 7-3/4" drill collars, 1 bit sub, 2 complete and 1 partial bassh Ross bumper sub were left in the hole due to inability to latch onto fish. Twist off depth 8038 feet.

(m) Side Tracked Hole

None

3. Logging and Testing

(a) Ditch Cuttings

Four samples were taken and preserved for every 10' interval (except cored intervals) from 1050' to total depth. One set of samples was dried, bagged and despatched to the Bureau of Mineral Resources in Canberra, one set was sent to the Victorian Mines Department, one set was sent to Hematite Petroleum Pty.Ltd., and one set was retained by Esso.

(b) Coring

Core Number	Interval Cored	Footage Cut	Recovery in feet	Recovery %
1	6881 - 6903	22	17	78
2	6903 - 6954	51	0	0
3	7335 - 7357	22	9	44
1-3		95	26	30.6

Repositories of Core Material

Centre slab of core retained at Esso Spottswood Warehouse, Melbourne, Victoria.

Side slabs of each core retained by Bureau of Mineral Resources, Canberra, A.C.T. and the Victoria Mines Department, Melbourne, Victoria.

(c) Sidewall Sampling

All sidewall cores by Schlumberger wire line chronological sample taker.

Depth (in ft.)	Recovery (in inches)	Depth (in ft.)	Recovery (in inches)	Depth (in ft.)	Recovery (in inches)
929	1½	2160	1¼	4854	1-3/4
930	1½	2229	2	5084	1½
1000	1½	2230	1¼	5187	1-3/4
1099	1½	2462	2	5420	3/4
1100	1½	2629	2	5600	1-3/4
1200	2	2750	1-3/4	5764	1-3/4
1299	2	2997	2	5909	2
1300	1½	3149	1½	6061	1¼
1400	2	3190	1¼	6071	1½
1499	2	3227	½	6073	1
1500	1½	3233	½	6075	1½
1600	2	3234	1-3/4	6077	2
1699	1½	4085	3/4	6079	2
1700	1	4152	1½	6081	1-3/4
1800	2	4208	1-3/4	6660	1½
1899	1¼	4315	1-3/4	7348	1
1900	1½	4462	1¼	7360	3/4
2000	N.R.	4543	1¼	7396	½
2099	½	4654	1½	7428	3/4
2100	2¼	4735	1	7449	3/4
				7490	½

The above sidewall core residues will be retained by Esso's Spotswood Warehouse Melbourne, Victoria, although in some cases the preparation of palynological, micro-paleontological samples and chemical analyses may destroy the small core.

4. Electrical and Other Logging Surveys

(a) Schlumberger Logs

	Run 1.	Run 2.
Induction Electric Log	882-2247	2197-7500
Borehole Compensated Sonic Gamma-Ray Log (Gamma-Ray ran to surface)	882-2247	
Compensated Formation Density Gamma-Ray Log	2197-7332	7200-7500
Borehole Compensated Sonic Log with SP		2197-7500
Continuous Dipmeter Log (3 arm)		2197-7503

(b) Penetration Rate

A record of penetration rate was kept at all times during drilling and is presented in figure 3 of this report.

(c) Mudgas Log

Mudgas logging services were carried out by Exploration Logging Inc. under the supervision of Esso geologists. In addition to the continuous hotwire, a gas chromatograph was used to detail all mud gas shows. Also a CO_2 analyses was in operation during the drilling of the well. Cuttings gas was measured with a Waring blender and recorded. The cuttings were also examined for fluorescence and stain. The mudgas log is included in figure 3 of this report.

(d) Deviation Surveys

Sonde position showing the hole deviation was recorded every 100 feet on the continuous Dipmeter Log from 2197 to 7503 feet. Hole deviation did not exceed 3 degrees during drilling.

(e) Temperature Surveys

None, except thermometer run on Schlumberger logging tools which are as follows : - 100° at 1365 ... 154° at 7500'.

(f) Velocity Surveys

A velocity survey was carried out by United Geophysical Corp. The results are included as an appendix to this report (Figure 4).

(g) Other Surveys

None

5. Testing

(i) Formation tests - none

(ii) Production tests - none

IV GEOLOGY

1. Summary of Previous Work

The search for petroleum has been carried out in the Otway Basin for many years and, although no commercial occurrences of hydrocarbons have been discovered to date, several wells have recorded shows of gas and oil. For example, the Frome-Broken Hill Pty.Limited Port Campbell No.1 recorded an initial gas flow of 4.2 MMCFD with some condensate from what is believed to be the Upper Cretaceous Waarre Formation. Rapidly declining pressure, however, proved the interval to be non-commercial in this well. An offset, Port Campbell No.4 produced small quantities of oil emulsion with gas cut salt water. More recently the Shell Development (Australia) Pty.Ltd., Pecten 1A flowed gas at the rate of 90 MCFD plus salt water from a 42' interval of the Waarre Formation.

Other gas shows are of a minor nature except at Alliance Oil Development Caroline No.1 which is producing carbon dioxide from both the Lower and Upper Cretaceous.

The following is a list of recent geophysical surveys carried out by Hematite Petroleum Pty.Ltd. and Esso.

Hematite Petroleum Pty.Ltd.

1. Aeromagnetic Survey completed in 1962.
2. 743 miles of single-fold seismic coverage in 1963.
3. 1554 miles of 3-fold CDP and 321 miles of single-fold seismic coverage completed in 1965.

Esso Exploration and Production Australia

1. 2364 miles of 6-fold seismic coverage completed in 1966 and early 1967.
2. 970 miles of 6-fold seismic coverage shot in late 1967 and early 1968.
3. 47 miles of 6-fold (Aquapulse) carried out in November 1968 (EU Survey)
4. 1110 miles of 12-fold (Aquapulse) carried out in September through November 1968 (ER Survey)

Existing Geological Work

A considerable amount of geological work has been done onshore in the Otway Basin. However, offshore information has come mainly from seismic control in conjunction with geological and geophysical data from the Crayfish-1, Prawn-1, Nautilus-1 and Argonaut-1 drilled by Esso and the Pecten 1A, Nerita 1A and Voluta 1A drilled by Shell Development (Aust.) Ltd.

2. Summary of Regional Geology - Otway Basin

The Otway Basin is of Mesozoic to Late Tertiary age and trends east-west across southwestern Victoria into South Australia. This is almost at right angles to the major trend in the underlying basement rocks, which are probably Paleozoic metasediments deposited in the Tasman Geosyncline.

The Otway Basin encompasses a 33,000 square mile area, and as such is relatively small in size when compared with the similar aged Great Artesian and Murray Basin downwarps.

Otway Basin sedimentation was initiated by sporadic deposition of thick Lower Cretaceous, non-marine clastics which are locally known as the Pretty Hill sand, and/or the Crayfish sand facies of the Otway Group. At the termination of coarse clastic deposition, these sediments were uplifted and truncated. Typical Merino-Otway Group finer sediments overly the older coarse clastics which consist of non-marine greywackes, mudstones and coal deposited in a northwest-southeast trending trough which was parallel to the present coast of Victoria and South Australia from Gippsland to Cape Jaffa.

The Otway Group is unconformably overlain by paralic clastics of the Sherbrook Group of Upper Cretaceous age. At the close of the Upper Cretaceous time the pre-Tertiary rocks were subjected to uplift and erosion and a widespread regional unconformity developed in the Otway Basin.

During Paleocene through to Upper Eocene time gentle subsidence took place in the Otway Basin and up to 4000 feet of predominantly clastic sediments were deposited in an environment ranging from paralic to neritic. In Upper Eocene through Lower Pliocene time, marls and limestones were deposited in the Otway Basin by an overall transgressive sea. Marine conditions persisted into late Miocene time when the transgression reached its fullest extent. During Pliocene time the Otway Basin was subjected to regional uplift which was probably accompanied by some gentle folding and faulting. Volcanism was widespread during this time in Tasmania and west-central Victoria. In late Pliocene and Pleistocene time the sea assumed its present position.

3. Stratigraphic Table - Mussel-1

The stratigraphic nomenclature applied to Mussel-1 corresponds to that recognized in the Port Campbell area. No new lithological sequences were encountered in the well.

(Depths relative to Rotary Table -subtract 99 (30.2 m) feet for subsea depths.)

	Interval	Thickness
Water depth 280'	RT - 379'	(379)
Tertiary		
Miocene-Oligocene		
Port Campbell Limestone	379-1350'	(971')
*Note first samples recovered at 1050'		
Gellibrand Marl Formation	1350'-2780'	(1430')
Clifton Formation	2780-2830'	(50')
Eocene - Browns Creek Group		
Narrawaturk Marl Formation	2830-3230	(400')
Mepunga Formation	3230-4076'	(846')
Paleocene - Wangerrip Group		
Rivernook Formation	4076-4252'	(176')
Pebble Point Formation	4252-4592'	(340')
Upper Cretaceous		
Sherbrook Group		
Belfast Formation (1.085) 4493'	4592-6594'	(2002')
Flaxmans Formation	6594-6836'	(242')
Waarre Formation	6836-7300'	(464')
Lower Cretaceous		
Otway Formation (1.588) 7201'	7300' -	

4. Stratigraphy in Mussel-1

(a) Tertiary 379-4592'

Miocene - Oligocene 379-2830'

The presence of the Port Campbell Limestone is inferred from electric log

character, seismic correlation and cavings, as cuttings samples were first recovered in the underlying Gellibrand Marl. From wells drilled in the area it is described as a white to light grey fine to coarse grained, porous calcarenite with abundant fossils, frequently to the extent that it is classified as a coquina. Traces of glauconite and lithic sand grains are generally present.

The top of the Gellibrand Marl was picked at 1350 feet and based solely on electric log character. However, the boundary with the overlying limestone is most certainly transitional as indicated by cuttings samples. In the upper 400 feet of section numerous stringers of limestone appear indistinguishable from that of the Port Campbell Formation. The Gellibrand is a light grey minutely granular marl, medium soft and occasionally very fossiliferous. Detrital, medium to coarse, quartz grains are often present. Fragments of glauconite and pyrite are rare.

The Clifton Formation is a 50 foot thick occurrance of pink to orange micritic limestone separating the Gellibrand from the similar Narrawaturk Marl below. It contains abundant skeletal material and some dark brown, subangular to sub rounded lithic fragments. The Clifton has a wide distribution relative to its thickness. With only negligible variation in thickness this 50' bed of micrite can be correlated from the on shore Port Campbell area to Mussel-1 and Prawn-1.

Eocene 2830-4076'

The Eocene Browns Creek Group was encountered at 2830 feet with the penetration of the Narrawaturk Marl. Lithologically this marl is similar to the Gellibrand Marl but has a greenish cast and becomes fissile towards the bottom. Forams and fossil fragments are common in the Narrawaturk.

The Tertiary clastic section came in at 3230 feet with the penetration of Mepunga Sandstone. The upper 400 feet of this 846 foot section shows very little interbedding with shaley material. It consists of medium to coarse (with pebble sizes in the top 100 feet), poor to well sorted and subangular to well rounded quartz grains. It appears unconsolidated in cuttings samples, contains abundant calcareous fragments and up to 30% fossil material (forams and bryozoa). In the lower 450 feet interbedding with light to dark brown calcareous fossiliferous siltstone becomes evident. This sequence possibly represents Dilwyn equivalent strata deposited from uppermost Paleocene times through the Lower Eocene.

Paleocene 4076-4592'

The Paleocene was encountered with the Rivernook Formation at 4076 feet. The Rivernook in Mussel-1 consists almost entirely of dark brown quartzose siltstone with clayey matrix. Below the Rivernook, basal Tertiary sand of the Pebble Point Formation was encountered at 4252 feet. It is medium to coarse grained, subangular to rounded well sorted quartz sandstone with approximately 30% dark brown non-calcareous silty nodules with onion skin structure in the upper 30 feet. The lower 200 feet is well interbedded with dark brown siltstone and shale.

(b) Upper Cretaceous 4592-7300'

The Upper Cretaceous came in with the predicted Belfast Formation. Sands of the Curdies and Paaratte Formation which generally mark the top of the Upper Cretaceous were not expected in the Mussel area. The Belfast section is a monotonous column of shaley siltstone to silty shale with a thickness of 2002 feet. The upper 300 feet shows interbedding with sand of medium grain size and abundant silty matrix.

65%

Separating the Belfast from the Waarre is 242 feet of Flaxmans Formation. Sample returns were extremely poor through this sequence, but electric logs indicate that this zone consists of shaley siltstone with thin (up to 15 feet) beds of silty sandstone.

The Waarre Sand came in at 6836 feet.
A core was cut from 6881 to 6903 feet recovering 17 feet of fine to medium grained, well sorted, sub-angular to sub-rounded friable quartz sand. It is thinly interbedded with black, micaceous, carbonaceous fissile shale. Burrowing is occasionally observed. Results of core analyses (see Appendix 2 of the report) indicate sand porosities ranging up to 25.5% and permeabilities up to 1650 MD. These sands persist for 264 feet to a depth of 7100 feet and then interbedding of silty sand and siltstone occurs with the siltstone dominating and increasing towards the base.

(c) Lower Cretaceous 7300' -

The Otway Formation is picked at 7300' with the appearance of dark grey shale, which predominates through the section, and both dolomitic and carbonaceous siltstones. Medium to very coarse sand grains also occur in the cuttings as unconsolidated grains. A core was cut from 7335 to 7357 feet from which 9 feet of medium dark grey to black, hard, carbonaceous shale was recovered in which was bedded a 4" band of medium grey claystone containing unconsolidated sand grains up to pebble size. A one foot coal bed occurs at the bottom of the core.

Due to technical difficulties the well could not be logged below 7500'. Cuttings samples, however, indicated interbedding of clay choked, slightly dolomitic, poorly sorted, fractured sandstone with associated mica and glauconite nodules interbedded with carbonaceous shale.

5. Structure.

The drilling of the well substantiated the structural interpretation of the Mussel prospect. Figure-1 is a dip section extending northeast to southwest through the location and compares the original prognosis with the results of drilling.

The Waarre sandstone is immediately overlain by 242 feet of interbedded shale and tight siltstone of the Flaxmans Formation which is, in turn, overlain by 2002 feet of marine Belfast shale. Underlying the Waarre is tight shaley mudstone of the Otway Formation. The structure of Mussel-1 is provided by a north dipping, tilted fault block, with approximately 1800 feet of throw, whereby Waarre sandstone is faulted against the Belfast shale. The structural closure is 14 square miles.

The Eocene sands of the Mepunga formation proved to have minor structural closure. Prior to drilling it was postulated that the top of the sand sequence owed its structure mainly to drape over thick underlying beds. Drilling results, however, proved this "draped sequence" to be marl deposits of the Narrawaturk Formation. Mepunga closure is now recognised as resulting from differential erosion just prior to the Marl deposition. Maximum effective depth of closure is 200 feet. The closed area encompasses 3.7 square miles.

6. Relevance to the Occurrence of Hydrocarbons

During the drilling of Mussel-1 no significant shows of hydrocarbons were encountered. Figure 6&7 shows, in the form of a Magnolia plot, the results of resistivity vs. porosity.

7. Porosity and Permeability of the Section Penetrated

In the Tertiary section 1186 feet of porous and permeable sands were penetrated. These include the following : -

1. Mepunga Formation (Eocene) 846 feet. No cores were cut in this section but density log calculations indicate porosities averaging over 30 percent with a maximum recorded at 34 percent.

2. Pebble Point Formation (Paleocene); 340 feet. Porosities based on density log calculations indicate an average of 22 percent with a maximum of 25 percent.

In the Upper Cretaceous 706 feet of section was penetrated which contains some porous and permeable sandstones.

1. Flaxmans Formation: 242 feet of siltstone with interbeded sandstone. Density log calculations indicate a total of 19 feet of sandstone with an average porosity of 14 percent and a maximum of 16 percent.

2. Waarre Formation: 464 feet of section with 210 feet of porous sandstone. A core was recovered close to the top of the section from which analyses indicate porosities ranging from 19 to 25.5 percent and permeabilities from 85 to 3300 milidarcies.

8. Contributions to Geological Concepts Resulting from Drilling

The drilling results of Mussel-1 conformed very closely to original predictions both stratigraphically and structurally. A minor exception was the absence of Dilwyn sand which, prior to drilling, was thought to have structural closure due to drape over a locally thick deposit of Mepunga. The formation encountered, however, was the Narrawaturk Marl.

Geologically conditions in Mussel-1 appear favorable for trapping hydrocarbons, and the well is considered a valid test of the strata penetrated. No shows of oil or gas however, were encountered. In the Eocene Mepunga sandstone water resistivities were high indicating post depositional fresh water flushing. This fact is widely recognized throughout the Otway Basin and explains the lack of hydrocarbon shows in the Tertiary. The porous and permeable Waarre Formation is sealed above by 2000 feet of marine Belfast Shale and below by several hundred feet of shale, siltstone and tight sandstone of the Lower Cretaceous Otway Group. As the Waarre does have a good top and bottom seal, the total absence of hydrocarbons is not clearly understood.

Most probably there are several contributing factors. Among them is the possibility that Mussel-1 being over 10 miles from Shells Pecten 1A well (which tested small amounts of gas) and approximately 30 miles from Frome-Broken Hill's Port Campbell-4 (which tested 4.2 mmdcfg/d plus some condensate) is situated in an area not conducive to hydrocarbon generation. Also there is the possibility that the trapping mechanism at Mussel occurred after any hydrocarbon migration.

V REFERENCES

1. Prawn-1 Well Completion Report

   Esso Exploration and Production 1968

2. Nautilus-1 Well Completion Report

   Esso Exploration and Production 1968

3. Pecten A-1 Well Completion Report

   Shell Development (Australia) Pty. Ltd. 1967

PALYNOLOGICAL REPORT ON ESSO MUSSEL NO. 1, OTWAY BASIN

by

P.R. EVANS & R.D. MULHOLLAND

Palyn. Rept. 1969/17

December 17, 1969.

INTRODUCTION

Available sidewall cores, main core samples and selected cuttings from Mussel No.1 have been examined for their spore/pollen and dinoflagellate content. The results of this study are summarized in Table 1: observed species on which ages are based are listed below with comments as necessary. Zones through the Cretaceous and Tertiary in question have been previously described and defined by Dettmann (1963), Dettmann & Playford (in press), Evans (1966) and Harris (1965).

TABLE 1: SUMMARY OF RESULTS

SAMPLE	DEPTH	AGE
swc 23	4085'	Tertiary indeterminate
swc 22	4152'	Upper Palaeocene, equivalent to Princetown Member of Dilwyn Clay in type section.
Cutt.	4170-4190'	As above
swc 21	4208'	As above
swc 20	4315'	Upper Cretaceous, Nothofagidites microflora
swc 19	4462'	As above
swc 18	4543'	As above
swc 17	4654'	As above
swc 16	4735'	As above
swc 15	4854'	As above - and top of Xenikoon australis dinoflagellate Zone.
swc 14	5084'	As above
swc 11	5600'	As above
swc 10	5764'	As above
swc 9	5909'	Upper Cretaceous ? Tricolpites pachyexinus Zone and continuing in X. australis Zone
swc 8	6061	As above
swc 1	6660'	Upper Cretaceous, ? Clavifera triplex and ? Deflandrea cretacea Zones.
core 1	6891	Upper Cretaceous, C. triplex or A. distocarinatus Zone
core 3	7337-42'	" " Appendicisporites distocarinatus Zone and Ascodinium parvum dinoflagellate Zone
swc 36	7348'	Upper Cretaceous A. distorcarinatus or Tricolpites pannosus Zone
swc 35	7360'	As above
swc 34	7396'	As above
cutt.	7500'	Cretaceous, indeterminate.
cutt.	7600'	As above
cutt.	7700'	As above
cutt.	7810'	As above
cutt.	7900'	As above
cutt.	8010'	As above

OBSERVATIONS & COMMENTS

A. 4085 feet Tertiary, indetminate.

Sidewall core 23, 4085 feet.

Very small residue, mainly of vegetable debris. Extremely rare bisaccate pollen and a specimen. of Cyathidites minor. Age therefore indeterminate.

B. 4152-4208 feet Upper Paleocene.

The microfloras from the three samples taken within this interval were not abundant, but were very distinctive, containing dinoflagellates as well as spores and pollen. The most productive sample, at 4208 feet has an assemblage which resembles ones described by Harris (1965) from the Princetown Member of the Dilwyn Clay, although the dinflagellates are more reminiscent of the forms described by Cookson & Eisenack (1967) from the base of the Rivernook Bed in the outcropping Dilwyn Clay.

Sidewall core 22, 4152 feet.
Fossil yield small, but including : -

Cyathidites minor

C. splendens

Lycopodiumsporites sp.

Bisaccate pollen undet.

Araucariacites australis

Microcachryidites antarcticus

Cycadopites spp. undiff.

Parasaccites sp.*

Nothofagidites spp. undiff. rare

Proteacidites pachypolus

P. incurvatus

Periporopollenites polyoratus

Triorites harrisii

Dinoflagellates undiff.

* Probably re-cycled.

Cuttings 4170-4190 feet.

Yield relatively abundant and without obvious signs of substantial cavings. The assemblage included:

Proteacidites dilwynensis

P. pachypolus

P. annularis

P. ornatus

Polycolpites esobalteus

Cupaneidites orthoteichus

Simpliceopollis meridianus

Malvacipollis diversus

Bankeaeidites minimus

Triorites harrisii

Nothofagidites spp. undiff.

Periporopollenites polyoratus

Sidewall core 21, 4208 feet.

The most abundant assemblage of the Upper Paleocene sequence, this sample is marked by a diverse content of dinoflagellates. Fossils included: -

Cyathidites splendens

C. minor

Baculatisporites comaumensis

Cupaneidites reticularis

Proteacidites annularis

P. pachypolus

P. ornatus

P. spp. nov.

Simplicepollis meridianus

Tricolporites microreticulatus

Malvacipollis diversus

Laevigatosporites ovatus

Dilwynites granulatus

Triorites harrisii — fairly common

Nothofagidites spp. — fairly common

Bisaccate spp. undiff.

Parasaccites sp.*

Bankseaeidites minimus

Deflandrea spp. nov.

Homotribulum ? sp. nov.

Kenleyia fimbriata — fairly common

Leptodinium sp.

Hystrichosphaera sp.

Thalassiphora flammea

Hystrichokolpoma sp.

Wetzeliella cf. W. glabra

C. 4315 - 4854 feet. Upper Cretaceous, Nothofagidites microflora.

The samples considered within this interval contain elements of the upper portion of the Nothofagidites microflora described by Dettman & Playford (in press). They are separated from a lower section bearing the microflora by the presence of Tricolpites lilliei Couper and by dinoflagellates which are apparently younger than the Xenikoon australis Zone (Evans, 1966).

Dacrydiumites balmei is present to a depth of 4735 feet. Tricolpites sabulosus and Proteacidites amolosexinus do not make their appearance until 4654 feet. It is therefore possible that the interval 4315 - 4543 feet is somewhat younger than the typical Nothofagidites microflora determined by Dettman & Playford, but it is still placed within the Upper Cretaceous because of the presence of the New Zealand species Tricolpites lilliei and the absence of species regarded as typical of the basal Tertiary. Associated dinoflagellates help little with the determination of the age of the section without further work. Forms of Deflandrea are present but cannot be exactly matched with known species. cf. D. bakeri is identified at 4462 feet; cf. D. pellucida at 4462-4654 feet; and a cf. D. korajongensis at 4654 feet. These appear to be in the relative order of sequence previously noted for the actual species within the Otway Basin. D. korojongensis has not been recorded from the Otway Basin, but was described from the Campanian - Lower Maastrichtian Korojong Calcarenite of the Carnarvon Basin. (Cookson & Eisenack, 1958).

Xenikoon australis was identified in the basal sample of the interval in question, at 4854 feet, but continued to lower levels. In view of the fact that the entire sequence from 4315 to 4854 feet was a dinoflagellate bearing facies, the 4854 feet horizon is probably a valid expression of the top of the range of X. australis. The following fossil lists do not include long ranging species such as Araucariacites australis, Cyathidites spp., Gleicheniidites.

Sidewall core 20, 4315 feet.

Nothofagidites spp. undiff	fairly common
Triorites edwardsii	fairly common
Tricolpites gillti	
T. lilliei	
T. pachyexinus	
"Dacrydiumites" balmei	
Dacrydiumites mawsonii verrucosus	
Simplicepollis cf. S. meridianus	
Camarozonosporites chaiensis	
Liliacidites sp.	
Australopollis obscurus	
Stereisporites regium	
Deflandrea spp. undiff.	
Epicephalopyxis dentata	
Svalbardella cf. S. granulata	
Cymatiosphaera sp.	

Cribroperidinium sp

Sidewall core 19, 4462 feet.

Nothofagidites spp.
Triorites edwardsii
Tricolpites gillii
Tr. lilliei
T. pachyesinus
T. cf. T. waiparaensis
Dacrydiumites mawsonii verrusosus
"D". balmei
Simplicepollis cf. S. meridianus
Liliacidites sp.
Camarozonosporites sp.
Ornamentifera sentosa

Deflandrea spp. undiff.
Deflandrea sp. cf. D. bakeri
D. sp. cf. D. pellucida
? Spinidinium sp.

Sidewall core 18, 4543 feet.

Nothofagidites spp.
Triorites edwardsii
Tricolpites gillii
T. pachyexinus
T. cf. T. waiparaensis
Liliacidites sp.
Dacrydiumites mawsonii verrucosus
Simplicepollis sp.
"Ericipites" cf. "E". scabratus
? Protaecidites retiformis
P. cf. P. granoratus
Australopollis obscurus

Deflandrea spp. indiff.
D. cf. pellucida
Spinidinium sp.
Hystrichosphaeridium sp.

Sidewall core 17, 4654 feet.

Nothofagidites spp.
Triorites edwardsii
Tricolpites gillii
T. pachyesinus
T. lilliei
T. sabulosus
T. cf. waip araensis
Dacrydiumites mawsonii verrucosus
"Ericipites" cf. scabratus
Liliacidites sp.
Proteacidites sp. cf. P. retiformis
P. amolosexinus
Camerozonosporites sp.
Australopollis obscurus
Ornamentifera sentosa

Deflandrea sp.
Deflandrea sp. cf. D. pellucida
Deflandrea sp. cf. D. korojongensis
Oligosphaeridium sp.

Sidewall core 16, 4735 feet.

Nothofagidites sp.
Triorites edwardsii
Tricolpites gillii
T. cf. T. waiparaensis
T. pachyexinus
Dacrydiumites balmei
D. mawsonii verrucosus
Simplicepollis sp.
"Ericipites" sp. cf. E. clavatus
Liliacidites sp.
Proteacidites sp. cf. P. retiformis
P. sp. cf. P. granoratus
? Camarozonosporites sp.
? Ornamentifera sentosa

Deflandrea spp. undiff.

Deflandrea cretacea

Spinidiniums sp.

Sidewall core 15, 4854 feet.

Nothofagidites spp. undiff.

Triorites edwardsii

Tricolpites gillii

T. pachyexinus

T. sp. cf. T. waiparaensis

? T. lilliei

T. sabulosus

Camarozonosporites chaiensis

Dacrydiumites mawsonii verrucosus

Simplicepollis sp.

"Ericipites" sp. cf. "E". scabratus

Liliacidites sp.

Proteacidites amolosexinus

Xenikoon australis

Deflandrea spp. incl. D. cretacea

D. 5084-6061 feet. Upper Cretaceous. Nothofagidites microflora. Xenikoon australis dinoflagellate Zone.

The correct base to the Nothofagidites microflora may be as high as 5764 feet, the lowest level at which the genus has been recorded. X australis ranges further than this depth and provisionally the base of the Nothofagidites microflora, which evidence elsewhere has shown to be very close to or coincident with the base, of the X. australis Zone is taken to 6061 feet. However, the sequence in Mussel may be a more precise demonstration of the relationship of the pollen and dinoflagellate zone boundaries.

Sidewall core 14, 5084 feet.
Yield relatively abundant and including the following species:

Nothofagidites spp.

Tricolpites pachyexinus

T. gillii

T. sabulosus

P. amolosexinus

Proteacidites amolsexinus

Camarozonosporites chaiensis

Cicatricosisporites spp. *

Dacrydiumites mawsonii
"D" balmei ??

Xenikoon australis

Sidewall core 11,5600 feet.
Low yield, with more abundant dinoflagellates than preceding sample.

Nothofagidites spp.
Tricolpites gillii
T. sabulosus
Ceratosporites equalis
Leptolepidites verrucatus *
Dictyotosporites speciosus *
Clavifera triplex
Cicatricosisporites spp.
Klukisporites scaberis*
Parasaccites sp. *

Xenikoon australis
Nelsoniella aceras
Odontochitina porifera
Hystrichosphaera sp.

* recycled. from the Permian or the Lower Cretaceous.

Sidewall core 10, 5764 feet.

Nothofagidites spp. (very rare)
Tricolpites pachyexinus
? T. sabulosus
T. gillii
Camarozonosporites chaiensis
C. amplus
Ceratosporites equalis
Oranmentifera sentosa
Gleicheniididites spp. undiff.
Cicitricosisporites spp. undiff *
Parasaccites sp. *
Striatiti undiff. *

Xenikoon australis (fairly common)
Nelsoniella aceras
N. tuberculata

Sidewall core 9?, 5909 feet.

A relatively limited yield, again dominated by dinoflagellates. Fossils of stratigraphic significance include :

Xenikoon australis

Odonotochitina porifera

Nelsoniella aceras

Tricolpites pachyexinus

T. gillii

? T. sabulosus

Dacrydiumites mawsonii

Ornamentifera sentosa

Callialasporites dampieri *

Camarozonsoporites amplus

Clavifera triplex

Sidewall core 8, 6061 feet.

As for preceding sample:

Xenikoon australis (very rare)

Nelsoniella aceras

Odontochitina porifera

Tricolpites pachyexinus

T. cf. sabulosus

"Triorites edwardsii" Evans 1966, pl.1, fig. 18.

Camarozonosporites amplus

Cicatricosisporites spp.

Australopollis obscurus

Aequitriradites verrucosus *

* recycled from the Permian or the Lower Cretaceous.

E. 6660 feet. Upper Cretaceous. ?Deflandrea cretacea dinflagellatee Zone. Probably Clavifera triplex Zone.

The sidewall core 1, 6660 feet, is provisionally placed in the D. cretacea Zone because of the presence of two specimens of the nominate species among mainly spinose dinoflagellates, the apparently complete absence of X. australis and N. aceras, the presence of Odontochitina striatoperforata and spores/pollen suggestive of the C. triplex Zone.

F. 6891 feet. Upper Cretaceous. Clavifera triplex or Appendixisporites distocarinatus Zone.

Although numerous specimens have been extracted from core 1, 6891 feet, it has not been possible to determine which of the C. triplex and the A. distocarinatus Zones the horizon represents. Dinoflagellates are extremely rare in the sample, spores are the most common forms and angiosperm pollen very rare. Some of the fossils present have been identified as :

Cyathidites minor	(common)
Clavifera triplex	
Sphagnumsporites antiquasporites	(fairly common)
Gleicheniidites spp. undiff.	(fairly common)
Osmundacidites wellmannii	
Cicatricosisporites cf. C. ludbrookii	
C. cuneiformis	
Appendicisporites distocarinatus	
Rugulatisporites sp.	
Tricrassate gen et sp. nov.	
Microcachryidites antarcticus	
Bisaccate pollen undiff.	(common)
Araucariacities australis	
Camarozonsporites sp. nov.	
Lycopodiumsporites spp.	
Dacrydiumites mawsonii	
Vitreisporites pallidus	
Laevigatosporites ovatus	
L. major	
Cycadopites sp.	
Perotrilites jubatus	
Neoraistrickia truncata	
Triporines spp. undet.	(rare)
Triptyches spp. undet.	(rare)

G. 7337 - 7396 feet. Upper - ?Lower Cretaceous. Ascodinium parvum dinoflagellate Zone; Appendicisporites distocarinatus spore/pollen zone.

The samples within this sequence are the lowest to which a relatively positive age may be assinged. Only cuttings were avilable below 7396 feet. Samples from core 3 are placed in the A. distocarinatus Zone because of the presence of angiosperm pollen in extremely rare proportions, the presence of A. distocarinatus, Balelmisporites glenelgensis, Cicatricosisporites cuneiformis, Laevigatosporites major, and cf. Australopollis obscurus. Lacking B. glenelgensis and A. obscurus and possessing Trilobosporites trioreticulosus, the assemblage

at 7348 feet might be as old as the Tricolpites pannosus Zone. Dinoflagellates are present throughout, but the zone fossil was only identified in company with "Palaeonystrichophora" infusioroides Odontochitina operculata, O. striatoperforata, Gonyaulacysta edwardsii and Appendicisporites distocarinatus at 7360 feet.

Core 3, 7337 - 7342 feet.

Several samples were taken from this core, but the following list is a composite of the assemblages extracted therefrom.

Cyathidites minor
C. australis
Balmeisporites glenelgensis
Osmundacidites wellmannii
Gleicheniidites spp. undiff.
Clavifera triplex?
Cicatricosisporties cuneiformis
C. australiensis
C. ludbrookii
Appendicisporites distocarinatus
Densoisporites velatus
Perotrilites jubatus
Dictyophyllidites concavus
cf. Dacrydiumites mawsonii
Bisaccate pollen undiff. (common)
Microcachridites antarcticus)
Podosporites microsaccatus)
Lycopodiumsporites sp.
Tricrassate gen. et sp. nov.
Camarozonosporites sp. nov.
cf. Australopollis obscurus
Stereisporites antiquasporites
cf. Kuylisporites lunaris
Parasaccites sp. *
Striatiti sp. undiff. *
Rouseisporites reticulatus
Cingutrilites clavus
Tricolporate sp.. undet.

* Recycled Permian.

Sidewall core 36, 7348 feet.

Cyathidites minor
C. australis

Pilisisporites grandis

Appendicisporites distocarinatus

Cicatricosispoorites cuneiformis

C. australiensis

Foraminisporis dailyi

Microcachryidites antarcticus

Dictyophyllidites concavus

Vitreisporites pallidus

Bisaccate spp. undiff. (common)

Laevigatosporites ovatus

L. major

Densoisporites velatus

Classopollis sp.

Gleicheniidites spp. undiff.

Cycadopites sp.

Trilobosporites trioreticulosus

Triptyches undiff. (extremely rare)

Araucariacites australis

Odontochitina operculata

O. Striatoperforata

Gonyaulacysta edwardsii

Sidewall core 35, 7360 feet.

Cyathidites minor

C. australis

Osmundacidites vellmannii

Bisaccate pollen undiff. (common)

Microcachrydities antarcticus (common)

Dictyophyllidites concavus

Appendicisporites distocarinatus

Araucariacites australis

Laevigatosporites ovatus

Gleicheniidites spp. undiff.

Cycadopites sp.

Perotrilites sp.

Densoispoorites valatus

Cicatricosisporites australiensis

C. cuneiformis

Foraminisporis assymetricus

F. dailyi

Lycopodiumsporites spp.
Monocolpate reticulate sp. undiff.

Amosopollis cruciformis
Odontochitina operculata
O. striatoperforata
Gonyaulacysta edwardsii
Palaeohystrichophora infusorioides
Diconodinium sp.
Cycloneophelium sp.
Ascodinium parvum
Hystrichosphaeridium cf. H. salpinophorum

Sidewall core 34, 7396 feet.

Cyathidites minor
C. australis
Cicatricosisporites cuneiformis
C. ludbrookii
Camarozonosporites sp. nov.
Stereisporites antiquasporites
Microcachryidites antarcticus (common)
Podosporites microsaccatus
Araucariacites australis
Foraminisporis dailyi
Appendicisporites distocarinatus
Cycadopites sp.
Laevigatosporites ovatus
Trypryches sp. (one specimen)

Amosopollis cruciformis
Odontochitina operculata
Gonyaulacysta edwardsii

H. 7500 - 8010 feet. Cretaceous undifferentiated.

Only cuttings were available from this interval and the residues derived from them were heavily contaiminated with fossils from younger beds - mainly in the X. australis Zone of the Upper Cretaceous. Nothing distinctive within the range T. pannosus - C. paradoxa Zones was identified except for the presence of Perotrilites majus at 7810 feet, Tricolpites pannosus and Pilosisporites cf. P. notensis at 8010 feet, which might suggest that the T. pannosus and the C. paradoxa Zones had been penetrated or entered.

REFERENCES

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DETTMAN, MARY E. (in press) - Palynology of the Australia Cretaceous - a review. A.N.U. Press, Canberra.

EVANS, P.R., 1966 - Meosozoic stratigraphic palynology of the Otway Basin. Bur. Mineral. Resources.Aust. Rec. 1966/69 (unpubl.)

HARRIS, W.K., 1965 - Basal Tertiary microfloras from thePrincetown area, Victoria, Australia. Palaeontographica, 115B (4-6), 75-106.

ESSO STANDARD OIL (AUSTRALIA) LTD.

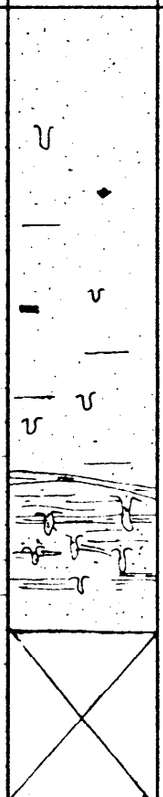
CORE DESCRIPTION

Core No. #1

WELL: MUSSEL-1

Interval Cored 6881 - 6903 ft., Cut 22 ft., Recovered 17 ft., (78 %) Fm. MURRAY SS

Bit Type C22 , Bit Size 8 5/16 in., Desc. by CURNOW Date 5th Aug 1969

Depth & Coring Rate (min./ft.)	Graphic (1" = 5')	Shows	Interval (ft.)	Descriptive Lithology
0			6881 - 6893	Sandstone: qtzose, massive w/ occ burrow & rare shale laminations. White to lt gy, f-m grained, occ crse; subang-subrnd, well srtd, friable, vis ϕ NS dy, v.s.l. calc. tr wh wthd felds w/ v. minor lithics. Shale laminations black, mic, carb, pty, sl. fissile.
			6893 - 6898	Thinly interbedded Ss & sh, w/ wavy bedding, abdt sd-filled burrows, occ micro X-bedding. Ss, qtzose, noncalc, white - lt gy, f gr, ang to subang, well srtd, mod friable, fr-g vis ϕ.
			6898 - 6903 NO RECOVERY	w/ occ thin bed Ss m-crs gr, sub ang-subrd, we srted fr to v. friable, good ϕ NS. Shale beds, black, dense, prly lam, mod fissile, mic, carb, with crse mica flakes.

REMARKS:

EXPLORATION LOGGING OF AUSTRALIA, INC.

A Geological-Engineering Service

PERTH ADDRESS 69 GREAT EASTERN HIGHWAY [illegible] WESTERN AUSTRALIA 6
PHONE 81 4437

CORE ANALYSIS REPORT

COMPANY ESSO-BHP
WELL MUSSEL 1
LOCATION/FIELD OFFSHORE/OTWAY BASIN
COUNTY _____ STATE VICTORIA
COUNTRY AUSTRALIA
REMARKS CUT 22FT; RECOVERED 17FT: SANDSTONE; LIGHT GREY, MEDIUM GRAIN, MASSIVE, MODERATELY HARD TO FRIABLE, WELL SORTED, PYRITIC, IN PART SHALEY, NO SHOWS, NO FLUORESCENCE, NO CUT.

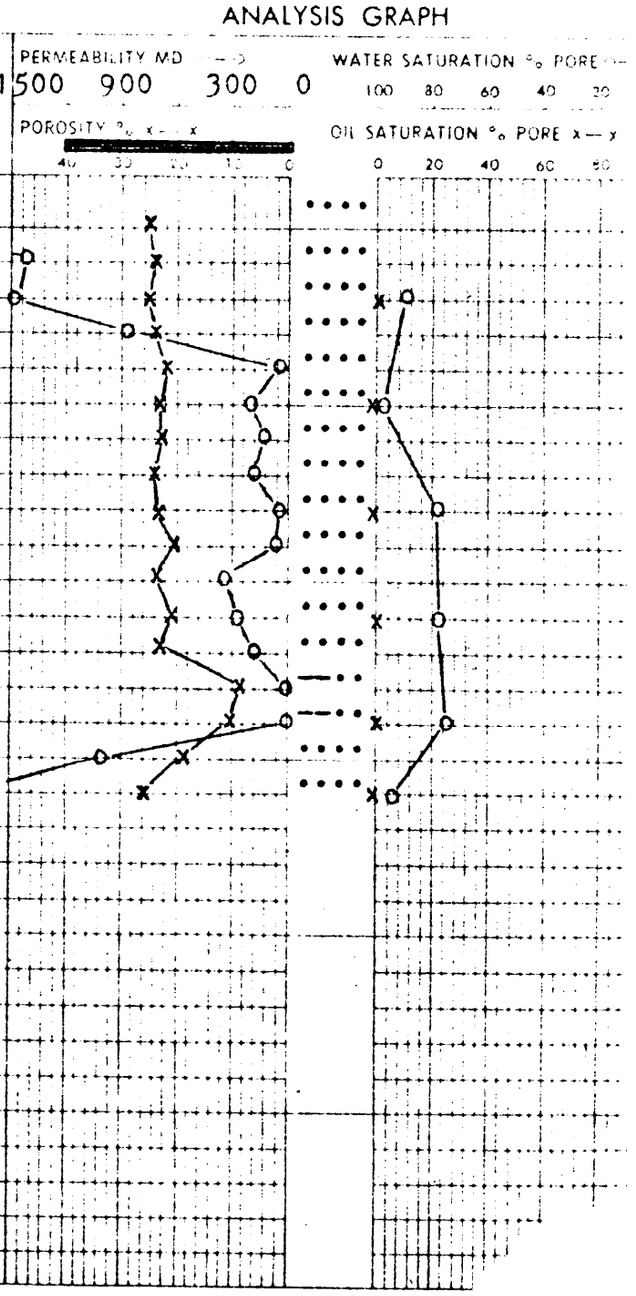
DATE SEP. 1, 1969
DEPTH 6881 FT TO 6903 FT
GEO-ENGINEER CRAIG; WEARE

SAND
SILTY SAND
SILTST
SHALE
LIME
CONGL

TABULAR DATA

SAMPLE NUMBER	CORE #1 DEPTH FEET	AIR PERM. MD.	POROSITY PERCENT	FLUID SATURATION % PORE VOLUME OIL	FLUID SATURATION % PORE VOLUME WATER	GRAVITY OIL °API	TOTAL Cl⁻ G/G	REMARKS LITH
1	6882	3300	25.2					SS
2	6883	1400	23.9					SS
3	6884	1447	24.4	0	90.3			SS
4	6885	897	24.1					SS
5	6886	85	21.9					SS
6	6887	214	22.7	0	97.5			SS
7	6888	117	22.5					SS
8	6889	169	23.6					SS
9	6890	79	22.6	0	75.5			SS
10	6891	93	21.2					SS
11	6892	340	23.0					SS
12	6893	293	20.7	0	76.4			SS
13	6894	183	23.7					SS
14	6895	2	8.9					SH. SS
15	6896	0	10.2	0	71.0			SH. SS
16	6897	1085	19.1					SS
17	6898	1650	25.5	0	94.2			SS

ANALYSIS GRAPH



ESSO STANDARD OIL (AUSTRALIA) LTD.

CORE DESCRIPTION

Core No. #2 Sheet 2 of 2

WELL: MUSSEL-1

Interval Cored 6903-6954 ft., Cut 51 ft., Recovered ZERO ft., (0 %) Fm. WAARRE SS

Bit Type C22, Bit Size 8 5/16 in., Desc. by CURNOW Date 1 Sept 69

Depth & Coring Rate (min./ft.)	Graphic (1" 5')	Shows	Interval (ft.)	Descriptive Lithology
0 5 10			6943	NO RECOVERY
			6954	

REMARKS:

ESSO STANDARD OIL (AUSTRALIA) LTD.

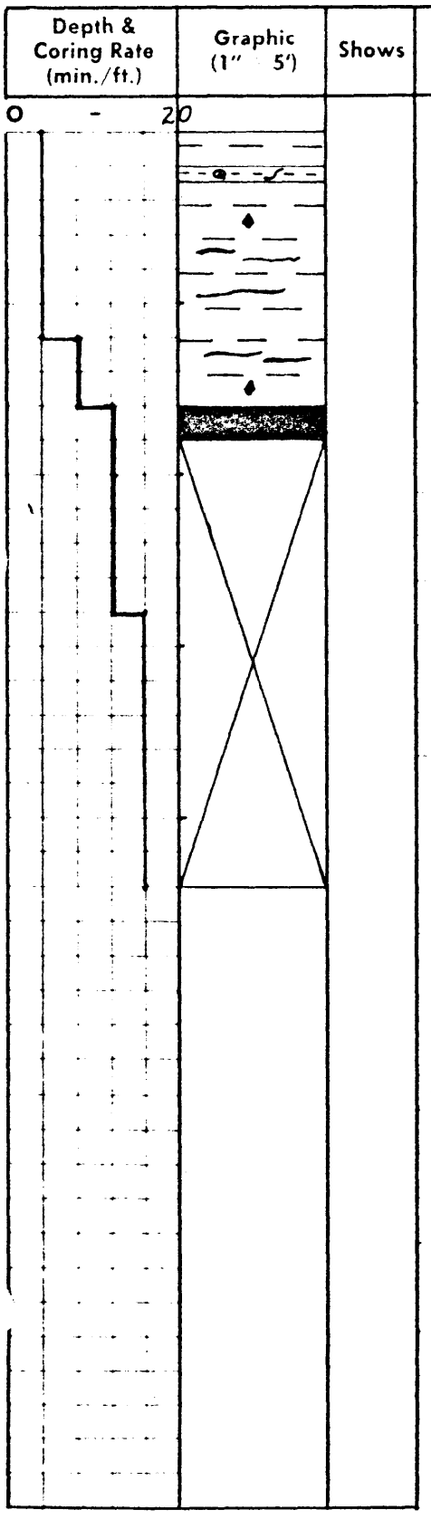
CORE DESCRIPTION

Core No. 3

WELL: MUSSEL # 1.

Interval Cored 7335 - 7357 ft., Cut 22 ft., Recovered 9 ft., (44 %) Fm. WARRE ?

Bit Type C20 , Bit Size 8 5/16 in., Desc. by H. STEAD Date 4/9/1969.



Interval (ft.)	Descriptive Lithology
7335 - 7336'	Shale; med dk gy; massive; hard; mod fissile with abund. fine mica.
7336 - 7336·3'	Claystone? med. gy.; hard; massive; with 10% clear, f-pebble sized qtz grains & 20% chlorite inclusions set in a dense matrix of clay with mini dispersed pyrite. (Note: only on rounded piece of this rock was recovered but is almost certainly a thin interbed betwee the shales.); very dolomitic.
7336·3 - 7343'	Shale - carbonaceous; med. dk gy - black; massive laminated; hard - v. hard; mostly ver fissile; with occas. v. fine silty laminae; with freq. wavy, discontin thin coal laminae which have been partly replaced by pyrite. Increase in carbonaceous content towards th base. Slight gas bleed.
7343 - 7344'	Coal; dk. brn - blk; dull - vitreous; very brit & fractured.
7344 - 7357'	No Recovery.

REMARKS:

EXPLORATION LOGGING OF AUSTRALIA, INC.

A Geological-Engineering Service

PERTH ADDRESS 64 GREAT EASTERN HIGHWAY VICTOR A PARK WESTERN AUSTRALIA
PHONE 61 4437

CORE ANALYSIS REPORT

COMPANY ESSO-BHP
WELL MUSSEL 1
LOCATION/FIELD OFFSHORE/OTWAY BASIN
COUNTY _____ STATE VICTORIA
COUNTRY AUSTRALIA
REMARKS CUT 22FT; RECOVERED 9FT: 8FT SHALE, DARK GREY, HARD, PYRITIC, WITH MINOR COAL STREAKS; 1 FOOT COAL AT BOTTOM OF CORE.

DATE SEP. 4, 1969
DEPTH 7335 FT TO 7357 FT
GEO-ENGINEER CRAIG
CORE: #3

SAND
SILTY SAND
SILTST.
SHALE
LIME
CONGL

TABULAR DATA

SAMPLE NUMBER	DEPTH FEET	AIR PERM. MD.	POROSITY PERCENT	FLUID SATURATION % PORE VOLUME		GRAVITY OIL °API	TOTAL CL G/G	REMARKS
				OIL	WATER			
	NO ANALYSIS REQUIRED							

ANALYSIS GRAPH

PERMEABILITY MD —○—
POROSITY % x — x
8 6 4 2 0
40 30 20 10 0
WATER SATURATION % PORE
100 80 60 40 20
OIL SATURATION % PORE x — x
0 20 40 60 80

PE900673

This is an enclosure indicator page.
The enclosure PE900673 is enclosed within the container PE900671 at this location in this document.

The enclosure PE900673 has the following characteristics:

ITEM_BARCODE	= PE900673
CONTAINER_BARCODE	= PE900671
NAME	= Mussel 1 Geological Cross Sections Before and After Drilling and Locality Map, Figure 1
BASIN	= OTWAY
PERMIT	= PEP 40
TYPE	= WELL
SUBTYPE	= CROSS_SECTION
DESCRIPTION	= Mussel 1 Geological Cross Sections Before and After Drilling and Locality Map, Figure 1
REMARKS	=
DATE_CREATED	= 1/12/69
DATE_RECEIVED	= *
W_NO	= W555
WELL_NAME	= Mussel-1
CONTRACTOR	= Esso
CLIENT_OP_CO	= Esso

(Inserted by DNRE - Vic Govt Mines Dept)

PE600577

This is an enclosure indicator page.
The enclosure PE600577 is enclosed within the container PE900671 at this location in this document.

The enclosure PE600577 has the following characteristics:

ITEM_BARCODE	= PE600577
CONTAINER_BARCODE	= PE900671
NAME	= Mussel 1 Well Completion log, Figure 2
BASIN	= OTWAY
PERMIT	= PEP 40
TYPE	= WELL
SUBTYPE	= COMPOSITE_LOG
DESCRIPTION	= Mussel 1 Well Completion log, Figure 2
REMARKS	=
DATE_CREATED	= *
DATE_RECEIVED	= *
W_NO	= W555
WELL_NAME	= Mussel-1
CONTRACTOR	= Esso
CLIENT_OP_CO	= Esso

(Inserted by DNRE - Vic Govt Mines Dept)

PE600578

This is an enclosure indicator page.
The enclosure PE600578 is enclosed within the container PE900671 at this location in this document.

The enclosure PE600578 has the following characteristics:

ITEM_BARCODE	= PE600578
CONTAINER_BARCODE	= PE900671
NAME	= Mussel 1 Mudlog, Figure 3
BASIN	= OTWAY
PERMIT	= PEP 40
TYPE	= WELL
SUBTYPE	= MUD_LOG
DESCRIPTION	= Mussel 1 Mudlog, Figure 3
REMARKS	=
DATE_CREATED	= 12/09/69
DATE_RECEIVED	= *
W_NO	= W555
WELL_NAME	= Mussel-1
CONTRACTOR	= Exploration Logging Inc
CLIENT_OP_CO	= Esso

(Inserted by DNRE - Vic Govt Mines Dept)

PE900672

This is an enclosure indicator page.
The enclosure PE900672 is enclosed within the container PE900671 at this location in this document.

The enclosure PE900672 has the following characteristics:

ITEM_BARCODE	= PE900672
CONTAINER_BARCODE	= PE900671
NAME	= Mussel 1 Time Depth Curve, figure 4
BASIN	= OTWAY
PERMIT	= PEP 40
TYPE	= WELL
SUBTYPE	= VELOCITY_CHART
DESCRIPTION	= Mussel 1 Time Depth Curve, figure 4
REMARKS	=
DATE_CREATED	= *
DATE_RECEIVED	= *
W_NO	= W555
WELL_NAME	= Mussel-1
CONTRACTOR	= Esso
CLIENT_OP_CO	= Esso

(Inserted by DNRE - Vic Govt Mines Dept)