WELL SUBSIDY REPORT 649.

COBIA-1, VICTORIA, AUSTRALIA

by

W. Threlfall, J. Black, D. McEvoy

ESSO AUSTRALIA LTD.

SUBSIDY REPORT

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Esso Australia Ltd.
November 1972.

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Cobia-1

I SUMMARY

(1) Drilling

Cobia-1 was drilled to a T.D. of 8511' by Global Marine's floating rig "Glomar Conception". The rig commenced operations on August 3, 1972. The well was spudded on August 4, 1972 and completed on August 27, 1972. Total rig time was 23.5 days.

Casing was set at 737' (20" in 26" hole) and 2756' (10¾" in 13¾" hole).

The well was plugged over the intervals 7950'-7530', 2850' - 2520' and 550' - 350'. The well head and pile joint were shot off and pulled to surface.

(2) Geological

Miocene to Recent marls, limestones and mudstones were drilled to -7290' and were underlain by impervious Oligocene fossiliferous mudstones and marls to -7782'. At this depth the top of the Latrobe Group was encountered within 30' of prediction. The Latrobe Group was composed of Lower Eocene and Paleocene sandstones, shales and coals.

At the top of the Latrobe Group, beneath the Gurnard Formation, a gross oil column of 74' was discovered having 18' of net effective and another 16' of possible net effective sandstone reservoir above the oil-water contact at -7866'.

II INTRODUCTION

The Cobia-1 well was designed to test a low relief anticlinal feature on the top of the Latrobe Group located to the west of the Mackerel Field and south-west of the Halibut Field.

A seismic time map to the top of the Latrobe Group over the feature exhibits no closure. However, when the interpreted average velocities to that mapped horizon are used to calculate depths, the resulting structure map shows a closed, broad anticlinal feature having approximately 110' of relief.

As the crest of the feature lay directly under the Kingfish-Halibut 20' pipeline the well was located down-dip, to the west, outside a 2,500' safety corridor.

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Cobia-1.

III WELL HISTORY

(1) General Data

(i) Well Name and Number
Cobia-1

(ii) Operator and Address
Esso Exploration and Production Australia Inc.,
c/- Price Waterhouse Nominees (Victoria) Pty. Ltd.,
The National Mutual Centre,
447 Collins Street,
MELBOURNE. VICTORIA. 3000.

(iii) Title Holder and Address
Hematite Petroleum Pty. Ltd.,
459 Little Collins Street,
MELBOURNE. VICTORIA. 3000.

(iv) Petroleum Title
Petroleum Production Licence Vic. L/5

(v) District
A.M.G. Zone 55

(vi) Location
Latitude 38° 27' 26.75" S.
Longitude 148° 17' 01.27" E.

(vii) Elevation
(a) -239' Seafloor
(b) + 32' KB

(viii) Total Depth
8511'

(ix) Spud Date
August 4, 1972

(x) Date T.D. Reached
August 24, 1972

(xi) Date of Completion
August 27, 1972

(xii) Rig Released
August 27, 1972

(xiii) Drilling Time
Total Drilling time 23.5 days (actual time on bottom 7.5 days)

(xiv) Status
Plugged and abandoned

(xv) Total Cost
$858,000

(2) Drilling Data

(i) Name and Address of Drilling Contractor
Global Marine A/Asia Pty. Ltd.
380 Lonsdale Street,
MELBOURNE. VICTORIA. 3000

(ii) Drilling Plant
Make: National 1625
Type: Diesel Electric
Rated Capacity with
drill pipe used: 25000 ft. with 5" drill pipe
Motors:
Make: General Electric (X2) Caterpillar (X8)
Type: Diesel Electric D398 V12 Diesel
BHP: 752 DT x 2 8720 Intermittent
6800 Continuous

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(iii) Derrick

Make:	Built by Continental EMSCo. using a Global Marine Design(142
Type:	Standard type with travelling block guide rails.
Rated Capacity:	1,000,000 lb.

(iv) Pumps

Make:	National x 2
Type:	N1300
Size:	1300 HP each
Pump Motors	
Make:	General Electric
Type:	DC Electric
BHP:	752 - 2 per pump

(v) Blowout Preventer Equipment

Make:	Vetco/Shaffer/Cameron/Hydril
Type:	3 Cameron, 1 Shaffer ram-type Preventers 1 Shaffer, 1 Hydril bag-type Preventer.
Size:	16¾" for 5" drill pipe
API Series:	1500; 5000 psi working pressure

(vi) Hole Sizes & Depths

Conductor Hole:	26" @ 802' KB
Surface Hole:	13¾" @ 2829' KB
Exploration Hole:	9-7/8" @ 8511' KB

(vii) Casing & Liner Cementing Details

Size	Weight	Grade	Range	Depth Set
20"	91.5 lb/ft.	X-52 LP	3	737' KB
10¾"	40.5 lb/ft.	J55	3	2756' KB

	20"	10¾"
Position of Float Collar	N/A	Top of Bottom Jt.
Position of Float Shoe	Bottom of String	Bottom of String
No. of Centralizers	6	10
Position of Centralizers	Top and Bottom of Bottom Joint Top of 2nd Joint Free on 4th,5th 6th Joints	Top and Bottom of 1st Joint One on every 2nd Joint over 16 Joints total
No. of Scratchers	Nil	Nil
Position of Scratchers	-	-
Cement used	1135 sx	530 sx
Top of Cement	Sea Floor	1500' est.
Method used (plug, multi-stage, etc.)	N/A	N/A

(viii) Drilling Fluid

Type:	Lignosulphonate Fresh Water
Average Weight:	Mud 9.7 ppg
Brief Details of Treatment, average weekly analysis:	Mud pumped over shale shaker and through de-sander and de-silter. Thinning accomplished by addition of fresh water, Q-Broxin and CC16.

WT.	FV.	WL.	F/CAKE	pH.	SAND
9.7	47	5.2	1/32	9.5	Nil

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List of Types and quantity of Mud materials and chemicals consumed:

Barytes	1650 sx
Gel	650 sx
Caustic	4300 lb
Lignosulphonate	240 sx
Lignite	100 sx

Nitrate added to the mud system was used as tracer indicating filtrate recovery on formation testing. From 7100', the desired concentration of nitrate was maintained in the range 120-180 PPM using 5lb of commercial pellet fertilizer per 100 bbls of mud.

(ix) Water Supply
Barry's Beach tap water transported by workboats.

(x) Perforation & Shooting Record
Nil

(xi) (a) Plugging Back Cementation Jobs

	1.	2.	3.
Length and Type of plug:	420' 15.6 ppg	330' 15.6 ppg	200' 15.6 ppg
No. of Sacks used:	253 sx	184 sx	95 sx
Methods used:	Displacement through drill pipe		
Whether plug job was satisfactorily tested:	Yes	Yes	Yes

(b) Squeeze Cementation Job
Nil

(xii) Fishing Operation
Nil

(xiii) Side-tracked Hole
Nil

(3) Location

(i) Site Investigations Carried out
Due to proximity of the Kingfish-Halibut pipeline to the recommended wellhead location, a survey of the pipeline including the use of side-scan sonar, was carried out by workboats and the pipeline buoyed off by divers. Only then was the drillship permitted to run anchors outside a 2500' safety corridor.

(ii) Anchoring Methods
10 x 30,000 lb. anchors were laid by workboats in a $40^{\circ}/80^{\circ}$ pattern on an average radius of 1800 ft.

(iii) Transportation
1. Helicopters from Longford
2. Workboats from Barry's Beach and Lakes Entrance

(4) Sampling

(i) Ditch Cuttings
From 850' 6 sets of washed and dried samples every 10' to T.D. 1 set of unwashed, bagged samples every 10', 1 canned sample every 100'. All samples were lagged and caught off a standard shale shaker by Baroid Mud-logging personnel under the supervision of an Esso Wellsite geologist.

A set of washed and dried samples was taken for Hematite, Vic. Mines, Bureau of Mineral Resources and Bureau of Mineral Resources - Subsidy Section. Esso retained 2 sets, 1 for palaeontological processing and the other for storage.

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(ii) Coring

Core No.	Interval Cored	Footage Cut	Recovery in Feet	Recovery %
1	7840' - 7845½	5½	5½	100
2	7845½'- 7882'	36½	36½	100
3	7881' - 7911'	30	17	57
4	7911' - 7925'	14	13	93
	TOTAL	86	72	84%

N.B. The 13' of core lost in Core # 3 was probably recovered in Core # 4 as indicated by the Oil/Water Contact in Core # 4. Cores 1, 2 and 3 should be adjusted up 7 ft. to fit the ISF log. Core # 4 should be adjusted upward 20 ft.

For a full description of each core see Appendix V.

(iii) Sidewall Sampling

Sidewalls were taken by Schlumberger wireline device. 30 cores from one gun were attempted and 28 recovered.

Depth	Recovered	Depth	Recovered
8390'	Fragments	7836'	1"
8270'	No recovery	7830'	½"
8150'	¾"	7821'	¾"
8085'	½"	7817'	¾"
8012'	½"	7810'	1⅛"
7960'	½"	7800'	1⅛"
7930'	½"	7790'	1¼"
7920'	5/8"	7780'	1⅜"
7912'	½"	7770'	1⅜"
7904'	5/8"	7760'	1¾"
7892'	½"	7750'	1"
7884'	½"	7740'	1⅜"
7876'	1"	7730'	1⅜"
7862	½"	7720'	1¼"
7854'	¾"	7710'	1⅜"

All samples were retained by Esso for palaeontological processing. Any residue or unused portions were placed in storage.
For full descriptions see Appendix V.

(5) Logging & Surveys

(i) Electric Logging

Log	Interval	Scale
ISF-SCT	2773 - 8425'	2" & 5"
FDC-CNL-GR-CAL	7600 - 8431' (GR to 372')	2" & 5"
HDT	7600 - 8430'	2" & 5"

Copies of all logs are in Enclosure IV.

(ii) Penetration Rate & Gas Logging

Full records of penetration rates, chromatographic gas analysis and total gas measurements were made from 850' to T.D. Shale densities, "d" exponent value and drillability measurements were made from 4075' to T.D. (see Enclosure II).

(iii) Deviation Surveys

The HDT continuous dipmeter run at total depth indicates deviation reached to be 1^{o} at 8300' on an azimuth of 205^{o}. (See Enclosure V).

(iv) Temperature Surveys

Temperatures were recorded by Schlumberger during bottom hole logging. Maximum temperatures reached are recorded on each log. A maximum BHT of 210° was reached on the HDT log 14 hours after breaking circulation.

(v) Other Well Surveys

A velocity survey was conducted at total depth. (See Enclosure V).

(6) Testing

(i) Formation Testing

A total of five formation tests were made using Schlumberger's Formation Interval Tester. All were successful in recovering fluids from the formation and recording accurate pressures by the use of dual Amerada gauges.

Summary of depths and fluid recoveries:

	Depth	Recovery
F.I.T. # 1	7903'	Formation water and filtrate
2	7896'	Oil
3	7854'	Oil and filtrate
4	8210'	Formation water and filtrate
5	8095'	Formation water and filtrate

Detailed test results are tabulated in Appendix VII and Enclosure III.

(ii) Production Testing

No production tests were carried out.

IV GEOLOGY

(1) Summary of Previous Work

Exploration for oil and gas in the Gippsland Basin has been in progress since 1924 when oil and gas shows were encountered during the drilling of a water well near Lakes Entrance. A large number of wells were subsequently drilled by government agencies and private firms, all of which met with discouraging results, (K.A. Richards, B.M. Hopkins, 1969).

The modern exploration phase commenced onshore in 1954, when geophysical methods were used to delineate drilling targets. None of those prospects drilled encountered significant hydrocarbon accumulations.

Offshore exploration began in 1960, when the Broken Hill Pty. Ltd. conducted an aeromagnetic survey over their offshore lease. In 1962 Hematite Petroleum (a wholly owned subsidiary of B.H.P.) shot 1005 miles of single-fold, analog seismic data.

In 1964, an agreement between Esso and B.H.P. was ratified for the exploration of the Gippsland Basin. Later that year Esso conducted the "EG" seismic survey (722 miles) and on June 5, 1965 completed the first Gippsland offshore well as a gas discovery (Barracouta-1, previously known as EGS-1).

Subsequent Esso/BHP seismic surveys are as follows:

1966	ET Survey
1967	EX Survey
	EC Survey
1968	EH Survey
	G69A Survey
1969	G69A Survey
	G69B Survey
1970	G69B Survey
	G70A Survey
1971	G71A Survey
	G71B Survey

Including the initial discovery, the drilling program to date has totalled 45 exploratory and stepout wells.

(2) Regional Geology

The Gippsland Basin occupies a portion of onshore Tasmania and South East Australia. Sedimentation has been continuous in some part of the basin from early Cretaceous to Recent time.

The Lower Cretaceous lacustrine and fluviatile greywackes of the Strzelecki Formation were deposited within an east-west rift system, the north and south boundaries of which were created by the limits of extensional faulting.

Upper Cretaceous through Eocene rocks (the Latrobe Group) represent a continuation of the lacustrine-fluviatile environment except that the quartz sandstones are more mature and develop better reservoir characteristics. From early Paleocene through Eocene, the nonmarine depositional environment had a laterally equivalent marginal marine and marine edge, primarily in the southeast portion of the basin. A substantial portion of the Eocene depositional patterns are attributed to a complex system of channel cut and fill and associated marine incursions,(E.A. James, P.R. Evans, 1971).

Rocks of Oligocene age are mainly fine grained marine mudstones which had slow depositional rates. The site of coarse clastic deposition was confined to the hinterland along a narrow zone in the Yallourn Valley in the north west portion of the onshore Basin area.

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Sedimentation during Early Miocene was similar to that of the Oligocene whereas very rapid deposition of marls, bryozoal-skeletal limestones and calcarenites occurred during Late Miocene through Pliocene. Submarine channelling and gross scour and fill features dominate the depositional characteristics and the resulting bedding configuration. The loading effect of this rapid deposition resulted in severe isostatic adjustment of the central to eastern portion of the offshore Gippsland Basin, with considerable tilting and change of the original Basin form.

Major oil and gas deposits have been discovered in the basin, most of which are found in either anticlinal culminations or combined anticlinal paleotopographic closures at the top of the Latrobe Group.

The Cobia feature is located in the eastern central portion of the basin where the Lower Eocene reservoir sands at the top of the Latrobe Group represent marginal marine environments. In this area, oil accumulations have been discovered in Kingfish to the south-west, Halibut to the north, and Mackerel to the east.

(3) Stratigraphic Table

The stratigraphy encountered in Cobia-1 is summarised in the following table:

AGE	FORMATION	FM. TOP	SUBSEA DEPTH	THICKNESS
	WATER	32' (KB)	SEA LEVEL	239'
PLIO-PLEISTOCENE	-	271' (SEA FLOOR)	- 239'	500' Appr
MIOCENE	GIPPSLAND	?	?	7000' Appr
OLIGOCENE	LAKES ENTRANCE	7322'	-7290'	492'
	LATROBE GROUP	7814'	-7782'	697' +
	GURNARD FORMATION	7814'	-7782'	10'
EOCENE	UNDIFFERENTIATED LATROBE	7824'	-7792'	132'
PALEOCENE		7956'	-7924'	555' +

(4) Stratigraphic Description

Gippsland Formation (? - 7322'; approx. 7000')

850' - 2840' Limestone - grey and brown, loosely consolidated with foraminifera and shell fragments, sandy in part.

2840' - 5960' Marl - grey-white, soft to firm, fossiliferous, trace glauconite and pyrite, minor interbeds of brown, dense limestone.

5960' - 7322' Marl - as above.
Shale - grey, soft to firm, calcareous, fossiliferous, traces of pyrite and glauconite.

The contact with the underlying Lakes Entrance Formation is tentatively placed at 7322' and is based on seismic and log correlation. No distinct lithological change is evident from the cutting analysis (Appendix IV). This section is identical to that penetrated to 7260' in Halibut-1.

Lakes Entrance Formation (7322' - 7814'; 492')

7322' - 7680' Shale - grey, soft to firm, bentonitic, trace pyrite and fine grained sand.
Marl - as above

7680' - 7814' Shale - grey, silty, micaceous, fossiliferous, traces of fine grained sand, very glauconitic at base.

Log and seismic correlations between Cobia-1 and Halibut-1 shows that Cobia-1 penetrated about 260 feet more Lakes Entrance Formation than Halibut. Most of this extra section is missing by onlap onto the flanks of the Halibut structure.

Latrobe Group (7814' - 8511'; 697' +)

Gurnard Formation (7814' - 7824' 10')

7814' - 7824' Siltstone - grey-green, and olive green, very argillaceous with disseminated sand grains and abundant glauconite and pyrite

Undifferentiated Latrobe

7824' - 8511' Shale - grey, silty
Siltstone - tan, firm, very glauconitic
Sandstone - white to tan, very fine to coarse grained, occasionally glauconitic and pyritic in part.
Coal - minor interbeds, black, brittle, conchoidal fractures.

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The Latrobe Group encountered at Cobia-1 is taken to include 10 ft. of Gurnard Formation (between 7814' and 7824'). Palynology and palaeontology places this greensand in the Early Oligocene (Appendix I and II), suggesting a reworking of Latrobe sands during the Oligocene transgression.

The early Eocene section penetrated extends to 7956', and is almost identical in thickness to the Eocene age sediments encountered in Halibut-1. The remaining interval to T.D. (8511') is a typical Latrobe sand, shale and coal sequence of Paleocene age.

(5) Structure

The Cobia-1 well confirmed the pre-drill structural prognosis. Mapped in seismic time Cobia does not exist as a separate feature, but appears as a nose of the Halibut-Flounder anticline. Lateral lithology changes in the overlying Miocene section produce a relatively low average velocity to the Latrobe in an area between Halibut and Tailor. The use of these velocities in converting seismic times to depth results in Cobia appearing as a closed high with approximately 110' of vertical relief and an areal closure of approximately 4.3 sq. miles.

The location of the Kingfish-Halibut oil pipeline prevented the Cobia-1 well from being drilled on the crest of the structure; therefore, the well was drilled somewhat off-structure to allow mooring clearance for the drilling vessel.

(6) Hydrocarbon Occurrence

A 74 ft. oil column, from the base of the Gurnard Formation (7824') to the oil-water contact (7898'), was discovered in the Cobia-1 well. If this contact extends over the area of the Cobia closure, the feature is full to structural spill-point. However, the oil-bearing sands in Cobia-1 do not appear to be continuous with sands in either Halibut or Mackerel and appear to be of a depositional type which is typically of limited areal extent. Hydrocarbon pooling would appear to be contemporaneous with that at both Mackerel and Halibut.

Of the 74' gross oil column, 18' is interpreted as net effective reservoir and a further 16' as possibly effective. The latter 16' is regarded as being a poor reservoir, probably having very low productivity.

Despite the fact that the well was drilled off the crest of the structure (approximately 30' downdip), the thin effective oil column, the possible lack of reservoir continuity and small areal extent severely downgrade the commercial potential of the Cobia feature. More velocity analyses and seismic interpretation will be undertaken to determine if further drilling is justified.

(7) Relevance to Geological Concepts

Existing concepts of the geological history of the Gippsland Basin require no alteration on the basis of the section penetrated at Cobia. The lithology and age of sediments drilled were anticipated.

The well encountered a thin interval of Gurnard Formation at the top of the Latrobe Group which was previously unknown in the immediate area. This formation is, however, widespread in other parts of the Gippsland Basin, generally on the flanks of structures and in topographic lows.

(8) Porosity and Permeability

The Miocene and Oligocene sections have virtually no effective porosity or permeability except for a thin unit at approximately 4300' - 4400' consisting of slightly porous skeletal limestone.

The Latrobe section contains sandstones with excellent porosity and permeability (see Appendix III and Appendix V).

V REFERENCES

James, E.A., Evans, P.R., "The Stratigraphy of Offshore Gippsland Basin, Australia", APEA March, 1971.

Richards, K.A., Hopkins, B.M., "Exploration in the Gippsland, Bass & Otway Basins, Australia", ECAFE, 1969.

VI ENCLOSURES:

I
a) Structure on Top Latrobe (Pre drill)
b) Cross Section A-A' (Tailor-Cobia-Halibut) (Pre drill)
c) Structure on Top Latrobe (Post drill)
d) Cross Section A-A' (Tailor-Cobia-Halibut) (Post drill)

II
a) Completion log and composite log.
b) Rock Log
c) Baroid PPM Gas Chromatograph log
d) Baroid ADT log
e) Baroid "d" exponent/drillability log

III Amerada Pressure Charts

IV
a) ISF-SCT 2" & 5"
b) FDC-GR-CNL-CAL 2" & 5"

V
a) HDT 5"
1) Arrow Plot 1.5' step 5"
2) Arrow Plot 2.5' step 2" & 5"
3) Arrow Plot 9' step 5"
b) Velocity Survey Time-Depth Curve
c) Formation Interval Test Log

VI Well History Chart

Appendix 1

THE PALYNOLOGY OF COBIA-1 GIPPSLAND BASIN

by

A.D. Partridge

Palaeontological Report 1972/17

October, 1972

THE PALYNOLOGY OF COBIA-1

SUMMARY

The following spore-pollen zones are identified in Cobia-1:

Zone	Depth in Feet	Age
Proteacidites tuberculatus	7817	Early Oligocene
Malvacipollis diversus	7821 - 7882	Early Eocene
Lygistepollenites balmei	8012 - 8150	Paleocene

COMMENTS

The palynology does not indicate any time break between the *L. balmei* and Lower *M. diversus* Zones. The samples referred to the *L. balmei* Zone are from near the top of the zone, while the Lower *M. diversus* section appears to represent the oldest portion of the zone.

The *L. balmei* Zone is only identified in two samples. The presence of the dinoflagellate *Wetzeliella homomorpha* in both samples and the rare occurrence of *Cupanieidites orthoteichus* and *Tricolporites paenestriatus* in the higher sample at 8012 feet suggest that only the upper part of the zone has been penetrated.

The *Malvacipollis diversus* Zone contains assemblages which are fairly well preserved but are of low diversity. The assemblages are dominated by the pollen *Proteacidites grandis* but contain few other key species. The lack of other key forms indicates that the section in Cobia-1 represents the oldest portion of the *M. diversus* Zone. The sample at 7821 feet contains a good *M. diversus* Zone assemblage without the presence of any younger fossil to suggest that it could be a reworked assemblage. The palynology data therefore indicates that the unconformity at the top of the Latrobe Group in Cobia-1 is between the *P. tuberculatus* Zone at 7817 feet and the *M. diversus* Zone at 7821 feet.

The *Proteacidites tuberculatus* Zone is identified by the presence at 7817 feet of the spore *Cyatheacidites annulatus*, associated with Oligocene dinoflagellate.

APPENDIX 2

FORAMINIFERAL BIOSTRATIGRAPHY,

COBIA-1,

GIPPSLAND BASIN

BY

D.J. Taylor

10th October, 1972

FORAMINIFERAL BIOSTRATIGRAPHY, COBIA-1 - GIPPSLAND BASIN

by David Taylor

October 10, 1972

Thirteen side wall cores were submitted for examination from a short interval between 7821 and 7710 feet. No fauna was found in the side wall core at 7821 feet. As yet no rotary cuttings have been examined from the well.

BIOSTRATIGRAPHY

The biostratigraphic zonation is that proposed by Taylor (1966) for the off-shore Gippsland Basin. Certain refinements to the scheme are in accordance with the New Zealand planktonic foraminiferal zonation as outlined by Jenkins (1971).

The earliest fauna found is that in a "greensand" at 7817 feet, where Globigerina angioporoides is present without associated planktonic species. Such a fauna can be no younger than Zone J and is probably no older. Immediately above, at 7810 feet, G. angioporoides is associated with G. euapertura indicating the upper part of Zone J which is the equivalent of Jenkins (1971) G. angioporoides Zone. The highest appearance of G. angioporoides at 7790feet marks the top of Zone J.

At 7780 feet the association of G. euapertura and Globorotalia opima opima is diagnostic of Zone I and this association persists to 7720 feet.

Globigerina woodi woodi makes its initial appearance at 7710 feet where it is associated with Globoquandrina praedehiscens and Globorotalia continuosa. This fauna represents the base of Zone H and the G. woodi woodi Zone of Jenkins (1971).

The samples examined are all from the Oligocene, if current opinions by Jenkins (1970; non 1971) are valid.

ENVIRONMENT

The faunas in sidewall cores from 7810 to 7710 feet are dominated by planktonic foraminifera. The percentage of planktonics in the foraminiferal fauna ranges from 95% to 98%. Obviously the sediment was a globigerinid ooze and probably deep water. The benthonic fauna includes such forms as Melonis pompiliodes, Osangularia bengalensis, Discammina compressa and Avelophragmium spp. (Bandy, 1960). These species are deep water indicators and support the contention for a deep water origin of the sediment.

SAMPLES EXAMINED

COBIA-1

Sample	Depth (in feet)	Zone
SWC 19	7817 *	P. tuberculatus
SWC 18	7821 *	M. diversus
SWC 17	7830 *	M. diversus
SWC 16	7836 *	Indeterminant (Very poor preservation)
Core-1	7842 (Coal)	M. diversus
Core-1	7845½	M. diversus
Core-2	7876 *	M. diversus
SWC 13	7876 (Coal)	M. diversus
Core-3	7882 *	M. diversus
Core-3	7894	Barren
SWC 9	7912	Barren
SWC 8	7920	Barren
SWC 6	7960	Barren
SWC 5	8012	L. balmei
SWC 3	8150	L. balmei
SWC 1	8390	Barren

* Dinoflagellates present

SPORE-POLLEN & DINOFLAGELLATE

DISTRIBUTION CHART

COBIA-1

	7817	7821	7830	7836	7842	7845½	7876	7876 (coal)	7882	8012	8150
Aglaoreidia qualumis	●										
Araucariacites australis			●								
Baculatisporites disconformis										●	
Banksieaeidites elongatus											●
Cupanieidites orthoteichus		●								●	
Cyatheacidites annulatus	●										
Cyathidites splendens		●					●			●	
Dilwynites granulatus	●	●	●						●		
D. tuberculatus			●					●			
Foveotriletes palaequetrus	●										
Gleicheniidites cercinidites		●	●	●			●				
Haloragacidites harrisii	●	●	●	●	●	●	●	●	●	●	
Ilexpollenites anguloclavatus			●					●			●
Latrobosporites crassus							●				
Lygistepollenites balmei										●	●
L. florinii		●	●		●	●	●	●			●
Malvacipollis diversus		●	●							●	
M. subtilis						●	●	●	●		●
Myrtaceidites parvus		●	●				●				
Nothofagidites deminutus	●										
N. emarcidus	●	●	●			●					
N. falcatus	●										
N. flemingii	●	●	●			●			●		
N. brachyspinulosus			●					●			●
Periporopollenites polyoratus		●	●			●					
Phyllocladidites mawsonii		●	●			●			●		●
Podosporites anarticus			●			●					
Podosporites microsaccatus			●		●	●		●	●		●
Polycolpites langstonii											●
Proteacidites adenanthoides			●	●	●	●	●	●			
P. annularis			●			●					
P. grandis		●	●		●	●	●		●		
P. incurvatus						●					
P. obscurus							●				
P. tenuiexinus		●		●		●					●
Rugulatisporites mallatus										●	
Simplicepollis meridianus			●		●	●	●				●
Stereisporites antiquisporites	●						●				
S. (Tripunctisporis) spp.		●									
Tricolpites phillipsii						●				●	
Verrucosisporites kopukuensis	●		●							●	
Cyclonephelium retiintextum										●	
Deflandrea dartmooria		●	●								
D. obliquipes						●					
Diphyes colligerum										●	
Epicephalopyxis indentata		●									
Hystrichokoploma rigaudae	●										
Hystrichosphaera spp.	●						●			●	
Lingulodinium machaerophorum	●										
Operculodinium centrocarpum	●										
Wetzeliella homomorpha		●								●	●

BANDY,O.L. 1960 - 21st. Intern. Geol. Congress, 22; 7 - 19.
JENKINS, D.G. 1970 -Rev. Espan. Micropaleont.,
JENKINS, D.G. 1971 -N.Z. Geol. Surv. Paleont. Bull. 42.
TAYLOR, D.J. 1966 - Appendix in Comm. Aust. Petrol. Search Subsidy Acts Publ. 76.

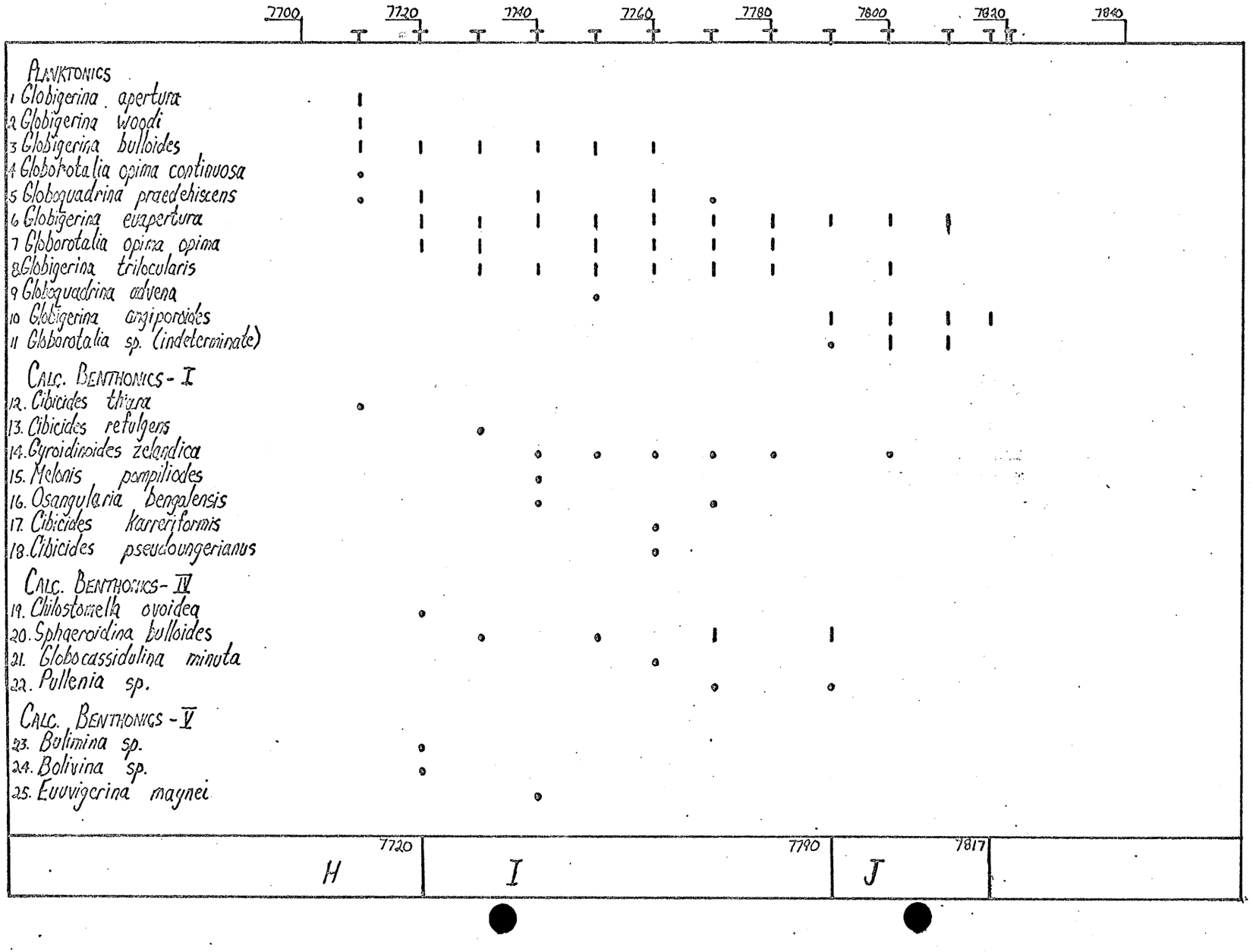
Key to two foraminifera distribution sheets

T = sidewall cores at: - 7710'; 7720'; 7730; 7740; 7750'; 7760'; 7770'; 7780'; 7790'; 7800';7810';7817'; 7821' (No foraminiferal fauna).

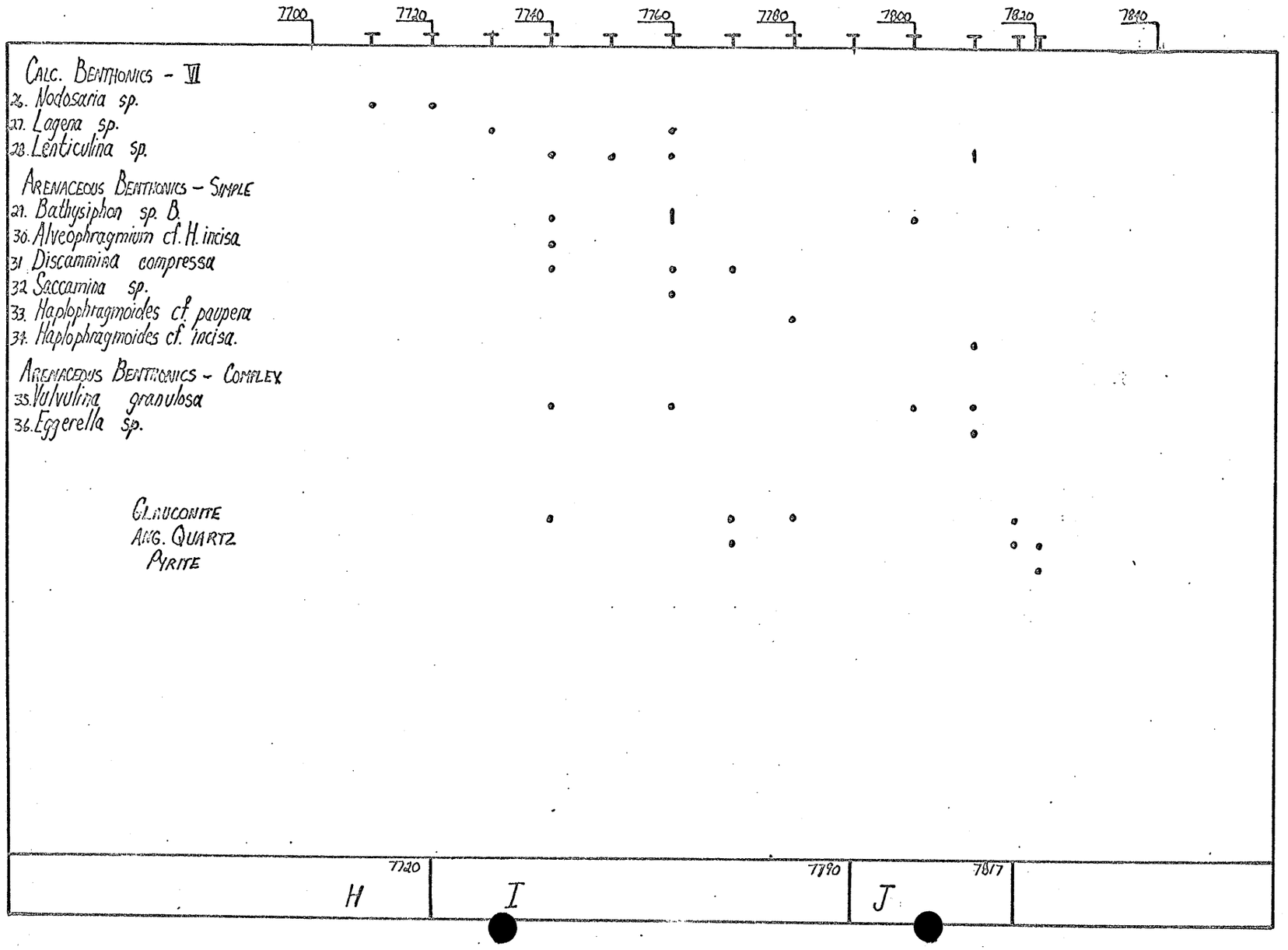
No rotary cutting or conventional cores were submitted for examination.

. = 1-20 specimens
1 = over 20 specimens

COBIA - 1


7700
7720
7740
7760
7780
7800
7820
7840
PLANKTONICS
1 Globigerina apertura
2 Globigerina woodi
3 Globigerina bulloides
4 Globorotalia opima continuosa
5 Globoquadrina praedehiscens
6 Globigerina euapertura
7 Globorotalia opima opima
8 Globigerina trilocularis
9 Globoquadrina advena
10 Globigerina angiporoides
11 Globorotalia sp. (indeterminate)
CALC. BENTHONICS - I
12. Cibicides thiara
13. Cibicides refulgens
14. Gyroidinoides zelandica
15. Melonis pompiliodes
16. Osangularia bengalensis
17. Cibicides karreriformis
18. Cibicides pseudoungerianus
CALC. BENTHONICS - II
19. Chilostomella ovoidea
20. Sphaeroidina bulloides
21. Globocassidulina minuta
22. Pullenia sp.
CALC. BENTHONICS - V
23. Bolimina sp.
24. Bolivina sp.
25. Euvigerina maynei
7720
H
7790
I
7817
J

CoB1A-1.


7700
7720
7740
7760
7780
7800
7820
7840
CALC. BENTHONICS - VI
26. Nodosaria sp.
27. Lagena sp.
28. Lenticulina sp.
ARENACEOUS BENTHONICS - SIMPLE
29. Bathysiphon sp. B.
30. Alveophragmium cf. H. incisa
31 Discammina compressa
32 Saccamina sp.
33. Haplophragmoides cf. paupera
34. Haplophragmoides cf. incisa.
ARENACEOUS BENTHONICS - COMPLEX
35. Valvulina granulosa
36. Eggerella sp.
GLAUCONITE
ANG. QUARTZ
PYRITE
7720
H
7780
I
7817
J

Appendix 3

OIL, GAS AND WATER ANALYSIS

COBIA-1

GIPPSLAND BASIN

October, 1972

Oil, Gas and Water Analyses

No production tests were run in Cobia-1. However, wellsite analyses of fluids recovered from 5 Formation Interval Tests in the Latrobe were performed. A Nitrate ion (NO_3^-) level of 100 to 140 ppm was maintained in the drilling mud to assist in differentiating filtrate from formation water.

FIT # 1 @ 7903'

Properties a) Main chamber — water: Cl^- 17,000 ppm, NO_3^- 43 ppm (By titration)
Rrf (filtered) 0.218 @ 68°F, Cl^- 19,000 ppm

b) Segregator — water: Cl^- 19,400 ppm, NO_3^- 20 ppm (By titration)
Rrf (filtered) 0.230 @ 64°F, Cl^- 19,400 ppm

FIT # 2 @ 7896'

Properties a) Main chamber — gas: ppm (Baroid Chromatograph)

C1	C2	C3	C4	C5	H2S
180M	50M	30M	50M	18M	100

oil: 42.7° API @ 60°F, pour point 56°F
GOR 500

water: Cl^- 8,500 ppm, NO_3^- 90 ppm (By titration)
Rrf (filtered) 0.556 @ 68°F, Cl^- 7000 ppm

b) Segregator — not opened. Kept for laboratory analysis.

FIT # 3 @ 7854'

Properties a) Main chamber — gas: ppm (Baroid Chromatograph)

C1	C2	C3	C4	C5	H2S
120M	180M	200M	240M	12M	90

oil: 44°API @ 60°F, pour Point 53°F, GOR 9000

water: Cl^- 7000 ppm, NO_3^- 60 ppm (by titration)
Rrf (filtered) 0.485 @ 68°F
Cl^- 8000 ppm

b) Segregator — not opened. Kept for laboratory analysis

FIT #4 @ 8210'

Properties a) Main Chamber — water: dumped without making any measurements

b) Segregator — water: Cl^- 17,300 ppm, NO_3^- 25 (by titration)
Rrf (filtered) 0.249 @ 63°F, Cl^- 17,500 ppm.

FIT # 5 @ 8095'

Properties a) Main chamber — water: Rrf (filtered) 0.270 @ 68°F
Cl^- 17,000 ppm
NO_3^- - not available.

b) Segregator - none used. Main Chamber only.

Analysis of F.I.T. tests of Cobia No. 1 Gippsland Basin.
Nitrate in Drilling mud 168 ppm.

FIT No.	Depth	Chromatograph C_1	C_2	C_3	C_4	C_5	S.G.	H_2S	CO_2	Cl.	A.P.I. Gravity	Pour Point	No_3
1	7903'		NO	GAS			1.03	-	-	17M			43ppm
2	7896'	180M	50M	30M	50M	18M	1.00	100+	3600	8500	43.6@70°	56°	90ppm
3	7854'	120M	180M	200M	240M	12M	1.01	90	5000+	7000	44 @60°	53°	60ppm

Chromatograph analysis of sidewall cores, Cobia No. 1

Core No.	Depth	C_1	C_2	C_3	C_4	C_5
10	7904	-	-	-	-	-
11	7892	1500	200	1200	3M	4M
12	7884	-	-	-	-	-
13	7876	1200	TR	1800	600	TR
14	7862	1000	TR	TR	200	100
15	7854	600	200	300	600	300
16	7836	3500	9000	4500	10M	6M
17	7830	-	-	-	-	-
18	7821	-	-	-	-	-
19	7[illegible]	-	-	-	-	-
20	7810	-	-	-	-	-

M = 1000 ppm

Appendix 4

DESCRIPTION

WELL CUTTINGS SAMPLES

COBIA-1

GIPPSLAND BASIN

August, 1972

DRY SAMPLES

COBIA-1

J. Black
April 4, 1973

Drilling out from under 20" conductor set at 747' KB with 13-3/4" bit.

DEPTH	DESCRIPTION
800 - 30	30% Cement cavings. 70% Shell fragments - coral, turatella, mollusc.
830 - 60	40% Cement cavings. 60% Shell fragments.
860 - 90	50% Cement cavings. 50% shell fragments.
890 - 950	60% Cement cavings 40% Shell fragments.
950 - 980	50% cement cavings. 50% shell fragments.
980 - 1100	40% cement cavings. 60% shell fragments.
1100 - 1130	30% cement cavings 70% shell fragments
1130 - 1220	10% cement cavings 30% shell fragments 60% sandstone, grey, very fine to medium grained, friable, porous, subangular, with scattered shell fragments, very calcareous.
1220 - 1250	10% cement cavings. 10% shell fragments 80% sandstone, as above.
1250 - 1370	10% shell fragments. 90% Sandstone, grey, very fine to medium grained, poorly sorted, friable, very calcareous.
1370 - 1640	80% Sandstone, light gray, very calcareous, porous with scattered shell fragments. 20% Shell fragments.
1640 - 1670	80% Sandstone, as above, with trace medium gray platy limestone. 20% Shell fragments.
1670 - 1790	70% Sandstone 20% Limestone - Medium gray, platy, thin bedded. 10% Shell fragments.
1790 - 1940	80% Sandstone as above. 10% Limestone, as above. 10% Shell fragments.
1940 - 2000	80% Sandstone with trace limestone 20% Shell fragments.
2000 - 2060	70% Sandstone - as above. 30% Shell fragments.
2060 - 2270	90% Sandstone, light grey, very fine grained, very calcareous, cement matrix. 10% Shell fragments

Dry Samples cont'd

Cobia-1

DEPTH	DESCRIPTION
2270 - 2690	100% Sandstone, light grey, very fine grained, silty very calcareous firm, with scattered shell fragments and few large forams.
2690 - 2720	80% Marl - light to medium grey, argillaceous, silty, soft. 10% Sandstone, as above. 10% Shell fragments.
2720 - 2750	60% Marl. 30% Sandstone, with trace light grey limestone 10% Shell fragments.
2750 - 2810	90% Marl 10% Sandstone
2810 - 2870	80% Cement cavings 20% Marl- with some sandstone as above
2870 - 2900	20% Cement cavings. 80% Marl- light-medium grey, soft argillaceous silty, very calcareous.
2900 - 2990	100% Marl as above.
2990 - 3170	90% Marl 10% Limestone, tan-brown, fine grain to dense, slightly dolomitic.
3170 - 3530	100% Marl- as above, with few large forams and trace tan limestone.
3530 - 3710	90% Marl 10% Limestone, tan to brown, hard, fine grained, dense.
3710 - 4070	100% Marl as above with few large forams, trace tan limestone.
4070 - 4190	100% Marl, medium grey, firm to soft, very calcareous silty, trace brown limestone.
4190 - 4280	100% Shale, medium gray, very silty, very calcareous firm, trace fossiliferous.
4280 - 4460	90-100% Shale, as above with trace white fine grained sandstone, trace 10% bentonite limestone, dense, hard.
4460 - 4610	100% Shale, as above.
4610 - 4640	100% Shale, as above with trace coarse loose quartz grains.
4640 - 4700	No samples
4700 - 4970	100% Shale, as above
4970 - 5450	100% Shale - medium gray, platy, soft to firm, silty fossiliferous, occasional light to medium gray, platy dense limestone.
5450 - 5660	100% Shale, medium gray, very calcareous, soft to firm, scattered large forams, occasional fine mica and traces gray platy limestone.
5660 - 5930	100% Shale, as above, but forams are smaller.
5930 - 6080	100% Shale, medium gray firm, very calcareous, very small forams, fine mica, trace medium grained round quartz, very fossiliferous

Dry Samples cont'd

Cobia-1

DEPTH	DESCRIPTION
6080 - 6260	100% Shale, as above with traces light grey platy, limestone and scattered secondary calcite.
6260 - 6410	100% Shale, medium gray, fossiliferous, small forams and occasional pyrite replaced fossiliferous, firm some fine micaceous, few thin medium grained limestone stringers dense hard.
6410 - 6440	No sample.
6440 - 6590	Break over mud to lignosulphate. 100% Shale, as above with rare globular pyrite, scattered angular, medium to coarse lignite in samples are from lignosulphonate added to mud.
6590 - 6800	100% Shale, as above, with rare fill glauconite grains, trace pyrite, trace coarse white quarts, fossiliferous.
6800 - 7040	100% Shale, medium to dark grey, firm to hard, fissile, finely micaceous, fewer fossils, with medium to coarse well rounded white quartz grains.
7040 - 7070	Samples in hole at time of hang off for storm. Riser and hydril parted during storm. Resumed drilling after 8 days.

COBIA - 1

20 August, 1972.
J.R. Black

On bottom after 9 days. Riser parted. Hole in good condition.

7069-80	Shale - lt./med. grey, firm/soft, calcareous, trace pyrite, fossils
7080-7100	Shale as above
7100-40	Shale - as above, with slight trace glauconite
7140-80	Shale as above but slightly silty, slight trace glauconite and pyrite
7180-7220	Shale - medium grey, silty, firm, trace pyrite, trace fine grained sand.
7220-7260	Shale, medium grey, soft, trace tan dolomite, trace pyrite replaced fossils.
7260-80	Shale as above with trace light bentonitic marl
7280-7300	Shale as above with increase of light grey-white marl, trace detrital coal
7300-40	Shale - light grey soft, bentonitic calcareous with trace loose very fine grained sand Trace pyrite and slight trace detrital coal
7340-7400	Shale - as above with very slight trace sand, trace brown grey limestone.
7400-40	Shale as above with light grey white marl, bentonitic
7440-60	Shale as above
7460-80	Shale with abundant light grey marl (20%)
7480-7500	Shale - medium grey, platy. firm with abundant white bentonitic marl 50%
7500-20	50% shale as above 50% marl - light grey-white, sticky soft bentonitic
7520-30	30% shale 70% Marl
7530-40	40% shale as above with trace pyrite 60% marl
7540-50	50% shale - as above, with trace pyrite and trace very fine grained sand. 50% marl
7550-70	40% shale 60% Marl
7570-80	30% shale 70% Marl - white, very sticky, bentonitic
7580-90	60% shale - greenish grey slightly micaceous 40% marl
7590-7620	60% shale 40% marl
7620-7650	80% shale 20% marl

.../2

J.R. Black
21 August, 1972.
Cobia-1

7650-7660	50% shale - green grey firm 50% marl - grey-white, soft sticky, bentonitic
7660-70	40% shale - green grey firm 60% marl - grey-white, soft, sticky, bentonitic
7670-80	60% shale 40% marl
7680-7700	100% shale - medium grey, silty, fine micaceous, fossils
7700-30	100% shale - as above
7730-40	100% shale - as above
7740-50	100% shale - as above with trace very fine grained sandstone
7750-70	100% shale - as above with trace glauconite, trace calcite
7770-80	100% shale - medium grey, very silty, fossils
7780-90	70% shale 30% siltstone - brown-grey, glauconitic, firm
7790-7800	50% shale 50% siltstone, as above, very glauconitic.
7800-10	40% shale 60% siltstone - tan, very glauconitic, firm
7810-20	40% shale 60% siltstone - tan, very glauconitic, firm
7820-30	50% shale 50% siltstone - as above
7830-40	20% shale 70% siltstone, very glauconitic 10% sandstone, very fine grained, tan firm, trace fluorescence, fair cut.
7840-42	20% shale 40% siltstone, very glauconitic
	30% sandstone, tan, very fine to fine grained, very glauconitic, very pyritic, good fluorescence, fair cut
	10% Sand - white, well rounded quartz, ferrugenous stained, good fluoresence, abundant glauconite included in a pyrite matrix
	Pulled out to Run Core Bbl. for Core # 1.
	Strap out T.D. measured 7840' Ran very light weight on bit, drill break difficult to pick exactly.

.../3

COBIA-1

Sample Descriptions
A.J. Mebberson
23rd August, 1972.

7925-30	100% cavings (Lakes Entrance) Trace loose sand, coarse, well rounded
7930-60	100% cavings, trace sand as above
7960-90	60% cavings (Lakes Entrance) 40% coarse to medium grained, loose well rounded sand grains, trace spotty scattered fluorescence (caved)
7990-8000	80% cavings as above 20% sand, loose, as above, no shows.
8000-8040	100% sand, fine to very coarse generally coarse, sub-angular to well rounded, quartz, loose. No shows. Trace cavings of Lakes Entrance shale
8040-60	100% sand, coarse, loose as above
8060-70	100% sand as above
8070-80	100% sand as above, increasingly medium grained, white, frosted.
8080-90	100% sand, white frosted, generally medium grained (very fine grained to coarse), No shows
8090-8100	50% sand as above, No shows 50% shale, grey, fissile, slightly calcareous Trace coal, black, brittle
8100-10	90% shale as above 5% coal as above 5% sand as above
8110-40	70% shale as above 20% coal as above 10% sand as above, trace Fe stain
8140-70	80% sand as above 20% coal as above, trace Fe stain
8170-80	100% sand, medium coarse generally medium, frosted, Fe stained
8180-8220	80% sand as above, generally coarse, some Fe stain, trace pale brown mineral fluorescence 10% shale as above 10% coal as above
8220-30	90% sand as above, some very coarse, well rounded, frosted, generally medium to coarse 10% shale as above, trace coal as above
8230-60	100% sand as above, generally coarse grained some pebbles, rounded Fe stained, most clear to frosted, white, sub-angular to well rounded. Trace shale and coal as above
8260-8300	100% sand as above Trace shale as above

.../4

8300-20	60% sand as above, generally medium grained 40% shale as above
8320-30	50% sand as above 50% shale as above
8330-40	90% shale as above, 10% sand as above
8340-60	100% shale as above, trace sand as above
8360-70	100% shale as above
8370-8420	80% shale as above 20% sand as above
8420-30	80% sand as above, generally medium grained 20% shale as above
8430-40	90% sand as above 10% shale as above
8440-50	70% sand as above 30% shale as above
8450-60	100% sand as above, slightly coarser grained
8460-70	90% sand as above 10% shale as above, trace very fine grained to coarse grained
8470-8511	100% sand as above

T.D. 8511'

Appendix 5

DESCRIPTION OF CONVENTIONAL

AND SIDEWALL CORES &

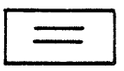
CORE ANALYSIS

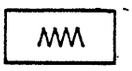
COBIA-1,

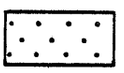
GIPPSLAND BASIN

October, 1972.

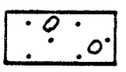
LEGEND OF CORE DESCRIPTION

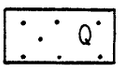

Shale


Silt

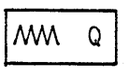

Sandstone


Coal

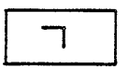

Conglomerate

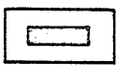


Sandy (Silica)

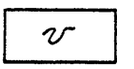


Silty (Silica)


Micaceous


Carbonaceous Matter


Plant Remains


Burrows

s Sharp Contact

g Gradational Contact

ESSO STANDARD OIL (AUSTRALIA) LTD.

CORE DESCRIPTION

Core No. 1

WELL: COBIA 1

Interval Cored 7840-45½ **ft., Cut** 5½ **ft., Recovered** 5½ **ft., (** 100 **%) Fm.** Latrobe

Bit Type C-19 **, Bit Size** 8- 15/32" **in., Desc. by** J. Black **Date** 22 August, 1972

Depth & Coring Rate (min./ft.)	Graphic (1" = 5')	Shows	Interval (ft.)	Descriptive Lithology
0 5 10 7840'			7840'-41'	SILTSTONE: Brown, sandy, very pyritic, micaceous, hard, indurated, with subr. coarse qtz. grains, tight
Av. Core rate 10 MIN/FT.			7841'-41'10"	SHALE: Tan, silty, micaceous, laminated, with carbonaceous fragments, very hard and indurated
7845½'			7841'10"-42'9"	COAL: Black, conchoidal fracture, light
			7842'9" - 45'6"	SHALE: Dark brown, silty, hard, well indurated, micaceous with large carbonaceous wood fragments.

REMARKS: Barrel jammed

<<< 4" Full diameter core for BMR

<<<< chips for palaeontology

ESSO STANDARD OIL (AUSTRALIA) LTD.

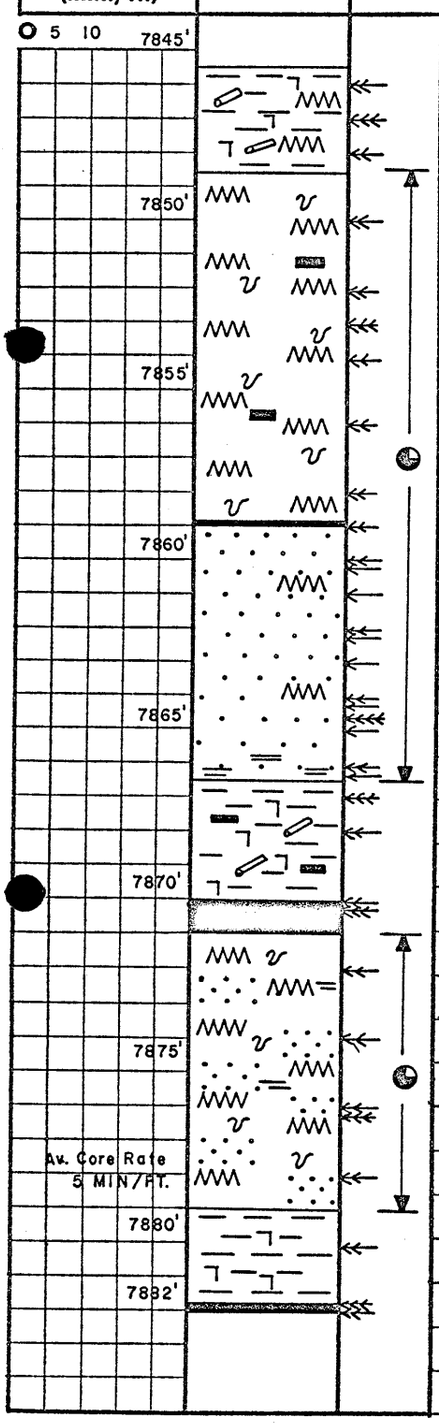
CORE DESCRIPTION

Core No. 2

WELL: COBIA 1

Interval Cored 7845'6"-82 **ft., Cut** 36'6" **ft., Recovered** 36'6" **ft., (** 100 **%) Fm.** Latrobe

Bit Type C-22 **, Bit Size** 8-15/32" **in., Desc. by** J. Mebberson **Date** 22 August 1972



Interval (ft.)	Descriptive Lithology
7845'6" - 48'6"	SHALE: Grey-brown, indurated, hard, occasionally silty, abundant wood fragments, micaceous
7848'6"-59'	SILTSTONE: Grey-brown, indurated, hard, heavily mottled and burrowed with sand filled burrows, laminated, occ. carbonaceous, patchy white fluorescence and cut. Occ. bleeding oil. tite 3" coal at base
7859'-66'6"	SAND: Brown-grey, vfg to coarse, firm to friable, quartzose, occ. silty, massive Good white fluorescence, cut and lt. bn. residue. Good porosity. Basal foot (1') with shale bands up to 1½"
7866'6"-71'	SHALE & COAL: Shale - laminated, grey to black, micaceous, abundant carb. plant remains firm to hard. Basal 1' of coal - black, brittle
7871'-79'	I'BEDDED SAND & SILTSTONE: Generally siltstone shaley in parts, brown to grey, laminated, burrowed, scattered coarse qtz. grains Sand: up to 4" thick bands, gen.a.a. slightly firmer. Good fluorescence cut & residue. Fair porosity
7879'-82'	SHALE: Carbonaceous, grey to black, laminated micaceous, indurated, coaly at base.

REMARKS: ← 4" full core to EPRCo. for analysis

← 4" full core to BMR for subsidy

←← Overburden sample

←←← Palaeontology

ESSO STANDARD OIL (AUSTRALIA) LTD.

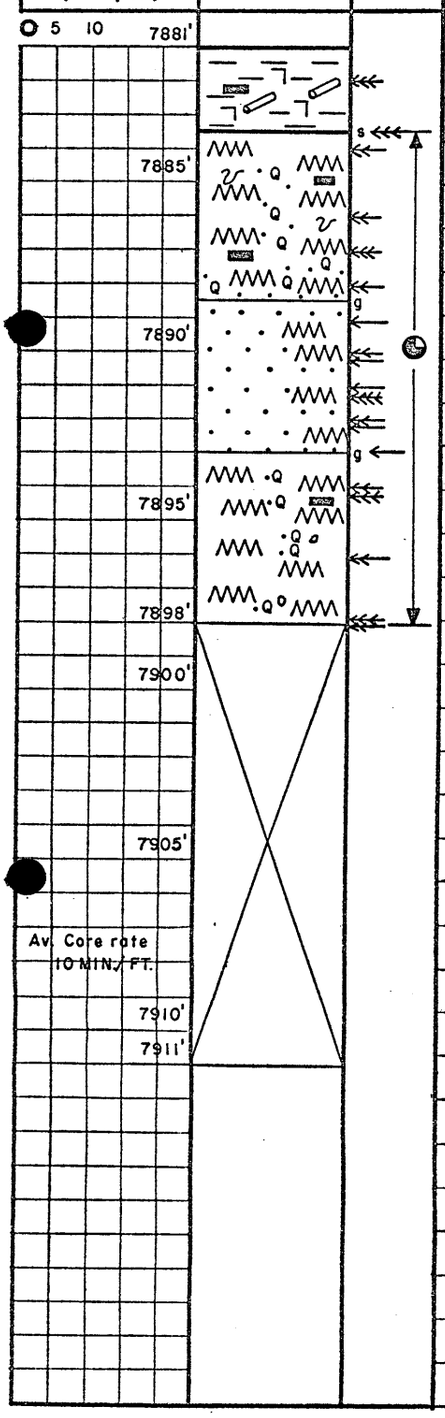
CORE DESCRIPTION

Core No. 3

WELL: COBIA 1

Interval Cored 7881 -7911 **ft., Cut** 30 **ft., Recovered** 17 **ft., (** 57 **%) Fm.** Latrobe

Bit Type C-22 **, Bit Size** 8-15/32" **in., Desc. by** J. Mebberson **Date** 23 August 1972



Interval (ft.)	Descriptive Lithology
7881' - 83'6" SHALE:	grey to black, laminated, very abt. carb. plant fragments, micaceous, indurated, hard to fissile, thin coals at top of base.
7883'6"-88'6" SILTSTONE:	Very sandy, dark brown, scattered coarse to medium sr. qtz grains (abundance increasing downwards). Carbonaceous, firm, faint laminae, occ. burrows. Spotty fluorescence, weak cut. Becomes sandy towards base & bleeds oil c white fluor, fair cut & odour.
7888'6"-93' SAND:	Very silty, qtz, white to brown, poorly sorted, coarse to very fine grained with silty matrix. Bleeding oil, friable to hard. Good cut, fluor. & pale brn. residue. Poor porosity
7893'-98' SILTSTONE:	Very sandy in parts. Light brown, sl. carbonaceous, few scattered coarse qtz. grains. Firm to hard, occ. indurated. Bleeding oil in sandy parts with white fluor. cut and lt. bn residue.
7898'-7911' NO RECOVERY	

REMARKS: ← EPRCo. Top of core # 3 adjusted up 1' after trip in hole to core

← BMR

←←← Overburden

←←← Palaeontology

ESSO STANDARD OIL (AUSTRALIA) LTD.

CORE DESCRIPTION

Core No. 4

WELL: COBIA 1

val Cored 7911' - 25' **ft., Cut** 14 **ft., Recovered** 13 **ft., (** 93 **%) Fm.** Latrobe

Type C-20 **, Bit Size** 8-15/32" **in., Desc. by** J. Mebberson **Date** 23 August 1972.

Depth & Coring Rate (min./ft.)	Graphic (1" = 5')	Shows	Interval (ft.)	Descriptive Lithology
2 4 6 7911'			7911'-16'	SAND: Quartzose, vfg to coarse, brown, poorly sorted, very silty, firm to hard. Bleeding oil, good even white fluorescence, cut & residue. Probable poor porosity, relatively tite.
7915'			7916'-29'	SAND: Silty, vfg to coarse, very coarse in top 2' decreasing median grain size downwards. Well rounded, friable at top becoming firmer towards base. Spotty white fluor. and weak cut becoming weaker and more scattered downwards. Porosity in top 2' good but fair to poor at base. Oil-water contact at 7916' with residual hydrocarbons below this.
7920'				
Av. Core rate 3 MIN/FT.			7924'-25'	NO RECOVERY
7924'				
7925'				

N.B. The driller does not believe he cut 14' of core, and thinks the recovery is what was lost from core no. 3.

REMARKS: Bit ringed

← 4" full core for water saturation

«← BMR

«« Palaeontology

The following simulated overburden core analyses were performed by Core Laboratories, Inc. off the well site.

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCYS		POROSITY PERCENT	RESIDUAL SATURATION		PROBABLE PRODUCTION	OVERBURDEN PRESSURE
		HORIZONTAL	VERTICAL		OIL % Volume % Pore	Total Water % Pore		
Core No. 3								
1	7864½	62		13.8				4325 PSIG.
2	7891	489		18.7				4350 PSIG.
Core No. 4								
3	7913	715		20.1	7.0	56.1		4350 PSIG.
4	7915	484		18.6	10.5	49.5		4350 PSIG.
5.	7917	387		19.2	0.0	82.0		4350 PSIG.
6	7921	508		22.5	0.0	80.5		4350 PSIG
7	7924	123		19.7	0.0	61.2		4350 PSIG.

NOTE: (1) Due to friable material all plugs were drilled using liquid Nitrogen. They were then jacketed in lead tubes with screens placed on the ends.

(2) All samples were extracted for 6 days using Toluene Solvent.

(3) Overburden Pressure simulated by formula:-

Net Overburden Pressure = .55 depth.

This formula assumes that the formation fluid pressure is normal.

Appendix 6

LIST AND INTERPRETATION

OF WIRELINE LOGS AND SURVEYS

COBIA-1,

GIPPSLAND BASIN

October, 1972

The following logs and wireline services were performed by Schlumberger in Cobia-1:

1. ISF-SCT (Spherically focused Induction-Sonic Combination tool)
   5" & 2" scales 8425 - 2773'

2. FDC-CNL-GR-CAL (Combination Density Neutron with Gamma Ray and caliper)
   5" & 2" scales FDC-CNL 8431-7600',
   Cal 8431-2773'
   GR 8431- 372'

3. HDT (Four-Arm High Resolution Dipmeter) 5" - 100' scale on Monitor log 8430 - 7600'. Interpretation logs of HDT tapes by Data Analysis 2" & 5" in 1.5, 2.5' and 9' step intervals

4. Velocity Survey - Six levels taken between -7783' and -2968' (See Time - Depth Curve Enclosure IV)

5. Shot 30 CST's and recovered 28 in interval 8390' - 7710'.

6. FIT's at 7903, 7896, 7854, 8210 and 8095'.

The next page gives R.B. King's analysis of the oil bearing section of Latrobe. All of the Latrobe sands below the oil/water contact are wet. Log response for Cobia-1 in the Latrobe and the younger marine Lakes Entrance and Gippsland Fm's are typical of the area.

WELL LOG ANALYSIS REPORT

TO

OPERATOR Esso Australia WELL COBIA-1 DATE 28 August 1972

STATE Victoria ELEV. 32' KB

DEPTH INTERVAL	POROSITY ESTIMATE	WATER SAT. ESTIMATE	REMARKS
7817 - 21	-	-	Possibly two very thin permeable streaks
7825 - 29 (4	Indeterminate	-	Pyritic sand with some permeability
7824 - 46 (4	11 - 12.2	83 - 95	Shaly sand, probably not effective
7846 - 51 (5	12.2 - 13.4	76 - 86	Shaly sand, probably not effective
7852 - 57 (5	14.6 - 15.8	47 - 50	Tight sand, possible effective
7863 - 67 (4	16.5 - 17.6	47 - 51	Shaly sand, possibly effective
7877 - 80 (3	14.6 - 15.8	44 - 48	Shaly sand, possibly effective
7880 - 83 (3	20.7 - 21.8	30 - 32	Oil productive
7883 - 85 (2	16.5 - 17.6	34 - 37	" "
7885 - 90 (5	21.3 - 22.5	24 - 26	" "
7890 - 94 (4	23.1 - 24.3	22 - 23	" "
7894 - 96 (2	19.5 - 20.7	34 - 37	" "
7896 - 98 (2	19.5 - 20.7	45 - 49	" " w/possible water cut
7898 - 7901 (3	17.6 - 18.8	92 - 100	Formation water productive
7901 - 10 (9	19.8 - 21	100	Formation water productive

SF depths

TESTS:

FIT

FORMATION:

Latrobe

LOGS:

ISF - BHC, FDC - CNI
GR

COMMENTS:

Limited cross plot data suggests the above listed porosities may be one to one and one half porosity units too low.

BY

Appendix 7

TEST DATA

COBIA-1,

GIPPSLAND BASIN

October, 1972

List and description of tests and Interpretation of Test Results

Five FIT tests were performed in Cobia-1 by Schlumberger using, in addition to Schlumberger pressure gauges, dual Amerada gauges with rated capacities of 0 - 10,250 and 0- 11,800 PSIG. these gauges were run on the FIT tool and interpreted by Agnew - GO - Western, Ltd.

Note: All depths are ISF depths.
(Mud Properties Rmf. 0.469 @ 63°F, Cl^- 8500 ppm, NO_3^- 168 ppm).

FIT #1 @ 7903'

Recovered: Scum of oil
(Main Chamber) 22100 cc water

(Segregator) 2000 cc water with no oil scum.

Properties: Water Cl^- 17000 ppm, NO_3^- 43 ppm. (By titration)
(Main Chamber) Rrf (filtered) 0.218 @ 68°F, Cl^- 19000 ppm.

(Segregator) Water Cl^- 19400 ppm, NO_3^- 20 ppm, (by titration)
Rrf (filtered) 0.23 @ 64°F, Cl^- 19400 ppm.

Pressures:	Schlumberger		Agnew (Dual Ameradas)
	Sampling Pressure	3510 psi.	3399 psi, 3391 psi.
	Final Shut-in	3510 psi.	3399 psi, 3391 psi.
	Hydrostatic	4220 psi.	4136 psi, 4133 psi.
	Sampling Time	12 min.	
	Shut-in Time	2 min.	

FIT #2 @ 7896'

Recovered: 58 cf gas.
(Main Chamber) 18,200 cc Oil.
1400 cc Water (filtrate)

(Segregator) # 24 not opened.

Properties:

Gas (ppm)	C_1	C_2	C_3	C_4	C_5	H_2S
(Main Chamber)	180M	50M	30M	50M	18M	100

Oil 42.7° API @ 60°F, Pour Point 56°F, GOR 500.

Water Cl^- 8500 ppm, NO_3^- 90 ppm (by Titration)
Rrf (filtered) 0.556 @ 68°F, Cl- 7000 ppm.

(Segregator) Not opened.

Pressures:	Schlumberger		Agnew (Dual Ameradas.)
	Sampling Pressure	3109 psi	3109 psi, 3105 psi
	Final Shut-in	3415 psi	3415 psi, 3409 psi
	Hydrostatic	4133 psi	4121 psi, 4127 psi
	Sampling Time	5 min.	
	Shut-in Time	10 min.	

FIT #3 @ 7854'

Recovered: 30 cf Gas
(Main Chamber) 500 cc Oil
17,700 cc Water (Filtrate)

(Segregator) # 4 not opened.

FIT #3 @ 7854'

Properties:	Gas	C_1	C_2	C_3	C_4	C_5	H_2S
(Main Chamber)	(ppm)	120M	180M	200M	240M	12M	90

Oil 44° API @ 60°F, Pour Point 53°F, GOR 9000

Water Cl^- 7000 ppm, NO_3^- 60 ppm (By Titration)
Rrf (filtered) 0.485 @ 68°F Cl^- 8000 ppm.

(Segregator) Not opened.

Pressures:	Schlumberger	Agnew (Dual Ameradas)
Sampling Pressure	1400 psi	1334 psi, 1440 psi
Final Shut-in	3390 psi	3362 psi, 3378 psi
Hydrostatic	4100 psi	4089 psi, 4096 psi
Sampling Time	9.5 min	
Shut-in Time	1 min	

FIT #4 @ 8210'

Recovered: 22100 cc Water
(Main Chamber)

(Segregator) 2000 cc Water

Properties: Dumped without making any measurements
(Main Chamber)

(Segregator) Water Cl^- 17300 ppm, NO_3^- 25 ppm, (By titration)
Rrf (filtered) 0.249 @ 63°F, Cl^- 17,500 ppm.

Pressures:	Schlumberger	Agnew (Dual Ameradas)
Sampling Pressure	3420 psi	3557 psi, 3555 psi
Final Shut-in	3420 psi	3563 psi, 3567 psi
Hydrostatic	4190 psi	4268 psi, 4279 psi
Sampling Time	8 min.	
Shut-in Time	3 min.	

FIT #5 @ 8095' (Run without segregator)

Recovered: 22100 cc Water
(Main Chamber)

Properties: Water Cl^- NA ppm, NO_3^- NA ppm (By Titration) not measured
Rrf (filtered) 0.27 @ 68°F, Cl^- 17,000 ppm.

Pressures:	Schlumberger	Agnew (Dual Ameradas)
Sampling Pressures	3460 psi	3442 psi, 3433 psi
Final Shut-In	3520 psi	3489 psi, 3482 psi
Hydrostatic	4220 psi	4210 psi, 4206 psi
Sampling Time	5 min.	
Shut-in Time	3 min.	

Remarks:	FIT	Interpretation of Test
	#1 @ 7903'	Water Productive
	#2 @ 7896'	Oil with possible water cut
	#3 @ 7854'	Tight, but oil productive
	#4 @ 8210'	Water productive
	#5 @ 8095'	Water productive

AGNEW-GO-WESTERN PTY. LTD.
582 St. Kilda Road
Melbourne, Victoria 3004

ESSO AUSTRALIA LIMITED — COBIA — COBIA No. 1
August 25, 1972

Purpose: Obtain subsurface pressures with Amerada gauges run in tandem with Schlumberger Formation Interval Tester.

Tools used: 1 Amerada 11,800 psi element Serial No. 8282 12 Hour clock
1 Amerada 10,250 psi element Serial No. 8757 3 Hour clock

F.I.T. TEST No. 1 @ 7903'

HOURS	ELAPSED TIME	PSIG 11,800	PSIG 10,250	REMARKS
1425				Start to run in hole
1524		4145	4131	Set Packer – Hydrostatic
1525	0			Open tool
	2	3391	3399	
	4	3391	3399	
	6	3391	3399	
	8	3391	3399	
	10	3391	3399	
	12	3391	3399	
	13	3391	3399	Chamber filled
	14	3415	3426	Seal chamber and open segregator
	15	3427	3426	
	16	3427	3426	Seal segregator
	17			Unseat packer
		4133	4136	Hydrostatic
1600				Out of hole

F.I.T. TEST No. 2 @ 7898'

HOURS	ELAPSED TIME	PSIG 11,800	PSIG 10,250	REMARKS
1655				Start to run in hole
		4127	4121	Hydrostatic
1803				Set Packer
1804	0			Open tool
	2	3105	3109	
	4	3105	3109	
	5	3105	3109	Chamber filled
	6	3403	3415	
	8	3409	3415	
	10	3409	3415	
	15	3409	3415	Seal chamber and open segregator
	16	3409	3415	
	18	3409	3415	
	20	3409	3415	Seal segregator
	21	3421	3420	Unseat packer – pseudo shut-in
1845				Out of hole

Operator: Larry Murphy

AGNEW-GO-WESTERN PTY. LTD.
532 St. Kilda Road
Melbourne, Victoria 3004

ESSO AUSTRALIA LIMITED | COBIA | COBIA No. 1
August 25, 1972

Purpose: Obtain subsurface pressures with Amerada gauges run in tandem with Schlumberger Formation Interval Tester.

Tools used: 1 Amerada 11,800 psi element Serial No. 8282 12 hour clock
1 Amerada 10,250 psi element Serial no. 8757 3 hour clock

F.I.T. TEST No. 3 @ 7854'

HOURS	ELAPSED TIME	PSIG 11,800	PSIG 10,250	REMARKS
2000				Start to run in hole
2050		4096	4089	Hydrostatic – set packer
2051	0			Open tool
	2	--	50	Fire shape charge
	3	1256	1206	
	4	1287	1233	
	6	1360	1297	
	8	1440	1334	
	10	3360	3320	
	11	3378	3362	Seal chamber and open segregator
	12	3397	3389	
	13	3397	3389	Seal segregator
	14			Unseat packer
2125				Out of hole

F.I.T. TEST No. 4 @ 8210'

HOURS	ELAPSED TIME	PSIG 11,800	PSIG 10,250	REMARKS
2215				Start to run in hole
2303		4279	4268	Hydrostatic – set packer
	0			Open tool
	2	3555	3557	
	4	3555	3557	Chamber filled
	6	3567	3563	
	8	3567	3563	
	10	3567	3563	
	11	3567	3563	Seal chamber and open segregator
	12	3567	3563	
	13	3567	3563	Seal segregator
	14	3567	--	Unseat packer
2350				Out of hole

Operator: Larry Murphy

AGNEW-GO-WESTERN PTY. LTD.
582 ST. KILDA ROAD
MELBOURNE, VICTORIA 3004

ESSO AUSTRALIA LIMITED COBIA

COBIA No. 1
AUGUST 26, 1972

PURPOSE: OBTAIN SUBSURFACE PRESSURES WITH AMERADA GAUGES RUN IN TANDEM WITH SCHLUMBERGER FORMATION INTERVAL TESTER.

TOOLS USED: 1 AMERADA 11,800 PSI ELEMENT SERIAL NO. 8282 12 HOUR CLOCK
1 AMERADA 10,250 PSI ELEMENT SERIAL NO. 8757 3 HOUR CLOCK

F.I.T. TEST No. 5 @ 8095'

HOURS	ELAPSED TIME	PSIG 11,800	PSIG 10,250	REMARKS
0035				START TO RUN IN HOLE
0125		4206	4210	HYDROSTATIC - SET PACKER
0126	0			OPEN TOOL
	1	3433	3442	
	2	3433	3442	
	3	3433	3442	
	4	3433	3442	CHAMBER FILLED
	5	3482	3489	
	6	3482	3489	
	7	3482	3489	
	8	3482	3439	SEAL CHAMBER
	9			UNSEAT PACKER
0215				OUT OF HOLE

OPERATOR: LARRY MURPHY