OFFSHORE 52

343001

SUBSIDY REPORT,

NARIMBA-1,

TASMANIA (T/5P), AUSTRALIA

by

V.A. Robinson

Esso Exploration and Production Australia Inc.

February, 1974.

OR_340

343002

CONTENTS

I. SUMMARY

(1) Drilling
(2) Geological

II. INTRODUCTION

III. WELL HISTORY

(1) General Data
(2) Drilling Data
(3) Location
(4) Sampling
(5) Logging and Surveys
(6) Testing

IV. GEOLOGY

(1) Summary of Previous Work
(2) Regional Geology
(3) Stratigraphic Table
(4) Stratigraphic Description
(5) Structure
(6) Hydrocarbon Occurrence
(7) Relevance to Geological Concepts
(8) Porosity and Permeability

V. REFERENCES

VI. ENCLOSURES

One (1) through 17

APPENDICES

I. Palynological Report
II. Foraminiferal Biostratigraphy
III. Description of Well Cuttings Samples
IV. Description of Conventional and Sidewall Cores and Core Analysis
V. List and Interpretation of Wireline Logs and Surveys
VI. Formation Interval Tests (F.I.T.'s) and Amerada Pressure Data.

343003

I. SUMMARY

(1) Drilling

Narimba-1 was drilled to a total depth of 11,003' (3360 metres) by Global Marine's floating rig "Glomar Conception". Drilling operations commenced on August 31, 1973, and the rig was released on October 4, 1973 after the well was plugged and abandoned. Total rig time was 35.57 days.

(2) Geological

Miocene and Oligocene marls, limestones, mudstones and calcarenites were penetrated from just below the sea floor to a depth of 5428'. The "upper Eocene shale" is present from 5428' to 5884' where the top of the Eastern View Group was encountered 98' higher than predicted. The lithology of the Eastern View Group was as anticipated, and consists of an interbedded sequence of sandstones, siltstones and coals.

There were no hydrocarbon shows reported, even though a number of the sandstone beds in the Eastern View have porosity over 20% and permeability over 100 md, they are water saturated.

343004

II. INTRODUCTION

Narimba-1 was drilled to test a structural trap on trend and to the northwest of the "Pelican anticline" on which Pelican-1 and Pelican-2 are located. The primary objective was the Lower Eocene (Lower M.diversus) section which contains wet gas at Pelican-1 and Pelican-2.

The well adequately evaluated this structural feature, and the absence of hydrocarbons indicates that the wet gas at Pelican-1 and Pelican-2 does not extend to the northwest past the saddle which separates the "Pelican anticline" from the "Narimba anticline".

343005

III. WELL HISTORY

(1) General Data

(i) Well Name and Number

NARIMBA - 1

(ii) Operator and Address

Esso Exploration and Production Australia Inc.
C/- Price Waterhouse Nominees (Tasmania) Pty. Ltd.
7th Floor, A.M.P. Building,
86 Collins Street,
HOBART TASMANIA 7000

(iii) Title Holder and Address

Hematite Petroleum Pty. Ltd.
B.H.P. House,
140 William Street,
MELBOURNE VICTORIA 3000

(iv) Petroleum Title

Petroleum Permit T/5P

(v) District

A.M.G. Zone 55

(vi) Location

Latitude 40° 16' 18.080" S
Longitude 145° 43' 53.581" E

(vii) Elevation

Mean Sea Level
(Water depth 253')

(viii) Total Depth

11,003'

(ix) Spud Date

31 August, 1973.

(x) Date T.D. Reached

1 October, 1973.

(xi) Date of Completion

4 October, 1973

(xii) Rig Released

4 October, 1973.

(xiii) Drilling Time

Total Drilling time 35.55 days

(xiv) Status

Plugged and abandoned as dry hole.

(xv) Total Cost

A$1,001,841 (Estimated)

WELL HISTORY (Cont'd)

343006

(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
B.H.P.:	752 D1 x 2 8720 Intermittent 6800 Continuous

(iii) Derrick

Make:	Build by Continential EMSCo. using Global Marine Design.
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
B.H.P.:	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 Preventers
Size:	16-3/4" for 5" drill pipe.
API Series:	1500; 500 psi working pressure.

(vi) Hole Sizes and Depths

Conductor Hole:	26" to 772' KB
Surface Hole:	16½" to 2821' KB
Intermediate Hole:	12¼" to 8850' KB
Exploration Hole:	8½" to 11003' KB

(vii) Casing and Liner Cementing Details

Size	Weight	Grade	Range	Depth Set
20"	91.5 lb/ft	X-52 LP	3	675' KB
13-3/8"	54.5 lb/ft	J-55	3	2747' KB
9-5/8"	47.0 lb/ft	N-80	3	8808' KB

	20"	13-3/8"	9-5/8"
Position of Float Collar	N/A	Top of Bottom Jt.	Top of Bottom Jt.
Position of Float Shoe	Bottom of String	Bottom of String	Bottom of String
No. of Centralizers	6	10	16
Position of Centralizers	Top and Bottom of Bottom Joint; Top of 2nd Jt.; Free on 4th, 5th & 6th Joints.	Top and Bottom of 1st Jnt. One on every 2nd Jnt., over 16 Joints total.	Top and Bottom of 1st Jnt. One free to move on 3rd, 5th, & 7th Jnts.; one free to move on every 3rd Jnt. from 8th Jnt. to 8000'; one every 2nd Jnt. between 2500' and 3000'.

(vii) Casing and Liner Cementing Details (Cont'd)

	20"	13-3/8"	9-5/8"
No. of Scratchers	NIL	NIL	NIL
Cement Used	1450 sx	687 sx	375 sx
Top of Cement	Sea Floor	1230' est.	7450' est.
Method Used (plug, multi-stage, etc.)	Plug	Plug	Plug

(viii) Drilling Fluid

Type: Lingnosulphonate Fresh Water
Average Weight: 10.3 ppg.
Brief Details of Treatment, average weekly analysis: Mud pumped over shale shaker and through de-silter. Thinning accomplished by addition of fresh water, Q-Broxin and CC16.

WT.	Vis.	W.L.	Filter Cake	pH	Sand
10.3	46	5.4	2/32	9.6	Tracer

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

Barites	3,235 sx
Gel	1,391 sx
Caustic	7,570 lb (65 cans)
Q-broxin	344 sx
CC-16	349 sx
Aluminium steorate	2 sx
Bicarb. of soda	3 sx
Benex	50 bags

(ix) Water Supply

Barry's Beach tap water transported by workboats.

(x) Perforation & Shooting Record

Perforate from 2447'-2450' w/4 shots per foot to enable setting of #2 abandonment plug.

(xi) (a) Plugging Back Cementation Jobs

	1.	2.	3.
Length and type of plug:	375' 15.6 ppg	200' 15.6 ppg	200' 15.6 ppg
Number of sacks used :	135 sx plus 0.7% HR-12	160 sx	70 sx
Method used :	Displaced through drill pipe.		
Whether plug job was satisfactorily tested:	Yes 8500'-8125'	Yes 2250'-2450'	Yes 654'-454'

(b) Squeeze Cementation Job

Abandonment plug #2 - squeezed 19 bbls. cement through perforations in 9-5/8" casing into 9-5/8" to 13-3/8" annulus.

(xii) Fishing Operation

NIL

(xiii) Side-tracked Hole

NIL

(3) Location

(i) Site Investigations Carried Out

NIL

(ii) Anchoring Methods

10 x 30,000 lb. anchors were laid by workboats in a 45^{o} / 95^{o} pattern on an average radius of 2100 ft.

(iii) Transportation

1. Helicopters from Wynyard, fixed wing from West Sale.
2. Workboats from Barry's Beach.

343008

(4) Sampling

(i) Ditch Cuttings

From 700', five sets of washed and dried samples every 10-30', to T.D. One set of unwashed, bagged samples every 10-30', one composite 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, Tasmania Mines Department, and the Bureau of Mineral Resources - Subsidy Section. Esso retained two sets, one for paleontological processing and the other for storage. For descriptions see Appendix 3.

(ii) Coring

Core No.	Interval Cored	Footage Cut	Recovery in Feet	Recovered %
1	9278'-9307'	29'	29'	100%
2	9542'-9561'	19'	19'	100%
3	9750'-9756'	6'	6'	100%

For a full description of the core see Appendix 4.

(iii) Sidewall Sampling

Sidewalls were taken by a Schlumberger wireline device. 90 cores from three guns were attempted and 84 were recovered.

Depth	Recov -ered	Depth	Recov -ered	Depth	Recov -ered	Depth	Recov -ered	Depth	Recov -ered
10978'	3/8"	10248'	1/4"	9246'	1/2"	8745'	1/2"	7105'	1"
10970'	1/2"	10200'	1/2"	9190'	1/4"	8734'	3/4"	6800'	1½"
10920'	1/4"	10130'	1/2"	9170'	1/2"	8682'	1/2"	6505'	1½"
10894'	1/4"	10084'	1/4"	9160'	3/4"	8590'	3/4"	6160'	1"
10874'	1/2"	10048'	1/2"	9120'	1/2"	8474'	5/8"	5850'	1½"
10860'	3/8"	10038'	1/4"	9110'	1/2"	8416'	3/4"	5500'	2"
10844'	1/4"	10000'	1/4"	9100'	1/2"	8375'	3/4"	5000'	2"
10798'	1/4"	9950'	1/2"	9080'	1/2"	8335'	3/4"	4500'	1½"
10770'	1/2"	9914'	1/4"	9070'	1/2"	8210'	1/2"	4000'	2"
10704'	1/4"	9900'	1/4"	9060'	1/2"	8120'	1"	3500'	2"
10640'	1/4"	9850'	1/2"	9020'	1/2"	7960'	3/4"	3000'	2"
10606'	1/2"	9784'	1/2" 1/4	8930'	1/2"	7840'	3/4"		
10556'	1/4"	9680' ←0650	3/8" 3/8"	8920'	1/4"	7716'	1"		
10396'	1/2"	9620'	1/2"	8910'	1/2"	7616'	3/4"		
10360'	1/2"	9558'	1/4"	8880'	1/2"	7434'	5/8"		
10348'	1/2"	9470'	1/4"	8860'	1/2"	7415'	1/2"		
10337'	1/2"	9420'	1/4"	8850'	1/4"	7318'	1"		
10294'	3/8"	9360'	1/4"	8785'	5/8"	7243'	1¼"		

All samples were retained by Esso for paleontological processing. Any residue or unused portions were placed in storage.
For full descriptions see Appendix 4.

(5) Logging and Surveys

(i) Electric Logging

Log	Interval	Scale
ISF-SLK	10,986 - 2770	2" & 5"
FDC-CNL-GR-Cal	FDC & CNL 10,992-5700 (GR to 285)	2" & 5"
HDT	10,989 - 5700	2" & 5"

Copies of all logs are in Enclosures 13, 14 and 17.

343009

(ii) Penetration Rate & Gas Logging

Full records of penetration rates, chromatographic gas analyses and total gas measurements were made from 700' to T.D. Shale densitites, 'd' exponent values and drilliability measurements were made from 5000' to T.D. (See Enclosure 11).

(iii) Temperature Surveys

Bottom hole temperatures were recorded by Schlumberger during logging. Maximum temperatures recorded are on each log header. A maximum BHT of 282°F was reached on the HDT log, 17 hours after breaking circulation.

(iv) Other Well Surveys

A velocity survey was conducted at 8813' K.B. prior to reaching T.D.
(See Enclosure 7)

(6) Testing

A total of five formation interval tests were run for pressure data.

F.I.T. 1 @ 9440'
I.H.P. 4910
F.H.P. 4884
F.S.I.P. 4215

F.I.T. 2 @ 9842'
I.H.P. 5610
F.H.P. 5599
F.S.I.P. 4418

F.I.T. 3 @ 9578'
I.H.P. 5457
F.H.P. 5446
F.S.I.P. 4241

F.I.T. 4 @ 10,251'
I.H.P. 5805
F.H.P. 5800
F.S.I.P. 4700

F.I.T. 5 @ 10,049'
I.H.P. 5661
F.H.P. 5618
F.S.I.P. 4663

The Amerada pressure data sheets are included in Appendix 6, and the Schlumberger formation tester logs are included as Enclosure 17.

343010

IV. GEOLOGY

(1) Summary of Previous Work

Exploration for oil and gas in the Bass Basin began in 1963, and has been continuous since that time (Richards and Hopkins, 1969). One aeromagnetic survey was completed for Broken Hill Pty. Ltd. in 1961-62. Subsequently, marine seismic surveys were conducted as the exploration program progressed. A summary of the Esso/BHP seismic surveys are as follows:

1963	B63	Survey
1965	EB65	Survey
	EK65	Survey
1966	ES66	Survey
1967	ED67	Survey
1968	EF68	Survey
1969	B69A	Survey
	B69B	Survey
1970	B70A	Survey
1971	B71A	Survey
1972	B72A	Survey
1973	HB73A	Survey

Thirteen wells have been drilled in the Bass Basin prior to the Narimba-1 test. A summary of the Esso/BHP wells are as follows:

1965	Bass-1
1966	Bass-2
1967	Bass-3
1970	Pelican-1
	Cormorant-1
	Pelican-2
1972	Pelican-3
	Poonboon-1
	Tarook-1
	Durroon-1

343011

1973 Konkon-1

Dondu-1

Yurongi-1

Narimba-1

(2) Regional Geology

The Bass Basin occupies the offshore area between the southern coast of Victoria and the northern coast of Tasmania. The oldest sedimentary rocks encountered whilst drilling are Early Cretaceous, but the greatest volume of sediment was deposited during the Tertiary.

Lower Cretaceous sediments consists of sandstone, siltstone, shale and coal which were deposited in a lacustrine and fluviatile environment.

The Upper Cretaceous through Eocene rocks (Eastern View Group) are an alternating sequence of sandstone, siltstone, shale and coal. These sediments were also deposited in a lacustrine and fluviatile environment, but the quartz sandstones are usually more mature and develop better reservoir characteristics than the Lower Cretaceous sandstones. There is no known marine edge in the Eastern View sequence, but during the Late Eocene, there is evidence for a greater marine influence in the northwestern portion of the basin. The "upper Eocene shale" that overlies the Eastern View is interpreted to vary from transitional marine to shallow marine.

Oligocene and Miocene deposits are comprised of fine grained marine mudstone, marl, calcarenite and bryozoal-skeletal limestone.

Hydrocarbon occurrence in the basin is limited to non-commerical shows of oil and wet gas in anticlinal culminations within the Eastern View Group.

343012

(3) Stratigraphic Table

The stratigraphy encountered in Narimba-1 is summarized in the following table:

AGE	FORMATION	MEASURED DEPTH	SUBSEA DEPTH	THICKNESS
Mid-Miocene	(Seismic Marker)	2862'	-2830'	1650'
Oligocene	(Seismic Marker)	4512'	-4480 '	916'
Eocene	"Upper Eocene shale"	5428'	-5396'	456
Eocene	Eastern View Group	5884'	-5852'	836'
Eocene	P.asperopolus(Seis.Mkr.)	6720'	-6688'	614'
Eocene	U.M.diversus(Seis.Mkr.)	7334'	-7302'	968'
Eocene	L.M.diversus(Seis.Mkr.)	8392'	-8270'	1010'
Eocene	Intra L.M.diversus(Seis.Mkr.)	9312'	-9280	1691'+

(4) Stratigraphic Descriptions

Miocene-Oligocene	772-2330	Calcarenite, grey to white, soft, abundant shell, bryozoan and coral fragments in a soft calcareous, muddy matrix.
	2330-2818	Calcirudite, grey to white, moderately soft, some shell and bryozoan fragments in a micrite matrix.
	2818-4760	Mudstone, grey to grey brown, soft, plastic, some bryozoan, foram and shell fragments, some limestone streaks.
	4760-5428	Shale, brown, calcareous to very calcareous, silty, fragments of hard limestone and calcaremite.
"Upper Eocene shale"	5428-5884	Shale, brown to dark brown, firm, calcareous, silty, slightly micaceous, some large forams, trace pyrite.
Eastern View Group	5884-5960	Siltstone, grey, tan to light green, dolomitic, hard, slightly pyritic, finely glauconitic, trace of sandstone, well rounded, some frosted.

5960-6820	Interbedded sandstone, siltstone, shale and coal. Sandstone, light grey to white, fine to medium, subrounded to subangular, fair sorting, tight, hard, some lithic grains, rare glauconite. Siltstone, light green to brown, dolomitic, hard, some argillaceous, micaceous and pyritic. Shale, brown to dark brown, firm, povily fissile. Coal, black to brown, pyritic, in part shaley.
6820-6850	Siltstone, brown, argillaceous, hard, tight, coaly, dolomitic, in part sandy, micaceous.
6850-7340	Interbedded sandstone, siltstone, shale and coal. Sandstone, white to brown, fine to medium, subangular, fair sorting, argillaceous. Siltstone, brown argillaceous, sandy, carbonaceous. Shale, dark brown, carbonaceous, micaceous, firm, slightly fissile. Coal, black, conchoidal fracture in part, dull to vitreous.
7340-8330	Interbedded sandstone, siltstone, shale and coal. Sandstone, light grey, consolidated clear quartz grains, fine to coarse, subangular to subrounded, poor to moderately sorted, fair to good porosity and permeability. Siltstone, medium to dark brown, carbonaceous, firm, partly dolomitic. Shale, dark brown, very carbonaceous in part, silty, fissile in part, firm. Coal, black, vitreous, conchoidal fracture, trace of amber (bluish fluorescence).
8330-9770	Interbedded sandstone, siltstone, shale and coal. Sandstone, light grey, very fine to medium grained, clay matrix, rare brown staining, subangular, poorly sorted, fair to poor porosity.

Siltstone, medium brown, slightly carbonaceous, friable.

Shale, medium to dark brown, carbonaceous silty, firm.

Coal, black, brittle, some amber with bright yellow fluorescence.

9770-11,000 Interbedded sandstone, siltstone, shale and coal.

Sandstone, buff to white, fine to coarse grained, silty, hard, firm some clay choking, subangular to subrounded, clay matrix, usually tight, some dolomite, poor porosity and permeability.

Siltstone, brown, shaley, carbonaceous.

Shale, dark brown, carbonaceous, coaly, some micaceous.

Coal, black, bright lustre, some bleeding gas.

(5) Structure

The Narimba structural feature is located on trend and to the northwest of the anticline on which Pelican-1 and Pelican-2 are located. A small, possibly fault controlled saddle separates the two anomalies. Seismic interpretation indicates that both Narimba and the Pelican feature grew during the Early Eocene, and that structural growth ceased shortly after the beginning of the Late Eocene. There is no structural closure mapped at the top of the Eastern View Group.

(6) Hydrocarbon Occurrence

No shows of oil or gas were reported even though several good quality reservoir sandstones with interbedded sealing shales were present. The well penetrated the equivalent stratigraphic section which contains shows of wet gas at Pelican-1 and Pelican-2. The lack of hydrocarbons is attributed to the limited migration of fluids in this portion of the basin, and the inadequate size of the paleo-drainage area of the prospect.

(7) Relevance to Geological Concepts

The stratigraphic section penetrated, and the structural position of the time-stratigraphic markers is essentially as predicted. There are no anomalous lithologies nor ages reported.

Palynology indicates that the Eastern View Group penetrated ranges in age from Late Eocene (Middle N. asperus) to Early Eocene (Lower M. diversus). Lithologically, the Eastern View section consists of alternating beds of relatively thin (10' - 100') sandstones, siltstones, shales, and coals. Neither the sands nor the coals can be correlated with those encountered in Pelican-2. This pattern of sporadic, discountinuous deposition is typical of sedimentation on a delta plain.

The top of the Eastern View Group (a key lithologic and seismic marker) was encountered 98' higher than predicted due to a slightly lower average velocity than was interpreted prior to drilling. This change does little to alter the structural geometry of the feature and does not detract from the validity of the test.

There was no abnormally pressured section penetrated at Narimba-1 in contrast to the section encountered below 9,200' (subsea) at Pelican-2, although the facies are similar in all three wells. There is no obvious reason for this pressure differential; however, there is a possibility that the fault mapped between Pelican-2 and Narimba-1 acts as a permeability barrier.

(8) Porosity and Permeability

The sandstones penetrated in the Eastern View Group have porosity and permeabilities well within the range of good quality sandstone reservoirs. Core analyses indicate that porosity averages about 20% above a depth of 9,500', and permeability exceeds 100 md. in the better quality sandstones and has been measured as 331 md. in a core at 9304'.

343016

V. REFERENCES

Richards, K.A. and Hopkins, B.M., 1969, Exploration in the Gippsland, Bass and Otway Basins, Australia: A.C.A.F.E. Nat. Resour. Symp. Dev. Petrol Resour. Asia Far East, Canberra, Aust., (Unpubl.).

343017

VI. LIST OF ENCLOSURES

1.		STRUCTURE CONTOUR MAP OF THE INTRA-LOWER M. DIVERSUS (SEISMIC MARKER) – PRE-DRILL	1:50,000
2.		STRUCTURE CONTOUR MAP OF THE INTRA-LOWER M. DIVERSUS (SEISMIC MARKER) – POST-DRILL	1:50,000
3.		GEOLOGICAL CROSS SECTION A-A′ - PRE-DRILL	1:50,000
4.		GEOLOGICAL CROSS SECTION A-A′ - POST-DRILL	1:50,000
5.		GEOLOGICAL CROSS SECTION B-B′ - PRE-DRILL	1:50,000
6.		GEOLOGICAL CROSS SECTION B-B′ - POST-DRILL	1:50,000
7.		TIME DEPTH CURVE	
8.		WELL HISTORY CHART	
9.		BAROID PPM LOG	
10.		BAROID ADT LOG	
11.		BAROID 'd' EXPONENT / DRILLABILITY LOG	
12.		COMPOSITE (COMPLETION) LOG	
13	a.	ISF / SONIC 2″	
	b.	ISF / SONIC 5″	
14	a.	COMPENSATED NEUTRON-FORMATION DENSITY 2″	(FDC/GR/CNL/CAL)
	b.	COMPENSATED NEUTRON-FORMATION DENSITY 5″	(FDC/GR/CNL/CAL)
	c.	COMPENSATED NEUTRON-FORMATION DENSITY 2″ + 5″	(FDC/GR/CNL/CAL)
	d.	COMPENSATED NEUTRON-FORMATION DENSITY 2″ + 5″	(FDC/GR/CNL/CAL)
15	a.	BOREHOLE COMPENSATED SONIC LOG 2″	(BHC/SONIC/GR)
	b.	BOREHOLE COMPENSATED SONIC LOG 5″	(BHC/SONIC/GR)
16.		CONTINUOUS DIPMETER	(HDT)
17	a.	DIPMETER LOG INTERPRETATION	
	b.	DIPMETER LOG INTERPRETATION	
	c.	DIPMETER LOG INTERPRETATION	
	d.	DIPMETER LOG INTERPRETATION	
18	a.	ISF 2″	
	b.	ISF 5″	
	c.	ISF 2″ + 5″	
19	a.	FORMATION TESTER – RUN 1	
	b.	FORMATION TESTER – RUN 2	
	c.	FORMATION TESTER – RUN 3	
	d.	FORMATION TESTER – RUN 1 to RUN 3	
20.		COMPOSITE LOG	

343018

APPENDIX 1

THE PALYNOLOGY OF NARIMBA-1, BASS BASIN.

BY

L.E. Stover

January, 1974

343019

PALYNOLOGICAL DETERMINATIONS FOR NARIMBA-1, BASS BASIN, AUSTRALIA

by

Lewis E. Stover

SUMMARY

Depths	Zone	Age
5850' to 6160'	Middle *N. asperus*	Middle to Late Eocene
6505' to 7243'	Lower *N. asperus*	Middle Eocene
7434' to 7616'	*P. asperopolus*	Early to Middle Eocene
7830' to 8210'	Upper *M. diversus*	Early Eocene
8335' to 9170'	Middle *M. diversus*	Early Eocene
9246' to 10770'	Lower *M. diversus*	Early Eocene
10844' to 10978'	Indeterminate	

Spore-pollen zone determinations for Narimba-1 are based on palynomorph assemblages from 51 sidewall and three conventional cores. Palynomorph preservation is good to fair in assemblage down to about 9000 feet; below this depth the preservation deteriorates and is very poor in assemblages below 10,000 feet. Microplankton occur in the majority of samples from 5850 to 10,844 feet and recycled Permian forms were found sporadically down to 10,770 feet. Occurrences of spore-pollen species are shown on the accompanying palynomorph distribution sheets and a summary of the palynological analyses is given on Table 1.

DISCUSSION

Middle *Nothofagidites asperus* Zone

The sample from SWC 23 at 5850 feet is assigned confidently to this zone because of the presence of *Triorites magnificus* and *Tricolpites thomasii*. Microplankton are rare in this assemblage which also has recycled Early Cretaceous spores. SWC 23 at 6160 feet is also placed in the Lower *N. asperus* zone but with reservation inasmuch as it could be assigned equally well to the Lower *N. asperus* zone on qualitative data. Quantitatively, the assemblage is more similar to other Middle *N. asperus* assemblages than to those from the Lower *N. asperus* zone. Recycled Permian spore-pollen and a specimen of *Lygistepollenites balmei* were identified at 6160 feet. Microplankton are rare at both 5850 and 6160 feet from which the following forms were identified:

Sample and Depth	Recycled Forms	Microplankton
Middle *N. asperus* Zone		
SWC 24 5850'	E. Cret.	Rare
SWC 23 6160'	Paleocene & Permian	Very rare
Lower *N. asperus* Zone		
SWC 22 6505'	Permian	Absent
SWC 21 6800'	None	Absent
SWC 20 7105'	Permian	Absent
SWC 19 7243'	Permian	Absent
Proteacidites asperopolus Zone		
SWC 16 7434'		Absent
SWC 15 7616'		Absent
Upper *M. diversus* Zone		
SWC 13 7830'		Absent
SWC 11 8120'		Absent
SWC 10 8210'		Rare
Middle *M. diversus* Zone		
SWC 9 8335'		Absent
SWC 8 8375'	Permian	Absent
SWC 5 8590'		Sparse
SWC 4 8682'	Permian	Absent
SWC 2 8745'		Rare
SWC 1 8785'		Common
SWC 59 8860'		Sparse
SWC 56 8920'		Absent
SWC 55 8930'		Absent
SWC 54 9020'		Abundant
SWC 52 9060'		Absent
SWC 51 9070'		Very rare
SWC 49 9100'		Very rare
SWC 48 9110'		Very rare
SWC 47 9120'		Very rare
SWC 46 9160'		Sparse
SWC 45 9170'		Common
Lower *M. diversus* Zone		
SWC 43 9246'		Common
Core 1 9292'		Absent
SWC 42 9360'		Sparse
SWC 39 9558'	Permian	
SWC 37 9650'		Very rare
SWC 36 9680'		Rare
Core 3 9752'		Common
SWC 32 9900'		Abundant
SWC 29 9950'		Rare
SWC 27 10,038'		Common
SWC 25 10,084'		Absent
SWC 21 10,294'	Permian	Absent
SWC 15 10,556'	Permian	Rare
SWC 11 10,770	Permian	Absent
Indeterminate Samples		
SWC 18 7318'		
SWC 7 8416'		
SWC 6 8474'		
SWC 3 8734'		
Core 2 9545'		
SWC 30 9914'		
SWC 23 10,200'		
SWC 13 10,640'		
SWC 9 10,844'		
SWC 7 10,860'		
SWC 3 10,970'		
SWC 1 10,978'		

Table 1. Summary of Palynological Analyses
Narimba-1 Well, Bass Basin, Australia

343020

Achomosphaera sp.	5850' only
Cordosphaeridium sp.	5850' only
Epicephalopyxis identata	5850' only
Hystrichokolpoma eisenackii	
Lingulodinium machaerophorum	
Operculodinium centrocarpum	
Spinferites spp.	
Wetzeliella sp.	5850' only

Lower *Nothofagidites asperus* Zone

Assemblages from sidewall cores 22 to 19 at 6505, 6800, 7105 and 7243 feet are placed in this zone. Spore-pollen preservation is generally fair and except for the shallowest sample, specimen abundance and species diversity are low. Recycled Permian spore-pollen are present within the Lower *N. asperus* zone which in Narimba-1 does not contain dinoflagellates.

The assemblage from SWC 22 at 6505 feet differs from the others assigned to this zone by having abundant spores (mostly *Laevigatosporites* and *Verrucatosporites*) and fairly common specimens of *Proteacidites kopiensis* and *Ericipites crassiexinus*. Recycled Permian forms include representatives of *Aratrisporites, Dulhuntyspora, Krauselisporites* and *Striatocarpidites*. Sparse assemblages were recovered from sidewall cores 21 (6800 feet), 20 (7105 feet) and 19 (7243 feet) and in each of these specimens of *Nothofagidites* are only slightly more common than those of *Haloragacidites harrisii*.

Proteacidites asperopolus Zone

Assigned to this zone are the assemblages from SWC 16 at 7434 and SWC 15 at 7616 feet. Relative to the assemblages from the overlying zone, those from the *P. asperopolus* zone show a moderate increase in the number of Proteaceous pollen, mostly examples of *Proteacidites leightonii*, and contain several specimens of *Intratriporopollenites notabilis* (a single specimen of *I. notabilis* was identified at 6800 feet). In Narimba-1, *Liliacidites lanceolatus, Proteacidites tripartitus* and *Tricolpites incisus* are found only in the *P. asperopolus* zone; *Myrtaceidites tenuis, Proteacidites, grandis* and *Tricolporites moultonii* have their last (youngest) occurrence in this zone. The following species were not seen below the *P. asperopolus* zone.

Beaupreaidites verrucosus
Dryptopollenites semilunatus
Nothofagidites deminutus
Polycolpites esobalteus
Proteacidites alveolatus

Upper *Malvacipollis diversus* Zone

Samples assigned to this zone are sidewall cores 13, 11 and 10 at 7830, 8120 and 8210 feet, respectively. Because of the rarity of spore-pollen from SWC 13, the placement of this sample in the Upper *M. diversus* zone is uncertain. Although it has species which indicate it is no older than Upper *M. diversus*, it could be younger. The other sidewall cores which contain moderately diverse assemblages are placed confidently in the Upper *M. diversus* zone.

A seemingly major palynological change occurs in Narimba-1 between SWC 10 at 8210 feet and SWC 9 at 8335 feet. Evidence for this is that several species occur in the Upper *M. diversus* and younger zones but not in the underlying section. These species include:

Ephedripites notensis
Myrtaceidites tenuis
Proteacidites kopiensis
P. obesolabrus
P. pachypolus
Santalumidites cainozoicus
Tricolporites adelaidensis

Middle *Malvacipollis diversus* Zone

Although spore-pollen assemblages from sidewall cores 9 through 1 (8335 to 8785 feet) and sidewall cores 59 through 45 (8860 to 9170 feet) are interpreted as representing the Middle *M. diversus* zone, moderately abundant assemblages were recovered only from samples at and below 8682 feet. Species and specimens are sparse in the assemblages from 8335 to 8590 feet. The Middle *M. diversus* zone assignment is based on the continued occurrence of *Kuylisporites waterbolkii* and *Proteacidites tuberculiformis* down to 8745 feet and of *P. ornatus* down to 9170 feet. Within this zone specimens of *Proteacidites leightonii* become increasingly rarer down section and the species is replaced gradually by *P. grandis* as the dominant, conspicuous Proteaceous pollen. Microplankton are sparse to rare and poorly preserved in samples above 9000 feet while abundant to common dinoflagellates occur at 9020 and 9170 feet, respectively. Recycled Permian forms were found at 8335, 8375 and 8682 feet and a specimen of *Classopollis* was seen at 8682 feet. Specimens of *Crassoretitriletes vanraadshoovenii*, *Cupanieidites orthoteichus*, *Ilexpollenites anguloclavatus*, *Nothofagidites asperus* and *Proteacidites reticuloscabratus* were not found below the Middle *M. diversus* zone in Narimba-1.

Lower *Malvacipollis diversus* Zone

Sidewall cores 43 to 11 (9246 to 10,770 feet) and samples from conventional cores 1, 2, and 3 are assigned to the Lower *M. diversus* zone. Assemblages from this zone are generally poorly preserved and contain relatively few species even though specimens are abundant in some samples. Microplankton occur almost consistently from 9246 to 10,038 feet; rare specimens were seen at 10,556 feet. Recycled Permian forms occur at 9558, 9900, 10,294, 10,556 and 10,770 feet.

Spore-pollen assemblages are montonously uniform throughout the zone with the some 12 to 15 species occurring repeatedly. These include:

Cyathidites splendens
Dilwynites granulatus
Haloragacidites harrisii
Malvacipollis diversus
Nothofagidites brachyspinulosus
N. emarcidus/heterus
N. flemingii
Phyllocladidites mawsonii
Proteacidites adenanthoides
P. grandis
P. incurvatus
P. pseudomoides
Rugulatisporites mallatus
Stereisporites punctatus
Tricolpites gillii

Specimen of *Intratriporopollenites notabilis* and *Nothofagidites goniatus* were not found below core 3 at 9752 feet. No indigenous species indicative of the Paleocene *Lygistepollenites balmei* zone were found in Narimba-1.

The residues from sidewall cores 7 (10,860 feet), 3 (10,970 feet) and 1 (10,978 feet) lacked identifiable palynomorphs and consist almost exclusively of carbonized debris and altered plant tissue. Sidewall core 9 at 10,844 feet has a few long ranging forms (no zone diagnostic species) and very rare microplankton. Zone determinations were not possible for these samples.

CONCLUSIONS

The spore-pollen sequence in Narimba-1 consists of Early to Middle Eocene zones, and no major palynological break was found in the succession between 5850 and 10,770 feet. Although dinoflagellates are most common in the Middle *M. diversus* zone below 9000 feet and in the Lower *M. diversus*

zone, rare specimens were identified in the Middle *N. asperus* and Upper *M. diversus* zones and in the Middle *M. diversus* zone above 9000 feet. Recycled spore-pollen, generally Permian species, occur consistently in the *N. asperus* zones and sporadically in the Middle and Lower *M. diversus* zones. The palynological sequences in Narimba-1 appears most similar to that in Pelican-2.

BASIN BASS DATE

WELL NAME NARIMBA-1 ELEVATION 343025

AGE	PALYNOLOGIC ZONES	HIGHEST DATA					LOWEST DATA				
		Preferred Depth	Rtg.	Alternate Depth	Rtg.	2 way time	Preferred Depth	Rtg.	Alternate Depth	Rtg.	2 way time
OLIG-MIO.	P. tuberculatus										
EOCENE	U. N. asperus	5850	0				6160	2			
	M. N. asperus	6505	1				7243	2			
	L. N. asperus	7434	1				7616	1			
	P. asperopolus	7830	2	8120	1		8210	1			
	U. M. diversus	8335	1				9170	1			
	M. M. diversus	9246	1				9952	1	10770	2	
	L. M. diversus										
PALEOCENE	U. L. balmei										
	L. L. balmei										
	T. longus										
LATE CRETACEOUS	T. lilliei										
	N. senectus										
	C. trip./T.pach.										
	C. distocarin.										
	T. pannosus										
EARLY CRETACEOUS											
PRE-CRETACEOUS											

COMMENTS:

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

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

DATA RECORDED BY: L. E. Stover DATE January 1974

DATA REVISED BY: DATE

FORM No R 315 12/72

Well Name Narimba-1 Basin Bass Sheet No. 1 of 6

SAMPLE TYPE *	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	C	S	S	S	S	S	S	S	S	S
DEPTHS / DINOMORPHS	5850	6160	6505'	6800	7105'	7243	7318'	7434	7616	7830	8120	8210	8335'	8375'	8590	8682	8745'	8785'	8860	8920-30	9020	9060-70	9100-20	9160-70	9246	9292	9360	9538'
A. qualumis																												
A. acutullus																												
A. luteoides																												
A. oculatus					/	/																						
A. sectus																												
A. triplaxis																												
A. obscurus																												
B. disconformis	/																							/				
B. arcuatus	·		/	/	/	/		/	/		·					?	/					·						
B. elongatus																												
B. mutabilis																												
B. otwayensis																												
B. elegansiformis	/																											
B. trigonalis																												
B. verrucosus	/							/	/																			
B. bombaxoides																												
B. emaciatus																												
C. bullatus																												
C. heskermensis																												
C. horrendus																												
C. meleosus																												
C. apiculatus																												
C. leptos																												
C. striatus																												
C. vanraadshooveni																												
C. orthoteichus/major				/	/	/		/	/	/	/	/	/	/				/		/	/		/	/				
C. annulatus																												
C. giantis																												
C. splendens	/	/	/	/		/		/	/	/	/	/	/	/			/	/	/	/	/	/	/	/	/	/		
D. australiensis		/																										
D. granulatus				/	/	/			/		/	/	/		/	/	/	/	/	/	/	/	/	/			/	
D. tuberculatus					/			/	/		/					/												
D. delicatus																												
D. semilunatus					/			/	/																			
E. notensis					/						/																	
E. crassiexinus		/	/	/		/																						
F. balteus																												
F. crater																												
F. lucunosus																												
F. palaequetrus																												
G. edwardsii																												
G. rudata																												
G. divaricatus																												
G. gestus																												
G. catathus																												
G. cranwellae																												
G. wahooensis																												
G. bassensis																												
G. nebulosus																												
H. harrisii	/	/	/	/	/	/		/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
H. astrus																												
H. elliottii																												
I. anguloclavatus		/	/	/	/											/					/							
I. antipodus																												
I. notabilis				/				/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/		/	
I. gremius								/	/										/									
I. irregularis					/																							
J. peiratus																												
K. waterbolkii			/		/	/			/							/	/											
L. amplus																												
L. crassus																			?									
L. ohaiensis																												
L. beinii																												
L. lanceolatus									/																			
L. balmei		R																										
L. florinii	/	/		/		/			/							/	/	/	/	/	/	/	/	/	/	/	/	/	
M. diversus	/	/			/	/		/	/	/	/	/	/	/		/	/	/	/	/	/	/	/	/	/	/	/	/	
M. duratus																												
M. grandis																												
M. perimagnus																												

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

343027

Well Name _____ Basin _____ Sheet No. 2 of 6

SAMPLE TYPE *	S	S	C	S	S	S	S	S	S																					
DEPTHS / PALYNOMORPHS	9650	9680	9752	9900	9950	10,038'	10,084	10,294	10,536	10,770																				
A. qualumis																														
A. acutullus																														
A. luteoides																														
A. oculatus																														
A. sectus																														
A. triplaxis																														
A. obscurus																														
B. disconformis			/																											
B. arcuatus																														
B. elongatus																														
B. mutabilis																														
B. otwayensis																														
B. elegansiformis																														
B. trigonalis																														
B. verrucosus																														
B. bombaxoides																														
B. emaciatus																														
C. bullatus																														
C. heskermensis																														
C. horrendus																														
C. nelcosus																														
C. apiculatus																														
C. leptos																														
C. striatus																														
C. vanraadshoovenii																														
C. orthoteichus/major																														
C. annulatus																														
C. gigantis			?																											
C. splendens		/	/		/				/	/																				
D. australiensis																														
D. granulatus	/	/	/		/			/	/	/																				
D. tuberculatus																														
D. delicatus																														
D. semilunatus																														
E. notensis																														
E. crassiexinus																														
F. balteus																														
F. crater																														
F. lucunosus																														
F. palaequetrus																														
G. edwardsii																														
G. rudata																														
G. divericatus																														
G. gestus																														
G. catathus																														
G. cranwellae																														
G. wahooensis																														
G. bassensis																														
G. nebulosus																														
H. harrisii	/	/	/	/	/	/	/	/		/																				
H. astrus																														
H. elliottii																														
I. anguloclavatus																														
I. antipodus																														
I. notabilis		/	/																											
I. gremius																														
I. irregularis																														
J. peiratus																														
K. waterbolkii																														
L. amplus																														
L. crassus																														
L. ohaiensis																														
L. bainii																														
L. lanceolatus																														
L. balmei																														
L. florinii									/																					
M. diversus	/	/	/				/	/		/																				
M. duratus																														
M. grandis																														
M. perimagnus																														

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

Well Name NARIMBA-1 Basin BASS Sheet No. 3 of 6

SAMPLE TYPE *	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	C	S	S	S	S	S	S	S	S	S
DEPTHS / PALYNOMORPHS	5850	6160	6505'	6800	7105'	7243	7318'	7434	7616	7830	8120	8210	8335'	8375'	8590	8682	8745'	8785'	8860	8920-30	9020	9060-70	9100-20	9160-70	9246	9292	9360	9558'
M. subtilis	/	/		/		/		/	/	/	/	/																
M. ornamentalis																												
M. hypolaenoides			·							·																	·	
M. homeopunctatus																												
M. parvus/mesonesus	/	/		/		/		/	/	/			/															
M. tenuis									/		/	/																
M. verrucosus																												
M. australis																			/									
N. asperus		/				/		/															/	/				
N. asperoides																												
N. brachyspinulosus		/																				/	/		/			/
N. deminutus	/	/																										
N. emarcidus/heterus	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
N. enduris		·																										
N. falcatus	/																											
N. flemingii	/	/	/	/	/	/		/	/	/	/	/	/		/	/	/	/	/	/	/	/	/	/	/	/	/	/
N. goniatus	/	/	/	/	/	/		/	/	/	/	/	/			/		/	/				/					
N. senectus																												
N. vansteenisii																												
O. sentosa																												
P. ochesis																												
P. catastus	/	/																										
P. demarcatus	/	/	/	/		/		/	/		/	/					/	/										
P. magnus																												
P. polyoratus												?				/									/	/		
P. vesicus											/																	
P. densus																											·	
P. velosus																												
P. morganii/jubatus																												
P. mawsonii	/	/	/	/	/	/		/	/	/	/					/			/			/	/	/	/	/		/
P. reticulosaccatus																												
P. verrucosus																												
P. crescentis																												
P. esobalteus			/	/	/	/		/	/																			
P. langstonii																												
P. reticulatus																												
P. simplex																												
P. varus											/	/																
P. adenanthoides (Prot.)	/	/		?				/	/												/	/	/	/	/			
P. alveolatus		/							/																			
P. amolosexinus																												
P. angulatus																												
P. annuleris	/	/	/	/	/	/		/	/	/										/	/	/		/		/		
P. asperopolus																												
P. biornatus				?																								
P. clarus																												
P. cleinei																												
P. confragosus																												
P. crassis																												
P. delicatus																												
P. formosus																												
P. grandis		?							/		/	/	/	/		/	/	/	/	/	/	/	/	/	/	/	/	/
P. grevillaensis																												
P. incurvatus	/	/	/					/			/								/		/	/		/	/		/
P. intricatus																												
P. kopiensis		/	/	/		/			/	/																		
P. lapis																												
P. latrobensis		/								?																		
P. leightonii	/	/	/	/	/	/		/	/	/	/	/	/	/		/	/	/	/		/							
P. obesolabrus								?	/		/																	
P. obscurus	/	/	/		/	/					/																	
P. ornatus			/		/	/		/	/		/	/	/	/					/	/		/		/				
P. otwayensis																												
P. pachypolus	/	/			?	/		/	/	/	/	/				·												
P. palisadus																												
P. parvus	/	/	/		/	/		/	/		/	/																
P. plemmelus				/		?		/	/				/															
P. prodigus																												
P. pseudomoides	/	/	/	/	/	/		/	/	/	/					/	/	/			/	/	/	/		/		
P. recavus																												

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

343029

Well Name _____ Basin _____ Sheet No. 4 of 6

SAMPLE TYPE *	S	S	C	S	S	S	S	S	S	S
DEPTHS / PALYNOMORPHS	9650	9680	9752	9900	9930	10,038'	10,084	10,294	10,526	10,770
M. subtilis										
M. ornamentalis										
M. hypolaenoides										
M. homeopunctatus										
M. parvus/mesonesus										
M. tenuis										
M. verrucosus										
M. australis										
N. asperus						?				
N. asperoides										
N. brachyspinulosus	/		/				/			
N. deminutus										
N. emarcidus/heterus	/	/	/	/	/	/	/	/	/	/
N. endurus							?	/		
N. falcatus										
N. flemingii	/	/	/	/	/	/	/	/	/	
N. goniatus		/	/							
N. senectus										
N. vansteenisii										
O. sentosa										
P. ochesis										
P. catastus										
P. demarcatus										
P. magnus										
P. polyoratus								/		
P. vesicus										
P. densus										
P. velosus										
P. morganii/jubatus										
P. mawsonii		/	/				/	/		/
P. reticulosaccatus										
P. verrucosus										
P. crescentis										
P. esobalteus										
P. langstonii										
P. reticulatus										
P. simplex										
P. varus										
P. adenanthoides (Prot.)							/		/	
P. alveolatus										
P. amolosexinus										
P. angulatus										
P. annularis			/							
P. asperopolus										
P. biornatus										
P. clarus										
P. cleinei										
P. confragosus										
P. crassis										
P. delicatus										
P. formosus										
P. grandis	/	/	/	/	/	/	/	/	/	/
P. grevilleensis										
P. incurvatus	/	/	/					/	/	
P. intricatus										
P. kopiensis										
P. lapis										
P. latrobensis										
P. leightonii										
P. obesolabrus										
P. obscurus										
P. ornatus										
P. otwayensis										
P. pachypolus										
P. palisadus										
P. parvus										
P. plemmelus										
P. prodigus										
P. pseudomoides		/		/						
P. recavus										

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

Well Name NARIMBA-1 Basin BASS Sheet No. 5 of 6

SAMPLE TYPE *	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	C	S	S	S	S	S	S	S	S	S	S
DEPTHS / PALYNOMORPHS	5850	6160	6505'	6800	7105'	7243	7318	7434'	7616	7830	8120	8210	8335'	8375'	8520	8682	8745'	8785'	8860	8920-30	9020	9060-70	9100-20	9160-70	9246	9292	9360	9558'
P. rectomarginis																												
P. reflexus																												
P. reticulatus	/		/																									
P. reticuloconcavus																												
P. reticuloscabratus											/	/				/	/	/	/				/					
P. rugulatus	/																											
P. scitus																												
P. stipplatus																												
P. tenuiexinus																												
P. truncatus																												
P. tuberculatus																												
P. tuberculiformis								?	?		/	/	/	/			/											
P. tuberculotumulatus																												
P. xestoformis (Prot.)																												
Q. brossus																												
R. boxatus	/			?																								
R. stellatus																												
R. mallatus	/										/	/	/			/	/		/			/					/	
R. trophus																												
S. cainozoicus	/	/		/	/	/		/	/			?																
S. rotundus	/																											
S. digitatoides																												
S. marlinensis																												
S. rarus																												
S. meridianus	/	/	/			/		/	/		/							/										
S. prominatus													/					/					/		/			
S. uvatus																												
S. punctatus			/	/				/	/		/					/		/	/			/	/	/	/	/		
S. regium																												
T. multistrixus (CP4)																												
T. textus																												
T. verrucosus																												
T. securus																												
T. confessus (C3)																												
T. gillii																							/	/				/
T. incisus									/																			
T. longus																												
T. phillipsii		/																										
T. renmarkensis																												
T. sabulosus																												
T. simatus			/																									
T. thomasii	/																											
T. waiparaensis																												
T. adelaidensis (CP3)	/	/	/	/							/																	
T. angurium																												
T. delicatus																												
T. geraniodes																												
T. leuros																												
T. lilliei																												
T. marginatus																												
T. moultonii									/				/															
T. paenestriatus		/														/												
T. retequetrus																												
T. scabratus																												
T. sphaerica																												
T. magnificus (P3)	/																											
T. spinosus				/																								
T. ambiguus	/	/			/																							
T. chnosus																												
T. helosus																												
T. scabratus																												
T. sectilis																												
V. attinatus																												
V. cristatus																												
V. kopukuensis		/	/	/	/	/		/	/	/		/				/	/			/			/			/		
Clavati. glarius						/																						
Prot. tripartitus								/																				
Prot. laportii											/																	

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

343031

Well Name _____ Basin _____ Sheet No. 6 of 6

SAMPLE TYPE *	S	S	C	S	S	S	S	S	S	S
DEPTHS / PALYNOMORPHS	9650	9680	9752	9900	9930	10,038	10,084	10,294	10,536	10,770
P. rectomarginis										
P. reflexus										
P. reticulatus										
P. reticuloconcavus										
P. reticuloscabratus										
P. rugulatus										
P. scitus										
P. stipplatus										
P. tenuiexinus										
P. truncatus										
P. tuberculatus										
P. tuberculiformis										
P. tuberculotumulatus										
P. xestoformis (Prot.)										
Q. brossus										
R. boxatus										
R. stellatus										
R. mallatus							/	/		
R. trophus										
S. cainozoicus										
S. rotundus										
S. digitatoides										
S. marlinensis										
S. rarus										
S. meridianus										
S. prominatus										
S. uvatus										
S. punctatus		/	/	/		/	/			/
S. regium										
T. multistrixus (CP4)										
T. textus										
T. verrucosus										
T. securus										
T. confessus (C3)										
T. gillii			/	?			/	/	/	/
T. incisus										
T. longus										
T. phillipsii										
T. renmarkensis										
T. sabulosus										
T. simatus										
T. thomasii										
T. waiparaensis										
T. adelaidensis (CP3)										
T. angurium										
T. delicatus										
T. geraniodes										
T. leuros										
T. lilliei										
T. marginatus										
T. moultonii										
T. paenestriatus										
T. retequetrus										
T. scabratus										
T. sphaerica										
T. magnificus (P3)										
T. spinosus										
T. ambiguus										
T. chnosus										
T. helosus										
T. scabratus										
T. sectilis										
V. attinatus										
V. cristatus										
V. kopukuensis			/							

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

343032

APPENDIX 2

FORAMINIFERAL BIOSTRATIGRAPHY

NARIMBA-1,

BASS BASIN.

BY

D.J. Taylor

January, 1974

FORAMINIFERA BIOSTRATIGRAPHY - NARIMBA 1 BASS BASIN

ten side wall cores were examined between 3000' and 6800'. No fauna was found in the basal 3 side wall cores; at 6160', 6505' and 6800'. Two distributional sheets have been submitted showing occurrence of planktonic and benthonic foraminifera and other fauna, whilst a third sheet shows environmental analysis and interpretation.

BIOSTRATIGRAPHY

The biostratigraphic zonation applied here is that used by Taylor in the completion report for Esso Bass-1 and other sudsidized Bass Basin wells.

The earliest fauna found was at 5850' which contained an indeterminated planktonic species and a benthonic fauna typical of the Demon's Bluff Formation ("Upper Eocene shale"), which consisted of arenaceous foraminifera and a peculiar pyritic tube of obvious organic origin. It is assumed that this fauna represents the late Eocene. The side wall core at 5500' contains a similar fauna, though the presence of Globigerina angioporoides could extend the age up to the early Oligocene (Zone J), but no older than late Eocene.

The poor fauna at 5000' gave no clear zonal indications but was probably of Oligocene age. Globigerina woodi makes its initial appearance at 4500' and as the fauna lacks Globigerionoides spp a placement on the Oligocene/Miocene boundary (Zone II) is suggested. A similar determination applies to 4000'.

The presence of Globigerinoides spp. and Globoquadrina dehiscens (s.s.) without Praeorbulina spp. or Orbulina spp. clearly indicates an early Miocene age for side wall cores at 3500' and 3000'.

ENVIRONMENT

The dominance of primitive arenaceous forms and pyritic tubes with sparse planktonic faunas in the late Eocene to early Oligocene faunas at 5850' and 5500' implies a salt marsh or lagoonal environment. The presence of sparse, though well preserved, planktonic foraminifera precludes any suggestion that deposition was in deep oceanic circumstances at or below $CaCO_3$ compensation depth. Connection with the open ocean was inhibited and thus oxygenation was very poor as is evident from the ratio of areaceous to calcareous bethonic to planktonic foraminifera.

Shallow continental shelf conditions prevailed from late Oligocene into the early Miocene (between 5000' and 3000'). Oceanic circulation gradually increased up the section. The pattern of environments/development in Narimba-1 was similar to that in all other Bass Basin wells.

Form R 193 3/71

BASIN BASS BY David Taylor

WELL NAME Narimba-1 DATE 25/9/73 ELEV. K.B 32'

343034

Foram Zonules

		Highest Data	Quality	2 Way Time	Lowest Data	Quality	2 Way Time
MIOCENE	A						
	Alternate						
	B						
	Alternate						
	C						
	Alternate						
	D_1						
	Alternate						
	D_2						
	Alternate						
	E						
	Alternate						
	F	3000	0		3000	0	
	Alternate						
	G	3500	1		3500	1	
	Alternate						
	H_1	4000	2				
	Alternate						
	H_2				4500	1	
	Alternate						
OLIGOCENE	I_1						
	Alternate						
	I_2						
	Alternate						
	J_1	5500*	2				
	Alternate						
	J_2						
	Alternate						
EOC.	K	5500*	2		5850	2	
	Alternate						
	Pre K						

*Range of SWC 5500 is from K to J-1

COMMENTS:

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

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

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

Date Revised _____

By _____

343035

NARIMBA - 1

. = 1 - 20 specimens
I = over 20 specimens

Sheet 1
of 3 sheets

5 cm

Depth	3000	3500	4000	4500	5000	5500	5850	6160	6505	6800
Side wall cores	T	T	T	T	T	T	T	T	T	T
PLANKTONICS								N	N	N
1. Globigerinoides trilobus	I	I						0	0	0
2. G. bisphericus	I									
3. Globigerina apertura	I	I	.	I				F	F	F
4. G. woodi woodi	I	I	.	I				A	A	A
5. Globoquadrina dehiscens	I	I						U	U	U
6. Globorotalia mayeri	.							N	N	N
7. Globigerina bulloides		I						A	A	A
8. G. woodi connecta		I								
9. G. praebulloides					.			F	F	F
10. G. angioporoides						.		0	0	0
11. G. sp?							.	U	U	U
CALC. BENTHONICS I								N	N	N
12. Cibicides pseudoungerianus	I	I	I					D	D	D
13. C. lobatulus (convex)	I	I								
14. Gyroidinoides subzelandica	.									
15. Siphonina australis	.									
16. Anomalinoides macroglabra		.								
17. Cibicides perforatus		I	I	I						
18. Astrononion centroplax			.							
19. Anomalinoides procolligera			I							
20. Cibicides cf vortex			.							
21. C. lobatulus (irregular)			I	I						
22. Eponides repandus			.							
23. Alabamina tenuimarginata				.						
24. Astrononion sp?					.					
CALC. BENTHONIC II										
25. Notorotalia miocenica	I	I	I							
26. N. crassimarra			I	I						
CALC. BENTHONICS III - not present										
CALC. BENTHONICS IV										
27. Sphearoidina bulloides	I		I	I						
28. Pullenia bulloides			.		.					
29. Cassidulina leavigata					.					
30. C. sp (corroded)						.				

Side wall core	T	T	T	T	T	T	T	T	T	T
Zone	F	G	H	H	?	?J or K	?K			
Depth	3000	3500	4000	4500	5000	5500	5850			

343036

5 cm

N A R I M B A - 1

Sheet 2
of 3 sheets

Depth	3000	3500	4000	4500	5000	5500	5850	6160	6505	6800
Side wall cores	T	T	T	T	T	T	T	T	T	T
CALC. BENTHONICS V										
31. Trifarina bradyii			.	.				N	N	N
32. Siphouvigerina canariensis				.				0	0	0
CALC. BENTHONICS VI										
33. Lagena spp.		I	I	I	.			F	F	F
34. Guttulina problema				I				A	A	A
35. Lenticulina spp.				I				U	U	U
CALC. BENTHONICS VII								N	N	N
36. milliolids		I		I		.		A	A	A
ARAGONITIC BENTHONICS										
37. Cerbotina kakohoica							.	F	F	F
ARENACEOUS BENTHONICS - PRIMITIVE								0	0	0
38. Ammosphearoidina sp	.	.						U	U	U
39. Haplophragmoides sp. (coarse)					.	.		N	N	N
40. Ammobaculites sp. (flat & large)						I		D	D	D
41. Haplophragmoides cf. incisa							.			
42. Reophax sp.							.			
ARENACEOUS BENTHONICS - COMPLEX										
43. Gaudyrina convexa		.								
44. G. heywoodensis		.								
45. Textularia fistulosa		.								
OTHER FAUNA										
Bryozoal fragments	I	I	I		I					
Echinoid spines	.	.	.							
Sponge spicules		I								
Mollusca fragments			I	I	I					
Gastropods					I					
pyrite tubes						I	I			
pyrite spheres							I			

Side wall core	T	T	T	T	T	T	T	T	T	T
ZONE	F	G	H	H	?	?J or K	?K			
Depth	3000	3500	4000	4500	5000	5500	5850			

343037

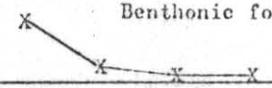
5 cm

NARIMBA - 1

Sheet 3
of 3 sheets.

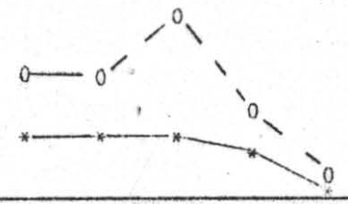
ZONE	F	G	H	H	?	?J or K	?K			
Depth	3000	3500	4000	4500	5000	5500	5850	6160	6505	6800
Side wall cores	T	T	T	T	T	T	T	T	T	T
ENVIRONMENTAL ASSEMBLAGE	8 INNER	8	8 SHELF	8	9 INNERMOST SHELF	9/10 SALT MARSH POOR CIRCULATION	10			
DIAGNOSTIC SPECIES IN ENVIRONMENTAL ANALYSIS	12 13 25	12 13 17 25	12 17 25 26 21	17 21 25 26	39	30 39 40 pyrite tubes low % or absence of planktonic foraminifera	41			

ACCUMULATIVE % OF PLANKTONIC TO BENTHONIC FORAMINIFERA — 100% — 50% — 0%



X = % of planktonic foraminifera

PLOT OF SPECIFIC DIVERSITY RELATIVE TO NUMBER OF SPECIMENS — 10 — 1000 — 5 — 500 — 0 — 0



0 — — 0 = specific diversity *——* = specimen number

343038

APPENDIX 3

SAMPLE DESCRIPTIONS

FOR

NARIMBA-1,

BASS BASIN.

BY

A.J. Mebberson
W.W. Hallstein
H.S. Stead
J.R. Black
D.M. Maughan
A.K. Svalbe

September-October, 1973

SAMPLE DESCRIPTIONS

343039

NARIMBA-1

A.J. Mebberson
1.9.1973

DEPTHS	%	DESCRIPTION
		Set 20" casing 675'. Drilled out with OSC-3A bit.
772- 920	100	Calcarenite - skeletal, bryozoans, shell fragments, grey to white
-1010	100	Calcarenite as above
1010-1520	100	Calcarenite and calcirudite, as above, trace calcareous cement, mostly loose skeletal material as above.
1520-1850	100	Calcarenite as above, skeletal material, becoming finer around 1700'.
1850-2000	100	Calcarenite as above, loose generally fragmented bryozoan and coral remains, well sorted, loose.
2000-2180	100	Calcarenite as above, trace calcareous cement
2180-2240	100	Calcarenite as above
2240-2330	100	Calcarenite as above, slightly coarser fragments, grey to yellow to white.
2330-2450	100	Calcirudite, grey to white, shell and bryozoan fragments
2450-2540	100	Calcirudite as above, moderate to poor sorting, sandstone-rudite
2540-2750	100	Calcirudite as above becoming finer, moderately soft micrite matrix
2750-2780	100	Calcirudite as above
2 -2810	100	Calcarenite, argillaceous, moderately softly micritic, predominantly fine to coarse skeletal fragments
2818 C.O.		P.O.H. to run 13-3/4 casing
		W. W. Hallstein
2818-3350	60 30 10	Mudstone, medium grey, soft, plastic, very fossiliferous, bryozoan etc. grading to 30% calcarenite, white, unconsolidated, fossil fragments Siltstone, medium grey to light brown, very argillaceous, slightly calcareous, siliceous, hard.
3350-3470	60 30 10	Mudstone as above Calcarenite as above Siltstone - as above, with few fragments chert, orange, sandy with very coarse angular grains. Trace siltstone.
3470-3500	60 30 10	Mudstone, medium grey to grey green to grey brown. Calcarenite as above Siltstone - as above, no chert.
3500-3770	60 30 10	Mudstone,medium grey to blue grey Calcarenite as above Siltstone as above
3770-3800	80 20	Mudstone, medium grey, some blue grey to grey brown, calcareous, less fossil, firmer, occasional silty streaks Fossil hash (calcarenite) as above
3800-3920	80 20	Mudstone as above Fossil hash (calcarenite) as above Rare pyrite fragments

..2/

343040

DEPTHS	%	DESCRIPTION
3920-4070	80	Mudstone as above, becoming firmer, very fossiliferous, bryozoan, foraminiferous, etc.
	10	Calcarenite, as above
	10	Siltstone, medium grey, very argillaceous, calcareous
4070-4160	80	Mudstone as above, up to 30% fossil fragments
	10	Calcarenite, as above
	10	Siltstone as above
4160-4190	90	Mudstone as above with occasional thin lignitic parting
	10	Calcarenite as above
		Trace siltstone
4190-4340	100	Mudstone, medium grey to grey brown, calcareous, soft to medium firm, with fossil fragments and forams
4340-4430	100	Mudstone as above with rare pyrite. Mudstone becoming firmer, very slight fissile/hackley. Some silty.
4430-4460	100	Mudstone, medium grey to grey brown, firm, calcareous, very slight pyrite, fossiliferous with bryozoa, forams, pely fragments.
4460-4520	100	Mudstone, as above, some medium brown, silty
4520-4580	100	Mudstone as above with rare trace glauconite
4580-4640	90	Mudstone as above
	10	Limestone, tan to light brown, argillaceous, glauconitic
4[illegible]-4700	80	Mudstone as above
	20	Limestone, very argillaceous, grading to shale, calcareous
4700-4760	90	Mudstone as above, less fossiliferous.
	10	Limestone.
4760-4790	90	Shale, medium grey, some brown, calcareous, slightly fossiliferous, foraminiferous, firm, slightly fissile,
	10	Limestone, brown, very argillaceous, soft, silty
4790-4850	90	Shale, as above, trace pelletal
	10	Limestone
4850-4910	70	Shale as above
	30	Limestone, brown, very fine calcarenite, very argillaceous, slightly micaceous, occasional glauconite
4910-4940	70	Shale as above
	30	Limestone as above, much caving, probably more limestone
4940-5000	100	Shale - 80% medium grey and brown, calcareous, fossiliferous, as above; 20% brown, calcareous to very calcareous, soft, occasional glauconite, silty
		10' samples below 5000'
5000-5020	50	Shale, medium grey
	50	Shale, brown, calcareous, silty
5020-5110	100	Shale, brown, calcareous to very calcareous, silty, some glauconite as above
5110-5130	90	Shale as above
	10	Siltstone, light grey to light brown, hard, tight, slightly argillaceous, slightly calcareous, rare glauconite

../3/

343041

DEPTHS	%	DESCRIPTION
5130-5150	70	Shale, brown, calcareous to very calcareous, silty as above
	30	Shale, medium grey, soft, calcareous, probably cavings, occasional fragments limestone, brown, pelletal/medium calcarenite, hard. Much caving.
5150-5180	80	Shale as above
	10-20	Limestone, brown, micritic to very fine calcarenite, hard, silty
5180-5200	100	Shale as above Trace limestone. Very poor samples
5200-5230	50	Shale, brown as above
	50	Shale, medium grey as above, possible cavings. Trace limestone, micritic as above
5230-5300	80	Shale
	20	Limestone, brown, micritic, silty to very silty, hard, trace pyrite
5300-5320	80	Shale, brown, calcareous, soft to firm, silty to very silty
	20	Limestone, brown, micritic, silty to very silty. Appears limey streaks in shale. Trace pyrite
		30' samples -
5330-5410	80	Shale as above
	20	Limestone as above. Very poor samples
5410-5460	80	Shale as above
	20	Limestone grading to siltstone
5460-5530		No samples
5530-5600		Probably as above. Very poor samples
5600-5620	90	Shale, brown to dark brown, firm, calcareous, silty, slightly micaceous,
	10	Limestone, brown, micritic, silty, hard, trace pyrite
5620-5640	100	Shale, light grey, soft, calcareous, appears to be 100% caving.
5640-5660	80	Shale, light grey, slightly fossiliferous, calcareous, tough, fissile, probably caving.
	20	Shale, dark brown, soft, poorly fissile, some silty to very silty, rare large forams, trace pyrite
5660-5820	90	Shale, dark brown as above
	10	Limestone, tan to brown, micritic, silty
5820-5920	80	Shale as above
	20	Limestone, tan, micritic. Trace pyrite
5920-5950	50	Shale as above
	30	Limestone as above, dolomitic
	20	Siltstone, grey to tan to light green, very dolomitic, hard, slightly pyritic, probably very finely glauconitic
5950-5960	90	Shale as above
	10	Siltstone, light green, glauconitic as above Trace coarse sandstone grains in sample. Well rounded, some frosted.
5960-5970	70	Sandstone, fine to very coarse, subrounded to well rounded, poor sorting, some frosted, glauconitic, probably conglomeratic, unconsolidated.
	30	Shale as above

..4/

DEPTHS	%	DESCRIPTION
5970-5990	70	Sandstone
	10	Siltstone as above, light green to tan
	10	Shale
5[illegible]-6030	50	Shale
	30	Sandstone
	20	Siltstone
6030-6050	10	Sandstone, glauconitic
	50	Shale
	20	Siltstone, grey to tan, dolomitic, some glauconite
	20	Dolomite, tan, some silty, micritic
6050-6080	50	Siltstone
	10	Dolomite
	10	Sandstone
	30	Shale
6080-6090	80	Sandstone as above
	20	Coal, black to brown, pyritic,in part shaley
6090-6100	100	Coal
6100-6110	30	Shale, brown to dark brown, firm, coaly partings
	30	Coal
	40	Sandstone as above
6110-6120	100	Shale as above
6[illegible]-6150	50	Shale
	30	Coal
	20	Siltstone, brown, some very argillaceous, some micaceous
6150-6190	80	Shale
	20	Siltstone. Trace sandstone as above. Trace pyrite. Poor samples
6190-6200	80	Shale
	20	Sandstone, light grey, fine to very fine, subrounded, fair sorting, some glauconitic, dolomitic. Trace coal. Poor samples
6200-6210	60	Sandstone as above
	20	Shale
	20	Coal. Appear interbedded and interlaminated.
6210-6240	70	Sandstone
	20	Shale
	10	Coal
6240-6250	70	Sandstone
	20	Shale
	10	Coal
6250-6260	90	Sandstone, white, very fine, subangular, fair sorting, some dolomitic, one fragment with pale white fluorescence and cut, tight, hard.
	10	Coal
6260-6280	90	Sandstone
	10	Shale as above. Trace very coarse, well rounded sandstone grains in sample. No show.

..5/

DEPTHS	%	DESCRIPTION
6280-6310	40	Sandstone
	60	Coal
6[illegible]-6320	30	Shale, dark brown, firm, coaly partings, in part silty
	30	Coal
	40	Sandstone, white, very fine, subangular, hard, tight, fair sorting, coaly partings. Trace pyrite
6320-6350	70	Sandstone
	20	Shale
	10	Coal
6350-6360	50	Sandstone
	50	Shale
		Trace pyrite
6360-6380	40	Sandstone
	40	Shale
	20	Coal
6380-6390	80	Sandstone
	10	Shale
	10	Coal
6390-6400	70	Coal
	20	Sandstone
	10	Shale
6[illegible]-6410	50	Sandstone
	40	Shale
	10	Coal
6410-6430	30	Sandstone
	30	Shale
	30	Siltstone, brown, argillaceous, firm
	10	Coal
6430-6450	70	Sandstone, pyritic
	20	Shale
	10	Coal
6450-6460	60	Sandstone
	30	Siltstone, tan, firm, argillaceous, in part coaly
	10	Shale
6460-6490	80	Sandstone, pyritic
	10	Shale
	10	Coal
6490-6510	70	Sandstone
	20	Shale
	10	Coal
6510-6520	50	Sandstone, fine to medium
	50	Shale, trace pyrite
6520-6530	80	Sandstone, light grey to white, fine to medium, subrounded to subangular, fair sorting, tight, hard, some lithic grains, rare glauconite
	20	Shale, trace pyrite

..6/

DEPTHS	%	DESCRIPTION
6530-6560	100	Sandstone as above, chiefly medium to coarse
6560-6570	80	Sandstone
	20	Shale, trace tan micritic dolomite
6570-6580	30	Sandstone, fine to medium, as above
	50	Siltstone, tan to brown, argillaceous, sandy, coaly partings, firm
	10	Shale, dark brown, slightly dolomitic, firm.
	10	Micritic dolomite, in part silty
6580-6600	40	Sandstone
	20	Siltstone
	20	Shale
	20	Dolomite
6600-6610	100	Shale, dark brown, firm, in part coaly, with trace sandstone and dolomite as above
6610-6620	80	Sandstone, light grey to white, very fine to medium, subangular to subrounded, fair sorting, hard, tight, trace lithics, trace pyrite
	20	Shale
6620-6630	60	Sandstone
	20	Shale
	20	Coal
6630-6640	100	Sandstone, very pyritic
6640-6650	60	Sandstone
	40	Shale
6650-6700	100	Sand to sandstone, coarse to very coarse, conglomeratic, poor sorting, subrounded to well rounded, some frosted grains.
6700-6720	80	Sandstone
	20	Shale
6720-6730	100	Sandstone, light grey to white, fine to medium, poorly sorted, subrounded to subangular, trace lithic grains, hard, tight.
6730-6760	100	Coal
6760-6780	80	Sandstone, white, very fine to medium, as above, pyritic
	20	Shale, dark brown, as above
6780-6800	80	Sandstone
	20	Coal
6800-6810	60	Siltstone, brown, very argillaceous, coaly partings
	40	Sandstone
6810-6820	100	Coal
6820-6830	100	Siltstone, some glauconite
6830-6840	100	Siltstone, white, clean, hard, tight
6840-6850	100	Siltstone, brown, argillaceous, coaly, hard, tight, dolomitic, in part sandy, micaceous
6850-6890	70	Siltstone, as above, some argillaceous, some pyritic
	30	Sandstone, fine to medium, hard, tight, some pyritic

..7/

Sample Descriptions

DEPTHS	%	DESCRIPTION
6890-6900	70	Sandstone, white to brown, fine to very fine, some medium, subangular, pyritic, fair sorting, some argillaceous to very argillaceous
	30	Shale, brown, silty, coaly
6[illegible]-6920	80	Sandstone as above
	20	Siltstone, brown, argillaceous, coaly
6920-6950	80	Siltstone, as above
	20	Sandstone, pyritic
6950-6960	40	Shale, dark brown, firm, coaly
	40	Siltstone
	20	Sandstone
6960-7000	60	Sandstone
	20	Shale
	20	Siltstone
7000-7020	60	Siltstone
	20	Shale
	20	Sandstone
7020-7030	60	Shale
	20	Sandstone
	20	Siltstone
7030-7040	50	Shale
	50	Sandstone
7[illegible]-7050	30	Sandstone
	30	Siltstone
	30	Coal
	10	Shale
7050-7060	70	Sandstone
	20	Shale
	10	Siltstone
7060-7070	100	Coal
7070-7120	70	Sandstone
	30	Shale, very silty to silty
7120-7130	80	Shale, brown, silty to very silty
	20	Sandstone, interbedded
7130-7140	80	Shale as above
	20	Sandstone as above
7140-7150	70	Sandstone, white, very fine to fine, tight, hard, coaly partings, silty, pyrititic
	30	Siltstone, some argillaceous
7150-7160	70	Siltstone, brown, argillaceous, sandy, interbedded with
	30	Sandstone, white, fine to medium, clean, poorly sorted, subrounded
7160-7170	60	Siltstone
	20	Sandstone
	20	Shale, brown, in part silty
7170-7190	100	Sandstone as above with coaly partings
7190-7200	100	Sandstone as above, fine to very fine

..8/

343046

DEPTHS	%	DESCRIPTION
7200-7210	100	Coal
7210-7220	50	Coal
	50	Siltstone as above
7 -7230	50	Sandstone, fine to very fine, silty as above
	50	Shale, brown, coaly, silty, micaceous
7230-7240	50	Sandstone as above
	30	Shale as above, silty to very silty
	20	Coal
7240-7250	50	Coal
	50	Shale
		H. STEAD, 11.9.73
7250-7260	60	Sandstone, light grey, very fine to fine grained, moderately well sorted, medium to well rounded, with trace mica, glauconitic, partly finely laminated with carbon and coal laminations, very calcareous, occasionally very pyritic.
	40	Shale, carbonaceous, dark brown, micaceous, very finely laminated with coal and carbon laminae, firm, slightly fissile. Trace of dolomite, buff, very hard, brittle, conchoidal fracture
7260-7270	90	Sandstone, light grey, very fine to fine grained grading to silt in part, calcareous, carbonaceous, micaceous, slightly glauconitic. No show.
	10	Dolomite, buff, very hard, brittle, conchoidal fracture, dull yellow, mineral fluorescence. No cut.
0-7280	80	Sandstone, very dolomitic in part, light grey to buff, very fine to fine grained, moderately well sorted, subangular to subrounded very calcareous with carbonaceous laminae, micaceous, dull mineral fluorescence. No cut. Probably 10-20% dolomitic sandstone in sample.
	20	Shale as above
7280-7290	50	Sandstone as above
	20	Siltstone, light to dark brown, carbonaceous, friable
	20	Shale as above
	10	Coal, black, conchoidal fracture in part, dull to vitreous
7290-7300	20	Sandstone as above
*	30	Shale, silty, dark brown, carbonaceous
	50	Coal as above. No gas bleed.
7300-7310	50	Sandstone, dolomitic in part, calcareous, carbonaceous, with fine carbonaceous laminae, light grey, very fine to silty grained, micaceous, dull mineral fluorescence. No cut.
	50	Siltstone, very shaley, medium to dark brown with carbonaceous laminae. Trace coal
7310-7320	70	Sandstone, dolomitic in part, calcareous, light grey, very fine to silty with fine carbonaceous micaceous laminae, friable, dull yellow fluorescence. No cut, very pyritic in part.
	30	Siltstone, very shaley in part, dark brown, carbonaceous, laminated, pyritic. Trace carbonaceous shale
7320-7330	70	Sandstone as above
	30	Siltstone, very shaley as above Trace carbonaceous shale

* Note: Sandstone change to medium to very coarse grained, angular to sub rounded, non-calcareous. Probably near ..9/
U. M. diversus top.

DEPTHS	%	DESCRIPTION
7330-7340	60	Sandstone, light grey, clean consolidated quartz, very fine to silty, non-calcareous, trace dull yellow minor fluorescence. No cut.
	40	Coal, black, dull to vitreous. No visible gas bleed.
7340-7350 *	70	Sandstone, quartz, light grey, bimodal, very fine to silty and medium to very coarse, angular, poorly sorted, clay matrix, pyritic, laminated, parallel silt laminae, trace dull minor fluorescence, no cut.
	30	Siltstone, shaley, carbonaceous, medium to dark brown, friable
7350-7360	80	Sandstone, clean quartz, light grey, medium to very coarse grained, angular to subrounded, poorly sorted, pyritic as above.
	20	Siltstone as above.
7360-7370	30	Sandstone as above
	30	Siltstone as above
	40	Coal as above with trace of amber
7370-7380	30	Sandstone as above, very fine to silty
	30	Siltstone as above
	40	Coal as above
7380-7390	30	Sandstone as above, very fine to silty
	20	Siltstone, very shaley, as above
	50	Coal, black, dull to vitreous, no gas bleed.
7390-7400	20	Sandstone as above, very fine to silty
	80	Siltstone, very shaley, very carbonaceous, dark brown, firm, with carbonaceous laminae.
7400-7410	20	Sandstone as above, no show
	40	Siltstone, carbonaceous
	40	Coal, black, dull to vitreous with trace of amber, with bright blue fluorescence.
7410-7420	20	Sandstone as above, no show, very fine to silty
	70	Siltstone as above
	10	Coal
7420-7430	40	Sandstone as above
	60	Siltstone as above
7430-7440	60	Sandstone, quartzose, light grey, very fine to silty with occasional medium to very coarse grains, moderately well sorted, friable, no show.
	40	Siltstone, very shaley, light to dark brown, carbonaceous, friable Trace coal and shale.
7440-7450	40	Sandstone
	60	Siltstone
7450-7460	60	Sandstone
	40	Siltstone, trace coal and shale.
7460-7470	80	Sandstone, dolomitic in part, quartzose, light grey, very fine to medium grained with trace of coarse to very coarse grains, subangular to subrounded, moderate sorting, trace pyrite, clay matrix, no show.
	20	Siltstone, grading to carbonaceous shale. Trace coal.

* Note: Sandstone change to medium to very coarse grained, angular to subrounded, non-calcareous. Probably near U. M. diversus top.

..10/

DEPTHS	%	DESCRIPTION
7470-7480	80	Sandstone, dolomitic in part. No show.
	20	Siltstone as above
7480-7490	100	Sandstone, dolomitic in part, light grey quartzose sand, very fine to coarse grained, predominantly very fine to fine grained, subangular to subrounded, moderately well sorted, trace pyrite and carbonaceous material, medium to hard, clay matrix, no show. Trace shale and coal.
7490-7500	100	Sandstone as above, very fine grained, no show.
7500-7510	50	Sandstone, no show.
	50	Siltstone, grading to shale, dark brown, with carbonaceous laminae, pyritic, firm to friable.
7510-7520	20	Sandstone as above, no show.
	30	Siltstone as above
	50	Coal
7520-7530	50	Sandstone, very fine to coarse grained, angular to subrounded, poorly sorted, pyritic, clay matrix.
	30	Siltstone as above
	20	Shale, carbonaceous, dark brown.
		P.O.H. @ 7555' for new bit. 9.00 pm - 4.30 am. J.33 type bit.
7530-7540		Poor sample; abundant Tertiary marine shale cavings. (12.9.73)
	30	Sandstone as above
	50	Siltstone as above
	20	Shale as above
7540-7550		Abundant cavings as above
	30	Sandstone
	50	Siltstone
	20	Shale
7550-7560	100	Siltstone as above Trace quartz, coal. Abundant cavings.
7560-7570	100	Siltstone as above Abundant cavings.
7570-7580	80	Sandstone, grading to siltstone, dolomitic, light grey, friable, very fine to silt, moderate sorting, with occasional very thin carbonaceous laminae, dull yellow minor fluorescence, no cut.
	20	Siltstone, shaley in part, medium to dark brown, friable, very carbonaceous.
7580-7590	80	Sandstone, grading to siltstone, dolomitic, carbonaceous, pyritic, very fine to silty as above.
	20	Siltstone as above
7590-7600	80	Sandstone as above
	20	Siltstone as above
7600-7610	100	Coal, black, vitreous, slight gas bleed.
7610-7620	20	Sandstone, slightly dolomitic, very fine to silty grained as above
	60	Siltstone as above
	20	Coal as above
7620-7630	20	Sandstone, slightly dolomitic, non calcareous, as above
	80	Siltstone as above

..11/

DEPTHS	%	DESCRIPTION
7630-7640	40	Sandstone, slightly dolomitic as above
	60	Siltstone, carbonaceous, medium to dark brown, friable
7[illegible]-7650	20	Sandstone as above
	80	Siltstone, dolomitic in part, carbonaceous, medium to dark brown. Trace coal.
7650-7660	50	Sandstone, clear quartz, unconsolidated, light grey, medium to very coarse grained, subangular, poor to moderate sorting, no fluorescence, no cut. 5 units of HW gas.
	30	Siltstone, partly dolomitic, medium to dark brown, yellow mineral fluorescence, no cut.
	20	Coal, black
7660-7670	20	Sandstone as above
	20	Siltstone as above
	60	Coal, brown to black, dull to vitreous.
7670-7680	20	Sandstone as above
	40	Siltstone as above
	40	Shale, very carbonaceous, dark brown, firm.
7680-7690	40	Sandstone, mostly very fine to silty with occasional medium to coarse grains.
	60	Siltstone as above.
7690-7700	40	Sandstone as above
	60	Siltstone as above
7[illegible]-7710	80	Sandstone, very silty, light grey, very fine to silty grained, moderate sorting, subrounded, moderately hard, clay matrix, pyritic, carbonaceous, non calcareous, very slightly dolomitic with occasional yellow mineral fluorescence, no cut. Poor porosity and permeability.
	20	Siltstone as above.
7710-7720	80	Sandstone as above
	20	Siltstone as above
7720-7730	100	Sandstone, very fine to silty grained, no show, poor porosity and permeability as above
7730-7740	80	Sandstone as above
	20	Siltstone as above
7740-7750	50	Sandstone as above
	50	Siltstone, carbonaceous, medium to dark brown, moderately hard.
7750-7760	20	Sandstone with occasional coarse to very coarse loose grains.
	80	Siltstone as above
7760-7770	60	Sandstone, clear loose quartz grains, light grey, bimodal, very fine to fine consolidated and medium to very coarse clear loose grains, 20% fine, 40% coarse, angular to subrounded, no fluorescence, no cut, probably good porosity and permeability in coarse grained sandstone
	30	Siltstone as above
	10	Coal

..12/

DEPTHS	%	DESCRIPTION
7770-7780	100	Sandstone, clear quartz grains, very fine to very coarse poorly sorted subangular to subrounded, trace dull yellow minor fluorescence, no cut, good porosity and permeability.
80-7790	80	Sandstone as above
	20	Siltstone as above
7790-7800	70	Sandstone as above
	30	Siltstone as above
7800-7810	50	Sandstone as above
	50	Siltstone
7810-7820	30	Sandstone as above, no fluorescence, no cut, fine to coarse grained.
	30	Siltstone as above
	40	Coal, black to dark brown, slight gas bleed, trace of amber with bright blue fluorescence.
7820-7830	100	Coal, black, vitreous, conchoidal fracture.
7830-7840	100	Coal as above
7840-7850	60	Sandstone, consolidated, light grey, very fine to medium grained, moderately sorted, angular to rounded, trace carbonaceous material and pyrite, no fluorescence, no cut, fair to good porosity and permeability.
	30	Siltstone as above
	10	Coal as above
50-7860	80	Sandstone, consolidated quartz grains, light grey, carbonaceous, slightly pyritic, very fine to coarse grained, predominantly very fine to fine, subrounded, moderate sorting.
	10	Siltstone as above
	10	Coal as above
7860-7870	30	Sandstone as above, trace of dolomite
	50	Siltstone, medium to dark brown, carbonaceous, firm.
	20	Shale, dark brown, carbonaceous
		Trace coal.
7870-7880	100	Coal, dark brown to black, dull to vitreous with amber (bluish fluorescence), conchoidal fracture in part.
7880-7890	10	Sandstone, light grey, fine to medium grained, subrounded, clay matrix, no fluorescence, no cut, fair to good porosity and permeabilit
	20	Siltstone, dark brown, carbonaceous
	20	Shale, dark brown, very carbonaceous, silty in part.
	50	Coal, as above
7890-7900	30	Sandstone as above
	30	Siltstone
	20	Shale as above
	20	Coal as above
00-7910	70	Sandstone, light grey consolidated quartz sand, fine to coarse grained predominantly fine to medium, subrounded, moderately sorted, clay matrix, no fluorescence, fair to good porosity and permeability
	30	Siltstone, dark brown, carbonaceous

..13/

DEPTHS	%	DESCRIPTION
7910-7920	50	Sandstone, light grey, consolidated quartz, fine to very coarse predominantly medium to coarse, as above
	30	Siltstone as above
	20	Shale, dark brown, fissile.
7920-7930	100	Sandstone, partly consolidated,very slightly dolomitic and partly clear loose quartz grains, fine to very coarse, predominantly medium to very coarse, angular to rounded, poorly sorted, dull mineral fluorescence in occasional fine grained consolidated parts, no cut, good porosity and permeability.
7930-7940	60	Sandstone as above, no shows.
	40	Siltstone as above
7940-7950	70	Sandstone, very fine to very coarse, predominantly very fine to medium, no show.
	30	Siltstone, shaley, carbonaceous.
7950-7960	70	Sandstone as above
	30	Siltstone as above
7960-7970	70	Sandstone as above, no show
	30	Siltstone as above
7970-7980	50	Sandstone as above, partly very fine to fine grained and partly medium to very coarse. No show.
	30	Siltstone as above
	20	Shale, dark brown, very carbonaceous, silty.
80-7990	70	Sandstone as above, very fine to very coarse, partly very fine to fine, predominantly medium to very coarse, no show.
	30	Siltstone, shaley.
7990-8000	80	Sandstone, very fine to very coarse, predominantly medium to very coarse, traces of dull yellow mineral fluorescence, no cut, good porosity.
	20	Siltstone, shaley
8000-8010	80	Sandstone as above, no show
	20	Siltstone, shaley as above
8010-8020	80	Sandstone as above, no show
	20	Siltstone as above
8020-8030	40	Sandstone as above
	40	Siltstone as above
	20	Shale
8030-8040	40	Sandstone as above
	40	Siltstone as above
	20	Shale as above
8040-8050	60	Sandstone as above
	40	Siltstone
8050-8060	20	Sandstone, very fine to fine grained as above
	40	Shale, dark brown, carbonaceous, fissile in part, firm
	40	Coal, black, vitreous
8060-8070	20	Sandstone as above
	20	Siltstone as above
	50	Shale as above
	10	Coal

..14/

343052

DEPTHS	%	DESCRIPTION
8070-8080	100	Sandstone, consolidated, light grey, very fine to fine, moderately well sorted, subrounded, hard, clay matrix, no fluorescence or cut, fair to poor porosity.
8080-8090	70	Sandstone as above
	30	Shale as above
8090-8100	80	Sandstone as above
	20	Shale, dark brown, very carbonaceous, fissile in part, firm.
8100-8110	100	Sandstone, carbonaceous, very fine to silt grained, subrounded, well sorted, clay matrix, no fluorescence, poor to fair porosity.
8110-8120	100	Sandstone as above Trace shale and coal
8120-8130	80	Sandstone, very fine to fine grained as above, trace of amber, coal laminae in sand. Amber has strong blue fluorescence
	20	Siltstone, dark brown, carbonaceous, friable. Trace shale and coal.
8130-8140	60	Sandstone, carbonaceous, consolidated very fine to fine, subrounded, moderately sorted, clay matrix, moderately hard. Sandstone is interlaminated with siltstone, no fluorescence or cut, fair porosity.
	40	Siltstone as above
8140-8150	60	Sandstone as above
	40	Siltstone as above
8150-8160	10	Sandstone as above
	90	Coal, black, vitreous, conchoidal fracture, trace of amber, bluish fluorescence.
8160-8170	60	Sandstone, light grey, consolidated, very fine to fine grained, moderately sorted, carbonaceous in part, no show.
	20	Shale, carbonaceous, dark brown, fissile.
	20	Coal as above
8170-8180	80	Sandstone as above, no show
	20	Siltstone as above
8180-8190	40	Sandstone, no show
	40	Shale, dark brown, very carbonaceous, firm, fissile
	20	Coal
8190-8200	40	Sandstone, no show
	20	Siltstone, dark brown, very carbonaceous, friable
	40	Shale
8200-8210	50	Sandstone as above, no show
	50	Shale as above
8210-8220	50	Sandstone as above, no show
	30	Siltstone as above
	20	Shale as above
8220-8230	80	Sandstone as above, no show
	20	Siltstone as above
8230-8240	50	Sandstone as above, no show
	30	Siltstone as above
	20	Shale as above

..15/

DEPTHS	%	DESCRIPTION
8240-8250	50	Sandstone as above, no show
	50	Siltstone, shaley, medium to dark brown, carbonaceous
8250-8260	50	Sandstone, consolidated, light grey, very fine to medium grained, subrounded, moderate sorting, moderately hard, clay matrix, non-calcareous, interlaminated with siltstone and coal laminae.
	50	Siltstone as above, interlaminated with sandstone and coal.
8260-8270	80	Sandstone, very carbonaceous, consolidated, light grey, very fine to medium grained interlaminated with coal laminae
	20	Siltstone as above
8270-8280	100	Sandstone interlaminated with very fine coal laminae.
8280-8290	80	Sandstone as above
	20	Siltstone as above
8290-8300	60	Sandstone as above
	20	Siltstone as above
	20	Shale as above
8300-8310	60	Sandstone as above
	20	Siltstone as above
	20	Shale as above
8310-8320	40	Sandstone
	40	Siltstone
	20	Shale
8320-8330	20	Sandstone
	60	Siltstone, buff to dark brown, very calcareous in part, carbonaceous, firm to hard.
	20	Shale, medium to dark brown, carbonaceous, fissile, firm
8330-8340 *	20	Sandstone, light grey, very fine to medium grained, subrounded, moderate sorting, with very thin micro coal laminae, no fluorescence, no cut, poor to fair porosity
	60	Siltstone, very calcareous in part, also carbonaceous in part, buff to dark brown, very dull yellow mineral fluorescence, no cut.
	20	Shale as above
8340-8350	40	Sandstone as above
	20	Siltstone as above, very calcareous
	40	Shale, light to dark brown, soft to firm, partly fissile and partly carbonaceous
8350-8360	60	Sandstone, light grey, very fine to fine grained, rounded, moderate sorting, non calcareous, slightly carbonaceous, no fluorescence, no cut, poor to fair porosity.
	40	Siltstone, light brown, very calcareous and dolomitic, dull yellow fluorescence, no cut, tight.
8360-8370	40	Sandstone as above
	40	Siltstone as above
	20	Shale
8370-8380	20	Sandstone as above
	40	Siltstone as above
	40	Shale, medium to dark brown, carbonaceous, fissile, firm.

* Note: Possible formation change - i.e. very calcareous siltstone.

..16/

343054

DEPTHS	%	DESCRIPTION
8380-8390	30	Siltstone as above
	60	Shale, light to dark brown, partly carbonaceous, non-calcareous, fissil in part, firm
	10	Coal, black, vitreous, conchoidal fracture, grains of amber, bluish fluorescence.
8390-8400	60	Siltstone, light to dark brown, partly carbonaceous, friable, non-calcareous.
	40	Shale as above
8400-8410	30	Sandstone, light grey, consolidated, moderately hard, very fine to medium grained, moderate sorting, with small amounts of carbonaceous material, trace pyrite.
	20	Siltstone as above, trace of dead oil or amber, bluish fluorescence. No cut.
	50	Shale, dark brown, very carbonaceous, laminated, partly fissile.
8410-8420	40	Sandstone as above. No show.
	40	Siltstone as above. No trace of amber or dead oil. No fluorescence.
	20	Shale as above
8420-8430	40	Sandstone as above. No show.
	40	Siltstone as above
	20	Shale as above
8430-8440	40	Sandstone as above. No show.
	40	Siltstone (trace of dark brown vitreous, translucent, hard and brittle substance, probably amber or dead oil residual, bluish fluorescence, no cut), as above
	20	Shale as above
8440-8450 *	60	Sandstone, consolidated, light grey, very fine to medium grained, moderate sorting, clay matrix, trace of dark brown staining on quartz grains, bluish fluorescence, very weak bluish-white crush cut, probably dead oil or bituminous substance from coal laminations within the sandstone, poor porosity.
	20	Siltstone as above
	20	Shale as above
8450-8460	60	Sandstone as above with rare brown staining, strong bluish fluorescence, very weak bluish-white crush cut. Appears to be associated with coal laminations.
	20	Siltstone as above
	20	Shale as above
8460-8470	60	Sandstone, slightly dolomitic, consolidated, very fine to medium grained clay matrix, hard, with rare brown residual ? oil or bituminous residue staining and bluish fluorescence, with very weak crush cut, poor to fair porosity.
	20	Siltstone as above
	20	Shale as above
8470-8480	20	Sandstone. No show, as above
	60	Siltstone as above
	20	Shale as above
8480-8490	40	Sandstone. No shows, as above
	40	Siltstone as above
	20	Shale as above
8490-8500	20	Sandstone, slightly dolomitic, consolidated, light grey, very fine to medium, clay matrix, pyritic, hard, interlaminated with siltstone, no fluorescence, no cut, poor porosity.
	50	Siltstone, light to medium brown, carbonaceous, friable.
	30	Shale, medium to dark brown, carbonaceous, firm.

* Note: Dead oil fluorescence and very slight crush cut

DEPTHS	%	DESCRIPTION
8500-8510	80	Sandstone, no show, as above
	20	Siltstone as above
8510-8520	80	Sandstone. No show, as above
	20	Siltstone as above
8520-8530	10	Sandstone as above. No show.
	90	Coal, dark brown to black, dull to vitreous, conchoidal fracture, trace of amber with blue fluorescence. No cut.
8530-8540	20	Sandstone as above. No show.
	80	Siltstone as above
8540-8550		Interlaminated sandstone and siltstone
	30	Sandstone as above. No show
	70	Siltstone, shaley, as above
8550-8560	100	Sandstone, slightly dolomitic, consolidated, light grey, very fine to fine grained, angular to rounded, moderate sorting, clay matrix, moderately hard, no fluorescence, no cut, poor to fair porosity.
8560-8570	80	Sandstone, slightly dolomitic, consolidated, very fine to fine grained, angular to rounded, clay matrix, moderately hard, no fluorescence, no cut, poor porosity, no show, interlaminated with siltstone.
	20	Siltstone, carbonaceous, medium to dark brown, friable.
8570-8580	80	Sandstone as above interlaminated with siltstone. No show.
	20	Siltstone, medium brown, slightly carbonaceous, friable
8580-8590	40	Sandstone as above, no show, interlaminated with siltstone
	60	Siltstone as above
8590-8600		Interlaminated sandstone and siltstone as above
	30	Sandstone with occasional loose quartz grains. No show.
	70	Siltstone.
		Trace of coal
8600-8610	10	Sandstone as above. No show
	90	Siltstone, medium brown, slightly carbonaceous, friable.
		Trace of coal
8610-8620	20	Sandstone, predominantly clear loose quartz grains with some consolidated sandstone as above, very fine to very coarse predominantly coarse to very coarse, subangular, poorly sorted, no fluorescence, good porosity.
		Trace of coal
	80	Siltstone as above
8620-8630		Interlaminated sandstone and siltstone.
	30	Sandstone, consolidated, very fine to fine grained, clay matrix, no fluorescence, poor porosity.
	60	Siltstone as above
	10	Shale, medium to dark brown, carbonaceous, firm
8630-8640	10	Sandstone as above. No show.
	60	Siltstone as above
	30	Shale, medium to dark brown, carbonaceous, firm.
8640-8650	10	Sandstone as above, no show.
	60	Siltstone as above
	30	Shale as above
		P.O.H. for new bit @ 8662'.
8650-8660		Abundant marine cavings after trip
	60	Siltstone as above
	40	Shale as above

DEPTHS	%	DESCRIPTION
8660-8670	60	Siltstone as above
	40	Shale as above
		Abundant cavings
8670-8680	60	Siltstone as above
	40	Shale
		Abundant cavings
8680-8690	10	Sandstone, consolidated, very fine to fine grained, clay matrix, hard, no fluorescence, poor porosity.
	60	Siltstone, medium to very dark brown, friable
	30	Shale, dark brown with carbonaceous laminae, firm.
8690-8700	30	Siltstone as above
	70	Shale as above
8700-8710	20	Sandstone as above
	20	Siltstone as above
	60	Shale as above
8710-8720	30	Sandstone as above. No show
	30	Siltstone, medium to dark brown, carbonaceous, pyritic, friable
	40	Shale as above
8720-8730	20	Sandstone as above. No show
	20	Siltstone as above
	60	Shale - silty, carbonaceous, medium to dark brown, firm.
8730-8740	30	Sandstone, dolomitic cement, consolidated, light grey, very fine to fine, subangular, moderate sorting, some clay matrix, hard, dull yellow mineral fluorescence that disappears after soaking in acid, no cut, poor porosity.
	70	Shale, silty, medium to very dark brown, firm, slightly calcareous.
8740-8750	20	Sandstone as above
	80	Shale as above
8750-8760	10	Sandstone as above
	90	Shale as above
8760-8770	30	Sandstone, dolomitic as above
	20	Siltstone, medium brown, carbonaceous, calcareous, friable
	50	Shale as above
8770-8780	40	Sandstone as above
	30	Siltstone as above
	30	Shale as above
8780-8790	40	Sandstone, partly dolomitic, very fine to fine, yellow mineral fluorescence, tight.
	30	Siltstone as above
	30	Shale as above
8790-8800	60	Sandstone, partly dolomitic, slightly carbonaceous, traces of pyrite, very fine to silt grained, subrounded, moderate sorting, hard, clay matrix, with occasional very fine carbonaceous laminae and interlaminated with siltstone, very dull yellow mineral fluorescence, no cut, tight.
	30	Siltstone, calcareous, carbonaceous, medium to dark brown, friable
	10	Shale, dark brown, carbonaceous, firm.
8800-8810	60	Sandstone as above. No show.
	30	Siltstone as above
	10	Shale as above
8810-8813	50	Sandstone as above
	40	Siltstone as above
	10	Shale as above

..19/

NARIMBA-1

Sample Descriptions

18.9.73
J.R. Black, D. Maughan

343057

DEPTHS	%	DESCRIPTION
8813-8820	20	Sandstone, white, fine grained, consolidated, with few unconsolidated coarse grains.
	20	Siltstone, white, moderately firm, trace carbonaceous laminae.
	60	Shale with trace coal
8[illegible]-8830	10	Sandstone
	30	Siltstone, laminated, with carbonaceous streaks
	60	Shale, brown, firm, slightly silty, finely micaceous
8830-8840	10	Sandstone as above
	10	Siltstone as above
	80	Shale
8840-8850	10	Sandstone
	20	Siltstone, trace pyrite
	70	Shale, trace fossil.
		POH to run casing Ran 9-5/8" casing with shoe at 8808'. Cemented with 374 Sx. Ran Seal assembly. Drilled out plug @ 530. Pressure checked 16.5# at 8861.
8850-8860	100	Cement cavings
8860-8870	30	Cement cavings
	20	Siltstone as above
	50	Shale as above
8870-8880	50	Cement cavings
	10	Siltstone
	40	Shale
8880-8890	30	Cement
	20	Siltstone as above with trace unconsolidated fine grained, subangular quartz
	50	Shale, brown, carbonaceous, silty, finely micaceous with trace fossil.
8890-8900	10	Siltstone
	10	Shale
	80	Coal, black, brittle.
8900-8910	20	Siltstone, white with very fine grained sand, firm, thin bedded.
	70	Shale
	10	Coal
8910-8920	20	Siltstone
	80	Shale, brown, silty, firm, carbonaceous, finely micaceous, trace coal.
8920-8930	40	Siltstone, white to tan white with some very fine grained sand, very hard indurated, slightly carbonaceous
	60	Shale, as above, trace fossil.
8930-8940	20	Sandstone, white, very fine to fine grained quartz, very silty, hard, tight.
	30	Siltstone as above
	50	Shale as above
		Ironstone ?
8975		PO to CB
8940-8950	10	Siltstone
	90	Shale
8950-8960	90	Siltstone, tan to buff, moderately firm, argillaceous
	10	Shale

../20/

DEPTHS	%	DESCRIPTION
8960-8970	20	Sandstone, white, very fine to fine grained, silty, consolidated, poorly sorted, moderately firm to hard, poor porosity and permeability
	30	Siltstone as above
	50	Shale, dark brown to brown, carbonaceous, silty, finely micaceous
8970-8980	40	Sandstone
	20	Siltstone
	40	Shale with trace coal
8980-8990	50	Sandstone, white, fine to medium grained, consolidated, subangular quartz, moderately firm with some unconsolidated subangular coarse quartz grains, slightly carbonaceous.
	20	Siltstone
	20	Shale
	10	Coal, with amber and mineral fluorescence.
8990-9000	90	Sandstone, white, fine grained, silty, consolidated, moderately firm, calcareous with few unconsolidated coarse to medium quartz grains.
	10	Shale
9000-9010	80	Sandstone, white, fine grained, becoming more silty
	20	Shale, brown, carbonaceous, silty.
9010-9020	60	Sandstone as above
	40	Shale as above
9020-9030	30	Sandstone as above, very silty
	70	Shale, brown, silty, carbonaceous
9030-9040	100	Shale, brown, firm with few silty streaks
9040-9050	80	Shale
	20	Coal
9050-9060	10	Shale
	90	Coal, black, brittle with abundant amber with bright yellow fluorescenc
9060-9070	10	Siltstone
	90	Shale, brown, platey, slightly silty in places, slightly carbonaceous
9070-9080	20	Siltstone
	80	Shale as above, but silty
9080-9090	30	Sandstone, white, very fine grained, consolidated, firm, very silty, slightly carbonaceous
	70	Shale, brown, silty, carbonaceous
9090-9100	20	Sandstone as above
	80	Shale
9100-9110	20	Siltstone
	80	Shale
9110-9120	10	Siltstone
	90	Shale, brown, laminated silty, slightly carbonaceous, firm
9120-9130	20	Siltstone as above, becoming sandy
	80	Shale, trace coal
9130-9140 Circ. 30 min. at 9144.	50	Sandstone, white, fine to medium grained, consolidated, moderately friable, subrounded, fair porosity and permeability, silty, poorly sorted with some unconsolidated coarse grains (subrounded)
	50	Shale as above, with silty stringers.

..21/

DEPTHS	%	DESCRIPTION
9140-9150	70	Sandstone as above
	30	Shale
9150-9160	30	Sandstone as above but more silty
	20	Siltstone
	50	Shale, brown, carbonaceous, finely micaceous, silty
9160-9170	10	Sandstone
	10	Siltstone
	80	Shale
9170-9180	40	Siltstone, white to buff, moderately firm, trace very fine grained sand.
	60	Shale
9180-9190	20	Sandstone, white, fine to medium grained, silty, poorly sorted, consolidated, moderately firm
	20	Siltstone as above
	60	Shale
9190-9200	70	Sandstone, white, very fine to fine grained, quartz, very silty, consolidated, firm, non calcareous, fair to poor porosity and permeabilit
	30	Shale as above
9200-9210	30	Sandstone
	60	Siltstone, white to tan, moderately firm
	10	Shale
9210-9220	20	Siltstone
	10	Shale
	70	Coal, black, brittle, conchoidal fracture
9220-9230	90	Siltstone, white to tan, firm with trace very fine grained sand, hard, tight
	10	Shale, brown, carbonaceous with trace coal
9230-9240	80	Siltstone as above
	20	Shale, light brown, very argillaceous, soft, trace coal
9240-9250	90	Siltstone
	10	Shale, dark brown, carbonaceous, silty
9250-9260	10	Siltstone as above
	90	Shale
9260-9270 Circ. at 9277. Drill break at 9267	100	Sandstone, milky white, coarse to very coarse, unconsolidated, subangular to subrounded quartz, well sorted, good porosity and permeability. No show.
9270-9277	100	Sandstone as above. No show.
		Came out of hole to run Core bbl Core #1.
		Core #1 9278-9307' Cut 29'. Recov. 29' 100% 16' siltstone, 9' shale, 3½'sandstone and ½' coal
9307-9310	100	Coal, black, conchoidal fracture with bright lustre.
9310-9320	90	Siltstone, light grey, firm, sandy, slightly carbonaceous
	10	Coal

..22/

DEPTHS	%	DESCRIPTION
9320-9330	100	Siltstone as above, some quartz and coal present
9330-9340	70	Coal, black, conchoidal fracture, bright lustre
	30	Shale, brown, carbonaceous, slightly silty
9340-9350	80	Coal as above
	10	Siltstone, white (non calcareous) to grey (very slightly calcareous)
	10	Shale, brown, carbonaceous
9350-9360	80	Siltstone, grey, slightly calcareous, few grains quartz
	20	Coal, black, conchoidal fracture
9360-9370	80	Sandstone, white, very fine to fine grained, well sorted, consolidated
	20	Siltstone, grey, non calcareous
9370-9380	80	Sandstone as above
	20	Siltstone as above
9380-9390	90	Sandstone as above
	10	Siltstone
9390-9400	100	Sandstone, white, fine to medium grained, very friable, slightly carbonaceous, subrounded with good to fair porosity and permeability
9400-9410	40	Sandstone, white, fine grained, moderately friable, subrounded, fair porosity and permeability
	20	Siltstone, white, sandy, slightly carbonaceous
	40	Shale, brown, slightly carbonaceous, moderately firm.
9410-9420	50	Sandstone, as above
	30	Siltstone, as above
	20	Shale, as above
9420-9430	50	Sandstone, white, fine grained becoming very silty, firm, hard, tight
	30	Siltstone as above
	20	Shale as above
9430-9440	10	Sandstone
	20	Siltstone
	70	Shale, chocolate brown, moderately soft to fissile, finely micaceous
9440-9450	90	Sandstone, white, medium to coarse grained, poorly sorted, angular to subrounded, about half consolidated, moderately firm and half unconsolidated (coarse grains), quartzose Fair to good porosity and permeability
	10	Shale as above with trace coal
9450-9460	90	Sandstone as above but less coarse grains
	10	Shale as above with trace coal
9460-9470	60	Sandstone, white, predominantly medium grained, moderately friable, subrounded, consolidated quartz with some unconsolidated subangular coarse quartz, fair to good porosity and permeability
	20	Shale as above
	20	Coal as above
9470-9480	40	Sandstone, white as above, poorly sorted
	60	Shale, brown, carbonaceous, fissile
9480-9490	10	Sandstone
	40	Siltstone, white, firm, sandy
	40	Shale as above
	10	Coal

..23/

343061

DEPTHS	%	DESCRIPTION
9490-9500	10	Sandstone
	90	Siltstone, white, firm, indurated
9500-9510	90	Siltstone as above
	10	Shale
9510-9520	40	Siltstone
	20	Shale
	40	Coal
9520-9530	10	Sandstone, white, fine to medium grained, consolidated with few unconsolidated coarse quartz grains
	30	Siltstone, tan, firm, slightly carbonaceous
	60	Shale, brown, silty, carbonaceous
9530-9540	60	Sandstone, white, fine to coarse bimodal poorly sorted, moderately friable.
	40	Shale
9540-9544 Circulation	90	Sandstone, white, fine to coarse, bimodal, predominantly fine grained, poorly sorted, moderately friable, subrounded fine grains , and subangular coarse grains, fair to good porosity and permeability
Spl.	10	Shale as above
		Core #2 9544-9561 Cut 19' Recov. 19'
		Ran FDC/CNT/GR/CAL 9542-8789' Casing checked 19' high ISF ISONIC 9535-8789' WLM (SCHLUMB.) TD 9543'
		Cores 1 & 2 should be adjusted upward 19'
		Ran in and drilled 15' on wiper trip. Circ. hole clear. Test BOP and did BOP drill.
		Ran FIT #1 @ 9440 (FDC depth)
		Spl. is 19' too deep 9542 to 9557'
9561-9576	60	Siltstone, brown and white, firm, carbonaceous
	40	Shale, brown, carbonaceous, silty
9557-7570		Readjusted 19' up.
	80	Sandstone, white, fine to medium grained quartz, with few lithics, consolidated, moderately firm, fair porosity and permeability, poorly sorted.
	20	Shale, brown, carbonaceous
9570-9580	100	Sandstone as above, but fair to good porosity and permeability
9580-9590	100	Sandstone as above
9590-9600	80	Sandstone
	20	Coal, black, brittle, dirty with some shale
9600-9610	100	Coal, black, brittle, abundant amber with yellow mineral fluorescence
9610-9620	10	Sandstone as above
	50	Shale, brown, carbonaceous, finely micaceous, moderately soft
	40	Coal as above
9620-9630	10	Sandstone
	80	Shale, dark brown, some silty, very carbonaceous
	10	Coal

..24/

DEPTHS	%	DESCRIPTION
9630-9640	70	Sandstone, white, very fine grained, silty, firm, consolidated, poor porosity and permeability, subrounded, non calcareous
	30	Shale as above
40-9650	30	Sandstone
	40	Siltstone, tan to white, sandy, hard, indurated
	30	Shale as above
9650-9660	10	Sandstone
	20	Siltstone
	70	Shale, dark brown, carbonaceous
9660-9670	20	Sandstone, white, fine grained, firm, silty, subrounded, quartzose, poor porosity and permeability. Scattered blue white fluorescence with fair blue yellow cut, good show on chromatograph.
	80	Shale
9670-9680	30	Sandstone, white, fine grained, firm, consolidated, scattered spotty blue yellow fluorescence, fair cut.
	70	Shale
		Drill break at 9683. Cut 4' (adj. for closure of Bumper Subs to 9680)
9680-9687	50	Sandstone, white, fine grained with few medium grains, very silty, firm.
	30	Siltstone, trace blue white fluorescence, faint oil.
	20	Shale
9687-9690	40	Sandstone, white, fine grained, silty, moderately friable, spotty fluorescence, with good cut. Blue white fluorescence and cut.
	60	Shale, brown, carbonaceous, silty.
9690-9700	10	Sandstone
	90	Shale, dark grey, silty, moderately soft
9700-9710	30	Sandstone, buff to white, fine grained, silty, trace spotty fluorescence, with fair cut.
	30	Siltstone, tan, firm, indurated.
	40	Shale as above
9710-9720	60	Sandstone as above, but very silty, trace spotty blue white fluorescence
	30	Siltstone
	10	Shale
9720-9730	40	Sandstone, white to buff, fine grained, consolidated, moderately firm, subrounded quartz with some lithics even dull yellor mineral fluorescence with spotty blue white fluorescence with fair cut.
	20	Siltstone, tan, firm
	40	Shale, brown, carbonaceous, moderately soft
9730-9740	20	Sandstone
	60	Siltstone, buff to white, firm, slightly carbonaceous
	20	Shale
9740-9750	80	Sandstone, white, fine to medium grained, poorly sorted, subrounded quartz with few angular lithics, consolidated, moderately friable, dull yellow mineral fluorescence and spotty bright yellow fluorescence with fair to good cut.
	20	Shale
9750-9760 Circ. drill brk.	90	Sandstone, white, fine to coarse predominantly medium grained, mostly consolidated, but some unconsolidated, friable, subrounded to sub-angular quartz with some lithics, some clay choking? non calcareous, but has dull yellow mineral fluorescence. Spotty bright yellow fluorescence with good bright yellow cut. Residual oil?
	10	Shale

..25/

343063

DEPTHS	%	DESCRIPTION
		Ran Core bbl for Core #3. Adjusted depth to 9750 on strap out of D.P. Core #3 9750-9756. Cut 6'.Rec. 6' 2' sand. 4' shale
9756-9770 Drilling with J/33	60	Sandstone, white to buff, fine to medium grained, consolidated, poorly sorted, trace spotty bright yellow fluorescence with fair cut. Fluorescence about 1% of total sample.
	40	Shale, dark brownish grey, firm
9770-9780	90	Sandstone, buff to white, fine grained, very silty, hard, firm, tight, subrounded quartz with some lithics. No show, clay choking
	10	Shale, as above, trace coal
9780-9790	100	Sandstone as above
9790-9800	90	Sandstone, as above, fine grained, silty, hard, tight, with some clay choking. No shows.
	10	Shale
9800-9810	100	Coal, black, bright lustre
9810-9820	40	Coal
	40	Shale
	20	Sandstone as above with shale laminae?
9820-9830	40	Coal
	40	Sandstone
	20	Shale
9830-9840	30	Sandstone
	40	Siltstone
	20	Shale
	10	Coal
9840-9850	20	Sandstone
	30	Siltstone
	40	Shale, brown, carbonaceous as above, and grey, soft, argillaceous
	10	Coal
9850-9860	70	Sandstone, fine to coarse grained, bimodal, half consolidated, half unconsolidated quartz, subangular to subrounded, clay choked.
	30	Shale
9860-9870	10	Sandstone
	90	Coal, platey fracture
9870-9880	10	Coal
	60	Shale
	30	Sandstone, fine grained to silty, clay choked
9880-9890	10	Sandstone
	50	Siltstone
	40	Shale
9890-9900	100	Shale, brown and light grey, soft
9900-9904	100	Shale, mostly medium grey, soft, some brown
		POH Run FDC/CNL, ISF/SONIC & FIT. Run #3

Sample Descriptions

A.K. Svalbe
25.9.1973

DEPTHS	%	DESCRIPTION
9900-9910	90	Shale, dark brown, massive to subfissile, hard, carbonaceous, micaceous, silty in part, coaly filaments and partings
	10	Siltstone, shaley, light brown, well consolidated, carbonaceous, tight. Trace coal and sandstone (uphole?)
9910-9920	90	Shale as above
	10	Siltstone as above
		Trace coal and sandstone (uphole?)
9920-9930	70	Shale as above
	30	Siltstone, trace fine grained to very fine grained sandstone.
		Trace coal and sandstone
9930-9940	30	Shale as above
	70	Siltstone, trace associated very fine grained sandstone, shaley with clay matrix and associated carbonaceous material and mica
9940-9950	10	Sandstone, white to light cream, fine to medium grained, consolidated, moderately well sorted, subangular to subrounded, clay matrix, tight.
	60	Siltstone, as above
	30	Shale as above, silty.
		Trace coal
9950-9960	10	Sandstone as above
	30	Siltstone as above
	60	Shale, silty as above
		Trace coal
9960-9970	20	Sandstone as above
	40	Siltstone as above
	40	Shale, silty as above
		Trace coal
9970-9980	20	Sandstone as above
	30	Siltstone as above
	50	Shale as above
9980-9990	40	Sandstone as above
	50	Siltstone as above with associated very fine grained sandstone
	10	Shale as above
		Trace coal
9990-10000	60	Siltstone as above
	40	Shale as above
		Trace coal and sandstone
10000-10010	60	Siltstone as above
	40	Shale, silty as above
		Trace sandstone and coal
10010-10020	60	Siltstone as above
	40	Shale as above
		Trace sandstone and coal
10020-10030	50	Siltstone with associated very fine grained sandstone
	50	Shale - silty as above
		Trace coal and sandstone
10030-10040	100	Silty shale, carbonaceous, micaceous, firm to hard (as above)
		Trace siltstone, sandstone and coal

..27/

343065

DEPTHS	%	DESCRIPTION
10040-10050	10	Siltstone as above
	90	Shale as above
		Trace coal and sandstone as above
10050-10060	10	Siltstone with associated very fine grained sandstone
	90	Shale, dark brown, micaceous, carbonaceous, firm-hard, well consolidated.
		Trace sandstone, medium to coarse grained, angular to rounded, moderately well sorted. Trace coal.
10060-10070	90	Sandstone, white to light cream, medium to coarse grained, subangular to subrounded, moderately well sorted, friable to weakly consolidated, minor clay cement. No fluorescence or cut. (Chromatograph to C3 only - very weak C4)
(Top sand) (10067)	10	Siltstone, brown, as above.
		Trace coal.
10070-10080	90	Sandstone, white to cream, medium to fine grained, angular to rounded, moderately well sorted, consolidated with abundant clay matrix. No fluorescence or cut.
	10	Siltstone as above.
		Trace coal.
10080-10090	90	Sandstone, white, fine grained to silty, angular to rounded, as above with trace micaceous and carbonaceous debris.
	10	Silty shale and shale.
		Trace coal.
10090-10100	90	Sandstone, white, light brown, fine grained to silty, tight, clay matrix, no show.
	10	Silty shale, and shale.
		Trace coal.
10100-10110	50	Sandstone, becoming more silty than above
	40	Silty shale as above
	10	Shale and coaly carbonaceous shale.
10110-10120	10	Sandstone as above
	20	Siltstone as above
	30	Shale as above
	40	Coal, black, conchoidal (Coal bed 10115 - gas kick)
10120-10130	20	Sandstone, light brown to buff, fine to medium grained, angular to rounded, firm to hard, well consolidated - calcareous (dolomitic?) with associated clay matrix, dull mineral fluorescence.
	30	Siltstone, light brown, carbonaceous as above
	50	Silty shale
		Trace coal
10130-10140	50	Sandstone as above, dolomitic
Drill break	30	Siltstone, light brown, weakly dolomitic
10145	20	Shale, silty, as above
		Trace coal
10140-10150	90	Sandstone as above - 20% dolomite and/or carbonate cemented - noncemente white to light brown, firm to friable, poor porosity and permeability. No show. Dull yellow to brown mineral fluorescence
	10	Shale, light to dark brown, silty with carbonaceous partings and flecks.
10150-10160	100	Sandstone - 10% dolomitic - remainder white with clay matrix. Trace shale and coal
10160-10170	80	Sandstone, dominantly medium grained as above, minor dolomite
	20	Siltstone, shaley as above

..28/

DEPTHS	%	DESCRIPTION
10170-10180	60	Sandstone as above
	40	Coal, black
10180-10190	100	Coal, black, (30 unit kick) Trace sandstone and shale
10190-10200	90	Sandstone as above, white, medium to coarse grained, with some fine grained, dominantly medium to coarse grained, friable, lack clay matrix, weakly consolidated. No show. Better porosity and permeability. Granitic lithics.
	10	Shaley coal, black.
10200-10210	80	Sandstone as above, becoming medium to fine grained with clay matrix, more consolidated, poor porosity and permeability. Trace dolomite.
	20	Shaley siltstone as above Trace coal
10210-10220	60	Sandstone, grey to light brown, trace dolomite
	30	Silty shale
	10	Coal, black
10220-10230	90	Sandstone as above, fine to coarse grained, dominantly fine to medium grained, trace dolomite - most sandstone clay choked and friable to well consolidated.
	10	Shaley siltstone, light brown, carbonaceous
10230-10240	60	Sandstone as above, no fluorescence or cut
	20	Silty shale as above
	20	Coal, black - bleeding gas
10240-10250	80	Sandstone, white, fine to coarse grained, dominantly fine to medium grained
	10	Siltstone, grey to white, tight, clay choked
	10	Coal, black, bleeding gas
10250-10260	100	Sandstone as above Trace shale and coal
10260-10270	30	Sandstone, white, fine to medium grained, angular to rounded, moderately well sorted, clay matrix, tight, no fluorescence or cut
	60	Siltstone, light to dark brown, shaley, carbonaceous, with filaments of coal and coaly flecks, very tight
	10	Coal
10270-10280	10	Sandstone as above
	30	Siltstone as above
	60	Coal, black, bleeding gas
10280-10290	40	Sandstone as above
	50	Siltstone as above
	10	Shale, grey brown, carbonaceous Trace coal
10290-10300	10	Sandstone as above
	60	Siltstone as above
	30	Coal as above Trace shale
10300-10310	40	Siltstone as above
	60	Shale, light to dark brown grey, weakly silty in part Trace coal and sandstone
10310-10320	30	Sandstone, white to grey, fine to medium grained, angular to rounded, moderately well sorted, firm to well consolidated, clay choked, poor porosity and permeability
	40	Siltstone, brown, carbonaceous, shaley
	30	Shale, brown. Trace coal

..29/

DEPTHS	%	DESCRIPTION
10320-10330	10	Sandstone as above
	50	Siltstone as above
	40	Shale as above
		Trace coal
330-10340	20	Sandstone, white to grey, fine to medium grained, angular to rounded
	50	Siltstone as above
	30	Shale as above
		Trace coal
10340-10350	20	Siltstone as above
	40	Shale as above
	40	Coal as above
		Trace sandstone
10350-10360	50	Sandstone as above
	30	Shale as above
	20	Coal as above
10350-10370	100	Sandstone, grey to white, fine to medium grained, angular to rounded, moderately well sorted, quartzose, granitic lithics, with mica, feldspar and quartzose, partly weathered, clay choked, poor porosity and permeability
		Trace shale, coal and siltstone
10370-10380	100	Sandstone as above.
		Trace shale, siltstone and coal
10380-10390	90	Sandstone, abundant dolomitic cemented sand - 30% of sample fine to medium (coarse grained), dominantly fine to medium grained, angular to rounded, moderately well sorted as above
	10	Silty shale.
		Trace coal
10390-10400	90	Sandstone as above
	10	Shale, silty
		Trace coal
		P.O.H. @ 10400 to Run ISF/BHC's and FDC/CNL combo - followed by FIT's (90 units trip gas after RIH at completion of logging)
10400-10410	40	Sandstone, white to cream, fine to medium grained, angular to rounded, moderately well sorted, firm to hard, dolomitic in part, clay matrix, tight, poor porosity and permeability.
	40	Siltstone, light brown, carbonaceous, with minor very fine grained sandstone.
	20	Shale, dark brown, carbonaceous, micaceous, subfissile.
		Trace coal
10410-10420	60	Sandstone as above
	20	Siltstone as above
	20	Shale as above
		Trace coal
10420-10430	80	Sandstone, white to light brown, partly dolomitic, fine to medium grained, angular to rounded, tight
x gas	10	Siltstone, light to dark brown, as above
kick 20 units)	10	Shale, dark brown to grey brown, as above
		Trace coal
10430-10440	30	Sandstone as above
	20	Shale as above, silty
	50	Coal as above
		Trace siltstone
10440-10450	60	Sandstone as above
	20	Shale as above, silty
	20	Coal as above. Trace siltstone.

..30/

343068

DEPTHS	%	DESCRIPTION
10450-10460	40	Sandstone as above
	30	Siltstone as above
	20	Shale as above
	10	Coal as above
10460-10470	20	Sandstone as above
	60	Siltstone as above
	20	Shale as above
		Trace coal
10470-10480	20	Sandstone as above
	30	Siltstone as above
	50	Shale as above
		Trace coal
10480-10490	30	Sandstone, white to cream, fine to medium grained, angular to rounded, clay choked.
	50	Siltstone, light brown, shaley, carbonaceous
	20	Shale, as above, brown grey, carbonaceous, subfissile.
		Trace coal
10490-10500	10	Sandstone
	60	Siltstone, very shaley
	30	Shale as above
		Trace coal
10500-10510	20	Sandstone as above
	50	Siltstone as above
	30	Shale as above
		Trace coal
10510-10520	50	Sandstone
	40	Siltstone, sandy, white to light cream
	10	Shale, dark brown, subfissile
		Trace coal
10520-10530	30	Sandstone as above
	40	Siltstone as above
	30	Shale
10530-10540	30	Sandstone. Trace dolomitic cement
	30	Siltstone as above
	40	Shale as above
		Trace coal
10540-10550	60	Sandstone as above
	30	Shale as above
	10	Siltstone as above
		Trace coal
10550-10560	50	Sandstone as above
	20	Siltstone as above
	30	Shale as above
10560-10570	30	Sandstone as above
	40	Siltstone as above
	30	Shale as above
10570-10580	30	Sandstone, dolomitic, fine to medium grained, angular to rounded, moderately well sorted, tight
	40	Siltstone as above
	30	Shale as above
		Trace coal
10580-10590	100	Coal, bleeding gas

..31/

DEPTHS	%	DESCRIPTION
10590-10600	70	Sandstone, white, medium to coarse grained, subangular to subrounded, moderate to poor sorting, friable?, cemented - fragments only - have silica cement and overgrowths
	20	Siltstone as above
	10	Shale, dark brown.
		Trace coal
10600-10610	80	Sandstone, white, medium to coarse grained, angular to rounded, moderate to poor sorting, firm to hard
	20	Shale, dark brown, very coaly.
		Trace coal
10610-10620	80	Sandstone, fine to coarse grained, dominantly medium grained to fine grained, becoming more like above 10600', reappearance of clay matrix in cemented sand aggregates (above 20' had "quartzite" appearance with silica cement and outgrowths.) Still very hard to very firm
	20	Shale, dark brown, silty in part, cargonaceous
10620-10630	80	Sandstone as above
	20	Shale, dark brown, very carbonaceous.
		Trace coal
10630-10640	40	Sandstone as above
	30	Siltstone as above, dark brown, shaley
	30	Shale, dark brown, coaly, very carbonaceous.
		Trace coal
10640-10650	10	Sandstone as above
	40	Siltstone, shaley, light to dark brown, carbonaceous
	50	Shale, dark brown, locally silty.
		Trace coal
10650-10660	10	Sandstone as above
	60	Siltstone, shaley, dark grey brown to brown, carbonaceous, firm to hard, massive to weakly laminated.
	30	Shale, silty, dark brown, carbonaceous.
		Trace coal
10660-10670	100	Coal.
		Trace shale, sandstone and siltstone
10670-10680	10	Sandstone, grey to cream, fine to coarse grained, dominantly fine to medium grained, tight, hard with silica and clay cement matrix. Very poor porosity and permeability.
	50	Siltstone as above
	30	Shale, silty, carbonaceous
		Trace coal
	10	Coal
10680-10690	20	Sandstone as above
	30	Siltstone, shaley
	50	Coal, black
10690-10700	100	Coal
		Trace sandstone, shale and siltstone
10700-10710	10	Sandstone
	30	Siltstone
	20	Shale
	40	Coal

..32/

DEPTHS	%	DESCRIPTION
10710-10720	10	Sandstone as above
	30	Siltstone as above
	30	Shale as above
	30	Coal as above
1 .0-10730	10	Sandstone as above
	30	Siltstone as above
	20	Shale as above
	40	Coal as above
10730-10740	20	Sandstone as above
	40	Siltstone as above
	40	Coal as above
10740-10750	60	Sandstone as above
	20	Siltstone as above
	20	Coal as above
10750-10760	80	Sandstone as above
	20	Silty shale as above
		Trace coal
10760-10770	90	Sandstone as above
	10	Silty shale as above
		Trace coal
10770-10780	30	Sandstone, white to cream, angular to rounded, moderately well sorted, fine to coarse grained, dominantly fine to medium grained, dolomitic in part, tight, hard, well indurated.
	40	Siltstone, light to dark brown, carbonaceous, clay matrix, dirty, firm, well compacted.
	30	Shale, dark brown grey, carbonaceous, micaceous
		Trace coal.
10780-10790	20	Sandstone as above
	40	Siltstone, shaley as above
	40	Shale, silty as above
		Trace coal
10790-10800	40	Sandstone as above
	30	Siltstone
	30	Shale as above
10800-10810	10	Sandstone as above
	40	Siltstone as above
	20	Shale as above
	30	Coal
10810-10820	10	Sandstone as above
	50	Siltstone, shaly as above
	30	Shale, silty, as above
	10	Coal
		P.O.H. wash out on heavy weight collars.
10820-10830		Sample in hole - predominantly coal and minor shale and sandstone
10830-10840		" " " " "
10840-10850	50	Sandstone, white to cream, fine to medium grained, firm to hard, angular to rounded, moderately well sorted, tight, clay choked. Pale blue to white fluorescence, medium cut - fluorescence over 10% of sand aggregates.
Oil Show	40	Coal
	10	Shale, dark brown, carbonaceous

..33/

DEPTHS	%	DESCRIPTION
10850-10860	70	Sandstone as above - 2% show fluorescence, weak cut
	30	Coal as above
		Trace shale, siltstone
10860-10870	100	Sandstone as above. No show.
		Trace coal, siltstone and shale
10870-10880	100	Sandstone. Show - possible very weak pale yellow fluorescence, ve weak cut.
		Trace shale, siltstone, coal
10880-10890	100	Sandstone, as above
		Trace shale, siltstone, coal
10890-10900	100	Sandstone as above
		Trace shale, siltstone and coal
10900-10910	90	Sandstone as above
	10	Coal, as above
		Trace shale and siltstone
10910-10920	30	Sandstone as above
	10	Siltstone as above
	10	Shaley coal
10920-10930	80	Sandstone as above
	10	Siltstone as above
	10	Coal
		Trace shale
10930-10940	70	Sandstone as above
	20	Siltstone as above
	10	Shale as above
		Trace coal
10940-10950	30	Sandstone as above
	30	Siltstone
	20	Shale, silty, as above
	20	Coal as above
10950-10960	30	Sandstone as above
	30	Siltstone as above
	20	Shale as above
	20	Coal as above
10960-10970	50	Sandstone as above. Trace pale blue-white patchy fluorescence and
	20	Siltstone as above weak cut.
	20	Shale as above
	10	Coal as above
10970-10980	50	Sandstone as above. Trace minor spotty fluorescence and very weak cut
	20	Siltstone, shaley
	20	Shale as above
	10	Coal as above
10980-10990	80	Sandstone as above
	10	Siltstone as above
	10	Shale as above
10990-11000	80	Sandstone as above
	10	Siltstone as above
	10	Shale as above
		T.D. 11003'

343072

APPENDIX 4

CORE DESCRIPTIONS

AND

SIDEWALL CORE DESCRIPTIONS

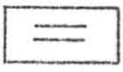
BY

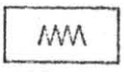
J.R. Black
D.M. Maughan
H.S. Stead
A.K. Svalbe

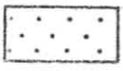
September-October, 1973

343073

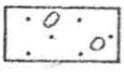
LEGEND OF CORE DESCRIPTION

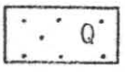

Shale


Silt

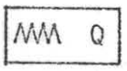

Sandstone


Coal

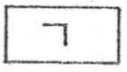

Conglomerate

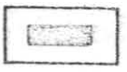


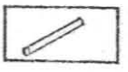
Sandy (Silica)

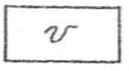


Silty (Silica)


Micaceous


Carbonaceous Matter


Plant Remains


Burrows

s Sharp Contact

g Gradational Contact

343074

ESSO STANDARD OIL (AUSTRALIA) LTD.

CORE DESCRIPTION

Core No. 1

WELL: NARIMBA-1

Interval Cored 9278-9307 ft., Cut 29 ft., Recovered 29 ft., (100 %) Fm. EASTERN VIEW

Bit Type CHRISTENSEN C-20, Bit Size 8 15/32 x 4 in., Desc. by J. BLACK Date 20/SEPT/1973

Depth & Coring Rate (min./ft.)	Graphic (1" = 5')	Shows	Interval (ft.)	Descriptive Lithology
9278			9278-86'	Siltstone tan/buff, very hard and indurated, abundant carbonaceous matter, finely micaceous horizontal fracture, indistinct bedding.
2 4 6				
			9286-90'6"	Shale dark brown, very silty, carbonaceous, finely micaceous, becoming more silty downward.
8				
			9290'6"-95'4"	Shale dark brown, very hard, indurated, massive, finely micaceous, silty in places.
			9295'4"-96'	Coal black, bright lustre, very lightweight, clean, conchoidal fracture.
			9296'-98'	Shale Dark grey to black, very carbonaceous very hard, indurated, platty fracture.

REMARKS: Core chip for Paleo (←) Core BbL. jammed

4" Full diameter sample for B.M.R. (←←)

NOTE: Due to error in pipe tally and based on correlation with GR/FDC/CNT Log, core should be adjusted upward $\pm$ 19' (Note Coal)

5 cm

343075

ESSO STANDARD OIL (AUSTRALIA) LTD.

CORE DESCRIPTION

Core No. 1

WELL: NARIMBA-1

Interval Cored 9278-9307 ft., Cut 29 ft., Recovered 29 ft., (100 %) Fm. EASTERN VIEW

Bit Type CHRISTENSEN C-20, Bit Size 8 15/32" x 4 in., Desc. by J. BLACK Date 20/SEPT/1973

Depth & Coring Rate (min./ft.)	Graphic (1" = 5')	Shows	Interval (ft.)	Descriptive Lithology
9298			9298-9303'	Siltstone light grey, very micaceous, sandy, distinct horizontal bedding, horizontal laminae, disturbed by burrowing, some current ripples.
9303-06'			9303-06'	Sandstone white medium to very coarse and pebbly very poorly sorted, angular to subrounded quartz with some lithics, consolidated, firm hard, non-calcareous, fair porosity and permeability.
9306-06'8"			9306-06'8"	Shale dark grey, finely micaceous, very silty carbonaceous with few horizontal coal laminae.
9307			9306'8"-07'	Sandstone tan white medium to coarse subangular to subrounded predominately quartz with few lithics, very friable, clean good porosity and permeability.

REMARKS: Core chip for Paleo (←—)

4" Full diameter sample for B.M.R. (←←—)

5 cm

343076

ESSO STANDARD OIL (AUSTRALIA) LTD.

CORE DESCRIPTION

Core No. 2

WELL: NARIMBA-1

Interval Cored 9542-9561 ft., Cut 19 ft., Recovered 19 ft., (100 %) Fm. EASTERN VIEW

Bit CHRISTENSEN C-20 Bit Size 8 15/32" x 4 in., Desc. by J. BLACK & D. MAUGHAN Date 21/SEPT/1973

Depth & Coring Rate (min./ft.)	Graphic (1" = 5')	Shows	Interval (ft.)	Descriptive Lithology
9542			9542-45'	Sandstone white fine to medium grained, well sorted, consolidated firm, horizontal fracture slightly micaceous, sugary texture Scour to fill at base. Fair to poor porosity and permeability.
12 24			9545-45'4"	Shale dark brown, very hard, micaceous carbonaceous.
			9545'4"-51'	Sandstone as above but with scattered coarse angular quartz grains near base. Scour and fill with elongated shale clasts near base.
			9551-55'6"	Shale and Siltstone finely interbedded with siltstone increasing toward the base. Shale is dark brown, silty, carbonaceous, finely micaceous, siltstone is light grey, very hard, indurated with some fine to medium grained sandstone, finely micaceous, shows irregular wavy bedding, some small cross-beds.
			9555'6"-61'	Siltstone light grey, very sandy, with very fine to fine grained subrounded quartz, hard, indurated tight scattered carbonaceous laminae, micaceous.
9561				

REMARKS: Core chip for Paleo (←)

4" Full diameter sample for B.M.R. (←←)

NOTE: Due to error in pipe tally core should be adjusted upward ± 19'.

5 cm

343077

ESSO STANDARD OIL (AUSTRALIA) LTD.

CORE DESCRIPTION

Core No. 3

WELL: NARIMBA-1

Interval Cored 9750-9756 ft., Cut 6 ft., Recovered 6 ft., (100 %) Fm. EASTERN VIEW

Bit CHRISTENSEN C-20, Bit Size 8 15/32 x 4 in., Desc. by J. BLACK Date 24 SEPT 1973

Depth & Coring Rate (min./ft.)	Graphic (1" = 5')	Shows	Interval (ft.)	Descriptive Lithology
9750			9750-9751'10"	Sandstone white fine to coarse, predominantly medium grained, subrounded to subangular quartz with some lithics, trace clay choking many irregular carbonaceous pieces and some shale pebbles, dull gold mineral fluorescence but non-calcareous, few thin streaks between shale partings have bright yellow fluorescence with good streaming yellow cut, light brown oil residue, most of sand is wet.
9756			9751'10"-56'	Shale dark grey and brownish grey, hard indurated, finely micaceous, carbonaceous with few thin fine grain sands and siltstone interbeds. Fine grained sands have bright yellow fluorescence and cut. Siltstone interbeds decrease downward and make up approximately 5% of total section. Some current ripples and small cross bedding.
			@ 9753'6"	1 inch of sandstone medium to coarse grained white subangular quartz with lithics and shale clasts, has spotty yellow fluorescence with good cut.

REMARKS:

Core BbL Jammed

Core Chip for Paleo (←)

4" full diameter sample for B.M.R. (←←)

5 cm

343078

CORE ANALYSIS REPORT

COMPANY: ESSO
WELL: NARIMBA NO.1
FIELD: BASS BASIN

COUNTY
STATE: TASMANIA
TYPE OF CORE: CHRIS. C-20 DIAMETER 4"

DEPTH	LITHOLOGY	PERM. md.	POROSITY %	SATURATIONS %PORE SPACE		% GAS BULK VOL.	REMARKS
				OIL	WATER		
9304	SAND	331	21·01	—	42·2	12·4	
9305	"	6	24·5	—	45·1	13·4	
9306	"	225	20·7	—	47·6	10·9	
9307	"	1·3	18·1	—	32·3	12·2	
9542	"	3·5	17·0	—	60·2	6·8	
9545	"	3·5	16·5	—	65·3	5·7	
9547	"	5·0	16·7	—	67·0	5·5	
9549	"	6·9	18·3	—	60·4	7·3	
9550	"	0·7	16·0	—	65·8	5·5	
9750	"	3·0	12·5	—	86·1	1·74	
97[illegible]-1/2	"	2·5	16·0	—	67·0	5·25	
(9751-1/2)							

SIDEWALL CORE DESCRIPTIONS

343079

NARIMBA-1

H.S. Stead
17.9.1973

	Depth (ft.)	Recovery (inches)	Description
1.	8785	5/8	Interlaminated Siltstone & Sandstone. Sandstone; light grey, quartzose, slightly calcic, siltstone to very fine grained, subangular, moderate sorting, friable, slightly carbonaceous, clay matrix, interlaminated with siltstone, laminations 2 mm or less in width; no fluorescence, no cut; fair porosity. Siltstone; shaley, micaceous, carbonaceous, slightly calcareous, medium to dark brown, firm, very fine disseminated plant material. No gas.
2.	8745	½	Siltstone; shaley, micaceous, carbonaceous, non calcareous, medium to dark grey, firm, with very thin sandstone laminations. No gas.
3.	8734	3/4	Interlaminated Sandstone and Coal Sandstone; light grey quartzose, slightly calcareous, silt to very fine grained, subangular, moderate sorting, friable, clay matrix, interlaminated with 1-2 mm coal and lignite laminae, sandstone contains traces of amber and a yellow staining on the quartz grains in spots, resulting in a very spotty strong blue fluorescence, very pale yellow cut. Coal; dark brown to black, lignitic to bituminous, dull to vitreous, traces of orange coloured amber with blue fluorescence. Gas: C_1 - 90, C_2 - 200, C_3 - 200, C_4 - 100, C_5 - 100
4.	8682	½	Siltstone; shaley, micaceous, pyritic, moderately calcareous, carbonaceous, medium grey, firm, with very fine plant material disseminated throughout. Gas: C_1 - 100
5.	8590	3/4	Interlaminated Siltstone and Shale Siltstone; quartzose, gypsum, micaceous, light grey, friable, very thin siltstone laminations with shale, no fluorescence. Shale; very silty, carbonaceous, moderately calcareous, medium grey, firm, no visible fossils. No gas.
6.	8474	5/8	Shale; very silty, very calcareous, carbonaceous, micaceous, medium to dark grey, firm, with siltstone micro-laminae, no visible fossils. No gas.
7.	8416	3/4	Sandstone; quartzose, fine to medium grained, subangular, moderate sorting, minor clay matrix, no fluorescence, no cut, good porosity. No gas.

..2/

343080

	Depth (ft.)	Recovery (inches)	Description
8.	8375	3/4	Shale; non calcareous, slightly carbonaceous, micaceous, medium grey, firm, with very fine carbonaceous micro-lamellae, no visible fossils. No gas.
9.	8335	3/4	Interlaminated Sandstone & Siltstone. Sandstone; quartzose, slightly calcareous, micaceous, light grey, very fine grained, subangular, well sorted, with very minor carbonaceous micro lamellae, no fluorescence, no cut, fair porosity. Siltstone; very shaley, slightly calcareous, slightly carbonaceous, micaceous, medium to dark grey, no show. No gas.
10.	8210	½	Interlaminated Siltstone and Shale. Siltstone; quartzose, dolomitic, light grey, friable, with minor carbonaceous micro-lamellae, no show. Shale; very silty, non calcareous, micaceous, carbonaceous, the carbonaceous material occurring as very fine micro-lamellae, dark grey, firm, no visible fossils. No gas.
11.	8120	1	Interlaminated Siltstone and Shale. Siltstone; quartzose, light grey, friable, no show. Shale; carbonaceous, moderately calcareous, micaceous, medium to dark grey, firm, no visible fossils. No gas.
12.	7960	3/4	Sandstone; quartzose, non calcareous, light grey, friable, fine to medium grained, angular to subangular, well sorted, open framework with very little matrix material, no fluorescence, no cut, very good porosity. Gas; C_1 - 100.
13.	7840	3/4	Siltstone; quartzose, non calcareous, micaceous, light to medium grey, friable, no shows. No gas.
14.	7716	1	Sandstone; very silty, non calcareous, light grey, friable, no shows. No gas.
15.	7616	3/4	Siltstone; very silty, non calcareous, micaceous, medium grey, firm, no shows. Gas; C_1 - 150.
16.	7434	5/8	Siltstone; very shaley, non calcareous, micaceous, slightly carbonaceous, medium to dark grey, firm, no shows.
17.	7415	½	Sandstone; dolomitic, quartzose, micaceous, trace of lithics, light grey, very fine to fine grained, angular to subangular, moderate sorting, clay matrix, no fluorescence, no cut, good porosity. No gas.
18.	7318	1	Siltstone; sandy, quartzose, dolomitic, micaceous, light grey, friable, no shows. No gas.

	Depth (ft.)	Recovery (inches)	Description
19.	7243	1¼	Interlaminated Siltstone and Shale Siltstone; very shaley, quartzose, non calcareous, light grey, firm, with trace of disseminated carbonaceous material, no shows. Shale; silty, non calcareous, carbonaceous, medium to dark grey, firm, no visible fossils. Gas; C_1 - 100 ppm.
20.	7105	1	Interlaminated Shale and Siltstone Shale; silty, non calcareous, carbonaceous, micaceous, dark grey, firm, no visible fossils. Siltstone; quartzose, non calcareous, light grey, friable, no shows. No gas.
21.	6800	1½	Shale; silty, slightly calcareous, micaceous, carbonaceous, firm, no visible fossils. Gas; C_1 - 200.
22.	6505	1½	Shale; non calcareous, carbonaceous, medium grey, firm, with coalified leaf and plant remains. No gas.
23.	6160	1	Siltstone; very shaley, micaceous, slightly non calcareous, carbonaceous, dark grey to brown, slightly friable, no visible fossils. Gas; C_1 - 150.
24.	5850	1½	Shale; moderately calcareous, micaceous, dark chocolate brown, slightly sticky, occasional forams. No gas.
25.	5500	2	Shale; moderately calcareous, micaceous, pyritic, black, firm, no visible fossils. Gas; C_1 - 1400; C_2 - 100
26.	5000	2	Shale; moderately calcareous, pyritic, micaceous, quartz; dark grey, firm, with forams infilled with pyrite. Gas; C_1 - 700; C_2 - 100.
27.	4500	1½	Shale; very calcareous, glauconitic, medium to dark grey, firm, occasional forams. Gas; C_1- 700 ppm.
28.	4000	2	Shale; very calcareous, pyritic, very dark grey, firm, occasional forams. Gas; C_1 - 50 ppm.
29.	3500	2	Marl; dark blue-grey, firm, very fossiliferous, bryozoa, forams, bivalve shell fragments. No gas.
30.	3000	2	Marl; medium blue-grey, firm, very fossiliferous, mainly bryozoa. Gas; C_1 - 250.

HSS/st

343082

PAGE 1 OF 3

ATT 30 REC 30

DATE 16 SEPTEMBER 1972

ESSO AUSTRALIA LTD.

SIDEWALL CORE DESCRIPTIONS

IES RUN NO 1 SWC RUN NO 1

WELL NARIMBA-1

GEOLOGIST H.S. STEAD

SERVICE CO SCHLUMBERGER

NO. 1a	DEPTH 1	REC 2	ROCK TYPE 3	MODIFIERS 4	CAL 5	COLOR 6	INDUR DEG 7	GRAIN SIZE 8	SRTG 9	RND 10	DISS CLAY 11	STAIN 12	FLOURESCENCE % RK	FLOURESCENCE DISTR 14	FLOURESCENCE INTEN 15	FLOURESCENCE COLOR 16	CUT FLUOR. INTEN 17	CUT FLUOR. COLOR 18	CUT RESIDUE QUAN 19	CUT RESIDUE COLOR 20	SHOW 21	PROB PROD 22	REMARKS - GAS 23
1	8785	5/8	Shale	V.f.ss.lam.	Sl	Dk.Gy	Firm	Clay	-	-	-	-	-	-	-	-	-	-	-	-	N.S.	N	-
2	8745	½	Shale	Qtz,Carb, Mica.	-	M-dk. Gy.	Firm	Clay-Silt	-	-	-	-	-	-	-	-	-	-	-	-	N.S.	N	-
3	8734	3/4	Ss. Coal	Qtz. Carb.	Sl	Lt.Sh. Blk.	Fria.	V.f-f.	M	A	-	- Fluor.	- in	V.Spotty in coal. coal,	Bright not in	Blue-White sand	V.W.	Pale Yello			Yes	N	C_1 900, C_2 200, 200, C_4 100, C_5
4	8682	½	Shale	Qtz.	Mod	Med. Grey	Firm	Silt-Clay	-	-	-	-	-	-	-	-	-	-	-	-	N.S.	N	C_1 100
5	8590	3/4	Shale	Qtz, mica	Mod	Dk. Grey	Firm	Silt-Clay	-	-	-	-	-	-	-	-	-	-	-	-	N.S.	N	-
6	8474	5/8	Shale	Qtz,Carb. Mica.	V.	Dk. Brn	Firm	Silt-Clay	-	-	-	-	-	-	-	-	-	-	-	-	N.S.	N	-
7	8416	3/4	Ss.		-	Lt.Gy	Fria.	F-m.	G	R	-	-	-	-	-	-	-	-	-	-	N.S.		-
8	8375	3/4	Shale	Carb.Mica.	-	Med. Grey	Firm	Silt-Clay	-	-	-	-	-	-	-	-	-	-	-	-	N.S.	N	-
9	8335	3/4	Shale Ss.	Carb.Mica. Qtz.	Mod.	Med. Brn	Firm	Clay-V.f.	-	-	-	-	-	-	-	-	-	-	-	-	N.S.	N	-
10	8210	½	Silts.	Shale-Carb. Mica.	Dol	Lt. Grey	Fria.	Silt-F.	D	-	-	-	-	-	-	-	-	-	-	-	N.S.	N	-
11	8120	1	Shale	Ss. Lam. Carb.	Mod	Med. Brn	Firm	Clay-V.f.	-	-	-	-	-	-	-	-	-	-	-	-	N.S.	N	-

FORM R 257 3/72

ESSO AUSTRALIA LTD.
SIDEWALL CORE DESCRIPTIONS

WELL NARIMBA-1 GEOLOGIST H.S. STEAD SERVICE CO. SCHLUMBERGER
IES RUN NO 1 SWC RUN NO 1 DATE 16 SEPTEMBER 1973
ATT 30 REC 30 PAGE 2 OF 3

NO. 1a	DEPTH 1	REC 2	ROCK TYPE 3	MODIFIERS 4	CAL 5	COLOR 6	INDUR DEG 7	GRAIN SIZE 8	SRTG 9	RND 10	DISS CLAY 11	STAIN 12	FLOURESCENCE % RK	FLOURESCENCE DISTR 14	FLOURESCENCE INTEN 15	FLOURESCENCE COLOR 16	CUT FLUOR. INTEN 17	CUT FLUOR. COLOR 18	CUT RESIDUE QUAN 19	CUT RESIDUE COLOR 20	SHOW 21	PROB PROD 22	REMARKS - GAS 23
12	7960	3/4	Ss.	Tr.of liths.	-	Lt.Gry	Fria.	F-c.	G	R	-	-	-	-	-	-	-	-	-	-	N.S.	N	C_1 100
13	7840	3/4	Shale	Silty	-	Med. Gry	Fria.	Clay-Silt	-	-	-	-	-	-	-	-	-	-	-	-	N.S.	N	-
14	7716	1	Ss.	Tr.of liths.	-	Lt.Gry	Fria.	F-c.	G	R	-	-	-	-	-	-	-	-	-	-	N.S.	N	
15	7616	3/4	Shale	Carb. Mica.	-	Dk.Brn	Firm	Clay-Silt	-	-	-	-	-	-	-	-	-	-	-	-	N.S.	N	C_1 150
16	7434	5/8	Shale	Silty,Carb, Qtz.	-	Med. Brn	Firm	Clay-Silt	-	-	-	-	-	-	-	-	-	-	-	-	N.S.	N	C_1 50
17	7415	½	Ss.	Tr. lithics	Dol	Lt.Gry	Fria.	V.f.-M.	Mod	A-R	-	-	-	-	-	-	-	-	-	-	N.S.	N	-
18	7318	1	Silt.	-	Dol	Lt.Gry	Fria.	Silt-V.f.	-	-	-	-	-	-	-	-	-	-	-	-	N.S.	N	-
19	7243	1¼	Shale	Silty,Carb, Mica,Qtz	-	Med. Gry	Fria.	Clay-Silt	-	-	-	-	-	-	-	-	-	-	-	-	N.S.	N	C_1 100
20	7105	1	Shale	Silty,Carb, Mica, Qtz	-	Dk. Brn	Firm	-	-	-	-	-	-	-	-	-	-	-	-	-	N.S.	N	-
21	6800	1½	Shale	Carb.	Sl.	Dk. Brn	Firm	Clay-Silt	-	-	-	-	-	-	-	-	-	-	-	-	N.S.	N	C_1 200
22	6505	1½	Shale	Carb.	-	Med. Gry	Firm	Clay-Silt	-	-	-	-	-	-	-	-	-	-	-	-	N.S.	N	-
23	6160	1	Silt	Carb,Mica	-	Med. Brn	Firm	Clay-Silt	-	-	-	-	-	-	-	-	-	-	-	-	N.S.	N	C_1 150

FORM R 257 3/72

343083

PAGE 3 OF 3

ATT 30 REC 30

DATE 16 SEPTEMBER 1973

ESSO AUSTRALIA LTD.

SIDEWALL CORE DESCRIPTIONS

IES RUN NO 1 SWC RUN NO 1

WELL NARIMBA-1

GEOLOGIST H.S. STEAD

SERVICE CO SCHLUMBERGER

NO. 1a	DEPTH 1	REC 2	ROCK TYPE 3	MODIFIERS 4	CAL 5	COLOR 6	INDUR DEG 7	GRAIN SIZE 8	SRTG 9	RND 10	DISS CLAY 11	STAIN 12	FLOURESCENCE % RK	FLOURESCENCE DISTR 14	FLOURESCENCE INTEN 15	FLOURESCENCE COLOR 16	CUT FLUOR. INTEN 17	CUT FLUOR. COLOR 18	CUT RESIDUE QUAN 19	CUT RESIDUE COLOR 20	SHOW 21	PROB PROD 22	REMARKS - GAS 23
24	5850	1½	Shale	Carb, Qtz	Mod	V.Dk Brn	Firm	Clay-Silt	-	-	-	-	-	-	-	-	-	-	-	-	N.S.	N	-
25	5500	2	Shale	Carb, Qtz, Pyrite	Mod	V.Dk Brn	Hard	Clay-Silt	-	-	-	-	-	-	-	-	-	-	-	-	N.S.	N	C_1 1400; C_2 100
26	5000	2	Shale	Carb, Mica	Mod	Dk. Brn	Firm	Clay-Silt	-	-	-	-	-	-	-	-	-	-	-	-	N.S.	N	C_1 400; C_2 100
27	4500	1½	Shale	-	V	Med. Gry	Firm	Clay	-	-	-	-	-	-	-	-	-	-	-	-	N.S.	N	C_1 700
28	4000	2	Shale	Foss.	V	Dk. Gry	Firm	Clay	-	-	-	-	-	-	-	-	-	-	-	-	N.S.	N	C_1 50
29	3500	2	Marl	Foss.	V	Med. Gry	Firm	Clay	-	-	-	-	-	-	-	-	-	-	-	-	N.S.	N	-
30	3000	2	Marl	Foss.	V	Med. Gry	Firm	Clay	-	-	-	-	-	-	-	-	-	-	-	-	N.S.	N	C_1 250

FORM R 257 3/72

343084

SIDEWALL CORE DESCRIPTIONS

NARIMBA 1

LOGGING RUN #5 GUNS 1 AND 2

1.	10,978	Sandstone, grey, fine to medium grained, well compacted, firm, abundant clay cement. Tight, poor porosity and permeability. Interlaminated shaley partings. No show.
2.	10,974	NO RECOVERY.
3.	10,970	Sandstone with interlaminated silty shale partings. Sandstone, fine to medium grained, firm, to hard, local dolomitic ? cement.
4.	10,920	Siltstone, shaley, grey to dark grey, dolomitic in part, very hard to firm, weakly laminated, even parallel bedding, carbonaceous debris along bedding planes.
5.	10,894	Sandstone, grey to dark grey, fine to medium grained, laminated with shaley siltstone interbeds. Firm to hard, well compacted, clay matrix. Even parallel bedding. No shows. Carbonaceous debris in shaley siltstone laminae.
6.	10,874	Sandstone, grey to dark grey, fine to medium grained, silty with silty clay matrix, moderate to poor sorting, massive to weakly developed bedding, well compacted, firm to hard. Weak patchy yellow fluorescence in upper 1/3 segment of core - with weak pale yellow cut. Lower 2/3 of core face water wet - no fluorescence. Possible residual oil.
7.	10,860	Siltstone, dark grey, brown, very shaley, firm to hard, well compacted, massive to weakly developed bedding, carbonaceous flecks and debris. No show.
8.	10,848	NO RECOVERY - lost barrel.
9.	10,844	Siltstone, dark grey to grey, very shaley, firm to hard, massive to weakly developed even parallel bedding. Carbonaceous, micaceous. No shows.
10.	10,798	Siltstone, dark grey brown, very shaley, firm to hard, well compacted, massive to weakly developed bedding. Carbonaceous, micaceous. No show.
11.	10,770	Shale, dark grey brown, weakly silty, firm to hard, well compacted, carbonaceous and micaceous. Poorly developed bedding.
12.	10,704	Shale, dark grey brown, very silty, firm to hard, well compacted, carbonaceous, micaceous, massive to weakly developed bedding.
13.	10,640	Siltstone, dark grey, massive, shaley, firm to hard, well compacted. No show. Carbonaceous and micaceous
14.	10,606	Sandstone, grey, very fine to medium grained, firm to hard, moderate to poor sorting, subangular to subrounded, silty clay matrix, carbonaceous, silty interlaminations. No show.
15.	10,556	Siltstone, dark grey brown, firm to hard, poor sorting, very shaley with carbon debris. Massive.
16.	10,460	NO RECOVERY
17.	10,396	Sandstone, grey, fine to coarse grained, dominantly fine to medium grained, angular to subrounded, poorly sorted, massive, clay choked. Firm to hard, well consolidated, tight. No show.

18.	10,360	Sandstone, grey, fine to very fine grained, silty, massive, firm, clay choked, trace carbonaceous flecks. No show. Poor porosity and permeability.
19.	10,348	Sandstone, grey, fine to medium grained, trace silt sized quartz associated with clay matrix. Firm to friable, moderately well sorted, subangular to subrounded, massive. Frequent dark grey to black lithics of smoky quartz and heavy ? minerals. Poor porosity and permeability. Tight.
20.	10,337	Sandstone, grey to light tan, weakly shaley and abundant clay matrix. Firm to soft, fine to medium grained, subangular to subrounded, moderately well sorted, clay choked, tight. Poor porosity and permeability. Well compacted.
21.	10,294	Shale, grey to brown, massive to weakly laminated, weakly silty, trace carbonaceous flecks and mica. Firm to hard, well compacted.
22.	10,248	Sandstone, grey to light tan, fine to medium grained, firm to soft, moderately well sorted, subangular to subrounded, massive, abundant clay matrix, tight. No show.
23.	10,200	Siltstone, shaley, dark grey to grey, firm to soft, massive, moderately well sorted, abundant clay matrix, tight, poor porosity and permeability. No show.
24.	10,130	Sandstone, grey, fine to very fine grained, soft to firm, silty, massive, moderately well sorted, abundant clay matrix. Tight, poor porosity and permeability, no show.
25.	10,084	Siltstone, dark grey brown, argillaceous, firm, massive, carbonaceous, micaceous, tight. No show.
26.	10,048	Sandstone, silty, grey, fine to coarse grained, dominantly fine to medium grained, firm to soft, massive, well compacted, clay with associated silt matrix, poor sorting. Tight. Patchy yellow to white fluorescence, weak yellow to white cut. Residual oil.
27.	10,038	Siltstone, dark grey brown, very argillaceous, firm to hard, well compacted, massive. Carbonaceous, micaceous, no show.
28.	10,000	Siltstone, dark grey brown, very argillaceous, firm to hard, well compacted, massive, carbonaceous, micaceous, tight.
29.	9,950	Shale, grey to brown, massive to weakly bedded, weakly silty, firm to hard, well compacted. Trace carbonaceous flecks. Micromicaceous.
30.	9,914	Shale, dark grey brown, silty, firm to hard, even parallel micro bedding. Weakly carbonaceous, micaceous.

GUN #2

1.	10,848	NO RECOVERY
2.	9,900	Shale, dark grey brown, firm to hard, massive, silty, weakly carbonaceous.
3.	9,886	NO RECOVERY.
4.	9,850	Sandstone, light grey, fine to coarse grained, dominantly medium to coarse grained, subangular to subrounded, moderate to poor sorting, silty clay matrix. Massive, no apparent bedding. Poor porosity and permeability. No show.

..3/

5.	9,784	Sandstone, white to light grey with shaley carbonaceous laminations and partings. Sandstone fine to very fine grained, angular to rounded, moderately well sorted, clay choked, quartzose. Poor porosity and permeability. Tight. No show. Shaley carbonaceous partings indicate weakly developed cross-bedding.
6.	9,680	Shale, grey brown, massive to weakly bedded, very weakly silty, firm to hard, well compacted.
7.	9,650	Shale, grey brown, with interlaminated siltstone lense. Firm to hard, well compacted, micromicaceous. Massive to weakly bedded. Shale section shows no bedding.
8.	9,620	Shale, grey brown to grey, with silty interlaminations, firm, well compacted and consolidated, weakly carbonaceous and micaceous. Even parallel bedding depicted by silty micro laminations.
9.	9,558	Siltstone, grey brown with associated very fine grained sandstone, shaley, massive to weakly bedded (even parallel) carbonaceous flecks and partings. Tight, well compacted.
10.	9,470	Sandstone, laminated, silty, white to grey, fine to very fine grained, firm to hard, well compacted, quartzose, with even, parallel, shaley laminations. Matrix clay. Tight. No show. Poor porosity and permeability.
11.	9,420	Siltstone, dark grey brown, argillaceous, hard to very hard, dolomitic, massive, with abundant associated clay matrix.
12.	9,360	Sandstone, grey to grey brown with shaley partings. Firm to hard, sand with associated silty clay matrix. Shaley partings with carbonaceous debris.
13.	9,246	Shale, grey brown, massive, firm, weakly silty, no apparent bedding. Trace microcrystaline pyrite, weakly micaceous.
14.	9,190	Interlaminated siltstone, silty mudstone and shaley siltstone, grey to brown grey, firm to soft, moderately well compacted, even parallel bedding. Trace carbonaceous flecks and filaments.
15.	9,170	Siltstone. Very argillaceous, grey brown, firm to moderately hard, well consolidated. Micro-micaceous.
16.	9,160	Shale, grey brown, massive to very weakly bedded, firm to hard, weakly silty, trace carbonaceous flecks and mica.
17.	9,120	Shale, dark brown grey, laminated, silty, carbonaceous and micro-micaceous. Even parallel bedding defined by silty laminations.
18.	9,110	Shale, very silty, dark brown grey, massive to very poorly developed bedding, micro-micaceous and carbonaceous.
19.	9,100	Interlaminated grey siltstone and dark grey brown argillaceous siltstone. Firm to soft, well consolidated, even parallel bedding. Weakly carbonaceous.
20.	9,080	Interlaminated grey siltstone and dark grey brown argillaceous siltstone as above.

..4/

21.	9,070	Interlaminated siltstone and argillaceous siltstone as above.
22.	9,060	Shale, dark brown, massive, weakly silty, firm to hard, well compacted, strongly carbonaceous with coaly filaments and flecks.
23.	9,028	NO RECOVERY
24.	9,020	Shale, massive, grey brown, pyritic with scattered pyrite nodules (aggregates of microcrystals). Minor carbonaceous debris. Minor siltstone.
25.	8,930	Shale, weakly silty, brown to grey brown, evenly parallel bedded, firm to hard, well compacted, weakly developed minor silty interlaminations. Minor carbonaceous debris along bedding.
26.	8,920	Shale, very silty, grey brown, evenly laminated with silty shale interlaminations. Carbonaceous flecks and debris in shaley partings.
27.	8,910	Sandstone, silty, grey to dark grey, with carbonaceous shaley laminations, sandstone fine to very fine grained, subangular to subrounded, moderately sorted. Even parallel bedding shown by carbonaceous shaley laminations. No shows.
28.	8,880	Sandstone, grey, medium to coarse grained, dominantly medium grained with abundant silt associated with clay matrix, firm to friable, quartzose, massive, angular to subrounded, moderate to poor sorting, moderate to poor porosity, poor permeability, no fluorescence or cut.
29.	8,860	Shale with interlaminated grey brown very argillaceous siltstone. Shale dark brown to brown, carbonaceous, micro-micaceous. Even parallel bedding.
30.	8,850	Shale with grey brown argillaceous siltstone interlaminations. As above.

A.K. Svalbe
October 1973

PAGE 1 OF 4

ATT 60 REC 54

DATE 2.10.73

SWC RUN NO 2

IES RUN NO 5

ESSO AUSTRALIA LTD.

SIDEWALL CORE DESCRIPTIONS

WELL NARIMBA 1

GEOLOGIST A.K. SVALBE

SERVICE CO SCHLUMBERGER

NO. 1a	DEPTH 1	REC 2	ROCK TYPE 3	MODIFIERS 4	CAL 5	COLOR 6	INDUR DEG 7	GRAIN SIZE 8	SRTG 9	RND 10	DISS CLAY 11	STAIN 12	FLOURESCENCE % RK	FLOURESCENCE DISTR 14	FLOURESCENCE INTEN 15	FLOURESCENCE COLOR 16	CUT FLUOR. INTEN 17	CUT FLUOR. COLOR 18	CUT RESIDUE QUAN 19	CUT RESIDUE COLOR 20	SHOW 21	PROB PROD 22	REMARKS - GAS 23
1	10978	3/8	Sst	Qte,clay choked	V. wk	Wh.	Hd	F-mg	Mod	Sa/ Sr	Ab.	No	-	-	-	-	-	-	-	-	-	-	Water wet
2	10974	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
3	10970	½	Sst	Interlam.& Shly Silt.	Wk.	Wh-GyBr	Hd	F-mg	Mod	Sa/ Sr	Ab.	No	1	Min.	-	-	-	-	-	-	-	-	Water wet
4	10920	¼	Sst	Shly, Dol.	Mod	Gy-DkGy	V.Hd	F-mg	Mod	Sa/ Sr	Ab.	No	-	-	-	-	-	-	-	-	-	-	"
5	10894	¼	Sst	Lam.,Shly	Mod	Gy-DkGy	Hd	F-mg	Mod	Sa/ Sr	Ab.	No	-	-	-	-	-	-	-	-	-	-	
6	10874	½	Sst	Qte,Clay choked	Wk	Wh-gy	Hd	F-mg	Mod	Sa/ Sr	Ab.	No	15	Patchy	Dull	Dk.yel	Wk	Wh	Wk	Pale Yell.	Oil	Water	Residual oil,wat wet,carb'n,V.sha siltst.
7	10860	3/8	Silts.	V.shaley	-	DkGy Brn	Firm	Silt.	Mod	-	Ab.	-	-	-	-	-	-	-	-	-	-	-	
8	10848	0	LOST BARREL																				
9	10844	¼	Silts	V.shaley	-	DkGy Brn	Firm	Silt	Mod.	-	-	-	-	-	-	-	-	-	-	-	-	-	Carb'n V.shaley, siltst.
10	10798	¼	Silts	Shaley,Vfg, qte	-	Gy	Firm	Fg-Silty	Mod	Sa/ Sr	-	-	-	-	-	-	-	-	-	-	-	-	Water wet
11	10770	½	Shale	Silty,Carb'n	-	GyBrn	Firm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
12	10704	¼	Shale	V.silty	-	GyBrn	Firm-Hd	Silty	Mod	-	-	-	-	-	-	-	-	-	-	-	-	-	
13	10640	¼	Silts	V.shaley	Dol?	DkGy	Firm-Hd	Silty	Poor	-	Ab.	-	-	-	-	-	-	-	-	-	-	-	
14	10606	½	Sst	Silty,Carb'n	-	Gy	Firm	Vf-mg	Mod	-	-	-	-	-	-	-	-	-	-	-	-	-	
15	10556	¼	Silts	V.shaley	-	DkGy Brn	Firm	Silt.	Poor	-	Ab.	-	-	-	-	-	-	-	-	-	-	-	
16	10460	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
17	10396	½	Sst	Silty	-	Gy	Firm	F-cg	Poor	A/ Sr	Mod	-	-	-	-	-	-	-	-	-	-	-	

FORM R 257 3/72

343089

PAGE 2 OF 4

ATT 60 REC 54

DATE 2.10.73

ESSO AUSTRALIA LTD.

SIDEWALL CORE DESCRIPTIONS

IES RUN NO 5 SWC RUN NO 2

WELL NARIMBA-1

GEOLOGIST A.K. SVALBE

SERVICE CO SCHLUMBERGER

NO. 1a	DEPTH 1	REC 2	ROCK TYPE 3	MODIFIERS 4	CAL 5	COLOR 6	INDUR DEG 7	GRAIN SIZE 8	SRTG 9	RND 10	DISS CLAY 11	STAIN 12	FLOURESCENCE % RK	FLOURESCENCE DISTR 14	FLOURESCENCE INTEN 15	FLOURESCENCE COLOR 16	CUT FLUOR. INTEN 17	CUT FLUOR. COLOR 18	CUT RESIDUE QUAN 19	CUT RESIDUE COLOR 20	SHOW 21	PROB PROD 22	REMARKS - GAS 23
18	10360	½	Sst	Silty	-	Gy	Firm	Vf-fg	Mod	Sa/Sr	Mod	-	-	-	-	-	-	-	-	-	-	-	
19	10348	½	Sst	Qte,Tr.lith.	-	Gy	Firm	F-mg	Mod	Sa/Sr	Mod	-	-	-	-	-	-	-	-	-	-	-	
20	10337	½	Sst	Qte,Shaley	-	DkGy	Firm	F-mg	Mod	Sa/Sr	Mod	-	-	-	-	-	-	-	-	-	-	-	
21	10294	3/8	Sh.	Silty,wkly carb.	-	GyBrn	Firm	-	-	-	Sh	-	-	-	-	-	-	-	-	-	-	-	
22	10248	¼	Sst	Silty	-	GyTan	Firm	F-mg	Mod.	Sa/Sr	Mod	-	-	-	-	-	-	-	-	-	-	-	
23	10200	½	Silts	Shaley	-	Gy	Firm	Silt.	Mod	-	Ab.	-	-	-	-	-	-	-	-	-	-	-	
24	10130	½	Silty		-	Gy	Firm	Vfg-fg	Mod	Sa/Sr	Ab.	-	-	-	-	-	-	-	-	-	-	-	
25	10084	¼	Silts	Argillaceous	-	DkGy Brn	Firm	Silt.	Mod.	-	Ab.	-	-	-	-	-	-	-	-	-	-	-	
26	10048	½	Sst	Silty	-	Gy	Firm	F-cg	Poor	Sa/Sr	Mod.	No	5	Patchy	Dull	Yellow	Wk	Pale Yell	Poor	Lt.yel	Oil	Water	Residual oil?
27	10038	¼	Silts	V.argill.	-	DkGy	Firm-Hd	Silt.	Mod.	-	Ab.	-	-	-	-	-	-	-	-	-	-	-	
28	10000		Silts	V.argill.	-	DkGy	Firm-Hd	Silt.	Mod.	-	Ab.	-	-	-	-	-	-	-	-	-	-	-	
29	9950	½	Sh.	Silty	-	GyBrn	Firm	-	-	-	Sh.	-	-	-	-	-	-	-	-	-	-	-	
30	9914	¼	Sh.	Silty	-	GyBrn	Firm	-	-	-	Sh.	-	-	-	-	-	-	-	-	-	-	-	
GUN #2																							
1	10848	0	NO RECOVERY																				
2	9900	¼	Sh.	Wkly Silty	-	DkGy	Firm	-	-	-	Sh.	-	-	-	-	-	-	-	-	-	-	-	
3	9886	0	NO RECOVERY																				

FORM R 257 3/72

343090

ESSO AUSTRALIA LTD.
SIDEWALL CORE DESCRIPTIONS

WELL NARIMBA-1 PAGE 3 OF 4
GEOLOGIST A.K. SVALBE ATT 60 REC 54
SERVICE CO SCHLUMBERGER DATE 2.10.73
IES RUN NO 5 SWC RUN NO 2

NO. 1a	DEPTH 1	REC 2	ROCK TYPE 3	MODIFIERS 4	CAL 5	COLOR 6	INDUR DEG 7	GRAIN SIZE 8	SRTG 9	RND 10	DISS CLAY 11	STAIN 12	FLOURESCENCE % RK	FLOURESCENCE DISTR 14	FLOURESCENCE INTEN 15	FLOURESCENCE COLOR 16	CUT FLUOR. INTEN 17	CUT FLUOR. COLOR 18	CUT RESIDUE QUAN 19	CUT RESIDUE COLOR 20	SHOW 21	PROB PROD 22	REMARKS - GAS 23
4	9850	½	Sst	Qte	-	Gy	Firm	F-cg	Poor	Sa/Sr	Min	-	-	-	-	-	-	-	-	-	-	-	
5	9784	⅓	Sst	Shaley;Clay choked	-	Wh-Gy	Firm	Vf-fg	Mod	Sa/Sr	Ab.	-	No	-	-	-	-	-	-	-	-	-	
6	9680	¼	Sh.	Wkly Silty	-	GyBrn	Firm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
7	9650	3/8	Sh.	Laminated	-	GyBrn	Firm	Silty	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
8	9620	½	Sh.	Lam. Silty	-	GyBrn	Firm	Silty	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
9	9558	¼	Silts	Shaley	-	GyBrn	Firm	Silty	-	Sa/Sr	Ab.	-	-	-	-	-	-	-	-	-	-	-	
10	9470	¼	Sst	Laminated	-	Wh-Gy	Firm	F-vfg	Mod	Sa/Sr	Ab.	-	No	-	-	-	-	-	-	-	-	-	
11	9420	¼	Silts	Argill.	-	GyBrn	Hd	Silty	Mod	Sa/Sr	Ab.	-	-	-	-	-	-	-	-	-	-	-	
12	9360	¼	Sst	Laminated	-	Wh-Gy	Firm	F-vfg	Mod	Sa/Sr	Ab.	-	-	-	-	-	-	-	-	-	-	-	
13	9246	½	Sh.	Silty	-	GyBrn	Firm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
14	9190	¼	Silts	Interlam.	-	Gy-Gy Brn	Firm	Silty	-	-	Ab.	-	-	-	-	-	-	-	-	-	-	-	
15	9170	⅓	Silts	Silty	-	GyBrn	Firm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
16	9160	3/4	Sh.	Massive	-	GyBrn	Firm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
17	9120	½	Sh.	Silty,lam.	-	GyBrn	Firm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
18	9110	½	Sh.	Silty,mass.	-	GyBrn	Firm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
19	9100	½	Silts	Argill, interlam.	-	GyBrn	Firm	Silty	Mod	Sa/Sr	Ab.	-	-	-	-	-	-	-	-	-	-	-	
20	9080	½	Silts	Argill, interlam.	-	GyBrn	Firm	Silty	Mod	Sa/Sr	Ab.	-	-	-	-	-	-	-	-	-	-	-	
21	9070	½	Silts	Argill, interlam.	-	GyBrn	Firm	Silty	Mod	Sa/Sr	Ab.	-	-	-	-	-	-	-	-	-	-	-	
22	9060	½	Sh.	Mass,Silty	-	Brn	Firm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

FORM R 257 3/72

343091

ESSO AUSTRALIA LTD.
SIDEWALL CORE DESCRIPTIONS

WELL NARIMBA-1 PAGE 4 OF 4
GEOLOGIST A.K. SVALBE ATT 60 REC 54
SERVICE CO SCHLUMBERGER DATE 2.10.73
IES RUN NO 2 SWC RUN NO 5

NO. 1a	DEPTH 1	REC 2	ROCK TYPE 3	MODIFIERS 4	CAL 5	COLOR 6	INDUR DEG 7	GRAIN SIZE 8	SRTG 9	RND 10	DISS CLAY 11	STAIN 12	FLOURESCENCE % RK	FLOURESCENCE DISTR 14	FLOURESCENCE INTEN 15	FLOURESCENCE COLOR 16	CUT FLUOR. INTEN 17	CUT FLUOR. COLOR 18	CUT RESIDUE QUAN 19	CUT RESIDUE COLOR 20	SHOW 21	PROB PROD 22	REMARKS - GAS 23
23	9028	0																					
24	9020	½	Sh.	Mass,pyr.	-	Brn	Firm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
25	8930	½	Sh.	Silty,Carbn	-	GyBrn	Firm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
26	8920	¼	Sh.	V.silty, Carbn	-	GyBrn	Firm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
27	8910	½	Sst	Carbn, Shaley	-	Gy-Wh	Firm	F-vfg	Mod	Sa/ Sr	Mod	-	-	-	-	-	-	-	-	-	-	-	
28	8880	½	Sst	Qte,massive	-	Gy-Wh	Firm	M-cg	Mod	A/ Sr	Mod	-	-	-	-	-	-	-	-	-	-	-	
29	8860	½	Sh.	Silt.inter-laminated	-	Gy-Gy Brn	Firm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
30	8850	¼	Sh.	Silt.inter-laminated	-	GyBrn	Firm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

FORM R 257 3/72

343092

343093

APPENDIX 5

LIST AND INTERPRETATION OF

LOGS & SURVEYS

October, 1973

The following logs and wireline services were performed by Schlumberger in Narimba-1.

(1)	GR/CNL/FDC/Cal	(Gamma ray, compensated neutron, compensated formation density and caliper tool). 2" and 5" scale-interval 10992-5700'; GR to 285'.
(2)	ISF/SLK	(Spherically focused induction - sonic combination tool) 2" and 5" scale-interval 10986-2770'.
(3)	HDT	(Four arm high resolution continuous dipmeter tool). 10" scale-interval 10989-5700'.
(4)	Velocity survey	32 shots (air gun) over the interval 8771-2830'. (See time-depth curve, Enclosure 7).
(5)	CST	(Shot 90 sidewall cores and recovered 84 over the interval 10978-3000'.

Well log analyses of the most likely reservoir sandstones indicate that all intervals are non-hydrocarbon bearing and therefore, are interpreted to be formation water productive.

343095

APPENDIX 6

FORMATION INTERVAL TESTS (FIT'S)

AND

AMERADA PRESSURE DATA

October, 1973

343096

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

ESSO AUSTRALIA LIMITED NARIMBA NARIMBA No. 1,
August 22, 1973

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

Tools used: Kuster 10,300 psi Element Serial No. 9403 12 hour clock
Kuster 10,250 psi Element Serial No. 8757 12 hour clock

F. I. T. No. 1 @ 9440'

HOURS	PSIG 10,250	PSIG 10,300	REMARKS
	4899	4910	Initial hydrostatic
1853			Set tool @ 9440'
1855	4121	4220	Open tool
1856			Open segregator
1857	4021	4209	
1858	4031	4215	
1859	4031	4215	
1900	4031	4215	
1901			Seal chamber
1902	4052	4225	
1904	4052	4225	
1905			Unseat packer
	4694	4884	Final hydrostatic

Note: Hole in bellows of 10,250 psi element, serial No. 8757

343097

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

ESSO AUSTRALIA LIMITED NARIMBA NARIMBA No. 1
August 25, 1973

PURPOSE: Obtain subsurface pressures with Amerada Gauges run in tandem with Schlumberger Formation Interval Tester.

TOOLS USED: Kuster 10,300 psi Element Serial No. 9403 12 hour clock
Kuster 8.500 psi Element Serial No. 9391 12 hour clock

F. I. T. No. 2 @ 9842'

HOURS	PSIG 8,500	PSIG 10,300	REMARKS
	5597	5610	Initial hydrostatic
0351			Set tool @ 9842'
0352			Open tool
0354	0	20	
0356	0	20	
0359	0	20	Seal chamber; open segregator
0402	0	10	
0405	0	10	
0407			Fire shape charge
0408	4394	4413	
0410	4402	4418	
0412	4402	4418	
0413			Seal segregator
0414	4453	4429	
0416	4453	4429	
0417			Unseat tool
0419			Pull out of hole
	5614	5599	Final hydrostatic

343098

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

ESSO AUSTRALIA LIMITED NARIMBA NARIMBA No. 1
AUGUST 25, 1973

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

TOOLS USED: KUSTER 10,300 PSI ELEMENT SERIAL No. 9403 12 HOUR CLOCK
KUSTER 8,500 PSI ELEMENT SERIAL No. 9391 12 HOUR CLOCK

F. I. T. No. 3 @ 9578'

HOURS	PSIG 8,500	PSIG 10,300	REMARKS
	5451	5457	INITIAL HYDROSTATIC
0718			SET TOOL @ 9578'
0720			OPEN TOOL - MAIN CHAMBER
0722	--	10	
0724	--	10	
0725			FIRE SHAPE CHARGE
0726	--	51	
0727	--	25	
0728			SEAL MAIN CHAMBER
0729	29	30	
0730	37	35	
0731	50	51	
0732	117	66	
0733	281	164	
0734	2635	458	
0735	4056	3412	
0736	4146	4178	
0737	4201	4215	
0738	4214	4230	
0739	4223	4241	
0740	4227	4241	
0741			SEAL SEGREGATOR
0742	4286	4267	
0744	4282	4267	
0748	4282	4267	
0750	4282	4267	
0751			UNSEAT TOOL - PULL OUT OF HOLE
	5455	5446	FINAL HYDROSTATIC

343099

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

ESSO AUSTRALIA LIMITED NARIMBA NARIMBA No. 1
September 28, 1973

PURPOSE: Obtain subsurface pressures with Amerada Gauges run in tandem with Schumberger Formation Interval Tester.

TOOLS USED: Kuster 10,300 psi element Serial No. 9403 12 Hour Clock
Kuster 8,500 psi element Serial No. 9391 12 Hour Clock

F.I.T. TEST No. 4 @ 10,251'

HOURS	PSIG 10,300	PSIG 8,500	REMARKS
0340			Run in Hole
0450	5804.8		Set Packer – Initial Hydro – Open Tool
0452	50.6		
0454	50.6		
0456	50.6		
0458	50.6		
0500	50.6		
0502	50.6		
0503			Seal Tool – Open Segregator
0505	50.6		
0507	50.6		
0509	50.6		
0511			Fireshape charge
0513	1541.9		
0515	1604.2		
0517	1718.4		
0519	1822.2		
0521	1926.0		
0524	2071.4		Flow Line Plugging
0525	2185.6		
0527	2362.1		
0529	2492.0		
0531	2653.0		
0533	3001.1		
0534			Seal Segregator
0536	3292.3		
0538	3333.9		Build up in Flow Line
0540	3443.2		
0542	3469.2		Unseat Packer No final Hydrostatic Flow Line plugged

NOTE: Clock stopped in 8,500 psi element, Serial No. 9391 when running in hole – no data recorded.

343100

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

ESSO AUSTRALIA LIMITED — NARIMBA — NARIMBA No. 1
SEPTEMBER 28, 1973

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

TOOLS USED: KUSTER 10,300 PSI ELEMENT SERIAL No. 9403 12 HOUR CLOCK
KUSTER 8,500 PSI ELEMENT SERIAL No. 9391 12 HOUR CLOCK

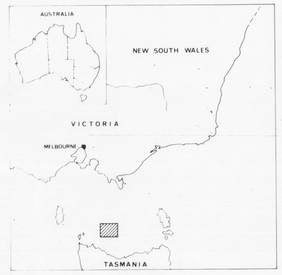
F.I.T. No. 5 @ 10,049'

HOURS	PSIG 10,300	PSIG 8,500	REMARKS
1103			RUN IN HOLE
1148	5667.6	5661.1	SET PACKER – OPEN TOOL INITIAL HYDROSTATIC
1150	40.4	--	
1152	40.4		
1154	40.4		
1156	40.4		
1158	40.4		
1200	40.4		
1201			FIRE SHAPE CHARGE
1203	4680.0	4628.6	
1205	4680.0	4632.9	
1207	4680.0	4632.9	
1209	4680.0	4637.2	
1211	4680.0	4637.2	
1213	4680.0	4637.2	
1214			SEAL TOOL – OPEN SEGREGATOR
1216	4680.0	4645.7	
1218	4680.0	4650.0	
1220	4680.0	4654.3	
1222	4680.0	4662.8	
1224	4680.0	4662.8	
1226	4680.0	4662.8	
1227	4680.0	4662.8	SEAL SEGREGATOR
1229	4680.0	4662.8	BUILD UP IN FLOW LINE
1231	4680.0	4662.8	
1233	4680.0	4662.8	
1235	4680.0	4662.8	
1237	4680.0	4662.8	
1239	4680.0	4662.8	
1241	4680.0	4662.8	
1242	5657.1	5618.2	UNSEAT PACKER – FINAL HYDRO.

NOTE: STYLUS BADLY BENT DURING TEST ON THIS ELEMENT. (8500 - 9391)

145° 45'
146° 00'
146° 15'
40° 15'
40° 30'

LOCALITY MAP



ESSO EXPLORATION AND PRODUCTION AUSTRALIA INC.

THE BASS BASIN

TASMANIA

NARIMBA PROSPECT

STRUCTURE MAP

INTRA LOWER M. diversus (Seismic Marker)

PRE-DRILL

CONTOUR INTERVAL : 100 FEET

DATUM : MEAN SEA LEVEL

Scale 1 : 50,000

1 ½ 0 1 2

MILES

AUTHOR : J. BORDELON, R. COPPIN, D. EYLES

TO ACCOMPANY : FINAL SUBSIDY REPORT NARIMBA-1

DRAFTED BY : R.L. RYNSBERGEN

DATE : JULY 1972

5 cm

243101

ENCL. 1 - CR.6340

Dwg. 1605-17

145° 45'
146° 00'
146° 15'
40° 15'
40° 30'

B70A-17

A
A'
B
B'

Pelican-3
T.D. 9537'

Pelican-2
T.D. 10,066

Pelican-1
T.D. 10,428

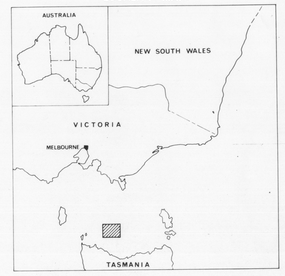
Norimba-1
T.D. 11,003

Prambeon-1
T.D. 10,715

T/5P Hematite

T/6P Hematite

LOCALITY MAP



ESSO EXPLORATION AND PRODUCTION AUSTRALIA INC.

THE BASS BASIN

TASMANIA

NARIMBA PROSPECT

STRUCTURE MAP

INTRA LOWER M. diversus (Seismic Marker)

POST - DRILL

CONTOUR INTERVAL : 100 FEET

DATUM : MEAN SEA LEVEL

Scale 1:50,000

1 0 ½ 0 1 1 2

MILES

AUTHOR : J.BORDELON, R.COPPIN, D.EYLES

TO ACCOMPANY : FINAL SUBSIDY REPORT NARIMBA-1

DRAFTED BY : R.L. RYNSBERGEN

DATE : JULY 1973

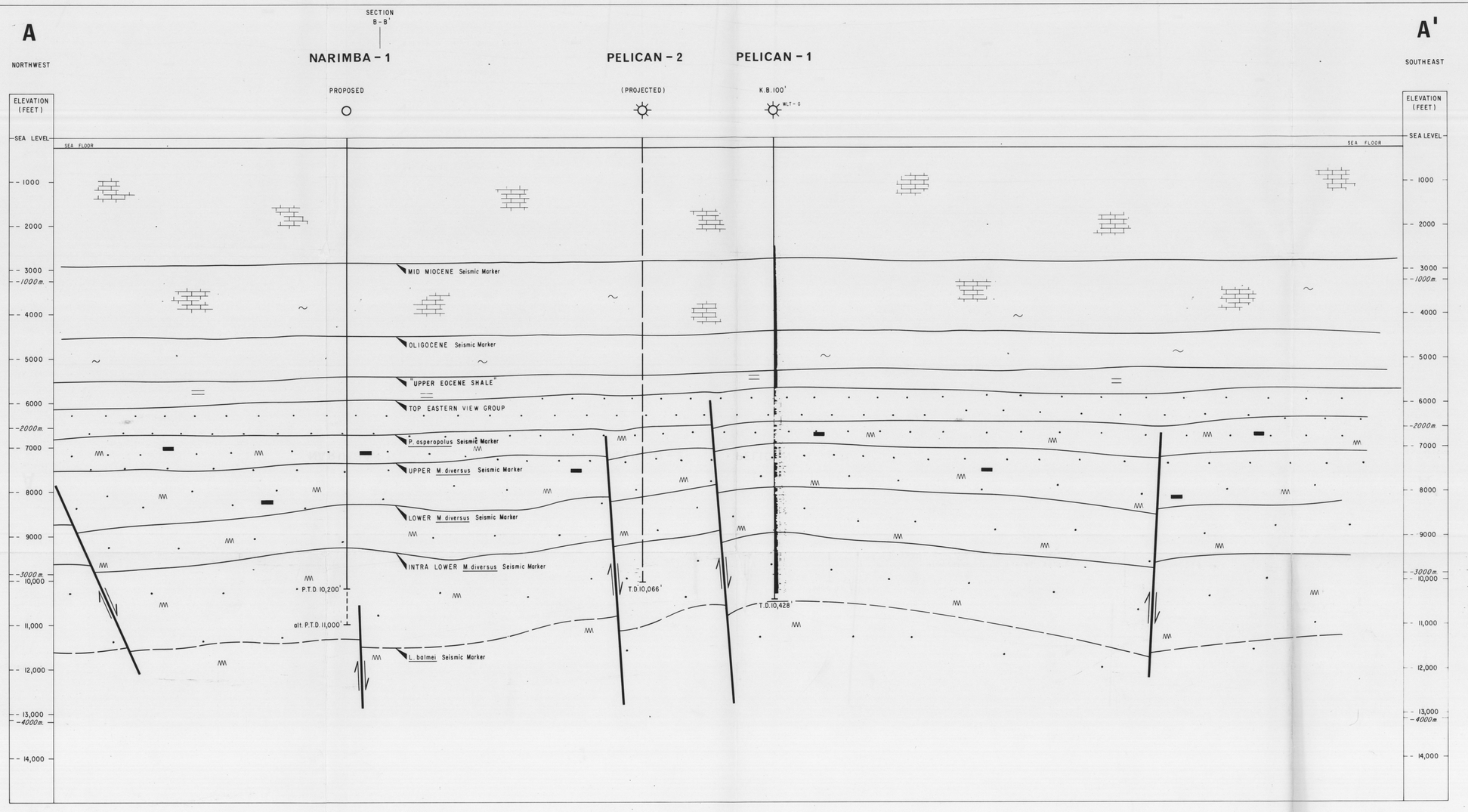
REVISED : JANUARY, 1974.

OR-0340

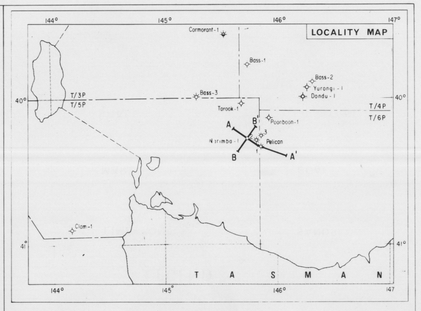
ENCL 2 - 548162

Dwg. 1584/OP/7

5 cm



VERTICAL EXAGGERATION 4·2 : 1



LEGEND

- LIMESTONE
- SANDSTONE
- MARL
- COAL
- SHALE
- SILTSTONE

ESSO EXPLORATION AND PRODUCTION AUSTRALIA INC.

BASS BASIN

TASMANIA

NARIMBA PROSPECT
GEOLOGICAL CROSS SECTION A – A'

PRE-DRILL

HORIZONTAL SCALE 1 : 50,000

1 0 1 2

MILES

VERTICAL SCALE 1" = 1000'

AUTHOR R.J. COPPIN

DRAFTED BY : R. WILSON

TO ACCOMPANY FINAL SUBSIDY REPORT NARIMBA-1

DATE : JULY, 1973

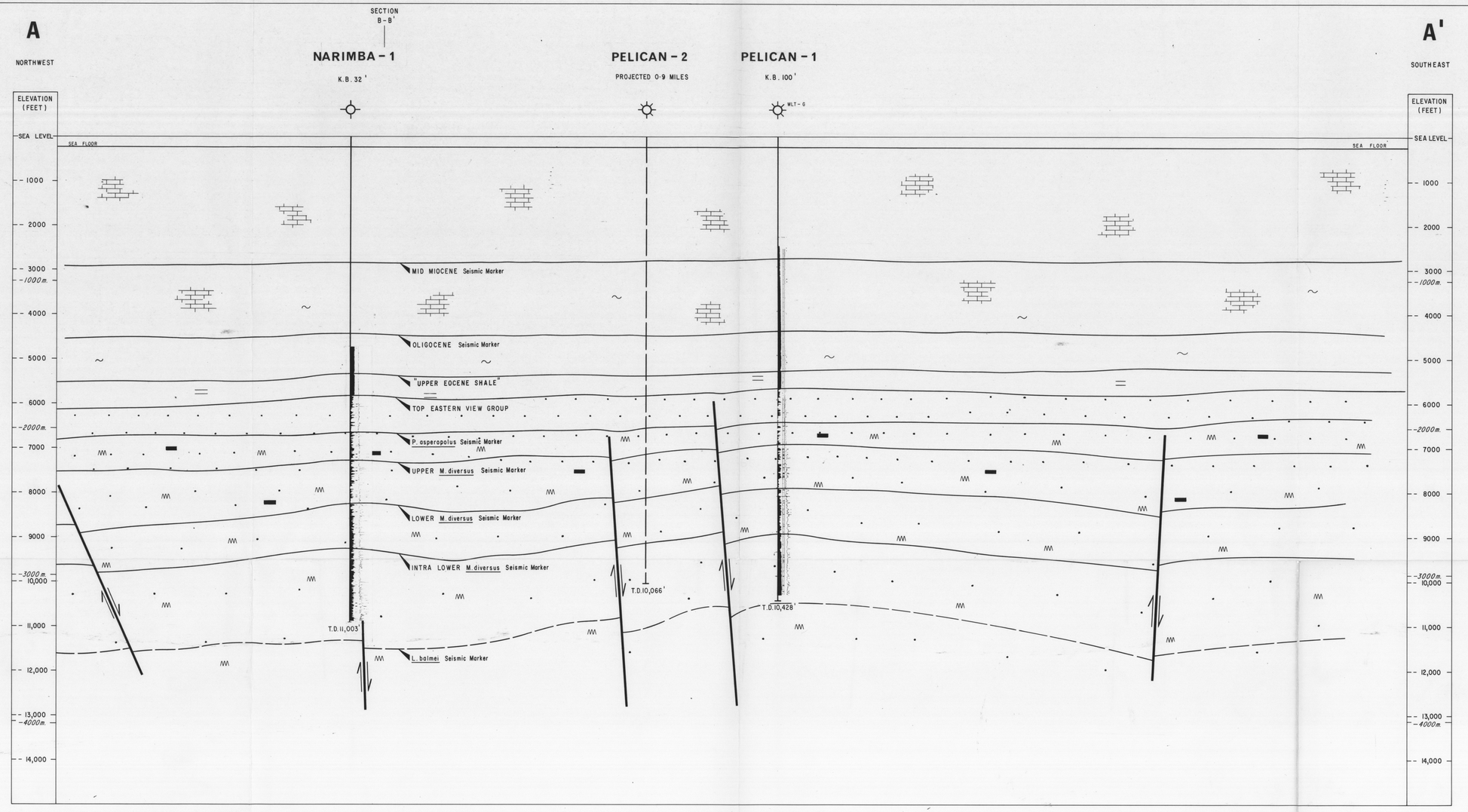
5 cm

243103

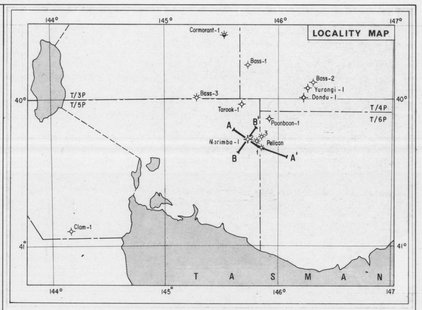
ENCL. 3

OR 0340

Dwg 1605/OP/3



VERTICAL EXAGGERATION 4·2 : 1



LEGEND

- LIMESTONE
- SANDSTONE
- MARL
- COAL
- SHALE
- SILTSTONE

ESSO EXPLORATION AND PRODUCTION AUSTRALIA INC.

BASS BASIN

TASMANIA

NARIMBA PROSPECT
GEOLOGICAL CROSS SECTION A – A'

POST – DRILL

HORIZONTAL SCALE 1 : 50,000

1 0 1 2

MILES

VERTICAL SCALE 1" = 1000'

AUTHOR : V.A. ROBINSON / R.J. COPPIN

DRAFTED BY : R. WILSON

TO ACCOMPANY : FINAL SUBSIDY REPORT NARIMBA–1

DATE : JULY, 1973

REVISED : JANUARY, 1974.

5 cm

ENCL. 4

343104

CR-0340

Dwg. 1584/OP/5.

SECTION
A – A'

B

SOUTHWEST

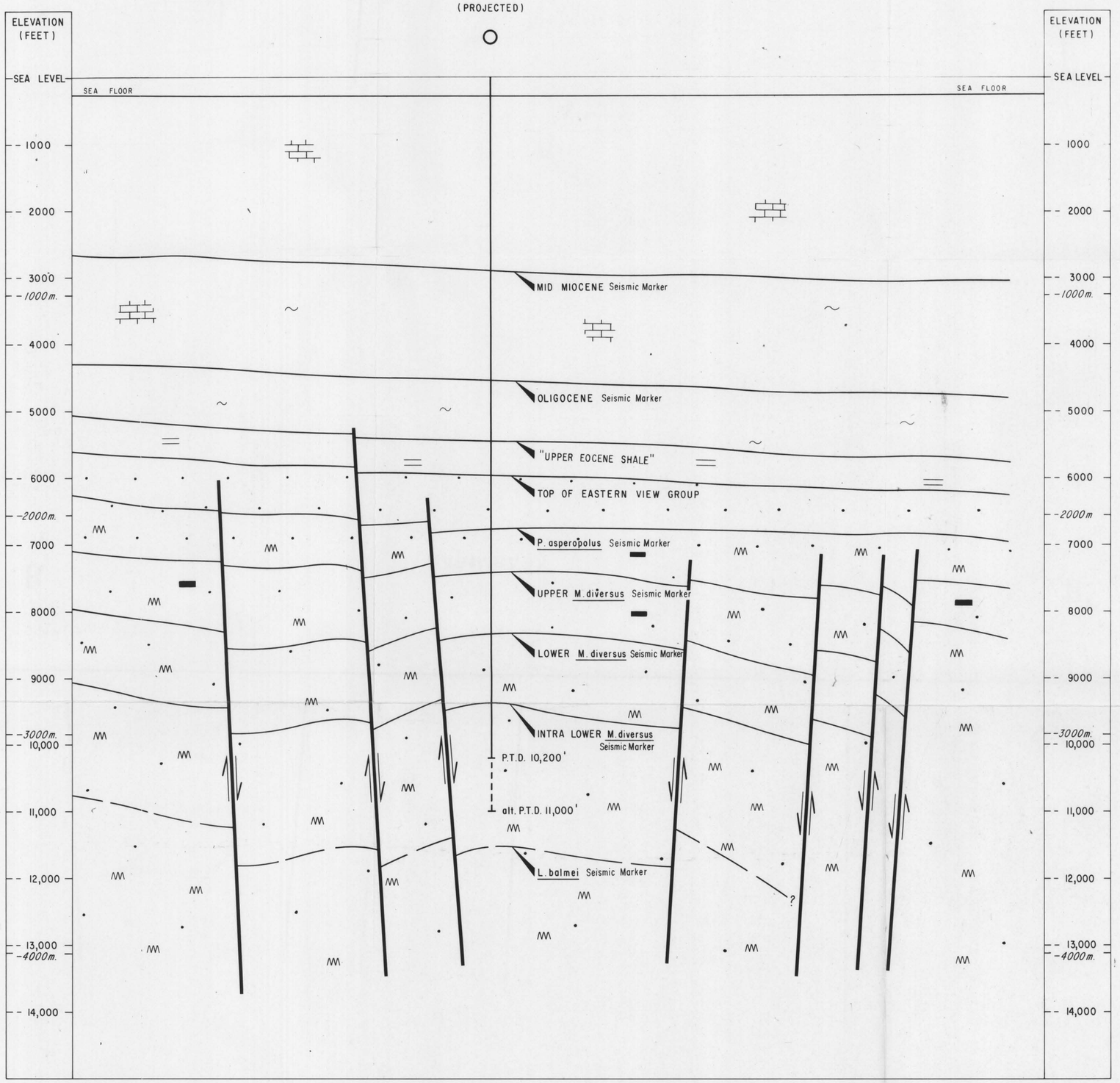
NARIMBA – 1

PROPOSED

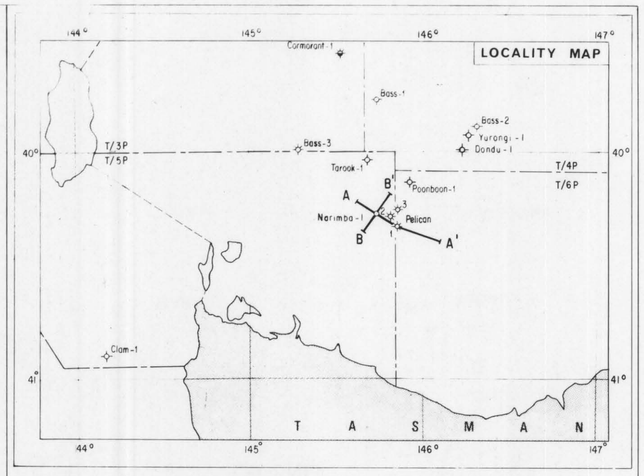
(PROJECTED)

B'

NORTHEAST



VERTICAL EXAGGERATION 4·2 : 1



LEGEND

- LIMESTONE
- SANDSTONE
- MARL
- COAL
- SHALE
- SILTSTONE

ESSO EXPLORATION AND PRODUCTION AUSTRALIA INC.

BASS BASIN

TASMANIA

NARIMBA PROSPECT

GEOLOGICAL CROSS SECTION B – B'

PRE-DRILL

HORIZONTAL SCALE 1: 50,000

1 0 1 2

MILES

VERTICAL SCALE 1" = 1000'

AUTHOR: R.J COPPIN

DRAFTED BY: R. WILSON

TO ACCOMPANY: FINAL SUBSIDY REPORT NARIMBA-1

DATE: JULY, 1973

5 cm

ENCL. 5

243105

OR-0340

Dwg 1605/OP/2

SECTION
A – A'

NARIMBA – 1

K.B. 32'

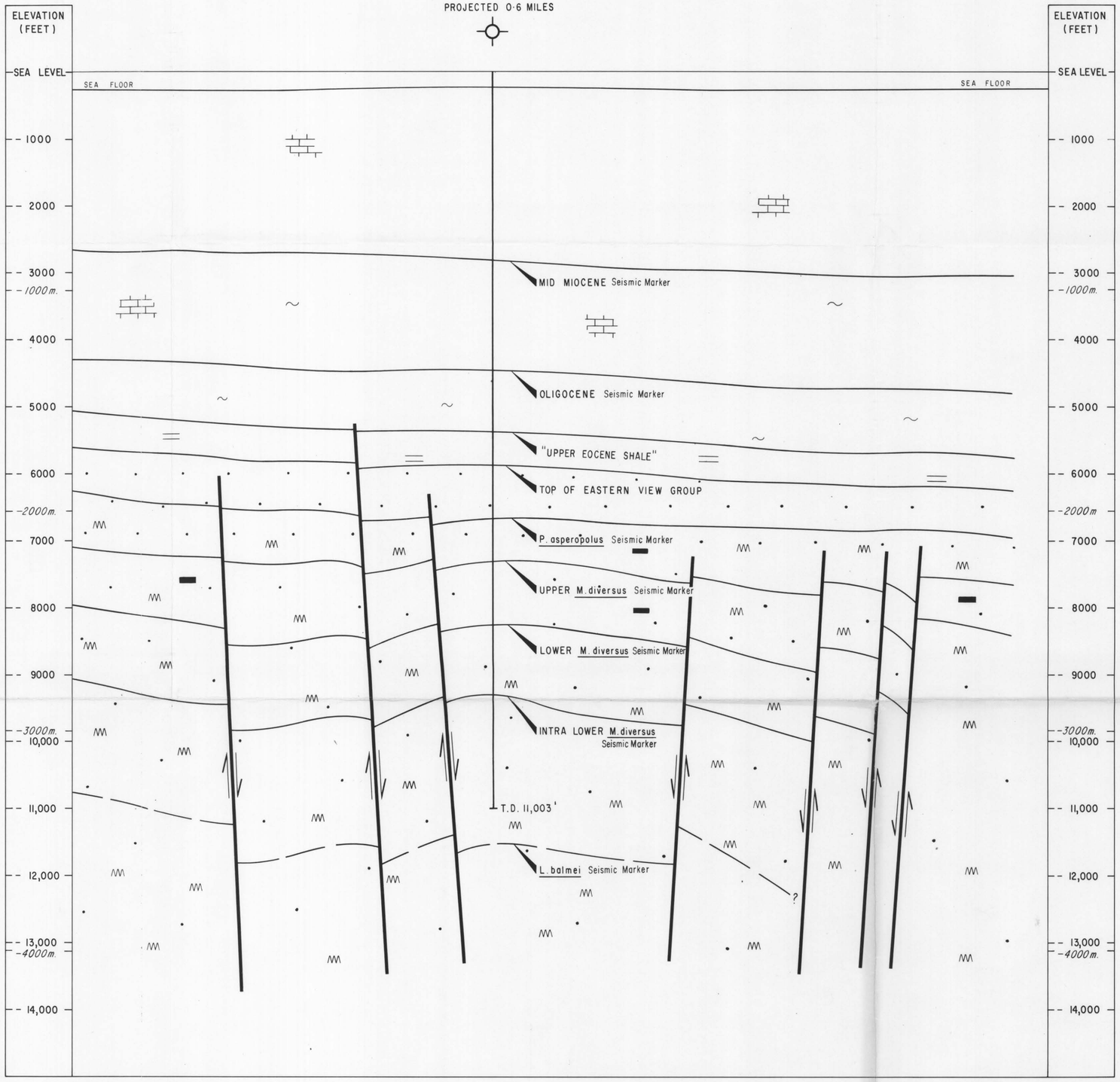
PROJECTED 0·6 MILES

B

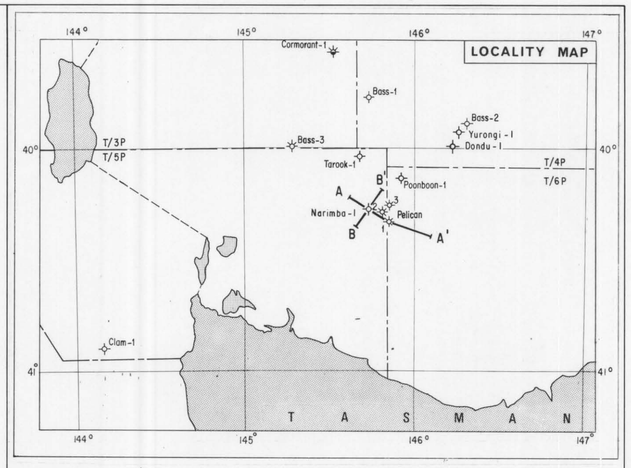
SOUTHWEST

B'

NORTHEAST



VERTICAL EXAGGERATION 4·2 : 1



LEGEND

- LIMESTONE
- SANDSTONE
- MARL
- COAL
- SHALE
- SILTSTONE

ESSO EXPLORATION AND PRODUCTION AUSTRALIA INC.

BASS BASIN

TASMANIA

NARIMBA PROSPECT

GEOLOGICAL CROSS SECTION B – B'

POST – DRILL

HORIZONTAL SCALE 1: 50,000

0 1 2

MILES

VERTICAL SCALE 1" = 1000'

AUTHOR: R.J COPPIN

DRAFTED BY: R. WILSON

TO ACCOMPANY: FINAL SUBSIDY REPORT NARIMBA-1

DATE: JULY, 1973

REVISED: JANUARY, 1974.

5 cm

ENCL. 6

343106

OR-340

Dwg 1584/OP/6.

OR-0340

ONE WAY TIME BELOW SEA LEVEL - SECONDS

TWO WAY TIME BELOW SEA LEVEL - SECONDS

ESSO EXPLORATION AND PRODUCTION AUSTRALIA INC.

343107 **NARIMBA – 1**

TIME DEPTH CURVE

ENCL. 7

DATUM ..... : MEAN SEA LEVEL

AUTHOR ..... : P.J. BIRMINGHAM

DRAFTED BY: K. ANDREWS

CO ORDINATES

LAT : 40° 16' 18.080" S

LONG: 145° 43' 53.581" E

LEGEND

⊙ Check shots.

⊡ Points interpolated from Sonic Log.

5 cm

Date of survey: 15th / 16th, September, 1973
Type of survey: GAS GUN
Height of K.B.: 32' K.B.
Water depth : -253' (-285' K.B.)
T.D. ..... : 8813' K.B. when shot, F.T.D. -10,971' (11,003 K.B.)
Casing depth : 2747' K.B. when shot
G Denotes good quality data

NO INFORMATION IS AVAILABLE ABOUT THIS PORTION OF THE CURVE

TIME DEPTH CURVE

TIME vs VELOCITY

DEPTH vs AVERAGE VELOCITY

DEPTH vs INTERVAL VELOCITY

EXTRAPOLATION FROM SONIC LOG

(-2798,7402) (-3388,7414) (-3978,7477) (-4812,7566) (-5396,7698) (-5850,7790) (-6468,7936) (-7466,8259) (-8081,8418) (-8739,8618) (-8958,8680) (-9300,8782) (-9557,8849) (-9822,8921) (-10290,9050) (-10548,9117) (-10940,9209)

(-378,-2798) (-457,-3388) (-532,-3978) (-636,-4812) (-701,-5396) (-751,-5850) (-815,-6468) (-819,-6558) (-832,-6688) (-843,-6777) (-858,-6968) (-865,7050) (-869,7114) (-881,-7238) (-885,-7268) (-890,-7302) (-892,-7328) (-896,-7368) (-904,-7466) (-913,-7580) (-917,-7630) (-923,-7700) (-933,-7776) (-939,-7856) (-944,-7918) (-948,-7976) (-960,-8075) (-969,-8186) (-980,-8325) (-987,-8440) (-992, 8504) (-1014,8618) (-1032,8680) (-1059, 8782) (-1080, 8849) (-1101, 8921) (-1137, 9050) (-1157, 9117) (-1188, 9209)

(378, 7402) (457, 7414) (531, 7477) (636, 7566) (701, 7698) (751, 7790) (820,7935) (843, 8039) (865, 8150) (913, 8302) (944, 8388) (980, 8325) (987, 8440) (992, 8504) (1014, 8618) (1014, -8739) (1032, 8958) (1059, -9300) (1080, -9557) (1101, -9822) (1137, -10290) (1157, -10548) (1188, -10940)

AVERAGE VELOCITY - FEET PER SECOND and DEPTH IN FEET BELOW SEA LEVEL

AVERAGE AND INTERVAL VELOCITY – FEET PER SECOND

DWG. 1584/OP/1

343108

OR-0340

5 cm

MEASURED DEPTH

FEET

METRES

TIME (DAYS)

0 5 10 15 20 25 30 35 40 45 50 55 60

0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10,000 11,000

0 500 1000 1500 2000 2500 3000 3500

Drill 36" and 26" hole

Run 20" casing and 20"/30" pile joint.

Run 16¾" stack and 18⅝" riser.

Drill 16½" hole

Set 13⅜" casing.

Drill 12¼" hole.

ACTUAL

PROGRAM

Log, and set 9⅝" casing

Drill 8½" hole.

Possible cores

Drill 8½" hole.

Log, plug, and abandon

Alternate T.D. 11,000'

ESSO EXPLORATION AND PRODUCTION AUSTRALIA INC.

BASS BASIN

NARIMBA - 1 WELL HISTORY CHART

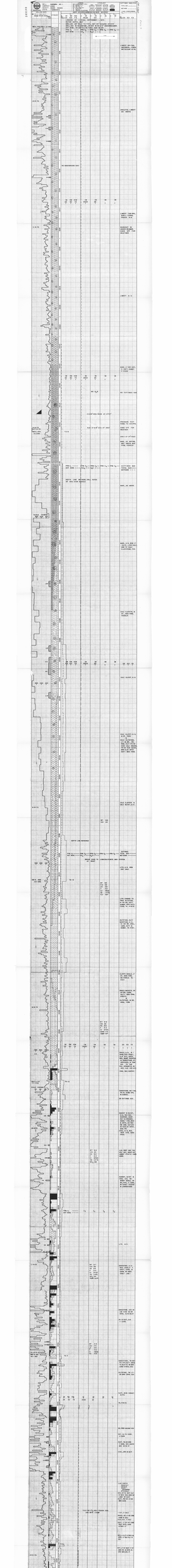
RIG: GLOMAR CONCEPTION DATE: JANUARY, 1974.

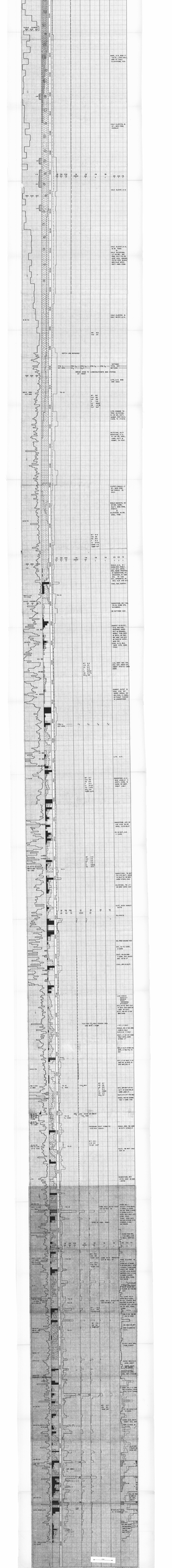
TO ACCOMPANY: DRAFTED BY: R. WILSON

WELL SUBSIDY REPORT

ENCL. 8

Dwg. 1584/OP/4.





OFFSHORE 26

ENCLOSURE 10

343110

OR-0340

WELL NARIMBA NO.1
COMPANY ESSO
COUNTY BASS BASIN
STATE TASMANIA

DEPTH CORRESPONDS TO DRILL PIPE MEASUREMENTS.
NB NEW BIT
NCB NEW CORE BIT
DST DRILL STEM TEST

LEGEND
TG TRIP GAS
NR NO RETURNS
E LOG ELECTRIC LOG
CO CIRCULATE OUT RETURNS
CFK CHECK FOR FLOW
SAND
SHALE

APPLIED DRILLING TECHNOLOGY

DRILLING RATE FT./HR. 200 100 50 0 "d" 1 2 3
DEPTH
TOTAL GAS
CONNECTION GAS (BAR GRAPH)
UNITS GAS IN AIR 25 50 75 100
SHALE DENSITY g/cc 2·3 2·4 2·5
SHALE FACTOR 2 4 6 8 10 12 14
MUD WT.
REMARKS

8-9-73 B3.XDG
NB4.XDG
NB5,J33
NB6,J33
NB7.XDV
NB8.XDV
NB9.XDV
NB10.J33
RR.J33
NB11.J33
RR.J33
NB12.J33
NB13.J33
TD.11000'

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10,000
11000

170
95
35

9·6-90°F
9·8
9·9-112°
9·8-115°
9·8-120°F
9·8-130°
9·7-130°F
9·5-126°
9·7-135°
10·1-113°
10·0-127°
10·1-113°
10·1-120°
10·3-115°
10·8-110°
11·0-128°
10·9-125°
11·0-130°
11·0-128°
10·9-130°
10·9-125°
11·0-125°

5 cm

ER 6213-A

OK-0340

BAROID
WELL INFORMATION SYSTEMS N. DRAKEMYRE
A.C.T. MWDM

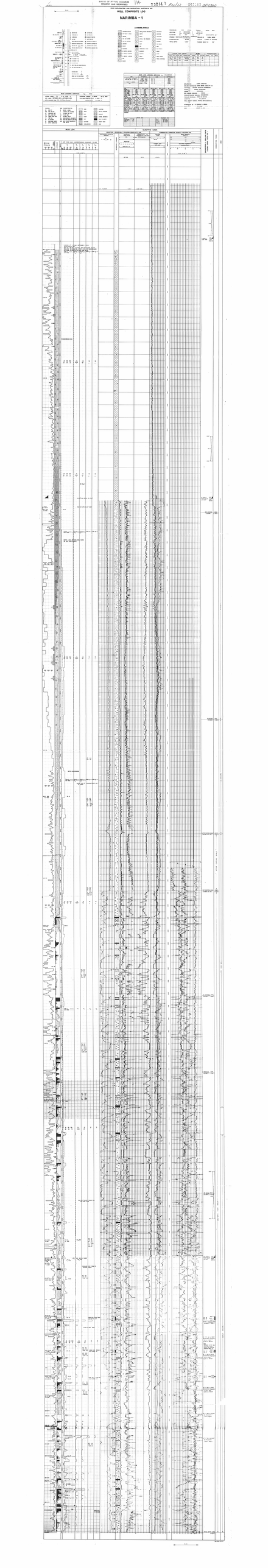
SAMPLE NO: 1
DATE: 10/ 5/93 13:
BAROID BOOM,TEXARKA

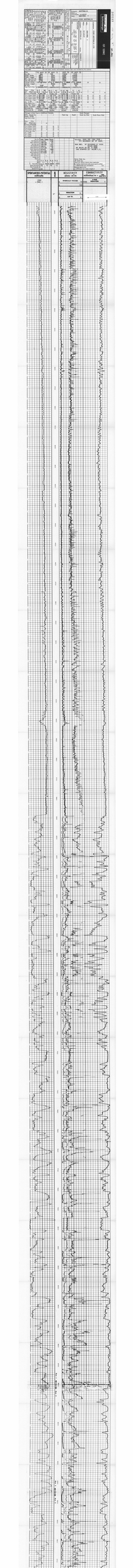
R=PENETRATION RATE, FT/HR
W=WEIGHT, SPEED, KLBS
T=TORQUE, KFT-LBS
D=BIT DIAMETER,INCHES

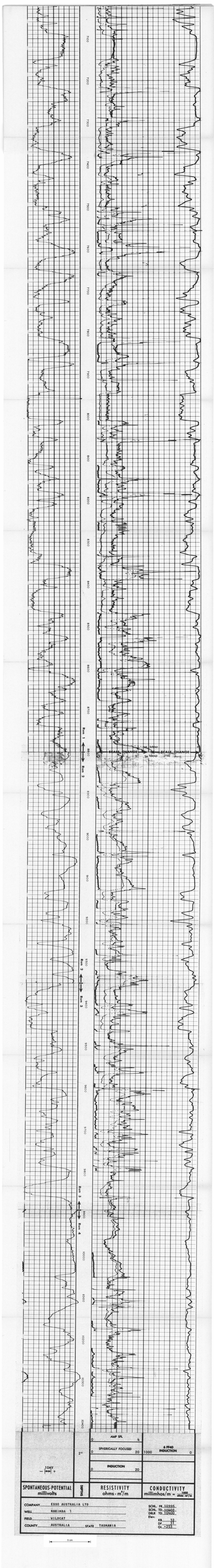
BASIN OF ATTACK DIVISION
RESERVOIR MANAGEMENT GROUP

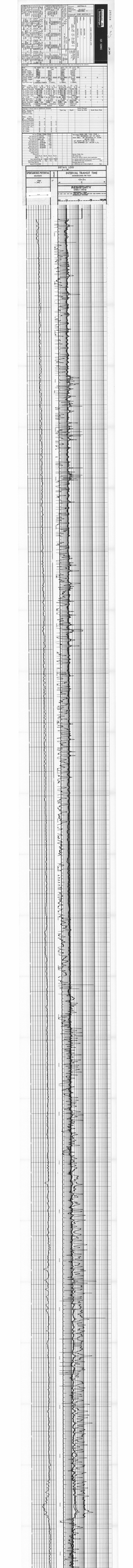
WELL COMPOSITE LOG

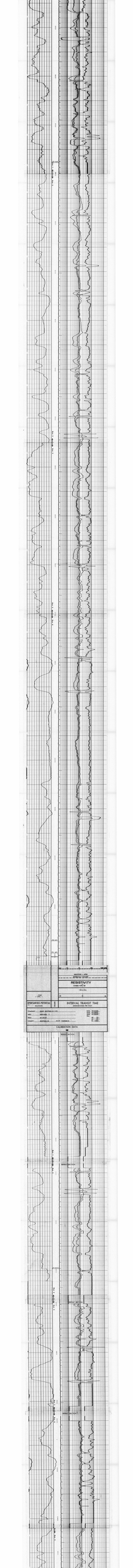
NARIMBA - 1

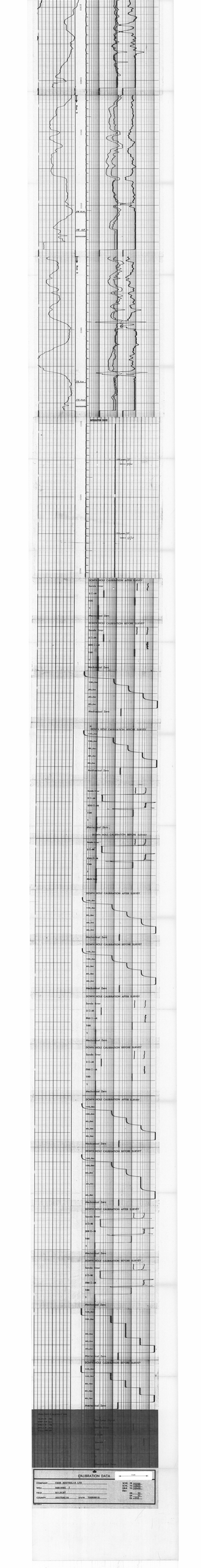





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INTERVAL TRANSIT TIME
RESISTIVITY


RESISTIVITY
INTERVAL TRANSIT TIME
CALIBRATION DATA


MEASURE OVER
CALIBRATION DATA
COMPANY ESSO AUSTRALIA LTD
WELL BARRACOUTA 7
FIELD WILLICAT
COUNTY AUSTRALIA STATE TASMANIA