

212001

Bass Basin  
Tasmania  
Australia  
Quarterly Report  
Permit T-15-P

Second Quarter Report  
May 19 to August 19, 1984

Submitted by:

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Sugarland, Texas U.S.A.

Summary

The Squid Prospect has been drilled during this quarter by a partnership of Australian and American companies.

The original Squid #1 exploratory well had to be abandoned due to mechanical problems just prior to final logging at total depth. The Squid #1 sidetrack well was drilled to a measured depth of 2925 meters and was logged, plugged and abandoned as a dry hole without significant shows. The well results have been discussed in detail in the Well Completion Report.

An incomplete palynological zonation has been established in spite of the poor state of presentation of the fauna and flora in this well.

The source-rock evaluation indicate that a distinctly oil-prone, exinite rich, shale section is present in the lower Eastern View Coal Measure sequence of this well and that it is still immature at total depth.

An abundance of potential reservoir quality sandstones are shown on the various electrical logs taken in this well. All are water bearing on the basis of saturation calculations.

A series of lithostratigraphic units are identified on the synthetic seismograms and electrical logs of the Squid #1 sidetrack well. These are described and tentatively correlated to similar units in the Pelican #1 well. The structural evolution, through time, of the Squid Prospect can thus be described.

The seismically identified and mapped Oligocene Lens at Squid was found to consist of mostly massive sandstone. Regionally, the mid and basal Oligocene section consist of interbedded sandstone and claystone to the northeast and claystone with lesser or minor sandstone to the southwest. The section at the Squid well location is anomalous in that it is mostly sandstone with a lower than regional interval velocity. Its base is an angular unconformity which indicate structural growth at Oligocene time. The under-

lying Demon's Bluff Formation, or Eocene Shale is relatively thin, again indicating non definition or erosion on an elevated area.

Remapping of the Squid Prospect area indicates that the Squid #1 side-track well tested a structurally closed area. It is tentatively concluded that this exploratory well failed to reveal the presence of hydrocarbons because the source-rock section at the well location is immature and that generation, expulsion, migration, and entrapment did not take place.

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Introduction

The Squid Prospect has been drilled during this quarter.

The Prospect is defined as to its structural style and anticipated reservoir - source-rock section.

The drilling operation, well results, palynological zonation and source-rock evaluation of the Squid #1 and #1 sidetrack exploratory wells are summarized.

A series of lithostratigraphic units is established, described and tentatively correlated to similar units in the Pelican #1 well.

The nature of the seismically identified, defined, modeled and mapped anomalous Oligocene Lens at Squid is described on the basis of synthetic seismograms and electrical log response and compared with the various predictions

The post-drill Squid structure is reviewed in terms of its seismic, gravity and magnetic expression at the local and regional scale.

Prospect Definition

The Squid Prospect was originally recognized on seismic line E5-52 and B-70A-9 as a lens-shape anomaly at the Oligocene seismic reflector horizon. Associated with this lens is a zone of destructive interference, a major unconformity, and a deeper horst block.

Additional seismic, gravity and magnetic data were acquired in 1981 and 1982 over this anomaly. Long regional seismic lines were tied to the Dondu #1 and Pelican #1 wells for purpose of reflector identification, Figure 1.

Seismic time structure maps were constructed at the top Oligocene seismic reflector horizon, Figure 2, as well as at the Eocene/Paleocene Lower M. diversus palynological zone, unconformity seismic reflector horizon, Figure 3. In addition, an isochron map of the seismically defined Oligocene lens was constructed.

The Squid prospect was so defined, a faulted domal feature, a horst block, at the Lower M. diversus unconformity map level overlain by an unfaulted domal feature at the Oligocene map level.

The Squid #1 exploratory well was positioned in such a way as to test the hydrocarbon potential of the Oligocene, Eocene, and Paleocene objective section of the prospect, Figure 4 and 5.

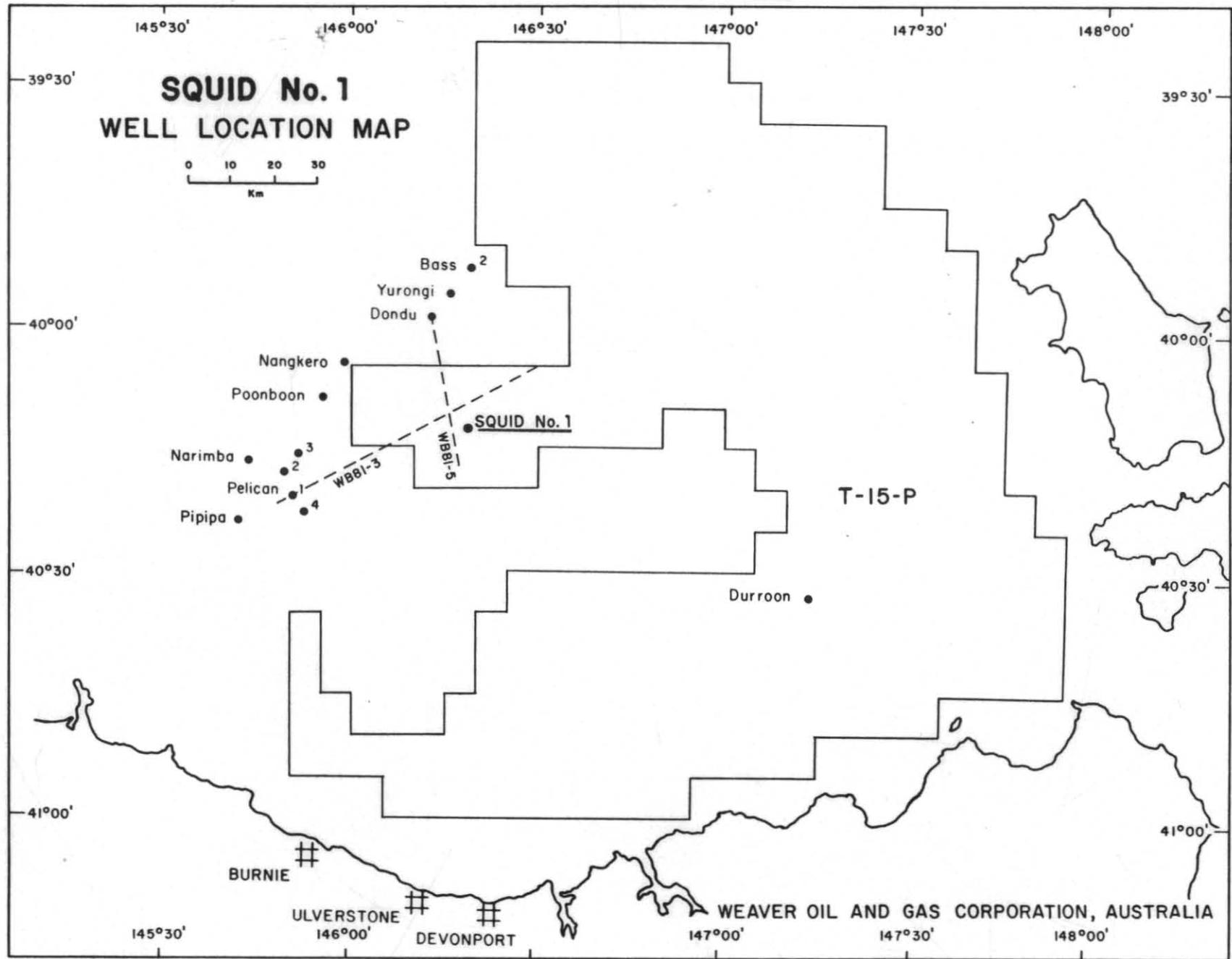
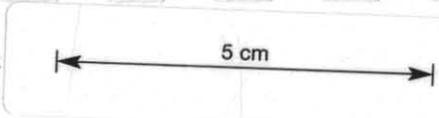


Figure 1

5 cm

05

T-14-P  
T-15-P

10

15

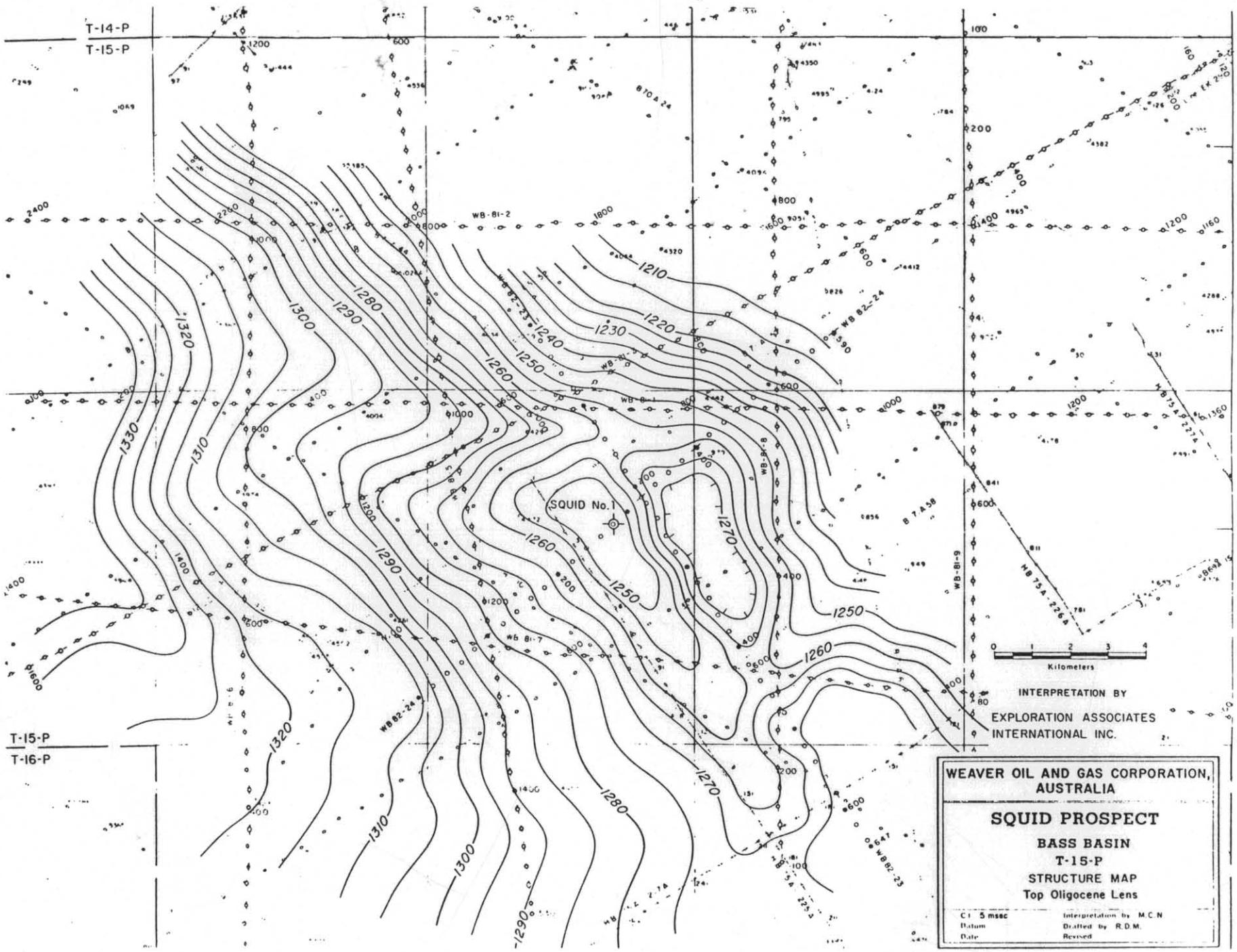


Figure 2

T-15-P  
T-16-P

0 1 2 3 4  
Kilometers

INTERPRETATION BY  
EXPLORATION ASSOCIATES  
INTERNATIONAL INC.

WEAVER OIL AND GAS CORPORATION,  
AUSTRALIA

**SQUID PROSPECT**

BASS BASIN  
T-15-P  
STRUCTURE MAP  
Top Oligocene Lens

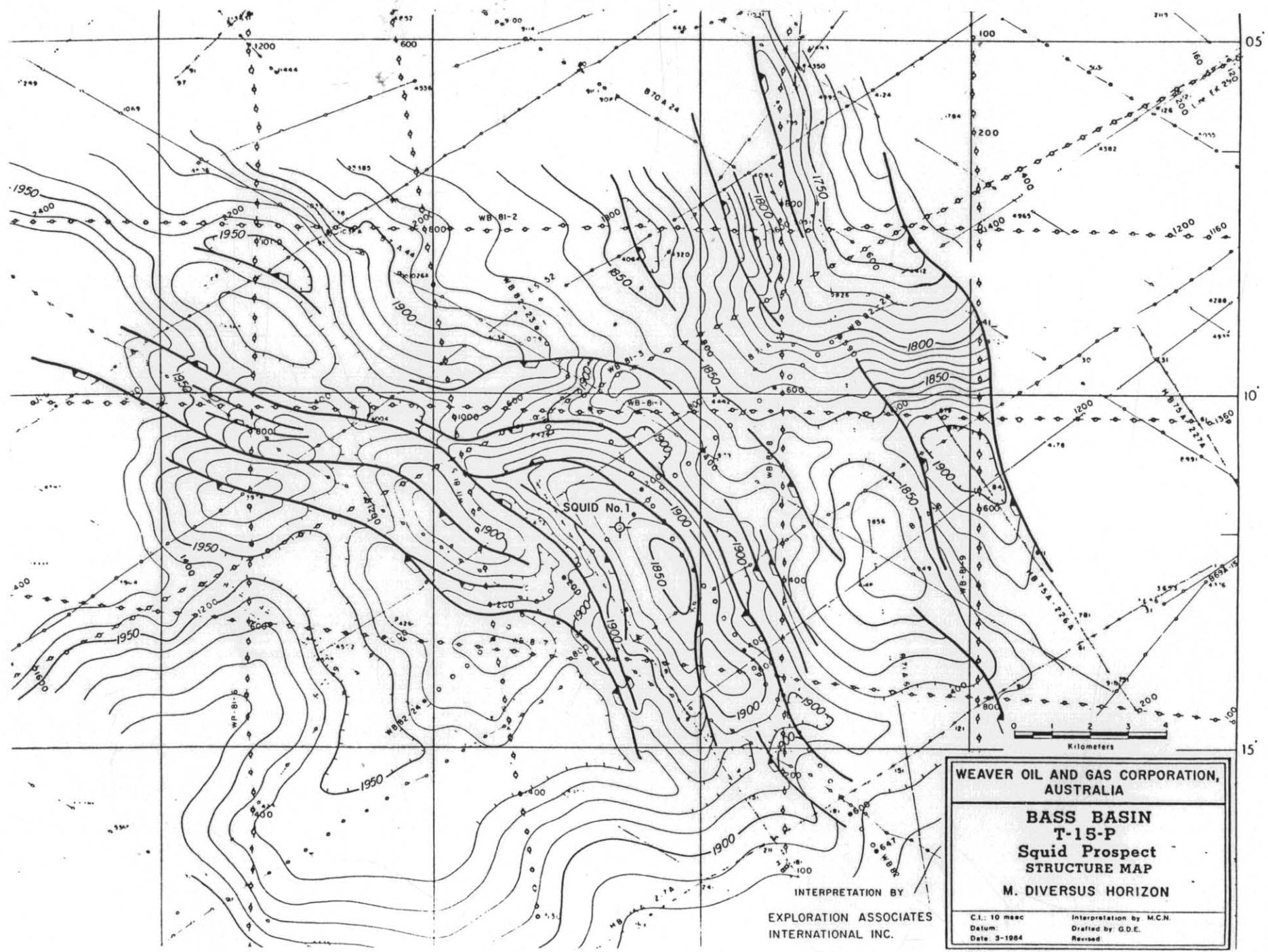
C1 5 msec  
Datum  
Date

Interpretation by M.C.N.  
Drafted by R.D.M.  
Revised

212012

5 cm

Figure 3



WEAVER OIL AND GAS CORPORATION,  
AUSTRALIA

**BASS BASIN  
T-15-P  
Squid Prospect  
STRUCTURE MAP**

M. DIVERSUS HORIZON

INTERPRETATION BY  
EXPLORATION ASSOCIATES  
INTERNATIONAL INC.

C.I.: 10 mae  
Datum:  
Date 3-1984

Interpretation by M.C.N.  
Drafted by G.D.E.  
Revised:

212013

ANTICIPATED STRATIGRAPHIC SECTION

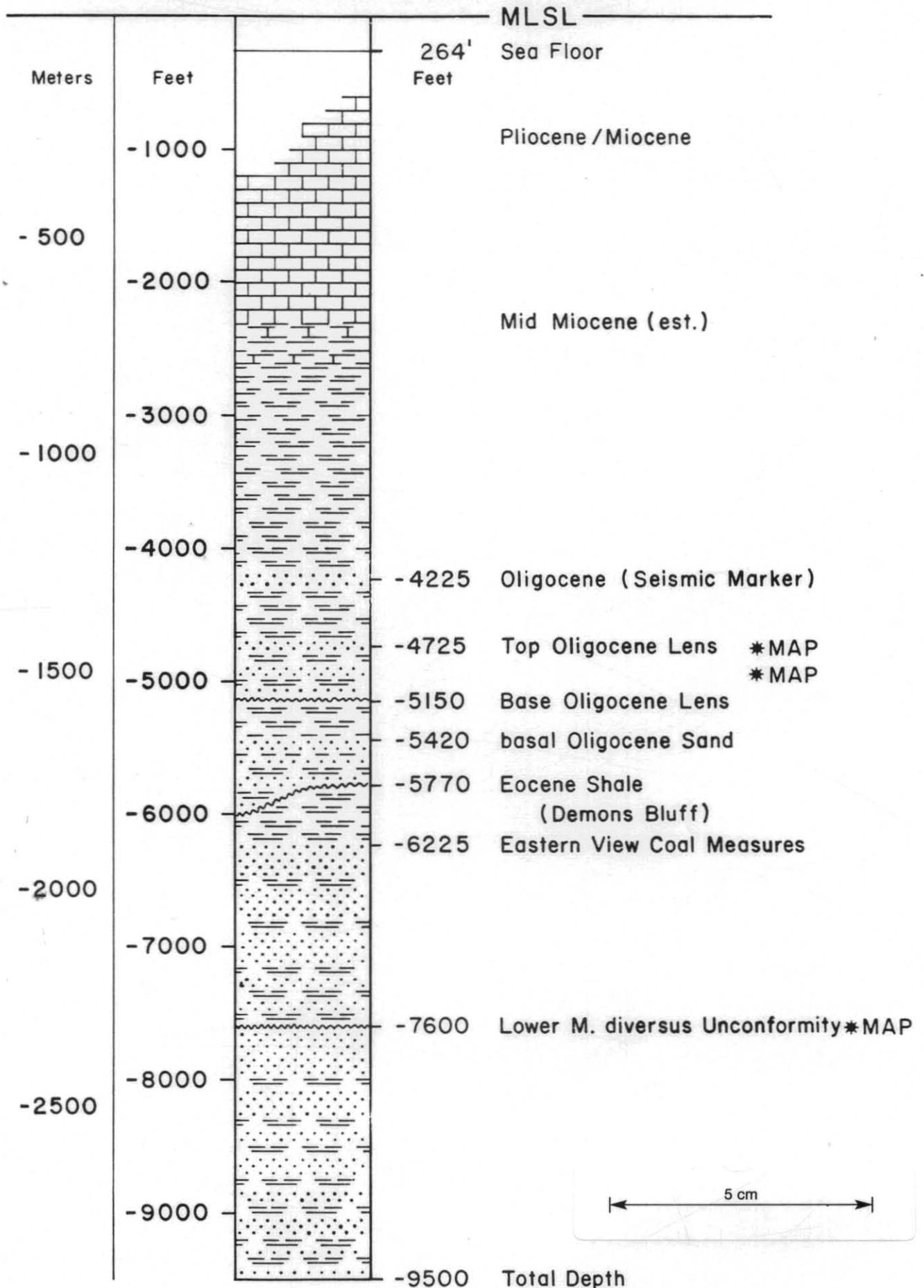


Figure 4

WEAVER OIL AND GAS CORPORATION, AUSTRALIA

AGE (m.y.)	EPOCH	SERIES	SPORE-POLLEN ASSEMBLAGE ZONES	STRATIGRAPHY
	MIOCENE- PLIOCENE			TORQUAY  GROUP
24	OLIGOCENE			
37.5			<i>Upper Nothofagidites asperus</i>	DEMONS BLUFF FORMATION
40		Late	<i>Nothofagidites goniatus</i>  <i>Middle Nothofagidites asperus</i>	
45	EOCENE	Middle	<i>Lower Nothofagidites asperus</i>	'UPPER' EASTERN
			<i>Proteacidites asperopolus</i>	
50		Early	<i>Upper Malvacipollis diversus</i>	VIEW
			<i>Lower Malvacipollis diversus</i>	
55		Late	<i>Upper Lygistepollenites balmei</i>	
60	PALEOCENE	Middle	<i>Lower Lygistepollenites balmei</i>	'LOWER' COAL
		Early		
65	LATE CRETACEOUS		<i>Tricolpites longus</i>	MEASURES
98	EARLY CRETACEOUS			OTWAY GROUP

Stratigraphy of the Bass Basin

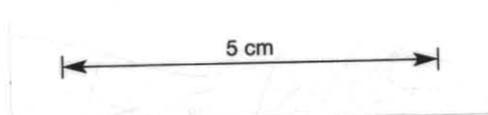


Figure 5

Partnership

The Squid #1 and #1 Sidetrack exploratory well was a drilled by a partnership of Australian and American Companies.

Australian Hydrocarbons NL

Belco Petroleum Australia Inc.

Bridge Oil Limited

Cluff Oil (Pacific) Ltd

Kimberley Oil and Gas NL

Oakwood International Petroleum NL

Sunland Petroleum Corporation NL

Weaver Oil and Gas Corporation, Australia

Weeks Australia Ltd

Drilling

The Squid #1 exploratory well was spudded July 16, 1984 and reached total depth of 2918m on the 1st of August, 1984. A wiper trip prior to running final wireline electric logs encountered a tight hole section and while conditioning the hole, the drill string became stuck. The drill string was subsequently backed-off to 1762m. During the fishing operation, a storm caused an anchor to slip and resulted in the rig moving off location by 40 feet thus complicating the fishing operation. A cement plug was set over the interval 1288m to 1450m and a sidetrack hole was drilled from 1320m, beginning on the 8th of August. Total measured depth of 2925m was reached August 16th. Final logging at total depth took place on the 17th of August. Cement plugs were set, the well plugged and abandoned, and the rig was released on August 18th, 1984.

Well Results

The Squid #1 and #1 sidetrack exploratory wells penetrated a sedimentary and igneous sequence ranging in age from recent to Paleocene, Figure 6. The well was drilled on prognosis, but no significant indications of hydrocarbons were encountered. The presence of a thick reservoir sandstone section as well as that of an immature source-rock shale package is indicated, Figure 7.

The major stratigraphic units and formation tops are as follows:

Recent; sea floor to 917 meters, limestone, claystone, bioclastic limestone.

Torquay Group; Miocene-Pliocene, Oligocene, 917 meters to 1785.5 meters. 917 meters to 1425.5 meters, claystone; 1425.5 meters to 1548.5 meters, sandstone, the seismically defined Oligocene sandstone lens. 1548.5 meters to 1785.5 meters, sandstone, the basal Oligocene sandstone.

Demon's Bluff Formation; Late Eocene, 1785.5 meters to 1853.5 meters, claystone.

Eastern View Coal Measures; Eocene, Paleocene, 1853.5 meters to total depth, 2525 meters. Upper Eastern View Coal Measures; in part Late Eocene and Early Eocene; 1853.5 meters to approximately 2372 meters, sandstone, claystone, coal, olivine basalt (2320 m. to 2365 m.). Lower Eastern View Coal Measures; in part Early Eocene, Paleocene, approximately 2372 meters to total depth, sandstone, claystone, siltstone, coal.

		Elevation : 22.3m AMSL		WD : 80.5m BSL		
AGE	FORMATION	LITHOLOGY	DEPTH RT BRT	DEPTH MSL SUBSEA	THICKNESS M	
		sea floor	0	+ 22.3	103	
RECENT		LIMESTONE	-103	-81	814	
		CLAYSTONE				
		BIOCLASTIC LIMESTONE				
TERTIARY	MIO- PLIOCENE	TORQUAY GROUP	-917	-895	508	
		OLIGOCENE				
		OLIGOCENE SAND LENS	1425	-1403	360.5	
		BASAL OLIGOCENE SAND	Shale Mkr. 1585	Shale Mkr. -1563		
		DEMONS BLUFF Fm.	1785.5	-1763	68	
			1853.5	-1831		
	EOCENE	UPPER	EASTERN VIEW COAL MEASURES			1071.5
		LOWER		2372	-2292	
	PALEOCENE			2925	-2903	

VERT. SCALE : 1:15,000

WEAVER OIL & GAS CORP. AUSTRALIA

**SQUID No. 1 ST**

STRATIGRAPHIC TABLE

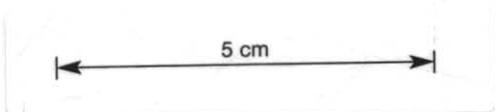
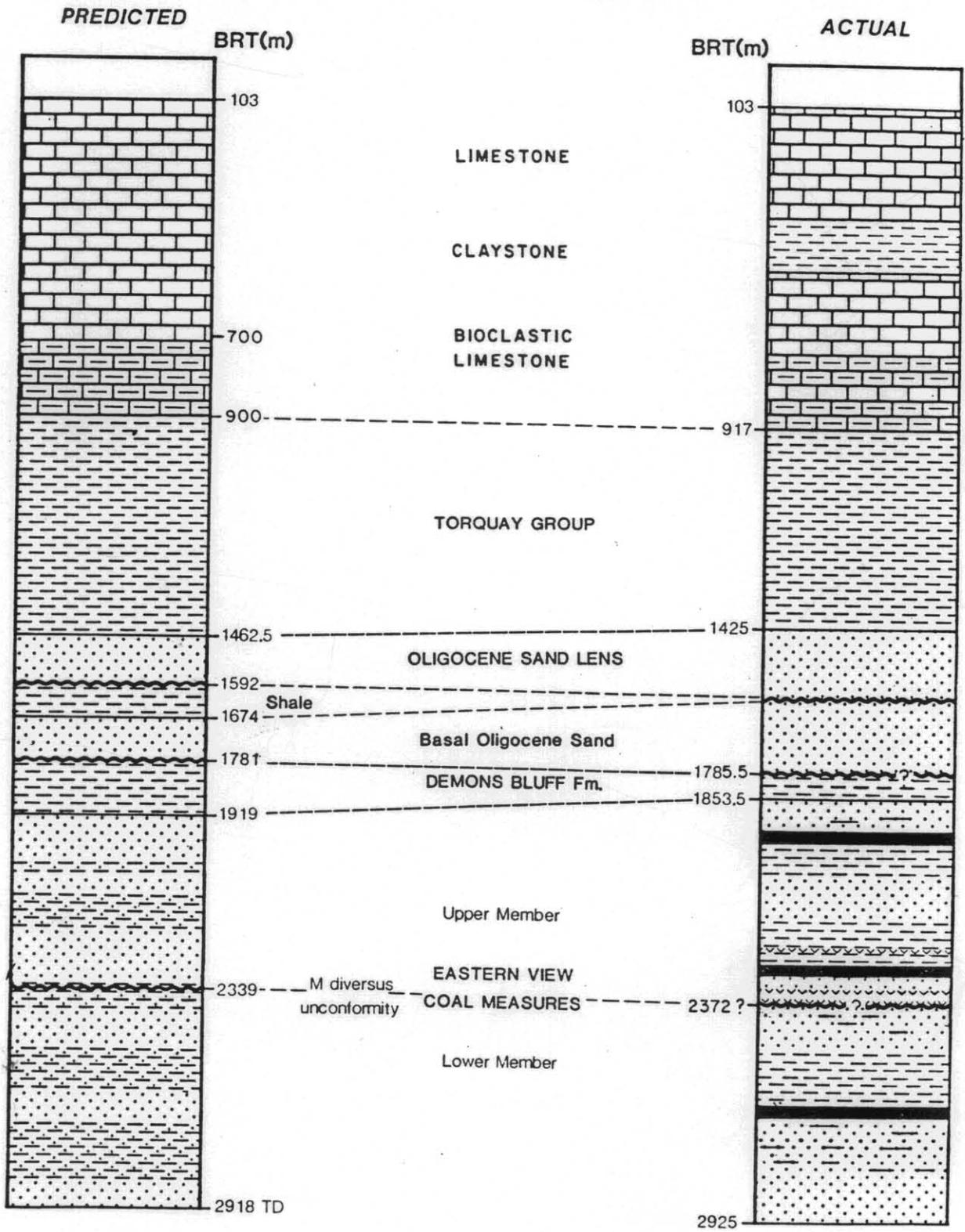


Figure 6



Vert. Scale : 1:15 000

5 cm

WEAVER OIL & GAS CORP. AUSTRALIA

**SQUID No. 1 ST**

COMPARISON PREDICTED AND ACTUAL SECTION

Figure 7

### Palynological Zonation

A palynological zonation of the sequence encountered in the Squid #1 sidetrack exploratory well was performed by Helene A. Martin of the School of Botany, University of New South Wales and P.R. Evans of the School of Applied Geology, University of New South Wales. Results can be summarized as follows.

All the assemblages are poorly preserved. The grains are frequently broken or corroded and the finer morphological details may be obliterated. This poor preservation often prevents a reliable specific identification although the objects may be referable to a genus.

The interval 1400m to 1855m consists of the seismically recognized Oligocene Sand Lens, the basal Oligocene sand and the Demon's Bluff Formation. This interval is assigned to the *P. tuberculatus* zone of the Early Oligocene-Early Miocene. Dinoflagellate assemblages indicate that this interval was deposited in a marginal marine environment.

The interval 1855m to 1942m consists of massive sandstone of the Upper Eastern View Coal Measures.

The interval 1930m to 1960m consists of massive sandstone down to 1942m, then massive claystone to 1960m. This interval is assigned to the Mid N. *aspersus* zone of the Late Eocene. Dinoflagellate assemblages indicate that this interval was deposited in a marginal marine environment. The Upper N. *aspersus* zone is not recognized maybe because of the sample interval or because the section above 1942m consists of massive sandstone.

The interval 1960m to 1975m consists of claystone, coal, and sandstone. The coal being a single bed between depths of 1960 and 1965 meters.

The interval 1975m to 2020m consists of sandstone, claystone, and coal. It is assigned to the Lower N. *aspersus* zone of the Mid Eocene. A lack of

indigenous dinoflagellates indicate that this interval was deposited in a non-marine environment.

The interval 2020m to 2050m consists of claystone, coal and minor dolomite. It is assigned to the *P. asperopolus* zone of the Mid Eocene. A lack of indigenous dinoflagellates indicate that this interval was deposited in a non-marine environment.

The interval 2050m to 2090m consists of claystone, sandstone and coal. This interval was not studied for purposes of palynological zonation.

The interval 2090m to 2322m consists of claystone, sandstone, and coal. A minor body of olivine basalt may be present between 2154m and 2167m. The palynologic assemblages of this interval have an extremely low pollen content and only long ranging species are present. It is not possible to place them in any one zone. A lack of dinoflagellates indicate that this interval was deposited in a non-marine environment.

The interval 2322m to 2364m consists of olivine basalt.

The interval 2364m to 2780m consists of claystone, sandstone, siltstone and coal. It is assigned to the *M. diversus* zone of the Early Eocene. On the basis of two species whose range terminate in the *M. diversus*, this interval may in part be assigned to the Lower *M. diversus* zone. A lack of dinoflagellates indicate that the interval 2365m to 2485m was deposited in a non-marine environment. On the basis of coal occurrences recognized on logs, this non-marine interval could be extended down to 2575m or so. Dinoflagellate assemblages indicate that the interval 2530m to 2780m was deposited in a marginal marine environment.

The interval 2780m to 2890m consists of siltstone with minor sandstone and coal. It has not been studied for purposes of palynologic zonation.

The interval 2890m to 2918m consists of siltstone with minor sandstone and coal. It is assigned to the *L. balmei* zone of the Paleocene. No dinoflagellates were recognized.

Source-Rock Evaluation

## Types of Organic Matter

Figures 8 to 15 contain microscopic coal maceral identification as to types of organic matter present in eight samples intervals of the Squid #1 sidetrack well. These results are summarized in Figure 16. The first five samples are from the Upper Eastern View Coal Measures section while the bottom three samples are from the Lower Eastern View Coal Measures section. Two of the samples, 2200m to 2215m and 2260m to 2275m, are from a very coaly portion of the Upper EVCM section and expectedly show vitrinite in excess of 99.00 percent. The upper most sample, 1945m to 1960m is from the basal portion of the Demon's Bluff Formation and has exinite content of 16 percent. This section is described as marginal marine on the basis of paleontology. The next sample, 1975m to 1990m is from the uppermost sandstone, shale and thin coal facies of the Upper EVCM. It has an exinite content of 7 percent. This section may also be marginal marine. A sample of the interval 2365m to 2380m consists mostly of coal and has an exinite content of 1 percent. On logs, this section consists of olivine basalt and shale with minor coal. This sample consists mostly of cavings and is considered not representative of the section drilled.

The next three sample intervals are from the Lower Eastern View Coal Measures section and have exinite contents of 32.36 and 32 percent. The sample intervals are 2425m to 2440m, 2530m to 2545m and 2750m to 2785m. This section is described as marginal marine on the basis of paleontology. These exinites consist of sporinites, resinites, cutinites and fluorinites. These sample intervals show percentages of exinites far greater than any other ever analyzed in all of the Bass Basin wells drilled so far.

## VITRINITE REFLECTANCE AND COAL MACERAL IDENTIFICATION

1984      WELL NAME : SQUID #1

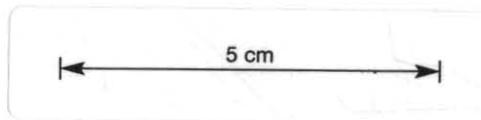
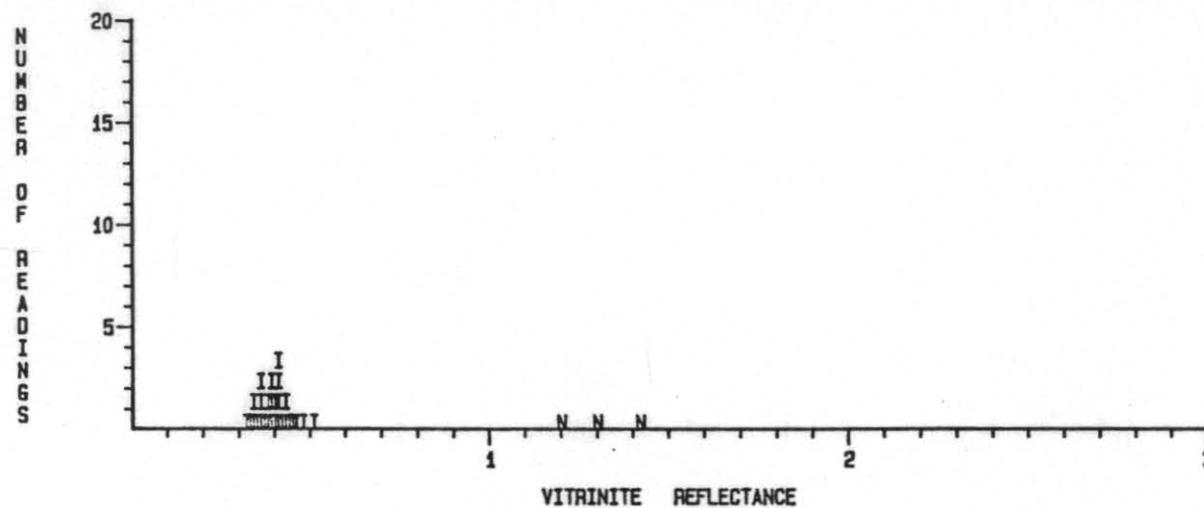
DEPTH OR SAMPLE No : 1945-1960 Metres

SAMPLE TYPE : CUTTINGS

(Total No. of Readings = 31) 0.32 0.33 0.34 0.34 0.35 0.36 0.38 0.36 0.37 0.38 0.38 0.39 0.39 0.39 0.40 0.41 0.41  
0.41 0.41 0.41 0.42 0.43 0.43 0.44 0.45 0.46 0.48 0.51 1.20 1.30 1.42

VITRINITE REFLECTANCE							MACERAL IDENTIFICATION				
POPULATION		No. of Readings	Mean Ro (%)	Min. Ro (%)	Max. Ro (%)	STD. Dev. (%)	Comments	% Alginite	% Exinite	% Vitrinite	% Inertinite
Number	%										
1	90.3	28	0.40	0.32	0.51	0.05	INDIGENOUS (I)	0.00	18.00	92.00	2.00
2	9.7	3	1.31	1.20	1.42	0.11	INERTINITE (N)	No data	No data	No data	No data

Figure 8



212024

# VITRINITE REFLECTANCE AND COAL MACERAL IDENTIFICATION

1984 WELL NAME : SQUID #1

DEPTH OR SAMPLE No : 1975-1990 Metres

SAMPLE TYPE : CUTTINGS

(Total No. of Readings = 30 ) 0.35 0.36 0.36 0.37 0.37 0.37 0.38 0.38 0.39 0.39 0.39 0.40 0.41 0.41 0.42 0.42 0.42  
0.43 0.45 0.48 0.47 0.48 0.49 0.49 0.50 0.52 0.52 0.53 1.32 1.48

VITRINITE REFLECTANCE							MACERAL IDENTIFICATION				
POPULATION		No. of Readings	Mean Ro (%)	Min. Ro (%)	Max. Ro (%)	STD. Dev. (%)	Comments	% Alginite	% Exinite	% Vitrinite	% Inertinite
Number	%										
1	93.3	28	0.43	0.35	0.53	0.08	INDIGENOUS (I)	0.00	7.00	89.00	4.00
2	6.7	2	1.40	1.32	1.48	0.11	INERTINITE (N)	No data	No data	No data	No data

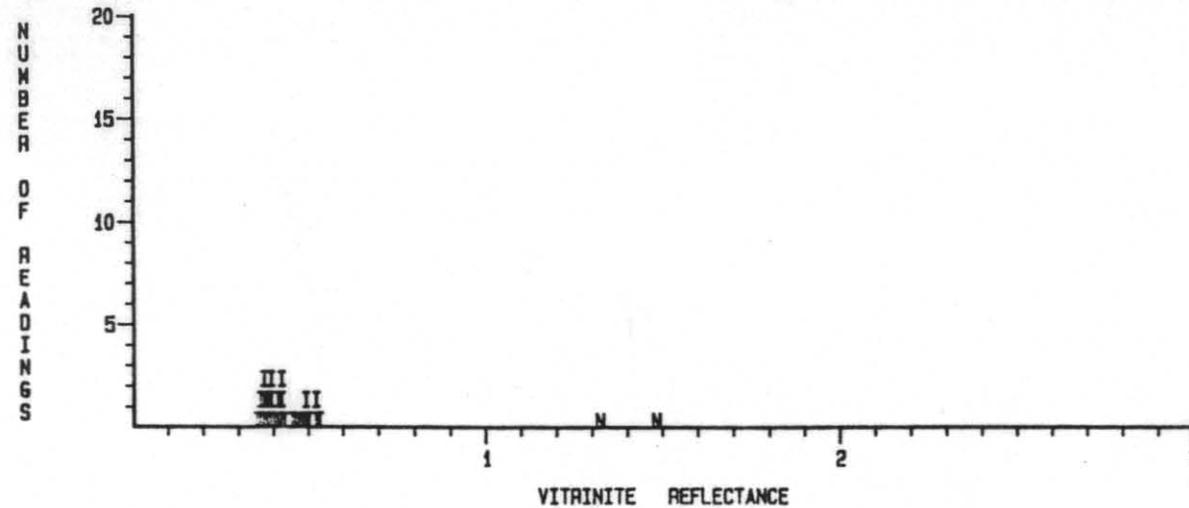


Figure 9

## VITRINITE REFLECTANCE AND COAL MACERAL IDENTIFICATION

1984      WELL NAME : SQUID #1

DEPTH OR SAMPLE No : 2200-2215 Metres

SAMPLE TYPE : CUTTINGS

(Total No. of Readings = 25) 1.77 1.79 1.81 1.84 1.89 1.92 1.97 1.99 2.00 2.02 2.02 2.03 2.05 2.08 2.08 2.07 2.10  
2.10 2.16 2.20 2.21 2.25 2.25 2.34 2.35

VITRINITE REFLECTANCE							MACERAL IDENTIFICATION				
POPULATION		No. of Readings	Mean Ro (%)	Min. Ro (%)	Max. Ro (%)	STD. Dev. (%)	Comments	% Alginite	% Exinite	% Vitrinite	% Inertinite
Number	%										
1	100	25	2.05	1.77	2.35	0.16	THERMALLY ALTERED	0.00	0.00	99.89	0.10

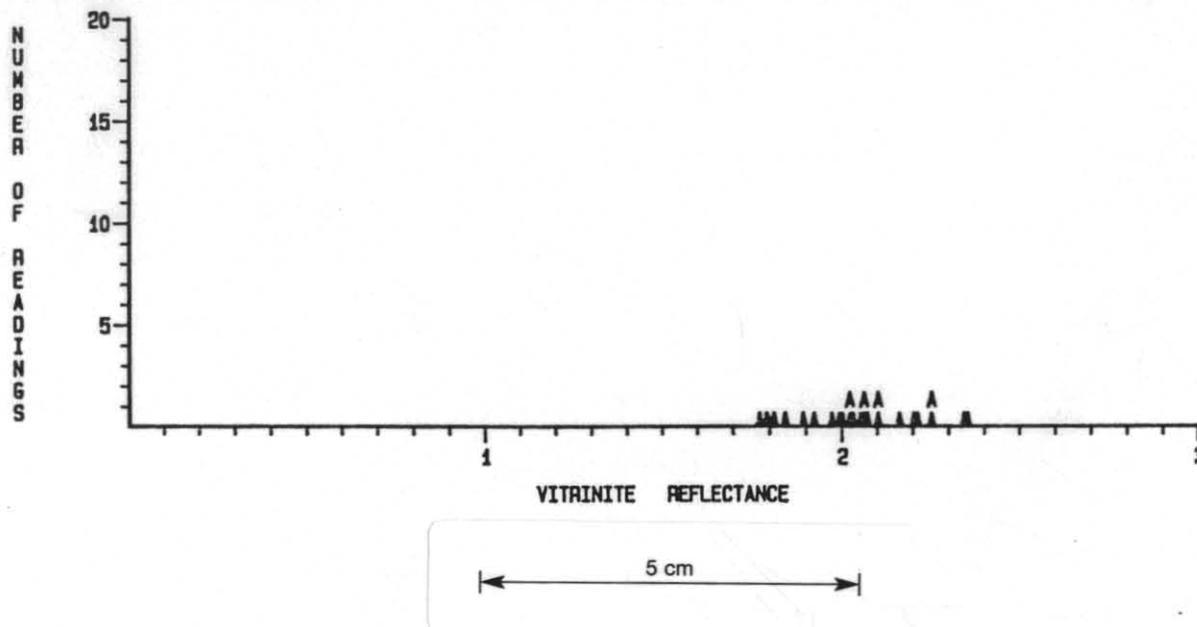


Figure 10

# VITRINITE REFLECTANCE AND COAL MACERAL IDENTIFICATION

1984 WELL NAME : SQUID #1

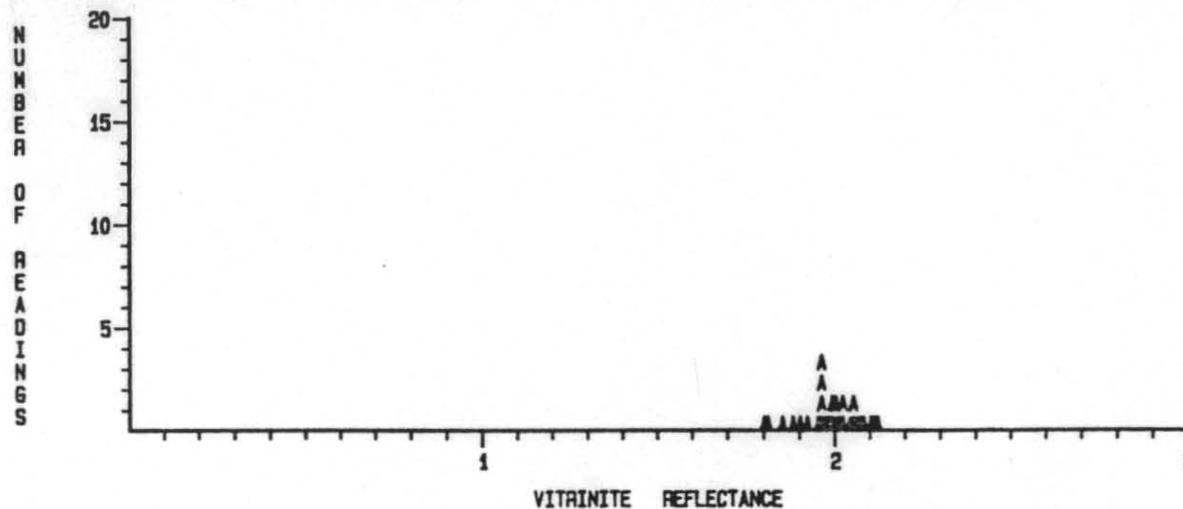
DEPTH OR SAMPLE No : 2260-2275 Metres

SAMPLE TYPE : CUTTINGS

(Total No. of Readings = 29) 1.80 1.81 1.85 1.88 1.90 1.92 1.95 1.98 1.98 1.98 1.98 1.97 1.98 1.99 1.99 2.00 2.00  
2.01 2.02 2.02 2.04 2.05 2.05 2.08 2.07 2.08 2.10 2.11 2.12

VITRINITE REFLECTANCE							MACERAL IDENTIFICATION				
POPULATION	No. of	Mean	Min.	Max.	STD.	Comments	%	%	%	%	
Number	%	Readings	Ro (%)	Ro (%)	Ro (%)		Dev. (%)	Alginite	Exinite	Vitrinite	Inertinite
1	100	29	1.99	1.80	2.12	0.08	THERMALLY ALTERED	0.00	0.00	100.00	0.00

Figure 11



212027

# VITRINITE REFLECTANCE AND COAL MACERAL IDENTIFICATION

1984 WELL NAME : SQUID #1

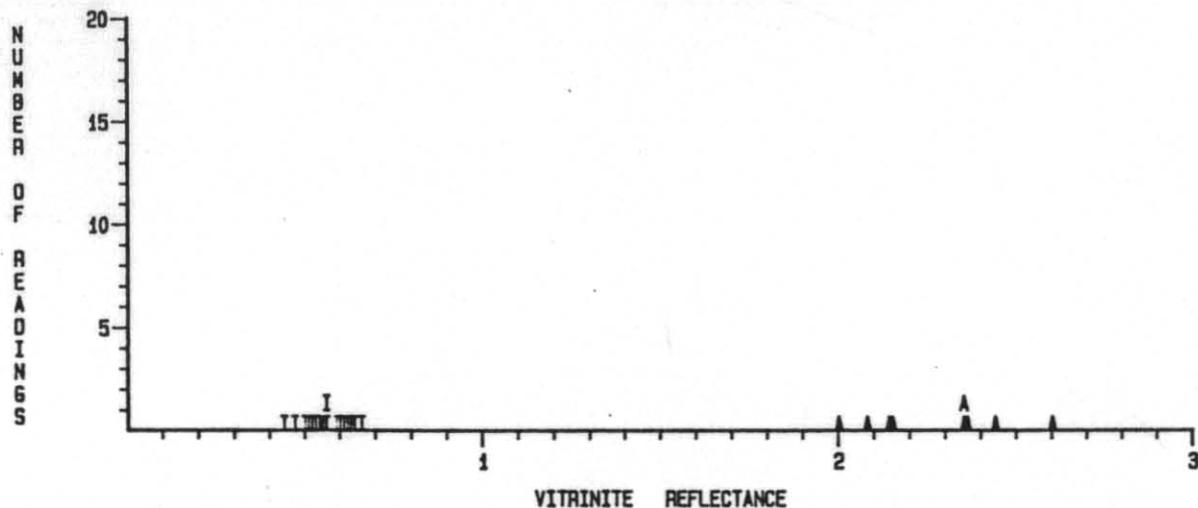
DEPTH OR SAMPLE No : 2365-2380 Metres

SAMPLE TYPE : CUTTINGS

(Total No. of Readings = 34) 0.44 0.47 0.50 0.51 0.52 0.53 0.54 0.55 0.58 0.58 0.59 0.60 0.61 0.62 0.63 0.64 0.66  
2.00 2.08 2.14 2.15 2.35 2.35 2.38 2.44 2.60 4.08 5.88 5.85 6.43 6.53 6.58 7.10 7.88

VITRINITE REFLECTANCE							MACERAL IDENTIFICATION				
POPULATION		No. of Readings	Mean Ro (%)	Min. Ro (%)	Max. Ro (%)	STD. Dev. (%)	Comments	% Alginite	% Exinite	% Vitrinite	% Inertinite
Number	%										
1	50	17	0.58	0.44	0.68	0.08	INDIGENOUS (I)	0.00	1.00	98.00	1.00
2	28.5	9	2.27	2.00	2.60	0.19	THERMALLY ALTERED	No data	No data	No data	No data
3	23.5	8	6.28	4.08	7.88	1.13	THERMALLY ALTERED	No data	No data	No data	No data

Figure 12



## VITRINITE REFLECTANCE AND COAL MACERAL IDENTIFICATION

1984      WELL NAME : SQUID #1

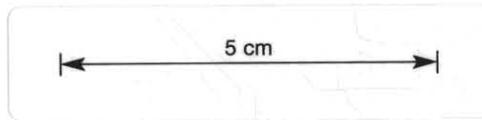
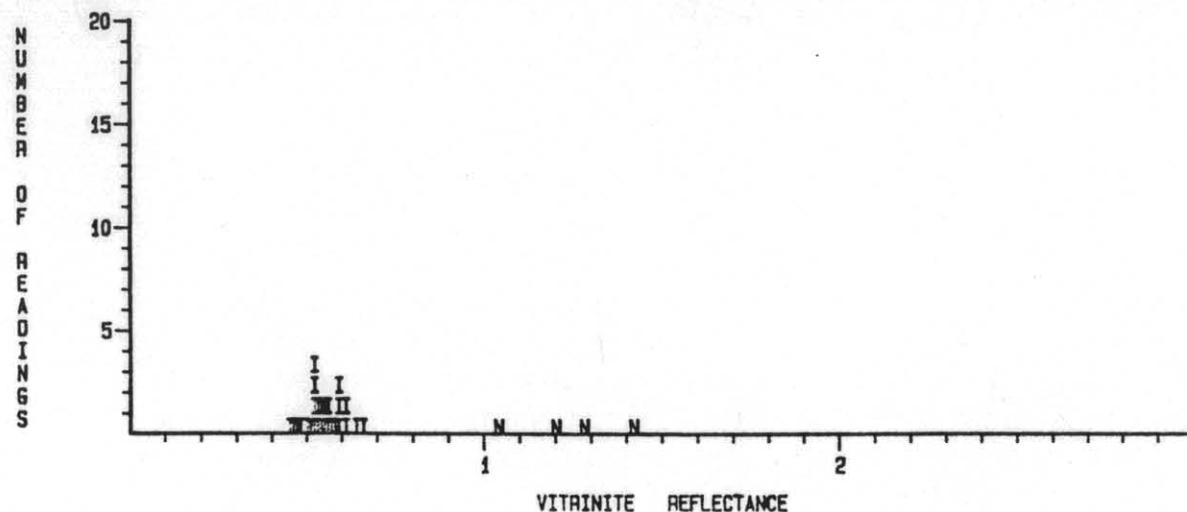
DEPTH OR SAMPLE No : 2425-2440 Metres

SAMPLE TYPE : CUTTINGS

(Total No. of Readings = 31) 0.45 0.48 0.47 0.48 0.50 0.51 0.52 0.52 0.52 0.52 0.53 0.53 0.54 0.54 0.55 0.55 0.58  
0.58 0.57 0.58 0.59 0.59 0.59 0.81 0.81 0.84 0.68 1.04 1.20 1.28 1.42

VITRINITE REFLECTANCE							MACERAL IDENTIFICATION				
POPULATION		No. of Readings	Mean Ro (%)	Min. Ro (%)	Max. Ro (%)	STD. Dev. (%)	Comments	% Alginite	% Exinite	% Vitrinite	% Inertinite
Number	%										
1	87.1	27	0.55	0.45	0.68	0.05	INDIGENOUS (I)	0.00	32.00	84.00	4.00
2	12.9	4	1.24	1.04	1.42	0.18	INERTINITE (N)	No data	No data	No data	No data

Figure 13



212029

# VITRINITE REFLECTANCE AND COAL MACERAL IDENTIFICATION

1984 WELL NAME : SQUID #1

DEPTH OR SAMPLE No : 2530-2545 Metres

SAMPLE TYPE : CUTTINGS

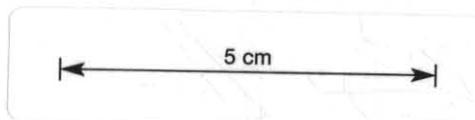
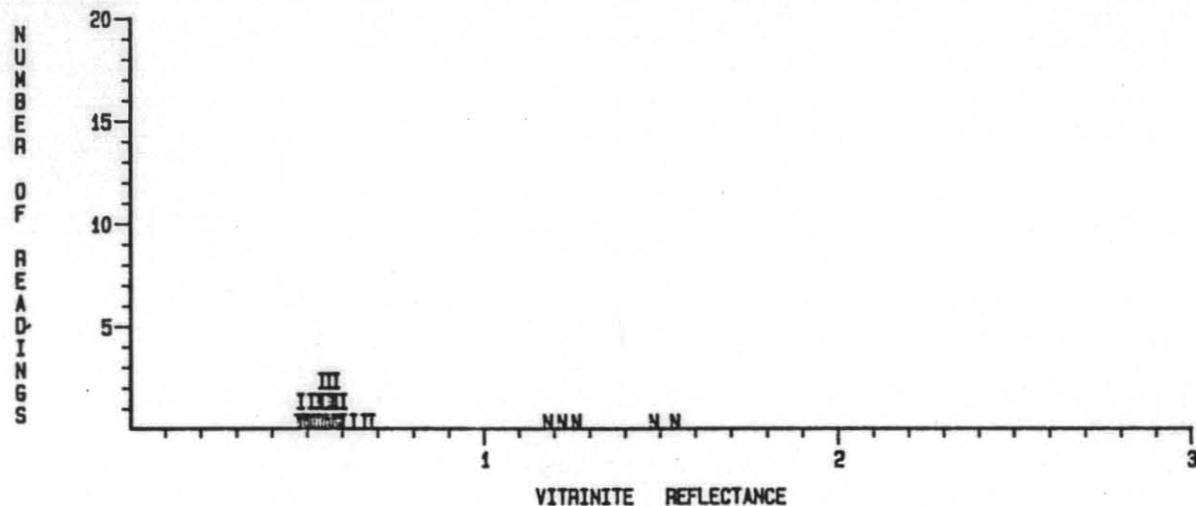
(Total No. of Readings - 33) 0.47 0.48 0.48 0.48 0.50 0.51 0.51 0.52 0.53 0.53 0.54 0.54 0.54 0.55 0.56 0.56 0.56  
0.57 0.57 0.58 0.58 0.58 0.59 0.60 0.60 0.63 0.68 0.68 1.18 1.22 1.26 1.48 1.54

## VITRINITE REFLECTANCE

## MACERAL IDENTIFICATION

POPULATION		No. of Readings	Mean Ro (%)	Min. Ro (%)	Max. Ro (%)	STD. Dev. (%)	Comments	% Alginite	% Exinite	% Vitrinite	% Inertinite
Number	%										
1	84.8	28	0.55	0.47	0.68	0.05	INDIGENOUS (I)	0.00	38.00	60.00	4.00
2	15.2	5	1.34	1.18	1.54	0.18	INERTINITE (N)	No data	No data	No data	No data

Figure 14



212030

## VITRINITE REFLECTANCE AND COAL MACERAL IDENTIFICATION

1984      WELL NAME : SQUID #1

DEPTH OR SAMPLE No : 2750-2765 Metres

SAMPLE TYPE : CUTTINGS

(Total No. of Readings = 22) 0.48 0.48 0.50 0.51 0.51 0.52 0.53 0.53 0.53 0.54 0.54 0.54 0.58 0.57 0.58 0.58 0.59  
0.59 0.61 0.63 1.22 1.58

VITRINITE REFLECTANCE							MACERAL IDENTIFICATION				
POPULATION		No. of Readings	Mean Ro (%)	Min. Ro (%)	Max. Ro (%)	STD. Dev. (%)	Comments	% Alginite	% Exinite	% Vitrinite	% Inertinite
Number	%										
1	90.8	20	0.55	0.48	0.63	0.04	INDIGENOUS (I)	0.00	32.00	65.00	3.00
2	9.1	2	1.40	1.22	1.58	0.25	INERTINITE (N)	No data	No data	No data	No data

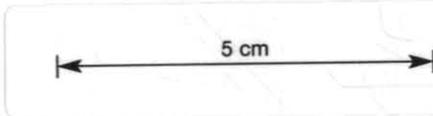
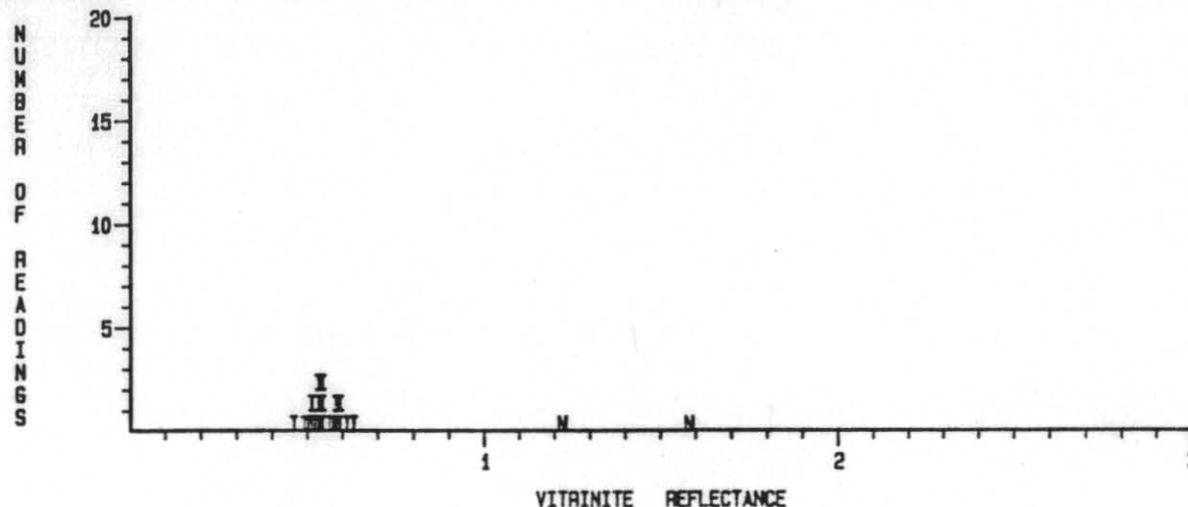


Figure 15

212031

TYPES OF ORGANIC MATTER IN SQUID #1 WELL

<u>Interval (m)</u>	<u>Exinite %</u>	<u>Vitrinite %</u>	<u>Inertinite %</u>	<u>Exinite Fractions</u>
1945 - 1960 U. EVCM	16.00	82.00	2.00	S,F,R,C, Coal Abun- dant
1975 - 1990 U. EVCM	7.00	89.00	4.00	S,R, Coal Sparse
2200 - 2215 U. EVCM	-0-	99.69	0.10	None, Coal Dominant
2260 - 2275 U. EVCM	-0-	100.00	-0-	None, Coal Dominant
2365 - 2380 U. EVCM	1.00	98.00	1.00	L, Coal Major, S <sub>1</sub>
2425 - 2440 L. EVCM	32.00	64.00	4.00	S,S <sub>2</sub> ,R,C,F,E,
2530 - 2545 L. EVCM	36.00	60.00	4.00	S,R,C,F
2750 - 2785 L. EVCM	32.00	65.00	3.00	S,C,R

S - Sporinite  
 R - Resinite  
 C - Cutinite  
 L - Liptodetrinite  
 S<sub>2</sub> - Suberinite  
 F - Fluorinite  
 E - Exsudatinite  
 S<sub>1</sub> - Sclerotinite

Figure 16

Total Organic Carbon

Fourteen sample intervals have been analyzed for total organic carbon (TOC) content. The samples cover a gross interval ranging from 1840m to 2915m (total depth). The Demon's Bluff, Upper Eastern View Coal Measures and Lower Eastern View Coal Measures are represented.

Using the generally accepted criteria that a minimum TOC content of 0.5 percent is necessary for a clastic rock to have hydrocarbon-source potential, it is readily obvious that all samples exceed this threshold value by a wide margin. Figure 17 is a list of the sample intervals, their TOC content, facies and formation name.

## Total Organic Carbon Content

## Squid #1 Sidetrack Well

<u>Depth (m)</u>	<u>TOC (%)</u>	<u>Facies/Formation</u>
1840.0 - 1855.0	4.37	Claystone/Demon Bluff
1930.0 - 1945.5	1.34	Sandstone, Claystone/U. EVCM
1945.0 - 1960.0	5.02	Claystone/U. EVCM
1975.0 - 1990.0	9.89	Claystone, <u>Coal</u> /U. EVCM
2020.0 - 2035.0	6.91	Claystone, <u>Coal</u> , Siltstone/U. EVCM
2095.0 - 2110.0	9.38	Claystone, <u>Coal</u> , Sandstone/U. EVCM
2200.0 - 2215.0	41.80	Sandstone, <u>Coal</u> , Claystone/U. EVCM
2305.0 - 2320.0	0.69	Sandstone, Claystone/U. EVCM
2365.0 - 2380.0	7.64	Olivine Basalt, Claystone, <u>Coal</u> / U. EVCM - L. EVCM
2425.0 - 2440.0	44.61	Sandstone, <u>Coal</u> , Claystone/L. EVCM
2530.0 - 2545.0	12.47	Siltstone, <u>Coal</u> /L. EVCM
2645.0 - 2660.0	3.24	Siltstone, <u>Coal</u> /L. EVCM
2750.0 - 2765.0	1.32	Siltstone, <u>Coal</u> /L. EVCM
2900.0 - 2915.0	3.40	Siltstone, Sandstone/L. EVCM

\* Dominant fraction is underlined.

Figure 17

### Pyrolysis Source-Rock Data

Fourteen sample intervals covering the gross interval 1840m to 2915m have been analysed by pyrolysis using the Rock-Eval method, Figure 18.

In this method, the volatiles released, as the reaction takes place progressively, are: free hydrocarbons in the sample available for, or as a result of migration ( $S_1$ ), also called volatile hydrocarbons; residual hydrocarbons generated by the thermal cracking of kerogen ( $S_2$ ), or generating potential; and carbon dioxide of organic derivation generated during the cracking of kerogen ( $S_3$ ). Petroleum potential or potential yield ( $S_1 + S_2$ ) is a measure of the source-rock richness. Production index (PI) or ( $S_1/S_1 + S_2$ ) can reveal the presence of migrated hydrocarbons. The production index should increase regularly with depth, with organic maturation, and anomalously high values can be interpreted as due to hydrocarbons migrating through the section. Conversely, anomalously low values can be interpreted as due to hydrocarbons having migrated out of the section.

The hydrocarbon index (HI) and oxygen index (OI) relate the amounts of residual hydrocarbon ( $S_2$ ) and organic carbon dioxide ( $S_3$ ), respectively, to the total organic carbon content, and reflect the elemental composition of the kerogen. These can be plotted against one another to determine kerogen type, thus source type as to gas or oil or mix potential. High hydrogen indices relative to oxygen indices typifies oil prone sources or exinite kerogen, whereas high oxygen indices typify gas prone sources or humic kerogens.

A further parameter is the hydrogen to oxygen ratio (H/O) or ( $S_2/S_3$ ). Arbitrary ratio limits have been set to define oil and gas sources; a ratio of 5 or greater indicates oil source, less than 2.5 indicates gas source, intermediate ratio values indicate mixed oil and gas source. This ratio is used

ROCK-EVAL PYROLYSIS DATA

WELLNAME = SQUID #1

DATE OF JOB = OCTOBER 1984

DEPTH(m)	TMAX	S1	S2	S3	S1+S2	S2/S3	PI	PC	TOC	HI	OI
1840.0-1855.0	427	1.05	5.57	2.49	6.62	2.24	0.16	0.55	4.37	127	56
1930.0-1945.0	424	0.46	1.53	1.40	1.99	1.09	0.23	0.17	1.34	114	104
1945.0-1960.0	425	0.99	11.28	2.19	12.27	5.15	0.08	1.02	5.02	224	43
1975.0-1990.0	428	1.46	25.48	3.09	26.94	8.25	0.05	2.24	9.89	257	31
2020.0-2035.0	431	0.90	15.43	2.42	16.33	6.38	0.06	1.36	6.91	223	35
2095.0-2110.0	536	1.29	2.93	1.70	4.22	1.72	0.31	0.35	9.38	31	18
2200.0-2215.0	539	2.88	10.77	1.00	13.65	10.77	0.21	1.13	41.80	25	2
2305.0-2320.0	428	0.32	0.44	0.95	0.76	0.46	0.42	0.06	0.69	63	137
2365.0-2380.0	445	0.47	1.63	1.53	2.10	1.07	0.22	0.17	7.64	21	20
2425.0-2440.0	428	13.13	146.11	2.16	159.24	67.64	0.08	13.22	44.61	327	4
2530.0-2545.0	432	3.06	36.47	1.09	39.53	33.46	0.08	3.28	12.47	292	8
2645.0-2660.0	429	1.37	10.57	0.77	11.94	13.73	0.11	0.99	3.24	326	23
2750.0-2765.0	433	0.38	2.29	2.81	2.67	0.81	0.14	0.22	1.32	173	212
2900.0-2915.0	434	1.17	7.17	1.49	8.34	4.81	0.14	0.69	3.40	210	43

TMAX = Max. temperature  
 S1+S2 = Potential yield  
 PC = Pyrolysable carbon  
 OI = Oxygen Index

S1 = Volatile hydrocarbons (HC)  
 S3 = Organic carbon dioxide  
 TOC = Total organic carbon  
 nd = no data

S2 = H<sub>2</sub> generating potential  
 PI = Production index  
 HI = Hydrogen index

Figure 18

212036

when TOC content determinations are not available.

A last parameter is the temperature at which the  $S_2$  peak, the peak of thermal decomposition of kerogen, reaches a maximum (T-max) as an indicator of the state of organic maturation.

Results of the pyrolysis studies done on the Squid Well sample intervals as compared with those found in E. Nicholas et al, BMR report on the Petroleum Potential of the Bass Basin, Figure 19.

It should be kept in mind that core samples are used in the BMR study and that those do offer a great deal more selectivity than interval samples as is the case in the Squid well.

The T-Max measured in the non-thermally altered sample intervals of the Squid well increase with depth and range from 424°C to 434°C at total depth. These maturation levels indicate that the section is immature, the boundary between immature and oil generation being 435°C.

The TOC content measurements are significantly and consistently higher in the Squid well than those found in the BMR report.

The samples oil and gas content,  $S_1$ , or free hydrocarbons or volatile hydrocarbons are also substantially higher in the Squid well than those reported in the BMR report.

The petroleum potential or potential yield,  $S_1 + S_2$ , measurements are also consistently and significantly higher in the Squid well than are those found in the BMR report.

The production index, PI, or  $S_1/S_1 + S_2$ , measurements are also consistently higher in the Squid well. It should be noted that in the Squid well the best values are found in the upper portion of the Upper EVCM and in the Lower EVCM. These results are consistent with those found in the BMR report.

Relatively high hydrocarbon index measurements are significantly more common

## Petroleum potential of the Bass Basin

*E. Nicholas, K. L. Lockwood, A. R. Martin<sup>1</sup>, & K. S. Jackson*

Well name	Unit	Core No.	Total organic carbon (TOC) (%)	Oil & gas content $S_1$ (mg hydrocarbon/g rock)	Petroleum potential $S_1+S_2$ (mg hydrocarbon/g rock)	Production index $S_1/(S_1+S_2)$	Hydrogen index $S_2/TOC$ (mg hydrocarbon/g TOC)	Oxygen index $S_3/TOC$ (mg $CO_2/g$ TOC)	Hydrogen: oxygen ratio (H/O)
Bass No. 3	Torquay Gp	4	1.30	0.02	1.55	0.01	118	37	3.2
Cormorant No. 1	Demons Bluff Fm	2	5.10	0.05	2.06	0.02	39	95	0.4
Aroo No. 1	L. EVCM	1	6.05	0.82	22.80	0.04	365	10	37
Bass No. 1	Torquay Gp	6	0.70	0.02	0.26	0.08	34	213	0.2
	Torouay Gp	8	0.50	0.04	0.05	0.80	2	200	0.01
	U. EVCM	11	5.35	0.10	2.10	0.05	37	47	0.8
	U. EVCM	13	1.90	0.10	2.80	0.04	142	57	2.5
	U. EVCM	15	2.80	0.21	4.07	0.05	138	162	0.9
Bass No. 2	Torquay Gp	2	0.50	0.02	1.79	0.01	354	313	1.1
	U. EVCM	5	3.55	0.08	12.50	0.01	349	31	11
	L. EVCM	9	2.40	0.21	10.00	0.02	409	29	14
Bass No. 3	U. EVCM	8	1.05	0.04	1.00	0.04	91	240	0.4
	L. EVCM	10	20.10	1.21	46.70	0.03	226	10	23
	L. EVCM	11	2.40	0.13	4.74	0.03	192	11	18
	L. EVCM	13	0.60	0.02	0.03	0.67	2	18	0.1
Cormorant No. 1	U. EVCM	5	10.10	1.63	13.70	0.12	120	197	0.6
	U. EVCM	6	66.90*	14.50	182	0.08	250	33	7.6
Nangkero No. 1	U. EVCM	1	0.70	0.08	3.56	0.02	497	336	1.5
Narimba No. 1	L. EVCM	1	7.10	1.81	17.70	0.10	223	9	24
	L. EVCM	2	0.85	0.09	0.73	0.12	76	271	0.3
	L. EVCM	3	1.85	0.19	1.72	0.11	83	148	0.6
Poonboon No. 1	L. EVCM	2	65.80*	19.60	160	0.12	213	13	16
	L. EVCM	4	1.75	0.11	1.49	0.07	79	132	0.6
	L. EVCM	5	1.20	0.13	0.88	0.15	63	100	0.6
Snail No. 1	U. EVCM	2	2.65	3.86	4.07	0.95	8	114	0.07
	Otway Gp	3	4.15	3.03	3.14	0.96	3	150	0.02
Durroon No. 1	Otway Gp	3	1.80	0.01	0.60	0.02	33	69	0.5
	Otway Gp	4	4.50	0.17	0.98	0.17	18	9	2.0
	Otway Gp	5	3.75	0.23	2.28	0.10	55	9	5.9

\* Coal

Rock-Eval pyrolysis data for some Bass Basin source rocks (Martin & Saxby, 1980).

Figure 19

in the Squid well but do not reach as high values on those listed in the BMR report.

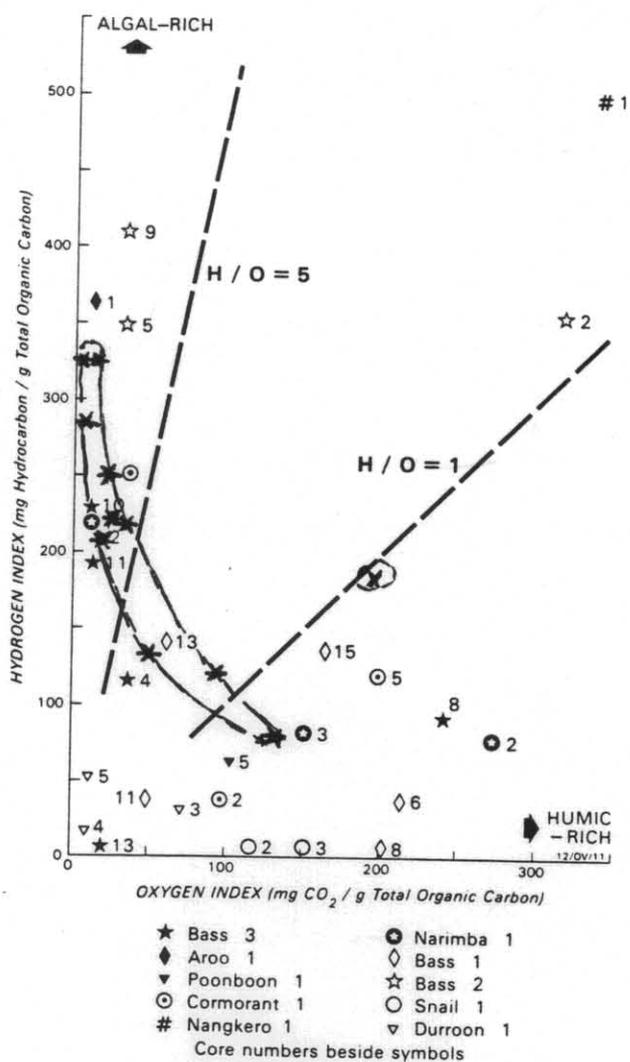
Oxygen index measurements listed in the BMR report are consistently and significantly higher than those found in the Squid well.

Hydrogen to oxygen ratio measurements are generally higher in the Squid well than those listed in the BMR report.

Hydrogen index and oxygen index measurements made on the Squid well interval samples have been added to the cross-plot found in the BMR report, Figure 20. These indicate that of eleven measurements made in the Squid well; seven fall within the oil-prone source rock window, two are in the oil and gas window, and two are in the gas-prone window. Of the seven measurements which fall within the oil-prone source rock window, four are from the Lower EVCM and three are from the Upper EVCM.

### Petroleum potential of the Bass Basin

E. Nicholas, K. L. Lockwood, A. R. Martin<sup>1</sup>, & K. S. Jackson



Hydrogen and oxygen indices plotted for some Bass Basin source rocks.

Arrows indicate trends in richness and nature of source-rock kerogen.

Figure 20

### Maturation of Organic Matter

The degree of thermal alteration of sedimentary organic material is determined by measurements of reflected light from opaque vitrinite.

Vitrinite reflectance ( $R_o$ ) measurements have been performed on eight sample intervals, Figures 8 to 15 and 21.

Values of  $R_o$  range from 0.32 to 0.68 for the indigenous population. The mean  $R_o$  values range from 0.40 to 0.55 indicating that the section is mostly immature to near mature. Evidence of thermal alteration is found in three of the samples. These are 2200m - 2215m with an  $R_o$  range of 1.77 to 2.35 and a mean  $R_o$  of 2.05. Sample 2260m - 2275m with an  $R_o$  range of 1.80 to 2.12 and a mean  $R_o$  of 1.98. Sample 2365m to 2380m is OMC in which three distinct populations are recognized. A population with a normal  $R_o$  range of 0.44 to 0.66 and a mean  $R_o$  of 0.56. A second population with an  $R_o$  range of 2.00 to 2.60 and a mean  $R_o$  of 2.05. A third population with an  $R_o$  range of 4.06 to 7.88 and a mean  $R_o$  of 6.26. Electrical logs and sample studies indicate a defined olivine basalt occurrence over the interval 2322m to 2364m. A much less well defined occurrence may be over the interval 2154m to 2167m. Possibly other minor volcanic occurrences may be present within the gross interval 2154m to 2365m.

This is the first documented case in the Bass basin wells where significant thermal alteration of the vitrimites in association with volcanic occurrences is recorded.

Figures 22 and 23 are from: Petroleum Potential of the Bass Basin by E. Nicholas et al. The  $R_o$  values versus depth from the Squid well are added to those reported in this BMR report. The Squid well  $R_o$  values are essentially on trend on Figure 22 but do fall a little low on Figure 23.

With a bottom hole temperature of 89°C at 2918 meters, true vertical depth, or 30.5°C/km in the Squid well, these results are in line with the results from other Bass Basin wells also located in the deep portion of the Basin where low vitrinite reflectance gradients and apparent lagging maturation increases behind temperature increases have been noted.

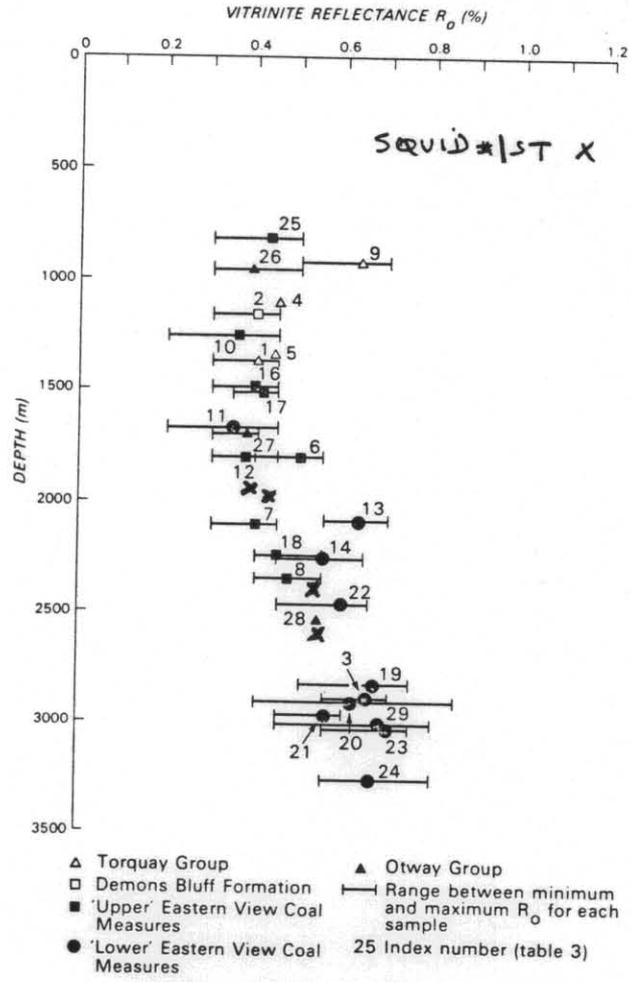
## SQUID NO. 1

Depth (m)	$\bar{R}_V$ max	Range	N	Exinite Fluorescence (Remarks)
1945- 1960 ?Ctgs * 337	0.40	0.32-0.51	28	Common sporinite, yellow to yellow orange, rare fluorinite, green, rare resinite and cutinite, dull orange. (Silty claystone>sandstone>coal. Coal abundant, V>E>>I. Clarite>vitrinite. Dom common, V>E>I. Vitrinite common, exinite and inertinite sparse. Abundant pyrite.)
1975- 1990 ?Ctgs	0.43	0.35-0.53	28	Sparse sporinite and resinite, yellow to yellow orange. (Claystone>siltstone>coal. Coal sparse, V>E. Clarite>vitrinite. Dom abundant, V>E>I. Vitrinite abundant, exinite and inertinite sparse. Common pyrite.)
2200- 2215 ?Ctgs	2.05*	1.77-2.35	25	No exinite fluorescence. (Coal>sandstone>siltstone. Coal dominant, is-thermally altered vitrinite and clarite. Dom common, V. Vitrinite is thermally altered, inertinite and exinite absent. Common carbonate and pyrite.)
* Thermally altered vitrinite				
2260- 2275 ?Ctgs	1.98*	1.80-2.12	29	No exinite fluorescence. (Coal>>claystone>sandstone. Coal, dominant as thermally altered vitrinite. Dom sparse but abundant where present, V. Inertinite and exinite absent.)
* Thermally altered vitrinite				
2365- 2380 Ctgs	0.56 <sup>1</sup>	0.44-0.66	17	Rare leptodetrinite, orange. (Altered igneous rock>siltstone>claystone>coal. Coal major, thermally altered with rare sclerotinite. Dom common, V. Inertinite and exinite absent. Some vitrinite has brown fluorescence.
	2.05 <sup>2</sup>	2.00-2.60	9	(1) (2) and (3) represent progressively more intensely thermally altered vitrinite. Population (1) has a reflectance near to the reflectance of x1337 but the paucity of fluorescing exinite suggests that it has suffered contact alteration.)
	6.26 <sup>3</sup>	4.06-7.88	8	
2425- 2440 ?Ctgs	0.55	0.45-0.66	27	Abundant sporinite, yellow to orange, abundant suberinite, brown, abundant resinite, yellow to brown, common cutinite, orange to brown, common fluorinite, green to yellow. Rare exsudatinite, yellow. (Coal>siltstone>sandstone. Coal major, V>E>>I. Clarite>vitrinite. Coal is Upper Eastern Vlew facies. Dom common, V>E>I. Vitrinite common, exinite sparse, inertinite rare. Weak green oil cuts from clarite. Sparse carbonate.)
2530- 2545 ?Ctgs	0.55	0.47-0.68	28	Common sporinite and resinite, yellow to orange, sparse cutinite, bright yellow and dull orange, sparse fluorinite, green to yellow. (Siltstone>claystone>coal>igneous rock and carbonate>shaly coal. Shaly coal sparse, V>E>>I. Coal common, V>E>I. Vitrinite common, exinite sparse, inertinite rare. Abundant carbonate. Sparse pyrite.)
2750- 2765 ?Ctgs	0.54	0.46-0.63	20	Common sporinite, yellow to orange, sparse cutinite, orange, sparse resinite, yellow. (Siltstone>igneous rock and carbonate. Dom common, V>E>I. Vitrinite abundant, exinite common, inertinite sparse. Sparse pyrite.)

Figure 21

# Petroleum potential of the Bass Basin

E. Nicholas, K. L. Lockwood, A. R. Martin<sup>1</sup>, & K. S. Jackson



Vitrinite reflectance plotted against depth in Bass Basin.

5 cm

Figure 22



A series of lithostratigraphic units have been identified in the Squid #1 sidetrack exploratory well and in the Pelican #1 field discovery well. These units are defined after distinct characters recognized on the synthetic seismogram of each of these two wells. They are described in terms of facies, palynological zone, boundaries and interval velocity.

Figure 24 is a synthetic seismogram of the Squid #1 sidetrack exploratory well. The major formations are identified.

Figure 25 is a synthetic seismogram of the Pelican #1 well. The major formation boundaries are also identified.

Figure 26 compares the synthetic seismograms from each of these two wells. The boundaries of the lithostratigraphic units are indicated. It should be noted that the vertical scales of these two synthetic seismograms are not quite the same. A base line at Unit #6 is indicated. It serves to split the difference in vertical scales. It should also be noted that the horizontal scales or interval velocity scales, are also not quite the same. Nevertheless, the boundaries of the units are well recognizable.

Table 1, is a listing of the two-way time versus depth conversion for the Squid #1 sidetrack exploratory well.

Table 2, is a listing of the lithostratigraphic units, the TR boundaries, lithotypes, and interval velocities. The units identified or numbers refer to their lower boundary surface in this table as well as on Figure 26.

Each of the units are first identified, unless stated otherwise, and described in the Squid #1 sidetrack well, then it is tentatively correlated to a similar unit in the Pelican #1 well to which the Squid #1 sidetrack well is tied by Weaver seismic line WB-81-03. The lower boundary of each unit is indicated by a numeral on Figure 26.

Unit #1 begins at the sea floor and consists of limestone overlying a

SEISMIC TIME CONVERSION

WELL ID: WEAVER O&G, #1 SQUID

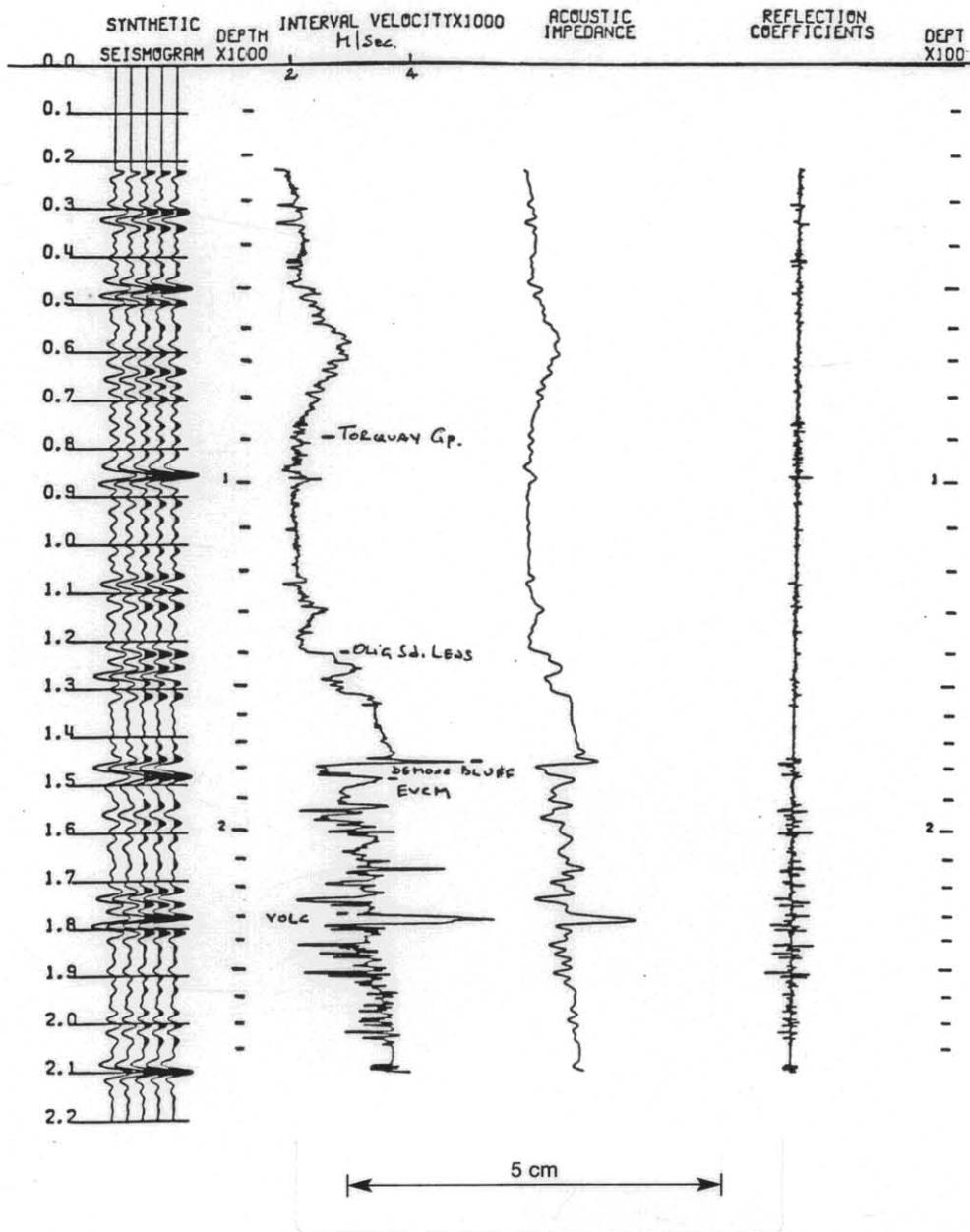
LOCATION: TASMANIA, AUSTRALIA

LOG TYPE: SONIC

VELOCITY: 2100'/S INTG SONIC

DATUM: SEA LEVEL

LOG REF (KB): +22



WEAVER OIL AND GAS CORPORATION, AUSTRALIA

Figure 24

SYNTHETIC SEISMOGRAM

GTS CORP.

HOUSTON OFFICE 3724 DACOMA 77018

ESSO EXPL & PROD AUSTRALIA INC PELICAN #1 WILDCAT AUSTRALIA TASMANIA

W

LOG DATUM = 100

SEISMIC DATUM = 0

COMMENTS \_\_\_\_\_

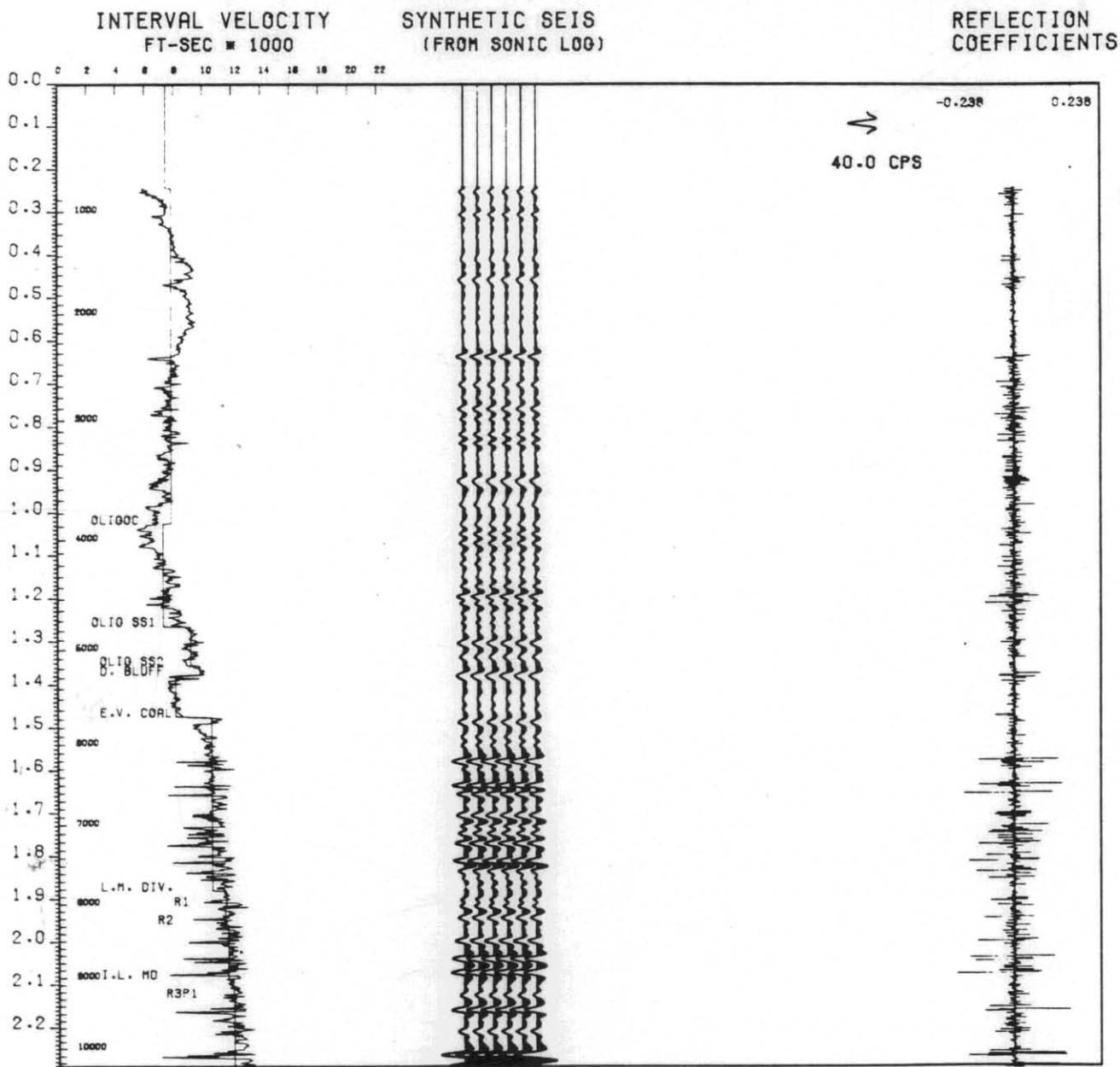


Figure 25

5 cm

WEAVER OIL AND GAS CORPORATION, AUSTRALIA

PELICAN #1

212049  
SQUID #157.

INTERVAL VELOCITY  
FT-SEC \* 1000

INTERVAL VELOCITY X 1000  
M/Sec.

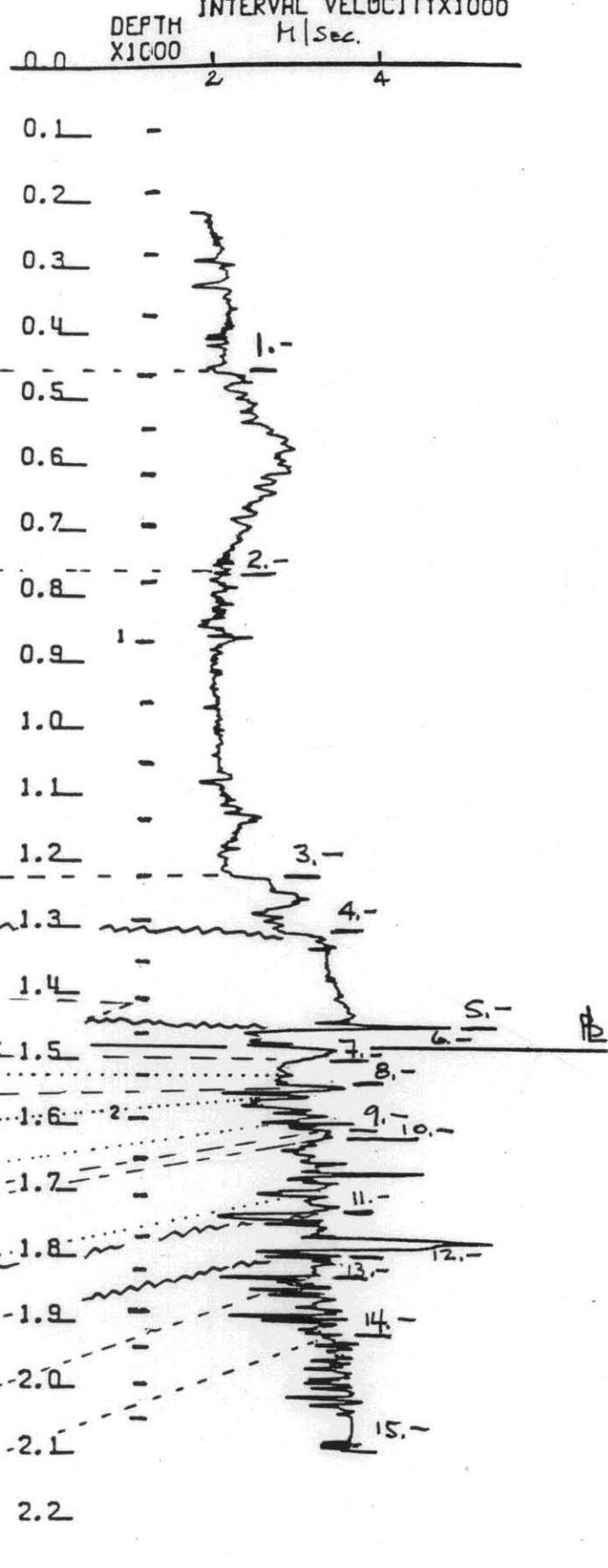
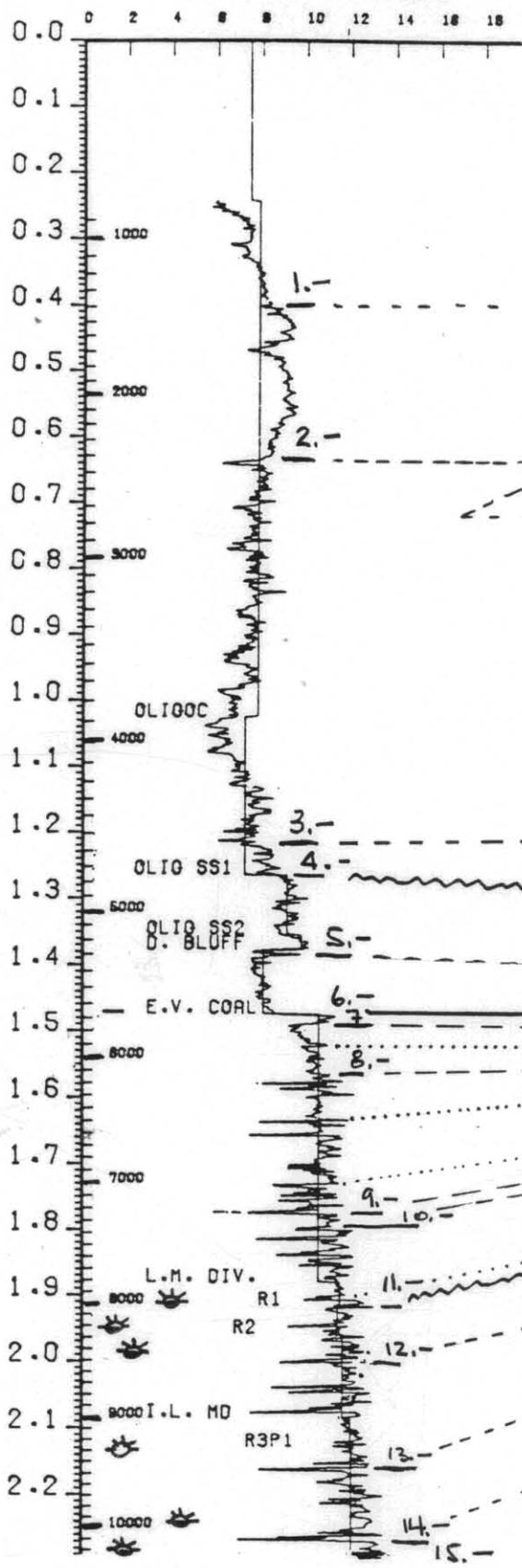
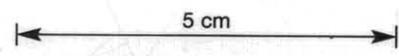


Figure 26



TIME (2-HAY) - DEPTH METERS SEA LEVEL

	0.000	0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009
0.000	0.	1.	2.	3.	4.	5.	6.	7.	8.	10.
0.010	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
0.020	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.
0.030	32.	33.	34.	35.	36.	37.	38.	39.	40.	41.
0.040	42.	43.	44.	45.	46.	47.	48.	49.	50.	51.
0.050	53.	54.	55.	56.	57.	58.	59.	60.	61.	62.
0.060	63.	65.	66.	67.	68.	69.	70.	71.	72.	73.
0.070	74.	75.	76.	77.	78.	79.	80.	81.	83.	84.
0.080	85.	86.	87.	88.	89.	90.	91.	92.	93.	94.
0.090	95.	96.	97.	98.	99.	101.	102.	103.	104.	105.
0.100	106.	107.	108.	109.	110.	111.	112.	113.	114.	115.
0.110	116.	117.	118.	119.	120.	121.	122.	123.	124.	125.
0.120	127.	128.	129.	130.	131.	132.	133.	134.	135.	137.
0.130	138.	139.	140.	141.	142.	143.	144.	145.	146.	147.
0.140	148.	149.	150.	151.	152.	153.	154.	155.	157.	158.
0.150	159.	160.	161.	162.	163.	164.	165.	166.	167.	168.
0.160	169.	170.	171.	172.	174.	175.	176.	177.	178.	179.
0.170	180.	181.	182.	183.	184.	185.	186.	187.	188.	189.
0.180	190.	192.	193.	194.	195.	196.	197.	198.	199.	200.
0.190	201.	202.	203.	204.	205.	206.	207.	208.	210.	211.
0.200	212.	213.	214.	215.	216.	217.	218.	219.	220.	221.
0.210	222.	223.	224.	225.	226.	227.	228.	229.	230.	231.
0.220	232.	233.	234.	235.	236.	237.	238.	239.	240.	241.
0.230	243.	244.	245.	246.	247.	248.	249.	250.	251.	252.
0.240	253.	254.	255.	256.	257.	258.	259.	260.	261.	262.
0.250	263.	264.	265.	266.	267.	268.	269.	270.	271.	272.
0.260	273.	274.	275.	276.	277.	278.	279.	281.	282.	283.
0.270	284.	285.	286.	287.	288.	289.	290.	291.	292.	293.
0.280	294.	296.	297.	298.	299.	300.	301.	302.	303.	304.
0.290	305.	306.	307.	308.	309.	310.	311.	312.	313.	314.
0.300	315.	316.	317.	318.	319.	320.	321.	322.	323.	324.
0.310	325.	326.	327.	328.	329.	330.	331.	332.	333.	334.
0.320	335.	336.	337.	338.	339.	340.	341.	342.	343.	344.
0.330	345.	346.	347.	348.	349.	350.	351.	352.	353.	354.
0.340	355.	356.	357.	358.	359.	360.	361.	362.	363.	364.
0.350	365.	366.	367.	368.	369.	370.	371.	372.	373.	374.
0.360	375.	376.	377.	378.	379.	380.	381.	382.	383.	384.
0.370	385.	386.	387.	388.	389.	390.	391.	392.	393.	394.
0.380	395.	396.	397.	398.	399.	400.	401.	402.	403.	404.
0.390	405.	406.	407.	408.	409.	410.	411.	412.	413.	414.
0.400	415.	416.	417.	418.	419.	420.	421.	422.	423.	424.
0.410	425.	426.	427.	428.	429.	430.	431.	432.	433.	434.
0.420	435.	436.	437.	438.	439.	440.	441.	442.	443.	444.
0.430	445.	446.	447.	448.	449.	450.	451.	452.	453.	454.
0.440	455.	456.	457.	458.	459.	460.	461.	462.	463.	464.
0.450	465.	466.	467.	468.	469.	470.	471.	472.	473.	474.
0.460	475.	476.	477.	478.	479.	480.	481.	482.	483.	484.
0.470	485.	486.	487.	488.	489.	490.	491.	492.	493.	494.
0.480	495.	496.	497.	498.	499.	500.	501.	502.	503.	504.
0.490	505.	506.	507.	508.	509.	510.	511.	512.	513.	514.
0.500	515.	516.	517.	518.	519.	520.	521.	522.	523.	524.
0.510	525.	526.	527.	528.	529.	530.	531.	532.	533.	534.
0.520	535.	536.	537.	538.	539.	540.	541.	542.	543.	544.
0.530	545.	546.	547.	548.	549.	550.	551.	552.	553.	554.
0.540	555.	556.	557.	558.	559.	560.	561.	562.	563.	564.
0.550	565.	566.	567.	568.	569.	570.	571.	572.	573.	574.
0.560	575.	576.	577.	578.	579.	580.	581.	582.	583.	584.
0.570	585.	586.	587.	588.	589.	590.	591.	592.	593.	594.
0.580	595.	596.	597.	598.	599.	600.	601.	602.	603.	604.
0.590	605.	606.	607.	608.	609.	610.	611.	612.	613.	614.
0.600	615.	616.	617.	618.	619.	620.	621.	622.	623.	624.
0.610	625.	626.	627.	628.	629.	630.	631.	632.	633.	634.
0.620	635.	636.	637.	638.	639.	640.	641.	642.	643.	644.
0.630	645.	646.	647.	648.	649.	650.	651.	652.	653.	654.
0.640	655.	656.	657.	658.	659.	660.	661.	662.	663.	664.
0.650	665.	666.	667.	668.	669.	670.	671.	672.	673.	674.
0.660	675.	676.	677.	678.	679.	680.	681.	682.	683.	684.
0.670	685.	686.	687.	688.	689.	690.	691.	692.	693.	694.
0.680	695.	696.	697.	698.	699.	700.	701.	702.	703.	704.
0.690	705.	706.	707.	708.	709.	710.	711.	712.	713.	714.
0.700	715.	716.	717.	718.	719.	720.	721.	722.	723.	724.
0.710	725.	726.	727.	728.	729.	730.	731.	732.	733.	734.
0.720	735.	736.	737.	738.	739.	740.	741.	742.	743.	744.
0.730	745.	746.	747.	748.	749.	750.	751.	752.	753.	754.
0.740	755.	756.	757.	758.	759.	760.	761.	762.	763.	764.
0.750	765.	766.	767.	768.	769.	770.	771.	772.	773.	774.
0.760	775.	776.	777.	778.	779.	780.	781.	782.	783.	784.
0.770	785.	786.	787.	788.	789.	790.	791.	792.	793.	794.
0.780	795.	796.	797.	798.	799.	800.	801.	802.	803.	804.
0.790	805.	806.	807.	808.	809.	810.	811.	812.	813.	814.
0.800	815.	816.	817.	818.	819.	820.	821.	822.	823.	824.
0.810	825.	826.	827.	828.	829.	830.	831.	832.	833.	834.
0.820	835.	836.	837.	838.	839.	840.	841.	842.	843.	844.
0.830	845.	846.	847.	848.	849.	850.	851.	852.	853.	854.
0.840	855.	856.	857.	858.	859.	860.	861.	862.	863.	864.
0.850	865.	866.	867.	868.	869.	870.	871.	872.	873.	874.
0.860	875.	876.	877.	878.	879.	880.	881.	882.	883.	884.
0.870	885.	886.	887.	888.	889.	890.	891.	892.	893.	894.
0.880	895.	896.	897.	898.	899.	900.	901.	902.	903.	904.
0.890	905.	906.	907.	908.	909.	910.	911.	912.	913.	914.
0.900	915.	916.	917.	918.	919.	920.	921.	922.	923.	924.

Table 1

## WEEVER 046, #1 SQUID TANZANIA, AUSTRALIA

TIME (2-HAY) - DEPTH BELOW SEA LEVEL

	0.000	0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009
0.800	922.	923.	924.	925.	926.	927.	928.	930.	931.	932.
0.810	933.	934.	935.	936.	937.	939.	940.	941.	942.	943.
0.820	944.	945.	946.	947.	948.	950.	951.	952.	953.	954.
0.830	955.	956.	957.	958.	959.	960.	962.	963.	964.	965.
0.840	966.	967.	968.	969.	970.	971.	972.	973.	974.	975.
0.850	976.	977.	978.	979.	980.	981.	983.	984.	985.	986.
0.860	987.	988.	989.	990.	991.	993.	994.	995.	996.	998.
0.870	999.	1000.	1001.	1002.	1003.	1004.	1005.	1007.	1008.	1009.
0.880	1010.	1011.	1012.	1013.	1014.	1015.	1016.	1017.	1019.	1020.
0.890	1021.	1022.	1023.	1024.	1025.	1026.	1027.	1028.	1029.	1030.
0.900	1031.	1032.	1033.	1035.	1036.	1037.	1038.	1039.	1040.	1041.
0.910	1042.	1043.	1044.	1045.	1046.	1047.	1048.	1049.	1051.	1052.
0.920	1053.	1054.	1055.	1056.	1057.	1058.	1059.	1060.	1061.	1062.
0.930	1063.	1064.	1065.	1067.	1068.	1069.	1070.	1071.	1072.	1073.
0.940	1074.	1075.	1076.	1077.	1078.	1079.	1081.	1082.	1083.	1084.
0.950	1085.	1086.	1087.	1088.	1089.	1090.	1091.	1092.	1093.	1095.
0.960	1096.	1097.	1098.	1099.	1100.	1101.	1102.	1103.	1104.	1105.
0.970	1106.	1107.	1108.	1110.	1111.	1112.	1113.	1114.	1115.	1116.
0.980	1117.	1118.	1119.	1121.	1122.	1123.	1124.	1125.	1126.	1127.
0.990	1128.	1129.	1130.	1131.	1133.	1134.	1135.	1136.	1137.	1138.
1.000	1139.	1140.	1141.	1142.	1143.	1145.	1146.	1147.	1148.	1149.
1.010	1150.	1151.	1152.	1153.	1154.	1155.	1157.	1158.	1159.	1160.
1.020	1161.	1162.	1163.	1164.	1165.	1167.	1168.	1169.	1170.	1171.
1.030	1172.	1173.	1174.	1175.	1176.	1178.	1179.	1180.	1181.	1182.
1.040	1183.	1184.	1185.	1186.	1187.	1188.	1190.	1191.	1192.	1193.
1.050	1194.	1195.	1196.	1197.	1198.	1199.	1201.	1202.	1203.	1204.
1.060	1205.	1206.	1207.	1208.	1209.	1211.	1212.	1213.	1214.	1215.
1.070	1216.	1217.	1218.	1220.	1221.	1222.	1223.	1224.	1225.	1227.
1.080	1228.	1229.	1230.	1231.	1232.	1233.	1234.	1235.	1236.	1237.
1.090	1238.	1240.	1241.	1242.	1243.	1244.	1245.	1246.	1247.	1249.
1.100	1250.	1251.	1252.	1253.	1254.	1255.	1257.	1258.	1259.	1260.
1.110	1261.	1262.	1264.	1265.	1266.	1267.	1268.	1269.	1270.	1272.
1.120	1273.	1274.	1275.	1276.	1277.	1279.	1280.	1281.	1282.	1284.
1.130	1285.	1286.	1287.	1288.	1290.	1291.	1292.	1294.	1295.	1296.
1.140	1298.	1299.	1300.	1301.	1303.	1304.	1305.	1307.	1308.	1309.
1.150	1310.	1311.	1313.	1314.	1315.	1316.	1318.	1319.	1320.	1321.
1.160	1322.	1323.	1324.	1326.	1327.	1329.	1330.	1331.	1332.	1333.
1.170	1334.	1336.	1337.	1338.	1339.	1340.	1342.	1343.	1344.	1345.
1.180	1346.	1347.	1348.	1350.	1351.	1352.	1353.	1354.	1356.	1357.
1.190	1358.	1359.	1360.	1361.	1362.	1364.	1365.	1366.	1367.	1368.
1.200	1369.	1370.	1371.	1373.	1374.	1375.	1376.	1377.	1378.	1379.
1.210	1381.	1382.	1383.	1384.	1385.	1386.	1387.	1388.	1390.	1391.
1.220	1392.	1393.	1394.	1395.	1397.	1398.	1399.	1400.	1401.	1403.
1.230	1404.	1405.	1406.	1407.	1409.	1411.	1412.	1414.	1415.	1417.
1.240	1418.	1419.	1421.	1422.	1424.	1425.	1427.	1428.	1429.	1431.
1.250	1432.	1434.	1435.	1437.	1438.	1440.	1441.	1443.	1444.	1446.
1.260	1448.	1449.	1451.	1452.	1454.	1456.	1457.	1459.	1460.	1462.
1.270	1463.	1465.	1467.	1468.	1470.	1471.	1472.	1474.	1475.	1477.
1.280	1478.	1479.	1481.	1482.	1483.	1485.	1486.	1487.	1489.	1490.
1.290	1492.	1493.	1495.	1496.	1498.	1499.	1500.	1502.	1503.	1505.
1.300	1506.	1508.	1509.	1511.	1512.	1514.	1515.	1516.	1518.	1519.
1.310	1521.	1522.	1524.	1525.	1527.	1528.	1530.	1532.	1533.	1535.
1.320	1537.	1539.	1540.	1542.	1544.	1545.	1547.	1549.	1551.	1552.
1.330	1553.	1554.	1556.	1558.	1559.	1561.	1563.	1565.	1566.	1568.
1.340	1572.	1573.	1575.	1577.	1579.	1580.	1582.	1584.	1585.	1587.
1.350	1589.	1591.	1592.	1594.	1596.	1598.	1600.	1601.	1603.	1605.
1.360	1606.	1608.	1610.	1612.	1613.	1615.	1617.	1619.	1620.	1622.
1.370	1624.	1626.	1628.	1629.	1631.	1633.	1635.	1636.	1639.	1640.
1.380	1642.	1643.	1645.	1647.	1649.	1651.	1652.	1654.	1656.	1658.
1.390	1662.	1663.	1665.	1667.	1669.	1670.	1672.	1674.	1676.	1678.
1.400	1680.	1681.	1683.	1685.	1687.	1689.	1690.	1692.	1694.	1696.
1.410	1698.	1699.	1701.	1703.	1705.	1707.	1708.	1710.	1712.	1714.
1.420	1716.	1718.	1720.	1721.	1723.	1725.	1727.	1729.	1731.	1733.
1.430	1735.	1736.	1738.	1740.	1742.	1744.	1746.	1748.	1750.	1752.
1.440	1755.	1757.	1759.	1761.	1763.	1765.	1767.	1769.	1771.	1773.
1.450	1775.	1777.	1779.	1781.	1783.	1785.	1787.	1789.	1791.	1793.
1.460	1795.	1797.	1799.	1801.	1803.	1805.	1807.	1809.	1811.	1813.
1.470	1815.	1817.	1819.	1821.	1823.	1825.	1827.	1829.	1831.	1833.
1.480	1835.	1837.	1839.	1841.	1843.	1845.	1847.	1849.	1851.	1853.
1.490	1855.	1857.	1859.	1861.	1863.	1865.	1867.	1869.	1871.	1873.

## WEAVER O&amp;G, #1 SQUID TASMANIA, AUSTRALIA

TIME (2-HAY) - DEPTH BELOW SEA LEVEL

	0.000	0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009
1.500	- 1851.	1853.	1855.	1856.	1858.	- 1860.	- 1861.	1863.	1864.	1866.
1.510	- 1867.	1869.	1870.	1872.	1873.	- 1875.	- 1876.	1878.	1879.	1881.
1.520	- 1882.	1884.	1885.	1887.	1888.	- 1890.	- 1891.	1893.	1894.	1896.
1.530	- 1897.	1899.	1900.	1902.	1903.	- 1905.	- 1906.	1908.	1909.	1911.
1.540	- 1912.	1914.	1915.	1917.	1919.	- 1920.	- 1922.	1923.	1925.	1927.
1.550	- 1929.	1931.	1933.	1934.	1936.	- 1938.	- 1939.	1940.	1941.	1943.
1.560	- 1944.	1946.	1947.	1949.	1951.	- 1952.	- 1954.	1955.	1957.	1959.
1.570	- 1959.	1961.	1962.	1963.	1965.	- 1966.	- 1967.	1969.	1970.	1971.
1.580	- 1973.	1975.	1976.	1978.	1980.	- 1981.	- 1983.	1984.	1986.	1987.
1.590	- 1989.	1991.	1993.	1994.	1996.	- 1998.	- 1999.	2001.	2002.	2004.
1.600	- 2005.	2007.	2008.	2010.	2012.	- 2014.	- 2015.	2017.	2019.	2020.
1.610	- 2022.	2023.	2025.	2027.	2029.	- 2030.	- 2032.	2034.	2036.	2037.
1.620	- 2039.	2041.	2043.	2044.	2046.	- 2048.	- 2050.	2051.	2053.	2055.
1.630	- 2057.	2058.	2060.	2062.	2063.	- 2065.	- 2067.	2068.	2070.	2071.
1.640	- 2073.	2075.	2076.	2078.	2079.	- 2081.	- 2083.	2084.	2086.	2087.
1.650	- 2089.	2091.	2092.	2094.	2096.	- 2097.	- 2099.	2101.	2102.	2104.
1.660	- 2105.	2107.	2109.	2111.	2112.	- 2114.	- 2116.	2118.	2119.	2121.
1.670	- 2123.	2125.	2126.	2128.	2130.	- 2131.	- 2133.	2135.	2137.	2139.
1.680	- 2141.	2144.	2146.	2147.	2149.	- 2151.	- 2152.	2154.	2155.	2157.
1.690	- 2159.	2160.	2162.	2164.	2166.	- 2167.	- 2169.	2171.	2173.	2175.
1.700	- 2176.	2178.	2180.	2181.	2183.	- 2185.	- 2186.	2188.	2189.	2191.
1.710	- 2192.	2193.	2195.	2196.	2198.	- 2200.	- 2202.	2203.	2205.	2207.
1.720	- 2209.	2210.	2212.	2213.	2215.	- 2217.	- 2218.	2220.	2222.	2224.
1.730	- 2226.	2227.	2229.	2231.	2233.	- 2234.	- 2236.	2238.	2239.	2241.
1.740	- 2242.	2244.	2245.	2246.	2247.	- 2248.	- 2249.	2251.	2252.	2254.
1.750	- 2255.	2257.	2259.	2261.	2262.	- 2264.	- 2265.	2267.	2269.	2270.
1.760	- 2272.	2274.	2276.	2277.	2279.	- 2281.	- 2282.	2284.	2286.	2288.
1.770	- 2293.	2291.	2293.	2291.	2296.	- 2298.	- 2299.	2302.	2304.	2306.
1.780	- 2307.	2311.	2314.	2316.	2319.	- 2322.	- 2324.	2327.	2329.	2331.
1.790	- 2334.	2336.	2339.	2341.	2343.	- 2345.	- 2346.	2348.	2349.	2351.
1.800	- 2352.	2354.	2356.	2357.	2359.	- 2361.	- 2362.	2364.	2366.	2367.
1.810	- 2369.	2371.	2373.	2374.	2376.	- 2378.	- 2380.	2381.	2383.	2385.
1.820	- 2397.	2399.	2390.	2392.	2393.	- 2395.	- 2397.	2398.	2400.	2402.
1.830	- 2403.	2405.	2407.	2409.	2410.	- 2412.	- 2413.	2415.	2416.	2417.
1.840	- 2419.	2421.	2422.	2424.	2425.	- 2427.	- 2428.	2430.	2432.	2433.
1.850	- 2435.	2437.	2439.	2441.	2442.	- 2444.	- 2445.	2446.	2448.	2450.
1.860	- 2451.	2453.	2455.	2456.	2458.	- 2459.	- 2461.	2463.	2465.	2466.
1.870	- 2468.	2470.	2472.	2473.	2475.	- 2477.	- 2479.	2480.	2482.	2484.
1.880	- 2485.	2487.	2489.	2490.	2492.	- 2494.	- 2495.	2497.	2499.	2501.
1.890	- 2503.	2504.	2506.	2508.	2510.	- 2511.	- 2512.	2514.	2515.	2517.
1.900	- 2519.	2521.	2522.	2524.	2525.	- 2527.	- 2529.	2530.	2532.	2534.
1.910	- 2536.	2538.	2539.	2541.	2543.	- 2544.	- 2546.	2548.	2549.	2551.
1.920	- 2553.	2554.	2556.	2558.	2560.	- 2562.	- 2563.	2565.	2567.	2569.
1.930	- 2570.	2572.	2574.	2576.	2578.	- 2579.	- 2581.	2583.	2585.	2587.
1.940	- 2589.	2591.	2592.	2594.	2596.	- 2598.	- 2600.	2602.	2604.	2605.
1.950	- 2607.	2609.	2611.	2613.	2615.	- 2616.	- 2619.	2620.	2622.	2624.
1.960	- 2626.	2628.	2629.	2631.	2633.	- 2635.	- 2637.	2638.	2640.	2642.
1.970	- 2644.	2646.	2648.	2649.	2651.	- 2653.	- 2655.	2656.	2658.	2660.
1.980	- 2662.	2664.	2666.	2668.	2669.	- 2671.	- 2673.	2675.	2677.	2679.
1.990	- 2681.	2682.	2684.	2686.	2688.	- 2690.	- 2691.	2693.	2695.	2696.
2.000	- 2698.	2700.	2702.	2704.	2706.	- 2708.	- 2709.	2711.	2713.	2715.
2.010	- 2717.	2719.	2721.	2723.	2724.	- 2726.	- 2728.	2730.	2732.	2734.
2.020	- 2735.	2737.	2739.	2741.	2742.	- 2744.	- 2746.	2748.	2750.	2752.
2.030	- 2754.	2756.	2757.	2759.	2761.	- 2763.	- 2765.	2767.	2769.	2770.
2.040	- 2772.	2774.	2776.	2778.	2780.	- 2782.	- 2784.	2786.	2788.	2789.
2.050	- 2791.	2793.	2795.	2797.	2799.	- 2801.	- 2803.	2805.	2807.	2809.
2.060	- 2811.	2812.	2814.	2816.	2818.	- 2820.	- 2822.	2824.	2826.	2828.
2.070	- 2833.	2832.	2834.	2836.	2837.	- 2839.	- 2841.	2843.	2845.	2847.
2.080	- 2849.	2851.	2853.	2855.	2857.	- 2859.	- 2860.	2862.	2864.	2866.
2.090	- 2869.	2870.	2871.	2873.	2875.	- 2877.	- 2879.	2881.	2883.	2884.
2.100	- 2886.	2888.	2890.							

LITHOSTRATIGRAPHIC UNITS TABLE 2

<u>Unit #</u>	SQUID #1			PELICAN #1		
	<u>Sub-Sea Depth (m/ft) Isopach (ft)</u>	<u>Facies/Fm Paleo</u>	<u>Interval Velocity (ft/sec)</u>	<u>Sub-Sea Depth (m/ft) Isopach (ft)</u>	<u>Facies/Fm Paleo</u>	<u>Interval Velocity (ft/sec)</u>
1	-484 -1588'	LST/CLYST	7150	-1403	LST/CLYST	7450
2	-484-895 -1588-2936' (1348')	LST/CLYST	7700	-1403'-2430' (1027')	LST/CLYST	9000
3	-895-1403 -2936'-4603' (1667')	CLYST Torquay Grp.	7200	-2430'-4560' (2130')	CLYST Torquay Grp.	7600
4	-1403-1526.2 -4603'-5007.2' (404')	SDST Olig. Sd Lens Unconf.	9700	-4560'-4740' (180')	CLYST Minor Sd. Unconf.	8400
5	-1526.2-1763 -5007'-5784' (777')	SDST mid/basal Olig. Sd.	11,800	-4795'-5265' (470')	CLYST/SDST mid/basal Olig. Sd.	9300
6	-1763-1831 -5784'-6007' (223')	CLYST Demons Bluff Fm.	8900	-5265'-5660' (395')	CLYST Demons Bluff Fm.	8200
7	-1831-1875 6007'-6151.6' (145')	SDST Top EVCM	11,500	-5660'-5795' (135')	SDST Top EVCM	10,900

TABLE 2 (cont.)

<u>Unit #</u>	SQUID #1			PELICAN #1		
	<u>Sub-Sea Depth (m/ft) Isopach (ft)</u>	<u>Facies/Fm Paleo</u>	<u>Interval Velocity (ft/sec)</u>	<u>Sub-Sea Depth (m/ft) Isopach (ft)</u>	<u>Facies/Fm Paleo</u>	<u>Interval Velocity (ft/sec)</u>
8	-1875-1922 -6151.6'-6305.8' (154')	SDST  Mid. N. Aspersus	10,000	-5795'-6123' (328')	SDST  Mid. N. Aspersus L.N. Aspersus	10,500
9	-1922-2030 -6305.8'-6660 (354')	COAL/CLYST/SDST  Mid. N. Aspersus L. N. Aspersus P. Asperopolus	10,500	-6123'-7258' (1135')	COAL/CLYST/SDST  L. N. Aspersus P. Aspersus	10,500
10	-2030-2038 -6660-6686 (26')	SDST	11,500	-7258'-7360' (102')	SDST	11,100
11	-2038-2220 -6686'-7283.5' (597')	SDST/CLYST Pre-P. Asperopolus Unconformity		-7360'-8030' (670')	Within M. diversus Unconformity	
12	-2220-2364 -7283.5'-7756' (469')	SDST/CLYST/COAL Olivine Basalt Unconformity		-8030'-8510' (480')	SDST/CLYST/COAL	

TABLE 2 (cont.)

<u>Unit #</u>	SQUID #1			PELICAN #1		
	<u>Sub-Sea Depth (m/ft) Isopach (ft)</u>	<u>Facies/Fm Paleo</u>	<u>Interval Velocity (ft/sec)</u>	<u>Sub-Sea Depth (m/ft) Isopach (ft)</u>	<u>Facies/Fm Paleo</u>	<u>Interval Velocity (ft/sec)</u>
13	-2363-2413 -7753'-7917' (164')	SDST/CLYST  Undiff. M. diversus	11,500	-8510'-9460' (950')	SDST/CLYST  Lower M. diversus	12,000
14	-2413-2562  -7917'-8406' (489')	COAL/SDST/ CLYST/SLTST  Undiff. M. diversus	11,000	-9460'-10,050 (590')	Lower M. diversus	12,400
15	-2562-TD- 2903 -8406'-TD- 9524.3'	SDST/SLST/ CLYST  Undiff. M. diversus L. balmei	12,300	-10,050'-TD- 10,328'	SDST/SLST/ CLYST  Lower M. diversus L. balmei	13,000

claystone section down to -484 meters. Its lower boundary with the limestone section in the Squid well, is correlated to a similar boundary recognized at -1403 feet or -427.63 meters (below sea level) in the Pelican #1 well.

Unit #2 consist of limestone down to -830 meters and then of limestone/claystone down to -895 meters, or -2936 feet in the Squid well. Its lower boundary is correlated to a similar one recognized at -2430 feet in the Pelican well.

Unit #3 begins at -895 meters which is the top of the Torquay Group in the Squid well. It consist of claystone down to -1403 meters, or -4603 feet. Its lower boundary is correlated to a similar boundary recognized at -4595 feet in the Pelican well.

Unit #4 begins at -1403 meters which is the top of the seismically defined Oligocene sandstone lens mapped in the Squid prospect area. This unit consists of massive sandstone with minor thin claystone beds. Its lower boundary is an angular unconformity recognized on seismic and at -1526.2 meters in the Squid well. In the Pelican well, this unit consist of claystone and minor sandstone recognized over the interval -4560 feet to -4740 feet or -1461.5 meters.

Unit #5 begins at the angular unconformity and consist of massive sandstone down to -1763 meters in the Squid well. It is equivalent to the mid-Oligocene sandstone, claystone, and basal Oligocene sandstone section, down to -5265 feet in the Pelican well.

Unit #6 begins at -1763 meters, or -5784 feet, and marks the top of the Demon's Bluff Formation in the Squid well. It consist of massive claystone down to -1831 meters, or -6007 feet, in the Squid well. This unit also consists of claystone in the Pelican well where it is substantially thicker. It is recog-

nized between the depths of -5265 feet and -5660 feet. The lower boundary of this unit is indicated by the numeral 6.- on Figure 26 and used as a base line.

Unit #7 begins at -1831 meters and marks the top of the Eastern View Coal Measures in the Squid well. This marker unit consist of a massive sandstone with a distinct high velocity signature recognized on the synthetic seismogram. Its base is at -1847 meters. This unit includes an argillaceous sandstone which extends down to -1875 meters. This unit is recognized in the Pelican well. Its top is at -5660 feet. The base of the massive sandstone is at -5725 feet and the base of the unit is at -5795 feet.

Unit #8 begins at -1875 meters, or -6151.6 feet, in the Squid well where it consist of a mostly massive sandstone section down to a depth of -1922 meters or -6305.8 feet. This unit is recognized in the Pelican well where it also consist of a mostly massive sandstone section between depth of -5795 feet and -6123 feet. A bed to bed correlation may be possible between the two wells, whereby a depth of -1894 meters, or -6214 feet, in the Squid well is equivalent to a depth of -5945 feet in the Pelican well. This unit is essentially twice as thick in the Pelican well as it is in the Squid well. Its base is characterized by a substantial increase of velocity associated with a significant facies change.

Unit #9 begins at -1922 meters, or -6305.8 feet, in the Squid well where it consist of a sequence of sandstone and claystone and is characterized by the occurrence of several relatively thick cool beds and thin relatively high velocity beds possibly associated with selective cementation of certain intervals. Overall this unit has a higher velocity than the unit above. It is recognized in the Pelican well between the depths of -6123 feet and -7258 feet. Although it is substantially thicker, by a factor of three or slightly more, in the Pelican well, it appears that some bed to bed correlations may be possible. An unconformity may be present at the top of this unit in the Squid well. The base of a claystone

bed recognized at -1946 meters or -6384.5 feet, in the Squid well may be equivalent to a depth of -6435 feet in the Pelican well. The base of a sandstone bed at -1999 meters, or -6558.4 feet, in the Squid well may be equivalent to a depth of -6990 feet in the Pelican well. The very coaly section recognized between -1999 meters, or 6558.4 feet and -2030 meters, or 6660 feet, in the Squid well may be equivalent to the coaly section recognized between -6990 feet and -7258 feet in the Pelican well.

Unit #10 is a sandstone marker identified in the Squid well where it begins at -2030 meters and extends down to -2038 meters. It is recognized in the Pelican well also as a massive sandstone body, between the depth of -7258 feet and -7360 feet.

Unit #11 begins at -2038 meters or -6686.4 feet in the Squid well, and consist of claystone with thin sandstone beds at its top, and thick sandstone with thin claystone beds towards its base at -2220 meters, or 7283.5 feet. This unit is recognized in the Pelican well between the depths of -7360 feet and -8030 feet. Individual beds or group of beds are correlatable. A very coaly section is recognized in the Squid well between the depths of -2185 meters and -2195.2 meters. A similar section is recognized in the Pelican well between the depths of -7931 feet and -7953 feet. The top of the Lower M. diversus palynological zone is recognized at -7810 feet in the Pelican well. It should be noted that various palynological zonation studies recognized the top of the Lower M. diversus zone at depths ranging all the way down to -9182 feet. Nevertheless, the shallower pick for the top of the Lower M. diversus (-7810 feet) may be loosely correlated to a depth of -2152 meters, or -7060 feet, in the Squid well.

The base of Unit #11 is recognized at -8030 feet in the Pelican well. At this depth the section is characterized by an eight foot thick sandstone bed

with a comparatively very low transit time, i.e., high velocity, and high density. This may represent a well cemented zone associated with an unconformity i.e., sub-aerial exposure. The first hydrocarbon bearing sandstone reservoir zone basis of an FIT wireline test in the Pelican well is at -8010 feet to -8022 feet which is the top of the eight foot thick, dense, high velocity marker, associated with an angular unconformity recognized on seismic lines through the Pelican well.

The base of Unit #11 is recognized at -2220 meters, or -7283.5 feet, in the Squid well where it is also associated with a diagnostic electrical log response.

Unit #12 begins at -2220 meters in the Squid well where it consist of sandstone, coal and claystone down to a depth of -2364 meters, or -7756 feet, where a major unconformity is recognized. A body of olivine basalt is recognized between the depths of -2300 meters and -2342 meters. This unit is recognized in the Pelican well where it begins at -8030 feet and consist of sandstone, claystone and coal down to -8510 feet. Three separate sonic log peaks associated with comparatively high velocities are recognized between depths of -8390 feet and -8460 feet. These may be associated with hiatus time equivalent to the emplacement of the olivine basalt found in the Squid well, as it also appears to be associated with a period of structural uplift. Additional hydrocarbon bearing sandstone reservoir zones are present within this unit of the Pelican well. These are known to contain gas and 56.5° API or 61.0° API oil on the basis of FIT wireline tests.

Unit #13 begins at -2363 meters in the Squid well where it consist of thick sandstone and claystone and is characterized by an absence of coal beds down to -2413 meters or -7917 feet. This unit is recognized in the Pelican well between the depths of -8510 feet and -9460 feet where it consist of sandstone, claystone and the occasional thin coal bed. In the Pelican well this

unit is assigned to the Lower M. diversus palynological zone and contains hydrocarbons bearing sandstone reservoir pay zones. Additional hydrocarbon bearing sandstone reservoir contain gas and oil on the basis of FIT wireline tests. The top of the slightly overpressured zone in the Pelican well is at -9350 feet or some 110 feet above the base of this unit.

Unit #14 begins at -2413 meters, or -7917 feet, in the Squid well where it consist of siltstone, claystone, and sandstone and is characterized by the occurence of several thick coal beds down to -2562 meters or -8406 feet. This unit is recognized in the Pelican well between the depths of -9460 feet and -10050 feet. It is known to contain a hydrocarbon bearing reservoir sandstone zone on the basis of an FIT wireline test which recovered both gas and oil.

Unit #15 begins at -2562 meters, or -8406 feet, in the Squid well where it consist of sandstone, siltstone, claystone, and minor coal down to total measured depth of -2903 meters, or -9524.3 feet. This unit is recognized in the Pelican well starting at -10050 feet and extending down to total depth or -10328 feet. It is known to contain a hydrocarbon bearing reservoir sandstone zone on the basis of an FIT wireline test which recovered gas and 51° API oil.

### Oligocene Lens

The Squid anomaly was originally recognized on old seismic lines as a lens-shape anomaly at the Oligocene seismic marker level. Associated with this lens is a zone of destructive interference, one or two major unconformities and a deeper horst block. Additional seismic data was acquired on this anomaly and a prospect was defined. The prospect was tied by seismic lines to the Dondu #1 well to the north and to the Pelican #1 well to the southwest. A seismic time structure map was constructed at the top Oligocene reflector level and an isochron of the Oligocene lens was also constructed. A seismic time structure map at the Lower M. diversus unconformity reflector level was also constructed.

Drilling of the Squid #1 sidetrack well indicates that the seismically defined Oligocene lens is, in fact, a sandstone lens. Lithostratigraphic Unit #4, Table 2, defined in the Squid well is described as follows.

Unit #4, Figure 26, begins at -1403 meters or -4603 feet, which is the top of the seismically defined Oligocene sandstone lens. This unit consist of a generally massive sandstone with minor claystone beds. Its lower boundary is an angular unconformity, and an interval velocity boundary, recognized on seismic lines, and at a depth of -1526.2 meters in the Squid well. The unconformable base of the Oligocene lens recognized in the Squid well is used as datum, base line, on Figure 27.

This unit can be further divided into correlatable members on the basis of facies and their interval velocities. The upper member is from -1403 meters down to -1430 meters, the middle unit is from -1430 meters down to -1475 meters, the lower unit is from -1475 meters down to -1501.2 meters and the lowest member is from -1501.2 meters to -1526.2 meters, the unconformity.

In the Bass #2 well, Unit #4 is recognized over the interval -2955 feet to -3585 feet, Figure 27. Its middle, lower and lowest member are well developed

ESSO EXPL & PROD AUSTRALIA INC  
 PELICAN #1

WEAVER O&G, #1 SQUID

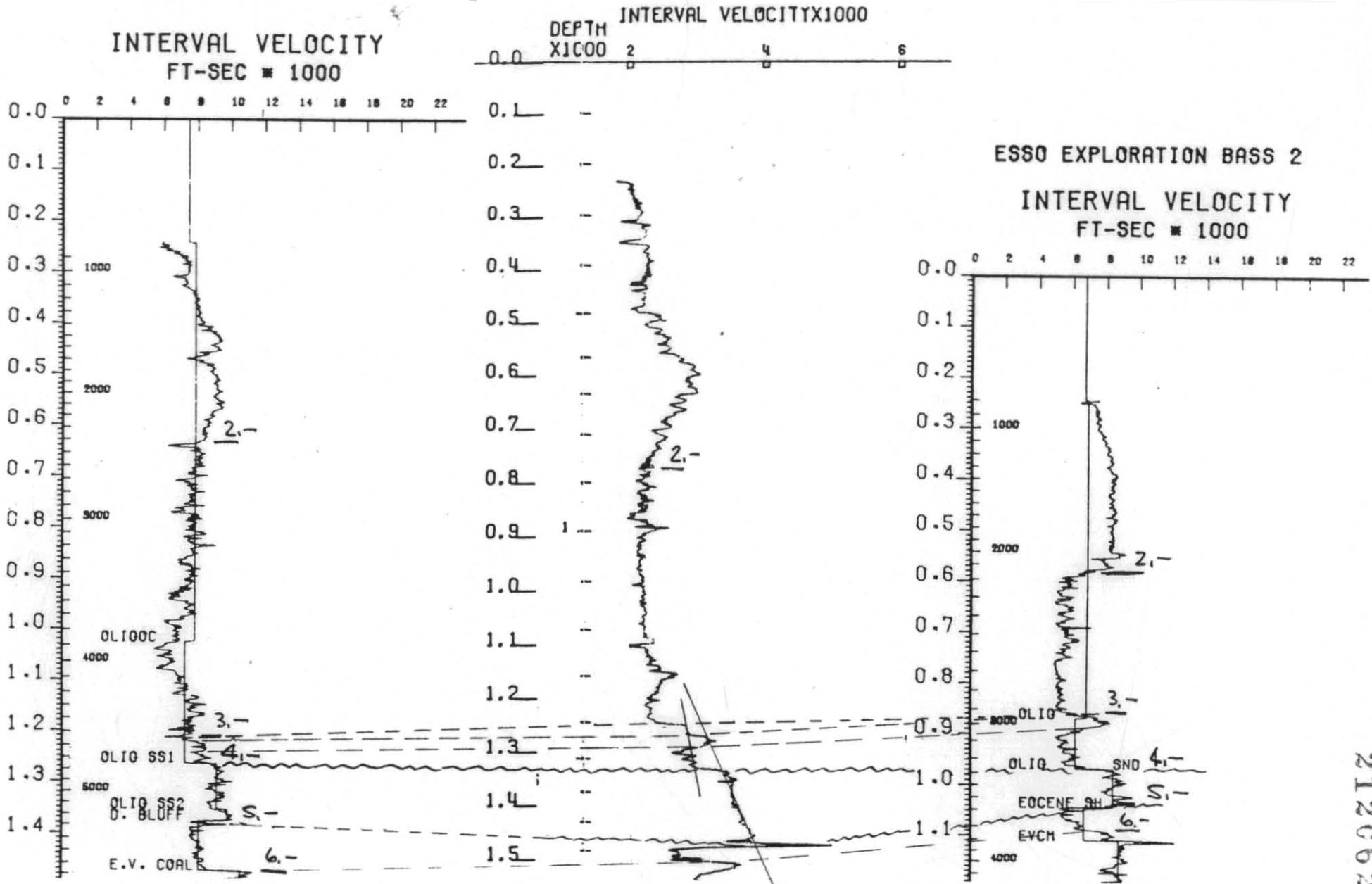
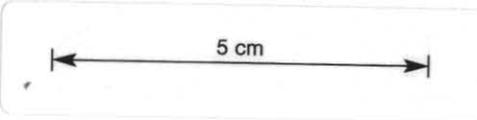


FIGURE 27

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while its upper member appears to be absent. A conventional core taken over the boundary between its middle and lower member is described as follows. From 3025 feet to 3048 feet, or -2994 feet to -3017 feet, it consist of silty sandstone; very argillaceous, very glauconitic, pyritic, fossiliferous, with calcareous grains and minor quartzose grains. The interval 3048 feet to 3055 feet, or -3017 feet to -3024 feet, the lower member, is described as silty mudstone overlying an argillaceous siltstone.

Unit #4 is also recognized in the Dondu #1 well when it is well developed.

Unit #4 is recognized in the Pelican #1 well over the interval -4560 feet to -4740 feet where it is not as sandy, in this condensed section as it is at Squid #1 sidetrack, Bass #2, and Dondu #1.

Lithostratigraphic Unit #5 begins at -1526.2 meters in the Squid well, the angular unconformity, and extends down to -1763 meters, an other angular unconformity. In this well, the underlying Demon's Bluff formation or Eocene shale, lithostratigraphic Unit #6 is very thin due to erosion and/or non deposition on a structural high.

The basal portion of the Oligocene section, lithostratigraphic units 4 and 5, consist of massive sandstone or interbedded sandstone and claystone in the northeast area of the Bass basin. Individual regressive sandstone members and transitional members are recognizable within this overall transgressive section, a barrier island complex. A source of coarse clastics and carbonates appear to have been located to the northeast, possibly associated with the Bassian Rise which separate the Bass Basin from the Gippsland basin. Other local sources may have been present.

At the Squid #1 sidetrack well location, the basal Oligocene section consist of mostly massive sandstone. An angular unconformity is recognized between lithostratigraphic units 4 and 5. Unit 4 is the Oligocene lens. This lens is

seismically mappable and was assigned some significance at the Squid prospect location because of the geometry of the underlying angular unconformity surface. This unconformity is present in other wells, Figure 27, but it is not angular, mostly a hiatus, therefore not assigned special significance.

An interval velocity gradient with depth is recognized in the Squid well, Figures 27 and 28. The interval velocity is shown to increase from 3100 m/sec, 10,170 ft/sec, at -1403 meters, -4603 feet, to 3400 m/sec, 11,155 ft/sec, at -1526.2 m, -5007 feet, to 3850 m/sec, 12,632 ft/sec, at -1763 meters, or -5784 feet. In addition, a lower interval velocity and a lower interval velocity gradient is shown for the Oligocene sand lens interval, -1403 meters to -1526.2 meters. Therefore it appears that the seismically defined and mapped Oligocene lens is in fact a sandstone lens with a low interval velocity as postulated. Its geometry indicates that the Squid structure was growing during this time, that its top was eroded, and that the material removed was replaced by reworked material with a lower interval velocity. The presence of a low interval velocity layer was indicated by some of the seismic data modeling studies; i.e. Seiscom Delta Complex Trace Analyses, and Synthetic Seismograms by Exploration Associates International. The Technica Inc. Seislog Processing (R) detected no unusual move-out velocity data, however, and to their credit, it should be recognized that insufficient amounts and quality of data was available. The signal amplitude derived Finegrain Velocity Analyses by Petty-Ray, does show some lower velocity readings (See enclosure 1).



### Seismic Data Modeling

When originally recognized on old seismic lines, the Squid Oligocene sandstone lens was thought to be caused by a seismic signal amplitude anomaly, thus indicative of the presence of hydrocarbons. Weaver's seismic line WB-81-01 was submitted to Seiscom Delta for their complex trace analysis studies and color coded display of the diagnostic attributes.

The Instantaneous Velocity display, as determined from signal amplitude, did emphasize the boundaries of the lens, and did indicate a reduction in velocity from 8500 ft/sec down to 6500 ft/sec within the lens. The actual interval velocity measured on the sonic log and synthetic seismogram of the Squid well indicate an average interval velocity of 10,600 ft/sec outside the lens and 9500 ft/sec inside the lens.

The Instantaneous Phase display and Apparent Polarity display did indicate a phase shift and a polarity reversal as is expected from lateral velocity variations.

The Reflection Strength and Weighted Frequency display are also dependent on velocity contrast at the interfaces and did fully substantiate the presence of a lens with a lower than regional interval velocity.

Overall the Seiscom Delta complex trace analysis did recognize the Oligocene sandstone lens and described it well.

The Seislog (R) processing and interpretation carried by Technica Inc. is based on generating a synthetic sonic log by combining velocity coefficients derived from density-corrected inverted seismic traces with low frequency velocity components obtained from velocity data. The result is a synthetic sonic which, within the limits of resolution of the seismic method and the constraints of wave propagation data, can be used for subsurface interpretation in the same manner as

the sonic log. The borehole sonic log from the Pelican #1 well was used for control or calibration. The log was digitized, integrated to a vertical time scale, filtered to approximately the same range as the seismic data, and then replotted in depth to match the scales of the Seislog (R) output. The Pelican #1 synthetic seismogram, Figure 27, shows that the Oligocene sandstone lens, lithostratigraphic unit #4 recognized in the Squid well is not very well developed at the Pelican #1 well location. Therefore the use of the Pelican #1 synthetic seismogram as a control, or calibration point, did not significantly contribute to the Technica Inc. study. Nevertheless, the Technica Inc. Seislog (R) processing and interpretation concluded that the dish-shape, or lens-shape, anomaly recognized on Weaver's seismic line WB-81-07, at Squid, was most likely an erosion surface with isolated stratigraphic units within, that it was not of unusual velocity based on move-out data, and that using criteria designed to recognize low velocity gas-filled porous sandstones, there were no features meeting the criteria on that seismic line. Further, it concluded that the observed structural sag was related to normal faulting which localized the erosional surface and that a combination of closely spread faults and irregular erosion surface led to a loss of data quality and stratigraphic continuity.

Overall the Technica Seislog (R) processing performed very well in that it did recognize the Oligocene sandstone lens with its basal unconformity and did describe it adequately. It could not be foreseen at the time that the Oligocene section in the Pelican #1 well was not representative of the conditions found at the Squid well location.

Exploration Associates International used a different approach. Check-shot velocity survey data from nearby wells was collected and a geological model was constructed using major interval velocity-units with the inclusion of a lens at

the mid-Oligocene and basal-Oligocene levels. Two cases were retained for purposes of calculations. One case with an anomalously low interval velocity-unit, the other with an anomalously high interval velocity-unit. Both cases were inputted to a computer program for normal incident ray tracing and synthetic seismogram modeling. Reflection coefficient computed along the ray paths were convolved with a 30 Hz Ricker wavelet. The resulting synthetic seismic sections were then compared with the seismic line crossing the Squid prospect. The low velocity model showed the best fit to the "actual" seismic data and it therefore was concluded that the Oligocene lens was apparently filled with a lower than regional velocity material. Well results indicate that the methodology by Exploration Associates International was valid and that the conclusion desired were right.

Lastly, Petty-Ray's finegrained velocity analyses of Weaver's seismic line WB-81-01 indicate that the area, in time, of the Oligocene lens is in fact a reworked area in that relatively few reflectors are present within; while its upper and lower boundaries are distinctly better reflecting surfaces. Enclosure 1.

Few interval velocity determinations are shown within the lens area itself and a certain randomness of the values is noted. Nevertheless, it is possible to identify a limited population of readings in the range of 6175 feet per seconds to 6725 feet per second against a regional background of 6975 to 7575 feet per second. This method is limited by the limited member of relatively high amplitude reflectors present within the Oligocene lens.

### Remapping of the Squid Area

The Squid prospect area has been remapped using the results provided by the Squid #1 sidetrack exploratory well.

A post-drill structure map showing depths measured in meters below sea-level has been constructed at the top of the Oligocene sandstone lens. The top of this lens is recognized on electric logs at a depth of 1425.5 meters or 1403 meters below sea level in the Squid well. The map scale is 1:50,000 and the contour interval is 5 meters. Enclosure 2.

The structural trends shown on this map are essentially the same as those displayed on the seismic two-way time structure map prepared in anticipation of the drilling of this well.

A depth correction map for the relatively low interval velocity of the Oligocene sandstone lens has been prepared. The map scale is 1:50,000 and the contour interval is 5 meters. Enclosure 3.

The Oligocene sandstone lens is recognized between drill depths of 1425.5 meters and 1548.5 meters in the Squid well. The lens has a lower interval velocity than the laterally equivalent section since it consists of reworked material with a lower matrix velocity. Its lower surface is an angular unconformity recognized on seismic and on electrical logs.

The depth correction has been calculated and applied to the isochron of the seismically defined lens area. Zero correction is applied to the isochron contour line which the well intersected. The correction increases towards the farther edge of the lens as more and more of the lower interval velocity lens material is replaced by higher interval velocity material.

Generally speaking, the correction is minimal when compared to the amount of structural relief displayed at the lower M. diversus map level.

A structure map has been constructed and called Near Top Lower M. diversus

unconformity level. In the Squid well this level represent a depth of -2456 meters. The map scale is 1:50,000 and the contour interval is 25 meters.

Enclosure 4.

This depth map is based in a seismic two-way time structure map prepared in anticipation of the drilling of the Squid well. On the basis of electric log correlation and incomplete palynological zonation, the actual intra-Lower M. diversus unconformity recognizes at the top of the first hydrocarbon bearing zone in the Pelican #1 well may be located at a depth of -2220 meters in the Squid well.

This map shows that the Squid #1 sidetrack exploratory well tested a closed structure at this level.

Aeromagnetic Survey

The results of an aeromagnetic survey conducted in 1960-61 indicate that at the Squid #1 sidetrack exploratory well location the calculated depth to magnetic basement is more than 12,000 feet below sea level. Figure 29.

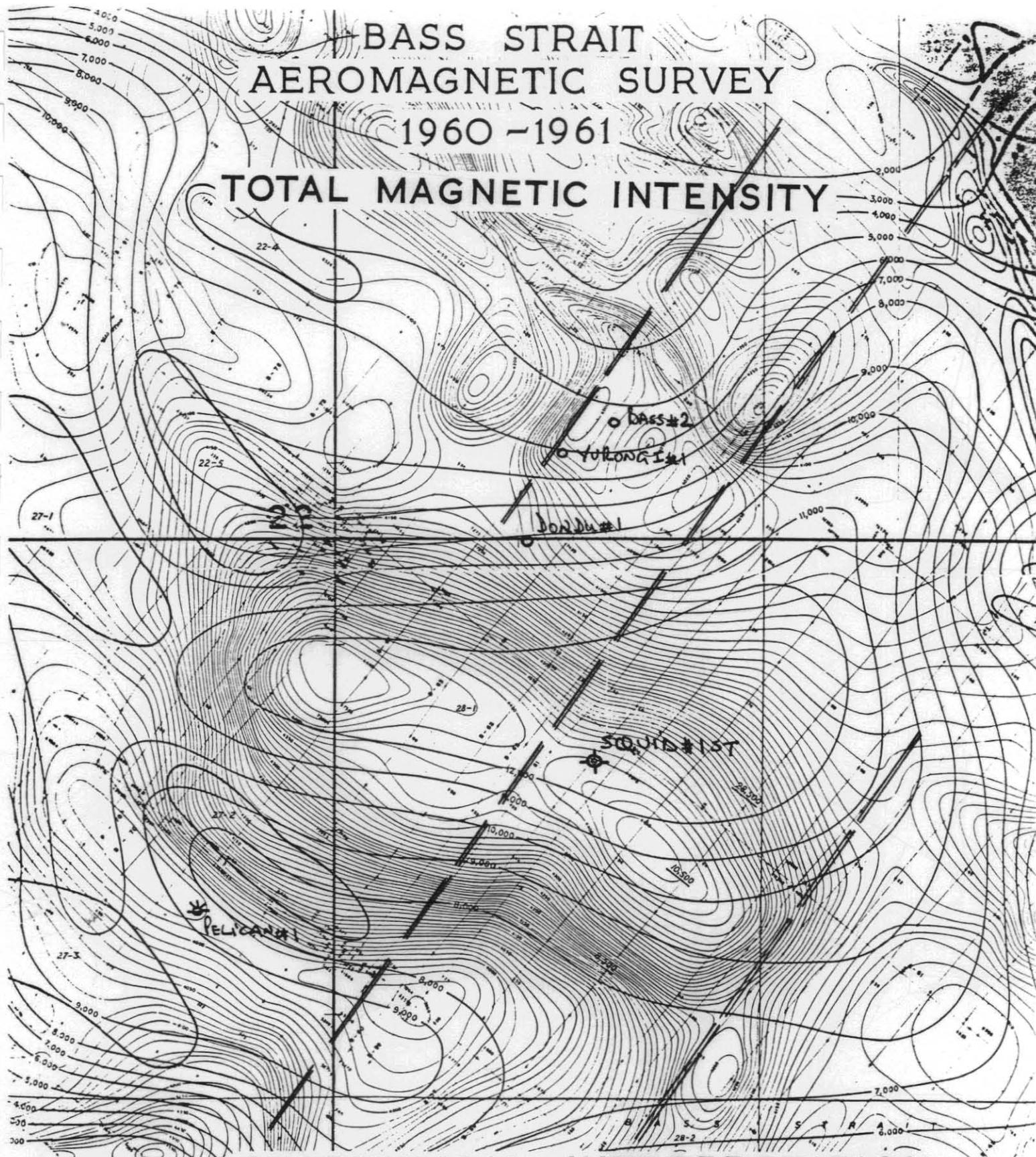
Results from the drilling of the Squid well indicate that a body of olivine basalt is present in this well between 2322 meters and 2364 meters or 7546 feet and 7684 feet below sea level. The well was drilled to a total depth of 9501 feet true vertical depth below sea level without reaching basement.

A northeast-southwest alignment and offset of total magnetic intensity contour lines is shown on Figure 29. Calculated depths to magnetic basement indicate that the Squid well is located within a faultblock bounded by two northeast-southwest trending transform faults which define the deepest area of the Bass basin in terms of depth to magnetic basement. These transform faults are recognized on seismic data whenever a so-called basement reflection is identified within the usual seismic record length.

# BASS STRAIT AEROMAGNETIC SURVEY

1960-1961

## TOTAL MAGNETIC INTENSITY



## GEOPHYSICAL INTERPRETATION

BASEMENT DEPTH. (Feet below sea level) ----- 2,000

ANALYTICAL DEPTH ESTIMATES ----- 16,000

5 cm

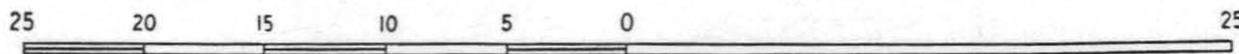


Figure 29

MILES

212072

Magnetic and gravity data was acquired in the course of the 1981 Squid geophysical survey and the 1982 Unicorn geophysical survey. Results of these two surveys have been compiled for the Squid prospect area. The contour interval for the Bouguer gravity map is 5 milligals and for the Total Magnetic Intensity map is 50 gammas. Depths to magnetic basement has been calculated.

Enclosure Map #5 is a sub-sea depth structure map near the top of the Lower M. diversus unconformity. The area of closure of the Squid structure is indicated. The contour interval is 25 meters and the scale is 1:100,000. This depth map is based on seismic mapping of the general area to which the results of the Squid #1 sidetrack well has been added. Regional dip is towards the southwest. Four separate but related areas of closure are recognized. These are controlled by a set of normal faults with a northwest-southwest trend and a set of normal faults with a more westerly trend. These two sets of faults may be offset by a transfer fault, or a conjugate of a transfer fault, with a northeast-southwest orientation.

Enclosure Map 6 uses as a base the sub-sea depth structure map near top Lower M. diversus unconformity level, to which the Bouguer gravity contour lines are added. The dominant trend of the Bouguer gravity contour lines is northwest-southeast and approximates rather well the structural contour at the near top Lower M. diversus unconformity level. A secondary gravity trend towards the northeast is indicated. Regionally, the gravity contour lines indicate the presence of a light mass, or deeper mass towards the northeast and rising gently towards the southwest. The structural map indicates that at the near top Lower M. diversus unconformity level the trend is reverse with regional dip towards the southwest. It therefore appears that the gravity readings are influenced by a mass which is deeper than the mapped Lower M. diversus unconformity surface. This is consistent with regional considerations which indicate that the Squid structure is located on a northeastward tilted fault block at the pre-intra Upper-Cretaceous breakup unconformity level.

Enclosure map 7 also uses as a base the sub-sea depth structure map near top contour lines are added. The dominant trends of the Total Magnetic Intensity contour lines is towards the northwest and west-northwest. The change in direction approximates rather well the structural contour lines at the near top Lower M. diversus unconformity level. Regionally, the Total Magnetic Intensity contour lines indicated the presence of a major arch which dips gently towards the northeast and somewhat more steeply towards the southwest. This is consistent with the results provided by the Bouguer gravity measurements and also with what is known about the deeper, nearer magnetic basement, geometry of the basin in this area.

Calculated depths to magnetic basement indicate a depth of 4000 meters, question mark, to interpreted magnetic basement in the area to the west of the Squid well. A depth of 10,000 meters from a source below interpreted basement is calculated for the area to the southeast of the Squid well. A depth of 4700 meters to interpreted magnetic basement is calculated for an area to the north of the Squid well. These depth values are basically in agreement with those generated by the 1960-61 aeromagnetic survey, Figure 29. The occurrence of olivine basalt, which usually has a high magnetic susceptibility, at 2322 meters to 2364 meters in the Squid well appears to not have been detected by the magnetic surveys. Enclosure Map 8.

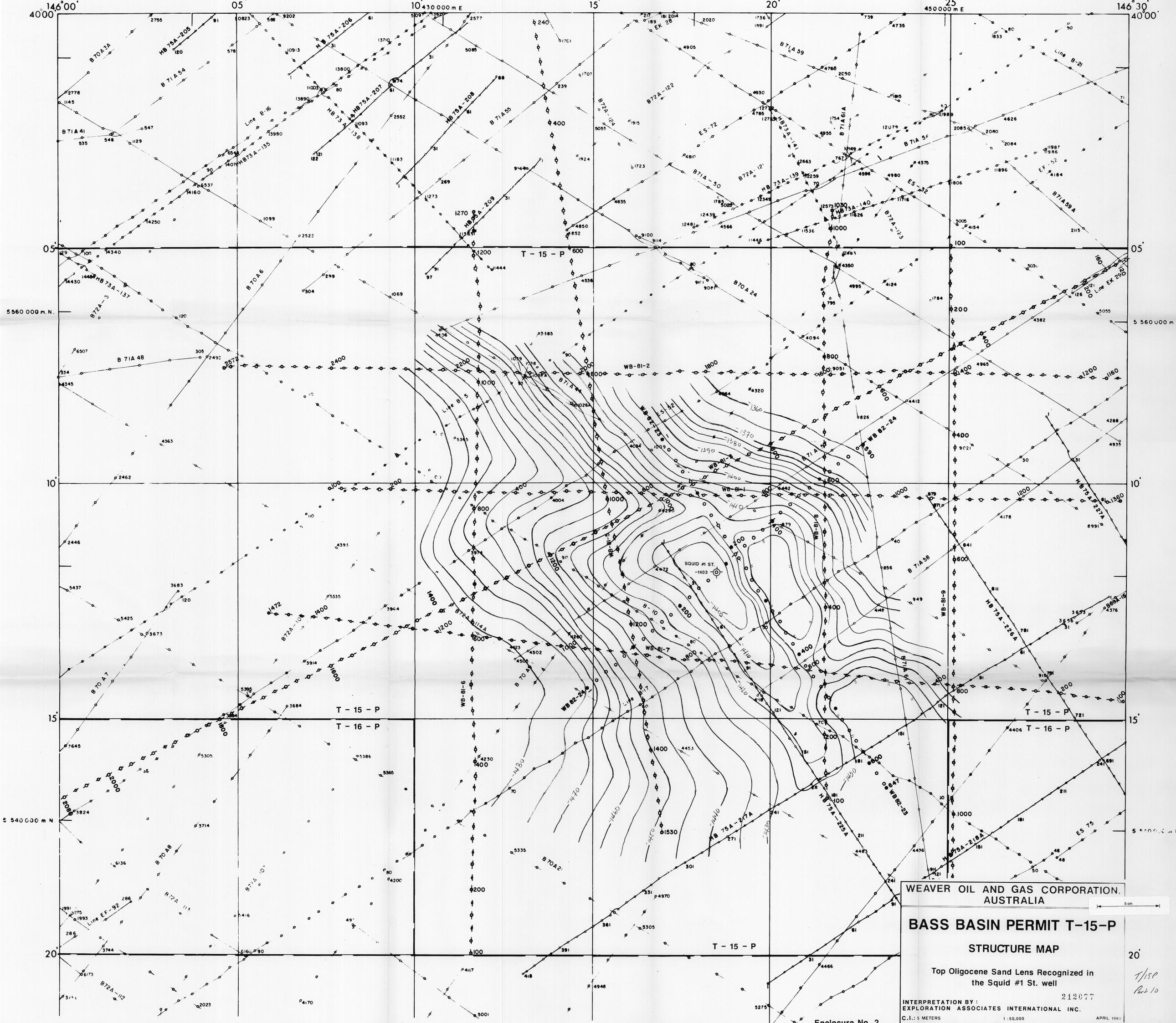
Conclusions

The Squid #1 and #1 sidetrack exploratory wells were drilled during this quarter.

The initial well reached a total depth of 2918 meters and had to be abandoned due to mechanical problems encountered before final logging. A sidetrack well was then drilled to a total measured depth of 2925 meters, logged, plugged and abandoned after evaluating the hydrocarbon potential of the Oligocene, Eocene and Paleocene sections of this prospect.

The wells were drilled on prognosis and were found to contain, under structural closure, an abundance of potential reservoir quality sandstones interbedded with immature source-rock shales.





WEAVER OIL AND GAS CORPORATION,  
 AUSTRALIA

**BASS BASIN PERMIT T-15-P**

**STRUCTURE MAP**

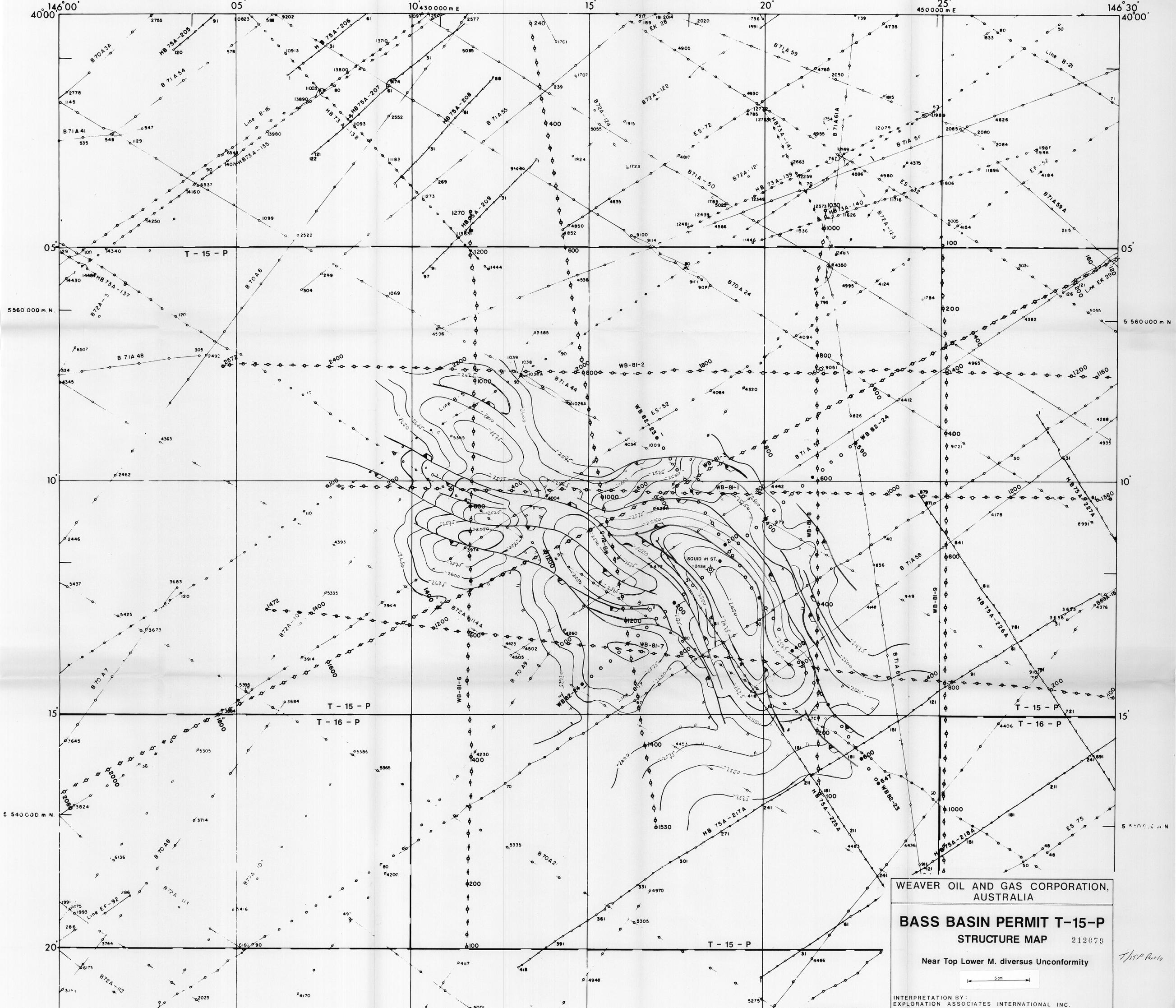
Top Oligocene Sand Lens Recognized in  
 the Squid #1 St. well

INTERPRETATION BY:  
 EXPLORATION ASSOCIATES INTERNATIONAL INC.  
 C.I.: 5 METERS 1:50,000 APRIL 1985

Enclosure No. 2

T/ISP  
 Part 10  
 CR-197 VOL. 2

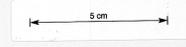




WEAVER OIL AND GAS CORPORATION,  
AUSTRALIA

**BASS BASIN PERMIT T-15-P**  
**STRUCTURE MAP** 212079

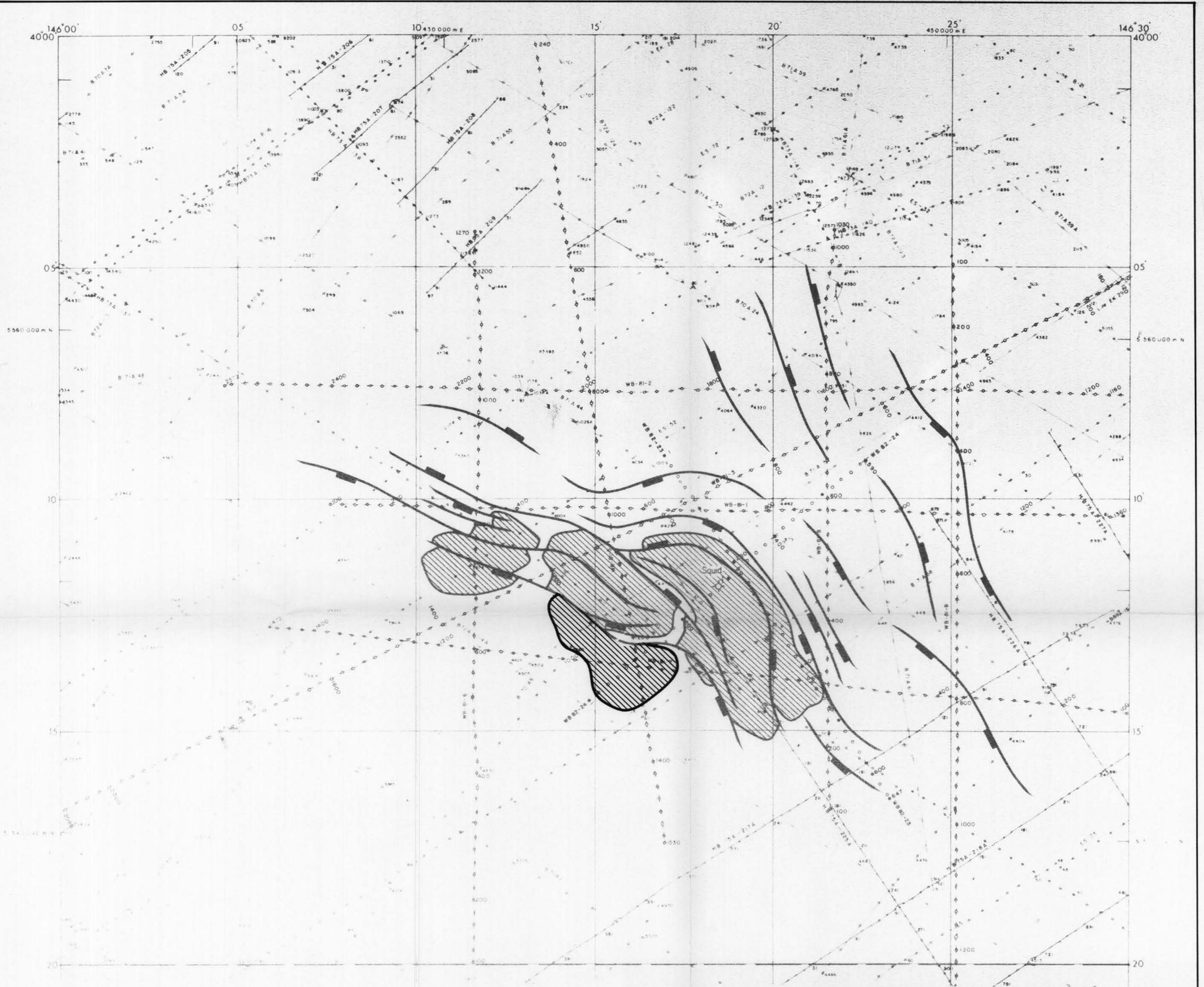
Near Top Lower M. diversus Unconformity



INTERPRETATION BY:  
EXPLORATION ASSOCIATES INTERNATIONAL INC.  
C.I.: 25 METERS

Enclosure No. 4

APRIL 1985  
OR-197 VOL 2

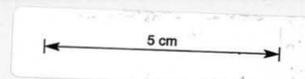


**WEAVER OIL AND GAS CORPORATION,  
AUSTRALIA**

**BASS BASIN T-15-P**

212080

**NEAR TOP LOWER M. DIVERSUS UNCONFORMITY  
SEISMIC MARKER SHADED CLOSURE AREA**

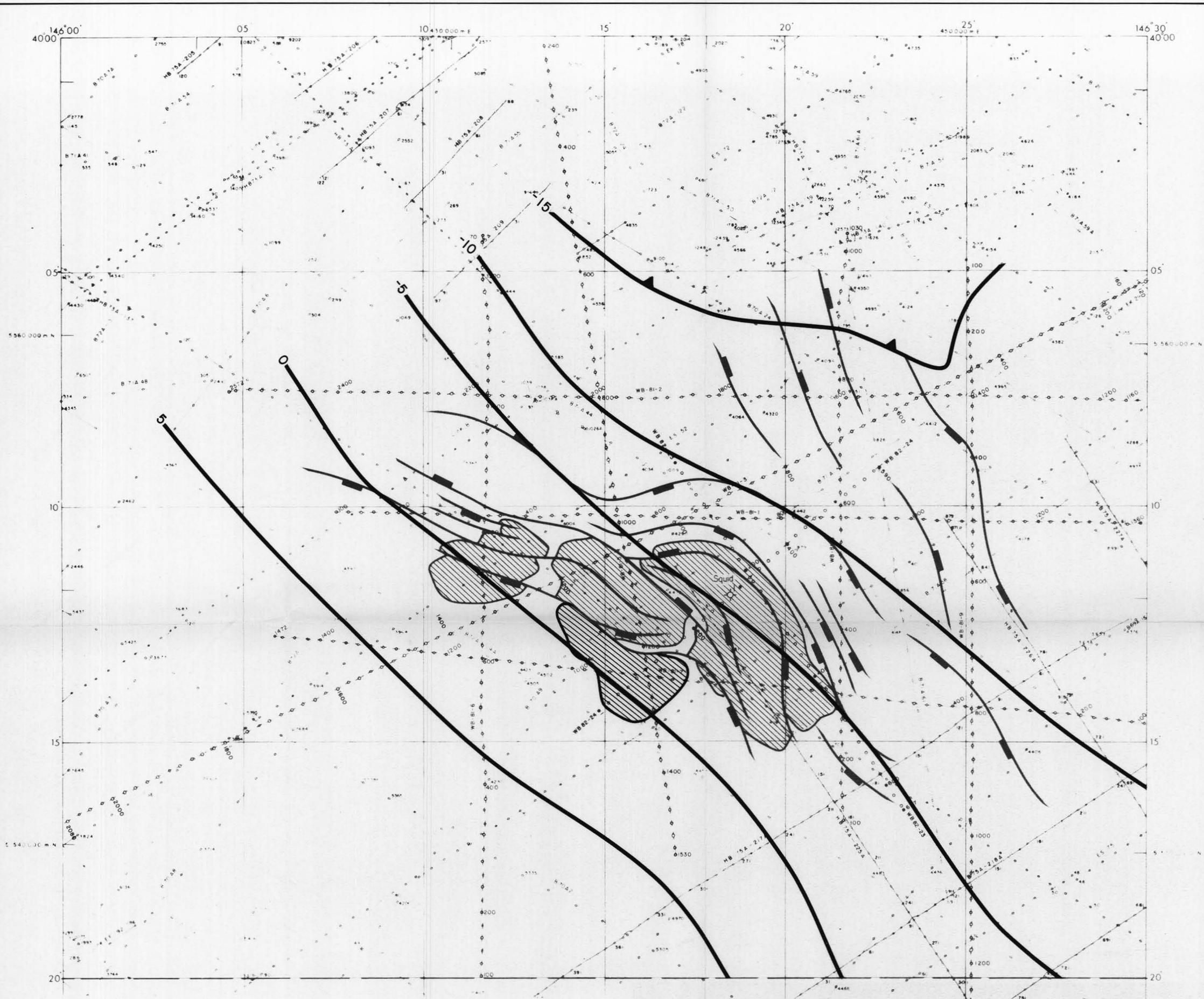


Enclosure Map 5

SCALE 1:100,000

T/15P Part 10

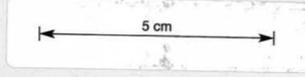
OR-197/062



**WEAVER OIL AND GAS CORPORATION,  
AUSTRALIA**

**BASS BASIN T-15-P**

212081  
**NEAR TOP LOWER M. DIVERSUS UNCONFORMITY  
 SEISMIC MARKER SHOWING BOUGUER  
 GRAVITY CONTOUR LINES**

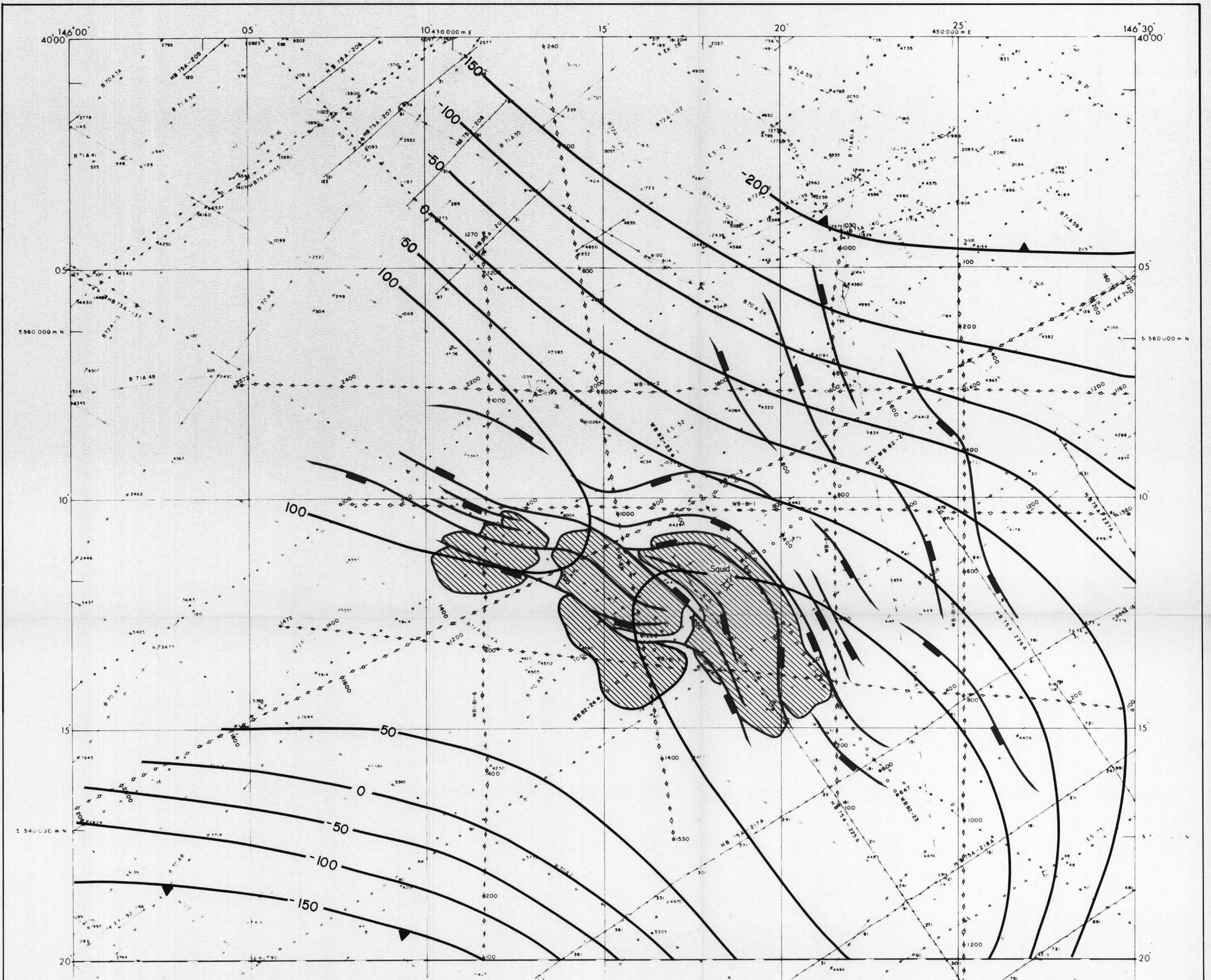


SCALE 1:100,000  
 CONTOUR INTERVAL 5 MILLIGALS

T/ISP Part 10

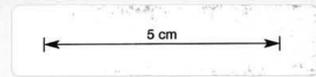
Enclosure Map 6

CR197 VOL 2



WEAVER OIL AND GAS CORPORATION,  
AUSTRALIA

**BASS BASIN T-15-P**  
212082  
NEAR TOP LOWER M. DIVERSUS  
UNCONFORMITY SEISMIC MARKER  
SHOWING TOTAL MAGNETIC CONTOUR LINES

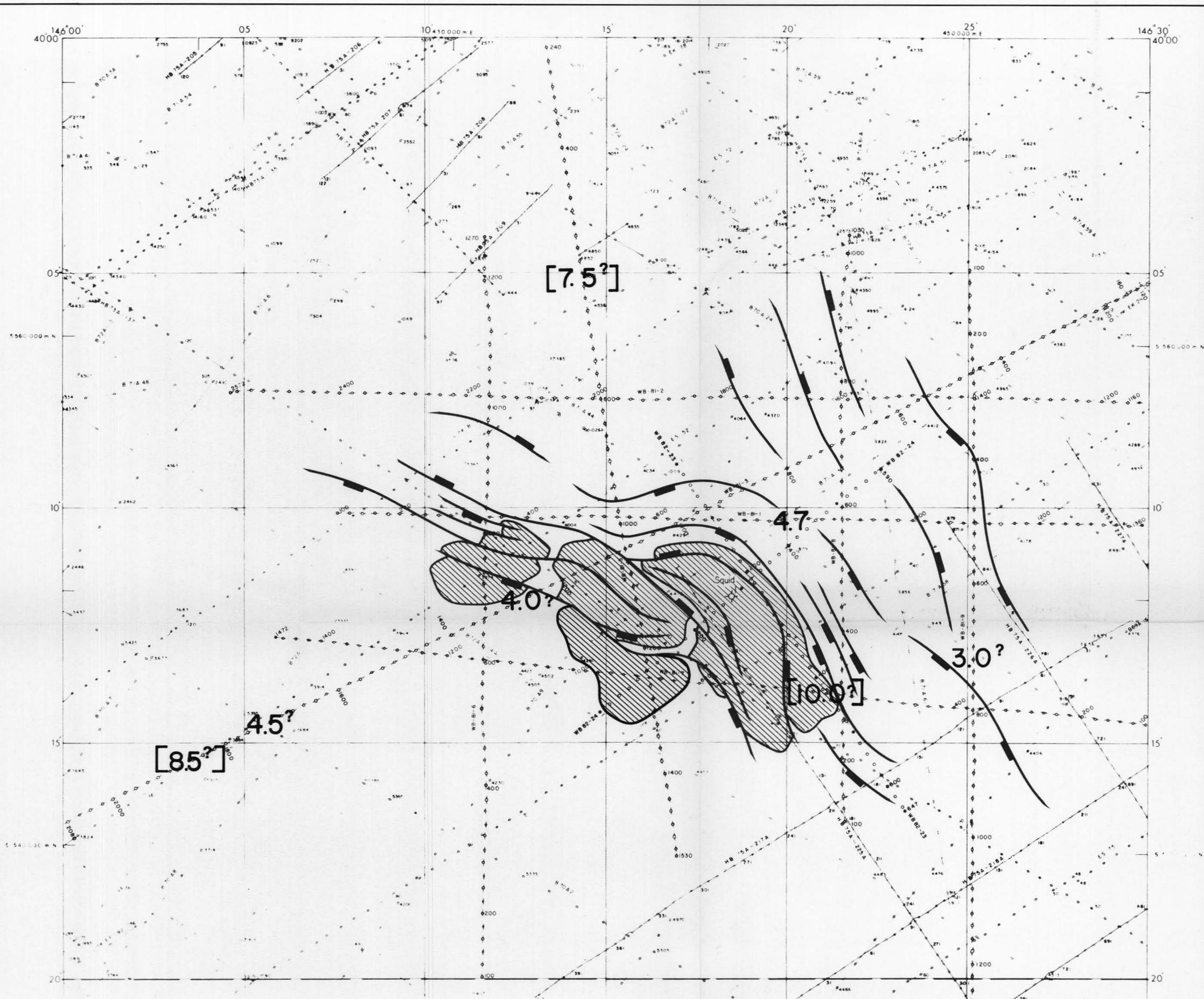


SCALE 1:100,000  
CONTOUR INTERVAL 50 GAMMAS

T/ISP Part 10

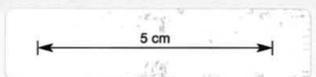
Enclosure Map 7

OR-197 VOL2



**WEAVER OIL AND GAS CORPORATION,  
AUSTRALIA**

**BASS BASIN T-15-P**  
212083  
**NEAR TOP LOWER M. DIVERSUS UNCONFORMITY  
SEISMIC MARKER SHOWING CALCULATED  
DEPTH TO MAGNETIC BASEMENT**



*T/15 P Part 10.*

GRADED DEPTH VALUES IN THOUSANDS OF METERS TO INTERPRETED MAGNETIC BASEMENT  
DEPTH VALUES IN PARENTHESIS ARE SOURCES OCCURING ABOVE INTERPRETED BASEMENT

Enclosure Map 8 SCALE 1:100,000

OR-197 VOL2