DEPT. NAT. RES & ENV
PE905086

Natural Resources and Environment

AGRICULTURE • RESOURCES • CONSERVATION • LAND MANAGEMENT

WELL SUMMARY

SOLE-1 (W666)

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

SOLE-1 (W666)

Well Summary Report

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WELL SUMMARY REPORT

41 pages

BASIC

WELL SUMMARY

SHELL SOLE-1 (VIC./P9)

1. Purpose of well

The exploration well Sole-1 was drilled to test the sandstones of the Eocene Latrobe Valley Formation in an E-W oriented anticline straddling the boundary between Shell's Vic/P9 and Esso-BHP's Vic./P1 permits.

2. Well statistics

Location	:	31 nautical miles from Marlo, Victoria.
Co-ordinates	:	Latitude 38° 06' 59.5" S Longitude 149° 02' 04.4" E
Elevation	:	Rotary table - datum for depth measurements. - 32 ft. above mean sea level. - 455 ft. above sea floor.
Total Depth	:	3,703 feet.
Date drilling commenced	:	28th January, 1973.
Date total depth reached	:	5th February, 1973.
Date well abandoned	:	9th February, 1973.
Drilling time in days	:	13 (to abandonment).
Status	:	Plugged and abandoned. Cleared sea floor of all drilling material.
Plugs	:	2850'-1858' 700'- 505'

Holes sizes and depths

36" hole to 500 ft.
26" hole to 972 ft.
13¾" hole to 2230 ft.
9⅞" hole to 3703 ft.

Casing and cementing details

Size	30"	20"	10¾"
Weight	310 lbs/ft	91.51 lbs/ft	40.5 lbs/ft
Grade	1" WT	X-52 LP	J55
Range	-	-	3
Set at	475'	952'	2199'
Cemented to		sea floor (estimated)	630' (TS)

Drilling fluid

0-2230' : Type : seawater
Average weight : 9.0 lbs/gal.
Treatment : None. Before running the 10¾" casing, the hole was displaced to sweet water/ bentonite/lignosulfonate mud.

2230'-TD : Type : sweet water/bentonite/lignosulfonate
Average weight : 10.7 lbs/gal.
Treatment : Addition of lignosulfonate was necessary to keep viscosity down.

Perforations : None

Plug back jobs :

Plug No.	Length of plug (ft)	Sacks of cement	Tested
1	2850-1858 (992)	650	10,000 lbs
2	700- 505 (195)	100	-

3. Formation Sampling

Ditch Cuttings : Cuttings were collected at the shale shaker at 10 ft. intervals after drilling out the 20" casing shoe.

Coring : No cores were taken.

Side wall sampling : A total of 90 samples were tried, of which 85 were recovered.

4. Logging and Surveys

Electric logs :
IES/SP : 3708'-2190', 2226'-952'
FDC/GR : 3708'-2190', 2226'-952', GR to 450'
CNL : 3708'-2190'
BHC : 3699'-2190', 2226'-952'
HDT : 3695'-2190', 2223'-952'
ML/MLL : 3703'-2190'
Velcocity survey

Penetration rate and gas logs : Recorded by Baroid, ADT-unit. A continuous record of gas in the mud was kept using a Hot Wire Detector and Gas Chromotograph from the 20" casing shoe to total depth.

Deviation surveys: Totco recorders were used
Depth 972 ft, Deviation 1°
" 1258 ft, " 1°
" 2230 ft, " ¾°
" 3703 ft, " 1°

Temperature surveys : A temperature survey was run to detect the top of the cement behind the 10¾" casing.
Top cement was found at 630 ft.

Sole-1.

3/3

5. Testing

F.I.T. Test 1	3160'	Seal failed
F.I.T. Test 2	3160'	Formation tight
F.I.T. Test 3	2728'	Seal failed
F.I.T. Test 4	2727'	Seal failed
F.I.T. Test 5	2673'	Recovered 61.2 cf gas + 1200 cc mud C_1+C_2
F.I.T. Test 6	2791'	Seal failed
F.I.T. Test 7	2695'	Recovered 57.9 cf gas + 1400 cc mud C_1+C_2
F.I.T. Test 8	2829'	Seal failed

6. Lithology

990-2096' : 301.75 - 638.86 m
MARL, grey-green, fossiliferous, soft, slightly pyritic and glauconitic, containing thin beds of slightly harder ARGILLACEOUS LIME MUD, fossiliferous, slightly pyritic.

2096-2657' : 638.86 - 809.85m
MARL, pale grey-green, fossiliferous, soft, slightly pyritic and pure LIME MUD, containing rare thin beds of slightly harder ARGILLACEOUS LIME MUD, fossiliferous.

2657-3355' : 809.85 - 1022.64 m
QUARTZ SANDSTONE, grey-white, fine-medium grained, sub-angular to sub-rounded, poor-moderate sorting, slightly pyritic, occasionally argillaceous, interbedded with SILTSTONE, dusky brown, micaceous. Thin COAL beds occur at 3180'.

3355-3522' : 1022.64 - 1073.50 m
QUARTZOSE SANDSTONE, green, mottled, chloritic, silty, lithic fragments, micaceous, containing thin beds of CLAYSTONE, olive grey, chloritic slightly calcareous.

3522-3703' : 1073.50 - 1128.67 m
CLAYSTONE, olive grey, chloritic, friable to moderately hard, slightly calcareous, containing thin beds of QUARTZOSE SANDSTONE and SILTSTONE, green, mottled lithic fragments, micaceous.

WELL HISTORY

The drilling ship "Glomar Conception" under contract to Esso Australia Limited, was released to S.D.A. for the drilling of this well.

The rig arrived on location on 27th January 1973. Some delays were experienced laying the anchors due to bad weather.

Sole No. 1 was spudded in on 28th January at 23.00 hours. Water depth at the location was 423 feet and the distance from rotary table to seafloor was 445 feet.

A 36" hole was drilled to 500 feet using a 26" bit and 36" hole opener. 26" hole was drilled to 972 feet and 20" casing run to 952 feet and cemented to seabed. BOP's were installed and tested to 5000 psi.

A $13\frac{3}{4}$" hole was drilled to 2230 feet using seawater as a drilling fluid. Displaced hole to mud and ran Schlumberger logs and took sidewall samples. $10\frac{3}{4}$" casing was run to 2199 feet and cemented to 630 feet. Tested BOP's to 1400 psi.

Drilled $9\frac{7}{8}$" hole to 3703 feet using sweet water/bentonite mud. Ran Schlumberger logs, took sidewall samples and wireline formation tests.

Set cement plugs 2850'-1858' and 700'-505'. Retrieved well head, guide frames and casing to 24 feet below seabed.

Sole No. 1 was abandoned on 9th February at 14.30 hours, and the "Glomar Conception" released to Esso Australia Limited.

SOLE No 1

DRILLING TIME CURVE

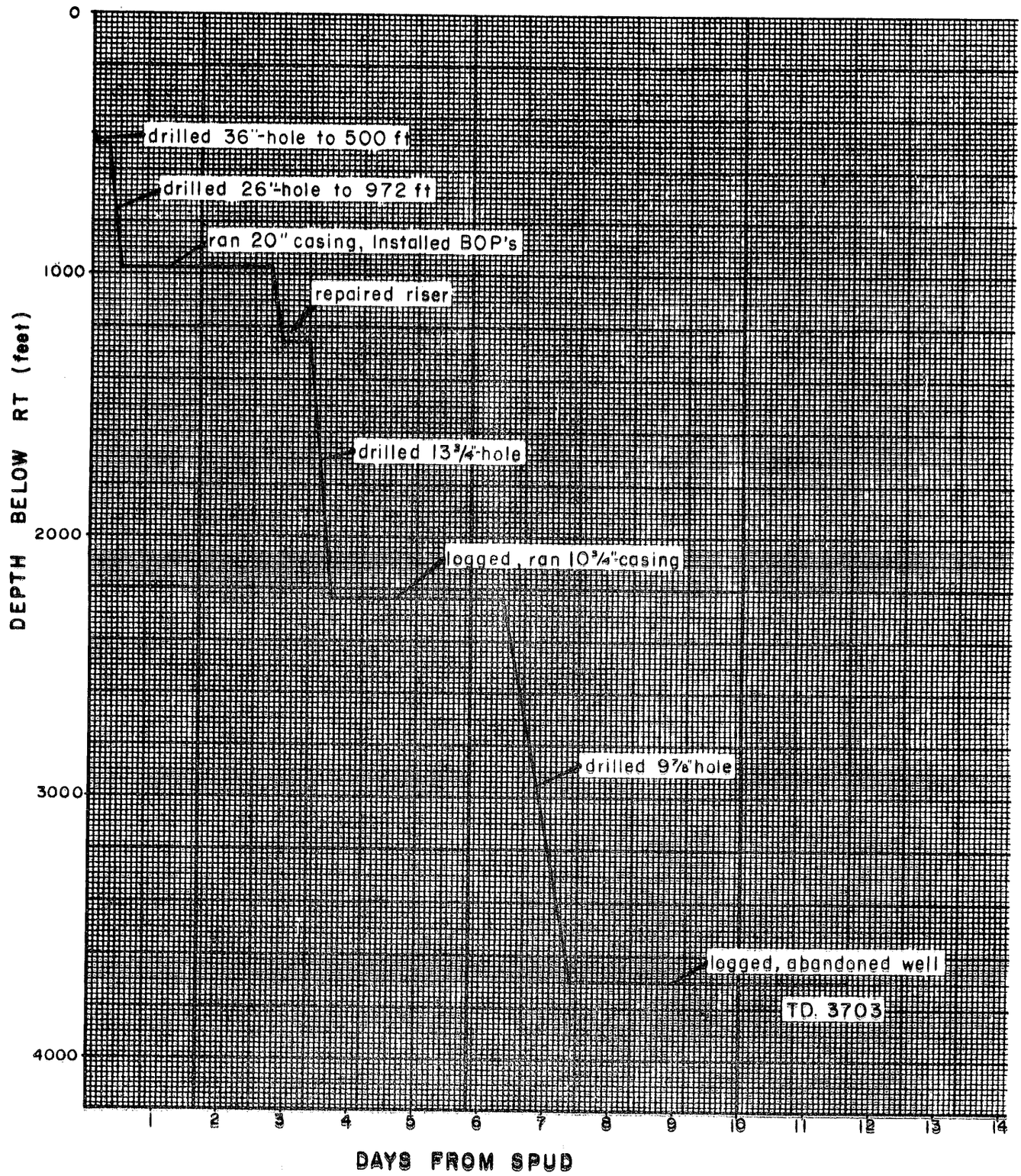

FIG. 1

SDA DRG. No. 6741

PART I : DRILLING AND GENERAL INFORMATION

1.1 GENERAL DATA

(i)	Well	:	Sole No. 1
(ii)	Operator	:	Shell Development (Australia) Pty. Ltd., 155 William Street, MELBOURNE, VIC. 3000.
(iii)	Permit	:	Vic./P9
(iv)	Location	:	31 nautical miles from Marlo, Victoria.
(v)	Co-ordinates	:	Latitude 38° 06' 59.5" S Longitude 149° 02' 04.4" E
(vi)	Elevation	:	Rotary table - datum for depth measurements. - 32 ft. above mean sea level. - 455 ft. above sea floor.
(vii)	Total Depth	:	3,703 feet.
(viii)	Date drilling commenced	:	28th January, 1973.
(ix)	Date total depth reached	:	5th February, 1973
(x)	Date well abandoned	:	9th February 1973.
(xi)	Drilling time in days	:	13 (to abandonment)
(xii)	Status	:	Plugged and abandoned. Cleared sea floor of all drilling material. Plugs : 2850'-1858' 700'- 505'

2. DRILLING DATA

(i) Name and address of drilling contractor:

Global Marine Drilling Company,
Global Marine House,
811 West Seventh Street,
Los Angeles, California 90017,
U.S.A.

(ii) Drilling plant : Drilling ship "Glomar Conception"
Builder : Levingstone Shipbuilding Company.
Maximum loaded displacement : 11,220 LT
Maximum variable load : 6,454 LT
Storage capacity mud : 2,810 bbl
drilling water: 15,200 bbls
bulk cement : 4,100 cu.ft.
bulk mud : 8,200 cu.ft.
sacks : 11,000 sacks

(iii) Mast/Derrick :
Global Marine design. 142' x 61' x 38'.
Hook load capacity : 1,000,000 lbs.

(iv) Pumps :

2 National N-1300 duplex $7\frac{1}{4}$" x 16" pumps.
Powered by dual GE 752 RI electric motors, independently driven.

(v) Blowout preventer equipment.

Blowout preventer stack $16\frac{3}{4}$" 5000 MSP, consisting of three Cameron type U- BOP's, one Shaffer $16\frac{3}{4}$" 5000 psi shear ram, one Gk Hydril and one Shaffer Spherical Bag Type BOP, $16\frac{3}{4}$" 5000 psi working pressure.

(vi) Hole sizes and depths

36" hole to 500 ft.
26" hole to 972 ft.
$13\frac{3}{4}$" hole to 2230 ft.
$9\frac{7}{8}$" hole to 3703 ft.

(vii) Casing and cementing details

Size	30"	20"	$10\frac{3}{4}$"
Weight	310 lbs/ft	91.51 lbs/ft	40.5 lbs/ft
Grade	1" WT	X-52 LP	J55
Range	-	-	3
Set at	475'	952'	2199'
Cemented to		sea floor (estimated)	630' (TS)

(viii) Drilling fluid

0-2230' : Type : seawater
Average weight: 9.0 lbs/gal.
Treatment : None. Before running the $10\frac{3}{4}$" casing, the hole was displaced to sweet water/bentonite/lignosulfonate mud.

2230'-TD : Type : sweet water/bentonite/lignosulfonate
Average weight : 10.7 lbs/gal
Treatment : Addition of lignosulfonate was necessary to keep viscosity down.

Average weekly analysis:

Week	Weight ppg	Viscosity MF	Fluid loss cc	Filtercake (1/32 m)	Sand %	PH
27/1-2/2	9.0	28	-	-	-	-
3/2-10/2	10.7	46	3.8	2	1	10.5

Total mud materials consumed :

Barytes	:	2400 x 100 lbs
Aquagel	:	736 x 100 lbs
Q-Broxin	:	169 x 50 lbs
CC-16	:	118 x 50 lbs
Soda-ash	:	16 x 93 lbs
Caustic	:	18 x 140 lbs

(ix) Perforation and shooting record: No perforating was carried out.

(x) Plug back jobs :

Plug No.	Length of plug (ft)	Sacks of cement	Tested
1	2850-1858 (992)	650	10,000 lbs
2	700- 505 (195)	100	-

(xi) Fishing operations and hole troubles:

No fishing operations were performed and no hole trouble experienced.

(xii) Sidetracked hole : Nil.

3. LOCATION

(i) Site investigations carried out : None

(ii) Anchoring methods :

Eight anchors of 30.000 lbs LWT-type.
All mooring lines made of $2\frac{3}{4}$ inch stud link chain and run out more than 2200 feet.
Ship heading.

(iii) Transportation :

The rig was serviced by the following supply boats
"Lady Laurie" 545 Ton.
"Smit-Lloyd 33" 779 Ton.

Two helicopters, 1 Bell-205 and 1 Allouette-3 , contracted from Airfast transported personnel between the rig and the airstrip at Marlo.

4. FORMATION SAMPLING

(i) Ditch cuttings :

Cuttings were collected at the shale shaker at 10 ft. intervals after drilling out the 20" casing shoe.

(ii) Coring :

No cores were taken.

(iii) Side wall sampling :

A total of 90 samples were tried, of which 85 were recovered.
A detailed list is given in appendix 5.

5. LOGGING AND SURVEYS

(i) Electric logs :

IES/SP	:	3708'-2190' , 2226'-952'
FDC/GR	:	3708'-2190' , 2226'-952', GR to 450'
CNL	:	3708'-2190'
BHC	:	3699'-2190' , 2226'-952'
HDT	:	3695'-2190' , 2223'-952'
ML/MLL	:	3703'-2190'
Velocity survey	:	

(ii) Penetration rate and gas logs :

Recorded by Baroid, ADT-unit. A continuous record of gas in the mud was kept using a Hot Wire Detector and Gas Chromotograph from the 20" casing shoe to total depth.

(iii) Deviation surveys :

Totco recorders were used.

Depth	972 ft,	Deviation	1°
"	1258 ft,	"	1°
"	2230 ft,	"	¼°
"	3703 ft,	"	1°

(iv) Temperature surveys :

A temperature survey was run to detect the top of the cement behind the $10\frac{3}{4}$" casing.
Top cement was found at 630 ft.

6. TESTING

Eight runs were made with the Schlumberger formation interval tester. Gas was recovered from 2673 ft. and 2695.5 ft. For details see appendix 7.

SHELL DEVELOPMENT (AUSTRALIA) PTY LTD | PERMIT: VIC/P9 | WELL: Sole No1

WEEKLY DRILLING REPORT No. 1 from 27/1 to 2/2/73 | RIG: GLOMAR CONCEPTION

R.T. Elevation 32 ft above MSL

Sea Bottom Depth 423 ft below MSL

CASING						
Size	30"	20"				
Depth	475'	952'				

DATE	DEPTH (PROGRESS) (feet)	MUD Weight (lb/gal) / pH	MUD Viscosity (MF secs) / oil (%)	MUD Waterloss (cc/30 mins) / Cl (ppm)	OPERATIONS
27/1					Rig released to Shell on 27/1/1973 at 1700 hours. Moved rig to location Sole. Suspended operations due to bad weather.
28/1	700 (245)	8.8	75		Ran anchores 7, 2, 5 and 10. Positioned vessel. Ran anchors 3, 4, 8 and 9. Tested anchors 2, 3, 4, 5, 7, 8 and 9 to 200,000 lbs., anchor 10 to 180,000 lbs. Ran guide base. Made up 26" bit + 36" hole-opener. Spudded in Sole No. 1 on 28/1/1973 at 23.00 hours. Co-ordinates :- Lat. 38° 07' 00.836" S Long. 149° 02' 04.183" E Water Depth: 423' Drilled 36" hole to 500 ft. Displaced hole with mud.
29/1	972 (272)	8.8	75		Drilled 26" hole to 972 ft. Displaced hole with mud. Ran 20" casing, X-52 LP, 91.51 lbs/ft and pile joint. Installed guide-frame in moonpool. Landed 20" casing at 952 ft. Cemented same with 1,100 sacks Cement "N" + 350 sacks cement "N" + 2% CaCl-2 BWOC, weight 15/6 lbs/gal. Tested BOP's at surface. Shear-rams failed to take test pressure of 5000 PSI.
30/1	972 (-)				Kept shear rams in Shaffer and installed blind-rams in position of upper-pipe rams in triple Cameron type-U BOP's. Tested rams to 5000 PSI. Ran BOP's and riser. Could lower stack over one guide-post only. Made observation dive. Turned stack and landed on all guide-posts.

SHELL DEVELOPMENT (AUSTRALIA) PTY LTD	PERMIT. VIC/P9	WELL No. No1
WEEKLY DRILLING REPORT No. 1 from 27/1 to 2/2/73		RIG GLOMAR CONCEPTION

R. T. Elevation 32 ft above MSL

Sea Bottom Depth 423 ft below MSL

CASING						
Size	30"	20"				
Depth	475	952				

DATE	DEPTH (PROGRESS) (feet)	MUD Weight (lb/gal) pH	MUD Viscosity (MF secs) oil (%)	MUD Waterloss (cc/30 mins) Cl (ppm)	OPERATIONS
31/1	1258 (286)	Seawater			Installed kill and choke-line. Tested casing and collet connector to 500 PSI. Tested BOP's, choke and kill-lines and surface equipment to 5,000 PSI. Installed wear-bushing. Ran in with 13¾" bit. Top cement at 923 ft. Drilled out cement. Drilled to 1258 ft. No cutting returns as from 1180 ft., due to leaking riser slipjoint. Unlatched riser and replaced packing.
1/2	2230 (972)	9.0 10.6	38 -	7.0 3,000	Connected marine riser and kill and choke lines. Tested kill and choke lines to 5000 PSI. Ran in with 13¾" bit and drilled to 2230 ft. Made checktrip to 1200 ft. Pulled out. 30,000 lbs. overpull from 1200 ft. to casing shoe. Ran IES. Unable to pass 980 ft. Ran in with bit. Reamed 980 - 1075 ft. Circulated and conditioned mud.
2/2	2230	9.0 10.6	38 -	7.0 3000	Made checktrip to shoe. Pulled out Logged : IES/SP : 2226' - 952' BHC : 2226' - 952' FDC/GR : 2223' - 952' GR to 450' HDT : 2223' - 952' CST : recovered 29 misfire 1 Ran in with bit. Circulated and conditioned mud. Pulled out.

SHELL DEVELOPMENT (AUSTRALIA) PTY. LTD. WELL: SOLE NO.1

WEEKLY DRILLING TIME BREAKDOWN FROM 27/1/73 TO 2/2/73

OPERATIONS	27/1	28/1	29/1	30/1	31/1	.1/2	2/2	WEEKS TOTAL	CUM TOTAL
(0) PREPARATION									
MOVING IN/OUT	.6							6	
ANCHORING	1½	10¾						12¼	
WAIT ON WEATHER (MOVING)	5½							5½	
SUB-TOTAL MOVING								23¾	
(1) DRILLING									
DRILLING, HRS.ON BOTTOM		2½	2¾		4¼	8¼		18¼	
DRILLING, ROUNDTRIPPING		8	1¼		2½	8	6¼	26	
DRILLING, MISCELLANEOUS			¼				¼	½	
ENLARGING, REAMING						1		1	
CIRC., COND. MUD		¼	¾			3¾	1¼	6	
RUN CASING AND CEMENT			11½				3	14½	
RUN AND TEST U.W.E.		2½	1½	16¾	8½		1½	30¾	
FISHING									
DIVING									
SUB-TOTAL DRILLING								97	
(2) EVALUATION									
CORING, HRS ON BOTTOM									
CORING, ROUNDTRIPPING									
CORING, MISCELLANEOUS									
LOGGING						1½	11¾	13¼	
WIRE LINE FM. TEST									
ROUNDTRIPS									
SUB-TOTAL EVALUATION								13¼	
(3) COMPLETION									
INSTALL. PROD. TEST EQP.									
PRODUCTION TESTING									
COMPLETION									
SUB-TOTAL COMPLETION									
(4) SUSPEND/ABANDON									
SUB-TOTAL SUSPEND/ABANDON									
MISCELLANEOUS*									
REPAIR DRAWWORKS									
REPAIR ENGINES/GENERATORS									
REPAIR PUMPS									
REPAIR U.W.E.			6 (1)	7¼ (1)	8¾(1)	1(1)		23	
REPAIR TV, GUIDANCE									
REPAIR MISCELLANEOUS									
WAIT ON WEATHER									
WAITING, OTHER									
SUB-TOTAL OPERATING DOWNTIME								23	
TOTAL								157	

REMARKS: * THE NUMBER BETWEEN BRACKETS AFTER THE HOURS SHOWS THE ALLOCATION TO PREPARATION (0), DRILLING (1), ETC.

CHEMICAL CONSUMPTION 27/1 TO 2/2 SOLE NO. 1.

		Cumulative
Barytes	700 sacks	idem
Aquagel	676 "	"
Q-Broxin	64 "	"
CC - 16	32 "	"
Soda-ash	7 "	"
Caustic	9 drums	"

Cement

Cement Class "N"	:	1504 sacks
Calcium Chloride	:	12 "

Bits

No.	Size	Type	Man	No.	Nozzles	Depth Out	Footage	Hours	Condition B-T-G	WOB 000 lbs	RPM
1	26"	OSC-3A	HTC	LN-131	-	500	45	1½	1-1-I	10	60
RR	26"	OSC-3A	HTC	LN-131	-	972	517	6¼	1-1-I	10-20	150-180
2	13¾"	OSC-3AJ	HTC	KH-405	3 x 1½	2230	1258	13	1-1-I	15-30	125-200

SHELL DEVELOPMENT (AUSTRALIA) PTY LTD	PERMIT: VIC/P9	WELL Sole No. 1
WEEKLY DRILLING REPORT No. 2 from 3/2 to 10/2/73		RIG GLOMAR CONCEPTION

R. T. Elevation 32 ft above MSL

Sea Bottom Depth 423 ft below MSL

CASING						
Size	30"	20"	10¾"			
Depth	475'	952'	2199'			

DATE	DEPTH (PROGRESS) (feet)	MUD Weight (lb/gal) / pH	MUD Viscosity (MF secs) / oil (%)	MUD Waterloss (cc/30 mins) / Cl (ppm)	OPERATIONS
3/2	2230 (-)	10.3 10.6	44 -	6.0 4100	Ran 10¾" casing, J55, 40.5 lbs/ft. and landed at 2199 ft. Cemented with 250 sacks neat cement, 15.6 lbs/gal followed by 230 sacks gel cement (3% Bentonite BWOC, prehydrated) 12.3 lbs/gal, followed by 200 sacks neat cement, 15.6 lbs/gal. Full returns. Pressure tested casing to 1500 psi. Installed seal assembly. Ran temperature survey. Top cement at 630'. Tested seal assembly and BOP's to 1400 psi. Ran in with 9⅞" bit. Drilled out cement. Made formation gradient test to an equivalent mud-weight of 12.8 lbs/gal.
4/2	3611 (1381)	10.8 10.5	45 -	4.8 4700	Circulated well to 10.5 lbs/gal mud. Drilled to 2706'. Hydrocarbon shows in mud. Made flow-checks and circulated at each connection. Drilled to 3360'. Made check trip to shoe.
5/2	3703 (92)	10.7 10.5	46 -	3.8 5000	Drilled to 3703'. Circulated. Made check trip to shoe, pulled out. Logged : IES/SP : 3709'-2190' FDC/CNL/GR : 3708'-2190' BHC : 3699'-2190' ML/MLL : 3703'-2190' HDT : 3695'-2190' LL-7 : Tool failure Velocity survey (CIS) : 3671'-455'
6/2	3703 (-)	10.7 10.4	44 -	3.9 5000	Made round trip. Ran FIT-1 at 3160', recovered 22000 cc mud. FIT-2 at 3160', recovered 1000 cc mud only. FIT-3 at 2728', recovered 22000 cc mud. FIT-4 at 2727', recovered 22000 cc mud. FIT-5 at 2673', recovered gas, see test report.

SHELL DEVELOPMENT (AUSTRALIA) PTY LTD | PERMIT: VIC/P9 | WELL: Sole No. 1

WEEKLY DRILLING REPORT No. 2 from 3/2 to 10/2/73 | RIG: GLOMAR CONCEPTION

R. T. Elevation 32 ft above MSL

Sea Bottom Depth 423 ft below MSL

CASING						
Size	30"	20"	10¾"			
Depth	475'	952'	2199'			

DATE	DEPTH (PROGRESS) (feet)	MUD Weight (lb/gal) pH	Viscosity (MF secs) oil (%)	Waterloss (cc/30 mins) Cl (ppm)	OPERATIONS
7/2	3703 (-)	10.7 10.4	44 -	3.9 5000	FIT-6 at 2791', recovered 22000 cc mud. CST : 2 guns, recovered 56. FIT-7 at 2695.5', recovered gas, see test report. FIT-8 at 2729', recovered 22000 cc mud. Ran in open-ended. Set cement plug 2850'-1858'. Weight tested cement with 10,000 lbs. Set cement plug 700'-505'.
8/2	3703 (PB to 505')				Disconnected bell nipple. Pulled marine riser and BOP stack. Retrieved anchors 1, 3, 4, 6, 8 and 9.
9/2					Ran explosive chage on drill pipe and detonated 24 ft. below seabed. Retrieved well head, guide frames and pile joint. Max. pull 350,000 lbs. Abandoned Sole No. 1 on 9/2/73 at 14.30 hours.
					Rig released to Esso on 10/2/1973 at 04.00 hours.

CHEMICAL CONSUMPTION 3/2 TO 9/2 SOLE NO. 1.

		Cumulative
Barytes	1700 sacks	2400 sacks
Aquagel	60 "	736 "
Q-Broxin	105 "	169 "
CC - 16	86 "	118 "
Soda-ash	9 "	16 "
Caustic	9 drums	18 drums

Cement

Cement Class "H" : 1430 sacks

Calcium Chloride : 1 sack

Bits

No.	Size	Type	Man	No.	Nozzles	Depth Out	Footage	Hours	Condition B-T-G	WOB 000 lbs.	RPM
3	9 7/8"	X-3AJ	HTC	21064	3 x 1/2	3703	1473	20 1/4	3-8-1/4	20-40	150

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SHELL DEVELOPMENT (AUSTRALIA) PTY. LTD. WELL: SOLE NO.1

WEEKLY DRILLING TIME BREAKDOWN FROM 3/2/73 TO 9/2/73

OPERATIONS	3/2	4/2	5/2	6/2	7/2	8/2	9/2	WEEKS TOTAL	CUM TOTAL
(0) PREPARATION									
MOVING IN/OUT							13½	13½	19½
ANCHORING									12¼
WAIT ON WEATHER (MOVING)									5½
SUB-TOTAL MOVING								13½	37¼
(1) DRILLING									
DRILLING, HRS.ON BOTTOM		18	2¼					20¼	38½
DRILLING, ROUNDTRIPPING	2¼	1	3½					6¾	32¼
DRILLING, MISCELLANEOUS	2¼	1						3¼	3¾
ENLARGING, REAMING									1
CIRC., COND. MUD	1¼	4	1¼					6½	12½
RUN CASING AND CEMENT	14							14	28½
RUN AND TEST U.W.E.	4¼							4¼	35
F[illegible]NG									
DIVING									
SUB-TOTAL DRILLING								55	152
(2) EVALUATION									
CORING, HRS ON BOTTOM									
CORING, ROUNDTRIPPING									
CORING, MISCELLANEOUS									
LOGGING			17	5½				22½	35¼
WIRE LINE FM. TEST				13¼	13			26¼	26¼
ROUNDTRIPS				5¼				5¼	5¼
SUB-TOTAL EVALUATION									
(3) COMPLETION									
INSTALL. PROD. TEST EQP.									
PRODUCTION TESTING									
COMPLETION									
SUB-TOTAL COMPLETION									
(4) SUSPEND/ABANDON					11	15¾	8½	35¼	35¼
SUB-TOTAL SUSPEND/ABANDON									35¼
MISCELLANEOUS*									
REPAIR DRAWWORKS									
REPAIR ENGINES/GENERATORS									
REPAIR PUMPS									
REPAIR U.W.E.									23
REPAIR TV, GUIDANCE									
REPAIR MISCELLANEOUS									
WAIT ON WEATHER									
WAITING, OTHER/STRIKE						8¼(4)		8¼	8¼
SUB-TOTAL OPERATING DOWNTIME								8¼	31¼
TOTAL								166	323

REMARKS: * THE NUMBER BETWEEN BRACKETS AFTER THE HOURS SHOWS THE ALLOCATION TO PREPARATION (0), DRILLING (1), ETC.

CEMENTATION REPORT No. 1

WELL SOLE NO. 1 DATE 29/1/73

PURPOSE OF CEMENTATION CEMENT 20" - CASING TO SEABED

CASING ASSEMBLY

Joints	lb / ft.	Grade	Range	Joint Nos.	DEPTH - FEET	
					From	To
1 X 30"	310	1" WT	-	PILE JOINT	445	475
1 X 20"	154.2	X-52 LP	-		445	478
1 X 20"	154.2	X-52 LP	-	CROSSOVER	478	522
10 X 20"	91.51	X-52 LP	-	1 - 10	522	952

Centralizer Depths 908'

Accessories DRILLPIPE STINGER TO 936 FT.

RAM CASING ON DRILLPIPE

CEMENTATION

Cement used Australian Class "N" Indent No.

Quantity used 1450 sacks Quality

Additives 2% CACL-2 in last 350 sacks Water 181 BBL

Average slurry weight 15.6 lbs/Gal lb/cu. ft.

Mixing time 57 Min mins. Mixing begins 20.03 hrs.

Loading plug mins.

Chasing 4 Min mins. Chasing fluid Mud

Displacement volume, calc. 21 BBL. actual

Chasing pressure : initial 400 psi. final 600 psi.

Returns To seabed Losses No indication of losses

Bumping pressure - psi.

Total time 61 mins. Cement in place 21.04 hrs.

REMARKS

Top plug - feet.

Pressure tests 500 PSI

Drilled shoe after 45 hrs.

Top cement : (TS) - feet. calculated Seabed feet

Cemented Pilejoint on Derrick floor with 54 sacks class "N" + 2% CACL-2 BWOC.
Slurry weight 15.3 lbs/Gal.

CEMENTATION REPORT No. 2.

WELL SOLE NO. 1 DATE 3/2/73

PURPOSE OF CEMENTATION Cement 10¾" casing to 200 ft. into 20" casing

CASING ASSEMBLY

Joints	lb / ft.	Grade	Range	Joint Nos.	DEPTH - FEET	
					From	To
46	40.5	J55	3	1 - 46	451	2199

Centralizer Depths 2180. 2160. 2120. 2081. 2042. 903.

Accessories Baker float shoe at 2199.

Halliburton float collar at 2160.

CEMENTATION

Cement used Australian Class "N" Indent No.

Quantity used 250 bags - 230 bags - 200 bags ~~Quality~~ in mixing order

Additives None - 3% Bentonite* - None Water 31 - 68 - 25 BBL. Sweet Water

Average slurry weight 15.6 - 12.3 - 15.6 lb/~~cubic~~ Gal.

Mixing time 10 - 12 - 10 mins. Mixing begins 9.43 hrs.

Loading plug 5 mins.

Chasing 20 mins. Chasing fluid Mud

Displacement volume, calc. 176 bbl. actual 176 BBL.

Chasing pressure : initial 700 psi. final 1100 psi.

Returns Full returns Losses None

Bumping pressure 1500 psi.

Total time 57 mins. Cement in place 10.40 hrs.

REMARKS

Top plug 2160 feet.

Pressure tests Tested casing to 1500 PSI after bumping plug

Drilled shoe after 18 hrs.

Top cement : (TS) 630 feet. calculated 752 feet

* 3% Bentonite (BWOC) pre-mixed in Sweet Water.

CEMENTATION REPORT No. 3

WELL SOLE NO. 1 DATE 7.2.73

PURPOSE OF CEMENTATION ABANDON WELL

CASING ASSEMBLY SET CEMENT PLUG 2850 - 1900 FT.

Joints	lb / ft.	Grade	Range	Joint Nos.	DEPTH - FEET From	To

Centralizer Depths

Accessories

CEMENTATION

Cement used Austr. Class "N" Indent No.

Quantity used 650 sacks Quality

Additives None Water 80 bbls.

Average slurry weight 15.6 ~~Thickener~~ Gall.

Mixing time 27 min. mins. Mixing begins 22[10] hrs.

Loading plug - mins.

Chasing 7 mins. Chasing fluid Mud

Displacement volume, calc. 26 bbl. actual -

Chasing pressure ; initial - psi. final - psi.

Returns No cement returns Losses -

Bumping pressure - psi.

Total time 34 min. mins. Cement in place 22[44] hrs.

REMARKS

Top ~~plug~~ cement 1858 feet.

Pressure tests

Drilled shoe after - hrs.

Top cement : (TS) feet. calculated feet

Tested Top Cement With 10,000 lbs.

CEMENTATION REPORT No. 4

WELL SOLE NO. 1 DATE 8.2.73

PURPOSE OF CEMENTATION ABANDON WELL, SET CEMENT PLUG

CASING ASSEMBLY 700 - 500 FT.

Joints	lb / ft.	Grade	Range	Joint Nos.	DEPTH - FEET From	To

Centralizer Depths

Accessories

CEMENTATION

Cement used Austr. Class "G" Indent No.

Quantity used 100 sacks Quality

Additives 2% Cal Water 12 bbls.

Average slurry weight 15.6 lb/~~XXX~~ Gal.

Mixing time 10 mins. Mixing begins 0445 hrs.

Loading plug - mins. -

Chasing 3 mins. Chasing fluid

Displacement volume, calc. 5 bbl. ~~XXX~~ actual Water

Chasing pressure : initial - psi. final - psi.

Returns No cement Losses -

Bumping pressure - psi. -

Total time mins. Cement in place 4.58 hrs.

REMARKS

Top plug 505 feet.

Pressure tests -

Drilled shoe after - hrs.

Top cement : (TS) - feet. calculated feet

SHELL DEVELOPMENT (AUSTRALIA) PTY. LTD.

TABULAR TALLY SHEET

Well: SOLE NO. 1 Field: PERMIT VIC/P9 Date: 29/1/73

Pipe Size:- 20" CASING

CASING STRING SUMMARY

No. of Joints	Weight lbs/ft	Grade	Coupling	Length	INTERVAL (K.B.)	
1 (30")	310	1" WT	-	30	445 - 475)	
1 (20")	156.2	X-52LP	CIW-CC	33	445 - 478)	PILE JOINT
1 (20")	154.2	X-52LP	CC X 3V	44	478 - 522	
10 (20")	94.54	X-52LP	CIW-3V	430	522 - 952	

Details and position of Cementing Accessories:- BAKER FLOAT SHOE AT 952 FT.

Centralizers:- Centralizer at 908 FT.

Joints with Bakerlok/Weld A:-

Joint No.	Cent.	Length		Total		Joint No.	Cent.	Length		Total	
DF	TO	SEAFLOOR		455	00						
TOP	20" TO	SEAFLOOR		9	70						
DF	TO	TOP	20"	445	30						
PILE	JOINT	33	05	478	35						
X - OVER		43	49	521	84						
1		39	60	561	44						
2		42	39	603	83						
3		42	01	645	84						
4		42	78	688	62						
5		43	45	732	07						
Total						Total					
6		46	03	778	10						
7		41	23	819	33						
8		46	04	865	37						
9		42	22	907	59						
10		42	85	950	44						
SHOE		1	50	951	94						
Total						Total					

SHELL DEVELOPMENT (AUSTRALIA) PTY. LTD.

TABULAR TALLY SHEET

Well: VIC/P9 Field: SOLE NO. 1 Date: 3/2/73

Pipe Size:- 10¾

CASING STRING SUMMARY

No. of Joints	Weight lbs/ft	Grade	Coupling	Length	INTERVAL (K.B.)
46	40.5	J55	BUTTRESS	1748'	451' - 2199'

Details and position of Cementing Accessories:- Baker Float Shoe at 2199 ft.

Halliburton Float Collar at - 2160 ft.

Centralizers:- 2180', 2160', 2120', 2081', 2042', 903'.

Joints with Bakerlok/Weld A:-

Joint No.	Cent.	Length		Total		Joint No.	Cent.	Length		Total	
TOP HANGER (BDF)				451	00	28		38	32	1166	83
HANGER		1	42	452	42	27		39	34	1206	17
46		38	28	490	70	26		38	18	1244	35
45		31	53	522	23	25		38	07	1282	42
44		36	37	558	60	24		38	84	1321	26
43		38	56	597	16	23		37	76	1359	02
42		39	66	636	82	22		37	25	1396	27
41		37	96	674	78	21		38	93	1435	20
40		37	44	712	22	20		38	28	1473	48
39		37	93	750	15	19		36	73	1510	21
Total						Total					
38		38	88	789	03	18		39	63	1549	84
37		38	51	827	54	17		37	31	1587	15
36		39	22	866	76	16		37	50	1624	65
35	C	36	35	903	11	15		38	91	1663	56
34		35	95	939	06	14		38	75	1702	31
33		39	00	978	06	13		39	48	1741	79
32		36	88	1014	94	12		37	65	1779	44
31		36	93	1051	87	11		37	88	1817	32
30		37	37	1089	24	10		37	75	1855	07
29		39	27	1128	51	9		36	82	1891	89
Total						Total					

SHELL DEVELOPMENT (AUSTRALIA) PTY. LTD.

TUBULAR TALLY SHEET

Joint No.	Cent.	Length		Total		Joint No.	Cent.	Length		Total	
Brought Forward						Brought Forward					
8		37	33	1929	22						
7		37	05	1966	27						
6		38	20	2004	47						
5	C	37	32	2041	79						
4	C	39	14	2080	93						
3	C	39	30	2120	23						
2		38	20	2158	43						
Collar		1	55	2159	98						
1	E	37	28	2197	26						
Shoe		1	55	2198	81						
Total						Total					
Total						Total					
Total						Total					

PALYNOLOGY

APPENDIX 2 to WCR Sole-1

PALYNOLOGICAL REPORT ON WELL SOLE-1, OFFSHORE GIPPSLAND BASIN, VICTORIA, AUSTRALIA.

By J.G. Wilschut

SUMMARY

All suitable sidewall samples in the Latrobe and Strzelecki formations intersected by well Sole-1 were investigated palynologically. The Latrobe group proved to be of an Eocene-Paleocene age, unconformably overlying the Strzelecki group, Albian in age in this well. No Upper Cretaceous dating could be proved although sediments of this age may be present between 3200' and 3355'.

1. INTRODUCTION

Palynological investigations were carried out in the interval 2665' to TD from which no microfaunas were recovered. Out of a total of forty three (43) sidewall samples taken in that interval only thirteen (13) could be selected as suitable for palynology. In addition a coal sample from 3190-3205' was selected from the ditch cuttings.

Detailed analyses were carried out by using types published by Cookson (Refs. 1-5), Cookson and Pike (Refs. 6 and 7), Dettmann (Ref. 9), Dettmann and Playford (Refs. 10 and 11) and Harris (Refs. 12 and 13). A number of type slides of Tertiary and late Cretaceous sporomorphs, on which a publication is in progress by the Royal Society of Victoria and which are already available at the National Museum of Victoria, were also studied (Ref. 14).

For Cretaceous sediments the zonation of Dettmann (Ref. 11) is used. In the Lower Tertiary section no published zonation could be referred to and only the Time-stratigraphic classification has been given.

The samples analysed, together with their microfloral content and bio-stratigraphic and bio-facies interpretations are presented on a Distribution chart (Encl.3).

2. MICROFLORAL SUBDIVISION

Generally speaking, samples proved to be rich in sporomorphs with the exception of 2917' and 3175'. The following subdivisions could be established:

a) 3365'-3690' Albian Coptospora paradoxa zone.
All samples determined to belong to this zone were taken in the Strzelecki group of sediments penetrated in this well. The zone was determined on the presence of restricted species as Contignisporites glebulentus and Pilosporites grandis, although the latter one was only identified in the deepest sample. A number of Species commencing their vertical range within this zone were noted, notably Appendicisporites distocarinatus, Cicatricosisporites cuneiformis and pseudotripartitus, Krauselisporites jubatus and majus and Laevigatosporites major. A few specimen of Tricolpites pannosus were observed in these samples. This species is supposed to start its range in a younger zone, overlying the Coptospora paradoxa zone (Tricolpites pannosus zone). However, some contamination of small angiospermous elements such as Triporates and Tricolporates was observed most likely due to mudfiltrate and it is believed that the species determined as Tricolpites pannosus have the same origin.

Slightly higher maturation levels were observed in this interval as compared with those noted above. This may indicate erosion of some Strzelecki sediments before sedimentation resumed during Paleocene times.

b) 2791'-3200' Paleocene
Microfloras observed in this interval closely resemble those described by Harris (Ref. 12) from the Princetown area as belonging to his Triorites edwardsii Assemblage zone. Dacrydiumites balmei, restricted to the basal beds of the Pebble Point Formation occurs throughout with the exception of the coal sample at 3200'. Gambierina edwardsii was found from 2917' downwards and occurred in high frequencies in the coal. Duplopolis orthoteichus is absent. The absence of types characteristic of Dettmanns 'Nothofagidites microflora' such as Nothofagidites senectus and Tricolpites sabulosus from the coal at 3200' would favour a Paleocene age for it. A few species also believed restricted to the 'Nothofagidites microflora' such as Proteacidites amolosexinous and Tricolpites pachyexinus were found higher in this interval. However, in sample 3093' a specimen of Deflandrea speciosa was found which is restricted to Paleocene sediments.

The presence of the Triorites edwardsii/Duplopollis orthoteichus Concurrent range zone of Harris could not be established.

Between 3200' and 3365' no suitable sidewall samples are available, and the presence of the 'Nothofagidites microflora' of Upper Cretaceous age could thus not be determined.

c) 2665' Eocene
The highest sample belonging to the Latrobe group contains a microflora which differs from that described before. It consists of species described by Harris as belonging to his Duplopollis orthoteichus Assemblage zone, such as Duplopollis orthoteichus, Tiliaepollenites notabilis, Myrtaceiidites eugenoiides Proteacidites dilwijnensis and pachypolis. Harris assigned a Paleocene (Upper) to these microfloras. In a lecture given during the Anzaas congress in May 1971 on the stratigraphic palynology of the offshore Gippsland basin (unpublished) Evans indicated the Eocene/Paleocene boundary at the first occurrence of Duplopollis orthoteichus. It is of interest to note a marked increase in Nothofagidites in the higher part of the Latrobe group in this well.

3. BIOFACIES INTERPRETATION

In both the Latrobe and Strzelecki group of sediments no microfaunas were recovered, indicating a non marine depositional environment. In palynological preparations however, a few microplankton specimen were observed. This could indicate marginal marine conditions for these samples. No detailed identification of depositional environments by means of sporomorphs has been attempted for lack of more data on the basin and the entire interval has been classified as continental/transitional.

J.G. Wilschut

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BASIN GIPPSLAND BASIN DATE December 4th, 1974

WELL NAME SOLE-1 ELEVATION

PALYNOLOGIC ZONES	HIGHEST DATA					LOWEST DATA				
	Preferred Depth	Rtg.	Alternate Depth	Rtg.	2 way time	Preferred Depth	Rtg.	Alternate Depth	Rtg.	2 w tim
P. tuberculatus										
U. N. asperus										
M. N. asperus										
L. N. asperus										
P. asperopolus										
U. M. diversus										
M. M. diversus										
L. M. diversus										
U. L. balmei										
L. L. balmei	2791	1				2917	1			
T. longus	3070	1				3350	3	3175	1	
T. lilliei										
N. senectus										
C. trip./T.pach.										
C. distocarin.	3365	1				3690	1			
T. pannosus										

COMMENTS: Definite Eocene is present in SWC at 2665' however it cannot confidently be referred to a zone. From comparison with Wahoo- and Flathead-1 the most likely zone to be present are the P. asperopolus or the Lower N. asperus Zones.

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

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

DATA RECORDED BY: A.D. Partridge DATE 4th Dec. 1974

DATA REVISED BY: DATE

BASIN GIPPSLAND BASIN DATE December 4th, 1974

WELL NAME SOLE-1 ELEVATION

AGE	PALYNOLOGIC ZONES	HIGHEST DATA Preferred Depth	Rtg.	Alternate Depth	Rtg.	2 way time	LOWEST DATA Preferred Depth	Rtg.	Alternate Depth	Rtg.	2 way time
MIO-OLIG-	P. tuberculatus										
	U. N. asperus										
	M. N. asperus										
	L. N. asperus										
EOCENE	P. asperopolus										
	U. M. diversus										
	M. M. diversus										
	L. M. diversus										
PALEOCENE	U. L. balmei										
	L. L. balmei	2791	1				2917	1			
	T. longus	3070	1				3350	3	3175	1	
LATE CRETACEOUS	T. lilliei										
	N. senectus										
	C. trip./T.pach.										
	C. distocarin.	3365	1				3690	1			
	T. pannosus										
EARLY CRETACEOUS											
PRE-CRETACEOUS											

COMMENTS: Definite Eocene is present in SWC at 2665' however it cannot confidently be referred to a zone. From comparison with Wahoo-1 and Flathead-1 the most likely zone to be present are the P. asperopolus or the Lower N. asperus Zones

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

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

DATA RECORDED BY: A.D. Partridge DATE 4th Dec. 1974

DATA REVISED BY: DATE

PALAEONTOLOGY

INTERPRETATIVE

APPENDIX - 1

SOLE-1

PALAEONTOLOGICAL REPORT

by

M. Apthorpe

Melbourne

May 1973

INTERPRETATIVE

Introduction.

This report presents an analysis based on foraminifera of the upper part of the Sole-1 well, in the Gippsland Basin, Southern Australia. The interval 1015 feet to 2657 feet was sampled by 41 sidewall cores, of which 32 were used in this analysis. Some samples were not examined because of severe diagenesis.

Acknowledgements.

The writer is indebted to David J. Taylor, consultant to Esso Exploration Ltd., for biostratigraphic advice and guidance on the environmental interpretation of the fauna, based on his work on the Gippsland Basin.

The Foraminiferal Sequence.

Summary.

Sole-1 intersected 1660 feet + of the Gippsland Limestone Formation before reaching the unfossiliferous Latrobe Group. In this well the Gippsland Limestone is entirely of Middle Miocene age, in the sense of Shell. (The same interval is referred to the Upper Miocene by Taylor and Esso, who use only a two-fold division of the Miocene). The biostratigraphic units intersected are zonules C, D-1 and D-2 of Taylor (1966, and unpublished).

The depositional environment of that part of the Gippsland Limestone intersected in this well is of an upward and outward building slope and shelf with progressive shallowing. Initial continental slope deposits are followed by thick deposits of a migrating submarine canyon, passing up into outer neritic and then middle neritic carbonate shelf sediments. The nature of the top of the sequence is concealed by the casing.

Biostratigraphy.

Zonule C (+1015' - approximately 1750').

The zonule is identified in this well on the presence of Globorotalia lenguaensis, which is sporadically abundant, together with Globorotalia miotumida. Longer ranging planktonic species occurring in the zonule include the Globorotalia miozea group, Globorotalia acostaensis, G. menardii, G. mayeri, G. panda, G. siakensis, G. bella, and Orbulina universa. Globigerinoides glomerosus circularis ranges up into this zonule; it has previously been reported only as high as Zonule D. The occurrence of Globorotalia siakensis in Zonules C and D-1 extends the known range of the species in Southern Australia considerably upwards. Globorotalia lenguaensis disappears about 150 feet above the base of the zonule (lowest occurrence at 1582 feet).

Zonule D-1 (approximately 1750' - 2150').

The top of the zonule is placed at the highest occurrence of Globorotalia conica. Specimens referable to Jenkin's species Globorotalia "mayeri barisanensis" occur just above this, at 1705', so that the top of D-1 could possibly be placed as high as 1705'. Other species present apart from those listed above are Globorotalia acostaensis (in the upper part of the zonule only) and occasional occurrences of Globorotalia peripheroacuta. Globorotalia miotumida and G. panda both disappear close to the base of the zonule.

 INTERPRETATIVE

Zonule D-2 (2150' - approximately 2650')

The top of the zonule is defined by the highest occurrence of Globorotalia peripheroronda in the sample at 2160'. Specimens close to Globorotalia peripheroacuta appear higher in the sequence, within D-1, but abundant specimens corresponding to the type of G. peripheroacuta occur only near the base of D-2.

Orbulina universa and O. suturalis disappear at 2538'. Older members of the Orbulina lineage, Globigerinoides transitorius and Globigerinoides sicanus (=bisphericus), do not appear until 2623', so that there appears to be a gap in the lineage. Since G. sicanus is the indicator species for the top of Zonule E, the interval between 2623' and 2657' is referred to the Zonule D - Zonule E boundary. Some workers may prefer to place the interval within Zonule E, but the numbers of Globigerinoides sicanus are not great, and Globigerinoides glomerosus glomerosus is conspicuously absent, so that a determination on the boundary is preferred here. Taylor (pers. comm.) has suggested that the disappearance of Orbulina above the base of D-2 may be due to environmental factors. He has indicated that changing water mass characteristics may have temporarily removed the Orbulina population from the Sole area at the time when O. universa was evolving.

Rare specimens of Globorotalia zealandica, which is normally found in Zonules F to H, may indicate reworking of older sediments into the Sole sequence. Reworking is supported by the presence of Oligocene microplankton species within the Miocene carbonate sequence. Cassigerinella chipolensis occurs in abundance at 2632'. Its presence may be due either to reworking, or may be an extension of the local range of the species.

The form recorded here as Globigerina tripartita is the same as that referred to by Jenkins, and by Taylor, as Globoquadrina dehiscens advena.

All sidewall cores examined below 2660' were barren of foraminifera.

Environment of Deposition.

A. Comment on the faunas.

Neritic (shelf) faunas have been recognised by the abundance of the calcareous benthonic group, the Cibicidae, which make up 23% of the total fauna in the middle neritic samples. The species Cibicides cygnorum and Rosalina mitchelli, which are abundant, are confined to the shelf. The percentage of planktonic species rises from 50% in the middle neritic interval to 63% in the outer neritic.

Canyon faunas in general have a much lower diversity, particularly in the group of calcareous benthonic species, than either shelf or slope faunas. Two types of canyon fill are recognised here:
i) The upper part of the canyon sequence (1485' - 1918') is characterized by moderate planktonic percentages, and by high percentages of individual calcareous benthonic species which are spasmodically important, and then rapidly become insignificant in number. Cassidulina neocarinata is consistently abundant; Taylor regards it as indicative of high energy conditions. Shape and size sorting by currents or slumping appears to be an important factor contributing to the abundance of some species.
ii) The lower part of the canyon sequence is extremely impoverished in all calcareous benthonic species, and the planktonic percentage rises to over 88% below 2400'. Arenaceous species are relatively more important than in the upper part of the canyon. The calcareous benthos includes small numbers of the most common slope species, presumably washed in. Conditions within the canyon appear to have been unsuitable for the survival of an in situ calcareous benthonic fauna. The only abundant

calcareous benthonic is Nonionella bradii. In the upper canyon this species is abundant only where Cassidulina neocarinata, the high energy indicator, is also at a peak. It is therefore possible that Nonionella bradii may be indicative of extremely unstable, turbulent, or high energy conditions within the canyon environment. The lower part of the canyon appears to have been a more extreme environment for fauna than the upper part, and there is a much greater ratio of sediment to fauna than elsewhere.

Slope faunas are recognized on a planktonic percentage over 60%, and a rich and extremely diverse benthonic fauna which includes deep water species. Some of the latter include: Melonis pompilioides, Planulina wuellerstorfi, Gavelinopsis lobatulus, Bucella cf. frigida, Euuvigerina picki (in a smoother slope morphology), Ramulina globulifera (one sample only), Reophax scorpiurius, Karreriella bradyi, Sigmoilopsis schlumbergeri, Vulvulina pennatula and Cyclammina spp. "Canyon" species such as Cassidulina neocarinata may also be abundant in slope samples. Some samples with transitional characteristics may represent the low energy edge of a migrating canyon, transitional to the slope.

B. The sequence of environments.

Slope (2651' - 2510').

At the base of the Gippsland Limestone carbonate sedimentation commenced on the upper continental slope. A flourishing deep-water fauna developed, but the presence of shallow water species (Carpenteria rotaliformis, Elphidium macellum), quartz and lithic fragments suggest transportation of material from the shelf. Reworking of older parts of the Gippsland Limestone is suggested by some of the planktonics and microplankton (see Biostratigraphy - Zonule D-2).

Lower "canyon and slope" interval (2500' - 1950').

The alternation of slope, canyon and transitional faunas suggests that one or more canyons migrated laterally across the continental slope in the Sole area during this interval. As already noted, environmental conditions within the canyon(s) appear to have been extreme, and the quantity of high-energy indicators within the intervening slope intervals suggests that the slope was also subjected to strong current activity, perhaps as a "spillover" from adjacent canyons.

Severe diagenesis has affected some sediments within the canyons. Channeling of solutions through the more porous parts of the canyon fill has resulted in heavy calcite cementation of some samples.

Upper canyon interval (1950' - 1450').

The later infilling of the canyon occurred under conditions more favourable to the development of an indigenous bottom living fauna. The abundance of Cassidulina neocarinata is interpreted by Taylor as indicating fairly high energy conditions throughout this interval. There are periodic population explosions of other forms - Bulimina costata and B. marginata, Epistominella exigua, Gavelinopsis lobatulus. Current activity may have strengthened at around 1705', where a percentage rise occurs in Cassidulina neocarinata and Nonionella bradii. (The latter is conspicuous in the more "hostile" lower canyon sequence). Sponge spicules are abundant in this interval.

Neritic (shelf) interval (1450' - 1015').

The canyon faunas pass upwards into deep outer neritic faunas below 1400'. High productivity at the shelf edge produces a planktonic percentage over 60%, and a rich and diverse benthos in which no single species is dominant. The dominant group of the deeper water faunas, the Cassidulinids, are gradually replaced on the shelf by the Cibicidae. Sponge spicules are extremely abundant, particularly in the outer neritic environment.

No detailed analysis of the shelf faunas has been made, but the depth of

water is seen to gradually shallow to middle neritic at the highest sample at 1015'. The foraminiferal populations show a gradual change, suggesting fairly stable conditions, in contrast to the violent fluctuations in populations observed in the lower part of the sequence.

Correlation of the local zonation with the Shell standard zonation.

Zonule C is correlated with the Globigerinoides subquadratus zone, based on the overlap of the ranges of Globorotalia mayeri and Globorotalia lenguaensis. The highest occurrence of Globorotalia mayeri defines the top of Zonule C in Victoria, and marks the top of Jenkins' G. mayeri mayeri zone in New Zealand. There appears to be some inconsistency between time ranges in temperate and tropical regions obvious here, as both Globorotalia acostaensis and Hastigerinella aequilateralis are present in Zonule C. Neither is reported by Postuma to range downwards so far.

Zonule D-1 is approximately equivalent to part or all of the Globorotalia fohsi (s.l.) zone, the G. lobata, and G. peripheroacuta zones of Postuma (1971). The top of the zonule cannot be precisely correlated with the standard zones because the top is defined on the appearance (=extinction) of two local species, Globorotalia conica and Globorotalia "mayeri barisanensis" (after Jenkins).

Zonule D-2 can be firmly equated with the Globorotalia peripheroronda zone of the standard zonation. D-2 is defined on the highest appearance of G. peripheroronda, and its base is defined on the highest appearance of Globigerinoides sicanus (=bisphericus).

Note on the distribution chart (Enclosure 2)

Because the washed residues of the sidewall cores consisted of thousands of foraminifera, conventional frequency symbols are not employed on the chart as they would generally be meaningless. A cross (x) on the chart indicates that the species was common to abundant (ie. tens to thousands of specimens present in the sample); a dot (.) indicates that the species was rarely seen during counting. A total of 200 to 1000 specimens were counted for each of the 24 cores quantitatively analysed.

References.

Jenkins, D.G. (1960) Planktonic foraminifera from the Lakes Entrance oil shaft, Victoria, Australia. Micropal. v.6, no.4.

Jenkins, D.G. (1971) New Zealand Cenozoic Planktonic Foraminifera. New Zealand Geological Survey, Paleontological Bulletin 42.

Postuma, J.A. (1971) Manual of Planktonic Foraminifera. Elsevier, Amsterdam.

Taylor, D.J. (1966) Esso Gippsland Shelf No.1: The Mid-Tertiary Foraminiferal Sequence. Australia: Petroleum Search Subsidy Act; Publication no. 76.

SIDEWALL CORE DESCRIPTIONS

Appendix 5

SOLE-1

SHELL DEVELOPMENT (AUSTRALIA) PTY. LTD.

SIDEWALL SAMPLE DESCRIPTION

by

D. ELLENOR

DEPTH	NAME		LITHOLOGICAL DESCRIPTION
1015'	FOSSILIFEROUS MARL	:	grey-green (5 GY/41), extremely finely crystalline, soft plastic with some hard steaks. finely disseminated pyrite common occurring as thin amorphous plates or lumps, trace finely granular glauconite as scattered grains; macrofossils abundant, cream white bryozoa sticks particularly common, some forams noted. CALCIMETRY: 55% $CaCO_3$, 45% CLAY nil porosity, clay non-swelling.
1075'	MARL	:	essentially as above; fossil debris minor sponge spicules noted, CALCIMETRY: $CaCO_3$ - 52%, CLAY - 48%.
1130'	MARL	:	As 1075', grey-green, soft, plastic non-swelling.
1165'	ARGILLACEOUS LIME MUD	:	As 1075', very small amorphous pyrite blebs and thin lamina quite prevalent; soft; sl. fossiliferous, sponge spicules, forams. CALCIMETRY $CaCO_3$ - 74% CLAY -26%
1240'	LIME MUD	:	grey-green (5 GY/41) extremely fine to microcrystalline, soft, silt size to very fine grained glauconite and quartz grains scattered throughout, sparsely fossiliferous. CALCIMETRY $CaCO_3$ >90% small pyrite blebs common;
1325'	FOSSILIFEROUS LIME MUD	:	as 1240'; finely comminuted fossil debris prevalent ; CALCIMETRY $CaCO_3$ >90%
1410'	MARL	:	as 1075'. CALCIMETRY $CaCO_3$ - 52%; CLAY - 48%.
1485'	MARL	:	as 1075'; very slightly sandy; forams noted. CALCIMETRY : $CaCO_3$ - 55%; CLAY - 45%.
1510'	ARGILLACEOUS LIME MUD	:	as 1165', slightly fossiliferous, very fine to extremely finely crystalline. CALCIMETRY: $CaCO_3$ - 72%; CLAY - 28%.
1542'	FOSSILIFEROUS MARL	:	as 1015', grey-green (5 GY/41), soft, non-swelling, clay content high fossiliferous sponge spicules prevalent; pyrite flecks. CALCIMETRY: $CaCO_3$ - 34%; CLAY - 66%.

DEPTH	ROCK NAME	LITHOLOGICAL DESCRIPTION
1582'	FOSSILIFEROUS CALCAREOUS: CLAY	physical appearance as 1015'; fossiliferous sponge spicules, gastropods, forams noted; very clayey. CALCIMETRY : $CaCO_3$ - 23%, CLAY - 77%.
1618'	FOSSILIFEROUS CALCAREOUS: CLAY	as 1582' CALCIMETRY $CaCO_3$ - 24%; CLAY -76%.
1650'	MARL :	as 1075'.
1705'	FOSSILIFEROUS MARL :	as 1015', fossils noted - sponge spicules, forams, pelecypod frags, unidentifiable micrcbioclastic hash. CALCIMETRY: $CaCO_3$ - 44%; CLAY - 56%.
1727'	FOSSILIFEROUS ARGILLACEOUS LIME MUD	:as 1165', minor pyrite, forams prevalent. CALCIMETRY: $CaCO_3$ - 64%; CLAY - 36%.
1748'	MARL :	as 1015', soft, plastic.
1775'	FOSSILIFEROUS ARGILLACEOUS: LIME MUD	as 1727; unidentifiable microbioclastic hash. CALCIMETRY: $CaCO_3$ - 75%; CLAY - 25%.
1840'	FOSSILIFEROUS MARL :	as 1015'; forams prevalent CALCIMETRY: $CaCO_3$ - 50%; CLAY - 50%.
1857'	FOSSILIFEROUS MARL :	as 1840'; sponge spicules and forams common. CALCIMETRY: $CaCO_3$ - 50%; CLAY - 50%.
1918'	CALCAREOUS CLAY :	as 1582'; fossil content much reduced. CALCIMETRY: $CaCO_3$ - 31%; CLAY - 69%.
1954'	FOSSILIFEROUS CALCAREOUS CLAY :	as 1582'; microbioclastic debris visible, sponge spicules and forams. CALCIMETRY: $CaCO_3$ - 26%; CLAY - 74%.
1985'	CALCAREOUS CLAY :	as 1582'; trace pyrite as flecks occasional silt size glauconite grains; no observable fossil detritus. CALCIMETRY: $CaCO_3$ - 25%; CLAY - 75%.
2022'	MARL :	as 1075'; occasional silt size quartz and glauconite grain; no observable fossil detritus. CALCIMETRY: $CaCO_3$ - 41%, CLAY - 59%.
2055'	ARGILLACEOUS LIME MUD :	as 1165'; slightly fossiliferous, sponge spicules and forams noted. CALCIMETRY: $CaCO_3$ - 82%, C:AY - 18%.
2063'	FOSSILIFEROUS MARL :	as 1542'; forams prevalent; trace pyrite. CALCIMETRY: $CaCO_3$ - 35%; CLAY - 65%.
2078'	MARL :	as 1075'; trace pyrite and glauconite; minor forams. CALCIMETRY $CaCO_3$ - 63%; CLAY - 37%.

DEPTH	ROCK NAME	LITHOLOGICAL DESCRIPTION
2130'	FOSSILIFEROUS MARL	: as 1015', sponge spicules prominent. CALCIMETRY : $CaCO_3$ - 53%; CLAY - 47%.
2160'	MARL	: as 1075'. CALCIMETRY: $CaCO_3$ - 41%; CLAY - 59%.
2195'	-	
2210'	FOSSILIFEROUS MARL	: as 1015'; forams prevalent. CALCIMETRY: $CaCO_3$ - 38%; CLAY - 62%.
2289'	LIME MUD	: grey-green (5 GY/41), soft-crumbly silt size to very fine grained quartz grains scattered throughout, pyrite flecks and thin laminae common, sparsely to non-fossiliferous. CALCIMETRY: $CaCO_3 > 90\%$.
2340'	MARL	: as 1075', no fossil debris noted. CALCIMETRY: $CaCO_3$ - 63%; CLAY 37%.
2415'	ARGILLACEOUS LIME MUD	: as 1165', grey-green, non-fossiliferous scattered pyrite flecks, occasional silt size glauconite grains. CALCIMETRY: $CaCO_3$ - 70%; CLAY - 30%.
2459'	ARGILLACEOUS LIME MUD	: as 2415'. CALCIMETRY: $CaCO_3$ - 64%; CLAY - 36%.
2510'	SANDY LIME MUD	: dark greenish-grey (5 G 1/4) soft-plastic fine sand size quartz grains abundant, some scattered pyrite; lime mud appears pelletoidal; sparsely fossiliferous sponge spicules present. CALCIMETRY: $CaCO_3 < 90\%$.
2538'	CALCAREOUS CLAY	: as 1985'; no observable fossil detritus. CALCIMETRY : $CaCO_3$ - 33%; CLAY - 67%.
2574'	ARGILLACEOUS LIME MUD	: as 1240'; pyrite blebs and specks common; flaky texture. CALCIMETRY: $CaCO_3$ - 86%; CLAY - 14%.
2595'	FOSSILIFEROUS MARL	: as 1015'. forams abundant but no bryozoa sticks; scattered glauconite grains. CALCIMETRY: $CaCO_3$ - 68%, CLAY - 32%.
2623'	ARGILLACEOUS LIME MUD	: as 2574'. CALCIMETRY: $CaCO_3$ - 87%; CLAY -13 %.
2632'	LIME MUD	: as 2289'. silt-fine sand size quartz grains common sparsely fossiliferous, trace pyrite flecks. CALCIMETRY $CaCO_3$ - $> 90\%$.

DEPTH	ROCK NAME	LITHOLOGICAL DESCRIPTION
2642'	FOSSILIFEROUS SANDY LIME MUD	: as 2510'; fine sand-silt size quartz grains common; glauconite, some forams replaced by glauconite.
2644'	FOSSILIFEROUS MARL	: as 1542'; forams abundant some glauconite grains, and silt size quartz detritus. CALCIMETRY: $CaCO_3$ - 47%; CLAY - 53%.
2651'	SANDY LIME MUD	: as 2510'; silt size quartz debris abundant; sparsely fossiliferous, scattered glauconite grains.
2665'	PYRITIC QUARTZ SANDSTONE	: brownish-black (5 YR 2/1), fine-coarse grained, loosely ccnsolidated but with hard streaks, mod. argillaceous, poorly sorted, pyritic cement, visible porosity strong petroliferous odour; moderate pale yellow fluorescence with mod.-yellow fluorescent pinpoints and streaks; pale blue fluorescent streaks: pyrite cementation probably streaky.
2673'	QUARTZ SANDSTONE	: light grey-white (N7-N9) fine-med. gr. grains clear occasionally milky or smoky, no clay matrix, loose subang-subround; poor mod. sort, trace pyrite as coatings on grains; excellent visible porosity; moderate white fluorescence with mod. yellow fluor. pinpoints and streaks; pale blue white fluor. cut.
2681'	QUARTZ SANDSTONE	: as 2673', med. c. gr., weak even pale yellow fluorescence.
2682'	SILTSTONE	: dusky brown (5 YR 2/2), micaceous, soft, scattered silt size quartz grains; weak pale yellow fluor. cut.
2686'	ARGILLACEOUS QUARTZ SAND	: light grey-white (N7-N9), med. gr., subang-subrnd, mod. sort. loose-friable abundant clay matrix; weak spotty pale yellow fluorescence.
2697'	PYRITIC QUARTZ SANDSTONE	: as 2665' with brassy yellow tint, med-c. gr., subang., poorly-mod. sort, loosely cemented by masses of pyrite, weak pale yellow fluor. cut.
2703'	QUARTZ SANDSTONE	: as 2673'; unconsol., excellent visible porosity; very weak spotty pale yellow fluorescence.
2712'	ARGILLACEOUS QUARTZ SANDSTONE	: as 2686'; f.-med. gr. well sort. unconsol., clay matrix, scattered pyrite flecks and as coatings on some grains; strong even to slightly streaky yellow fluorescence; strong petroliferous odour.

DEPTH	ROCK NAME		LITHOLOGICAL DESCRIPTION
2720'	QUARTZ SANDSTONE	:	as 2673'; well sorted, brown oil staining, very bright even to streaky yellow fluorescence, strong petroliferous odour.
2726'	QUARTZ SANDSTONE	:	as 2673', f. gr., scattered pyrite flecks, subang, mod- well sort.; streaky to even bright yellow fluorescence.
2734'	QUARTZ SANDSTONE	:	as 2673'; f-med gr., loose - friable, well sort., spotty to streaky bright yellow fluorescence
2742'	QUARTZ SANDSTONE	:	as 2673'; med. gr., subrnd; strong, even bright yellow fluorescence.
2749'	ARGILLACEOUS QUARTZ SANDSTONE	:	as 2686'; f. gr., well sort. white clay matrix, loose-friable; even bright yellow fluorescence.
2766'	QUARTZ SANDSTONE	:	as 2742'; even to spotty bright yellow fluorescence.
2786'	ARGILLACEOUS QUARTZ SANDSTONE	:	medium grey (N5), grains clear to smoky, f. gr., well sort, subrnd, loose - friable, pyritised black organic stringers and masses common, sl. argillaceous; spotty yellow fluorescence.
2791'	ARGILLACEOUS QUARTZ SANDSTONE	:	as 2786'; spotty yellow fluorescence.
2844'	ARGILLACEOUS QUARTZ SANDSTONE	:	as 2686'; f. gr., well sort., white clay matrix; nil fluorescence.
2885'	VERY SILTY SANDSTONE	:	dusky brown (5 YR 2/2), f. gr, subrnd, well sort, grains clear with brownish tint, visible porosity, slightly micaceous silty matrix; nil fluorescence.
2917'	ARGILLACEOUS QUARTZ SANDSTONE	:	as 2686'; f. - vy. f. gr., subrnd well sort, loose - friable, visible porosity; nil fluorescence.
2934	ARGILLACEOUS QUARTZ SANDSTONE	:	light grey-white (N7-N9) with brownish tint, f. - c. gr., poorly sort, subang-subrnd, clay matrix.
3015'	ARGILLACEOUS QUARTZ SANDSTONE	:	as 2934'; generally f. gr., poor - mod. sort, subang., loose-friable clay matrix.
3021'	SILTY QUARTZ SANDSTONE	:	as 2885'; f. - c. gr., loose friable poor sort, subang., poor visible porosity, brown silt to clay matrix.
3058'	VERY ARGILLACEOUS QUARTZ SANDSTONE	:	as 2686; f. gr. - vy. f. gr., well sort, subind, friable, abundant milky white clay matrix; occasional pyrite fleck.
3070'	QUARTZ SANDSTONE	:	light grey (N7), grains clear to colourless, f. gr., well sort, subind, friable, loosely compacted, good visible porosity; scattered small pyrite flecks.

EPTH	ROCK NAME		LITHOLOGICAL DESCRIPTION
3093'	ARGILLACEOUS GLAUCONITIC QUARTZ SANDSTONE	:	greyish olive green (5 GY 3/2), f. gr., subrnd, well sort, friable, mod hard, argillaceous, f. gr., glauconite grains, abundant, pyrite flecks and blebs scattered throughout.
3112'	GLAUCONITIC QUARTZ SANDSTONE	:	greenish-black (5 GY 2/1), med - c. gr., poor sort., subang. mod. hard, silty, rock cemented by amorphous masses of glauconite; pyrite coats some smoky to clear quartz grains; no visible porosity; some pyrite cubes in glauconite matrix.
3114'	GLAUCONITIC QUARTZ SANDSTONE	:	as 3112'; pyrite masses abundant in places.
3156'	QUARTZ SANDSTONE	:	as 3070'; sl. argillaceous and micaceous, minor glauconite grains scattered throughout; quartz grains clear, smoky and milky, subang-subrnd, mod. sort.
3175'	VERY SILTY, CARBONACEOUS QUARTZ SANDSTONE	:	greyish brown (5 YR 3/2), mottled colouration; fn-med. gr., subang, poor sort, pyrite flecks and coatings on quartz grains common; sl. micaceous; flecks and blebs of shiny black carbonaceous matter abundant; very silty to argillaceous; friable-mod. hard.
3178'	SILTY, CARBONACEOUS QUARTZ SANDSTONE	:	as 3175'; silt and carbonaceous not as abundant as in 3175'.
3235'	SILTY QUARTZ SANDSTONE	:	mottled dusky brown (5 YR 2/2), med-vy c. gr., subang, poor sort, friable-mod. hard, brown silt forms matrix, quartz grains clear to milky; minor carbonacecus blebs.
3276'	SILTY QUARTZ SANDSTONE	:	as 3235'; vy. poorly sorted, f.-vy. c. gr., white clay common, some glauconite grains and amorphous blebs; minor weathered pyrite flakes.
3318'	ARGILLACEOUS QUARTZ SANDSTONE	:	light grey (N5), f.-c. gr., poorly sort, subang. friable mod. hard; white clay matrix, grains colourless to milky; some visible porosity.
3339'	VERY SANDY SILTSTONE	:	light grey (N5), mod. hard, scattered f. m. gr., subrnd quartz grains.
3365'	CLAYSTONE	:	olive-grey (5 Y 4/1), chloritic, friable to moderately hard, slightly calcareous scattered fine silt size black flecks, (lithic fragments or pyrite flecks).
3367'	CLAYSTONE	:	as 3365'.
3403'	GREEN VERY SILTY QUARTZOSE SANDSTONE	:	dark greenish grey (5 G 4/1), f. gr., subang, very silty, green (chloritic?) to white matrix friable - mod. hard, well sort, pyrite flecks, carbonaceous blebs, sl. micaceous.; rock has distinctive greenish hue.

DEPTH	ROCK NAME		LITHOLOGICAL DESCRIPTION
3433'	GREEN SILTY QUARTZOSE SANDSTONE	:	mottled dark greenish grey (5 G 4/1), quartz grains - med. gr., subang. predominant, black lithic fragments abundant, friable, porous, micaceous; glauconite grains common quartz grains clear, milky and rarely pinkish red.
3435'	GREEN SILTY QUARTZOSE SANDSTONE	:	as 3422'; lithic frags. and glauconite grains abundant.
3526'	GREEN, VERY SILTY QUARTZOSE SANDSTONE	:	as 3403'; f. gr., white clay-silt matrix abundant; sl. micaceous friable - mod. hard.
3608'	GREEN, VERY SANDY SILTSTONE	:	dark greenish grey (5 G 4/1), very f. gr., quartz, lithic and feldspar detritus abundant throughout; greenish (chloritic) matrix; mod. hard to hard; sl. micaceous.
3666'	CLAYSTONE	:	as 3365'; mod. hard - hard; sl. micaceous; very f. gr. quartz detritus scattered throughout.
3690'	CLAYSTONE	:	as 3365'.

Sole-1 8/9

BASIC DATA

SIDEWALL SAMPLES

SOLE-1

RUN -1

GAS CHROMATOGRAPHY

SHOT	DEPTH(FT)	C_1 (ppm)
1	2210	-
2	2195	-
3	2160	50
4	2130	-
5	2078	150
6	2063	200
7	2055	100
8	2022	120
9	1985	300
10	1954	-
11	1918	20
12	1857	2000
13	1840	800
14	1775	30
15	1748	350
16	1727	1500
17	1705	100
18	1650	-
19	1618	300
20	1582	450
21	1542	1000
22	1510	50
23	1485	-
24	1410	tr
25	1325	-
26	1240	50
27	1165	60
28	1130	300
29	1075	900
30	1015	500

SIDEWALL SAMPLES

SOLE-1

(RUN -2)

LATROBE COMPLEX FLUORESCENCE & GAS CHROMATOGRAPHY

NO.	LITHOLOGY	DEPTH	FLUORESCENCE	C_1 (ppm)	C_2 (ppm)
11	Coal	3182			
15	Siltstone	2923	-		
16	Sandstone	2850	-	0	0
17	Silty sandy	2798	Spotty yellow	400	100
18	Sandstone	2773	Even/spotty, bright yellow	0	0
19	Sandstone	2749	Even bright yellow	0	0
20	Sandstone	2728	Even/streaky, very bright yellow	250	100
21	Argill.sandstone	2720	Even/sl. streaky, very bright yellow	200	100
22	Pyritic, silty Sst	2706	-	50	0
23	Sand	2695	Weak,spotty, pale yellow	0	0
24	Brn. Siltstone	2692	-	200	100
26	Sst/siltstone	2683	Spotty, weak, pale yellow in sandstone	0	0
28	Marly sandstone	2662	-	0	0
36	-	3177	-	100	50
42	Argill.sandstone	2939	-	0	0
43	Sandy siltstone	2890	-	0	0
44	Argill.sandstone	2791	Spotty yellow	100	0
45	Sandstone	2755	Even bright yellow	50	0
46	Sandstone	2740	Spotty/streaky bright yellow	100	0
47	Argill.sandstone	2733	Streaky/even bright yellow	100	0
48	Sandstone	2710	Spotty, very weak pale yellow	0	0
49	Sand	2688	?	300	50
50	Pyritic, silty Sst	2673	Spotty yellow	0	0

JD004

6-11-1986

SOLE-1

SWC RESIDUE

S.W.C. FROM 1015' TO 2595' AVAILABLE BUT NOT RECORDED.

6/11/86

2595' 1/4" long APPROX.	2917' 1/2" LONG APPROX.
2623' 1/2" " "	2934' 1" "
2632' 1/4" " "	3015' 1" "
2642' 1/4" " "	3021' 1/2" "
2644' 3/8" " "	3058' 5/8 "
2651' 1/4" " " ETC	3070' 1/4 "
2665' 1cm square	3093' 5/8
2673' 1 1/2cm square	3112' 1/2
2681' Scrap	3114' 1/2
2682' 1/2"	3156' 3/4cm square
2686' Scrap	3175' 3/4cm square
2697' 1/4"	3178' 3/8"
2703' 1cm square	3235' 5/8
2712' Powder	3276' 1/2
2720' Scrap	3318' 3/8
2726' Scrap	3339' 1cm square
2726' Scrap	3365' 3/8
2734' Scrap	3367' 1"
2742' Scrap	3403' 3/8
2749' Scrap	3433' 1/2
2766' 1/4" Scrap	3435' 1 1/2"
2786' Powder	3526' Scrap
2791' 3/4cm square	3608' 1"
2844' 1cm	3666' Scrap
2885' 5/8"	3690' 1"

GAS ANALYSIS RESULTS

CORE LABORATORIES AUSTRALIA (QLD.) LTD.

Petroleum Reservoir Engineering

PERTH, AUSTRALIA

PERTH OFFICE:
P.O. BOX 163
NEDLANDS
WESTERN AUSTRALIA 6009
CABLE: CORELAB
TELEPHONES: 86 4319
69 2160
TELEX: AA93415

BRISBANE OFFICE:
P.O. BOX 111 ALBION
CABLE: CORELAB
TELEPHONE: 52 3222

BASIC DATA

COMPANY: SHELL DEVELOPMENT (AUSTRALIA) PTY. LTD.

WELL: SOLE NO. 1

SAMPLE: M-4 F.I.T. NO. 5

Page 1

Date 11 May 1973

File AP3-GA4

GAS ANALYSIS RESULTS

COMPONENT	MOL %
METHANE	96.09
ETHANE	1.54
PROPANE	0.11
I-BUTANE	0.01
N-BUTANE	NIL
I-PENTANE	NIL
N-PENTANE	NIL
HEXANES +	NIL
CARBON DIOXIDE	1.52
OXYGEN	0.01
NITROGEN	0.72
HYDROGEN SULFIDE	NIL
	100.00

Calculated Gas Gravity = 0.5796 (AIR = 1)

Calculated Gross Heating Value = 1002 BTU per cubic foot of dry gas at 14.7 P.S.I.A. and 60° F.

CORE LABORATORIES AUSTRALIA (QLD.) LTD.

Petroleum Reservoir Engineering

PERTH, AUSTRALIA

PERTH OFFICE:
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CABLE: CORELAB
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COMPANY: SHELL DEVELOPMENT (AUSTRALIA) PTY. LTD.

WELL: SOLE NO. 1

SAMPLE: B-25 F. I. T. NO. 7

Date 11 May 1973

File: AP3-GA3

GAS ANALYSIS RESULTS

COMPONENT	MOL %
METHANE	96.07
ETHANE	1.51
PROPANE	0.14
I-BUTANE	0.01
N-BUTANE	NIL
I-PENTANE	NIL
N-PENTANE	NIL
HEXANES +	NIL
CARBON DIOXIDE	0.79
OXYGEN	0.03
NITROGEN	1.45
HYDROGEN SULFIDE	NIL
	100.00

Calculated Gas Gravity = 0.5762 (AIR = 1)

Calculated Gross Heating Value = 1002 BTU per cubic foot of dry gas at 14.7 P.S.I.A. and 60° F.

PETROPHYSICAL EVALUATION

PETROPHYSICAL EVALUATION SOLE-1

Interval 2,657-2,800 ft.

Results: Net pay 50 ft., gas bearing, see fig. 1
Average porosity = 33.5%, range 28-38%
Average water saturation ≐ 29%
Gas/water contact at 2716 ft.

Logs available

Date	Log type	Run	Interval
5/2/73	IES/SP	2	3,709-2,190
5/2/73	FDC/CNL/GR	2	3,708-2,190
5/2/73	BHCSL/SP	2	3,706-2,190
6/2/73	MLL/ML	1	3,703-2,190

Method of Evaluation

Porosity

The sonic log was not used as it is very much influenced by hydrocarbons in the pay zone. Calibration of FDC and CNL in a waterbearing section from 3,300'-2,760' indicates a matrix density of 2.71 gr/cm^3, which was confirmed by grain density measurements on cuttings.

The GR-curve is apparently not a good indicator of shaliness as indicated by the CNL-FDC and analysis of sidewall samples.

The CNL porosity in the gas bearing zone was corrected to equivalent SNP-porosity using Schlumberger chart CP-9. Equivalent SNP-porosity and density were used to find the porosity corrected for hydrocarbons (Chart CP.6).

Water Salinity

Cross plots of RMLL versus porosity and RIL versus porosity (see fig. 2) indicate an m-factor of 2.1 and a water resistivity of 0.09 Ω m at BHT (53,000 ppm NaCl).

Water Saturation -

A value of n = 2 was used.

Induction log readings were used uncorrected, as the laterolog failed.

A gas/water contact is present at 2,716'. The interval 2,716'-2,739' still shows a small resistivity anomaly, and is thought to contain some residual hydrocarbons.

Hydrocarbon density

Through the hydrocarbon bearing interval the average CNL-porosity is approximately 20 porosity units lower than the FDC-porosity, indicating the whole interval to be gas bearing.

This was confirmed by formation interval tests. See appendix 7 for FIT test reports and appendix 4 for a gas analysis.

PETROPHYSICAL DATA SHEET SOLE NO. 1

CALIBRATION IN WATER ZONE

DEPTH	ø CNL	ρ FDC	ø	RMLL	RIL
3300	31	2.16	31.5	5.0	1.39
3233	30	2.23	29	6.2	1.25
3220	26	2.29	25	5.0	2.45
3155	33	2.20	31.5	4.2	1.25
3145	26	2.29	25	5.0	1.47
3108	24	2.34	23	4.7	2.00
3060	39	2.08	38	2.6	0.71
3033	23	2.26	25	6.0	1.20
3005	29	2.26	27.5	6.0	1.08
2970	28	2.28	26.5	7.0	1.09
2947	27	2.20	28.5	4.6	1.05
2927	26	2.27	26	6.0	1.39
2917	25	2.23	26.5	6.0	1.43
2905	39	2.07	38	2.3	0.71
2885	36	2.13	35	3.8	0.77
2805	36	2.11	35.5	5.6	1.00
2798	24	2.23	26	9.0	1.43
2790	36	2.06	37	2.9	0.71
2762	36	2.08	36.5	3.6	0.79

PETROPHYSICAL DATA SHEET SOLE NO. 1

GAS BEARING INTERVAL

INTERVAL	ø CNL	ρFDC	øFDC	ø SNP eq.	ø derived	RIL	Ro	SW
2657-2661	31	2.22	28.5	n.a.	30	4.0	1.14	54
2661-2666	10	1.96	44	17.5	35	13.0	0.82	25
2669-2676	1	1.90	47.5	11	34	40.0	0.87	15
2678-2682	3	1.96	44	12	32	15.0	1.00	26
2684-2691	13	2.10	35	18	30	190.0	1.14	8
2693-2695	19	1.99	42	24	35	90.0	0.82	10
2695-2699	15	2.13	34	19	29	15.0	1.22	28
2699-2705	20	2.02	40.5	24.5	35	8.8	0.82	31
2705-2710	28	2.05	38.5	30	36	5.0	0.78	40
2710-2716	32	2.03	40	33.5	38	2.7	0.69	51
2716-2739	39	2.06	38	n.a.	38.5	1.25	0.67	73
2739-2765	39	2.07	37.5	n.a.	38	0.83	0.69	91
2765-2787	37.5	2.12	34.5	n.a.	36	0.91	0.78	92
2787-2794	36	2.06	38	n.a.	37	0.71	0.74	100
2794-2800	27	2.22	28.5	n.a.	28	1.42	1.32	96

PE905091

This is an enclosure indicator page.
The enclosure PE905091 is enclosed within the container PE905086 at this location in this document.

The enclosure PE905091 has the following characteristics:

ITEM_BARCODE	= PE905091
CONTAINER_BARCODE	= PE905086
NAME	= Petrophysical Evaluation Interval
BASIN	= GIPPSLAND
PERMIT	= VIC/P9
TYPE	= WELL
SUBTYPE	= WELL_LOG
DESCRIPTION	= Petrophysical Evaluation Gasbearing Interval for Sole-1
REMARKS	=
DATE_CREATED	=
DATE_RECEIVED	=
W_NO	= W666
WELL_NAME	= SOLE-1
CONTRACTOR	=
CLIENT_OP_CO	= SHELL AUSTRALIA

(Inserted by DNRE - Vic Govt Mines Dept)

FIT DATA AND REPORT

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

BASIC

1/3

SHELL DEVELOPMENT
AUSTRALIA PTY. LTD.

SOLE

FEBRUARY 6-7, 1973
SOLE No.1 (WILDCAT)

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

TOOLS USED: AMERADA 3300 PSI ELEMENT SERIAL No. 15630-N 12 HOUR CLOCK
AMERADA 4950 PSI ELEMENT SERIAL No. 6556-N 12 HOUR CLOCK

F.I.T. TEST No. 1 @ 3160'

HOURS	PSIG 4950	PSIG 3300	REMARKS
	1785.4	1785.1	HYDROSTATIC
			SEAL FAILED - MUD RUN

F.I.T. TEST No. 2 @ 3160'

HOURS	PSIG 4950	PSIG 3300	REMARKS
	1787.9	1785.1	HYDROSTATIC
			FORMATION TIGHT. FIRE SHAPED CHARGE INTO SEGREGATOR.
	478.2	466.2	PRESSURE RESULTING FROM CHARGE

F.I.T. TEST No.3 @ 2728'

HOURS	PSIG 4950	PSIG 3300	REMARKS
	1542.5	1542.8	HYDROSTATIC
			SEAL FAILURE - MUD RUN

F.I.T. TEST No.4 @ 2727'

HOURS	PSIG 4950	PSIG 3300	REMARKS
	1540.0	1538.7	HYDROSTATIC
			SEAL FAILURE - MUD RUN

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

2/3

SHELL DEVELOPMENT
AUSTRALIA PTY. LTD.

SOLE

SOLE No. 1 (WILDCAT)
FEBRUARY 7, 1973

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

TOOLS USED: AMERADA 3300 PSI ELEMENT SERIAL No. 15630 N 12 HOUR CLOCK
AMERADA 4950 PSI ELEMENT SERIAL No. 6556 N 12 HOUR CLOCK

MAXIMUM TEMPERATURE: 110° @ 3160'

F.I.T. TEST NO.5 @ 2673'

HOURS	PSIG 3300	PSIG 4950	REMARKS
0413	1508.1	1510.2	HYDROSTATIC
0415			OPEN MAIN CHAMBER
0416			AND SET TOOL
0418	1174.9	1173.1	
0420	-----	1175.6	
			SAMPLING PRESSURE
0442	1174.9	1175.6	
0444	1188.3	1180.7	
0446	1200.2	1185.5	
0448	1201.92	1205.3	
0450	-----	1207.8	
			SHUT IN PRESSURE
0458	1201.92	1207.8	SHUT MAIN CHAMBER
0459	215	220.7	OPEN SEGREGATOR
			EITHER BLOCKED OR A
			TIGHT TEST
0507	215	220.7	
0508			SHOOT SHAPED CHARGE
0509	1198.5	1202.9	
			SEGREGATOR NOT FULL SO NOT
			TRUE FORMATION PRESSURE
0515	1198.5	1202.9	SEAL SEGREGATOR

F.I.T. TEST No. 6 @ 2791'

HOURS	PSIG 3300	PSIG 4950	REMARKS
	1571.0	1572.4	HYDROSTATIC
			SEAL FAILURE - MUD RUN

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

3/3

SHELL DEVELOPMENT
AUSTRALIA PTY. LTD.

SOLE

FEBRUARY 7, 1973
SOLE No.1 (WILDCAT)

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

TOOLS USED: AMERADA 3300 PSI ELEMENT SERIAL No. 15630 N 12 HOUR CLOCK
AMERADA 4950 PSI ELEMENT SERIAL No. 6556 N 12 HOUR CLOCK

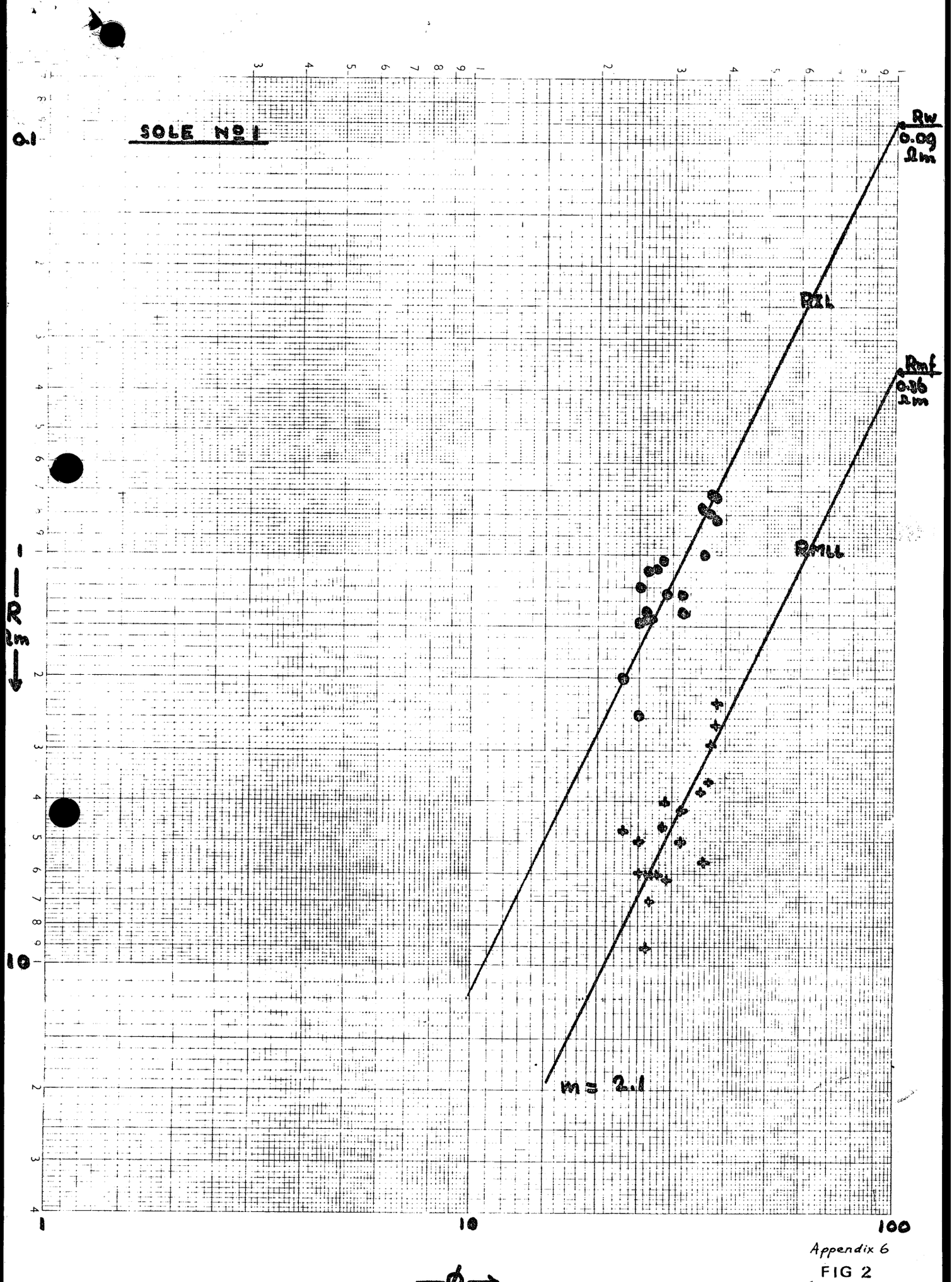
F.I.T. TEST No. 7 @ 2695'

HOURS	PSIG 3300	PSIG 4950	REMARKS
1435	1520	1522.6	HYDROSTATIC
[illegible]8	1121.9	1121.1	OPEN MAIN CHAMBER
1440	1144	1158.3	AND SET TOOL
1442	1159.4	1168.2	
1444	1166.2	1170.6	
1446	1167.9	1170.6	
1448	1169.6	1175.6	
1450			SAMPLING PRESSURE
1504	1171.3	1175.6	
1506	1176.4	1180.6	
1508	1188.3	1205.3	
1510	1201.9	1207.8	
			SHUT IN PRESSURE
1514	1201.9	1207.8	SEAL MAIN CHAMBER AND
1516	1201.9	1207.8	OPEN SEGREGATOR
			SAMPLING PRESSURE
1518	1201.9	1207.8	
1520	1203.6	1212.8	SHUT IN PRESSURE
1524	1203.6	1212.8	SEAL SEGREGATOR

F.I.T TEST No. 8 @ 2728'

HOURS	PSIG 3300	PSIG 4950	REMARKS
	1535.3	1537.5	HYDROSTATIC
			SEAL FAILURE - MUD RUN

INTERPRETATIVE



Appendix 6
FIG 2

Rmf = 0.550 Ωm at 70°F
BHT = 110°F Rmf = 0.36 Ωm at BHT Rw = 0.09 Ωm at BHT (53,000 ppm NaCl

SHELL DEVELOPMENT (AUSTRALIA) PTY. LTD.

SCHLUMBERGER WIRELINE FORMATION TEST FINAL REPORT

CONCESSION: VIC./P9

WELL: SOLE-1 TEST NO. 1 DATE: 6/2/73 DEPTH: 3160 ft.bdf = 2705 ft. Sub. seabed

TEST OBJECTIVE/CONCLUSION LATROBE FORMATION

1. HOLE AND MUD DATA

Hole size (nominal) 9 7/8
(caliper) 10
Deviation (test depth) 1 °
Mud type LIGNOSULPHONATE
Weight 10.7 lbs/gal
Viscosity 46 sec. Marsh
API fluid loss (30 min.) 3.8 cc
Oil content - %
Chloride content 5200 ppm

2. TOOL DATA

Tester type FIT
Gun block COMBO
Pad type SOFT
Spacer shoe 3 ins.
Pressure gauge 2000 psig
Sample chamber 6 gal = 22.7165cc
Choke size 0.030 ins.
Depth control GR

3. SAMPLING DATA

Charges installed 1 x 7/8" SC
Open Port installed
Flowline valve fitted
Firing order used NORMAL

4. TEST DETAILS

Tool in hole	17.30
Tool Set	17.33
Flowline open	17.34
Tool free	17.46

5. PRESSURES MEASURED

	Schlumberger	Amerada A	Amerada B	Mean (A&B)
Initial Flowing Pr.	psig	psig	psig	psig
Final Flowing Pr.	psig	psig	psig	psig
Final Build-up Pr.	psig	psig	psig	psig
Closed-in Pr.	psig	psig	psig	psig
Mud Pressure	1750 psig	1785* psig	1785 psig	1785 psig

6. RECOVERY

a) Oil/condensate l
b) Water/filtrate l
c) Mud 22.2 l
d) Solids +
e) Total a + b + c + d l
f) Formation gas l
g) Explosion gas l+
h) Total gas l

Pourpoint °F, Gravity °API
Salinity ppm Cl⁻
Weight 10.7 lbs/cu.ft.
Description

Carbon dioxide %

Calculated fill-up mins.
Observed fill-up mins.
Max. temp. recorded °F

Opening pressure psig
Opening temperature °F

7. PVT DATA

(Final sampling conditions)

E = vols/vol
B_o = vols/vol
R_s = vols/vol

8. GAS SAMPLES TAKEN

A. Chamber pressure psig Sample pressure psig
Chamber pressure psig Sample pressure psig
Chamber pressure psig Sample pressure psig

9. FILL CALCULATION

i) Solution gas (atmospheric conditions), $a \times R_s$ =
j) Free gas (atmospheric conditions), h-i =
k) Free gas (final sampling conditions), j/E =
l) Oil/condensate (final sampling cond.), $a \times B_o$ =
m) Non-hydrocarbons e-a = +
Total fill =
% of l =

10. OTHER RESULTS

GOR, f/a = vol/vol = cu.ft/bbl
Condensate Ratio = bbl/MMSCF
Permeability = mD
Porosity (from FDC→CNL log) = 24 %
Formation Pressure = psig
Productivity Index = b/d/psi
(for l.l. ft.

REMARKS: SEAL FAILURE

PETROLEUM ENGINEER

T Jamieson

SHELL DEVELOPMENT (AUSTRALIA) PTY. LTD.

SCHLUMBERGER WIRELINE FORMATION TEST FINAL REPORT

CONCESSION: VIC./P9

WELL: SOLE-1 TEST NO. 2 DATE: 6/2/73 DEPTH: 3160 ft.bdf = 2705 ft. Sub. seabed

TEST OBJECTIVE/CONCLUSION: LATROBE FORMATION

1. HOLE AND MUD DATA

Hole size (nominal)	9⅞
(caliper)	10
Deviation (test depth)	1 °
Mud type	LIGNOSULPHONATE
Weight	10.7 lbs/cu.ft.
Viscosity	46 sec. Marsh
API fluid loss (30 min.)	3.8 cc
Oil content	– %
Chloride content	5200 ppm

2. TOOL DATA

Tester type	FIT
Gun block	COMBO
Pad type	SOFT
Spacer shoe	3 ins.
Pressure gauge	2000 psig
Sample chamber	6 gal = 22.7 165cc
Choke size	0.020 ins.
Depth control	GR

3. SAMPLING DATA

Charges installed	1 x ⅞" SC
Open Port installed	
Flowline valve fitted	
Firing order used	REVERSE

4. TEST DETAILS

Tool in hole	20.43
Open Flowline	20.44
Tool set	20.44
Fire Sample Shot	20.58
Sealed Sample	21.06
Tool free	21.07

5. PRESSURES MEASURED

	Schlumberger	Amerada A	Amerada B	Mean (A&B)
Initial Flowing Pr.	– psig	– psig	– psig	– psig
Final Flowing Pr.	– psig	– psig	– psig	– psig
Final Build-up Pr.	– psig	– psig	– psig	– psig
Closed-in Pr.	– psig	– psig	– psig	– psig
Mud Pressure	1740 psig	1788 * psig	1785 psig	1786.5 psig

6. RECOVERY

a) Oil/condensate		l
b) Water/filtrate		l
c) Mud	200cc	l
d) Solids	50cc	+
e) Total a + b + c + d	250cc	l
f) Formation gas		l
g) Explosion gas		l+
h) Total gas		l

Pourpoint ___ °F, Gravity ___ °API

Salinity ___ ppm Cl⁻

Weight 10.7 lbs/sx/ftx gal

Description SAND

Carbon dioxide ___ %

Calculated fill-up – mins.

Observed fill-up – mins.

Max. temp. recorded 110 °F

Opening pressure ___ psig

Opening temperature ___ °F

7. PVT DATA

(Final sampling conditions)

E = ___ vols/vol

B_o = ___ vols/vol

R_s = ___ vols/vol

8. GAS SAMPLES TAKEN

A. Chamber pressure	psig	Sample pressure psig
Chamber pressure	psig	Sample pressure psig
Chamber pressure	psig	Sample pressure psig

9. FILL CALCULATION

i) Solution gas (atmospheric conditions), $a \times R_s$ = ___

j) Free gas (atmospheric conditions), h-i = ___

k) Free gas (final sampling conditions), j/E = ___

l) Oil/condensate (final sampling cond.), $a \times B_o$ = ___

m) Non-hydrocarbons e-a = 250cc +

Total fill = 250cc

%of 22.2 l = 1

10. OTHER RESULTS

GOR, f/a = ___ vol/vol	= ___	cu.ft/bbl
Condensate Ratio	= ___	bbl/MMSCF
Permeability	= ___	mD
Porosity (from FDC-CNL log)	= 24	%
Formation Pressure	= ___	psig
Productivity Index (for l.l. ft.	= ___	b/d/psi

REMARKS: FORMATION APPARENTLY IMPERMEABLE

PETROLEUM ENGINEER

T.J. Hammerand

SHELL DEVELOPMENT (AUSTRALIA) PTY. LTD.

SCHLUMBERGER WIRELINE FORMATION TEST FINAL REPORT

CONCESSION: VIC/P9

WELL: Sole-1 TEST NO. 3 DATE: 6/2/73 DEPTH: 2728 ft.bdf = 2273 ft. Sub. seabed

TEST OBJECTIVE/CONCLUSION LATROBE FORMATION

1. HOLE AND MUD DATA

Hole size (nominal) 9⅞
(caliper) 11
Deviation (test depth) 1 °
Mud type LIGNOSULPHONATE
Weight 10.7 lbs/ gal
Viscosity 46 sec. Marsh
API fluid loss (30 min.) 3.8 cc
Oil content - %
Chloride content 5200 ppm

2. TOOL DATA

Tester type FIT
Gun block COMBO
Pad type SOFT
Spacer shoe 3 ins.
Pressure gauge 2000 psig
Sample chamber 6 gal = 22165 cc
Choke size 0.030 ins.
Depth control GR

3. SAMPLING DATA

Charges installed 1 x ⅞" SC
Open Port installed
Flowline valve fitted
Firing order used REVERSE

4. TEST DETAILS

Tool in hole	23.10
Open Flowline	23.15
Tool set	23.16
Segr. Open	23.31
Sealed Sample	23.36
Tool Free	23.37

Calculated fill-up mins.
Observed fill-up mins.
Max. temp. recorded °F

Opening pressure 800 psig
Opening temperature 100 °F

5. PRESSURES MEASURED

	Schlumberger	Amerada A	Amerada B	Mean (A&B)
Initial Flowing Pr.	1140 psig	1540 psig	1539 psig	1539 psig
Final Flowing Pr.	1440 psig	psig	psig	psig
Final Build-up Pr.	1440 psig	psig	psig	psig
Closed-in Pr.	1440 psig	psig	psig	psig
Mud Pressure	1500 psig	psig	psig	psig

6. RECOVERY

a) Oil/condensate l
b) Water/filtrate l
c) Mud 22,000 cc l
d) Solids 100 cc +
e) Total a + b + c + d l
f) Formation gas l
g) Explosion gas l+
h) Total gas l

Pourpoint °F, Gravity °API
Salinity ppm Cl
Weight 10.5 lbs/cu.ft.
Description SAND

Carbon dioxide %

7. PVT DATA

(Final sampling conditions)

E = vols/vol
B_o = vols/vol
R_s = vols/vol

8. GAS SAMPLES TAKEN

A. Chamber pressure psig Sample pressure psig
Chamber pressure psig Sample pressure psig
Chamber pressure psig Sample pressure psig

9. FILL CALCULATION

i) Solution gas (atmospheric conditions), $a \times R_s$ =
j) Free gas (atmospheric conditions), h-i =
k) Free gas (final sampling conditions), j/E =
l) Oil/condensate (final sampling cond.), $a \times B_o$ =
m) Non-hydrocarbons e-a = 22.1 +
Total fill =
%of 22.2 l = 100

10. OTHER RESULTS

GOR, f/a = vol/vol = cu.ft/bbl
Condensate Ratio = bbl/MMSCF
Permeability = mD
Porosity (from FDC-CNL log) = 38 %
Formation Pressure = psig
Productivity Index = b/d/psi
(for l.l. ft.

REMARKS: SEAL FAILURE

PETROLEUM ENGINEER

Hammond

SHELL DEVELOPMENT (AUSTRALIA) PTY. LTD.

SCHLUMBERGER WIRELINE FORMATION TEST FINAL REPORT

CONCESSION: VIC/P9

WELL: Sole-1 TEST NO. 4 DATE: 7/2/73 DEPTH: 2727 ft.bdf = 2272 ft. Sub. seabed

TEST OBJECTIVE/CONCLUSION LATROBE FORMATION

1. HOLE AND MUD DATA

Hole size (nominal) 9 7/8
(caliper) 11
Deviation (test depth) 1 °
Mud type LIGNOSULPHONATE
Weight 10.7 lbs/cu.ft.
Viscosity 46 sec. Marsh
API fluid loss (30 min.) 3.8 cc
Oil content - %
Chloride content 5200 ppm

2. TOOL DATA

Tester type FIT
Gun block COMBO
Pad type SOFT
Spacer shoe 3 ins.
Pressure gauge 5000 psig
Sample chamber 6 gal = 22,165
Choke size 0.020 ins.
Depth control GR

3. SAMPLING DATA

Charges installed 1 x 7/8" SC
Open Port installed
Flowline valve fitted
Firing order used REVERSE

4. TEST DETAILS

Tool in hole 02.00
Flowline open 02.03
Tool Set 02.04
Tool free 02.07

5. PRESSURES MEASURED

	Schlumberger	Amerada A	Amerada B	Mean (A&B)
Initial Flowing Pr.	1375 psig	1540 psig	1539 psig	1539 psig
Final Flowing Pr.	psig	psig	psig	psig
Final Build-up Pr.	psig	psig	psig	psig
Closed-in Pr.	psig	psig	psig	psig
Mud Pressure	1375 psig	psig	psig	psig

6. RECOVERY

a) Oil/condensate l
b) Water/filtrate l
c) Mud 22.000 cc l
d) Solids 50 cc +
e) Total a + b + c + d l
f) Formation gas l
g) Explosion gas l+
h) Total gas l

Pourpoint °F, Gravity °API
Salinity ppm Cl
Weight 10.7 lbs/cu.ft.
Description SAND

Carbon dioxide %

Calculated fill-up mins.
Observed fill-up mins.
Max. temp. recorded °F

Opening pressure psig
Opening temperature °F

7. PVT DATA

(Final sampling conditions)

E = vols/vol
B_o = vols/vol
R_s = vols/vol

8. GAS SAMPLES TAKEN

A. Chamber pressure psig Sample pressure psig
Chamber pressure psig Sample pressure psig
Chamber pressure psig Sample pressure psig

9. FILL CALCULATION

i) Solution gas (atmospheric conditions), $a \times R_s$ =
j) Free gas (atmospheric conditions), h-i =
k) Free gas (final sampling conditions), j/E =
l) Oil/condensate (final sampling cond.), $a \times B_o$ =
m) Non-hydrocarbons e-a =
Total fill =
% of l =

10. OTHER RESULTS

GOR, f/a = vol/vol = cu.ft/bbl
Condensate Ratio F bbl/MMSCF
Permeability = mD
Porosity (from FDC-CNL log) = 38 %
Formation Pressure = psig
Productivity Index = b/d/psi
(for l.f. ft.

REMARKS: LOST SEAL

PETROLEUM ENGINEER

T. Jamieson

SHELL DEVELOPMENT (AUSTRALIA) PTY. LTD.

SCHLUMBERGER WIRELINE FORMATION TEST FINAL REPORT

CONCESSION: VIC/P9

WELL: SOLE-1 TEST NO. 5 DATE: 7/2/73 DEPTH: 2673 ft.bdf = 2218 ft. Sub. seabed

TEST OBJECTIVE/CONCLUSION LATROBE FORMATION/GAS BEARING

1. HOLE AND MUD DATA

Hole size (nominal) 9 7/8
(caliper) 11 1/4
Deviation (test depth) 1 °
Mud type LIGNOSULPHONATE
Weight 10.7 lbs/gal.
Viscosity 46 sec. Marsh
API fluid loss (30 min.) 3.8 cc
Oil content – %
Chloride content 5200 ppm

2. TOOL DATA

Tester type FIT
Gun block COMBO
Pad type SOFT
Spacer shoe 3 ins.
Pressure gauge 2000 psig
Sample chamber 6 gal = 22,165 cc
Choke size 4 x 0.020 ins.
Depth control GR

3. SAMPLING DATA

Charges installed HTF – SC 7/8"
Open Port installed –
Flowline valve fitted –
Firing order used REVERSE

4. TEST DETAILS

Tool in hole	4.10
Tool open	4.15
Tool set	4.16
Segr. open	4.59
Sample shot	5.08
Seal valve	5.15
Tool free	5.16

Calculated fill-up 39 mins.
Observed fill-up 33? mins.
Max. temp. recorded 110 °F

Opening pressure 1070 psig
Opening temperature 100 °F

5. PRESSURES MEASURED

	Schlumberger	Amerada A	Amerada B	Mean (A&B)
Initial Flowing Pr.	1350 psig	1175 psig	1173 psig	1174 psig
Final Flowing Pr.	1350 psig	1175 psig	1176 psig	1175 psig
Final Build-up Pr.	1350 psig	1202 psig	1208 psig	1205 psig
Closed-in Pr.	– psig	– psig	– psig	– psig
Mud Pressure	1500 psig	1508* psig	1510 psig	1509 psig

6. RECOVERY

a) Oil/condensate – l
b) Water/filtrate – l
c) Mud 1.200 l
d) Solids – +
e) Total a + b + c + d 1.200 l
f) Formation gas 1750 l
g) Explosion gas – (+
h) Total gas 1750 l

Pourpoint – °F, Gravity – °API
Salinity – ppm Cl
Weight 10.6 lbs/gal
Description –

Carbon dioxide 5000+ ppm

7. PVT DATA

(Final sampling conditions)

E = 75 vols/vol
B_o = ____ vols/vol
R_s = ____ vols/vol

8. GAS SAMPLES TAKEN *

A. Chamber pressure	1070 psig	Sample pressure 0 psig
Chamber pressure	____ psig	Sample pressure ____ psig
Chamber pressure	____ psig	Sample pressure ____ psig

9. FILL CALCULATION

i) Solution gas (atmospheric conditions), a x R_s = ____
j) Free gas (atmospheric conditions), h-i = 1750
k) Free gas (final sampling conditions), j/E = 23.3
l) Oil/condensate (final sampling cond.), a x B_o = ____
m) Non-hydrocarbons e-a = 1.2 +
Total fill = 24.5
% of 22.2 l = 111 %

10. OTHER RESULTS

GOR, f/a = – vol/vol = – cu.ft/bbl
Condensate Ratio = – bbl/MMSCF
Permeability = * * mD
Porosity (from CML-FDC log) = 38 %
Formation Pressure = 1205 psig
Productivity Index = – b/d/psi
(for l.l. ft.

REMARKS: * USED MONEL SEGREGATOR NO M4.
** FLOWLINE PROBABLY PARTIALLY BLOCKED. FLOWING PRESSURE NOT INDICATIVE OF FORMATION PERMEABILITY. HAD TO USE SHAPED CHARGE TO FILL SEGREGATOR.

PETROLEUM ENGINEER

T.J. Townsend

SHELL DEVELOPMENT (AUSTRALIA) PTY. LTD.

SCHLUMBERGER WIRELINE FORMATION TEST FINAL REPORT

CONCESSION: VIC/P9

WELL: Sole-1 TEST NO. 6 DATE: 7/2/73 DEPTH: 2791 ft.bdf = 2336 ft. Sub. seabed

TEST OBJECTIVE/CONCLUSION LATROBE FORMATION

1. HOLE AND MUD DATA

Hole size (nominal) 9 7/8
(caliper) 11 1/4
Deviation (test depth) 1 o
Mud type LIGNOSULPHONATE
Weight 10.7 lbs/cu.ft.
Viscosity 46 sec. Marsh
API fluid loss (30 min.) 3.8 cc
Oil content - %
Chloride content 5200 ppm

2. TOOL DATA

Tester type FIT
Gun block COMBO
Pad type SOFT
Spacer shoe 3 ins.
Pressure gauge 5000 psig
Sample chamber 6 gal = 22,165 cc
Choke size 4 x 0.020 ins.
Depth control GR

3. SAMPLING DATA

Charges installed 1 x 7/6" SC
Open Port installed
Flowline valve fitted
Firing order used REVERSE

4. TEST DETAILS

Tool in hole 7.10
Flowline open 7.15
Tool Set 7.16
Tool Free 7.18

5. PRESSURES MEASURED

	Schlumberger	Amerada A	Amerada B	Mean (A&B)
Initial Flowing Pr.	psig	psig	psig	psig
Final Flowing Pr.	psig	psig	psig	psig
Final Build-up Pr.	psig	psig	psig	psig
Closed-in Pr.	psig	psig	psig	psig
Mud Pressure	1525 psig	1571 psig	1572 psig	1572 psig

6. RECOVERY

a) Oil/condensate l — Pourpoint °F, Gravity °API
b) Water/filtrate l — Salinity ppm Cl
c) Mud 22,000 cc l — Weight 10.7 lbs/cu.ft.
d) Solids 50 cc + — Description SAND
e) Total a + b + c + d l
f) Formation gas l
g) Explosion gas l +
h) Total gas l — Carbon dioxide %

Calculated fill-up mins.
Observed fill-up mins.
Max. temp. recorded °F

Opening pressure psig
Opening temperature °F

7. PVT DATA

(Final sampling conditions)

E = vols/vol
B_o = vols/vol
R_s = vols/vol

8. GAS SAMPLES TAKEN

A. Chamber pressure psig	Sample pressure	psig
Chamber pressure psig	Sample pressure	psig
Chamber pressure psig	Sample pressure	psig

9. FILL CALCULATION

i) Solution gas (atmospheric conditions), $a \times R_s$ =
j) Free gas (atmospheric conditions), h-i =

k) Free gas (final sampling conditions), j/E =
l) Oil/condensate (final sampling cond.), $a \times B_o$ =
m) Non-hydrocarbons e-a = +
Total fill =
% of l =

10. OTHER RESULTS

GOR, f/a = vol/vol = cu.ft/bbl
Condensate Ratio = bbl/MMSCF
Permeability = mD
Porosity (from FDC-CNL log) = 36 %
Formation Pressure = psig
Productivity Index = b/d/psi
(for l.l. ft.

REMARKS: SEAL FAILURE

PETROLEUM ENGINEER

T Hammerard

SHELL DEVELOPMENT (AUSTRALIA) PTY. LTD.

SCHLUMBERGER WIRELINE FORMATION TEST FINAL REPORT

CONCESSION:

WELL: SOLE -1 TEST NO. 7 DATE: 7/2/73 DEPTH: 2695 ft.bdf = 2240 ft. Sub. tested

TEST OBJECTIVE/CONCLUSION LATROBE FORMATION/GAS BEARING

1. HOLE AND MUD DATA

Hole size (nominal)	9⅞
(caliper)	11
Deviation (test depth)	1°
Mud type	LIGNOSULPHONATE
Weight	10.7 lbs/gal
Viscosity	46 sec. Marsh
API fluid loss (30 min.)	3.8 cc
Oil content	– %
Chloride content	5200 ppm

2. TOOL DATA

Tester type	FIT
Gun block	COMBO
Pad type	SOFT
Spacer shoe	3 ins.
Pressure gauge	5000 psig
Sample chamber	6 gal = 22,165 cc
Choke size	4 x 0.020 ins.
Depth control	GR

3. SAMPLING DATA

Charges installed	HTF-SC
Open Port installed	–
Flowline valve fitted	–
Firing order used	REVERSE

4. TEST DETAILS

Tool in hole	14.34
Tool open	14.35
Tool set	14.36
Sealed Chamber	15.12
Sealed Segr.	15.22
Tool Free	15.24

5. PRESSURES MEASURED

	Schlumberger	Amerada A	Amerada B	Mean (A&B)
Initial Flowing Pr.	1060 psig	1144 psig	1158 psig	1151 psig
Final Flowing Pr.	1060 psig	1176 psig	1181 psig	1178.5 psig
Final Build-up Pr.	1100 psig	1202 psig	1208 psig	1205 psig
Closed-in Pr.	1100 psig	1204 psig	1213 psig	1208 psig
Mud Pressure	1370 psig	1520* psig	1523 psig	1521 psig

6. RECOVERY

a) Oil/condensate	–	l
b) Water/filtrate	–	l
c) Mud	1.400	l
d) Solids	0.050	+
e) Total a + b + c + d	1.450	l
f) Formation gas	1640	l
g) Explosion gas	–	l+
h) Total gas	1640	l

Pourpoint – °F, Gravity – °API

Salinity – ppm Cl

Weight 10.6 lbs/cu.ft.

Description SAND

Carbon dioxide 5000+ %

Calculated fill-up 39 mins.

Observed fill-up 28 mins.

Max. temp. recorded 110°F °F

Opening pressure 1000 psig

Opening temperature 100 °F

7. PVT DATA

(Final sampling conditions)

E = 70 vols/vol

B_o = vols/vol

R_s = vols/vol

8. GAS SAMPLES TAKEN *

A. Chamber pressure	1000 psig	Sample pressure 0 psig
Chamber pressure	psig	Sample pressure psig
Chamber pressure	psig	Sample pressure psig

9. FILL CALCULATION

i) Solution gas (atmospheric conditions), a x R_s =	
j) Free gas (atmospheric conditions), h-i =	1640
k) Free gas + (final sampling conditions), j/E =	23.40
l) Oil/condensate (final sampling cond.), a x B_o =	
m) Non-hydrocarbons e-e =	1.45 +
Total fill =	24.85
% of 22.2 =	112%

10. OTHER RESULTS

GOR, f/a = vol/vol =	– cu.ft/bbl
Condensate Ratio =	– bbl/MMSCF
Permeability =	ca 3 mD
Porosity (from FDC-CNL log) =	32% %
Formation Pressure =	1.208 psig
Productivity Index =	– b/d/psi
(for l.l. ft.	

REMARKS: * USED SEGREGATOR No. SFA-B25

PETROLEUM ENGINEER

T Hammond

SHELL DEVELOPMENT (AUSTRALIA) PTY. LTD.

SCHLUMBERGER WIRELINE FORMATION TEST FINAL REPORT

CONCESSION: VIC/P9

WELL: Sole-1 TEST NO. 8 DATE: 7/2/73 DEPTH: 2728 ft.bdf = 2273 ft. Sub. seabed

TEST OBJECTIVE/CONCLUSION LATROBE FORMATION

1. HOLE AND MUD DATA

Hole size (nominal) 9⅞
(caliper) 11
Deviation (test depth) 1 °
Mud type LIGNOSULPHONATE
Weight 10.7 lbs/gal
Viscosity 46 sec. Marsh
API fluid loss (30 min.) 3.8 cc
Oil content – %
Chloride content 5200 ppm

2. TOOL DATA

Tester type FIT
Gun block COMBO
Pad type SOFT
Spacer shoe 3 ins.
Pressure gauge 2000 psig
Sample chamber 6 gal = 22,165
Choke size 4 x 0.020 ins.
Depth control GR

3. SAMPLING DATA

Charges installed 1 x ⅞" SC
Open Port installed
Flowline valve fitted
Firing order used REVERSE

4. TEST DETAILS

Tool in hole 18.37
Flowline open 18.41
Tool Set 18.42
Tool free 18.46

5. PRESSURES MEASURED

	Schlumberger	Amerada A	Amerada B	Mean (A&B)
Initial Flowing Pr.	1500 psig	1535 psig	1537 psig	1536 psig
Final Flowing Pr.	psig	psig	psig	psig
Final Build-up Pr.	psig	psig	psig	psig
Closed-in Pr.	psig	psig	psig	psig
Mud Pressure	1500 psig	psig	psig	psig

6. RECOVERY

Calculated fill-up mins.
Observed fill-up mins.
Max. temp. recorded °F

Opening pressure psig
Opening temperature °F

a) Oil/condensate l
b) Water/filtrate l
c) Mud 22.100 cc l
d) Solids – +
e) Total a + b + c + d l
f) Formation gas l
g) Explosion gas l+
h) Total gas l

Pourpoint °F, Gravity °API
Salinity ppm Cl
Weight 10.7 lbs/gal
Description

Carbon dioxide %

7. PVT DATA

(Final sampling conditions)

E = vols/vol
B_o = vols/vol
R_s = vols/vol

8. GAS SAMPLES TAKEN

A. Chamber pressure psig Sample pressure psig
Chamber pressure psig Sample pressure psig
Chamber pressure psig Sample pressure psig

9. FILL CALCULATION

i) Solution gas (atmospheric conditions), $a \times R_s$ =
j) Free gas (atmospheric conditions), h-i =

k) Free gas (final sampling conditions), j/E =
l) Oil/condensate (final sampling cond.), $a \times B_o$ =
m) Non-hydrocarbons o-a = +
Total fill =
% of l =

10. OTHER RESULTS

GOR, f/a = vol/vol = cu.ft/bbl
Condensate Ratio F = bbl/MMSCF
Permeability = mD
Porosity (from FDC-CNL log) = 38 %
Formation Pressure = psig
Productivity Index = b/d/psi
(for l.l. ft.

REMARKS: SEAL FAILURE

PETROLEUM ENGINEER

T Hammerton

WELL VELOCITY SURVEY REPORT

Bendix

WELL VELOCITY SURVEY

of

SOLE No.1

FOR

SHELL DEVELOPMENT (AUSTRALIA) PTY. LTD.

by

AUSTRAL UNITED GEOPHYSICAL PTY. LTD.

Party 86

Bendix

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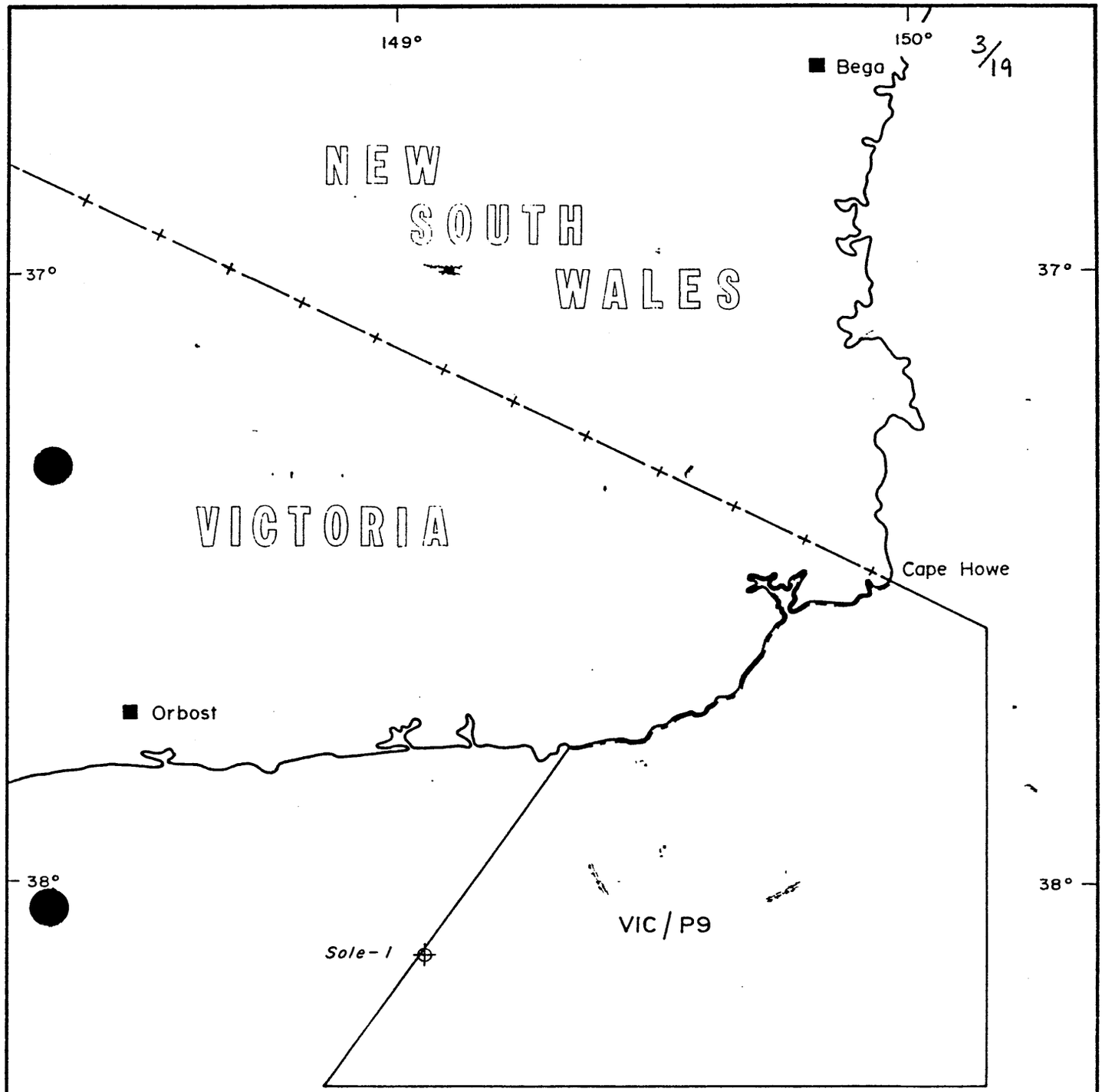

LOCATION MAP
WELL VELOCITY SURVEY
SHELL DEVELOPMENT (AUSTRALIA) P/L.
SOLE Nº1.
by
AUSTRAL UNITED GEOPHYSICAL Pty. Ltd.
Party 86 — 6 February 1973.

0 10 20 30 40 MI
0 10 20 30 40 50 60 KM.

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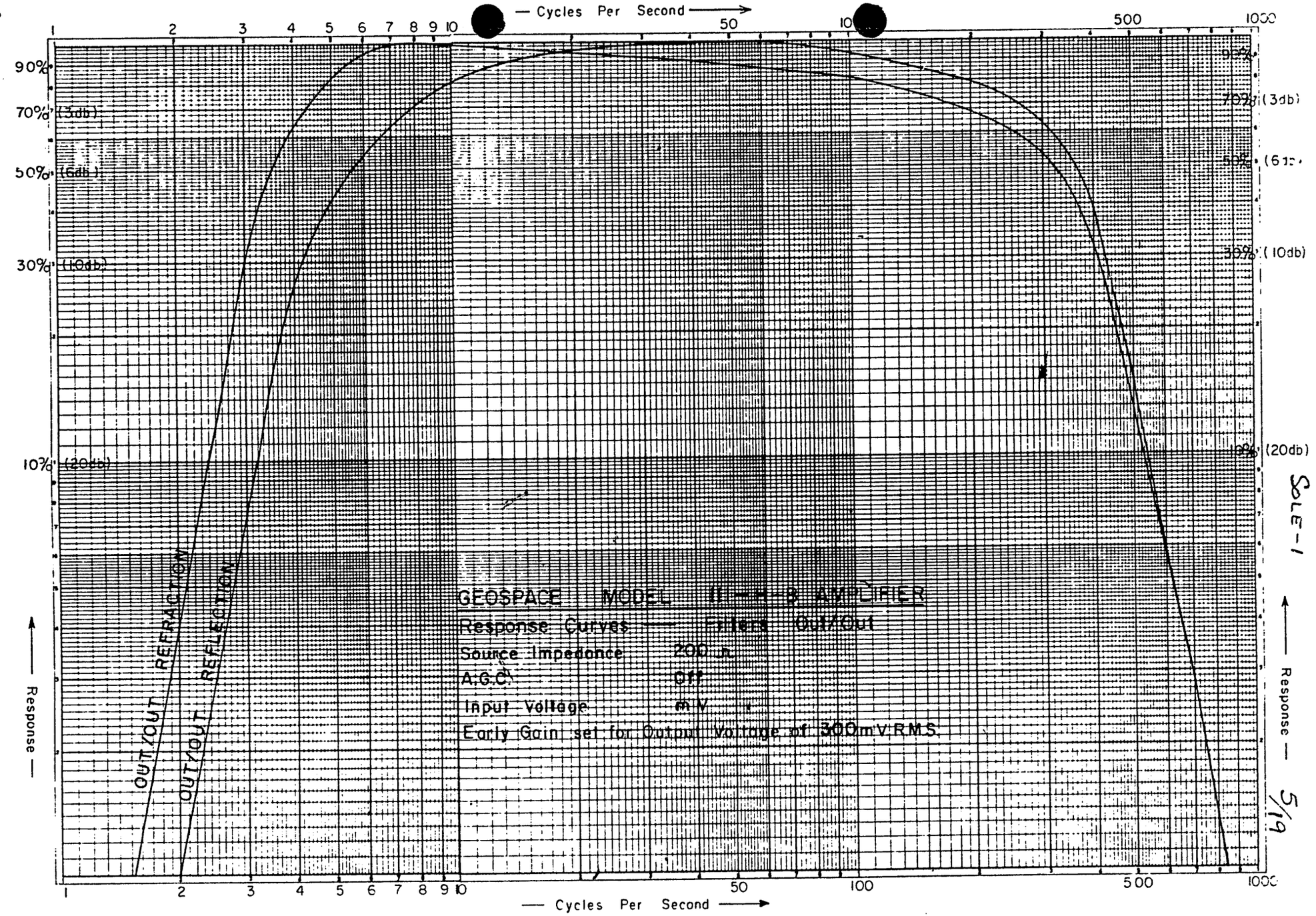
Bendix

WELL INFORMATION

NAME OF WELL	Sole No.1
DATE OF SURVEY	6th February, 1973
LOCATION	30 miles southeast of Marlo township, Victoria, in offshore permit Vic/P9
CO-ORDINATES	Latitude 38° 07' 00" S. Longitude 149° 02' 05" E.
ELEVATION K.B.	+ 32.0 feet M.S.L.
ELEVATION G.L.	- 423 feet M.S.L.
ELEVATION DATUM PLANE	0.0 feet M.S.L.
INTERVAL SURVEYED	1110 feet to 3671 feet below K.B.
SEISMOGRAPH PROFILE	Shotpoint 10225. Line G69-393
TOTAL DEPTH	3703 feet below K.B.
CASING	$10\frac{3}{4}$" @ 2199 feet below K.B.
SHIP HEADING	239°
RIG	Glomar Conception


— Cycles Per Second →
1
2
3
4
5
6
7
8
9
10
50
100
500
1000
90%
70% (3db)
50% (6db)
30% (10db)
10% (20db)
← Response —
OUT/OUT REFRACTION
OUT/OUT REFLECTION
GEOSPACE MODEL III-M-8 AMPLIFIER
Response Curves — Filters Out/Out
Source Impedance 200 Ω
A.G.C. Off
Input Voltage mV
Early Gain set for Output voltage of 300m V.R.M.S.

SOLE-1

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OPERATIONS

1. Recording Equipment

Well geophone	Geospace wall lock velocity geophone (6 X 4.5 hertz detectors)
Cable	Schlumberger cable and reel
Reference and Time Break Hydrophones	Marsh Marine MP3
Camera	Electro Tech Model ER62
Amplifiers	Geospace Model III

2. Amplifier Specifications

Geospace Model III

Frequency Response	:	Within 3db attenuation from 5 to 300 hertz
Input Signal Range	:	From 1 microvolt to 300 millivolts R.M.S.
Input Impedance	:	500 ohms
Noise	:	0.1 microvolts R.M.S. broad band from 10 to 300 hertz (200 ohms source impedance)

3. Energy Source

Gas Gun	4.24 cubic feet capacity (Propane Oxygen mixture)
Ignition System	United Hi-voltage Detonator Panel
Gas Control System	United gas fill timer

4. Recording Procedure

Amplifier No. 1	Downhole geophone
Output:	Divided output to traces No.1, No.2 and No.3
Filters:	Hi-Cut 300 hertz Lo-Cut 5 hertz
Amplifier No. 2	Moonpool Reference Hydrophone
Output:	Single output to trace No.5
Filters:	Hi-Cut 300 hertz Lo-Cut 5 hertz
Amplifier No. 3	Time-Break Hydrophone
Output:	Single output to trace No.4
Filters:	Hi-Cut 300 hertz Lo-Cut 5 hertz

Time break to trace No.6 (not amplified)

5. Operational Statistics

Surveyed Interval	1110 feet to 3671 feet below K.B.
Number of horizons surveyed	Eight
Number of shots per horizon	Two to Four
Gun Offset	85 feet
Gun Depth	40 feet
Gas fill time	20 secs. (approx. 2 cubic feet)
Observer	W.J. Larsen
Shooter	L.D. Moore

6. Recording Operations

Recording instruments were set up in the "Glomar Conception" air conditioning room, and gas gun equipment on the main deck adjacent to the large crane.

Cables for communications, remote firing and hydrophone signals were connected between recorder and gas gun, and between recorder and logging unit for communications, locking geophone control, and well geophone signals.

The gas gun was lowered 40 feet below sea level on the ship's crane, and charges were detonated by spark plug ignition controlled from the tape drum of the compositing system.

Dual time breaks were recorded on MP3 hydrophones fastened 5 feet from the carburettor.

An additional hydrophone was lowered 10 feet below sea level in the moonpool to record horizontal offset times.

All depth measurements were made using the Schlumberger depth indicator.

Comments

Secure geophone locking within the surface well casing could only be achieved at casing joints.

Where the well geophone had been allowed to slip to a casing joint, new depths were determined by Schlumberger depth indicator and marked signal increase as the cable took up weight.

COMPUTING

1. Datum Plane

Well geophone arrival times were corrected to a sea level datum plane using a reduction velocity of 5000 feet per second.

Velocity survey data was processed in Brisbane by the Scientific and Technical Computing centre.

2 Record Quality

Records at the 1510 feet and 2098 feet levels were disregarded because of excessive noise from tool slip.

Good quality records were obtained at slightly deeper levels, (1543 feet and 2112 feet K.B.), where the tool locked securely to casing joints.

Records for the eight levels used for computation purposes are of good quality and arrival times are considered reliable.

Times from shots at the same levels are in close agreement.

3. Sonic Calibration

The cumulative correction plot on plate 1 shows sonic log time $.003^5$ seconds shorter than seismic time at 3639 feet, from the reference point at 1078 feet where sonic and seismic times were tied.

4. Function Computation

The velocity function was computed by the Nash Miller method, using the following expressions and information from the plot of vertical time against depth.

$$a = \frac{4.605}{t_1} \log 10 \left(\frac{Z_1 - Z_2}{Z_2}\right)$$

$$Vd = \frac{aZ_1}{e^{at_1} - 1}$$

Z_1 and t_1 are corresponding depth and one way time at a deeper point in the section, and Z_2 is the depth corresponding to one way time of $\frac{t_1}{2}$ secs.

This function was computed with respect to a sea level datum plane.

RESULTS

1. Horizon Arrival Times

Average times were used to plot the time depth curve, the arrival times to the principal horizons are as follows:

HORIZON	DEPTH BELOW DATUM (0 ft. M.S.L.)	ARRIVAL TIMES (one way times)
Latrobe Valley Fm	2626'	0.401 secs
Strzelecki Fm	3323'	0.486^5 secs

Bendix

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RESULTS (Contd)

2. Velocity Function

The function V= 5475 + 0.86?computed for Sole No.1, is a close fit to the time depth curve from datum to total depth.

3. Function Plots

A plot of the above function is included in the appendix of this report for comparison purposes.

Respectfully submitted

W F Larsen

.....

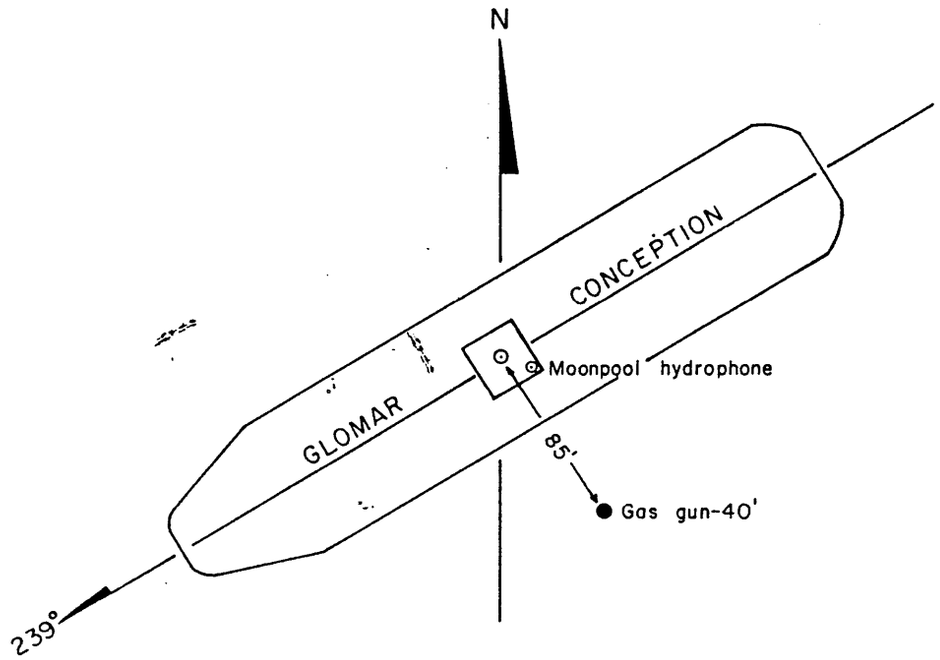
Austral United Geophysical Pty. Ltd.
Party 86

J L Dawlow

.....

Supervisor

12/19



GAS GUN LOCATION PLAT.

WELL VELOCITY SURVEY

SHELL DEVELOPMENT (AUSTRALIA) P/L.

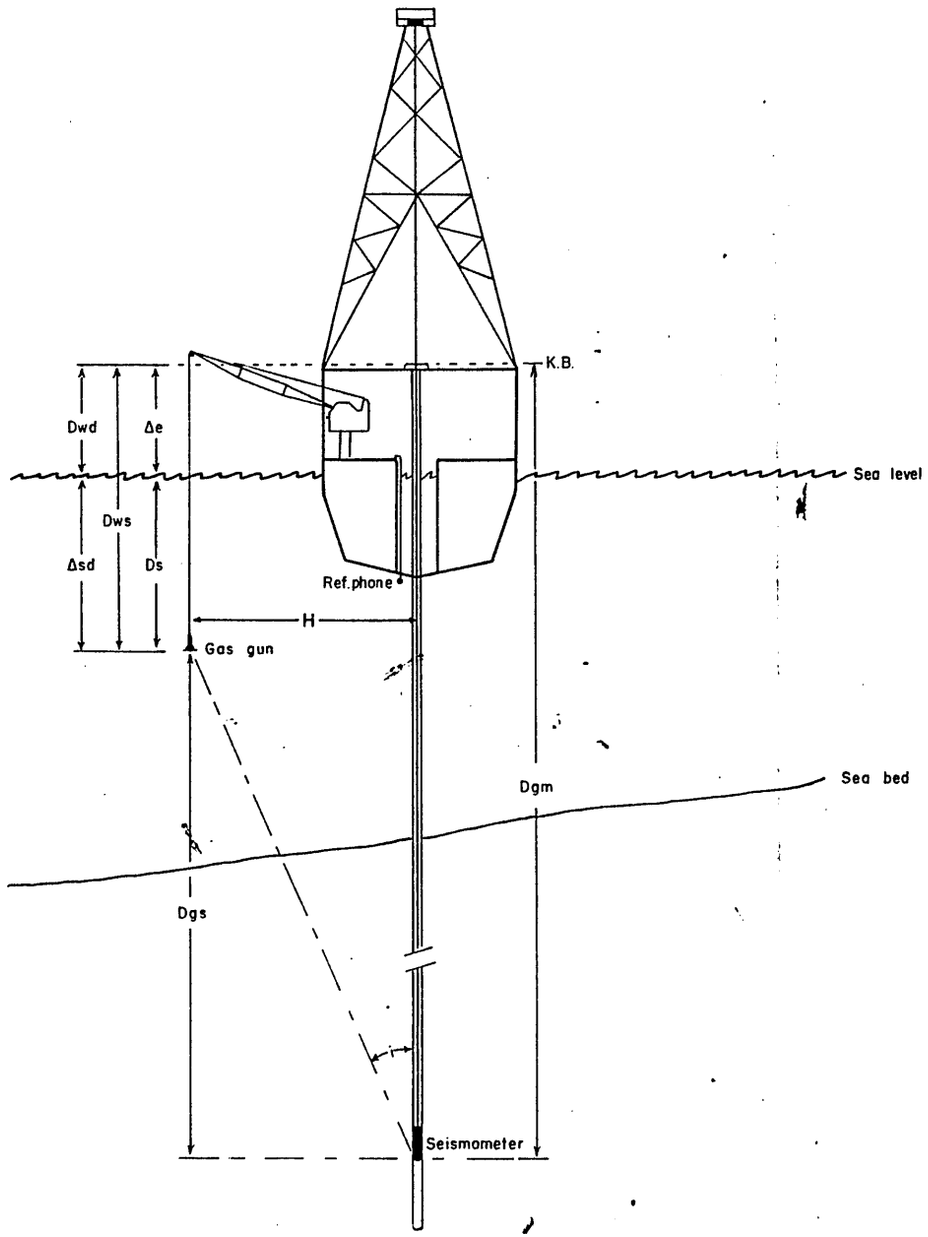
SOLE N º1

by

AUSTRAL UNITED GEOPHYSICAL Pty. Ltd.

Party 86 6 February 1973.

Fig - 3.



Dwd = Kelly – datum elevation
R = Record number
Ew = Elevation of sea water above M.S.L.
Dgm = Depth below kelly bushing
Tas = Time to "Moonpool" hydrophone
Tc = Time correction
Te = $(\frac{1}{Vw} - \frac{1}{Vo})$ X distance shot to sea floor
Ds = Depth of shot / depth of gas gun
Δe = Kelly – sea level elevation = Dwd – Ew
Dws = Ds + Δe
Δsd = Dws – Dwd
Dgs = Dgm – Dws
H = Horizontal distance shotpoint to well
Tan-i = H/Dgs
T = Arrival time from time break to wellphone
Tgs = T Cos-i
Q = Record quality
Tgd = Tgs + Δsd / Vd + Tc or Te
(Vertical travel time from datum to well phone)
Dgd = Dgm – Dwd
(Vertical distance datum plane to wellphone)
VI = Interval velocity = Δ Dgd / Δ Tgd
VA = Average velocity = Dgd/Tgd
Vd = Datum reduction velocity

COMPUTATION DIAGRAM

WELL VELOCITY SURVEY

SHELL DEVELOPMENT (AUSTRALIA) Pty.Ltd.

SOLE Nº1

by

AUSTRAL UNITED GEOPHYSICAL P/L.

Party 86 6 February 1973.

Fig-4

WELL VELOCITY DETERMINATION

SHELL DEVELOPMENT AUSTRALIA PTY. LTD.

WELL SOLE Nº 1

Record No. 1

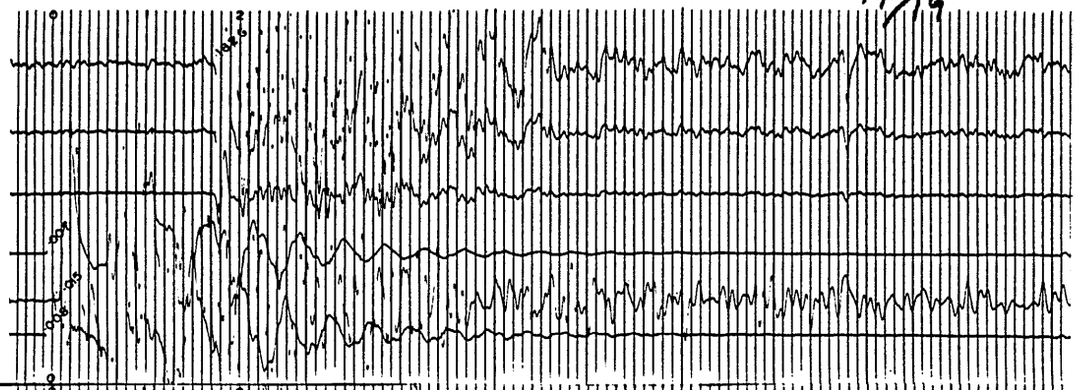
Shot Hole No. A
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 1110'

Below Datum 00ft. (A.S.L.) 1078'

Charge 20 sec. Depth of Shot 40'



WELL VELOCITY DETERMINATION

SHELL DEVELOPMENT AUSTRALIA PTY. LTD.

WELL SOLE Nº 1

Record No. 2

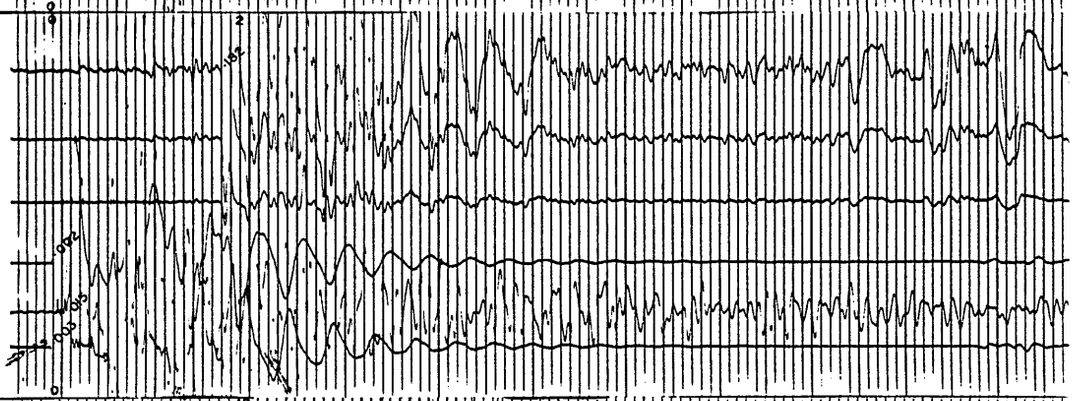
Shot Hole No. B
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 1110'

Below Datum 00ft. (A.S.L.) 1078'

Charge 20 sec. Depth of Shot 40'



WELL VELOCITY DETERMINATION

SHELL DEVELOPMENT AUSTRALIA PTY. LTD.

WELL SOLE Nº 1

Record No. 32

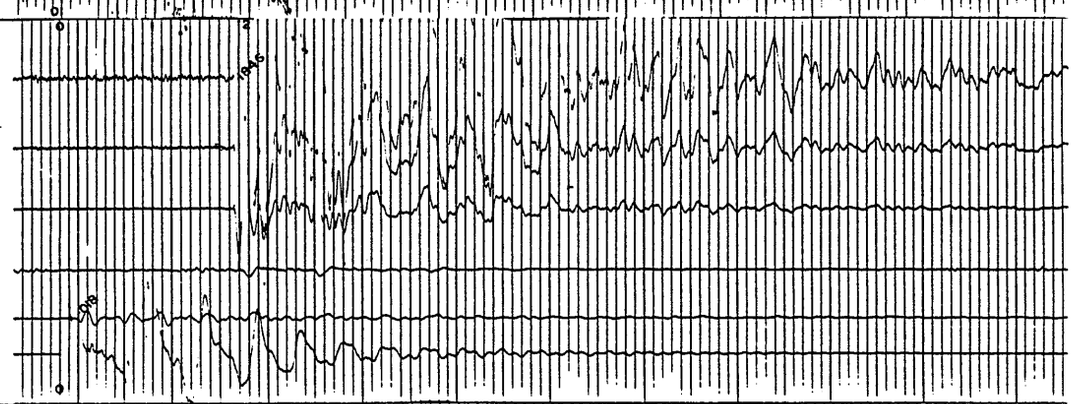
Shot Hole No. AF
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 1122'

Below Datum 00ft. (A.S.L.) 1090'

Charge 20 sec. Depth of Shot 40'



WELL VELOCITY DETERMINATION

SHELL DEVELOPMENT AUSTRALIA PTY. LTD.

WELL SOLE Nº 1

Record No. 33

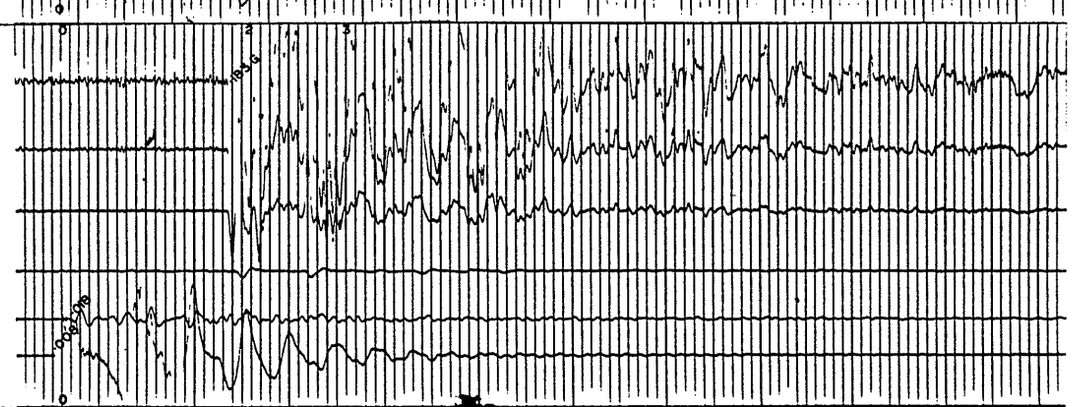
Shot Hole No. AG
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 1122'

Below Datum 00ft. (A.S.L.) 1090'

Charge 20 sec. Depth of Shot 40'



WELL VELOCITY DETERMINATION

SHELL DEVELOPMENT AUSTRALIA PTY. LTD.

WELL SOLE Nº 1

Record No. 34

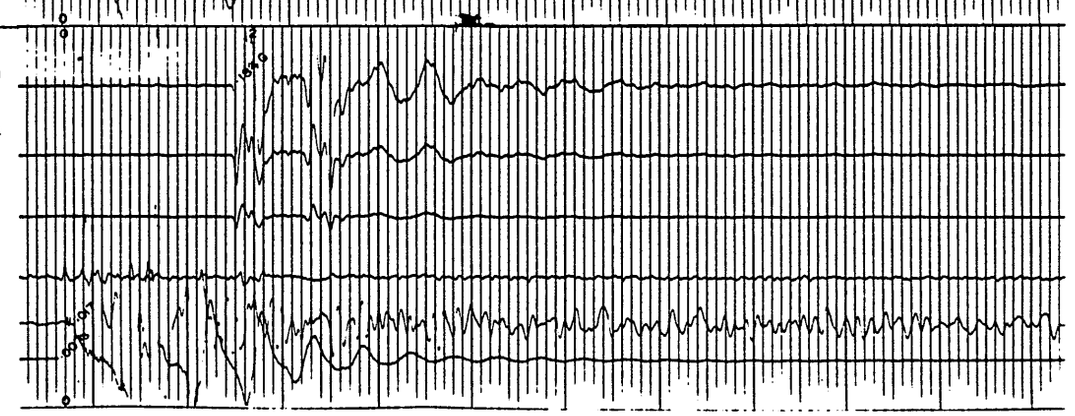
Shot Hole No. AH
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 1122'

Below Datum 00ft. (A.S.L.) 1090'

Charge 20 sec. Depth of Shot 40'



15/19

WELL VELOCITY DETERMINATION

SHELL DEVELOPMENT AUSTRALIA PTY. LTD.

WELL SOLE Nº 1

Record No. 35

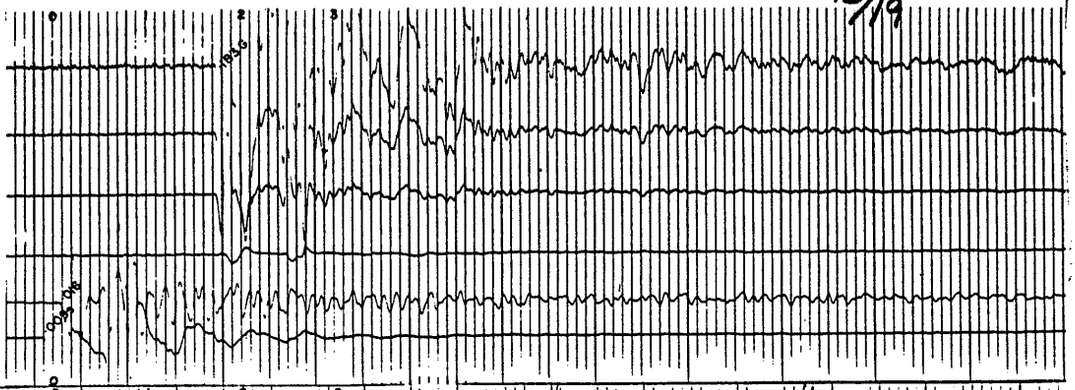
Shot Hole No. A1
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 1122'

Below Datum 00ft. (A.S.L.) 1090'

Charge 20 sec. Depth of Shot 40'.



WELL VELOCITY DETERMINATION

SHELL DEVELOPMENT AUSTRALIA PTY LTD.

WELL SOLE Nº 1

Record No. 26

Shot Hole No. 7
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 1543'

Below Datum 00ft. (A.S.L.) 1511'

Charge 20 sec. Depth of Shot 40'

WELL VELOCITY DETERMINATION

SHELL DEVELOPMENT AUSTRALIA. PTY. LTD.

WELL SOLE Nº 1

Record No. 27

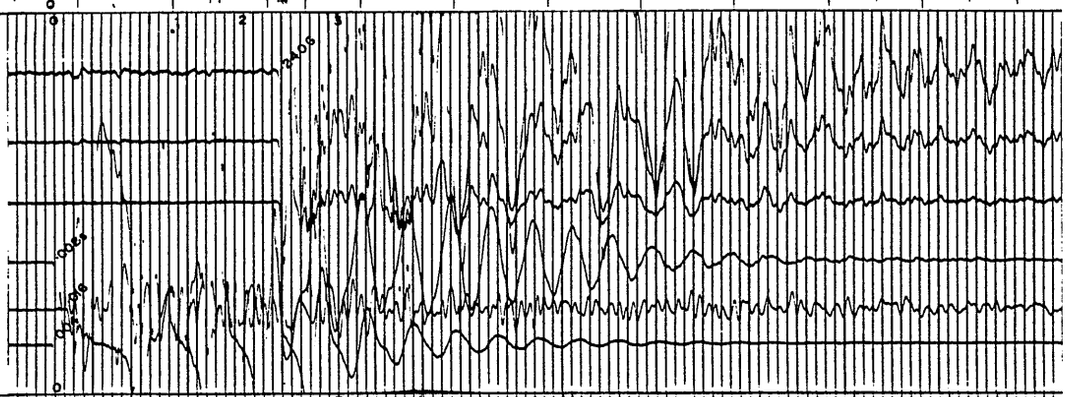
Shot Hole No. AA
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 1543'

Below Datum 00ft. (A.S.L.) 1511'

Charge 20 sec. Depth of Shot 40'



WELL VELOCITY DETERMINATION

SHELL DEVELOPMENT AUSTRALIA. PTY. LTD.

WELL SOLE Nº 1

Record No. 28

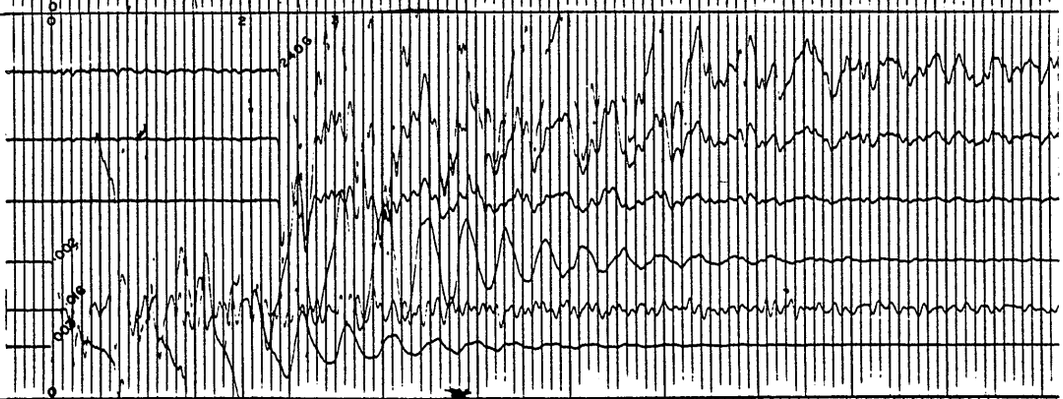
Shot Hole No. AB
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 1543'

Below Datum 00ft. (A.S.L.) 1511'

Charge 20 sec. Depth of Shot 40'



WELL VELOCITY DETERMINATION

SHELL DEVELOPMENT AUSTRALIA. PTY. LTD.

WELL SOLE Nº 1

Record No. 29

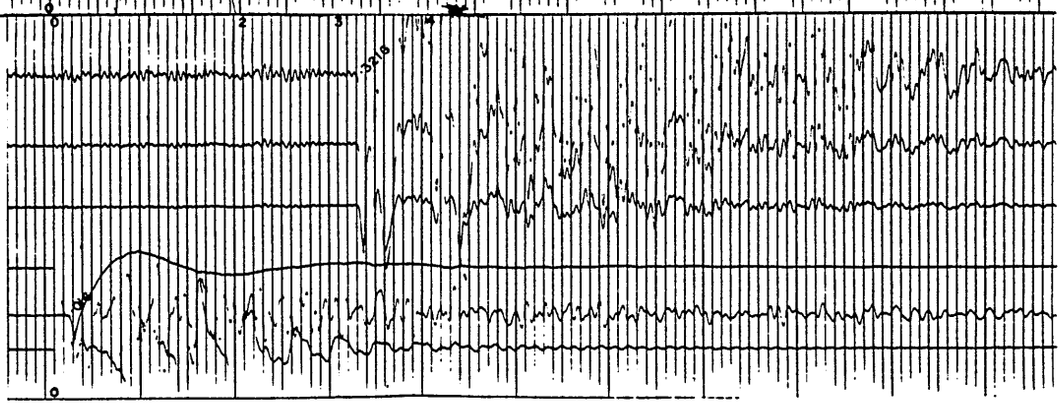
Shot Hole No. AC
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 2112'

Below Datum 00ft. (A.S.L.) 2080'

Charge 20 sec. Depth of Shot 40'



16/19

WELL VELOCITY DETERMINATION

SHELL DEVELOPMENT AUSTRALIA. PTY. LTD.

WELL SOLE Nº 1

Record No. 30

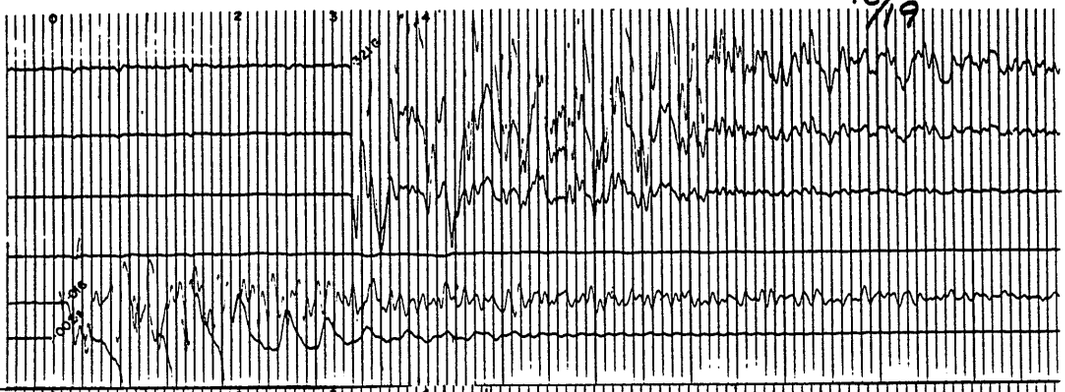
Shot Hole No. AD
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 2112'

Below Datum 00ft. (A.S.L.) 2080'

Charge 20 sec Depth of Shot 40'



WELL VELOCITY DETERMINATION

SHELL DEVELOPMENT AUSTRALIA. PTY. LTD.

WELL SOLE Nº 1

Record No. 31

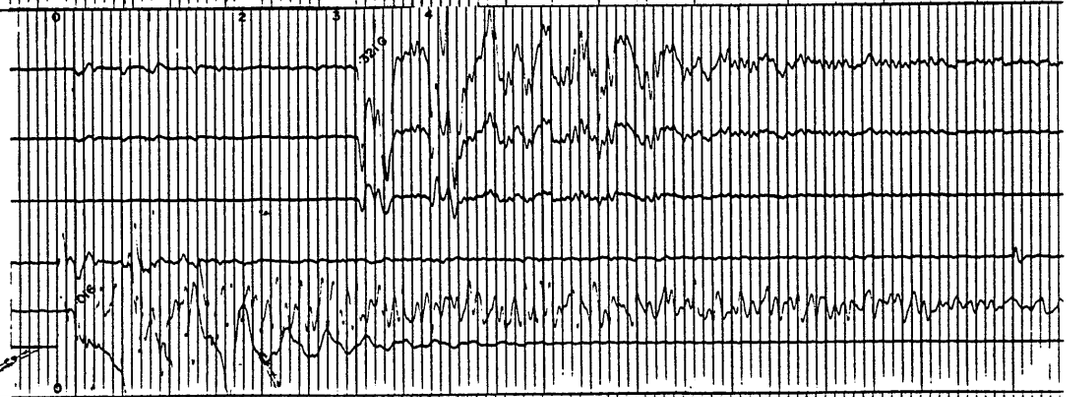
Shot Hole No. AE
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 2112'

Below Datum 00ft. (A.S.L.) 2080'

Charge 20 sec Depth of Shot 40'



WELL VELOCITY DETERMINATION

SHELL DEVELOPMENT AUSTRALIA. PTY. LTD.

WELL SOLE Nº 1

Record No. 3

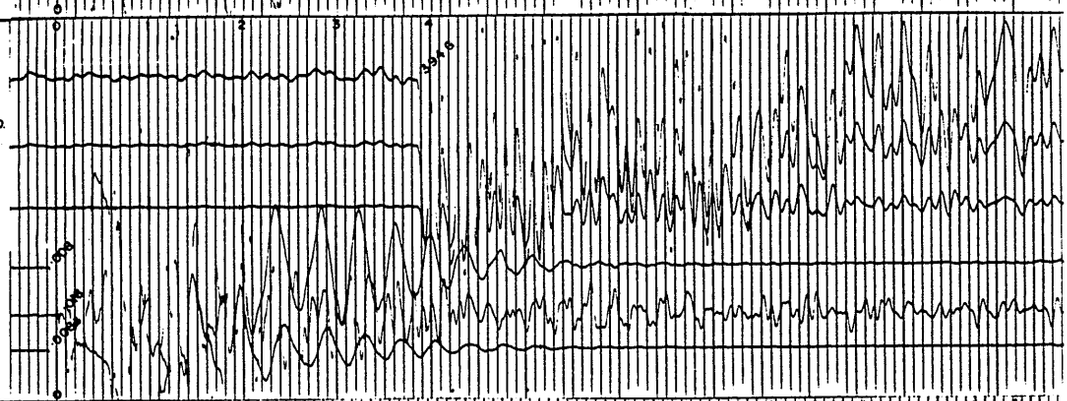
Shot Hole No. C
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 2658'

Below Datum 00ft. (A.S.L.) 2626'

Charge 20 sec Depth of Shot 40'



WELL VELOCITY DETERMINATION

SHELL DEVELOPMENT AUSTRALIA. PTY. LTD.

WELL SOLE Nº 1

Record No. 4

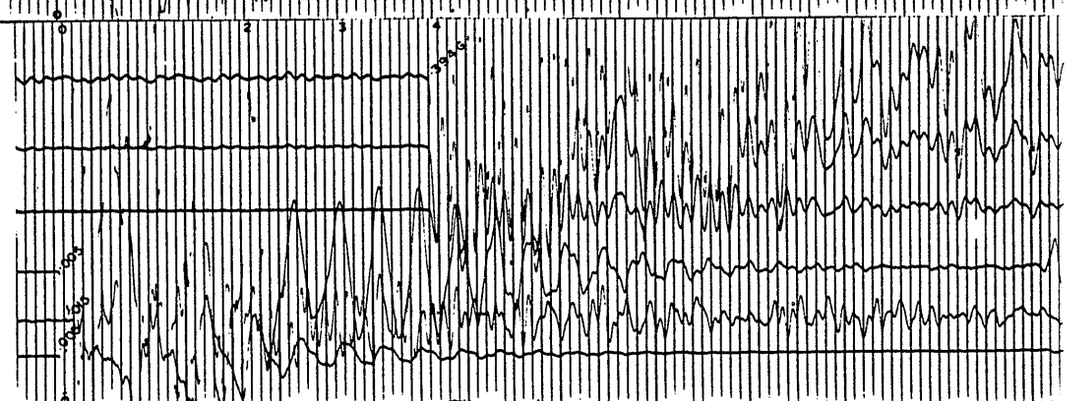
Shot Hole No. D
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 2658'

Below Datum 00ft. (A.S.L.) 2626'

Charge 20 sec Depth of Shot 40'



WELL VELOCITY DETERMINATION

SHELL DEVELOPMENT AUSTRALIA. PTY. LTD.

WELL SOLE Nº 1

Record No. 16

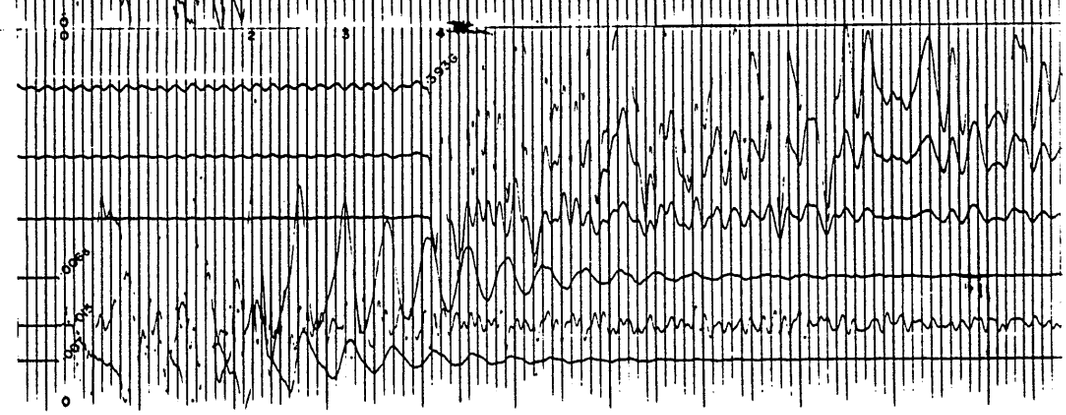
Shot Hole No. P
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 2658'

Below Datum 00ft. (A.S.L.) 2626'

Charge 20 sec. Depth of Shot 40'



17/19

WELL VELOCITY DETERMINATION

SHELL DEVELOPMENT AUSTRALIA. PTY. LTD.

WELL SOLE No 1

Record No. 17

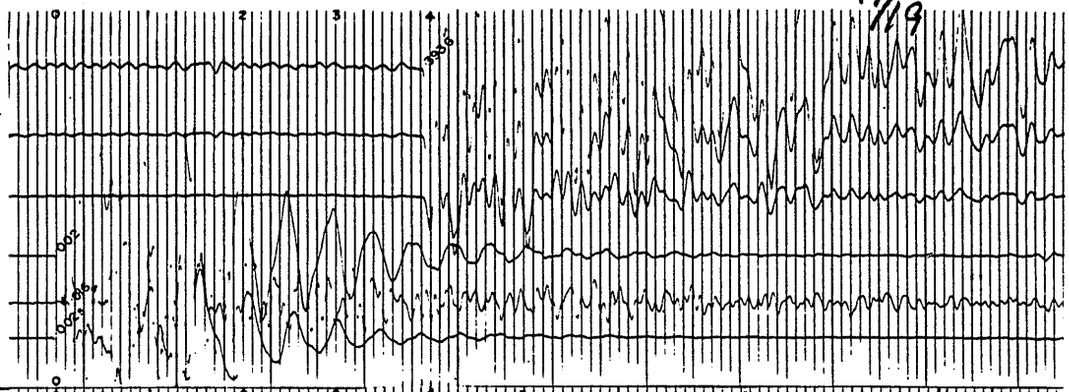
Shot Hole No. 0
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 2658'

Below Datum 00ft (A.S.L.) 2626'

Charge 20 sec. Depth of Shot 40'



WELL VELOCITY DETERMINATION

SHELL DEVELOPMENT AUSTRALIA. PTY. LTD.

WELL SOLE No 1

Record No. 5

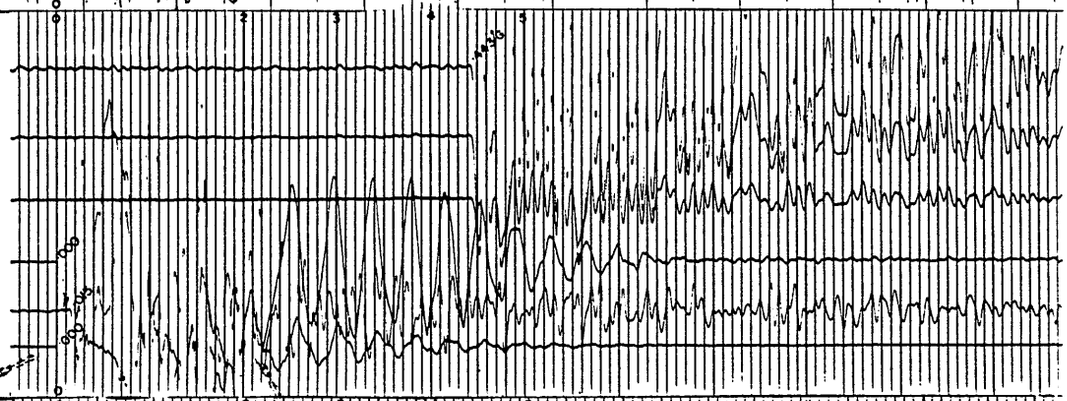
Shot Hole No. E
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 3037'

Below Datum 00ft (A.S.L.) 3005'

Charge 20 sec. Depth of Shot 40'



WELL VELOCITY DETERMINATION

SHELL DEVELOPMENT AUSTRALIA. PTY. LTD.

WELL SOLE No 1

Record No. 6

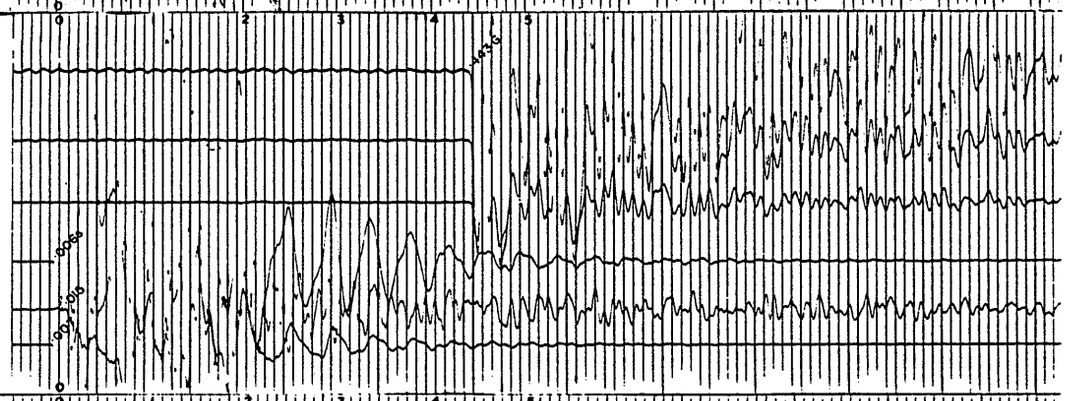
Shot Hole No. E
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 3037'

Below Datum 00ft (A.S.L.) 3005'

Charge 20 sec. Depth of Shot 40'



WELL VELOCITY DETERMINATION

SHELL DEVELOPMENT AUSTRALIA. PTY. LTD.

WELL SOLE No 1

Record No. 14

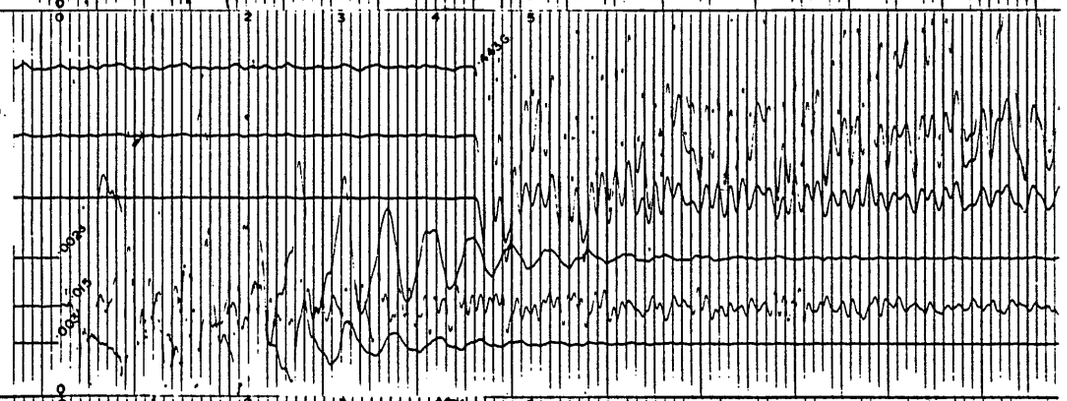
Shot Hole No. N
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 3037'

Below Datum 00ft (A.S.L.) 3005'

Charge 20 sec. Depth of Shot 40'



WELL VELOCITY DETERMINATION

SHELL DEVELOPMENT AUSTRALIA. PTY. LTD.

WELL SOLE No 1

Record No. 15

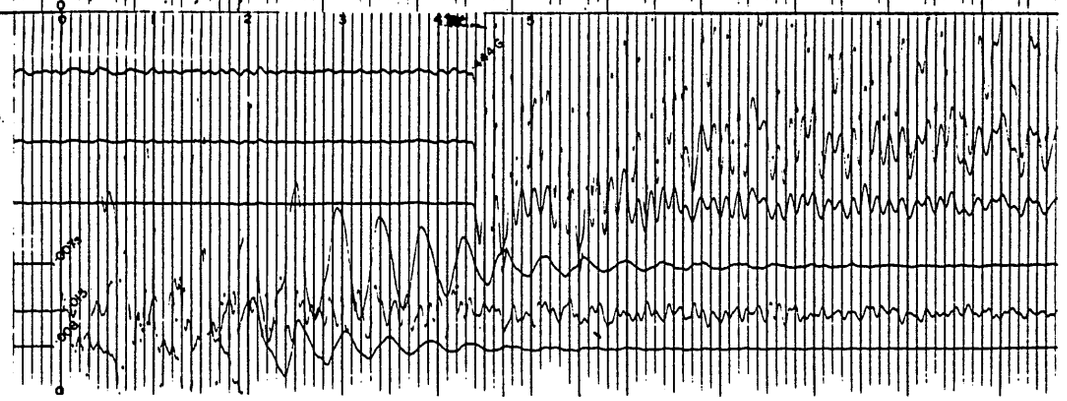
Shot Hole No. 0
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 3037'

Below Datum 00ft (A.S.L.) 3005'

Charge 20 sec. Depth of Shot 40'



WELL VELOCITY DETERMINATION

SHELL DEVELOPMENT AUSTRALIA PTY. LTD.

WELL SOLE No 1

Record No. 7

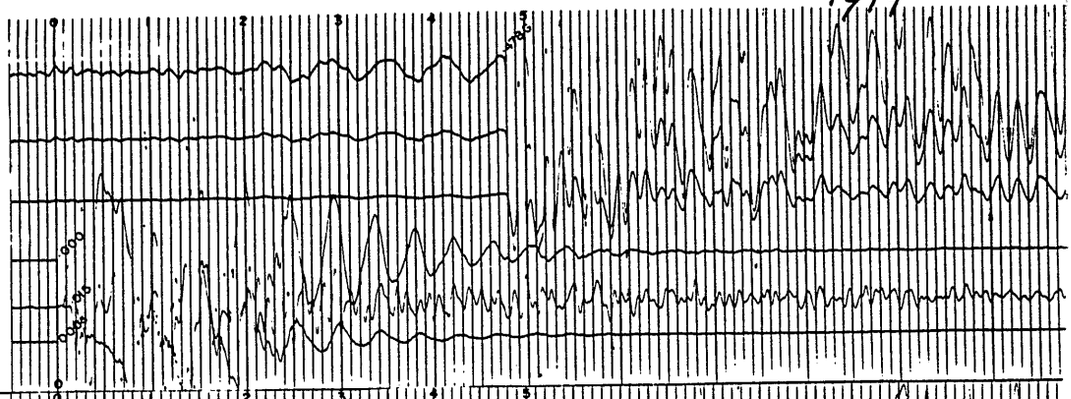
Shot Hole No. G
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 3355'

Below Datum 00ft. (A.S.L.) 3323'

Charge 20 sec. Depth of Shot 40'



WELL VELOCITY DETERMINATION

SHELL DEVELOPMENT AUSTRALIA. PTY. LTD.

WELL SOLE No 1

Record No. 8

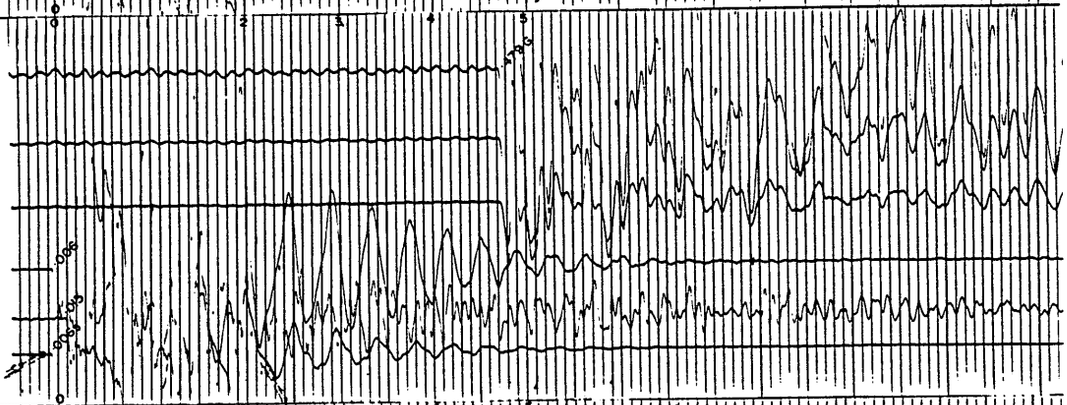
Shot Hole No. H
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 3355'

Below Datum 00ft. (A.S.L.) 3323'

Charge 20 sec. Depth of Shot 40'



WELL VELOCITY DETERMINATION

SHELL DEVELOPMENT AUSTRALIA PTY LTD

WELL SOLE No 1

Record No. 12

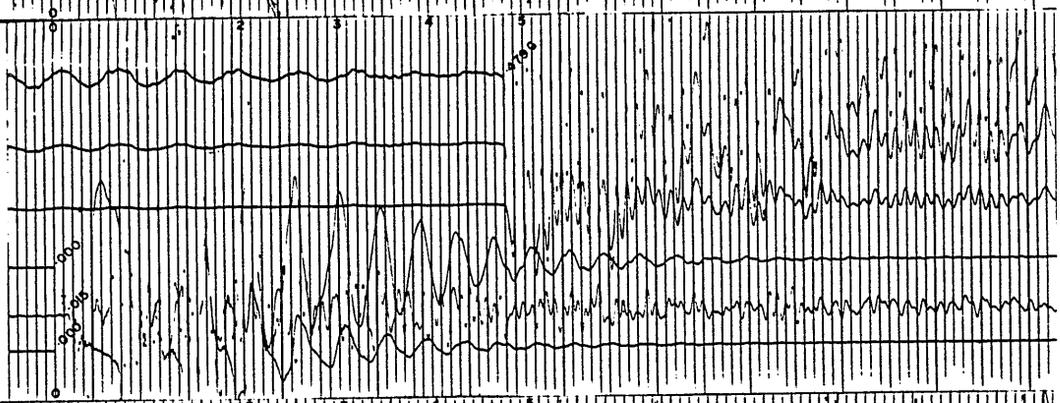
Shot Hole No. L
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 3355'

Below Datum 00ft. (A.S.L.) 3323'

Charge 20 sec. Depth of Shot 40'



WELL VELOCITY DETERMINATION

SHELL DEVELOPMENT AUSTRALIA .PTY. LTD.

WELL SOLE No 1

Record No. 13

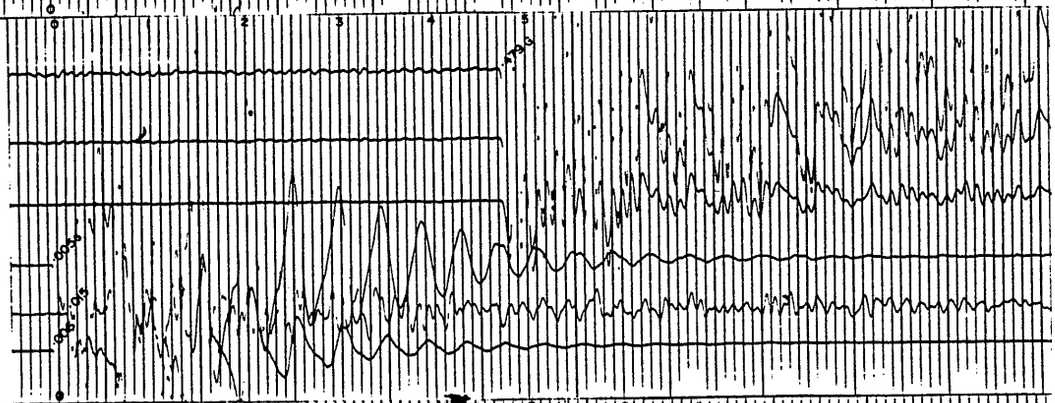
Shot Hole No. M
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 3355'

Below Datum 00ft. (A.S.L.) 3323'

Charge 20 sec. Depth of Shot 40'



WELL VELOCITY DETERMINATION

SHELL DEVELOPMENT AUSTRALIA .PTY. LTD.

WELL SOLE No 1

Record No. 9

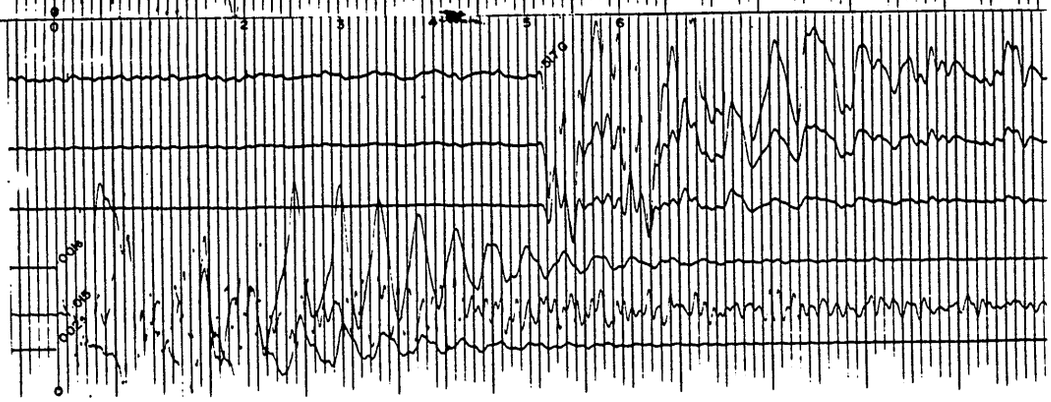
Shot Hole No. T
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 3671'

Below Datum 00ft. (A.S.L.) 3639'

Charge 20 sec. Depth of Shot 40'



WELL VELOCITY DETERMINATION

SHELL DEVELOPMENT AUSTRALIA. PTY. LTD.

WELL SOLE Nº 1

Record No. 10

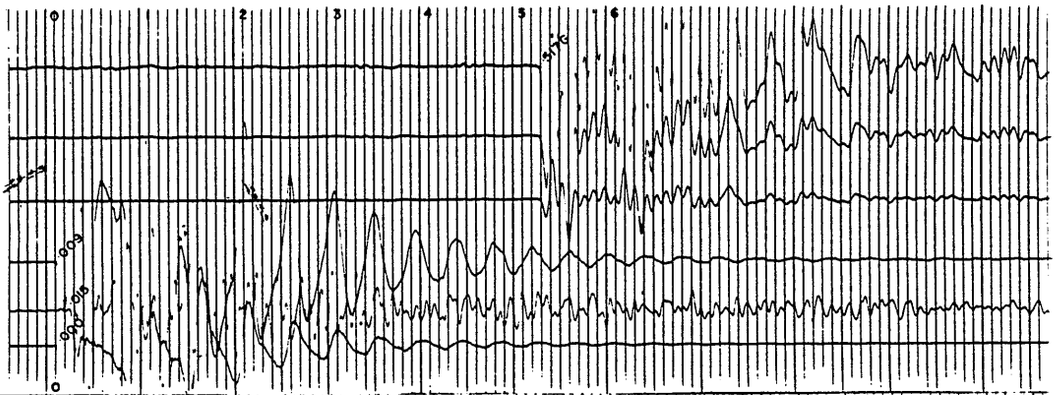
Shot Hole No. J
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 3671'

Below Datum 00ft. (A.S.L.) 3639'

Charge 20 sec. Depth of Shot 40'



WELL VELOCITY DETERMINATION

SHELL DEVELOPMENT AUSTRALIA. PTY. LTD.

WELL SOLE Nº 1

Record No. 11

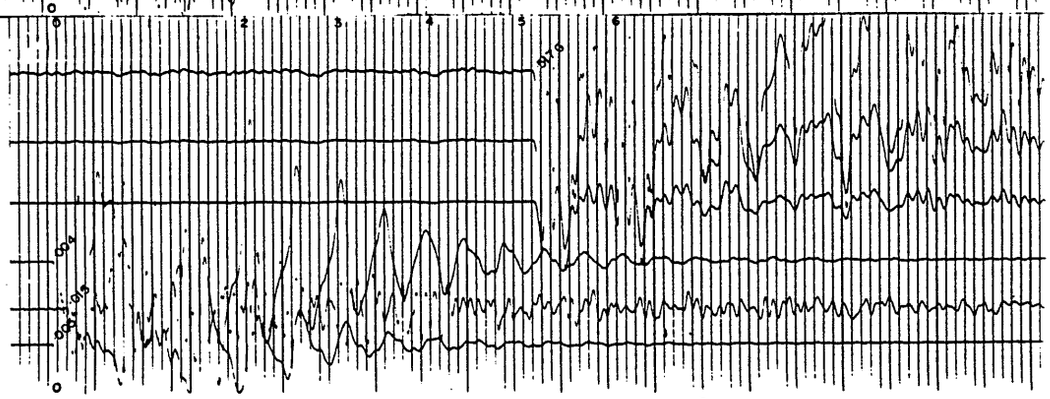
Shot Hole No. K
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 3671'

Below Datum 00ft. (A.S.L.) 3639'

Charge 20 sec. Depth of Shot 40'



SOLE-1 VELOCITY SURVEY REPORT

SHELL DEVELOPMENT AUSTRALIA PTY. LTD. SOLE NO1 06-02-73

LATITUDE 38 07 00 S KELLY BUSHING 32 FEET WEATHERING VELOCITY 0 FEET/SEC

LONGITUDE 149 02 05 E SEABED ELEVATION -423 FEET REPLACEMENT VELOCITY 0 FEET/SEC

CASING DEPTH 2199 FEET DATUM ELEVATION MSL 0 FT DATUM VELOCITY 5000 FEET/SEC

EW	R	DGM	TC	DS	AF	DWS	ASD	DGS	H	TANI	COSI	T	Q	TGS	ASD/DV	TGD	DGD	ADGD	ATGD	V1	VA
0	1	1110	0.0000	40	32	72	40	1038	85	0.0819	0.9967	0.182	G	0.1813	0.008	0.1893					
0	2	1110	0.0000	40	32	72	40	1038	85	0.0819	0.9967	0.182	G	0.1813	0.008	0.1893					
																0.1893	(1078 Disregard-depth unreliable)				
0	32	1122	0.0000	40	32	72	40	1050	85	0.0810	0.9967	0.184	G	0.1834	0.008	0.1914					
0	33	1122	0.0000	40	32	72	40	1050	85	0.0810	0.9967	0.183	G	0.1824	0.008	0.1904					
0	34	1122	0.0000	40	32	72	40	1050	85	0.0810	0.9967	0.184	G	0.1834	0.008	0.1914					
0	35	1122	0.0000	40	32	72	40	1050	85	0.0810	0.9967	0.183	G	0.1824	0.008	0.1904					
																0.1909	1090	1090	0.1909	5710	5710.
0	26	1543	0.0000	40	32	72	40	1471	85	0.0578	0.9983	0.240	G	0.2396	0.008	0.2476					
0	27	1543	0.0000	40	32	72	40	1471	85	0.0578	0.9983	0.240	G	0.2396	0.008	0.2476					
0	28	1543	0.0000	40	32	72	40	1471	85	0.0578	0.9983	0.240	G	0.2396	0.008	0.2476					
																0.2476	1511	421	0.0567	7425.	6103.
0	29	2112	0.0000	40	32	72	40	2040	85	0.0417	0.9991	0.321	G	0.3207	0.008	0.3287					
0	30	2112	0.0000	40	32	72	40	2040	85	0.0417	0.9991	0.321	G	0.3207	0.008	0.3287					
0	31	2112	0.0000	40	32	72	40	2040	85	0.0417	0.9991	0.321	G	0.3207	0.008	0.3287					
																0.3287	2080	569	0.0811	7014.	6328.
0	3	2658	0.0000	40	32	72	40	2586	85	0.0329	0.9995	0.394	G	0.3937	0.008	0.4017					
0	4	2658	0.0000	40	32	72	40	2586	85	0.0329	0.9995	0.394	G	0.3937	0.008	0.4017					
0	16	2658	0.0000	40	32	72	40	2586	85	0.0329	0.9995	0.393	G	0.3927	0.008	0.4007					
0	17	2658	0.0000	40	32	72	40	2586	85	0.0329	0.9995	0.393	G	0.3927	0.008	0.4007					
																0.4012	2626	546	0.0726	7524.	6544.
0	5	3037	0.0000	40	32	72	40	2965	85	0.0287	0.9996	0.443	G	0.4428	0.008	0.4508					
0	6	3037	0.0000	40	32	72	40	2965	85	0.0287	0.9996	0.443	G	0.4428	0.008	0.4508					
0	14	3037	0.0000	40	32	72	40	2965	85	0.0287	0.9996	0.443	G	0.4428	0.008	0.4508					
0	15	3037	0.0000	40	32	72	40	2965	85	0.0287	0.9996	0.444	G	0.4438	0.008	0.4518					
																0.4510	3005	379	0.0498	7613.	6662.
0	7	3355	0.0000	40	32	72	40	3283	85	0.0259	0.9997	0.478	G	0.4778	0.008	0.4858					
0	8	3355	0.0000	40	32	72	40	3283	85	0.0259	0.9997	0.479	G	0.4788	0.008	0.4868					
0	12	3355	0.0000	40	32	72	40	3283	85	0.0259	0.9997	0.479	G	0.4788	0.008	0.4868					
0	13	3355	0.0000	40	32	72	40	3283	85	0.0259	0.9997	0.479	G	0.4788	0.008	0.4868					
																0.4865	3323	318	0.0355	8952.	6829.
0	9	3671	0.0000	40	32	72	40	3599	85	0.0236	0.9997	0.517	G	0.5168	0.008	0.5248					
0	10	3671	0.0000	40	32	72	40	3599	85	0.0236	0.9997	0.517	G	0.5168	0.008	0.5248					
0	11	3671	0.0000	40	32	72	40	3599	85	0.0236	0.9997	0.517	G	0.5168	0.008	0.5248					
																0.5248	3639	316	0.0383	8258.	6933.

SOLE FIELD

EVALUATION

DEPARTMENT OF
~~NATIONAL RESOURCES~~
NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

IN CONFIDENCE

BMR RECORD 1980/8

SOLE FIELD - Gippsland Basin, Victoria:

Estimated Recoverable Petroleum Reserves

as at 1 January 1980

by

L.E. Kurylowicz

Shell
1/3/74

SOLE STRUCTURE

No. A.F.E. No.
Sheet No. 1

ROCK VOLUME QUANTITY EST^{N} – Ref ESSO DWG No. 1579/0P/3
Scale 1:50,000

2500' CONTOUR

0150	0341	0524	
9965	0150	0341	
185	191	183	av 186

Area = ·0092 × 186 sq ins
= ·0092 × 186 × 400 acres
= 685 acres.

2600' CONTOUR

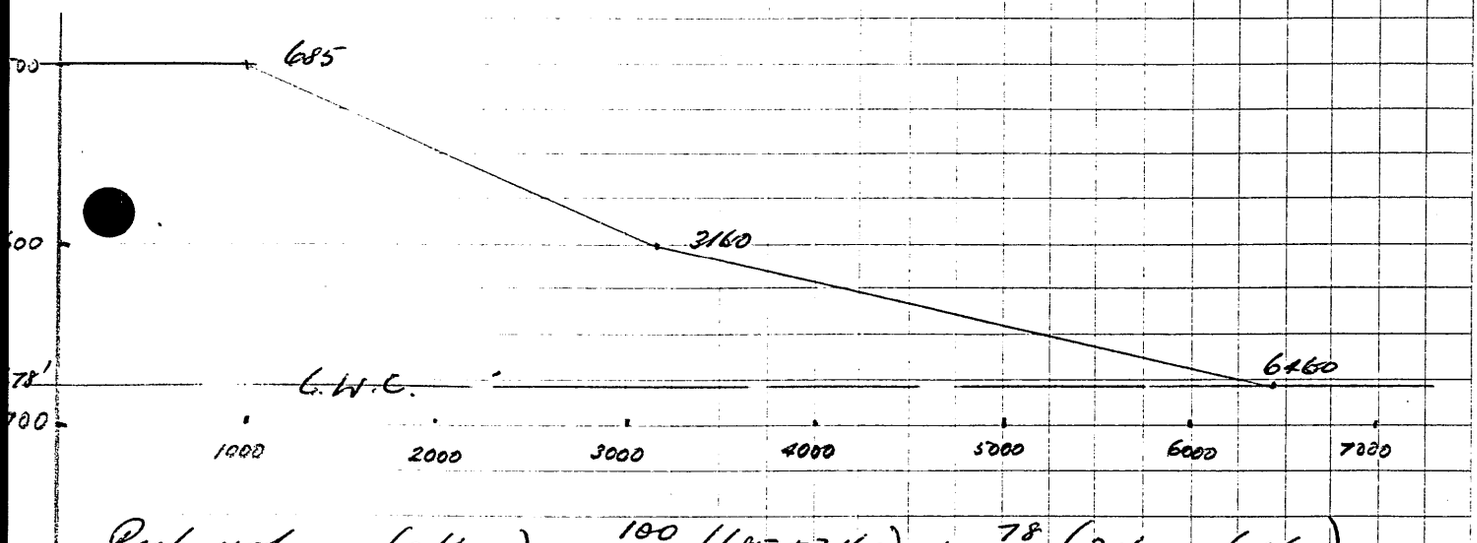
1578	2445	3300	
0726	1578	2445	
852	867	853	av 858

Area = 3,160 acres.

2678' CONTOUR (GWC)

5280	7024	8790	
3541	5280	7024	
1739	1744	1766	av 1753

Area = 6,460 acres.



Rock volume (approx) = $\frac{100}{2}(685 + 3160) + \frac{78}{2}(3160 + 6460)$.
= 192,000 + 375,000
= 567,000 acre feet.

Sle
1/3/74

SOLE STRUCTURE

Net rock volume / gross.

Sole structure was $50/59 = 85\%$.
For purposes of calculation assume a net/gross figure of 75%.
Porosities are generally in excess of 30% - this figure shall be used.

∴ Reservoir gas volume in place $= \dfrac{.75 \times 567{,}000 \times 43560 \times .30 \times .71}{.0116}$

$= 340$ Billion cu ft.

Calculation of B_g when pressure drops to 500 psia. Assume at this pressure behaviour is like an ideal gas ie assume $z = 1.$, temp constant.

$$B_g = \frac{P_{sc}\, T}{T_{sc}\, P} = \frac{14.7 \times 570}{520 \times 500} = .0322$$

Reservoir gas vol in place $= 122$ Billion

∴ Potential recovery $\simeq$ 240 Billion cu ft

SOLE GAS.

Reference Shell well summary report

Appendix 4 Composition	Mole %
Methane	96.09
Ethane	1.57
Propane	0.11
i. Butane	0.01
N. Butane	—
i. Pentane	—
N. Pentane	—
Hexanes	—
Carbon Dioxide	1.52
Oxygen	0.01
Nitrogen	0.72
H_2S	—
	100 %

Appendix 4 Calculate SG = 0.5762.

FIT Bottom hole pressure (2644-2695') = ~~1236~~ 1208 psig = ~~1550~~ 1222 psia (say)

Bottom hole temperature = 110°F. = 570°R.

Pseudo critical temperature & pressures not applicable.

$T_{cr} = 350 - 1.52 \times 0.8 - 0.72 \times 2.5 = 347$

$P_{cr} = 670 + 1.52 \times 4.4 - 0.72 \times 1.7 = 665$

Pseudo reduced pressure & temperature

$$\left.\begin{aligned} \frac{T}{T_{cr}} &= \frac{570}{347} = 1.65 \\ \frac{P}{P_{cr}} &= \frac{1222}{665} = 1.83. \end{aligned}\right\} \rightarrow z = 0.885.$$

$$\text{New } B_g = \frac{P_{sc}\, z\, T}{T_{sc}\, P} = \frac{14.7 \times 0.885 \times 570}{520 \times 1222} = .0116$$

Appendix 6. Interval 2657 – ~~2716~~' (59' gross)

Net pay 50' – gas bearing.

Average water saturation = 29 %.

Gas/water contact at 2716 ft.

PE905087

This is an enclosure indicator page.
The enclosure PE905087 is enclosed within the container PE905086 at this location in this document.

The enclosure PE905087 has the following characteristics:

ITEM_BARCODE	= PE905087
CONTAINER_BARCODE	= PE905086
NAME	= Prospect Map
BASIN	= GIPPSLAND
PERMIT	= VIC/P9
TYPE	= SEISMIC
SUBTYPE	= HRZN_CNTR_MAP
DESCRIPTION	= Prospect Map and Seismic Section, Depth Contours Horizon Top of Latrobe Formation for Sole-1 (pre-drill)
REMARKS	=
DATE_CREATED	= 31/03/72
DATE_RECEIVED	=
W_NO	= W666
WELL_NAME	= SOLE-1
CONTRACTOR	=
CLIENT_OP_CO	= SHELL AUSTRALIA

(Inserted by DNRE - Vic Govt Mines Dept)

PE905088

This is an enclosure indicator page.
The enclosure PE905088 is enclosed within the container PE905086 at this location in this document.

The enclosure PE905088 has the following characteristics:

ITEM_BARCODE	= PE905088
CONTAINER_BARCODE	= PE905086
NAME	= Time Contour Map
BASIN	= GIPPSLAND
PERMIT	= VIC/P9
TYPE	= SEISMIC
SUBTYPE	= HRZN_CNTR_MAP
DESCRIPTION	= Unmigrated Time Contour Map of Top Latrobe Formation
REMARKS	=
DATE_CREATED	= 30/09/73
DATE_RECEIVED	=
W_NO	= W666
WELL_NAME	= SOLE-1
CONTRACTOR	=
CLIENT_OP_CO	= SHELL AUSTRALIA

(Inserted by DNRE - Vic Govt Mines Dept)

PE905089

This is an enclosure indicator page.
The enclosure PE905089 is enclosed within the container PE905086 at this location in this document.

The enclosure PE905089 has the following characteristics:

ITEM_BARCODE	= PE905089
CONTAINER_BARCODE	= PE905086
NAME	= Time-Depth Curve
BASIN	= GIPPSLAND
PERMIT	= VIC/P9
TYPE	= WELL
SUBTYPE	= VELOCITY_CHART
DESCRIPTION	= Time-Depth Curve (interpretive) for Sole-1
REMARKS	=
DATE_CREATED	= 6/02/73
DATE_RECEIVED	=
W_NO	= W666
WELL_NAME	= SOLE-1
CONTRACTOR	=
CLIENT_OP_CO	= SHELL AUSTRALIA

(Inserted by DNRE - Vic Govt Mines Dept)

PE905090

This is an enclosure indicator page.
The enclosure PE905090 is enclosed within the container PE905086 at this location in this document.

The enclosure PE905090 has the following characteristics:

ITEM_BARCODE	= PE905090
CONTAINER_BARCODE	= PE905086
NAME	= FIT Data
BASIN	= GIPPSLAND
PERMIT	= VIC/P9
TYPE	= WELL
SUBTYPE	= FIT
DESCRIPTION	= Formation Tester Recovery Data for SOle-1
REMARKS	=
DATE_CREATED	=
DATE_RECEIVED	=
W_NO	= W666
WELL_NAME	= SOLE-1
CONTRACTOR	= SCHLUMBERGER
CLIENT_OP_CO	= SHELL AUSTRALIA

(Inserted by DNRE - Vic Govt Mines Dept)

PE900505

This is an enclosure indicator page.
The enclosure PE900505 is enclosed within the container PE905086 at this location in this document.

The enclosure PE900505 has the following characteristics:

ITEM_BARCODE	= PE900505
CONTAINER_BARCODE	= PE905086
NAME	= Palynological Chart
BASIN	= GIPPSLAND
PERMIT	= VIC/P9
TYPE	= WELL
SUBTYPE	= DIAGRAM
DESCRIPTION	= Palynology Distribution Chart for Sole-1
REMARKS	=
DATE_CREATED	= 31/05/73
DATE_RECEIVED	=
W_NO	= W666
WELL_NAME	= SOLE-1
CONTRACTOR	=
CLIENT_OP_CO	= SHELL AUSTRALIA

(Inserted by DNRE - Vic Govt Mines Dept)

PE900506

This is an enclosure indicator page.
The enclosure PE900506 is enclosed within the container PE905086 at this location in this document.

The enclosure PE900506 has the following characteristics:

ITEM_BARCODE	= PE900506
CONTAINER_BARCODE	= PE905086
NAME	= Foraminiferal Chart
BASIN	= GIPPSLAND
PERMIT	= VIC/P9
TYPE	= WELL
SUBTYPE	= DIAGRAM
DESCRIPTION	= Foraminiferal Distribution and Depositional Environment for Sole-1
REMARKS	=
DATE_CREATED	= 31/05/73
DATE_RECEIVED	=
W_NO	= W666
WELL_NAME	= SOLE-1
CONTRACTOR	=
CLIENT_OP_CO	= SHELL AUSTRALIA

(Inserted by DNRE - Vic Govt Mines Dept)

PE603647

This is an enclosure indicator page.
The enclosure PE603647 is enclosed within the container PE905086 at this location in this document.

The enclosure PE603647 has the following characteristics:

ITEM_BARCODE	= PE603647
CONTAINER_BARCODE	= PE905086
NAME	= Composite Log
BASIN	= GIPPSLAND
PERMIT	= VIC/P9
TYPE	= WELL
SUBTYPE	= COMPOSITE_LOG
DESCRIPTION	= Composite Log for Sole-1
REMARKS	=
DATE_CREATED	= 30/04/73
DATE_RECEIVED	=
W_NO	= W666
WELL_NAME	= SOLE-1
CONTRACTOR	=
CLIENT_OP_CO	= SHELL AUSTRALIA

(Inserted by DNRE - Vic Govt Mines Dept)

PE603648

This is an enclosure indicator page.
The enclosure PE603648 is enclosed within the container PE905086 at this location in this document.

The enclosure PE603648 has the following characteristics:

ITEM_BARCODE	= PE603648
CONTAINER_BARCODE	= PE905086
NAME	= Mud Log
BASIN	= GIPPSLAND
PERMIT	= VIC/P9
TYPE	= WELL
SUBTYPE	= MUD_LOG
DESCRIPTION	= Mud Log for Sole-1
REMARKS	=
DATE_CREATED	= 5/02/73
DATE_RECEIVED	=
W_NO	= W666
WELL_NAME	= SOLE-1
CONTRACTOR	= BAROID
CLIENT_OP_CO	= SHELL AUSTRALIA

(Inserted by DNRE - Vic Govt Mines Dept)

PE603649

This is an enclosure indicator page.
The enclosure PE603649 is enclosed within the container PE905086 at this location in this document.

The enclosure PE603649 has the following characteristics:

ITEM_BARCODE	= PE603649
CONTAINER_BARCODE	= PE905086
NAME	= Drill Rate Log, 1 of 5
BASIN	= GIPPSLAND
PERMIT	= VIC/P9
TYPE	= WELL
SUBTYPE	= WELL_LOG
DESCRIPTION	= Drill Rate Log for Sole-1, 1 of 5.
REMARKS	=
DATE_CREATED	=
DATE_RECEIVED	=
W_NO	= W666
WELL_NAME	= SOLE-1
CONTRACTOR	= BAROID
CLIENT_OP_CO	= SHELL AUSTRALIA

(Inserted by DNRE - Vic Govt Mines Dept)

PE603650

This is an enclosure indicator page.
The enclosure PE603650 is enclosed within the container PE905086 at this location in this document.

The enclosure PE603650 has the following characteristics:

ITEM_BARCODE	= PE603650
CONTAINER_BARCODE	= PE905086
NAME	= Drill Rate Log, 2 of 5
BASIN	= GIPPSLAND
PERMIT	= VIC/P9
TYPE	= WELL
SUBTYPE	= WELL_LOG
DESCRIPTION	= Drill Rate Log for Sole-1, 2 of 5.
REMARKS	=
DATE_CREATED	=
DATE_RECEIVED	=
W_NO	= W666
WELL_NAME	= SOLE-1
CONTRACTOR	= BAROID
CLIENT_OP_CO	= SHELL AUSTRALIA

(Inserted by DNRE - Vic Govt Mines Dept)

PE603651

This is an enclosure indicator page.
The enclosure PE603651 is enclosed within the container PE905086 at this location in this document.

The enclosure PE603651 has the following characteristics:

ITEM_BARCODE	= PE603651
CONTAINER_BARCODE	= PE905086
NAME	= Drill Rate Log, 3 of 5
BASIN	= GIPPSLAND
PERMIT	= VIC/P9
TYPE	= WELL
SUBTYPE	= WELL_LOG
DESCRIPTION	= Drill Rate Log for Sole-1, 3 of 5.
REMARKS	=
DATE_CREATED	=
DATE_RECEIVED	=
W_NO	= W666
WELL_NAME	= SOLE-1
CONTRACTOR	= BAROID
CLIENT_OP_CO	= SHELL AUSTRALIA

(Inserted by DNRE - Vic Govt Mines Dept)

PE603652

This is an enclosure indicator page.
The enclosure PE603652 is enclosed within the container PE905086 at this location in this document.

The enclosure PE603652 has the following characteristics:

ITEM_BARCODE	= PE603652
CONTAINER_BARCODE	= PE905086
NAME	= Drill Rate Log, 4 of 5
BASIN	= GIPPSLAND
PERMIT	= VIC/P9
TYPE	= WELL
SUBTYPE	= WELL_LOG
DESCRIPTION	= Drill Rate Log for Sole-1, 4 of 5.
REMARKS	=
DATE_CREATED	=
DATE_RECEIVED	=
W_NO	= W666
WELL_NAME	= SOLE-1
CONTRACTOR	= BAROID
CLIENT_OP_CO	= SHELL AUSTRALIA

(Inserted by DNRE - Vic Govt Mines Dept)

PE603653

This is an enclosure indicator page.
The enclosure PE603653 is enclosed within the container PE905086 at this location in this document.

The enclosure PE603653 has the following characteristics:

ITEM_BARCODE	= PE603653
CONTAINER_BARCODE	= PE905086
NAME	= Drill Rate Log, 5 of 5
BASIN	= GIPPSLAND
PERMIT	= VIC/P9
TYPE	= WELL
SUBTYPE	= WELL_LOG
DESCRIPTION	= Drill Rate Log for Sole-1, 5 of 5.
REMARKS	=
DATE_CREATED	=
DATE_RECEIVED	=
W_NO	= W666
WELL_NAME	= SOLE-1
CONTRACTOR	= BAROID
CLIENT_OP_CO	= SHELL AUSTRALIA

(Inserted by DNRE - Vic Govt Mines Dept)

PE601445

This is an enclosure indicator page.
The enclosure PE601445 is enclosed within the container PE902342 at this location in this document.

The enclosure PE601445 has the following characteristics:

ITEM_BARCODE	= PE601445
CONTAINER_BARCODE	= PE905086
NAME	= Borehole Compensated Sonic Log
BASIN	= GIPPSLAND
PERMIT	=
TYPE	= WELL
SUBTYPE	= WELL_LOG
DESCRIPTION	= Borehole Compensated Sonic Log
REMARKS	=
DATE_CREATED	= 5/02/73
DATE_RECEIVED	=
W_NO	= W666
WELL_NAME	= Sole-1
CONTRACTOR	= ESSO
CLIENT_OP_CO	= SHELL

(Inserted by DNRE - Vic Govt Mines Dept)