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NUMBER 4148

PEL 5 AND PEL 6, NAPPACOONGEE-MURTEREE BLOCK

EROMANGA BASIN AND COOPER BASIN

CORKWOOD 1

TEST REPORTS

Submitted by

Delhi Petroleum Pty Ltd
1983

MINES AND ENERGY
SOUTH AUSTRALIA

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ENVELOPE 4148

TENEMENT: PEL 5 and PEL 6, Nappacoongee-Murteree Block; Eromanga and Cooper Basins

TENEMENT HOLDER: Delhi Petroleum Pty Ltd (operator), Crusader Resources NL, Santos Ltd, Vamgas Ltd and South Australian Oil and Gas Corp. Pty Ltd

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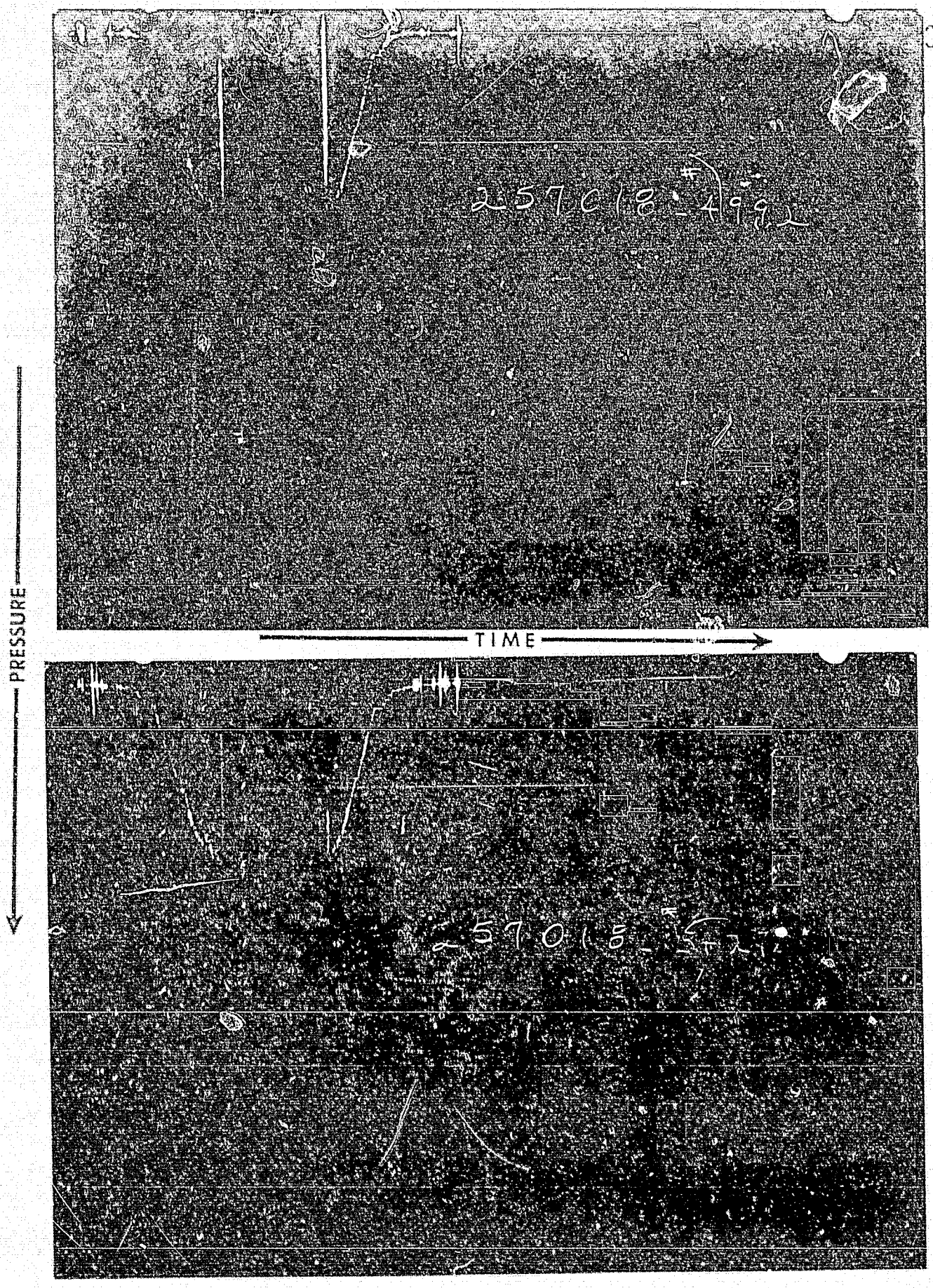

Each Horizontal Line Equal to 1000 p s i

FLUID SAMPLE DATA

Sampler Pressure _____ P.S.I.G. at Surface
Recovery: Cu. Ft. Gas _____
cc. Oil _____
cc. Water _____
cc. Mud _____
Tot. Liquid cc. _____
Gravity _____ ° API @ _____ °F.
Gas/Oil Ratio _____ cu. ft./bbl.

	RESISTIVITY		CHLORIDE CONTENT
Recovery Water	____ @ ____	°F.	____ ppm
Recovery Mud	____ @ ____	°F.	____ ppm
Recovery Mud Filtrate	____ @ ____	°F.	____ ppm
Mud Pit Sample	____ @ ____	°F.	____ ppm
Mud Pit Sample Filtrate	____ @ ____	°F.	____ ppm

Mud Weight 9.3 vis 37 sec.

Date 6-13-81 Ticket Number 257018
Kind of D.S.T. OPEN HOLE Halliburton Location ADELAIDE
Tester SKINNER Witness -
Drilling Contractor OD & E RIG # 6 NM

EQUIPMENT & HOLE DATA

Formation Tested Coorikiana Sandstone
Elevation 315' Ft.
Net Productive Interval - Ft.
All Depths Measured From Kelly Bushing
Total Depth 3302' Ft.
Main Hole/Casing Size 8½"
Drill Collar Length 414.53' I.D. 2.875"
Drill Pipe Length 2789.41' I.D. 3.826"
Packer Depth(s) 3232' - 3240' Ft.
Depth Tester Valve 3214.51' Ft.

Cushion TYPE NONE AMOUNT Ft. Depth Back Pres. Valve NONE Surface Choke .5" Bottom Choke .75"

Recovered 120' Feet of mud with a trace of oil
Recovered Feet of
Recovered Feet of
Recovered Feet of
Recovered Feet of

Meas. From Tester Valve

Remarks SEE PRODUCTION TEST DATA SHEET...

TEMPERATURE	Gauge No. 4992	Gauge No. 3427	Gauge No.	TIME (00:00-24:00 hrs.)
	Depth: 3215.51' Ft.	Depth: 3297.94' Ft.	Depth: Ft.	
	24 Hour Clock	24 Hour Clock	Hour Clock	Tool Opened 16:47
Est. °F.	Blanked Off NO	Blanked Off YES	Blanked Off	Opened Bypass 19:49
Actual 170 °F.	Pressures	Pressures	Pressures	

		Field	Office	Field	Office	Field	Office	Reported Minutes	Computed Minutes
Initial Hydrostatic		1634.7	1649.2	1670.4	1683.3			—	—
First Period	Flow Initial	.1 ?	46.6	70.1	90.2			60	
	Flow Final	32.5	72.3	103.6	107.0			122	
	Closed in	97.3	128.6	153.9	162.2			—	—
Second Period	Flow Initial								
	Flow Final								
	Closed in							—	—
Third Period	Flow Initial								
	Flow Final								
	Closed in							—	—
Final Hydrostatic		1602.9	1585.7	1653.8	1620.0			—	—

Legal Location Sec. - Twp. - Rng. -
Lease Name CORKWOOD
Well No. 1
Test No. 1
Field Area COOPER BASIN
County AUSTRALIA
State SOUTH AUSTRALIA
Tested Interval 3240.43' - 3302'
Lease Owner/Company Name DELHI - SANTOS

FORM 161-82 — PRINTED IN U.S.A.

FORMATION TEST DATA

LITTLE'S

Casing perfs.____ Bottom choke____ Surf. temp____ °F Ticket No. 257018
Gas gravity____ Oil gravity____ GOR____
Spec. gravity____ Chlorides____ ppm Res.____ @____ °F
INDICATE TYPE AND SIZE OF GAS MEASURING DEVICE USED____

Date Time a.m. p.m.	Choke Size	Surface Pressure psi	Gas Rate MCF	Liquid Rate BPD	Remarks
1300					Making up the tools.
1416					Started in the hole.
1643					Set packer.
1647					Tool opened with a moderate blow - with choke closed.
1652					Decreased to a weak blow.
1706	.5"				Opened choke line.
1707	.5"				Well dead..
1708					Closed choke line - well still dead.
1747					Closed DCIP for the closed in pressure.
1949					Pulled packer and started out of the hole.
2300					Tools out and laid down.

TICKET NO. 257018 **0006**

	O. D.	I. D.	LENGTH	DEPTH
Drill Pipe or Tubing				
Drill Collars				
~~Reversing Sub~~ DRILL PIPE	4.5"	3.826"	2789.41'	
~~Water Cushion Valve~~ DRILL COLLARS	6"	2.875"	384.95'	
~~Drill Pipe~~ REVERSING SUB	6"	3"	1'	
Drill Collars	6"	2.875"	29.58'	
~~Bundle Sub & Choke Assembly~~ X-OVER	6.5"	2.25"	.63'	
Dual CIP Valve	5"	.87"	4.92'	
Dual CIP Sampler				
Hydro-Spring Tester	5"	.75"	5.02'	3214.51'
Multiple CIP Sampler				
Extension Joint				
AP Running Case	5"	2.25"	4.14'	3215.51'
Hydraulic Jar	5"	1.75"	5'	
VR Safety Joint	5"	1"	2.78'	
Pressure Equalizing Crossover				
Packer Assembly	7.75"	1.75"	6'	3232.43'
Distributor	5"	1.68"	2'	
Packer Assembly	7.75"	1.75"	6'	3240.43'
Flush Joint Anchor				
Pressure Equalizing Tube				
Blanked-Off B.T. Running Case				
Drill Collars				
Anchor Pipe Safety Joint	5"	1.5"	4.3'	
Packer Assembly				
Distributor				
Packer Assembly				
~~Anchor Pipe Safety Joint~~ X-OVER	5.75"	2.5"	.92'	
~~Side Wall Anchor~~ DRILL COLLARS	6"	2.875"	29.37'	
~~Drill Collars~~ X-OVER	5.75"	2.5"	.92'	
Flush Joint Anchor	5.00"	2.37"	21'	
Blanked-Off B.T. Running Case	5.00"	2.44"	4.06'	3297.94'
Total Depth				3302'

PRESSURE
TIME

0008

FLUID SAMPLE DATA

Sampler Pressure _____ P.S.I.G. at Surface
Recovery: Cu. Ft. Gas _____
cc. Oil _____
cc. Water _____
cc. Mud _____
Tot. Liquid cc. _____
Gravity _____ ° API @ _____ °F.
Gas/Oil Ratio _____ cu. ft./bbl.

		RESISTIVITY		CHLORIDE CONTENT
Recovery Water	@	°F.		ppm
Recovery Mud	@	°F.		ppm
Recovery Mud Filtrate	@	°F.		ppm
Mud Pit Sample	@	°F.		ppm
Mud Pit Sample Filtrate	@	°F.		ppm

Mud Weight 9.3 vis 37 sec.

Date 6-20-81 Ticket Number 241140
Kind of D.S.T. OPEN HOLE Halliburton Location ADELAIDE
Tester MR. BRADY Witness ???
MR. HUNT
Drilling Contractor OCEAN DRILLING & EXPLORATION RIG #6

EQUIPMENT & HOLE DATA

Formation Tested Monga
Elevation - Ft.
Net Productive Interval - Ft.
All Depths Measured From Kelly Bushing
Total Depth 4514' Ft.
Main Hole/Casing Size 8 1/2"
Drill Collar Length 472.11' I.D. 2.875"
Drill Pipe Length 3928' I.D. ???
Packer Depth(s) 4427'-4435' Ft.
Depth Tester Valve 4411' Ft.

Cushion TYPE AMOUNT Depth Back Pres. Valve Ft. Surface Choke .50" Bottom Choke .75"

Recovered Feet of No recovery reported
Recovered Feet of
Recovered Feet of
Recovered Feet of
Recovered Feet of

Remarks SEE PRODUCTION TEST DATA SHEET.

TEMPERATURE	Gauge No. 4992	Gauge No. 3427	Gauge No.	TIME (00:00-24:00 hrs.)
	Depth: 4415' Ft.	Depth: 4510' Ft.	Depth: Ft.	
	24 Hour Clock	24 Hour Clock	Hour Clock	Tool Opened 11:29
Est. °F.	Blanked Off NO	Blanked Off YES	Blanked Off	Opened Bypass 17:30
Actual 220 °F.	Pressures	Pressures	Pressures	

		Field	Office	Field	Office	Field	Office	Reported Minutes	Computed Minutes
Initial Hydrostatic		2174.2	2300.5	2252.9	2311.2			—	—
First Period	Flow Initial	210.4	274.0	220.9	224.6			240	*
	Flow Final	1380.1	1396.8	1454.2	1434.4			121	*
	Closed In	1841.2	1869.7	1886.7	1908.8			—	—
Second Period	Flow Initial								
	Flow Final	*See attached incremental reading sheet.							
	Closed In							—	—
Third Period	Flow Initial								
	Flow Final								
	Closed In							—	—
Final Hydrostatic		2174.2	2153.5	2252.9	2197.8			—	—

Legal Location Sec. - Twp. - Rng. - -
Lease Name CORKWOOD
Well No. 1
Test No. 2
Tested Interval 4435' - 4514'
Lease Owner/Company Name SANTOS LIMITED
Field Area CORKWOOD
Meas. From Tester Valve
County AUSTRALIA
State SOUTH AUSTRALIA

FORM 181-R2 — PRINTED IN U.S.A.

FORMATION TEST DATA

LITTLE'S

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SANTOS LIMITED
Lease Owner/Company Name

241140
Ticket Number

B.T. 4992
Depth 4415'-24 Hr.

B.T. 3427
Depth 4510'-24 Hr.

B.T. _____
Depth _____

Time (minutes)	Log $\frac{t+\theta}{\theta}$	PSIG Temp. Corr.
First Flow...		
0		274.0
20		465.9
40		618.1
60		750.0
80		867.5
100		969.4
120		1055.9
140		1130.3
160		1195.9
180		1256.2
200		1309.2
220		1356.5
239.8		1396.8
Initial CIP...		
0		1396.8
8		1806.2
16		1822.4
24		1831.6
32		1837.5
40		1843.0
48		1847.1
56		1851.0
64		1854.9
72		1857.3
80		1859.5
88		1862.5
96		1864.1
104		1865.6
112		1867.6
121.6		1869.7

Time (minutes)	Log $\frac{t+\theta}{\theta}$	PSIG Temp. Corr.
First Flow...		
0		224.6
20		496.2
40		659.8
60		796.5
80		912.7
100		1011.5
120		1096.3
140		1170.1
160		1239.9
180		1296.5
200		1350.0
220		1396.3
238.3		1434.4
Initial CIP...		
0		1434.4
8		1842.8
16		1860.3
24		1870.0
32		1876.0
40		1881.0
48		1885.5
56		1889.3
64		1892.5
72		1895.8
80		1899.3
88		1901.3
96		1903.0
104		1905.0
112		1907.5
122.8		1908.8

Time (minutes)	Log $\frac{t+\theta}{\theta}$	PSIG Temp. Corr.

Remarks: _____

8

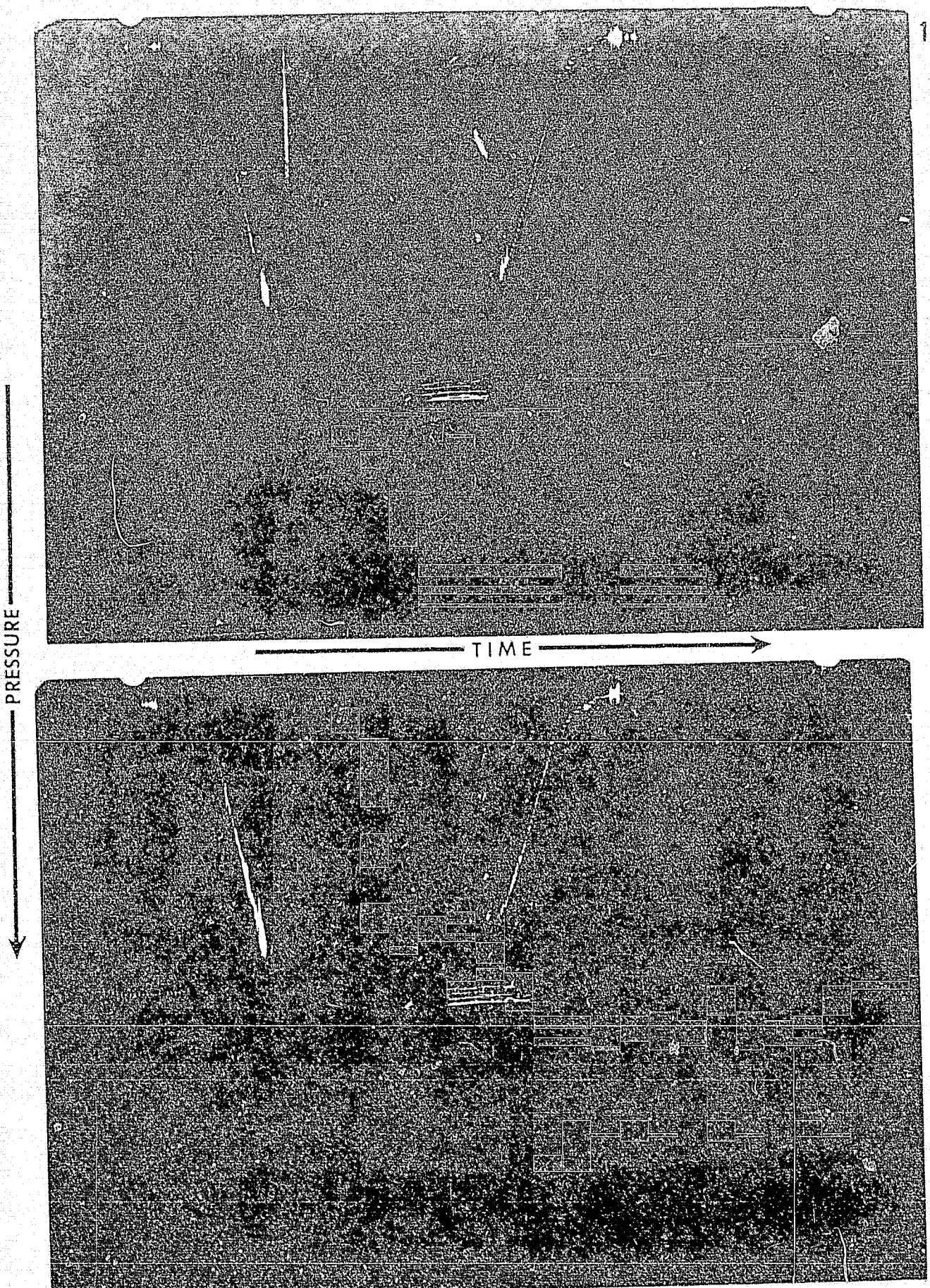
Casing perfs. ______ Bottom choke ______ Surf. temp ______ °F Ticket No. 241140
Gas gravity ______ Oil gravity ______ GOR ______
Spec. gravity ______ Chlorides ______ ppm Res. ______ @ ______ °F
INDICATE TYPE AND SIZE OF GAS MEASURING DEVICE USED ______

Date Time a.m. p.m.	Choke Size	Surface Pressure psi	Gas Rate MCF	Liquid Rate BPD	Remarks
07:00					Picked up tools.
08:45					Ran in hole.
09:30					Check drill pipe.
10:30					Checked drill pipe.
11:00					Tagged bottom.
11:05					Picked up head.
11:26					Set packer.
11:29		0			Opened tool with weak blow.
11:31		0			Weak blow.
11:33		0			Moderate blow.
11:35					Increased to moderately strong blow.
11:37		0			Strong blow.
11:39		"			Strong blow.
11:44	.5"	"			Flare line open.
11:45		"			Decreased to weak blow.
11:47		"			Well dead.
11:48		"			Flare closed - weak blow.
12:00		"			Moderately strong blow.
12:05		"			Strong blow.
12:30	.5"	"			Flare opened.
12:32		"			Well dead.
12:33		"			Closed flare line.
15:25		"			Moderate decreasing blow.
15:29					Tool closed.
17:30					Unseated packer
20:30					Laid tools down.

TICKET NO. 241140 0011

	O. D.	I. D.	LENGTH	DEPTH
Drill Pipe or Tubing				
Drill Collars				
Reversing Sub			1.00'	
Water Cushion Valve				
Drill Pipe	??	??	3928'	
Drill Collars	6.00"	2.875"	472.11'	
Handling Sub & Choke Assembly	6.50"	2.25"	.63' XO SUB	
Dual CIP Valve	5.00"	.87"	4.90'	
Dual CIP Sampler				
Hydro-Spring Tester	5.00"	.75"	5.00'	4411.61'
Multiple CIP Sampler				
Extension Joint				
AP Running Case	5.00"	2.25"	4.10'	4415.71'
Hydraulic Jar	5.00"	1.75"	5.00'	
VR Safety Joint	5.00"	1.00"	2.78'	
Pressure Equalizing Crossover				
Packer Assembly	5.00"	1.75"	6.00'	4427'
Distributor	5.00"	1.68"	2.00'	
Packer Assembly	5.00"	1.75"	6.00'	4435'
Flush Joint Anchor				
Pressure Equalizing Tube				
Blanked-Off B.T. Running Case				
Drill Collars				
Anchor Pipe Safety Joint	5.00"	1.50"	4.30'	
Packer Assembly				
Distributor				
Packer Assembly				
Anchor Pipe Safety Joint			.92'	
Side Wall Anchor	6.00"	2.875"	29.37' DRILL COLLARS	
Drill Collars			.92' XO SUB	
Flush Joint Anchor	5.00"	2.37"	37.00'	
Blanked-Off B.T. Running Case	5.00"	2.44"	4.00'	4510'
Total Depth				4514'

EQUIPMENT


PRESSURE
TIME

FLUID SAMPLE DATA

Sampler Pressure _____ P.S.I.G. at Surface
Recovery: Cu. Ft. Gas _____
cc. Oil _____
cc. Water _____
cc. Mud _____
Tot. Liquid cc. _____
Gravity _____ ° API @ _____ °F.
Gas/Oil Ratio _____ cu. ft./bbl.

	RESISTIVITY		CHLORIDE CONTENT
Recovery Water	____ @ ____	°F.	____ ppm
Recovery Mud	____ @ ____	°F.	____ ppm
Recovery Mud Filtrate	____ @ ____	°F.	____ ppm
Mud Pit Sample	____ @ ____	°F.	____ ppm
Mud Pit Sample Filtrate	____ @ ____	°F.	____ ppm

Mud Weight 9.2 vis 37 sec.

Date 6-22-81 Ticket Number 241141
Kind of D.S.T. OPEN HOLE Halliburton Location ADELAIDE
Tester HUNT Witness
Drilling Contractor OD & E #6 PW

EQUIPMENT & HOLE DATA

Formation Tested Namur
Elevation _____ Ft.
Net Productive Interval 39' Ft.
All Depths Measured From Kelly Bushing
Total Depth 4762' Ft.
Main Hole/Casing Size 8.50"
Drill Collar Length 501' I.D. 2.075"
Drill Pipe Length 4193' I.D. 3.826"
Packer Depth(s) 4715' - 4723' Ft.
Depth Tester Valve 4700' Ft.

Cushion TYPE AMOUNT Ft. Depth Back Pres. Valve Surface Choke .50" Bottom Choke .75"

Recovered Feet of No recovery reported.....
Recovered Feet of
Recovered Feet of
Recovered Feet of
Recovered Feet of

Meas. From Tester Valve

Remarks

- SEE PRODUCTION TEST DATA SHEET -

TEMPERATURE	Gauge No. 4992	Gauge No. 3427	Gauge No.	TIME (00:00-24:00 hrs.)
	Depth: 4703 Ft.	Depth: 4758 Ft.	Depth: Ft.	
	24 Hour Clock	24 Hour Clock	Hour Clock	Tool Opened 1111
Est. °F.	Blanked Off No	Blanked Off Yes	Blanked Off	Opened Bypass 1710
Actual 230 °F.	Pressures	Pressures	Pressures	

		Field	Office	Field	Office	Field	Office	Reported Minutes	Computed Minutes
Initial Hydrostatic		2365.4	2310.1	2386.1	2333.3				
First Period	Flow Initial	548.7	449.2-Q	555.1	546.6				
	Flow Final	2015.7	2036.3	2119.7	2056.6			359	*
	Closed In								
Second Period	Flow Initial								
	Flow Final								
	Closed In								
Third Period	Flow Initial								
	Flow Final								
	Closed In								
Final Hydrostatic		2332.7	2254.7	2386.1	2275.0				

* = See attached incremental reading sheet.....
Q = Questionable reading.....

Legal Location Sec. - Twp. - Rng.
Lease Name CORKWOOD
Well No. 1
Test No. 3
Tested Interval 4723' - 4762'
Field Area COOPER BASIN
County SOUTH AUSTRALIA
State AUSTRALIA
Lease Owner/Company Name DELHI/SANTOS

FORM 161-82 - PRINTED IN U.S.A.

FORMATION TEST DATA

LITHO'S

DELHI/SANTOS
Lease Owner/Company Name

241141
Ticket Number

B.T. 4992
Depth 4703'

B.T. 3427
Depth 4758'

B.T. _____
Depth _____

Time (minutes)	Log $\frac{t+\theta}{\theta}$	PSIG Temp. Corr.	Time (minutes)	Log $\frac{t+\theta}{\theta}$	PSIG Temp. Corr.	Time (minutes)	Log $\frac{t+\theta}{\theta}$	PSIG Temp. Corr.
FLOW PERIOD 1			FLOW PERIOD 1					
0		449.2	0		546.6			
18		1352.3	18		1282.3			
36		1704.7	36		1693.3			
54		1860.3	54		1866.6			
72		1934.9	72		1950.0			
90		1974.6	90		1991.6			
108		1998.4	108		2015.0			
126		2011.0	126		2030.0			
144		2018.9	144		2040.0			
162		2025.3	162		2046.6			
180		2028.4	180		2048.3			
198		2031.6	198		2051.6			
216		2033.2	216		2053.3			
234		2034.8	234		2055.0			
252		2034.8	252		2056.6			
270		2036.3	270		2056.6			
288		2036.3	288		2056.6			
306		2036.3	306		2056.6			
324		2036.3	324		2056.6			
346		2036.3	346		2056.6			
358.9		2036.3	359.4		2056.6			

Remarks: _____

80-2860

Casing perfs. Bottom choke Surf. temp °F Ticket No. 241141
Gas gravity Oil gravity GOR
Spec. gravity Chlorides ppm Res. @ °F
INDICATE TYPE AND SIZE OF GAS MEASURING DEVICE USED

Date 6-22-81 Time a.m. p.m.	Choke Size	Surface Pressure psi	Gas Rate MCF	Liquid Rate BPD	Remarks
0630					Picked up tools.
0800					Started in hole.
0900					Checked pipe.
1000					"
1045					Tagged bottom.
1050					Picked up head.
1108					Packers set.
1111					Opened tool with a weak blow.
1112					Moderate blow, increasing to a strong
					blow.
1116					Flare open - maintaining blow.
1119					Strong blow.
1125					Stable.
1135					Blow decreasing.
1140					"
1150					"
1232					Well dead - closed flare.
1248					Moderate blow.
1300					Blow increasing.
1312					Gas to the surface.
1330					Stable.
1500					Blow decreasing.
1511					Dual CIP would not function.
1533					Closed in at head.
1710					Packers unseated.

FORM 102-hl—PRINTED IN U.S.A.

PRODUCTION TEST DATA

LITTLE'S

Casing perfs. Bottom choke Surf. temp °F Ticket No. 241141
Gas gravity Oil gravity GOR
Spec. gravity Chlorides ppm Res. @ °F
INDICATE TYPE AND SIZE OF GAS MEASURING DEVICE USED

Date Time a.m. p.m.	Choke Size	Surface Pressure psi	Gas Rate MCF	Liquid Rate BPD	Remarks
1715					Head laid down.
2130					Tools laid down.

PRODUCTION TEST DATA

FORM 182-R1—PRINTED IN U.S.A.

LITTLE'S

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TICKET NO. 241141 0017

	O. D.	I. D.	LENGTH	DEPTH
Drill Pipe or Tubing				
Drill Collars				
Reversing Sub			1'	4658.65'
Water Cushion Valve	4 1/2"	3.826"	4193'	
Drill Pipe	6 1/2"	2.075"	29.58'	
Drill Collars	6.50"	2.25"	.63'	
Handling Sub & Choke Assembly	5.00"	.87"	4.90'	
Dual CIP Valve				
Dual CIP Sampler	5.00"	.75"	5.02'	4699.78'
Hydro-Spring Tester				
Multiple CIP Sampler				
Extension Joint				
AP Running Case	5.00"	2.25"	4.14'	4703.92'
Hydraulic Jar	5.00"	1.175"	5.00'	
VR Safety Joint	5.00"	1.00"	2.78'	
Pressure Equalizing Crossover				
Packer Assembly	5.00"	1.75"	6.00'	4715.20'
Distributor	5.00"	1.68"	2.00'	
Packer Assembly	5.00"	1.75"	6.00'	4723.20'
Flush Joint Anchor				
Pressure Equalizing Tube				
Blanked-Off B.T. Running Case				
Drill Collars	5.00"	1.50"	4.30'	
Anchor Pipe Safety Joint				
Packer Assembly				
Distributor				
Packer Assembly				
Anchor Pipe Safety Joint				
Side Wall Anchor				
Drill Collars				
Flush Joint Anchor	5.00"	2.37"	28.00'	
Blanked-Off B.T. Running Case	5.00"	2.44"	4.00'	4758'
Total Depth				4762'

FORM 187-83 — PRINTED IN U.S.A.

EQUIPMENT DATA

LITTLE'S

PRESSURE
TIME

FLUID SAMPLE DATA

Sampler Pressure ____ P.S.I.G. at Surface
Recovery: Cu. Ft. Gas ____
cc. Oil ____
cc. Water ____
cc. Mud ____
Tot. Liquid cc. ____
Gravity ____ ° API @ ____ °F.
Gas/Oil Ratio ____ cu. ft./bbl.

	RESISTIVITY			CHLORIDE CONTENT
Recovery Water	____	@ ____	°F.	____ ppm
Recovery Mud	____	@ ____	°F.	____ ppm
Recovery Mud Filtrate	____	@ ____	°F.	____ ppm
Mud Pit Sample	____	@ ____	°F.	____ ppm
Mud Pit Sample Filtrate	____	@ ____	°F.	____ ppm

Mud Weight 9.3 vis 33 sec.

Date 6-27-81 Ticket Number 256891
Kind of D.S.T. ON BOTTOM STRADDLE Halliburton Location ADELAIDE
Tester L. GOETJENS / P. LARKINS Witness H. VAN DERKRAAN
Drilling Contractor OD & E RIG #6 PW

Legal Location Sec. - Twp. - Rng.

EQUIPMENT & HOLE DATA

Formation Tested	Birkhead
Elevation	315' Ft.
Net Productive Interval	32.32' Ft.
All Depths Measured From	Rotary Kelly Bushing
Total Depth	5538' Ft.
Main Hole/Casing Size	8 1/2"
Drill Collar Length	621.07' I.D. 2.075"
Drill Pipe Length	4827.87' I.D. 3.826"
Packer Depth(s)	5476.86' - 5509.18' Ft.
Depth Tester Valve	5462.98' Ft.

Cushion TYPE ____ AMOUNT ____ Depth Back Pres. Valve ____ Ft. Surface Choke .5" Bottom Choke .75"

Recovered 220 Feet of muddy water.
Recovered 30 Feet of slightly gas and oil cut mud.
Recovered 30 Feet of oil and mud emulsion.
Recovered ____ Feet of
Recovered ____ Feet of

Remarks: - SEE PRODUCTION TEST DATA SHEET -

Meas. From Tester Valve

TEMPERATURE	Gauge No. 4992	Gauge No. 3427	Gauge No.	TIME (00:00-24:00 hrs.)
	Depth: 5463.98 Ft.	Depth: 5500.91 Ft.	Depth: Ft.	
	24 Hour Clock	24 Hour Clock	Hour Clock	Tool Opened 6:27 AM
Est. °F.	Blanked Off No	Blanked Off Yes	Blanked Off	Opened Bypass 1112 AM
Actual 230 °F.	Pressures	Pressures	Pressures	Reported / Computed

		Field	Office	Field	Office	Field	Office	Minutes	Minutes
Initial Hydrostatic		2522.6	2555.5	2552.3	2565.5			____	____
First Period	Flow Initial	0.1	4.0	19.7	31.1			95	*
	Flow Final	129.6	142.8	137.1	152.7			190	*
	Closed In	2205.9	2215.5	2219.6	2222.2			____	____
Second Period	Flow Initial								
	Flow Final								
	Closed In	* = See attached incremental reading sheet.....						____	____
Third Period	Flow Initial								
	Flow Final								
	Closed In							____	____
Final Hydrostatic		2538.4	2571.4	2569.4	2578.8				

Field Area COOPER BASIN
County SOUTH AUSTRALIA
State AUSTRALIA
Lease Name CORKWOOD
Well No. 1
Test No. 4
Tested Interval 5476.86' - 5509.18'
Lease Owner/Company Name DELHI/SANTOS

FORM 181-R2 — PRINTED IN U.S.A.

FORMATION TEST DATA

LITTLE'S

Casing perfs. _____ Bottom choke _____ Surf. temp _____ °F Ticket No. 256891

Gas gravity _____ Oil gravity _____ GOR _____

Spec. gravity _____ Chlorides _____ ppm Res. _____ @ _____ °F

INDICATE TYPE AND SIZE OF GAS MEASURING DEVICE USED _____

Date 6-26-81 Time a.m. p.m.	Choke Size	Surface Pressure psi	Gas Rate MCF	Liquid Rate BPD	Remarks
2245					Loaded clocks.
2400					Made up tools.
6-27-81					
0130					Tools made up - run in hole.
0600					Made up head - waited on daylight.
0623					Packer set.
0627					Opened tool with a weak blow
0647					decreasing to a very weak bubble.
0707					Remained the same.
0716					Blow died.
0718					Closed choke - very weak bubble.
0727					Dead
0757					"
0802					Closed in DCIP for closed in pressure.
1112					Packer pulled loose and hydrospring
					shut - pulled out of hole.
1120					Break out head.
1500					Tools out and laid down.

DELHI/SANTOS
Lease Owner/Company Name

256891
Ticket Number

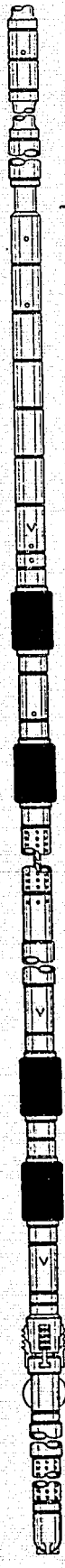
B.T. 4992	B.T. 3427	B.T.
Depth 5463.98'	Depth 5500.91'	Depth

Time (minutes)	Log $\frac{t+\theta}{\theta}$	PSIG Temp. Corr.	Time (minutes)	Log $\frac{t+\theta}{\theta}$	PSIG Temp. Corr.	Time (minutes)	Log $\frac{t+\theta}{\theta}$	PSIG Temp. Corr.
FLOW PERIOD			FLOW PERIOD					
0		4.0	0		31.1			
15		42.8	15		50.3			
30		65.6	30		71.6			
45		85.9	45		93.3			
60		103.7	60		111.7			
75		120.1	75		129.4			
90		136.5	90		145.7			
96.0		142.8	96.5		152.7			
CLOSED IN PERIOD			CLOSED IN PERIOD					
0		142.8	0		152.7			
10		1326.5	10		1328.9			
20		1686.8	20		1693.0			
30		1834.3	30		1836.3			
40		1917.9	40		1922.8			
50		1974.9	50		1983.0			
60		2017.2	60		2026.0			
70		2050.6	70		2060.0			
80		2077.4	80		2087.0			
90		2100.8	90		2109.7			
100		2119.6	100		2128.8			
110		2137.5	110		2144.8			
120		2151.7	120		2158.2			
130		2164.7	130		2172.0			
140		2176.1	140		2183.7			
150		2185.8	150		2193.7			
160		2194.8	160		2202.7			
170		2202.4	170		2210.3			
180		2210.3	180		2217.7			
188.5		2215.5	187.9		2222.2			

Remarks:

30-2860

TICKET NO. 256891 0022

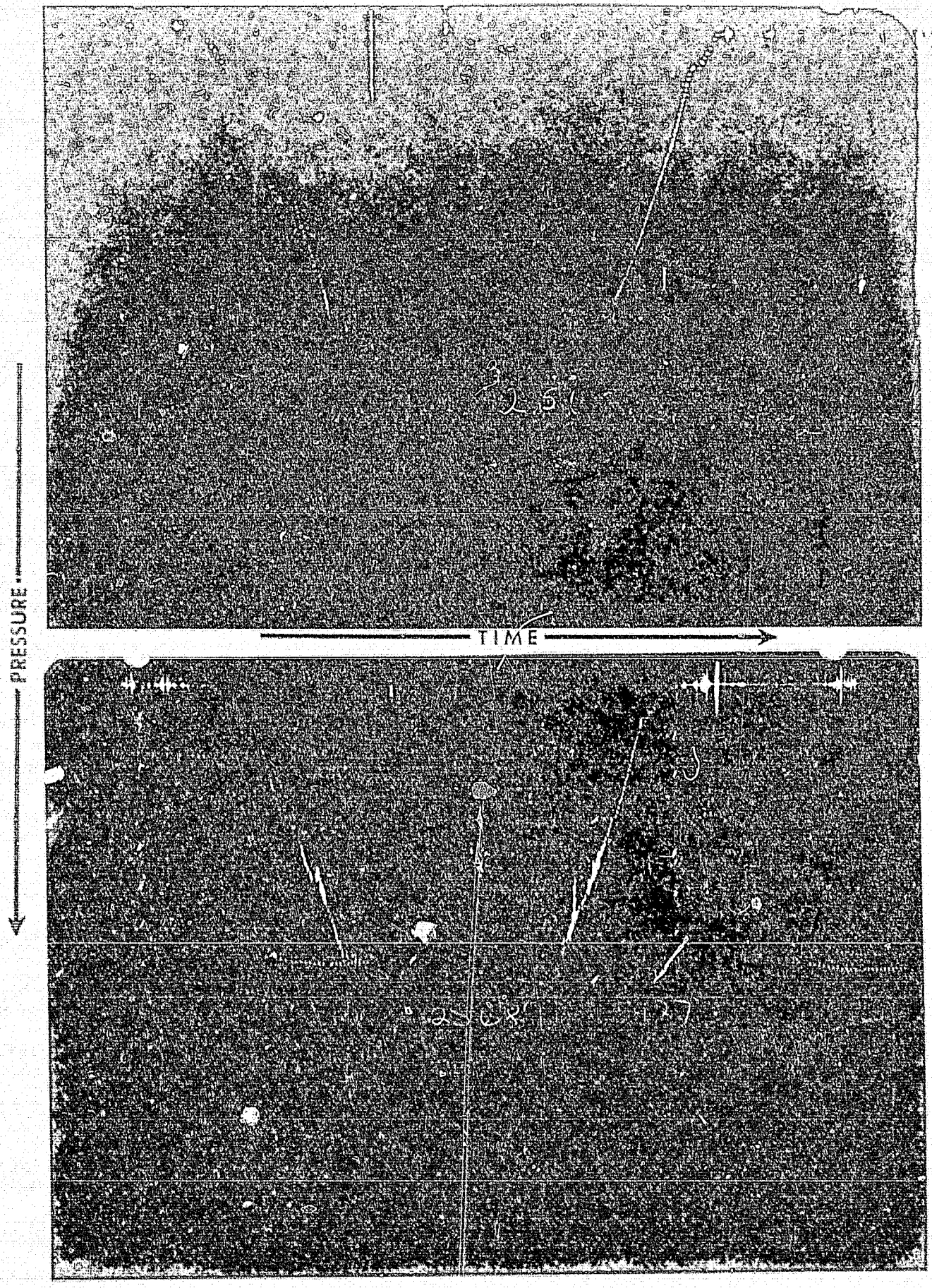


	O. D.	I. D.	LENGTH	DEPTH
Drill Pipe or Tubing	4.5"	3.826"	4827.87'	
Drill Collars	6 1/2"	2.075"	590.01'	
~~Running~~ ~~Sub~~ Impact Sub	6"	3"	1.0'	
Water Cushion Valve				
Drill Pipe	6 1/2"	2.075"	31.06'	
Drill Collars X-Over	5 1/2"	2"	.65'	
~~Handling Sub & Choke Assembly~~	5"	.87"	4.87'	
Dual CIP Valve				
Dual CIP Sampler	5"	.75"	5.02'	5462.98'
Hydro-Spring Tester				
Multiple CIP Sampler				
Extension Joint				
AP Running Case	5"	2.25"	4.12'	5463.98'
Hydraulic Jar	5"	1.75"	5.0'	
VR Safety Joint	5"	1"	2.78'	
Pressure Equalizing Crossover	4 5/8"	.7"	.98'	
Packer Assembly	7.75"	1.75"	5.75'	5476.86'
Distributor				
~~Packer Assembly~~ Anchor Pipe	5"	2.37"	24.0'	
~~Flush Joint Anchor~~ X-Over	4.5"	2 5/8"	1.0'	
Pressure Equalizing Tube	1"	.75"	26.0'	
Blanked-Off B.T. Running Case	5"	2.25"	4.12'	5500.91'
Drill Collars				
Anchor Pipe Safety Joint				
Packer Assembly	7.75"	1.75"	5.75'	5509.18'
Distributor				
~~Packer Assembly~~ X-Over	4 7/8"	2 3/8"	.67'	
Anchor Pipe Safety Joint	5"	1.5"	4.0'	
Side Wall Anchor				
Drill Collars				
Flush Joint Anchor	5"	2.37"	16.0'	
Blanked-Off B.T. Running Case	5"	2.44"	4.0' ????	5538.0'
Total Depth				5538.0'

FORM 187-82 – PRINTED IN U.S.A.

EQUIPMENT DATA

LITTLE'S


PRESSURE
TIME

FLUID SAMPLE DATA

Sampler Pressure _____ P.S.I.G. at Surface
Recovery: Cu. Ft. Gas _____
cc. Oil _____
cc. Water _____
cc. Mud _____
Tot. Liquid cc. _____
Gravity _____ ° API @ _____ °F.
Gas/Oil Ratio _____ cu. ft./bbl.

		RESISTIVITY		CHLORIDE CONTENT
Recovery Water	@	°F.		ppm
Recovery Mud	@	°F.		ppm
Recovery Mud Filtrate	@	°F.		ppm
Mud Pit Sample	@	°F.		ppm
Mud Pit Sample Filtrate	@	°F.		ppm

Mud Weight 9.3 vis 42 sec.

Date	6-28-81
Ticket Number	256892
Kind of D.S.T.	ON BOTTOM STRADDLE
Halliburton Location	ADELAIDE
Tester	GOETJENS
Witness	H. VANDERKRAAN
Drilling Contractor	ODE RIG # 6
	NM S

EQUIPMENT & HOLE DATA

Formation Tested	Birkhead		
Elevation	315'		Ft.
Net Productive Interval	12'		Ft.
All Depths Measured From	Rotary Kelly Bushing		
Total Depth	5538'		Ft.
Main Hole/Casing Size	8¼"		
Drill Collar Length	621.07' I.D.	2.075"	
Drill Pipe Length	4862.46' I.D.	3.826"	
Packer Depth(s)	5512' - 5524'		Ft.
Depth Tester Valve	5494.05'		Ft.

Cushion TYPE NONE AMOUNT _____ Ft. Depth Back Pres. Valve NONE Surface Choke .5" Bottom Choke .75"

Recovered 7' Feet of muddy water
Recovered _____ Feet of _____
Recovered _____ Feet of _____
Recovered _____ Feet of _____
Recovered _____ Feet of _____
Recovered _____ Feet of _____

Mea. From Tester Valve

Remarks SEE PRODUCTION TEST DATA SHEET...

* SEE ATTACHED SHEET FOR INCREMENTAL READINGS..

TEMPERATURE	Gauge No. 4992		Gauge No. 3427		Gauge No.		TIME (00:00-24:00 hrs.)	
	Depth: 5495.05 Ft.		Depth: 5515.85 Ft.		Depth: Ft.			
Est. °F.	24 Hour Clock		24 Hour Clock		Hour Clock		Tool Opened 6:27	
	Blanked Off NO		Blanked Off YES		Blanked Off			
Actual 230 °F.	Pressures		Pressures		Pressures		Opened Bypass 12:57	
	Field	Office	Field	Office	Field	Office	Reported Minutes	Computed Minutes
Initial Hydrostatic	2538.4	2607.0	2569.4	2614.0				
First Period Flow Initial	-	4.3	36.5	39.3			—	—
First Period Flow Final	.1	15.3	53.3	53.2			195	*
First Period Closed In	1984	2012.0	2019.8	2017.3			195	*
Second Period Flow Initial							—	—
Second Period Flow Final								
Second Period Closed In								
Third Period Flow Initial							—	—
Third Period Flow Final								
Third Period Closed In								
Final Hydrostatic	2522.6	2575.3	2552.8	2577.0			—	—

FORM 181-R2 — PRINTED IN U.S.A.

FORMATION TEST DATA

LITTLE'S

Legal Location Sec. - Twp. - Rng. -
Lease Name: CORKWOOD
Well No.: 1
Test No.: 5
Tested Interval: 5512' - 5524'
Field Area: COOPER BASIN
County: SOUTH AUSTRALIA
State: AUSTRALIA
Lease Owner/Company Name: DELHI - SANTOS

Casing perfs. _____ Bottom choke _____ Surf. temp _____ °F Ticket No. 256892
Gas gravity _____ Oil gravity _____ GOR _____
Spec. gravity _____ Chlorides _____ ppm Res. _____ @ _____ °F
INDICATE TYPE AND SIZE OF GAS MEASURING DEVICE USED _____

Date 6-27-81 Time a.m. p.m.	Choke Size	Surface Pressure psi	Gas Rate MCF	Liquid Rate BPD	Remarks
2330					Loaded clocks.
2400					Making up the tools.
6-28-81 0100					Tool made up - run in the hole.
0615					Making up the head..
0627					Tool opened with a very weak blow.
0637					Very weak blow.
0647					Decreasing.
0707					"
0737					"
0807					"
0812					Weakening.
0837					Very weak.
0856					Dead.
0857					Closed choke - weak bubble.
0913					Dead.
0942					Closed in DCIP for closed in pressure.
1257					Hydrospring closed and packer pulled
1730					loose. Pulled out of the hole. Tools out and laid down.
1305					Broke out head..

FORM 182-RI—PRINTED IN U.S.A.

PRODUCTION TEST DATA

LITTLE'S

8

DELHI-SANTOS
Lease Owner/Company Name

256892
Ticket Number

B.T. 4992	B.T. 3427	B.T.
Depth 5495.05'	Depth 5515.85'	Depth

24 Hour Clock			24 Hour Clock					
Time	Log $\frac{t+\theta}{\theta}$	PSIG Temp. Corr.	Time	Log $\frac{t+\theta}{\theta}$	PSIG Temp. Corr.	Time	Log $\frac{t+\theta}{\theta}$	PSIG Temp. Corr.
FLOW PERIOD---			FLOW PERIOD----					
0		4.3	0		39.3			
20		7.7	20		44.0			
40		7.7	40		44.3			
60		9.6	60		44.3			
80		10.5	80		45.3			
100		11.4	100		47.0			
120		11.9	120		48.0			
140		12.5	140		48.8			
160		13.5	160		49.8			
180		14.3	180		50.8			
196.6		15.3	203.7		53.2			
CLOSED IN PRESSURE...			CLOSED IN PRESSURE...					
0		15.3	0		53.2			
10		19.5	10		59.0			
20		26.7	20		68.6			
30		39.4	30		86.8			
40		63.2	40		129.8			
50		123.0	50		275.8			
60		304.5	60		602.2			
70		630.3	70		933.3			
80		954.0	80		1209.3			
90		1220.8	90		1414.6			
100		1425.9	100		1568.8			
110		1573.3	110		1676.8			
120		1578.9	120		1760.7			
130		1758.9	130		1824.7			
140		1822.2	140		1876.0			
150		1871.4	150		1918.0			
160		1912.1	160		1956.0			
170		1950.2	170		1984.5			
180		1978.1	180		2011.0			
195.1		2012.0	185.0		2017.3			

Remarks:

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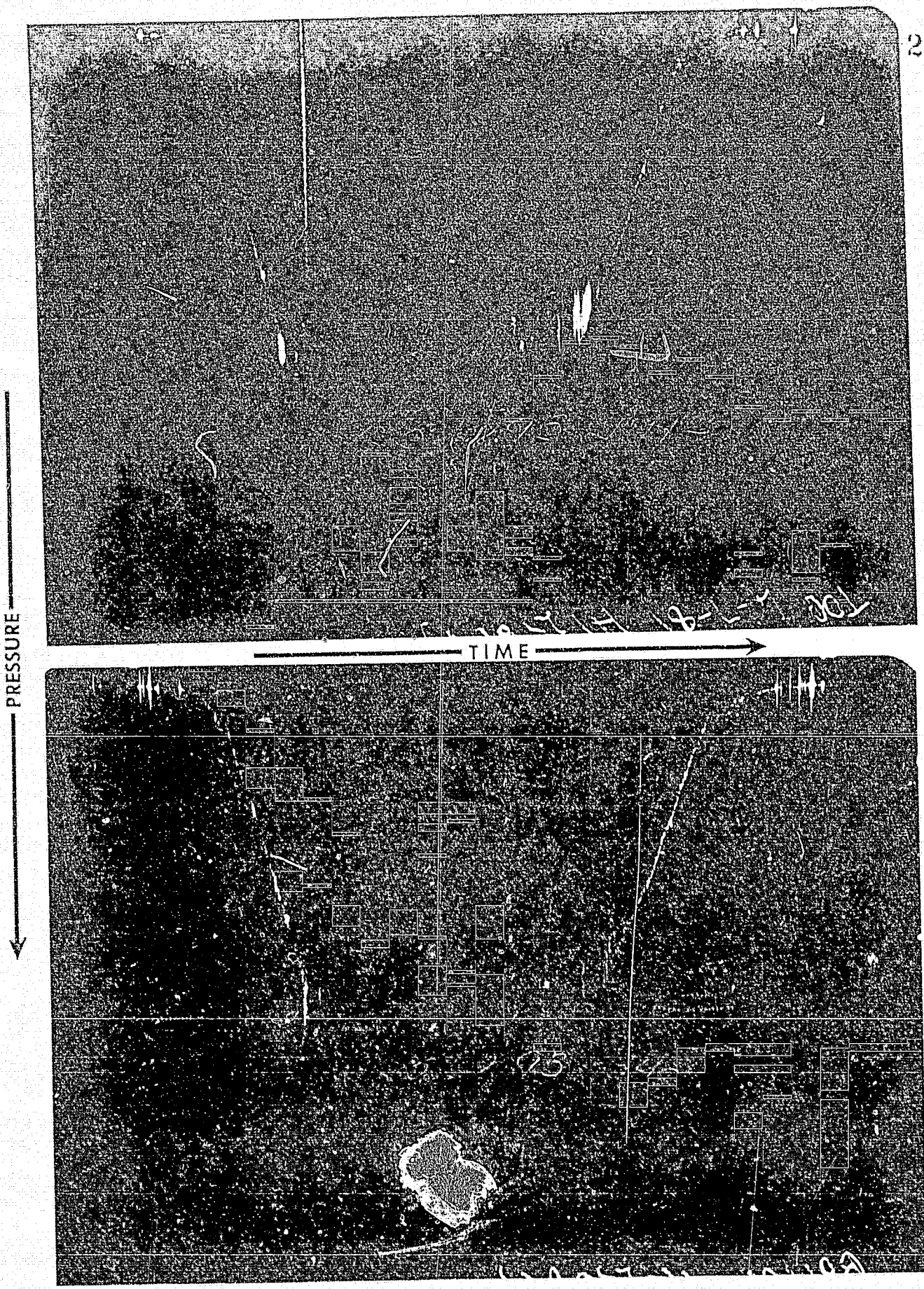
TICKET NO. 256892 0027

	O. D.	I. D.	LENGTH	DEPTH
Drill Pipe or Tubing				
Drill Collars	4.5"	3.826"	4862.46'	
~~Reversing Sub~~ DRILL PIPE	6.5"	2.075"	590.01'	
~~Water Cushion Valve~~ DRILL COLLARS	6"	3"	1.00'	
~~Drill Pipe~~ IMPACT SUB	6.5"	2.075"	31.06'	
Drill Collars	5½"	2"	.65'	
~~Handling Sub & Choke Assembly~~ X-O	5"	.87"	4.87'	
Dual CIP Valve				
Dual CIP Sampler	5"	.75"	5.00'	5494.05'
Hydro-Spring Tester				
Multiple CIP Sampler				
Extension Joint				
AP Running Case	5"	2.25"	4.00'	5495.05'
Hydraulic Jar	5"	1.75"	5.00'	
VR Safety Joint	5"	1.00"	2.8'	
Pressure Equalizing Crossover	4 5/8"	.7"	.98'	
Packer Assembly	7.75"	1.75"	5.75'	5512'
Distributor				
~~Packer Assembly~~ ANCHOR PIPE	5"	2.37"	4.00'	
~~Flush Joint Anchor~~ X-OVER	4.5"	2 5/8"	1.00'	
Pressure Equalizing Tube				
Blanked-Off B.T. Running Case	5.00"	2.25"	4.00'	5515.85'
Drill Collars				
Anchor Pipe Safety Joint				
Packer Assembly	7.75"	1.75"	5.75'	5524'
Distributor				
Packer Assembly				
~~Anchor Pipe Safety Joint~~ X-OVER	4 7/8"	2 3/8"	.67'	
Side Wall Anchor				
Drill Collars				
Flush Joint Anchor	5"	2.37"	5.00'	
Blanked-Off B.T. Running Case	5"	2.44"	4.00'	
Total Depth				5538'

FORM 187-R2 — PRINTED IN U.S.A.

EQUIPMENT DATA

LITTLE'S



Each Horizontal Line Equal to 1000 p.s.i.

FLUID SAMPLE DATA

Sampler Pressure _____ P.S.I.G. at Surface
Recovery: Cu. Ft. Gas _____
cc. Oil _____
cc. Water _____
cc. Mud _____
Tot. Liquid cc. _____
Gravity _____ ° API @ _____ °F.
Gas/Oil Ratio _____ cu. ft./bbl.

	RESISTIVITY			CHLORIDE CONTENT
Recovery Water	____	@ ____	°F.	____ ppm
Recovery Mud	____	@ ____	°F.	____ ppm
Recovery Mud Filtrate	____	@ ____	°F.	____ ppm
Mud Pit Sample	____	@ ____	°F.	____ ppm
Mud Pit Sample Filtrate	____	@ ____	°F.	____ ppm

Mud Weight 9.4 vis 38 sec.

Date 7-4-81 Ticket Number 256893
Kind of D.S.T. OPEN HOLE Halliburton Location ADELAIDE
Tester I. GOETJENS Witness J. HILL
Drilling Contractor ODE RIG #6 sm-vt

EQUIPMENT & HOLE DATA

Formation Tested Toolachee
Elevation 315' Ft.
Net Productive Interval - Ft.
All Depths Measured From Rotary Kelly Bushing
Total Depth 6451' Ft.
Main Hole/Casing Size 8.5"
Drill Collar Length 591.49' I.D. 2.075"
Drill Pipe Length 5747.92' I.D. 3.826"
Packer Depth(s) 6367.01'-6374.76' Ft.
Depth Tester Valve 6349.96' Ft.

Cushion TYPE AMOUNT Ft. Depth Back Pres. Valve Surface Choke .5" Bottom Choke .75"

Recovered 704 Feet of Slightly gas cut mud
Recovered 1567 Feet of Muddy water
Recovered 3828 Feet of Formation water slightly mud contaminated
Recovered Feet of
Recovered Feet of

Meas. From Tester Valve

Remarks -SEE PRODUCTION TEST DATA SHEET-
*See attached special reading sheet

TEMPERATURE	Gauge No. 4992	Gauge No. 3427	Gauge No.	TIME (00:00-24:00 hrs.)
	Depth: 6350.95' Ft.	Depth: 6446.94' Ft.	Depth: Ft.	
	24 Hour Clock	24 Hour Clock	Hour Clock	Tool Opened 1227
Est. 254 °F.	Blanked Off NO	Blanked Off YES	Blanked Off	Opened Bypass 1830
Actual °F.	Pressures	Pressures	Pressures	

		Field	Office	Field	Office	Field	Office	Reported Minutes	Computed Minutes
Initial Hydrostatic		2996.9	3036.4	3086.7	3091.1			____	____
First Period	Flow Initial	291.1	312.6	354.7	388.4			243	*
	Flow Final	2585.9	2619.3	2652.8	2663.6			120	*
	Closed In	2649.2	2668.7	2686.2	2709.3			____	____
Second Period	Flow Initial								
	Flow Final								
	Closed In							____	____
Third Period	Flow Initial								
	Flow Final								
	Closed In							____	____
Final Hydrostatic		2933.7	2963.7	2986.5	3002.6				

FORMATION TEST DATA

FORM 181-R2 — PRINTED IN U.S.A. LITTLE'S

Legal Location Sec. - Twp. - Rng.
Lease Name: CORKWOOD
Well No.: 1
Test No.: 6
Tested Interval: 6374.76'-6451'
Field Area: COOPER BASIN
County
State: SOUTH AUSTRALIA
Lease Owner/Company Name: SANTOS

Casing perfs.____ Bottom choke____ Surf. temp____ °F Ticket No. 256893
Gas gravity____ Oil gravity____ GOR____
Spec. gravity____ Chlorides____ ppm Res.____ @____ °F
INDICATE TYPE AND SIZE OF GAS MEASURING DEVICE USED____

Date Time a.m. p.m.	Choke Size	Surface Pressure psi	Gas Rate MCF	Liquid Rate BPD	Remarks
0540					Loaded clocks.
0705					Made up tools.
0840					Tools made up and ran in hole.
1210					Made up head.
1224					Set packer.
1227					Tool opened with weak bubble.
1230					Strong bubble.
1232					Strong blow.
1242					Same.
1243					Decreasing.
1244	.5"				Gas to surface-rate too small to
					measure.
1252					Moderate blow.
1302					Weak.
1312					Decreasing.
1322					Very weak.
1344					Nearly dead.
1427					Dead.
1436					Closed choke-weak bubble.
1447					Moderate blow.
1450					Strong blow. Opened choke-bubble
					died.
1451					Closed choke again-weak blow.
1457					Strong blow.
1527					Strong blow-choke still closed.

SANTOS
Lease Owner/Company Name

256893
Ticket Number

B.T. 4992 B.T. 3427 B.T. _____

Depth 6350.96' Depth 6446.94' Depth _____

Time (minutes)	Log $\frac{t+\theta}{\theta}$	PSIG Temp. Corr.	Time (minutes)	Log $\frac{t+\theta}{\theta}$	PSIG Temp. Corr.	Time (minutes)	Log $\frac{t+\theta}{\theta}$	PSIG Temp. Corr.
INITIAL FLOW...			INITIAL FLOW...					
0		312.6	0		388.4			
30		1267.0	30		1329.1			
60		1833.3	60		1898.5			
90		2165.1	90		2222.6			
120		2362.2	120		2412.7			
150		2474.1	150		2523.2			
180		2543.1	180		2589.7			
210		2585.2	210		2631.2			
240		2612.2	240		2656.7			
250.9		2619.3	249.1		2663.6			
INITIAL CIP...			INITIAL CIP...					
0		2619.3	0		2663.6			
10		2645.2	10		2688.4			
20		2649.2	20		2691.2			
30		2652.7	30		2693.9			
40		2655.0	40		2696.9			
50		2657.6	50		2699.1			
60		2660.4	60		2702.1			
70		2662.2	70		2703.8			
80		2664.1	80		2705.4			
90		2665.2	90		2706.9			
100		2666.8	100		2708.1			
110		2668.3	110		2708.8			
113.3		2668.7	114.5		2709.3			

Remarks: _____

80-2650

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Casing perfs. _____ Bottom choke _____ Surf. temp _____ °F Ticket No. 256893
Gas gravity _____ Oil gravity _____ GOR _____
Spec. gravity _____ Chlorides _____ ppm Res. _____ @ _____ °F Page #2
INDICATE TYPE AND SIZE OF GAS MEASURING DEVICE USED _____

Date Time a.m. p.m.	Choke Size	Surface Pressure psi	Gas Rate MCF	Liquid Rate BPD	Remarks
1557					Decreasing to moderate.
1627					Moderate blow.
1630					Closed in DCIP for CIP.
1830					Hydrospring closed.
1834					Packer pulled free. Broke out two
					stands and reverse circulated.
2015					Broke out head. Pulled out of hole.
0245					Tools out and laid down.

FORM 182-R1—PRINTED IN U.S.A.

PRODUCTION TEST DATA

LITTLE'S

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TICKET NO. 256893 **0033**

	O. D.	I. D.	LENGTH	DEPTH
Drill Pipe or Tubing	4.5"	3.826"	5747.92'	
Drill Collars	6.5"	2.075"	562.87'	
Reversing Sub IMPACT SUB	6"	2.25"	1'	
Water Cushion Valve				
Drill Pipe				
Drill Collars	6.5"	2.075"	28.62'	
~~Handling Sub & Choke Assembly~~ X/O	6"	2.25"	.66'	
Dual CIP Valve	5"	.87"	4.87'	
Dual CIP Sampler				
Hydro-Spring Tester	5"	.75"	5.02'	6349.96'
Multiple CIP Sampler				
Extension Joint				
AP Running Case	5"	2.25"	4.12'	6350.96'
Hydraulic Jar	5" 1	1.75"	5'	
VR Safety Joint	5"	1"	2.78'	
Pressure Equalizing Crossover				
Packer Assembly	7.75"	1.75"	5.75'	6367.01'
Distributor	5"		2'	
Packer Assembly	7.75"	1.75"	5.75'	6374.76'
Flush Joint Anchor				
Pressure Equalizing Tube				
Blanked-Off B.T. Running Case				
Drill Collars				
Anchor Pipe Safety Joint	5"	1.5"	4'	
~~Packer Assembly~~ X/O	6"	2.25"	1'	
Distributor				
Packer Assembly				
~~Anchor Pipe Safety Joint~~ DRILL COLLARS	6.5"	2.075"	29.58'	
Side Wall Anchor				
~~Drill Collars~~ X/O	5.5"	2.25"	1'	
Flush Joint Anchor	5"	2.37"	35'	
Blanked-Off B.T. Running Case	5"	2.44"	4.06'	6446.94'
Total Depth				6451'

FORM 187-82 – PRINTED IN U.S.A.

EQUIPMENT DATA

LITTLE'S

4148-1

CORE LAB Grapholog

CORE LABORATORIES, INC.

CL 706 Grapholog Head Foreign

COMPANY: DELHI PETROLEUM PTY.LTD.
WELL: CORKWOOD No.1
FIELD: NAPPACOONGEE-MURTEREE BLOCK.
COUNTY: EROMANGA BASIN — STATE: SOUTH AUSTRALIA.
LOCATION: LAT.:28°01'10.4"S, LONG.:140°48'11.2"E — ELEVATION: G.L.:302', K.B.:315'

DEPTH LOGGED FROM 0' TO 7078' FT.
DATE LOGGED: 9th JUNE,1981 - 7th JULY,1981.
CREW CHIEF: STEVE JONES — FILE NO. FL.206
DRLG FLUID: SPUD MUD (GEL,CAUSTIC.) 0' TO 800' FT.
GEL-CMC-DEXTRID-CAUSTIC 800' TO 7078' FT.

LEGEND

ABBREVIATIONS

NB = NEW BIT
NCB = NEW CORE BIT
CO = CIRCULATED OUT
DST = DRILL STEM TEST
LAT = LOGGED AFTER TRIP
TG = TRIP GAS
NR = NO RETURNS
DS = DIRECTIONAL SURVEY
DC = DEPTH CORRECTION
DEPTHS CORRESPOND TO DRILL PIPE MEASUREMENTS
~~FROM KELLY BUSHINGS~~

RESISTIVITY, OHM-METERS
Rm = MUD
Rmc = MUD CAKE
Rmf = MUD FILTRATE

MUD DATA
CK = CAKE THICKNESS 32nds
V = VISCOSITY API SECONDS
F = FILTRATE API CC'S
W = WEIGHT
S = SALINITY, ppm Cl

LITHOLOGY

SAND, SALT, COAL, CONG, CLAY, DOLOMITE, ANHYDRITE OR GYPSUM, SHALE, CHERT, LIMESTONE, CHALK, SILTSTONE

DRILLING RATE

MIN/FT [X]
FT/HR [ ]

HYDROCARBON ANALYSIS

CHROMATOGRAPHIC — Drilling Mud Gas
Methane —•— Butane —4—
Ethane —2— Pentane —5—
Propane —3— Hexane+ —6+—

Calibration:
½% Methane = 5000 ppm
½% Ethane = 5000 ppm
½% Propane = 5000 ppm
½% Butane = 5000 ppm

Scale: 0 10 50 150 300 600 1000 3000 5000 7500 10000

OIL SHOW: Trace, Poor, Fair, Good

HOT WIRE
Drilling Mud Gas
Drill Cuttings Gas

Calibration:
1% Methane = 50 units.

Scale: 0 5 10 20 40 70 100 150 200 250 300

REMARKS

FORMATION DESCRIPTION, MUD DATA, DRILL STEM TESTS, etc.

~~Spud at 6.00am 9/6/81~~
NB 1 12¼" OSC 3AJ 3x16"

0'

0'-300'
Sandstone with minor siltstone and surficial clays.
SANDSTONE: clear, translucent, occasion-white, medium to coarse grained, moderately sorted, angular, clean non-frosted quartz grains, loose, good porosity, staining in part due to yellow, reddish brown surficial clays.
SILTSTONE: dark grey, argillaceous matrix, very sandy in part, blocky, soft,

100' D.S. ½°

0 5 1 2 3 4 5 6 | 100 500 1500 3k 6k 10k 30k 50k 75k 100k | 10 20 40 80 140 200 300 400 500 600

200' D.S. ½°

SILTSTONE: A/A, also white quartz variety, firm, blocky, trace, becoming predominant with depth.

SANDSTONE: A/A, except fine to medium grained increasingly imbedded in sticky clay matrix.

300' D.S. 1°

300'-480'
Claystone with minor sandstone.
CLAYSTONE: medium grey greenish grey, occassionally carbonaceous, plastic to occassionally firm, very sandy in part.
SANDSTONE: A/A., fine tovery fine grained, calcareous matrix in part.

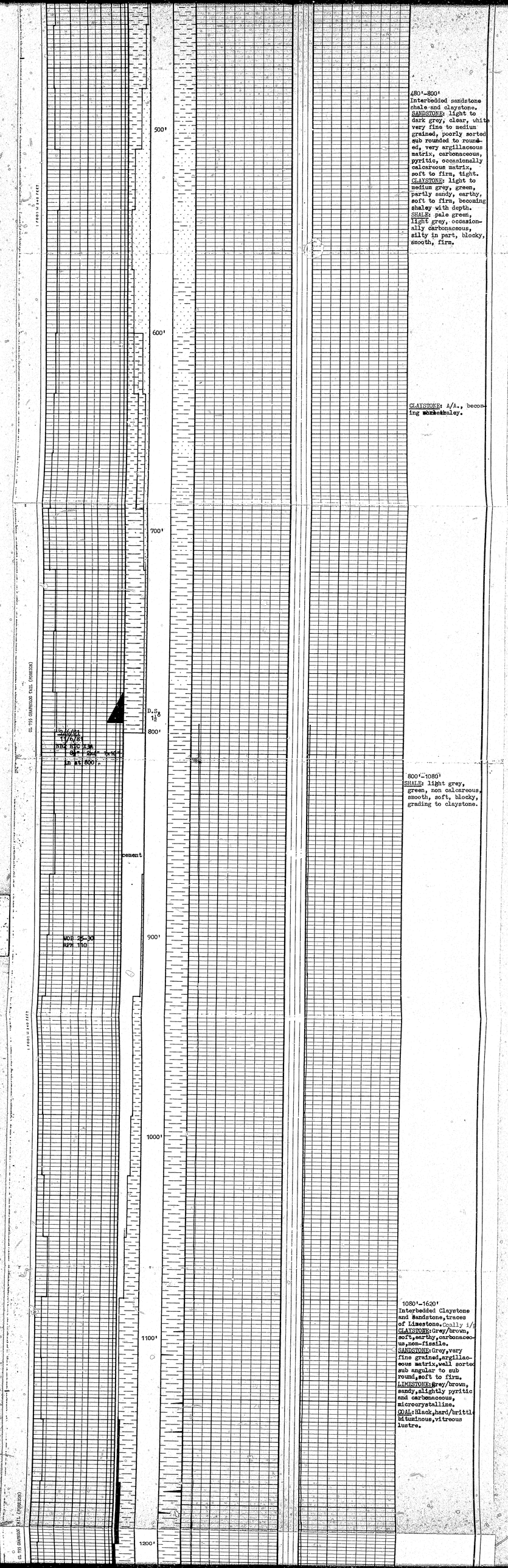
CL 755 GRAPHOLOG TAIL (FOREIGN)

400'

480'-800'
Interbedded sandstone shale and claystone.
SANDSTONE: light to dark grey, clear, white very fine to medium grained, poorly sorted sub rounded to rounded, very argillaceous matrix, carbonaceous, pyritic, occasionally calcareous matrix, soft to firm, tight.
CLAYSTONE: light to medium grey, green, partly sandy, earthy, soft to firm, becoming shaley with depth.
SHALE: pale green, light grey, occasionally ca...

500'

1 FOOT = 240 FEET



480'-800'
Interbedded sandstone shale and claystone.
SANDSTONE: light to dark grey, clear, white very fine to medium grained, poorly sorted sub rounded to rounded, very argillaceous matrix, carbonaceous, pyritic, occasionally calcareous matrix, soft to firm, tight.
CLAYSTONE: light to medium grey, green, partly sandy, earthy, soft to firm, becoming shaley with depth.
SHALE: pale green, light grey, occassionally carbonaceous, silty in part, blocky, smooth, firm.

CLAYSTONE: A/A., becoming ~~more~~ shaley.

800'-1080'
SHALE: light grey, green, non calcareous, smooth, soft, blocky, grading to claystone.

1080'-1620'
Interbedded Claystone and Sandstone, traces of Limestone. Coally i/s
CLAYSTONE: Grey/brown, soft, earthy, carbonaceous, non-fissile.
SANDSTONE: Grey, very fine grained, argillaceous matrix, well sorted sub angular to sub round, soft to firm.
LIMESTONE: Grey/brown, sandy, slightly pyritic and carbonaceous, microcrystalline.
COAL: Black, hard/brittle bituminous, vitreous lustre.


LIMESTONE: Grey/brown, sandy, slightly pyritic and carbonaceous, microcrystalline.
COAL: Black, hard/brittle bituminous, vitreous lustre.
1200'
D.S. ½°
1300'
WOB 25-30
RPM 10
1400'
0.5 1 2 3 4 5 7
100 1500 6k 30k 75k
500 3k 10k 50k 100k
10 40 140 300 500
20 80 200 400 600
(Power to unit down due to rig generator breakdown.)
1500'
TRACE SHOW
Dull to bright yellow spotted fluorescence with a very slow crush cut and thick residual ring.
SANDSTONE: medium grey brown grey, white, very fine to fine grained, poorly sorted, sub-angular, calcareous cement argillaceous matrix in part, carbonaceous, friable to hard, tight.
1600'
1620-1950'
Interbedded Claystone and Sandstone, thin Coal stringers.
CLAYSTONE: Medium grey to pale green, yellow/brown, earthy in part, waxy in part, slightly carbonaceous, silty, firm to hard.
SANDSTONE: Medium grey, brown grey, off white, very fine tofine grain-ed, friable to hard, poorly sorted, sub angular, calcareous matrix, argillaceous, carbonaceous, tight.
1700'
CG
+ CG
+CG
1800'
D.S ½°
CG
+CG

1800'

D.S. 3/4°

1900'

2000'

2100'

WOB 25-30
RPM 110

2200'

11/6/81
12/6/81

2300'

D.S. 3/4°

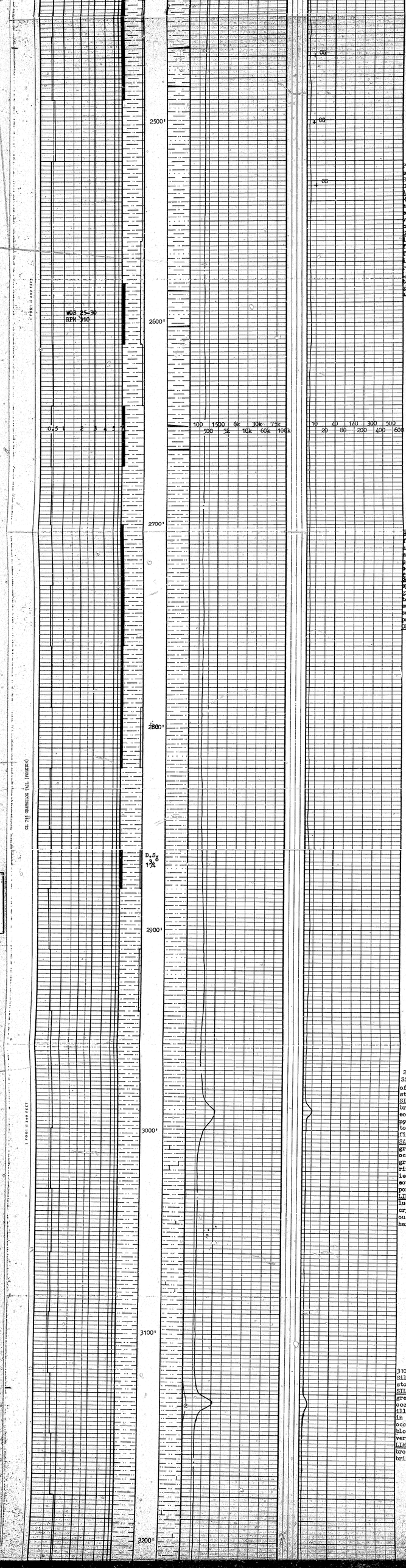
2400'

2500'

1950-2340'
Predominantly Silty Claystone interbedded with Sandstone.
CLAYSTONE:Light to medium brown,pale green, light grey,earthy-waxy texture,very silty in part,carbonaceous,non calcareous,soft,blocky.
SANDSTONE:Off white to light grey,very fine to fine grained,friable to firm,moderately sorted,sub angular,silty matrix,calcareous cement,micro carbonaceous and micaceous,tight to poor porosity.

2340-2520'
Predominantly Argillaceous siltstone,with minor Sandstone and Coal.
ARGILLACEOUS SILTSTONE: Grey to grey/brown,firm to soft,very argillaceous in part grading to claystone,slightly calcareous in part,carbonaceous.
SANDSTONE:Grey,firm-soft very fine to fine grained,silty and calcareous matrix,occ.trace pyrite,tight.
COAL:Black,brittle, bituminous,vitreous lustre.

2520'-2700'
Predominantly Argillaceous siltstone,minor Sandstone,traces of Coal.
ARGILLACEOUS SILTSTONE: Medium grey,firm,argillaceous,slightly calcareous,blocky,occasionall



2520'-2700'
Predominantly Argillaceous siltstone,minor Sandstone,traces of Coal.
ARGILLACEOUS SILTSTONE: Medium grey,firm,argillaceous,slightly calcareous,blocky,occasionally very fine grained sandy carbonaceous,glauconitic
SANDSTONE:Off white to light grey/grey,very fine to occasionally fine grained,silty/argillaceous matrix,calcareous cement,tight.
LIMESTONE:(Trace.)White to brown,opaque to slightly translucent,crystalline to amorphous.

2700-2970'
Argillaceous siltstone with minor Sand & Coal
ARGILLACEOUS SILTSTONE: Brown/grey,firm,sub-fissile to blocky,very argillaceous in part, micro carbonaceous and pyritic,glauconitic, occasionally with very fine grained sand.
SANDSTONE:White-grey speckled,fine to medium grained,friable,clean to silty in part,lithic, sub angular,moderately sorted,poor to fair porosity,no show.
COAL:As above.

2979'-3100'
Siltstone with traces of sandstone and limestone.
SILTSTONE: grey, grey-brown, very argillaceous, carbonaceous, pyrite nodules, blocky to sub-fissile, soft to firm.
SANDSTONE: white, light grey, clear, fine to occasionally medium grained, calcareous matrix, slightly silicified lithics, carbonaceous, tight to poor porosity.
LIMESTONE: clear, translucent brown, white, crystalline to amorphous, brittle, firm to hard.

3100'-3230'
Siltstone with limestone trace.
SILTSTONE: brownish grey to light grey, occasionally green, argillaceous, calcareous in part, carbonaceous, occasionally pyritic, blocky to sub-fissile, very soft to firm.
LIMESTONE: translucent brown, amorphous, firm, brittle.

3100'-3230'
Siltstone with limestone trace.
SILTSTONE: brownish grey to light grey, occasionally green, argillaceous, calcareous in part, carbonaceous, occasionally pyritic, blocky to sub-fissile, very soft to firm.
LIMESTONE: translucent brown, amorphous, firm, brittle.

3230'-3250'
SANDSTONE: light grey, very fine to fine grained, moderately sorted, sub-angular, carbonaceous, micropyritic, slightly micaceous, calcareous cement, arg-matrix in part, friable to firm, poor porosity.

POOR SHOW:
Very dim orange to dull yellow,spotted fluorescense,instant crush cut,thin ring residue.

3250'-3600'
Siltstone with traces of sandstone and limestone.
SILTSTONE: medium grey to grey brown, argillaceous, occasionally carbonaceous, sandy in part, blocky, soft.
SANDSTONE: light grey, very fine grained, well sorted, sub-angular, carbonaceous, pyritic, siliceous cement, friable to soft, tight to rarely poor porosity.
LIMESTONE: translucent brown, white, medium to coarse crystalline, brittle.

TRACE SHOW:Trace dull yellow fluorescence, instant crush cut, thin film residue.

MUD DATA:
Wt:9.3 Vis:37
WL:16 pH:8.5
Snd:Tr. Ck:2/32

3600'-3810'
Siltstone with sandstone and limestone traces.
SILTSTONE: medium grey non calcareous, argillaceous in part, micromicaceous, carbonaceous, occassional crystalline calcite laminae, firm, sub-fissile to blocky.
SANDSTONE: A/A.
LIMESTONE: A/A.
COAL:weak trace, black hard, brittle, bituminous, vitreous lustre, sub conchoidal fracture

3810'-4000'.
Massive Siltstone sequence.
SILTSTONE:Dark to medium grey,firm,sub fissile,-blockynon calcareous, argillaceous in part, micromicaceous,carbonaceous,occasionally laminated with milky white crystalline calcite.
Traces of Limestone and Coal.

3810'-4000'.
Massive Siltstone sequence.
SILTSTONE: Dark to medium grey, firm, sub fissile, blocky non calcareous, argillaceous in part, micromicaceous, carbonaceous, occasionally laminated with milky white crystalline calcite.
Traces of Limestone and Coal.

MUD DATA:	
Wt: 9.3	Vis: 41
WL: 9.8	pH: 8.5
Snd: Tr	Ck: 2/32

4000'-4070'
Massive Siltstone sequence.
SILTSTONE: Grey, firm, blocky, sub fissile, occassionally becoming very argillaceous, non calcareous, trace of pyrite and micromica.
SANDSTONE: (Trace) Grey to clear, fine to very fine grained, firm to friable, poorly sorted, sub angular to sub round silty matrix, calcareous cement, lithics, tight.
LIMESTONE: (Trace) Brown, firm, microcrystalline, clean.

4070'-4140'
Siltstone with weak traces of sandstone and limestone.
SILTSTONE: medium grey, slightly carbonaceous, argillaceous, calcareous, very slightly pyritic in part, blocky to sub-fissile, firm to hard.
SANDSTONE: light grey, white, very fine to fine grained, moderately sorted, sub-angular, carbonaceous, calcareous, occassionally pyritic, slightly micaceous, soft, tight.
LIMESTONE: white, brown medium crystalline, brittle, firm.

4140'-4270'
Siltstone interbedded with minor sandstone.
SILTSTONE: medium to dark grey, pale brown, carbonaceous, pyritic, slightly argillaceous, sandy in part, blocky to sub-fissile, firm, pale brown variety increasing with depth.
SANDSTONE: A/A, grading to siltstone with depth

MUD DATA	
W - 9.2	Ck - 2/32
V - 40	pH - 8.5
WL - 15.6	Sd - tr.

4270'-4380'
Interbedded siltstone and sandstone.
SILTSTONE: dark grey, micromicaceous, carbonaceous, occassionally very fine grained sandy blocky, firm.
SANDSTONE: light to medium grey, very fine grained, grading to coarse siltstone in part, slightly calcareous in part, slightly argillaceous, firm to friable, tight.

4380'-4482'
Interbedded siltstone and sandstone.
SILTSTONE: medium to dark grey, smooth, sub-fissile to blocky, argillaceous, micromicaceous, firm to hard, grading to shale,
SILTSTONE: grey brown, gritty, argillaceous, sandy, pyritic, slightly carbonaceous, very calcareous in part, blocky, hard.
SANDSTONE: tan, white, medium to fine grained, occasionally coarse loose quartz, poorly sorted, sub angular to sub rounded, very slightly carbonaceous and pyritic, minor lithics, non calcareous, siliceous matrix, predominantly grading to siltstone, hard, tight to occassionally poor porosity.

C1 ;	100%
C2 ;	tr

4514'-4630'
Interbedded siltstones and sandstone

medium to fine grained, occasionally coarse loose quartz, poorly sorted, sub angular to sub rounded, very slightly carbonaceous and pyritic, minor lithics, non calcareous, siliceous matrix, predominantly grading to siltstone, hard, tight to occassionally poor porosity.

C1 ; 100%
C2 ; tr

4514'-4630'
Interbedded siltstones and sandstone.
SILTSTONE: grey to dark grey, carbonaceous, slightly calcareous in part, occasionally sandy, blocky, soft to firm.
SANDSTONE: white to light brown, very fine grained, well sorted, sub rounded, glauconitic in part, silty and calcareous cement, soft to moderately firm tight, occasional loose medium grained quartz fragments.

MUD DATA
W - 9.7 Gk - 2/32
V - 45 pH - 8.5
WL - 9 Sd - 0.3

4630'-4680'
Sandstone with traces of siltstone.
SANDSTONE: white, fine grained, rare very cse grains, well sorted, sub angular to sub rd, unfrosted quartz grains siliceous matrix, non-calcareous, very slightly carbonaceous and pyritic, soft to very firm, tight to fair porosity.
SILTSTONE: light to dk grey, white, micaceous, slightly pyritic, calcareous in part, argillaceous, blocky, firm to hard, grading in part to very fine sandstone.

4680'-4763'
Sandstone interbedded with minor siltstone.
SANDSTONE: white, tan, coarse to very coarse, occasionally fine grained, poorly sorted, subangular to angular, siliceous cement in part, firm to hard, fair porosity.
SILTSTONE: light to dk grey, brown, pyritic, argillaceous, blocky to sub fissile, firm to hard, fine grained.

Fine grained tan sandstone increasing with depth.
4763'-4790'
SANDSTONE: A/A.
SILTSTONE: A/A.

4790'-4850'
SANDSTONE: clr to occ frstd, f to pred med grn, mod w srtd, hd, v clean, sil cmt where present, generally unconsolidated, good por becoming pred clr and fg with depth.

4850'-4910'
Sandstone with minor siltstone interbeds.
SILTSTONE: pred gy to occ brn, frm, blky, non calc, occ pyritic, micromica, the brn variety v arenaceous and grading to a vfg sandstone.
SANDSTONE: 2 types.
(i) lt brn, vfg, w srtd, sub ang to sub rnd hd, dirty, carb, sil cmt, tight.
(ii) wh to clr, f to med grn, poorly srtd, unconsolidated, pare

4910'-4960'
Sandstone with minor siltstone interbeds.
SANDSTONE: A/A
SILTSTONE: A/A

4960'-4990'
Sandstone with an interbedded siltstone.
SANDSTONE: White to brown, fine grained, well sorted, subrounded, friable, occasional carbonaceous lithics, tight porosity.
SILTSTONE: Gy-occ dk gy brn, mod frm, blcky, non-calc, carb i/p, micromica

4990'-5040'
Sandstone with occasional minor siltstone interbeds
SANDSTONE: A/A
SILTSTONE: A/A

5040'-5210'
Sandstone with minor siltstone interbeds.
SANDSTONE: White to clear very fine to medium to coarse grains, poorly sorted, angular to sub angular to subrounded, siliceous cement, silty matrix, firm to friable carbonaceous lithics, poor to fair porosity occasionally good.
SILTSTONE: Brown to grey to white, firm, blocky, subfissile grading to shale in parts, micromicaceous, micropyritic, carbonaceous.

subfissile grading to shale in parts, micromicaceous, micropyritic, carbonaceous.

5100'

5200'

5210'-5290'
Predominantly siltstone with occasional sandstone interbeds.
SANDSTONE: A/A except becoming very coarse in parts and becoming slightly calcareous in parts.
SILTSTONE: A/A.

MUD DATA	
W-9.5	Ck-2/32
V-40	pH-8.5
WL-9	Sd-tr

WOB 30
RPM 60

23/6/81
24/6/81

CR

5290'-5360'
Interbedded sandstone and siltstone.
SANDSTONE: Clear to frosted to light brown, very fine grained to fine grained, well sorted, subangular to subrounded, firm to friable, siliceous cement but occasionally very calcareous, slightly carbonaceous in parts, tight porosity.
SILTSTONE: Brown-grey to to grey, moderately soft blocky, non-calcareous, slightly carbonaceous, micromicaceous, occasionally glauconitic.

5300'

CR

24/6/81
25/6/81

CR

CR

5360'-5480'
Predominantly siltstone with sandstone interbeds.
SILTSTONE: Light grey to grey to greybrown to occasionally light green, moderately firm to firm, blocky to occasionally subfissile, noncalcareous, glauconitic, micromicaceous carbonaceous in parts.
SANDSTONE: Light brown to clear, to frosted to yellow, medium to fine to very fine grained with occasional coarse grains, poorly sorted, subangular to subrounded, friable to hard, calcareous cement, carbon lithics, glauconitic in parts, tight to poor to good porosity, trace flourescence of dull yellow spots, trace crush cut.
COAL: Trace. Black, blocky, dull lustre.

BIRKHEAD FORMATION (5366')

WOB: 30
RPM: 60

5400'

CR

Trace Show.
Dull yellow spotted flourescence, trace crush cut, trace residual ring.

CR

MUD DATA	
W-9.5	Ck-2/32
V-40	pH-8.5
WL-8	Sd-Tr

Poor Show.
Yellow spotted flourescence, very slow streaming cut, thin residual ring

N.B.
Scale change
5 10 15 20

CR

5480'-5495'
Sandstone with interbedded siltstone.
SANDSTONE: Yellow to white to clear, very fine to fine to medium grain, moderately sorted, subangular to subrounded, moderately hard to friable, siliceous and calcareous cement, poor porosity, poor show.
SILTSTONE: A/A.

S.G.%
C1: 97.9%
C2: 1.45%
C3: 0.4%
C4: 0.2%
C5: 0.05%
C6: TR

Trace-Poor Show.
Moderately bright spotted-streaked flourescence, slow streaming cut.

Core Bit 2:
Christ C20,
8 15/32"
in @5495

WOB: 15
RPM: 60

5500'

CORE No.2

CORE DESCRIPTION:
5495'-5541'
5495'-5511':
Sandstone with thin highly carbonaceous laminations.
off wht-lt gy, fn-med-cse grn, poor-mod std, subang-subrnd, quartzose, sil cmnt, kaolinitic mtx, poor-fair poros
5511'-5520':
Siltstone with minor sandstone interbeds.
SILTSTONE: Dk gy, mod hrd, fnly lmntd, carbonaceous, micromicaceous, sucrosic text.
SANDSTONE: Lt gy, v fn gn, ang-subang, mod srtd, occ carb lams, sil cmnt, tght-v poor porosity.
5520'-5535':
SANDSTONE: Lt gy, v fn-fn grn, subrnd-subang, pr-mod srtd, sil cmnt & mtx, tght-fair porosity.
SILTSTONE: A/A but becoming hrd-v hrd, interlaminated in places with lt gy arenaceous sltstn.
5535'-5541':
SANDSTONE: Wht, med-v cse grn, mod well std, sub rnd, qrtzose, sil cmt, occ carb inc, good-excellent poros

25/6/81
26/6/81

Note scale change
1 2 3 4

Poor-Fair Show.
Moderately bright yellow streaked flourescence, slow-fast streaming cut.

MUD DATA	
W-9.3	Ck-1/32
V-39	pH-8.5
WL-8.5	Sd-Tr

26/6/81
29/6/81

T.G.%
C1: 100%
C2: Tr
C3: Tr

HUTTON SANDSTONE (5535')

NOTE:
Depth correction of minus 3 feet.
New Bit No.
HTC J33, 8½"
9, 10, 10.

DST No.4
Interval: 5479'-5511'
Recovery: 220' muddy water, 30' slightly gas and oil cut mud, 30' oil/mud emulsion.

DST No.5
Interval: 5515'-5526'
Recovery: muddy water with a trace of oil.

5541'-5600'
Sandstone with siltstone interbeds.
SANDSTONE: Light brown to light grey to clear to frosted, fine to occasional medium grained moderately well sorted, subangular to subround, friable to moderately hard, slightly calcareous in parts, rare carbonaceous, predominantly clean, tight to good porosity.
SILTSTONE: Light grey to grey, soft to moderately firm, subfissile to blocky calcareous in parts, micromicaceous in parts carbonaceous in parts.
COAL: Trace, black/brown subvitreous.

5600'

29/6/81
30/6/81

5600'-5740'
Sandstone with minor siltstone interbeds.
SANDSTONE: Clear to frosted fine to medium to coarse grained with occasional very coarse grain, poorly sorted, subangular to subrounded, very clean occasional siliceous cement but predominantly loose grains, good poros.
SILTSTONE: A/A.

5700'

5740'-5880'
Predominantly Sandstone, minor Siltstone, traces of Coal and rare traces Limestone.
SANDSTONE: Clear-frosted, medium coarse-very coarse, some silica cemented, also common loose portion, poorly sorted, sub angular to sub round, good porosity.
SILTSTONE: Light grey to grey, soft to firm, sub fissile to blocky, occ. calcareous and micromicaceous, carbonaceous.

MUD DATA:	
Wt: 9.2	Vis: 40
W.L.: 5.6	pH: 8.5
Snd: Tr.	Ck: 2/32"

5800'

COAL: Black ...

SANDSTONE:Clear-frosted ,medium coarse-very coarse,some silica cem ented,also common loose portion,poorly sorted, sub angular to sub rou nd,good porosity.
SILTSTONE:Light grey to grey,soft to firm,sub fissile/to blocky,occ. calcareous and micromicaceous,carbonaceous.

MUD DATA:
Wt:9.2 Vis:40
W.L.:5.6 pH:8.5
Sand Tr. Ck:2/32"

5800'

COAL:Black-brown/black, blocky,sub vitreous, bituminous.

5880'-6000'
NAPPAMERRI FORMATION(5882') Siltstone with minor Sandstone.
SILTSTONE:Dark grey to grey,soft to firm,blocky to sub fissile,micromicaceous,carbonaceous in part,also light grey to buff,soft,blocky to sub fissile,arenaceous grading in part to very fine grained sandstone.Portion of red/brown,iron stained, fine silt(Poss.quartzite?)
SANDSTONE:Light grey-white,very fine grained well sorted,sub round, friable,non calcareous, argillaceous,silic cem ent,tight.Also small portion as above.

Trace show 10% sub patchy,dim to bright, very slow crush cut. Trace residue.

5900'

17/9/81
2/7/81

6000'

WOB:30
RPM:60

6000'-6070'
Predominantly Siltstone interbedded with and grading to sandstone.
SILTSTONE:Dark grey-grey,firm to hard,blocky to argillaceous,sub fissile,some soft-firm, blocky.
SANDSTONE:White-grey/buff,predominantly fine grained,occ.medium grained,friable,well sorted sub round,predom silic cement,occ.calcareous, tight porosity.

6070'-6130'
Siltstone with minor sandstone interbeds with occasional limestone inclusions.
SILTSTONE:Light grey-grey-dark grey,firm-hard,massive-blocky, very arenaceous,occasionally calcareous,kaolinitic in parts.
SANDSTONE:A/A.
LIMESTONE:Clear-tan-grey-brown,calcareous-calcarenite,silty in parts, moderately indurated.

6100'

6130'-6240'
Predominantly siltstone with occasional minor sandstone interbeds.
SILTSTONE:A/A but occasionally micromicaceous
SANDSTONE:Light grey-grey,fine-very fine grained with occasional medium grains,moderately well sorted,sub round-sub angular,silic cement,firm-hard,argillaceous matrix,tight porosity.

6200'

2/7/81
3/7/81

WOB:30
RPM:60

6300'

CR

TOOLACHEE FORMATION(6216') 6240'-6400'
Siltstone and sandstone sequences with interbedded Coal.
SILTSTONE:Dark grey-grey Light grey in parts, firm-hard,blocky,very arenaceous grading to very fine sand in parts, very carbonaceous in parts,micromicaceous.
SANDSTONE:Light tan-buff-clear,fine grain-very fine grain with occasional medium grains, moderately well sorted, sub round-round,moderately hard-brittle,siliceous cement,silty matrix,tight porosity.
COAL:Black,blocky,firm-brittle,vitreous but occasionally argillaceous

MUD DATA
W-9.3 Ck-2/32
V-42 pH-8.5
WL-7 Sd-Tr.

6400'

6400'-6490'
Predominantly Siltstone with minor Sandstone and Coal.
SILTSTONE:Dark grey to light grey,coarse silt grading in part to very fine grained sand firm to hard,sub-blocky, argillaceous,micromica, carbonaceous in part.
SANDSTONE:Light grey, fine,occ.very fine grained,firm to friable, silty matrix;silic cement in part,poorly sorted,sub round,tight to poor porosity.

6490'-6550'
Interbedded Sandstone and Siltstone.
SANDSTONE:Light brown, occ.buff,translucent, very fine;predominantly fine grained,sub angular to sub round,moderately well sorted,firm, quartzose-feldspathic, silica cement,slightly argillaceous matrix,

6500'

6400'-6490'
Predominantly Siltstone with minor Sandstone and Coal.
SILTSTONE: Dark grey to light grey, coarse silt grading in part to very fine grained sand firm to hard, sub-blocky argillaceous, micromica, carbonaceous in part.
SANDSTONE: Light grey, fine, occ. very fine grained, firm to friable, silty matrix, silic cement in part, poorly sorted, sub round, tight to poor porosity.

6490'-6550'
Interbedded Sandstone and Siltstone.
SANDSTONE: Light brown, occ. buff, translucent, very fine; predominantly fine grained, sub angular to sub round, moderately well sorted, firm, quartzose-feldspathic, silica cement, slightly argillaceous matrix, tight to poor porosity.
SILTSTONE: As above.

[illegible]
Interbedded Sandstone and Siltstone.
SANDSTONE: White-clear-grey-light brown-translucent-milky, medium-fine grained with angular coarse-very coarse loose grains, moderately well sorted, sub round-slightly sub angular, siliceous cement, siliceous-occ. argillaceous matrix, poor porosity.
SILTSTONE: i) Grey-brown, very fine laminated-with coarse silt, moderately firm, sub fissile-blocky, argillaceous matrix, occasionally carbonaceous, micromicaceous, sucrosic. ii) Grey, soft, sub fissile in parts, micromicaceous, very fine silt.

6690'-6730'
SANDSTONE: White-clear-very clean, fine grain-very fine grain-coarse-very coarse loose grains moderately well sorted sub round-sub angular, moderately hard siliceous cement, siliceous matrix, poor-tight porosity.

6730'-6790'
Sandstone with interbeds of Siltstone and Coal.
SANDSTONE: A/A but coarse grains becoming abundant.
SILTSTONE: Grey-light grey, moderately hard, massive-blocky, carbonaceous, micromicaceous, occ. calcareous.
COAL: Black, hard-brittle, vitreous.

6790'-6860'
Sandstone with minor Siltstone and Coal inclusions.
SANDSTONE: White-frosted-clear, predominantly coarse-very coarse sub angular-angular loose quartz grains. Fine-medium grained, poorly sorted, sub round, siliceous cement and matrix, tight-poor porosity.
SILTSTONE: Light grey-grey, moderately hard, blocky, non-calcareous.
COAL: A/A.

6860'-6900'
Sandstone and Siltstone sequences with Coal inclusions.
SANDSTONE: A/A but coarse loose grains decreasing in abundance.
SILTSTONE: A/A
COAL: A/A

6900'-6980'
Sandstone with Siltstone interbeds.
SANDSTONE: Clear-white-frosted-milky-occasionally grey/black, medium to coarse grains, poorly sorted, angular-sub angular, siliceous cement, hard/brittle, slightly argillaceous matrix. Very coarse, angular, quartz clasts becoming increasingly common with depth. Slightly carbonaceous.
SILTSTONE: Light-dark grey, firm, blocky, arenaceous in parts, micromicaceous, carbonaceous.
COAL: Traces. A/A

6980'-7078'
SILTSTONE: With Traces of METASILTSTONE
Light grey, firm-hard, coarse, shard-like, silicified, carbonaceous and chloritic.
COAL: Traces. A/A

CORKWOOD NO. 1

Organic Petrology of a suite of samples from Corkwood No. 1

A report prepared for

DELHI PETROLEUM PTY. LTD.

by

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July 1983

CORKWOOD NO. 1

Contents

Organic petrology of a suite of samples from Corkwood No. 1.

Introduction

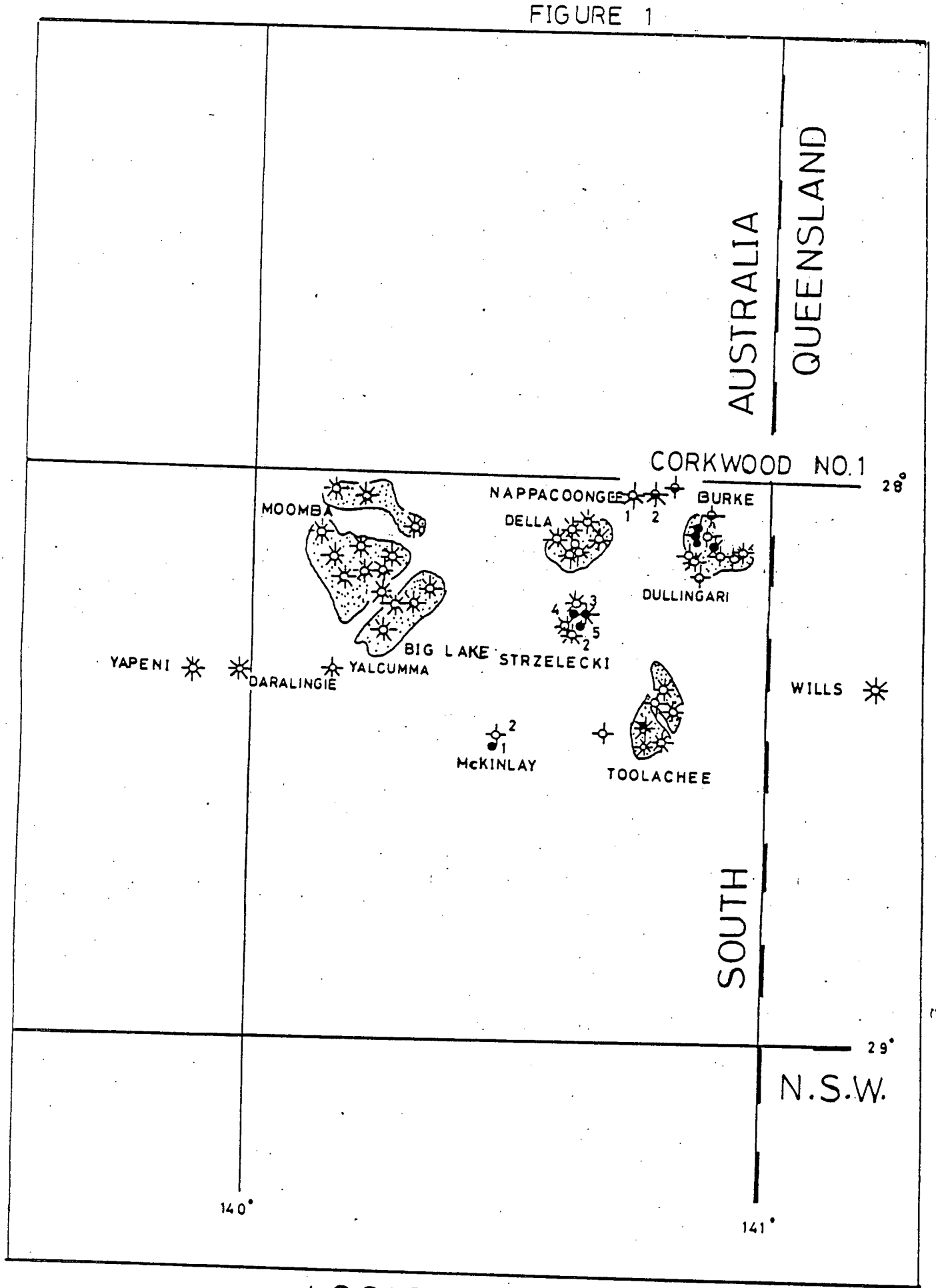
Ten samples of ditch cuttings were examined in polished section in normally incident white light and in reflected UV/Violet fluorescence mode. The cuttings samples were received washed and dried. The units sampled ranged from Cretaceous to Permian in age. Of the ten samples examined, four are from the Cretaceous, three are from the Jurassic, one is from the Triassic and two are from the Permian sections. The location of Corkwood No. 1 and some selected wells in the southern Cooper Basin are shown in Figure 1.

Short descriptions of the organic matter in each sample, together with vitrinite reflectance data and descriptions of rock-types, are given in Appendix 1. This report draws together the observations made on the suite of samples and develops an interpretation of the organic petrology in terms of hydrocarbon maturation, source potential, and the thermal history of the sequence drilled at the location of Corkwood No. 1.

Experimental Methods

Samples were mounted in cold-setting resin and polished "as received", so that whole-rock samples rather than concentrates of organic matter were examined. This method is preferred to the use of demineralised concentrates because of the greater ease, with whole-rock samples, of identifying first generation vitrinite and of recognising cavings. Identification of cavings was, nevertheless, a problem in

FIGURE 1



LOCATION MAP CORKWOOD NO. 1

the Jurassic and lower part of the Permian sequence. In sample from the Lower Jurassic Birkhead Formation the vitrinite cavings population is larger than the vitrinite population from the Birkhead Formation.

Vitrinite reflectance measurements were made with a Leitz MPV1 or a Leitz MPV1.1 photometer using immersion oil of refractive index 1.518 at 546 nm and spinel and garnet standards of 0.42%, 0.917% and 1.726% reflectance. Fluorescence-mode observations were made on all the samples and provide supplementary evidence concerning organic matter type, and exinite abundance and maturity. For fluorescence mode, a 3mm BG 3 excitation filter was used with a TK400 dichroic mirror and a K490 barrier filter. The photographs were taken using a Leitz variomat camera or a Leica camera mounted on an Orthoplan microscope.

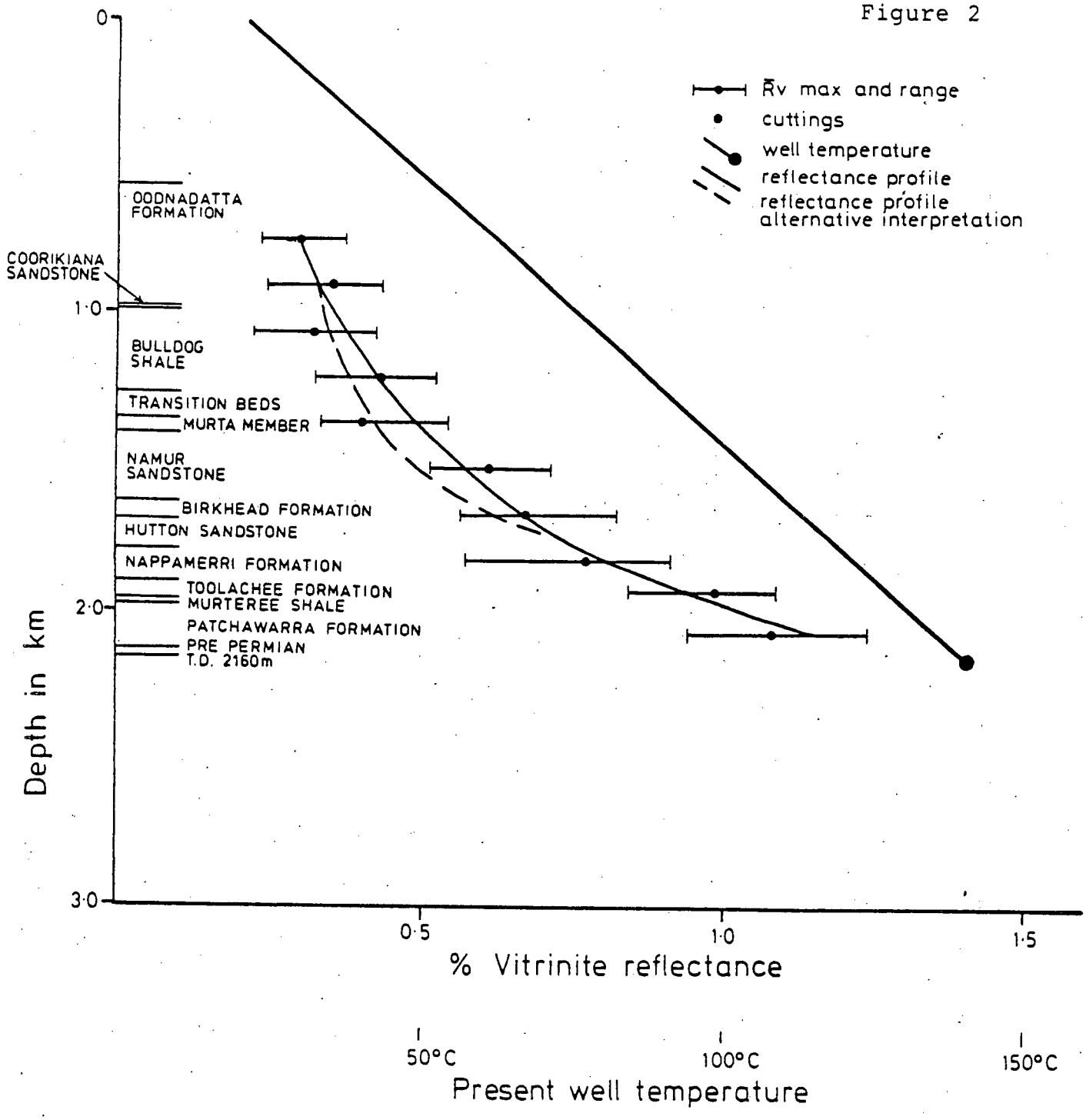
Vitrinite Reflectance

Table 1 (p.13) summarizes the depths to stated vitrinite reflectances and gives the present well temperatures at these reflectances. Table 1 also includes data from a number of other wells in the southern Cooper Basin and the overlying part of the Eromanga Basin, for comparison. Reflectance gradient data are given in Table 2 (p. 14). The model temperatures, T_{iso} and T_{grad} are derived from the reflectance data and are given in Table 3 (p. 15). They are discussed in the section on Thermal History, and these data are summarized in a graphical form in Figures 3 to 5 (pp. 15,16 and 17).

The samples provide good control over the variation of the vitrinite reflectance as a function of depth. Figure 2 (p. 5) shows the mean maximum reflectance and the range of

CORKWOOD NO. 1

Figure 2



reflectance attributed to each of the horizons sampled. The unbroken line is the most probable average trend.

The reflectance profile in Figure 2 shows a moderately curved profile with vitrinite reflectance gradients rising from a low gradient of about 0.25%/km at the top of the section sampled through 0.65%/km in the middle of the section (depth of about 1650m) to a high gradient of 1.73%/km at a depth of 2000m in the lower part of the Permian sequence.

The reflectance values for the Bulldog Shale Formation are below the general trend whereas the values for the Namur Sandstone, and the ower part of the Oodnadatta Formation are slightly above the trend; an effect that is probably due to type rather than rank differences. Data for the Murta Member are slightly below the trend, and this may result from the presence of cavings from the overlying Cretaceous units. The possible causes of the broadly arcuate vitrinite reflectance profile for Corkwood No. 1 location will be discussed in the section on thermal history.

The vitrinite reflectance data indicate that Corkwood No. 1 entered the liquids window at 1400m (0.5% $\bar{R}_v$max) at the top of Namur Sandstone and that the lower part of the Jurassic and the entire Triassic sections are within the peak zone of oil generation. The zone of peak generation can be estimated to lie between 1700m and 1900m (estimated depths to 0.70% to 0.90% $\bar{R}_v$max respectively). Vitrinite reflectance data suggest that the lower part of the Permian is close to the oil deadline. The reflectance gradients at both the 0.5% and 0.7% reflectance levels are moderately high (0.51%/km and 0.81%/km respectively) and high at the 0.9% reflectance level (1.22%/km). The zero depth intercept is relatively low at about 0.18% vitrinite reflectance.

Exinite is present in all samples but is mostly sparse to rare except in the upper part of the Oodnadatta Formation, the Murta Member, and the Toolachee Formation where it is common. However a major part of the exinite in the Toolachee occurs in shaly coal rather than as discrete organic matter dispersed in clastic rocks. Exinite fluorescence colours are generally consistent with the vitrinite reflectance data.

Organic Matter Type

Cavings and recirculated cuttings generally appear to comprise a very minor part of the samples from the Mesozoic, except in the case of the Birkhead Formation sample. This contains vitrinite caved, or recirculated, from the Cretaceous units. The following sample descriptions are considered to relate relatively accurately to the nominated horizons.

Of the two samples examined from the Oodnadatta Formation, the top sample contains common to abundant dispersed organic matter (d.o.m.) with vitrinite as the dominant maceral group. Exinite is common and confined mainly to the shaly coal in the form of sporinite and cutinite. Liptodetrinite forms the main exinite maceral dispersed in the epiclastics and tends to increase in abundance in finer grained lithologies. Fluorinite is abundant in shaly coal. Dinoflagellates are rare in claystone. Vitrite is the only coal microlithotype present and shows well preserved cellular texture. The lower sample contains less organic matter and exinite is sparse. Siltstone contains more d.o.m. than sandstone or the claystone.

Two samples were examined from the Bulldog Shale. Both samples are poor in d.o.m. which is rare in the upper

sample and sparse in the lower sample. In both samples, vitrinite forms the dominant maceral group. The dispersed organic matter is confined largely to claystone in the upper part but is more equally distributed among siltstone and claystone in the lower part. Rare exinite consists mainly of intense fluorescing cutinite, sporinite and lipto-detrinite. Rare well preserved acritarchs (genus Veryhachium) are found in the claystone (Plate 1). A substantial amount of carbonate is present in the upper sample, but d.o.m. is rare to absent in the carbonates.

The Murta Member sample contains abundant coal, some of which may be Winton-type coal caved in from the overlying Cretaceous Formations. However the vitrinite reflectance data suggest that most of the coal fragments are an integral constituent of the Murta Member itself. Vitrite forms the main coal microlithotype with duroclarite occurring in subordinate amounts. Both duroclarite and associated shaly coal are very rich in exinite (Plates 2 and 3). Shaly coal is also present in substantial amounts and is the major contributor towards the overall d.o.m. content of the sample. D.o.m. ranges from sparse to common, and is concentrated in finer grained lithologies. Vitrinite forms the major maceral group and the overall exinite abundance of the sample is common, with sporinite as the main exinite maceral. Cutinite is sparse and, fluorinite and telalginite are rare.

D.o.m. is rare in the underlying Namur Sandstone Member. The dominant sandstone lithology of the sample is largely devoid of organic matter. The minor siltstone lithology also contains only rare to sparse d.o.m. and all three maceral groups are rare. The only coal microlithotype observed is vitrite rich in faint brown fluorescing desmocollinite.

Sandstone forms the most abundant lithological type in the Birkhead Formation sample with siltstone, claystone and coal occurring in minor amounts. Like the overlying Namur Sandstone, most of the sandstone lithology is devoid of dispersed organic matter. Similarly the minor claystone lithology hardly contain any organic matter and the organic matter content of the siltstone facies ranges from rare to sparse. Overall the d.o.m. content of the sample is rare. Vitrite with abundant faint brown fluorescing desmocollinite is the only coal microlithotype present in the sample.

The sample from the lowest Mesozoic unit, the Triassic Nappamerri Formation is also dominated by sandstone. Carbonate lithologies are not present in this occurrence of the Nappamerri. A few sandstone grains contain vitrinite dominated abundant organic matter, but most of the sandstone lithology is barren or organic matter and the total d.o.m. content of the sample is assessed to be in the upper part of the "rare" range. The d.o.m. content of the minor siltstone lithology varies from rare to sparse. Coal is present in substantial amounts and consists of vitrinertite, clarite and duroclarite. Shaly coal occurs as a minor constituent and the exinite fluoresces dull orange. The vitrinite reflectance data indicate that much of the coal is probably from the Nappamerri Formation and does not represent cavings from the Jurassic.

The sample from the Toolachee Formation contains abundant d.o.m., distributed through all lithologies and dominated by vitrinite and inertinite. Exinite, however, is common consisting mainly of sporinite and liptodetrinite with subordinate cutinite and rare telalginite. Both coal and shaly coal are present in substantial amounts. The major

coal microlithotypes present are vitrite and vitrinertite with the exinite content being low. Faint brown fluorescing bands of vitrinite are common in the coal (Plates 4 and 5). Shaly coal is also dominated by vitrinite and inertinite.

The exinite fluorescence is very weak in the Permian Patchawarra Formation, the lowest stratigraphic level sampled in Corkwood No. 1. The mean maximum exinite reflectance of the sample is 0.62% and is indicative of the late mature to overmature nature of the organic matter. The main rock type present in the sample is sandstone with subordinate coal and trace amounts of carbonate. Most of the sandstone facies is very poor in organic matter and the sample contains rare, inertinite dominated d.o.m.. Inertite and vitrinertite form the only coal microlithotypes with very little exinite being present. Exinite fluorescence is very weak and the mineral matter fluorescence is relatively intense (Plates 6 and 7).

Thermal History

Observed and calculated data relating to the thermal history of Corkwood No. 1 are given in Figures 2, 3, 4 and 5 and Tables 1, 2 and 3 together with data from some other wells in the southern Cooper Basin. The reflectance gradient is very high at the base of the Permian (1.73%/km) and it gradually decreases through a high gradient in the upper part of the Permian to a moderately high gradient in the Mesozoic. The high reflectance gradient in the Permian part of the section probably indicates relatively high geothermal gradients in the pre-Jurassic. The broadly arcuate reflectance profile (Figure 2), with the reflectance gradient decreasing towards the top and lacking any appreciable inflections or

breaks may suggest for Corkwood No. 1 a slow decrease in the effect of a thermal event that was primarily pre-Jurassic. The zero depth intercept is low indicating that little if any cover loss has occurred at the site of Corkwood No. 1. The depth-present day temperature relationships at different reflectance levels are given in Table 1 and Figure 4. Temperatures for Corkwood No. 1 at any given reflectance level are on the higher side of the range for the wells in Table 1 and Figure 4. The present-day geothermal gradient of the Corkwood No. 1 lies in the upper part of the range for the southern Cooper Basin wells. At Corkwood No. 1 it appears that the Permian sedimentation occurred under a high to very high geothermal gradient. By the mid-Cretaceous it is possible that some of the Lower Permian formations had reached the oil window. The plot of T_{pres} vs T_{grad} (Figure 3 and Table 3) shows Corkwood No. 1 lying towards the upper left part of the field and the tie line tends to remain parallel to the $T_{pres} = T_{grad}$ line. This indicates that present-day high temperatures are not in equilibrium with the level of coalification and could well be due to a late stage thermal event. The Permian section had attained ideal thermal conditions for the oil generation during the late Mesozoic. During the Tertiary most of the Lower Permian units moved out of the peak zone of oil generation to the zone of cracking and gas generation. During the same period the Triassic and most of the lower Jurassic units reached the oil window.

Table 1

Present-day temperatures at various reflectance levels

Well Name	0.5% R_v		0.7% R_v		0.9% R_v		1.1% R_v	
	Depth m	Temp. °C	Depth m	Temp. °C	Depth m	Temp. °C	Depth m	Temp. °C
Corkwood-1	1400	98	1750	116	1900	128	2050	135
Nappacoongee-2	1200	80	1550	98	1750	108	1900	115
Murteree-1	1650	93	1099	104	2050	115	-	-
Toolachee-9	1300	83	1700	102	1900	112	2100	121
Pelketa-1	1550	88	1750	97	1950	106	-	-
Big Lake-1	1650	112	1800	120	1950	128	2050	134
Moomba XXVII	1200	65	1700	85	2000	95	2150	105
Dullingari-11	840	64	1450	97	-	-	-	-
Della-1	850	54	1650	86	1850	94	2000	100

Table 2

Reflectance gradient data

Well Name	Temp.Grad. °C/km	Mesozoic Refl.Grad. %R_v/km	Permian Refl.Grad %R_v/km
Corkwood-1	57	0.25-1.06	1.18-1.73
Nappacoongee-2	51	0.08-1.03	1.60
Murteree-1	45	0.13-0.66	0.90-1.21
Toolachee-9	48	0.23-0.78	1.00
Pelketa-1	45	? -0.79	0.93
Big Lake-1	55	1.20-1.65	2.30
Moomba XXVII	38	0.15-0.72	1.20-3.83
Dullingari-11	55	0.24-0.50	-
Della-1	40	0.10-1.21	1.42

Table 3

Present well temperatures compared with isothermal and gradthermal model temperatures

Depth m	Vitrinite Reflectance % $R_v$max	Vitrinite reflectance gradient $R_v$max%/km	Present Well Temperature °C	Calculated Temperature	
				Isothermal °C	Gradthermal °C
CORKWOOD NO. 1					
1400	0.50	0.51	98	-	-
1750	0.70	0.80	116	50	80
1900	0.90	1.22	128	62	99
2050	1.10	1.66	135	65	104
NAPPACOONGEE-2					
1200	0.50	0.41	80	-	-
1550	0.70	0.70	98	55	88
1750	0.90	1.16	108	70	112
1900	1.10	1.46	115	70	112
MURTEREE-1					
1650	0.50	0.65	93	-	-
1900	0.70	1.04	104	40	64
2050	0.90	1.25	115	60	96
TOOLACHEE-9					
1300	0.50	0.36	83	-	-
1700	0.70	0.72	102	54	86
1900	0.90	0.94	112	60	96
2100	1.10	0.94	121	65	104
PELKETA-1					
1550	0.50	0.90	88	-	-
1750	0.70	0.98	97	52	83
1950	0.90	0.98	106	60	96

Table 3

Present well temperatures compared with isothermal and gradthermal model temperatures

Depth m	Vitrinite Reflectance % $R_{v\,max}$	Vitrinite reflectance gradient $R_{v\,max}$%/km	Present Well Temperature °C	Calculated Temperature	
				Isothermal °C	Gradthermal °C
BIG LAKE-1					
1650	0.50	1.19	112	-	-
1800	0.70	1.54	120	62	99
1950	0.90	1.54	128	74	118
2050	1.10	1.63	136	78	125
MOOMBA XXVII					
1200	0.50	0.34	65	-	-
1700	0.70	0.49	85	60	96
2000	0.90	0.68	95	70	112
2150	1.10	0.95	105	70	112
DELLA-1					
850	0.50	0.18	54	-	-
1650	0.70	0.50	86	56	90
1850	0.90	1.27	94	65	104
2000	1.10	1.42	100	70	112

FIGURE 3

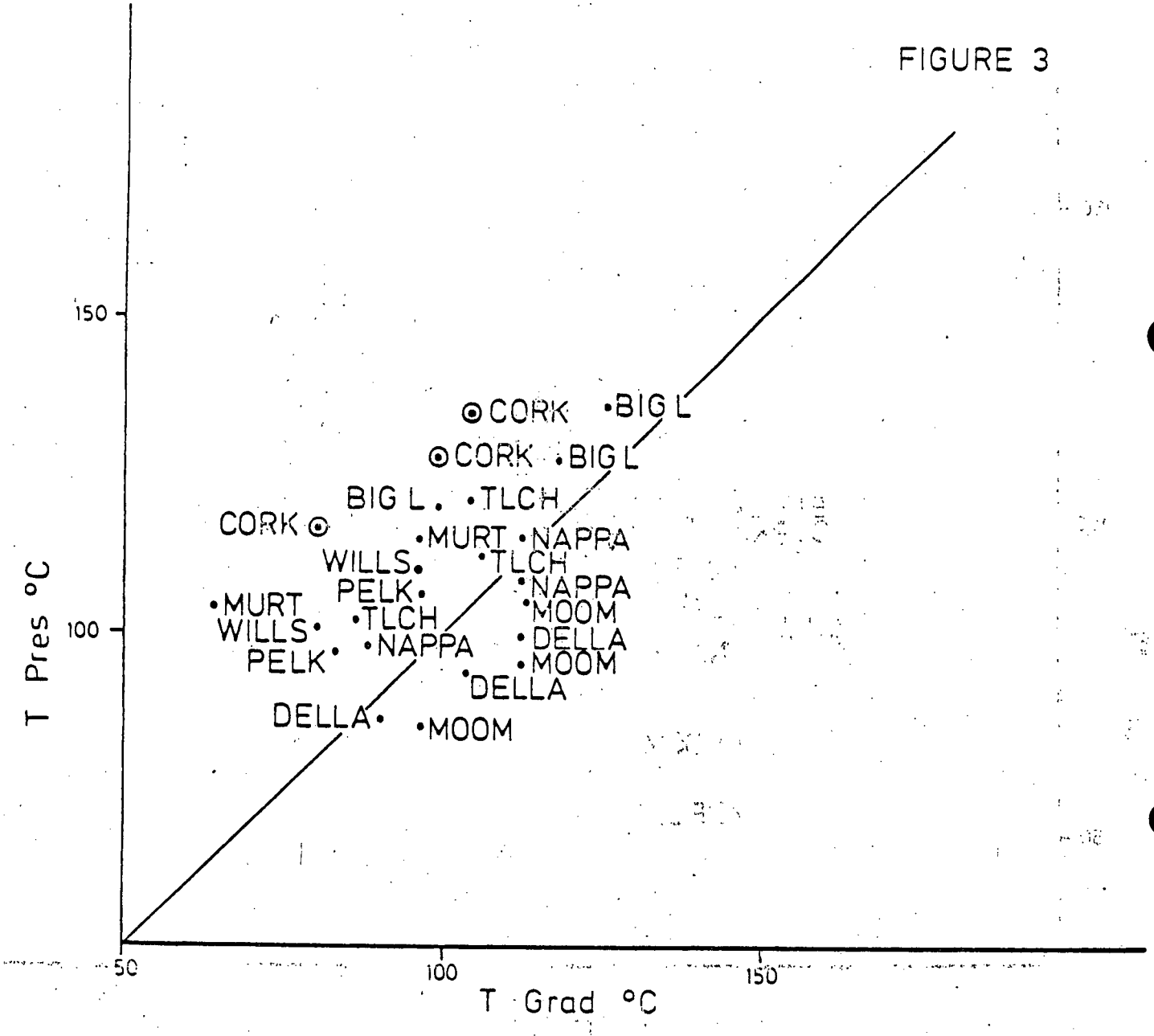
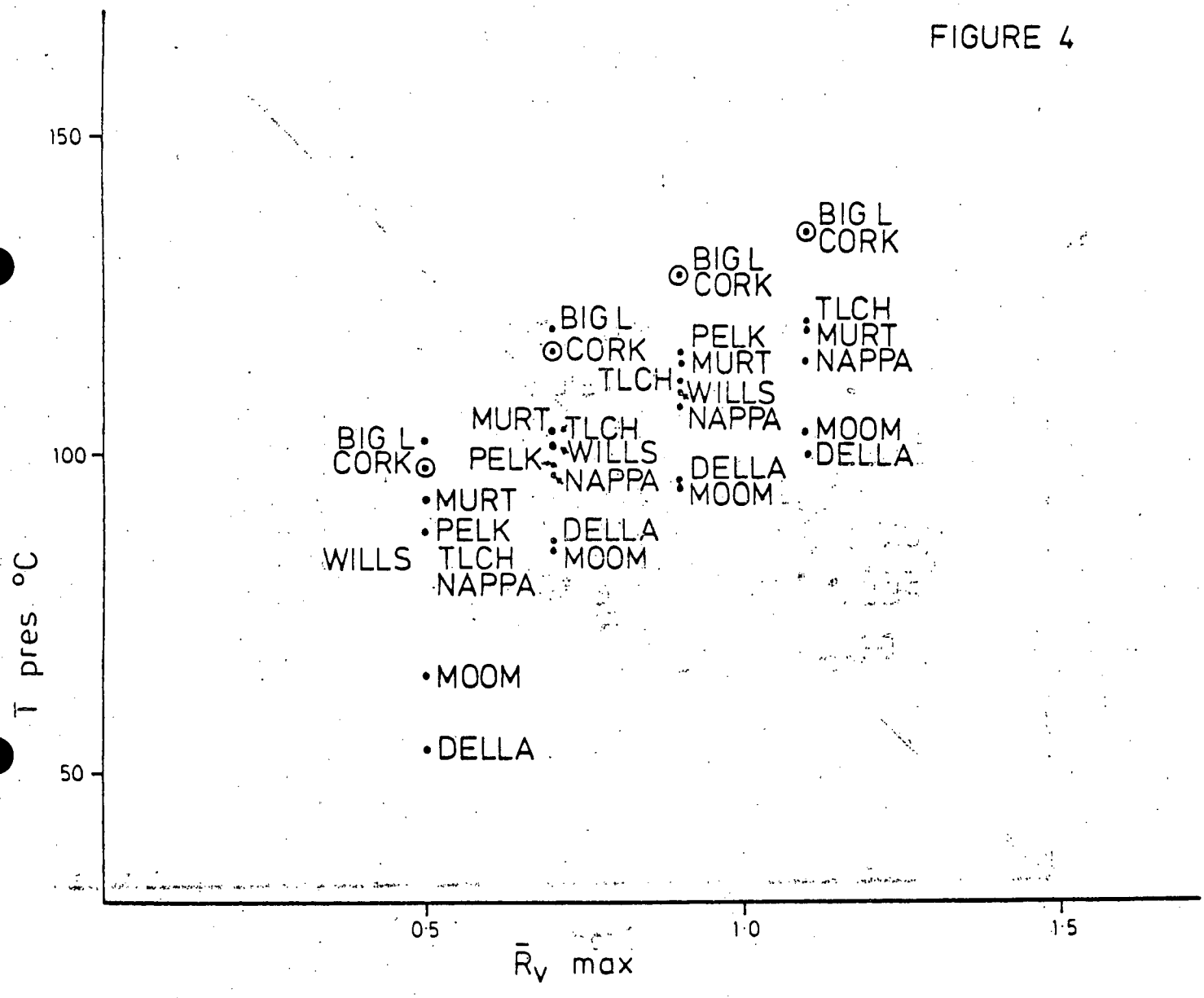

150
100
50
100
150
T Pres °C
T Grad °C
⊙CORK
•BIG L
⊙CORK
•BIG L
BIG L.
•TLCH
CORK ⊙
•MURT
•NAPPA
WILLS•
•TLCH
PELK•
•NAPPA
•MURT
•TLCH
•MOOM
WILLS•
•NAPPA
•DELLA
PELK•
•MOOM
•DELLA
DELLA•
•MOOM

FIGURE 4


150
100
50
T pres °C
0·5
1·0
1·5
$\bar{R}_V$ max
BIG L
CORK
PELK
MURT
TLCH
NAPPA
WILLS
DELLA
MOOM

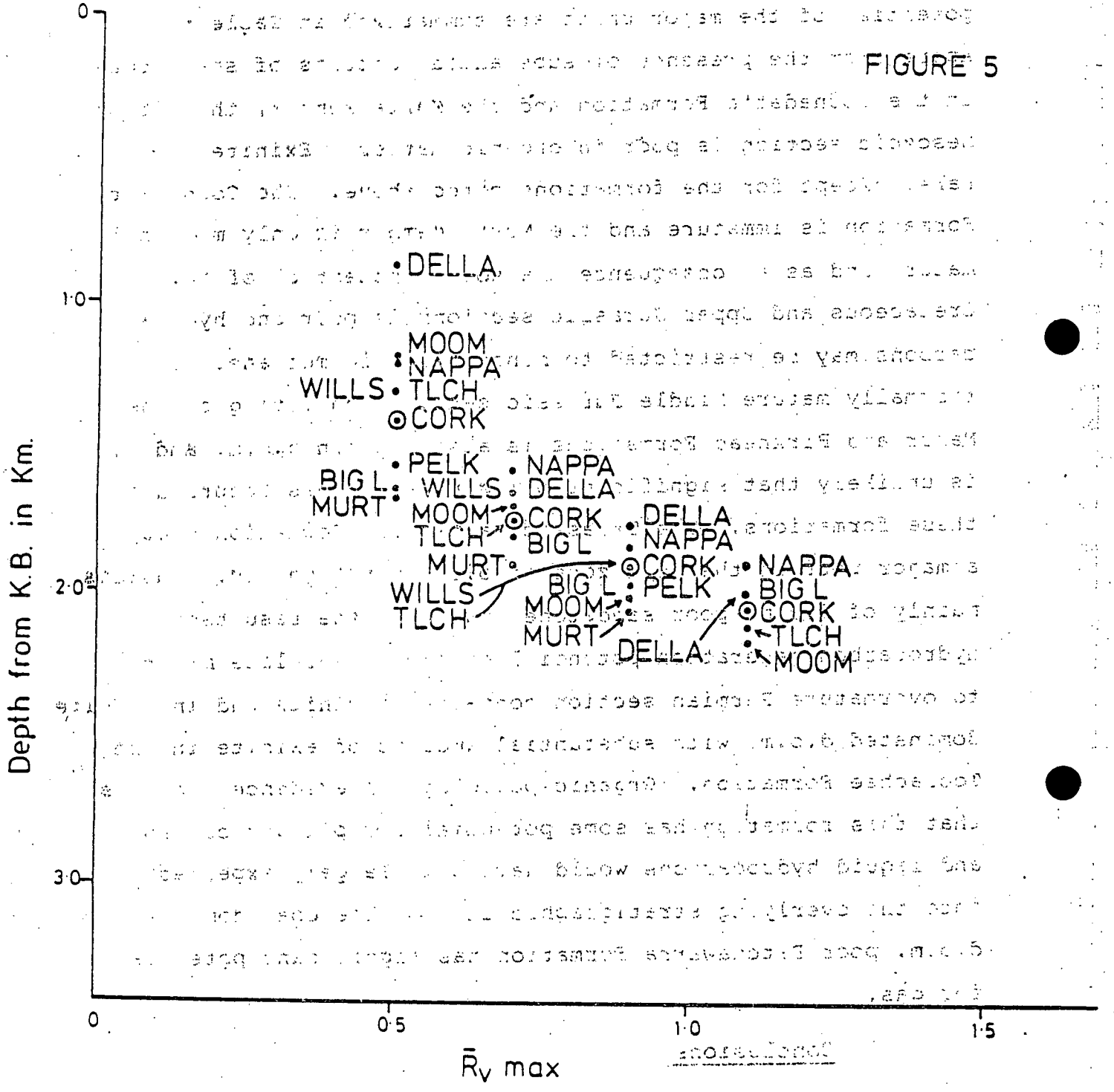

0
1·0
2·0
3·0
Depth from K.B. in Km.
0
0·5
1·0
1·5
$\bar{R}_V$ max
DELLA
MOOM
NAPPA
WILLS
TLCH
CORK
PELK
NAPPA
BIG L
WILLS
DELLA
MURT
MOOM
CORK
DELLA
TLCH
BIG L
NAPPA
MURT
CORK
NAPPA
BIG L
PELK
WILLS
BIG L
CORK
MOOM
TLCH
MURT
DELLA
TLCH
MOOM

FIGURE 5

Source potential and hydrocarbon generation

Source potential and the probable hydrocarbon generation potential of the major units are summarized in Table 4. Apart from the presence of substantial amounts of shaly coal in the Oodnadatta Formation and the Murta Member, the entire Mesozoic section is poor in organic matter. Exinite is also rare, except for the formations cited above. The Oodnadatta Formation is immature and the Murta Member is only marginally mature and as a consequence the source potential of the Cretaceous and Upper Jurassic sections is poor and hydrocarbons may be restricted to minor biogenic methane. The thermally mature Middle Jurassic section consisting of the Namur and Birkhead Formations is also poor in d.o.m. and it is unlikely that significant oil generation has occurred in these formations. The Triassic Nappamerri Formation occupies a major part in the peak zone of oil generation, but consists mainly of d.o.m.-poor sandstone and hence the resultant hydrocarbon generation potential is poor. The late mature to overmature Permian section contains vitrinite and inertinite dominated d.o.m. with substantial amounts of exinite in the Toolachee Formation. Organic petrological evidence suggests that this formation has some potential for oil and condensate, and liquid hydrocarbons would have been largely expelled into the overlying stratigraphic units. The coal dominated, d.o.m. poor Patchawarra Formation has significant potential for gas.

Conclusions

Corkwood No. 1 penetrated a section that is immature to the top of Namur Sandstone. The underlying Jurassic sequence is thermally mature but poor in d.o.m. except for the shaly coals in the Murta Member. D.o.m. poor Nappamerri Formation lies within the peak zone of oil generation. Late mature to

Table 4 Summary of source potential and hydrocarbon generation

UNIT/ FORMATION	SOURCE POTENTIAL		MATURATION LEVEL	PROBABLE RESULTANT HYDROCARBON GENERATION/ MIGRATION
	TYPICAL	CORKWOOD NO. 1		
COONADATTA	FAIR TO GOOD?	FAIR	IMMATURE	MINOR BIOGENIC METHANE
COORIKIANA/ BULLDOG	POOR TO FAIR?	POOR TO FAIR	IMMATURE	MINOR BIOGENIC METHANE
MURTA	GOOD	FAIR	MARGINALLY MATURE	MAINLY BIOGENIC METHANE AND MINOR OIL
NAMUR	POOR TO FAIR	POOR	MATURE	MINOR OIL
BIRKHEAD	FAIR TO GOOD	POOR	MATURE	MINOR OIL
HUTTON	POOR TO FAIR	N.A.	N.A.	N.A.
NAPPAMERRI	POOR	? POOR	MATURE	POSSIBLY SOME OIL AND GAS
TOOLACHEE	GOOD BUT COAL ABUNDANT	GOOD BUT COAL ABUNDANT	MATURE TO LATE MATURE	SOME OIL, SIGNIFICANT CONDENSATE, SOME METHANE
ROSENEATH/ EPSILON/ MURTEREE	GOOD TO VERY GOOD	N.A.	N.A.	N.A.
PATCHAWARRA	GOOD	FAIR, ORGANIC MATTER CHIEFLY AS COAL	LATE MATURE TO OVERMATURE	MAINLY GAS AND PRODUCTS OF HYDROCARBON CRACKING

N.A. - not applicable, not sampled in Corkwood No. 1

overmature Permian section is rich in coal but also contains dispersed organic matter dominated by humic macerals with some exinite present in the upper part. The vitrinite reflectance gradient is moderately high in the Mesozoic and high to very high in the Palaeozoic. Present well temperatures are high in relation to the levels of maturation found.

Within the Mesozoic some source potential is found in the Murta but the formation is only marginally mature. The Toolachee Formation has the best source potential. It has some oil source potential, is late mature and has not yet reached the main zone of dry gas generation.

Oil generation probably commenced in late Mesozoic times and was most intense during the Tertiary.