MINORA RESOURCES N.L.

DEP...
OTWAY BASIN
VICTORIA

WINDERMERE - 1

WELL COMPLETION REPORT

Volume I of

Minora Resources NL

WINDERMERE-1

WELL COMPLETION REPORT

PETROLEUM EXPLORATION PERMIT 111

OTWAY BASIN

VICTORIA, AUSTRALIA

(P111A)

MINORA RESOURCES NL
FEBRUARY 1988

1. INTRODUCTION

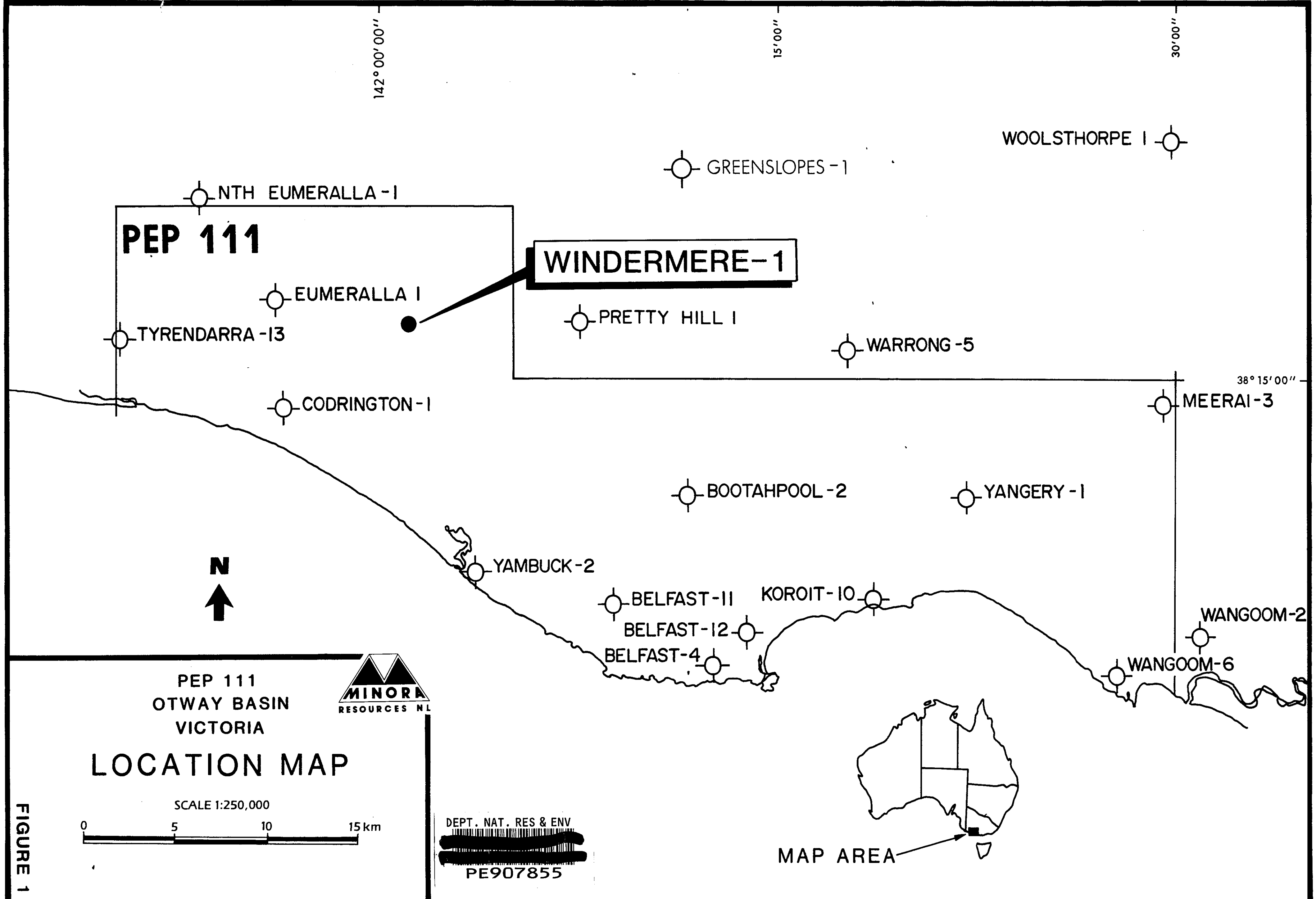
The Windermere-1 well is located 27.5 km northwest of Port Fairy, Victoria on seismic line OPP85A-04, V.P.645 (Figure 1).

Windermere-1 was spudded on 17 March 1987 at 1500 hours, and drilling completed on 8 April 1987 at a total depth of 1852 m. The well was completed as a Heathfield Member of the Eumeralla Formation oil discovery and was suspended on 10 April 1987 for later evaluation of oil producibility of the Heathfield Member. Operations to test the Heathfield Member resumed on 14 May and continued till 29 June when the well was again suspended and the rig released.

Windermere-1 was the first well to be drilled in PEP 111 since the permit was granted to the Joint Venture in 1984.

The PEP 111 Joint Venture participants for the drilling of Windermere-1 were:-

	%
Minora Resources NL (Operator)	20.5
Pan Pacific Petroleum NL	25.0
National Venture Corporation NL	12.5
Marlin Oil NL	12.0
Petro Energy Limited	15.0
NOMECO-Command NL	15.0



PEP 111
OTWAY BASIN
VICTORIA

MINORA RESOURCES NL

LOCATION MAP

SCALE 1:250,000

0 5 10 15 km

DEPT. NAT. RES & ENV
PE907855

FIGURE 1

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APPENDICES

(P111B)

WELL DATA CARD

WELL: WINDERMERE-1 STATE: VICTORIA BASIN: OTWAY

PERMIT: PEP 111 OPERATOR: Minora Resources NL

LOCATION: LATITUDE 38° 13' 44.7" S
LONGITUDE 142° 00' 52.1" E

GRID CO-ORDS: 588,792.15m E
5,768,267.0m N

SEISMIC LINE/SP NO: OPP85A-04/VP645

ELEVATIONS: GL 49m KB 54m ASL

SPUDDED: 1500 hrs, 17/3/87

WELL SUSPENDED: 1800 hrs, 10/4/87

OPERATIONS RESUMED: 1200 hrs 14/5/87

SUSPENSION & RIG RELEASED: 1800 hrs 29/6/87

STATUS: Suspended

RIG: GEARHART RIG 2

TD: 1852 m Driller

COMPLETION DETAILS: Casing set and cemented with tubing, sliding sleeve and packer in place, the xmas tree installed with valves chained.

CASING SIZE:	SHOE DEPTH:
16"	6m
$9^5/_8$"	286m
7"	1849m

SUMMARY:

Windermere-1 made an oil discovery in the Heathfield Member of the Eumeralla Formation. Open hole DST's 1 and 2 recovered 0.5 and 31.9 bbl oil respectively, however cased hole testing failed to recover significant hydrocarbons. The well was left suspended pending further evaluation.

AGE	FORMATION	DEPTH (KB)	DEPTH (SS)	THICKNESS
Miocene	Port Campbell Limestone	5m	+ 49m	105m
Miocene-Oligocene	Gellibrand Marl	110m	- 56m	230m
Oligocene	Clifton Formation	340m	- 286m	93m
Palaeocene	Dilwyn Formation	433m	* - 379m	212.5m
Palaeocene	Pember Mudstone	645.5m	- 591.5m	80m
Palaeocene	Pebble Point Formation	725.5m	- 671.5m	35.5m
Campanian-Santonian	Paaratte Formation	761m	- 707m	205m
Santonian-Coniacian	Belfast Mudstone	966m	- 912m	58m
Albian	Upper Eumeralla Sub-Unit	1024m	* - 970m	167m
Albian	Middle Eumeralla Sub-Unit	1191m	-1137m	559m
Albian	Heathfield Member	1750m	* -1696m	67m
Albian-Aptian	Lower Eumeralla Sub-Unit	1817m	* -1763m	35m+
	Total Depth	1852m	-1798m	-

WELL DATA CARD

WELL: Windermere-1 STATE: Victoria BASIN: Otway

CONVENTIONAL CORES (Log Depths)

NO	CORED	FORMATION	RECOVERED	NO	CORED	FORMATION	RECOVERED
	No cores cut						

WIRELINE LOGS (Gearhart)

LOG TYPE	RUN NO	INTERVAL METRES	BHT/TIME °C	LOG TYPE	RUN NO	INTERVAL	BHT/TIME °C
DLL/MSFL/GR	1	286-1828	67/5.25				
BCS/MEL/GR	1	10-1828	74/n/a				
CDL/CNS/GR	1	286-1827.6	75/16.9				
CIS/SWC	1	452-1816.5	17 cores recovered,shot 47,lost 10, misfired/empty 20				
Veloc. Survey	1	54-1828					
SFT	1	435-1806, 52 survey points, 43 successful					

FORMATION TEST (Log Depths)

TEST NO	INTERVAL metres	FORMATION	FLOW min	SHUT IN min	IHP psi	IFP psi	ISP psi	FFP psi	FSP psi	REV CIR	RESULTS
1	1791-1838	H'field Member	6,120,14	27,242	2885	110	2360	415	2439	Y	0.5 bbl oil 15.5 muddy water
2	1790-1814	"	5,794	34,398	2888	87	2360	1071	2420	Y	Gas TSTM,6.8 bbl mud,11.5 bbl gas cut oil,20.4 bbl oil,20.3 bbl water
3	1750-1790	"	5,65,7	62,5,137	mis-run						nil
4	1798-1813	"	7,607	61,393	2653	94	2141	488	2222	Y	5.6bbl brine & trace oil
5	1782-1787	"	7,75,41	67,7	2614	656	0	0	2614	Y	3000cc brine

HYDROCARBON EVALUATION:

Although a significant volume of oil was recovered during open hole testing, only traces of oil were recovered with formation water during subsequent swabbing operations. The swabbing results and the associated steady inflow of formation water suggest that the well may now be effectively depleted with the current completion. An alternation method of completion or stimulation could be more effective. The most likely interpretation is that the well penetrated 5 metres of oil pay from 1805-1810 metres, probably in an oil transition zone.

MISCELLANEOUS DATA:
Heathfield Member Swab Water: 13,500 ppmcl, Rw 0.286 ohm m at 25°C
BHT is 81°C
Geothermal gradient is 3.3°C/100 m assuming ST of 21°C
Heathfield Member Oil - 40.9° API
- 27°C pour point
- viscosity (40°C) 4.21 centistokes
- specific gravity 0.8205g/cc

(P111D)

3. WELL HISTORY

3.1 General Data

Well Name:	Windermere-1
Name of Operator:	Minora Resources NL 7th floor 55 St George's Terrace Perth WA 6000
Petroleum Title:	Petroleum Exploration Permit 111
Basin:	Otway, Victoria
Location:	Latitude 38°13'44.7" South Longitude 142°00'52.1" East North 5,768,267.00 metres East 588,792.15 metres Seismic Line OPP85A-04, VP 645 Approximately 27.5 km north-west of Port Fairy.
Elevation:	Ground Level 49m ASL KB 54m ASL
Water Supply:	Shallow bore at site
Total Depth:	Driller - 1852m Logger - 1828m (logger unable to reach TD, logs ran at 1838 m, 1838 - 1852 m unlogged).
Well Spudded:	17 March 1987
Rig Released:	10 April 1987
Spud to Release:	25 days
Re-entry and Evaluation Programme Commenced:	14 May 1987
Evaluation Programme Completed:	29 June 1987
Well Status:	Suspended oil producer.

3.2 Drilling Summary (all depths correspond to driller's depths)

Windermere-1 was spudded at 1500 hours on 17 March 1987 with a programmed total depth of 1400m and primary objectives in the Pebble Point Formation, and Upper and Middle Eumeralla Sub-units. A 21" hole was augered to 8m and 16" conductor pipe was cemented at 6m with 30 sacks of class "A" cement. Due to the high water table, the cement job was not sufficient and a further 40 sacks of class "A" cement were pumped through the conductor with returns to surface. A 12 1/4inch surface hole was drilled to 290m and 24 joints of 9 5/8 inch 36lb/ft J55 casing were installed with the shoe at 286m. The string was cemented with 350 sacks of class "A" cement with 0.5% calcium chloride. Good cement returns were observed at the surface.

After nippling up the BOP's, an 8 1/2" hole was drilled to 292m. A formation integrity test was performed to 14.1 lb/gal equivalent mud weight without breakdown. The 8 1/2" hole was then drilled to 1838m, 438m below the programmed depth due to increasing gas readings and favourable drilling conditions and the following suite of electric logs was recorded:

DLL/MSFL/GR/SP/CAL
BCS/MEL/GR to surface/CAL
CDL/CNS/GR
CIS/SWC
VELOCITY SURVEY

Mud log and electric log analysis indicated possible oil saturated sands within the Heathfield Member and an off bottom test, DST. 1, was conducted across the interval 1791 to 1838m. A total of 0.5 barrels of oil was recovered, with 11.5 barrels of gas cut water and 15.5 barrels of muddy water. Gas also flowed to surface during the test at a rate too small to measure. A conventional off bottom straddle test, DST 2, was performed over the interval 1790m to 1814m. The test resulted in a recovery of 20.4 barrels of oil, 11.5 barrels gas cut oil and 20.3 barrels mud cut water with gas TSTM over a 13.25 hour flow period. The well flowed until the test was terminated.

Gearhart Australia conducted an SFT Pressure/Depth survey. Two segregator samples were collected at 435m and 535m. Both samples contained some evidence of mixed mud filtrate and formation water and no evidence of hydrocarbons. The 435m sample appears to be the least contaminated. A total of 52 pressure sampling points were attempted between 1805 and 435m with 43 tight or successful readings. Few successful readings were obtained in the Eumeralla Formation due to low permeabilities. Details of the survey are contained in Appendix H.

A conventional off bottom straddle test, DST. 3 was conducted over the interval 1750m to 1790m but was a mechanical failure and further testing was discontinued.

The hole was deepened to 1852m and a 7" production casing string was run and cemented at 1849m using 53 joints of 291b/ft N80, buttress thread casing and 104 joints of 261b/ft K55, buttress thread casing. The casing was cemented with 680 sacks of class "G" cement returns calculated to 120m KB. The rig was released at 1800 hours 10 April 1987 and stacked in a rigged up mode over the well for use in later productivity evaluation operations.

A drilling time/depth chart is shown in Figure 2.

3.3 Cased Hole Testing Operations

The hole was re-entered on 14 May 1987 and the cement was drilled out to 1833.62m with a 6" bit and casing scraper.

The casing was discplaced with KCL/Polymer brine and perforated from 1798-1813m for DST. 4, which was a valid test and recovered 5.6 barrels brine with a trace of oil.

The casing was again perforated over the interval 1782m to 1787m and DST. 5 was run over the interval with straddle packers. DST. 5 was also a valid test, however only 3000 cc of filtrate, diesel and a trace of possible oil were recovered. Both DST 4 and DST 5 indicated the tested intervals had low productivity and permeability.

On 22 May 1987, 2 7/8" tubing was run with a closed sliding sleeve at 1786.5 metres, an Otis Packer at 1789m and tailpipe to 1800m. The well was swabbed for a total of 113.68 barrels of fluid in 88 runs over a 9 day swabbing operation. Swabbing operations were suspended from 30 May to 11 June to observe fluid inflow. Results of the swabbing are discussed in Appendix I.

Between 0800 hours 13 June and 1700 hours 18 June, the rig was standing by on a care and maintenance basis for a possible sole risk operation to be conducted by Pan Pacific. The operation would have involved milling a window in casing from 1596.5-1614.5m, sidetracking the well to a depth of 1950m and testing and coring the top and basal sand bodies of the Heathfield Member. The sole risk operations were indefinitely deferred by Pan Pacific and the well returned to the Joint Venture.

The well was suspended with the tubing, sliding sleeve and packer in place. The Well Head was installed with all valves chained and the rig was released at 1800 hours on 29 June 1987.

3.4 Drilling Equipment

Drilling Contractor:	Gearhart Drilling 5 Westcombe Street Darra QLD 4076
Drilling Rig:	Gearhart Rig #2
Make:	Superior 700E
Rated Depth:	3500 m
Power:	4 CAT. 3412 PCTA
Mast:	Dreco model no. M12713-510. Height 127', base width 13'6", gross nominal capacity 510,000 lbs.
Pumps:	2 x Gardner Denver PZ-8-750.
Rotary Table:	Oilwell 20 1/2
Drill Pipe:	3,000 m 4 1/2"OD.16.6 lb/ft, Grade E
Drill Collars:	3 x 8" OD drill collars 26 x 6 1/4" OD drill collars.
BOP's:	One Hydril 13 $^{5}/_{8}$" x 3000 PSI spherical annular BOP, studded top and flanged bottom. One Hydril 13 $^{5}/_{8}$" x 5000 PSI flanged double gate BOP. One Wagner model 130-160 3 BND 160 gallon accumulator.

3.5 Drilling Data

3.5.1 Well Configuration (Figure 3)

Hole Size	Depth	Casing and Cementing Details
12 1/4"	290m	Ran 24 joints of $9^5/_8$" J55 36lb/ft casing. Shoe at 286m and float collar at 275m. Cemented with 350 sacks of class A with 0.5% calcium chloride, 15.6 PPG.
8 1/2"	1852m	Ran 53 joints of 7" N80 29 lb/ft casing and 104 joints of K55 26 lb/ft buttress thread casing. Cemented with 680 sacks of class "G" cement.

3.5.2 Completion

The well was completed as a Heathfield Member oil producer. Details are shown in the completion diagram (Figure 4). A summary of the wellhead configuration is shown as Figure 5.

3.5.3 Drilling Fluid

Drilling fluid materials and engineering services were provided by Baroid Australia Pty Ltd. A KCL Polymer mud system was used. Details are given in Appendix F.

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DOWNHOLE WELL SCHEMATIC

WELL CONFIGURATION

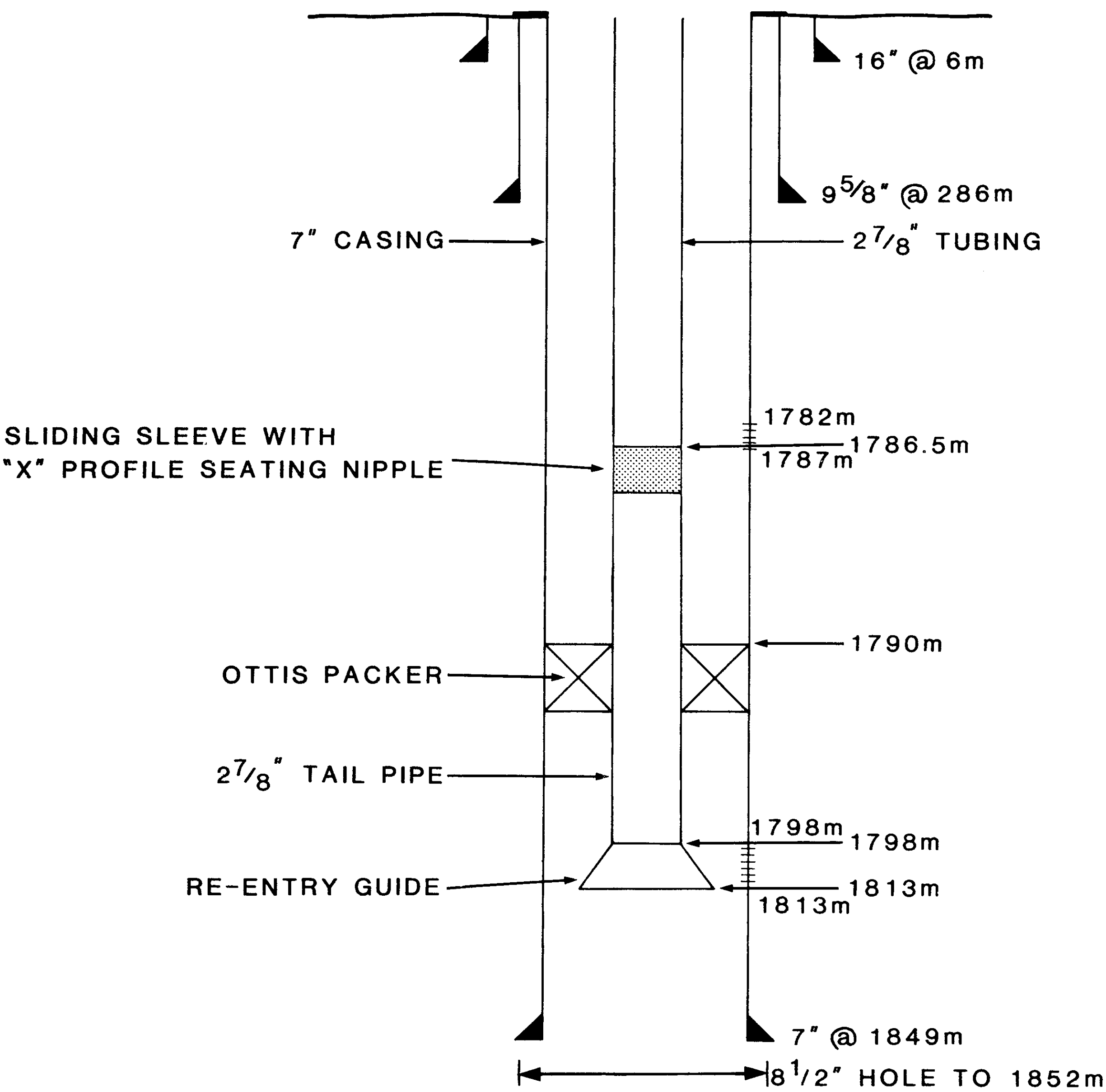


FIGURE 3

WINDERMERE-1

COMPLETION DIAGRAM

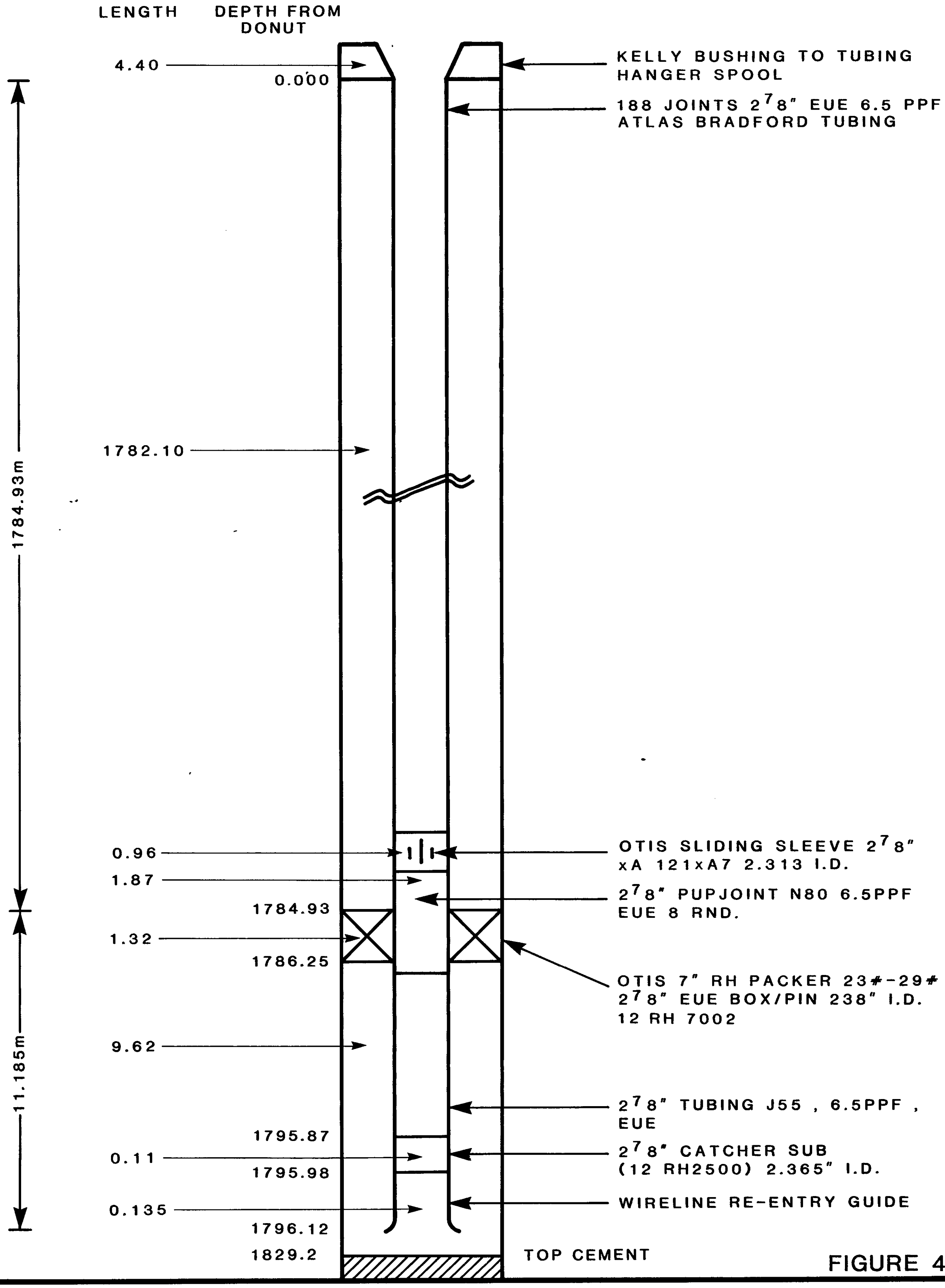
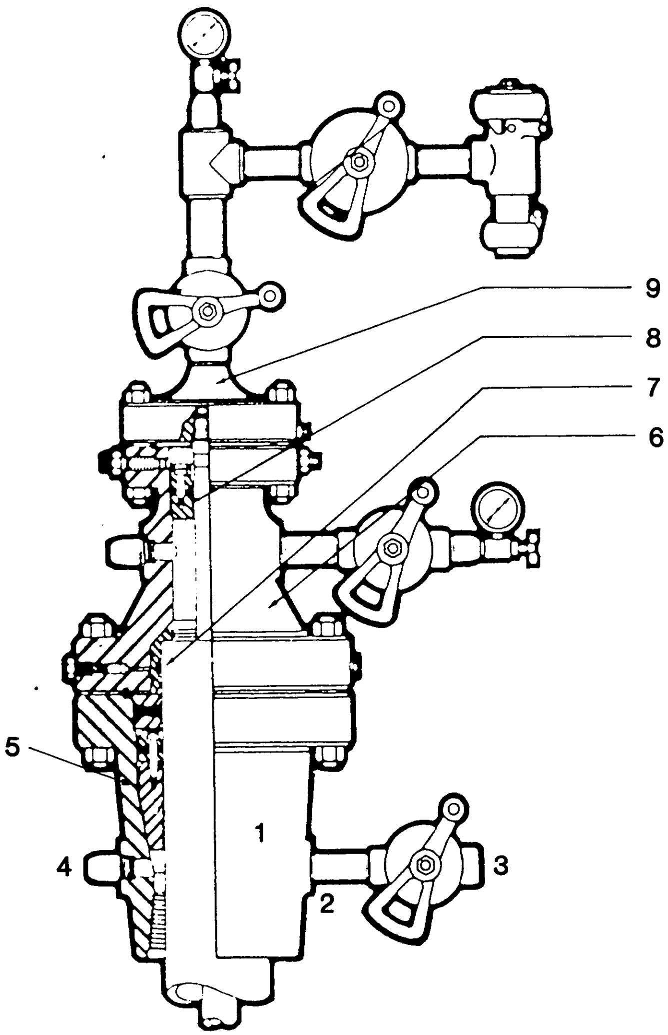


FIGURE 4



ITEM No

(1)	HOUSING , CASING HEAD , TYPE "5" 11" 3000 PSI x $9^5$8" FEMALE SLIPON C/W (2) 2" LP THREADED OUTLETS
(2)	NIPPLE XXHW 2" LPx6" LONG
(3)	VALVE , GATE MODEL "C" 3000 PSI
(4)	BULL PLUG 2" LP
(5)	UNITIZED SLIP AND SEAL ASSEMBLEY 7" WITH 5 PACKOFF
(6)	TUBING HEAD SPOOL
(7)	CROSSOVER SEAL
(8)	TUBING HANGER
(9)	TUBING HEAD ADAPTER

NOTE : ALL WELLHEAD COMPONENTS SUPPLIED BY WKM

WINDERMERE-1

WELLHEAD COMPLETION SCHEMATIC

FIGURE 5

3.5.4 Deviation Surveys

Deviation surveys were recorded at regular intervals. A maximum deviation of 4° was recorded at 1835 m.

Depth (m)	Deviation (Deg.)
69.9	1/4
153.2	1/4
285.0	1/4
368.0	1/4
429.0	3/4
544.0	1
648.0	1 1/4
756.0	1/4
901.0	0
998.0	3/4
1021.0	1
1067.0	1 1/2
1167.0	1
1500.0	3/4
1600.0	3/4
1835.0	4

3.5.5 Formation Sampling

Drill cuttings samples were collected at 10m intervals from surface to $9^5/_8$" casing depth at 286 m and at 5m intervals thereafter to the total depth of 1852m. Samples were air dried and split with one set of samples forwarded to the Government Core Laboratory, Petroleum Division, Department of Industry, Technology and Resources, Port Melbourne. Three sets of washed and dried samples and two sets of wet composited samples were retained by Minora Resources NL at their offices in Perth.

3.5.6 Gas Detector and Penetration Rate

A continuous reading total gas detector (flame ionisation detector) and gas chromatograph were in operation from surface to total depth. This equipment, together with drilling rate, pump rate and pit volume recorders, were operated by Gearhart Geodata Pty Ltd. Drilling rate was recorded at one metre intervals throughout the well and, together with total gas and chromatography readings, is displayed on the 1:500 scale mud log (Enclosure 2).

3.5.7 Conventional Coring

No cores were cut in Windermere-1.

3.5.8 Sidewall Cores

Two guns of sidewall samples were run with 47 shots attempted, 10 lost, 20 empty and 17 cores recovered.

A list of sidewall samples and descriptions is given in Appendix B.

3.5.9 Wireline Logging

The following suite of logs was recorded by Gearhart when the well was at a depth of 1838 m:-

DLL-MSFL-GR-SP-CAL	1827.4 - 286	
BCS-MEL-GR-CAL	1828.0 - 286	GR to surface
CDL-CNS-GR	1827.6 - 286	
CIS-SWC	1816.5 - 452	
SFT	1806 - 435	
VELOCITY SURVEY	1828 - 54	

The following bottom-hole temperatures were recorded on successive Gearhart logging runs:-

Log	Maximum Temp (°C)	Time Since Circulation Stopped (hours)
DLL-MSFL-GR-SP-CAL	67	5.25
BCS-MEL-GR-CAL	74	N/A
CDL-CNS-GR	75	16.9

The projected bottom hole temperature is 81°C at 1828m, giving a calculated geothermal gradient of 3.3°C/100m (assuming a mean surface temperature of 21°C).

3.5.10 Drill Stem Tests

Three open hole drill stem tests (1,2 & 3) and two cased hole drill stem tests (4 & 5) were conducted in Windermere-1. DST.'s 1 & 4 were conventional off bottom tests. DST's no. 2, 3 & 5 were off bottom straddle tests. All tests were run after evaluation with electric logs.

DST No.	INTERVAL (metres)	FLOW PERIODS (minutes)	SHUT-IN (minutes)	RECOVERY
1	1791-1838	6,120,14	27,242	0.5 bbl oil 15.5 bbl muddy water
2	1790-1814	5,794	34,398	59 bbl oil, water & mud
3	1750-1790	5,65,7	62,5,137	NIL
4	1798-1813	7,607	61,393	5.6 bbl brine & trace oil
5	1782-1787	7,75,41	67,7	3000 cc brine

The drill stem test reports are given in Appendix G.

3.5.11 Selective Formation Testing

Results of the SFT's conducted at 52 points in the well between 435 and 1806m are given in Appendix E, along with a plot of pressure and depth data.

3.5.12 Swabbing

Results of swabbing program conducted over nine days are included in Appendix I showing per run fluid recovery and total fluid recovery.

3.5.13 Velocity Survey

A well check shot survey was conducted by Velocity Data Pty Ltd and is uncluded as Appendix N.

4 GEOLOGY

4.1 Regional Geology

The Otway Basin formed as a rifted continental margin basin with the rifting and initial breakup stage during the Late Jurassic to Mid-Cretaceous being dominated by continental sedimentation. The Late Cretaceous - Tertiary sequence deposited during the period of continental dispersal of Southern Australia and Antarctica is comprised of four depositional sequences with widespread marine shales or marls intercalated with carbonates or porous sandstones. Tectonic activity associated with the breakup movements caused extensive block faulting through the basin. These faults were the control for early wrench movements and localised Tertiary rejuvenation.

The prospectivity of the basin is recognised from the thick Early Cretaceous sequence of source rocks which have demonstrated oil maturity. The basin has extensive structuring and numerous potential reservoirs and seals. Stranding of bitumen has been observed along the southern coastlines of Victoria and South Australia. It appears to have been derived from continental sourcebeds and is believed to have seeped up fault planes in the offshore portion of the Otway Basin.

4.2 Regional Stratigraphy (Refer figure 6)

Economic basement consists of Palaeozoic rocks of the Tasman Geosyncline. The structural history of the Palaeozoic sequence is complex, with deposition mainly aligned north-south in fault bounded lows and high areas.

Late Jurassic - Early Cretaceous

A late Jurassic sequence of volcanic and clastic rocks, the <u>Casterton Beds</u>, has been drilled near the South Australian border and represents the oldest known sequence in the basin. The overlying <u>Otway Group</u> was deposited under non-marine conditions prior to continental dispersal in a deep graben, probably formed in an extensional wrench-related setting. The <u>Pretty Hill Sandstone</u> at the base of the group is a thick sequence of coarse, quartzose sandstones deposited under high energy fluvial conditions, either as proximal fanglomerates or more distal braided stream sediments. Partially time equivalent to, and overlying the Pretty Hill Sandstone, is the Geltwood Beach Formation, a sequence of finer grained interbedded arenaceous and argillaceous sediments. Towards the northern basin margin, there is evidence for unconformities bounding the Pretty Hill Sandstone, the Geltwood Beach Formation and the overlying unit, the Eumeralla Formation. In the deepest parts of the basin, the boundaries between these three units may be represented by hiatuses but are essentially conformable. The Eumeralla Formation is the major unit of the Otway Group and consists of fine-grained fluviatile and lacustrine deposits of immature feldspathic sediments and bentonitic claystones. Up to 50% of the arenaceous beds in the unit were derived from volcanic sources. In the PEP 111 area, the Eumeralla appears to constitute three depositional sequences. Although occasional thick arenaceous bodies may be developed towards the base of the oldest Eumeralla sequence, it is the most argillaceous and coally of the three Eumeralla sub-units, forming a broad fining towards sequence. Logs show the Middle Eumeralla Sub-unit to comprise numerous argillaceous and arenaceous interbeds. The log character and palynological correlations in the Middle Eumeralla suggest that an equivalent of the Heathfield Member is present at the base of the sequence in the PEP 111 area and also show that the sandstones higher in the middle sub-unit are thicker and cleaner than those in the enveloping Eumeralla sequences. Locally, angularity can be recognised between the Middle and Upper Eumeralla. Lithologically, the Upper Eumeralla is similar to the middle sub-unit, but the arenaceous bodies are somewhat thinner bedded and more argillaceous.

Late Cretaceous

Near the end of the Early Cretaceous, volcanic activity paused. A major unconformity (the breakup unconformity) represents a hiatus between the Otway Group and overlying Sherbrook Group sediments. The Waare Sandstone, a fluvio-deltaic unit, was the first to be deposited on the unconformity and was restricted to depressions in the Otway Group terrain to the west and to the east of PEP 111. This formation is conformably overlain by the shallow marine to paralic Flaxman Formation. This in turn is overlain by an extensive marine silty claystone, the Belfast Mudstone, partially time equivalents, Nullawaare Greensand and the Paaratte Formation. The non-marine coarse sandstones, gravels and coals at the top of the Paaratte are referred to as the Timboon Sand.

Tertiary

The Cretacous-Tertiary boundary is unconformable with the Sherbrook Group, being overlain by the Wangerrip Group. This younger group comprises a basal transgressive conglomeratic sandstone, the Pebble Point Formation overlain by a fine-grained pro-delta marine facies unit, the Pember Mudstone. The latter interfingers with, and is overstepped by, a deltaic sandstone, siltstone and shale sequence, the Dilwyn Formation.

A regional unconformity separates the Wangerrip Group from the Nirranda and the Heytesbury Groups, each being extensive sequences of marls and limestone with minor sandstones deposited under open marine conditions on a subsiding shelf.

The former group usually comprises a basal sandstone unit, the Mepunga Formation which passes up into the Narrawaturk Marl. The basal unit of the Heytesbury Group usually consists of a shallow water bioclastic limestone/sandstone unit, the Clifton Formation, which passes upwards into a deeper water facies, the Gellibrand Marl. The Port Campbell Limestone is the overlying formation and consists of an offlapping wedge of coarse bioclastic limestones.

A late Tertiary period of wrench-related faulting and folding is apparent in several areas of the basin, including the major fault system bounding the Windermere Prospect.

4.3 PREVIOUS EXPLORATION

Frome-Broken Hill was granted PEP 5 prior to 1958 and conducted reflection and refraction seismic surveys in the years 1958 to 1964. During this period the wells Pretty Hill-1 and Eumeralla-1 were drilled. Shell farmed into the area in 1965 and conducted seismic surveys from 1966 to 1973. In addition, an aeromagnetic survey was conducted in 1970. North Eumeralla-1 was drilled in 1974 before Shell relinquished the area. Government water bores were drilled from 1959 to 1968.

PEP 5 expired in mid-1975 and the area was taken up by Beach Petroleum in 1976 under PEP 93. Beach did not conduct any exploration within the area, now known as PEP 111. PEP 111 was granted on 4th September 1984 for an initial period of 2 years. The initial term of the Permit was extended by another year, during which Windermere-1 was drilled.

Seismic Surveys carried out in or near PEP 111 are summarised as follows:

Date	Name of Survey	Company	Contractor
1958	Portland and Port Campbell-Timboon	Frome-Broken Hill	United Geophysical
1962	Yambuck-Portland	Frome-Broken Hill	Ray Service
1964	Koroit	Frome-Broken Hill	United Geophysical
1966	Port Fairy-Nelson	Shell	United Geophysical
1969	Hawkesdale	Shell	GSI
1970	Portland-McArthur	Shell	GSI
1971	Nelson-Koroit	Shell	Petty Geophysical
1973	Coastal Strip	Shell	Ray Geophysical
1985	Toolong	Pan Pacific	Geo Systems
1985	Windermere to Port Fairy	Pan Pacific	Seiscom Delta

In addition to the 1985 seismic acquisition, the current permittees have reprocessed the 1971, 1973 and certain older data from the permit area.

Port Campbell Embayment

Port Campbell-1, drilled in 1959 encountered a small flow of petroliferous gas from the Waarre Formation and Port Campbell-4, drilled in 1964, recovered free oil from the Eumeralla Formation. North Paaratte-1, drilled by Beach in 1979, flowed gas at rates of up to 270,000 cm/d (9.6 mmcf/d) from the Waarre Formation. In 1981, Beach's Grumby-1 flowed gas at 200,000 cm/d (7.3 mmcf/d) with approximately 50% carbon dioxide and Wallaby Creek-1, also drilled in 1981, tested gas at 280,000 cm/d (9.8 mmcf/d).

North Paaratte and Wallaby Creek fields contain at least 425 million cubic metres (15 bcf) of gas, and a pipeline transports this gas to Warrnambool.

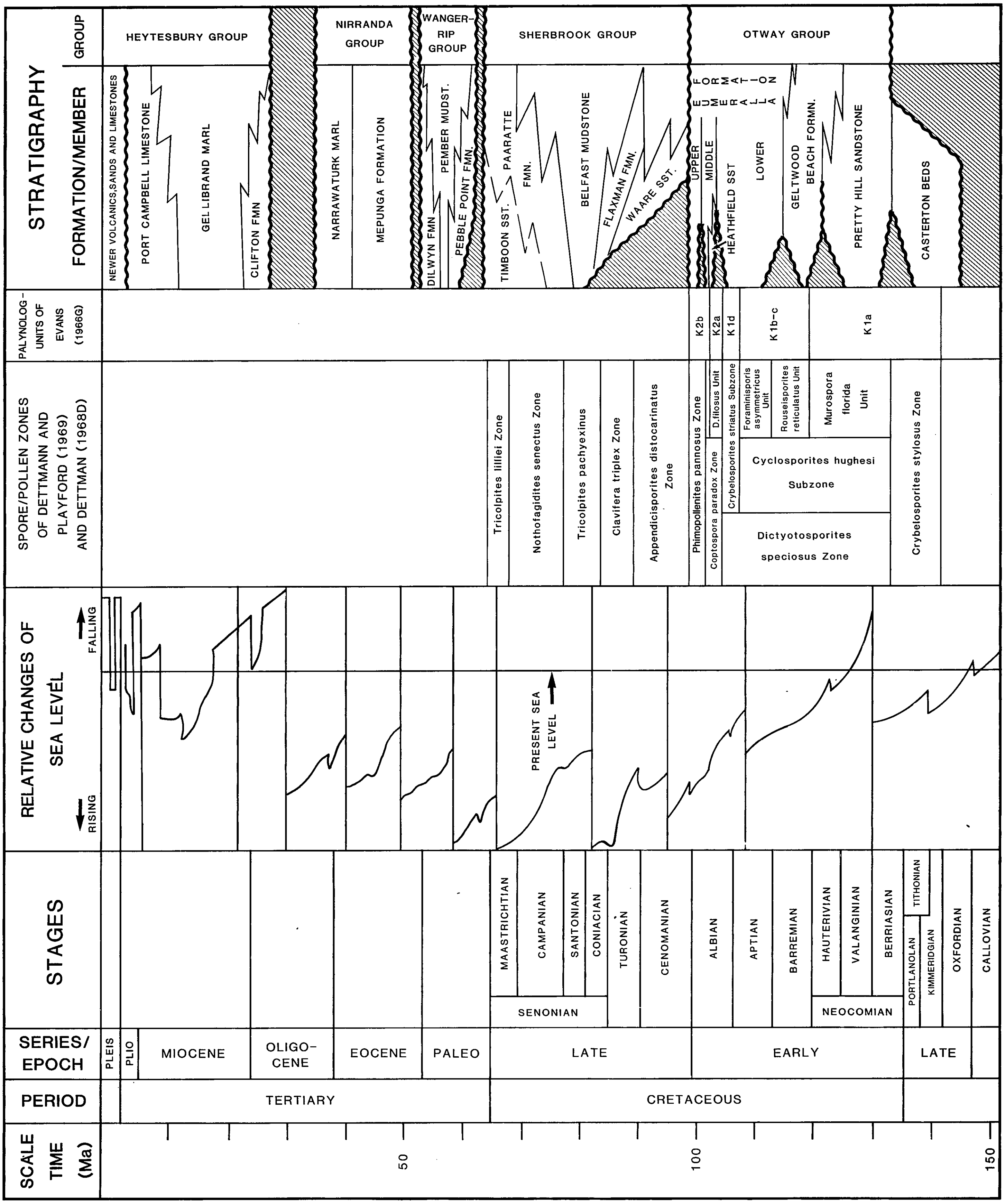
Tyrendarra Embayment

Few structurally valid wells have been drilled in this area. Modern exploration commenced in the late 1970's with Beach Petroleum acquiring extensive coverage of high resolution seismic. Drilled by Beach in 1983, the Lindon-1 well recovered a small amount of heavy, waxy oil from a drillstem test of the Pebble Point Formation over the interval 891-912m. The Fahley-1 well, drilled farther west by Beach in 1985 is believed to have encountered strong gas shows.

Several exploration wells have been drilled in or near PEP 111, but only Eumeralla-1, drilled by Frome-Broken Hill in 1962-63 was drilled within the permit area. The remaining boreholes in PEP 111 were drilled by the Victorian Government to evaluate the ground water of the area, or to supply water for local towns. Most of the latter wells penetrated the top of the Eumeralla Formation, whilst Eumeralla-1 appears to have been terminated in the Geltwood Beach Formation, or uppermost part of the Pretty Hill Sandstone. Pretty Hill-1 and North Eumeralla-1 both penetrated the Pretty Hill Sandstone, the latter was terminated in pre-Cretaceous basement. The only well in the proximity of PEP 111 with recorded oil shows is Eumeralla-1, which had fluorescence from several zones between 1448 and 2956m (4750 and 9700 feet). Eumeralla-1 tested a rotated fault block and was on the downthrown side of the major antithetic fault until it entered the Middle Eumeralla in the upthrown block. North Eumeralla-1 tested a similar structure and penetrated two major fault zones, one of which placed the Pretty Hill Sandstone structural crest upthrown from the well. While Pretty Hill-1 drilled good Pretty Hill Sandstone reservoirs in a prominent upthrown block, the well does not appear to have been crestal at all hydrocarbon objective levels.

Wells and boreholes drilled within, or close to, the permit are listed in the following table.

Year	Well Name	Company	T.D.	Oldest Fm Penetrated
1959	Belfast-4	Government	-1674m	Eumeralla
1967	Belfast-11	Government	-1464m	Eumeralla
1968	Bootahpool-2	Government	-1343m	Eumeralla
1968	Codrington-1	Government	-1262m	Eumeralla
1962	Eumeralla-1	Frome-Broken Hill	-3091m	Prob. Geltwood Beach
1985	Greenslopes-1	Phoenix	-2520m	Basement
1966	Koroit-10	Government	-1496m	Eumeralla
197?	Meerai-3	Government	- 561m	Pebble Point
1968	Nautilus-1	Esso	-1982m	Belfast Shale
1973	Nth Eumeralla-1	Shell	-2677m	Casterton Beds
1967	Pecten-1A	Shell	-2816m	Eumeralla
1962	Pretty Hill-1	Frome-Broken Hill	-2416m	Casterton Beds
1982	Triton-1	Esso	-3516m	Waarre
1968	Tyrendarra-13	Government	-1362m	Eumeralla
1967	Voluta-1	Shell	-3940m	Flaxman
1960	Wangoom-2	Government	-1036m	Eumeralla



MINORA RESOURCES NL

PEP 111
OTWAY BASIN
VICTORIA

OTWAY BASIN TYRENDARRA EMBAYMENT BIOSTRATIGRAPHY

FIGURE 6

1961	Wangoom-6	Government	-1186m	Eumeralla
1967	Warrong-5	Government	-1021m	Eumeralla
1968	Woolsthorpe-1	Interstate Oil Ltd	-1846m	Casterton
1967	Yambuck-2	Government	-1530m	Eumeralla
1960	Yangery-1	Government	-1239m	Eumeralla

4.4 Rationale for Drilling

4.4.1 Geophysical Mapping and Structure

Prior to the drilling of Windermere-1, the structure was identified and delineated by two rounds of seismic shooting acquired during 1985. This data provided an approximate 1 kilometre detail grid over the prospect.

The Windermere structure is an anticlinal feature on the downthrown side of a major growth fault. A broad anticlinal structure at top Dilwyn Formation level crests 1.8 km southwest of the Windermere-1 drilling location while at deeper levels, the structural crest is displaced to the northeast. At Pebble Point horizon, the structure is a simple anticline while at the top Heathfield Sandstone Member some faulting is observed. Deeper in the sequence at the Aptian Unconformity, the structure is a faulted anticline, with throw across the fault in the order of 700 m. Thickening of the Eumeralla sequence on the northern flank of the structure indicates early growth. Onlap onto the Aptian Unconformity indicates a positive structure at base Eumeralla time. (Refer Figures 7 and 8)

Young fault movement on the north bounding fault, probably during the Late Tertiary, is evident on seismic recorded over the area northwest of the Windermere-1 well. Localised wrenching is believed to have formed part of this younger tectonic movement.

Prior to drilling, the structure had been mapped on near top Dilwyn Formation (good regional reflector), near base Tertiary (reasonably reliable reflector) and near base Belfast Mudstone (good regional reflector) seismic horizons. The well was located primarily on the most suitable location for the Pebble Point Formation (near base Tertiary).

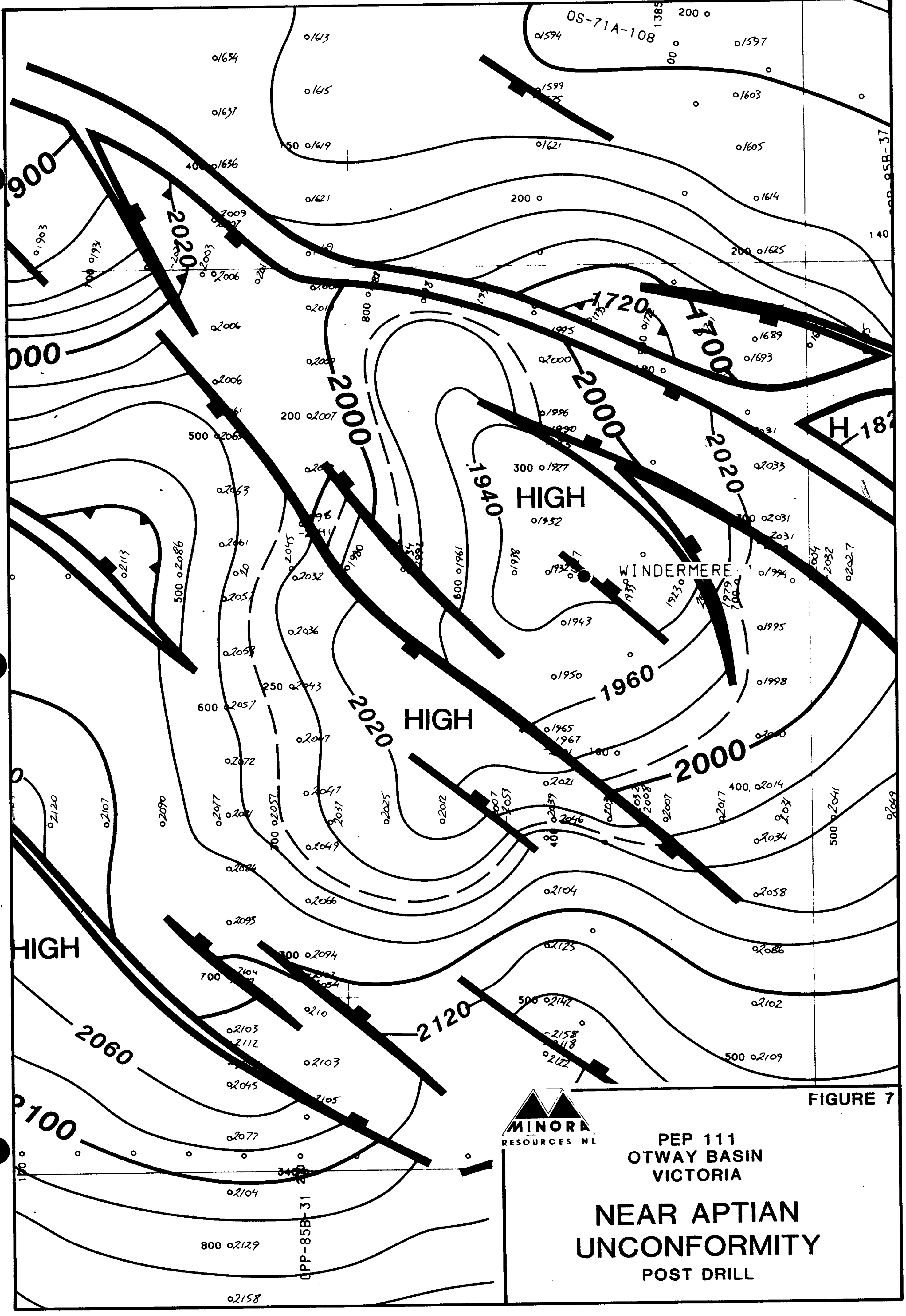


FIGURE 7

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PEP 111
OTWAY BASIN
VICTORIA

NEAR APTIAN UNCONFORMITY
POST DRILL

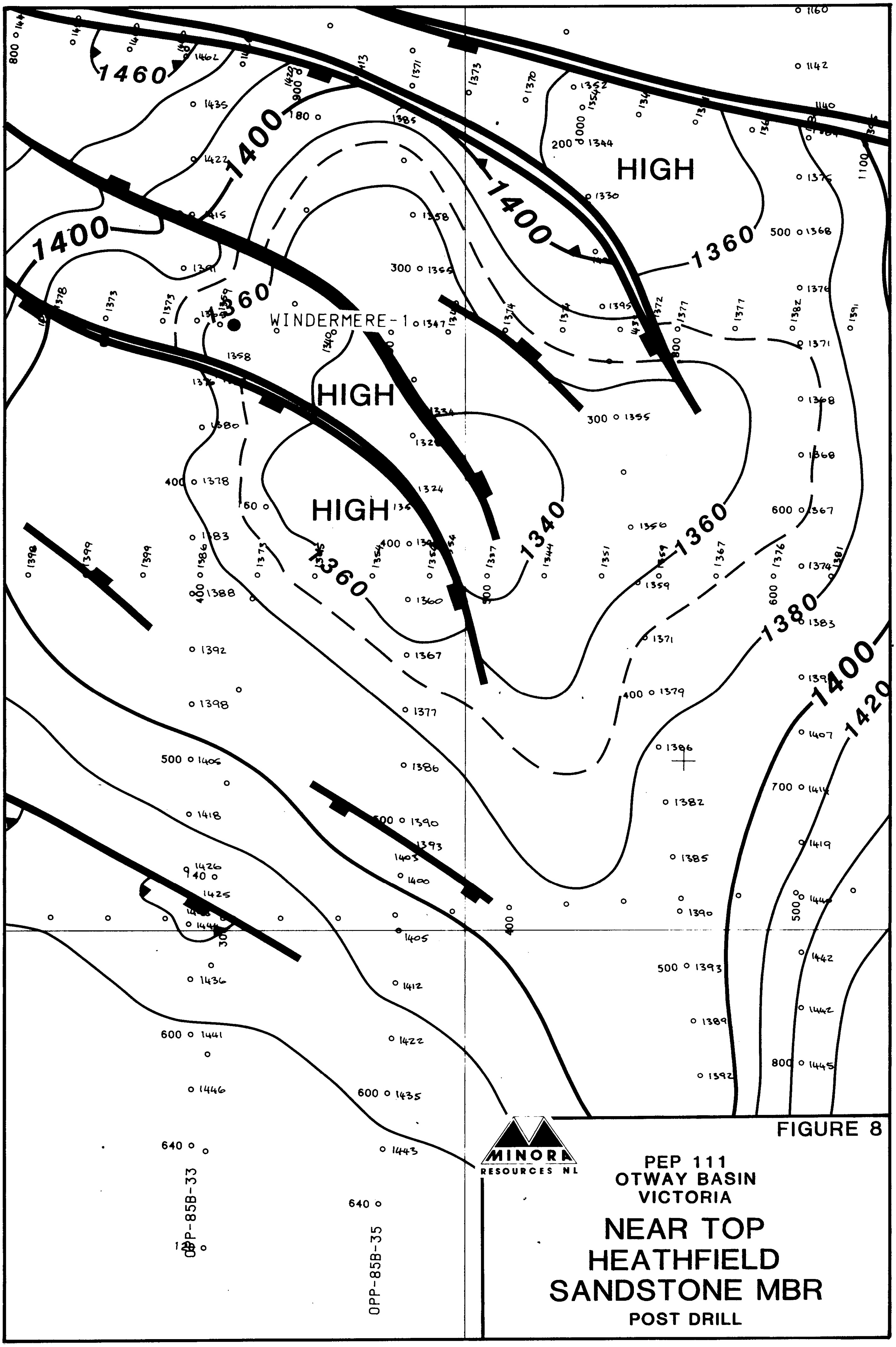


FIGURE 8

PEP 111
OTWAY BASIN
VICTORIA

NEAR TOP HEATHFIELD SANDSTONE MBR

POST DRILL

WINDERMERE-1
(PROJECTED 300m WEST)
85B-33 PRE-DRILL INTERPRETATION

NORTH

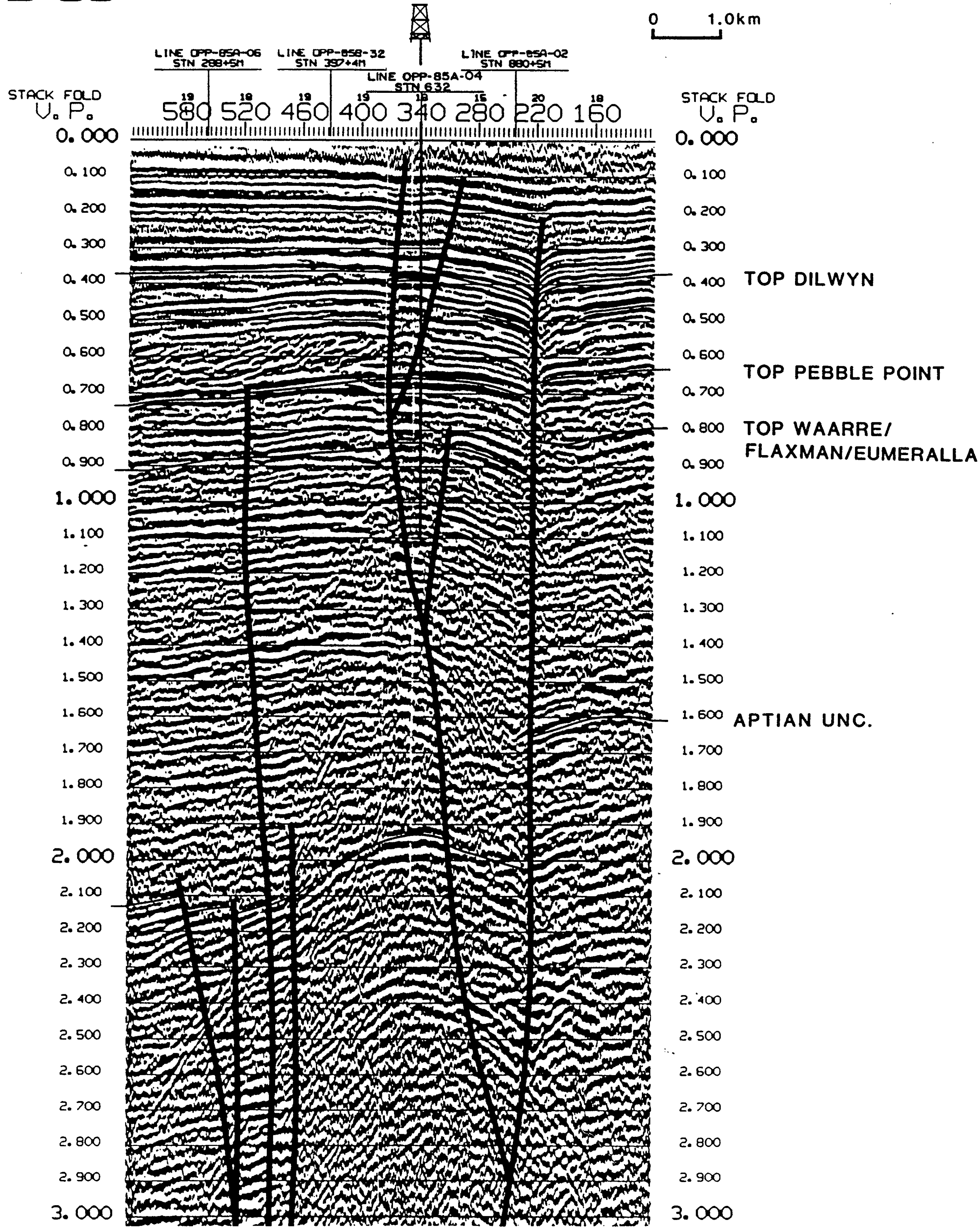


FIGURE 9

4.4.2 Objectives

The Windermere structure exhibits generally co-incident closure between Basement and Pebble Point Formation but the well also tested the Dilwyn Formation within closure. The Joint Venture programmed the well to evaluate all potential objectives between the Dilwyn Formation and the thickest Eumeralla sands, usually developed in the upper part of the Middle Eumeralla sub-unit. The primary objectives however were the Pebble Point Formation, suitable sands beneath the Belfast Mudstone and sands within the Middle/Upper Eumeralla Formation. These units respectively reservoir, oil at Lindon-1, gas at the North Paaratte field and oil at Port Campbell-4.

The Heathfield Member was recognised as a possible secondary objective prior to the drilling of Windermere-1 but the well was not programmed to test the Heathfield Member due to the generally poor reservoir characteristics in nearby wells, and the incremental increase in depth.

It was anticipated that the sequence to be drilled would be thermally immature. It was however expected that the minor crestal faults and major bounding fault could provide hydrocarbon migration conduits from deeper levels where potential oil source and adequate maturity have been identified in adjacent wells.

4.5 Windermere-1 Stratigraphy

(depths Below KB)

Refer Figure 9.

4.5.1 Tertiary

5-110m Port Campbell Limestone (Miocene)

The Port Campbell Limestone is 105m thick at Windermere-1 and consists of cream to grey limestone with abundant fossil fragments and traces of ferruginous and carbonaceous material and glauconite. The limestone is soft to firm and has no visual porosity.

110-340m **Gellibrand Marl** (Miocene-Oligocene)

This unit comprises light grey to olive grey soft, slightly silty marl with traces of carbonaceous material and glauconite and is interbedded with minor, finely crystalline, fossiliferous grey limestone.

340-433m **Clifton Formation** (Oligocene)

The top 76.5m of this formation, which conformably underlies the Gellibrand Marl, consists of interbedded marl and limestone, with the basal 16.5m being volcanics. The marl is light grey to olive grey, fossiliferous, soft, with traces of carbonaceous material and glauconite. The limestone increases with depth to about 50% of the lithology and is grey to buff, finely crystalline, fossiliferous and firm with very low porosity. Minor light grey to buff, calcareous claystone is also present.

The volcanics at the base of the formation appear to be dark grey to black, medium grained dolerite or basalt, with feldspar phenocrysts in a finer-grained, mafic matrix. The matrix appears to be partly replaced by chlorite and calcite. Seismic data shows several discrete volcanic bodies to be present at the same stratigraphic level in PEP 111.

433-645.5m **Dilwyn Formation** (Palaeocene)

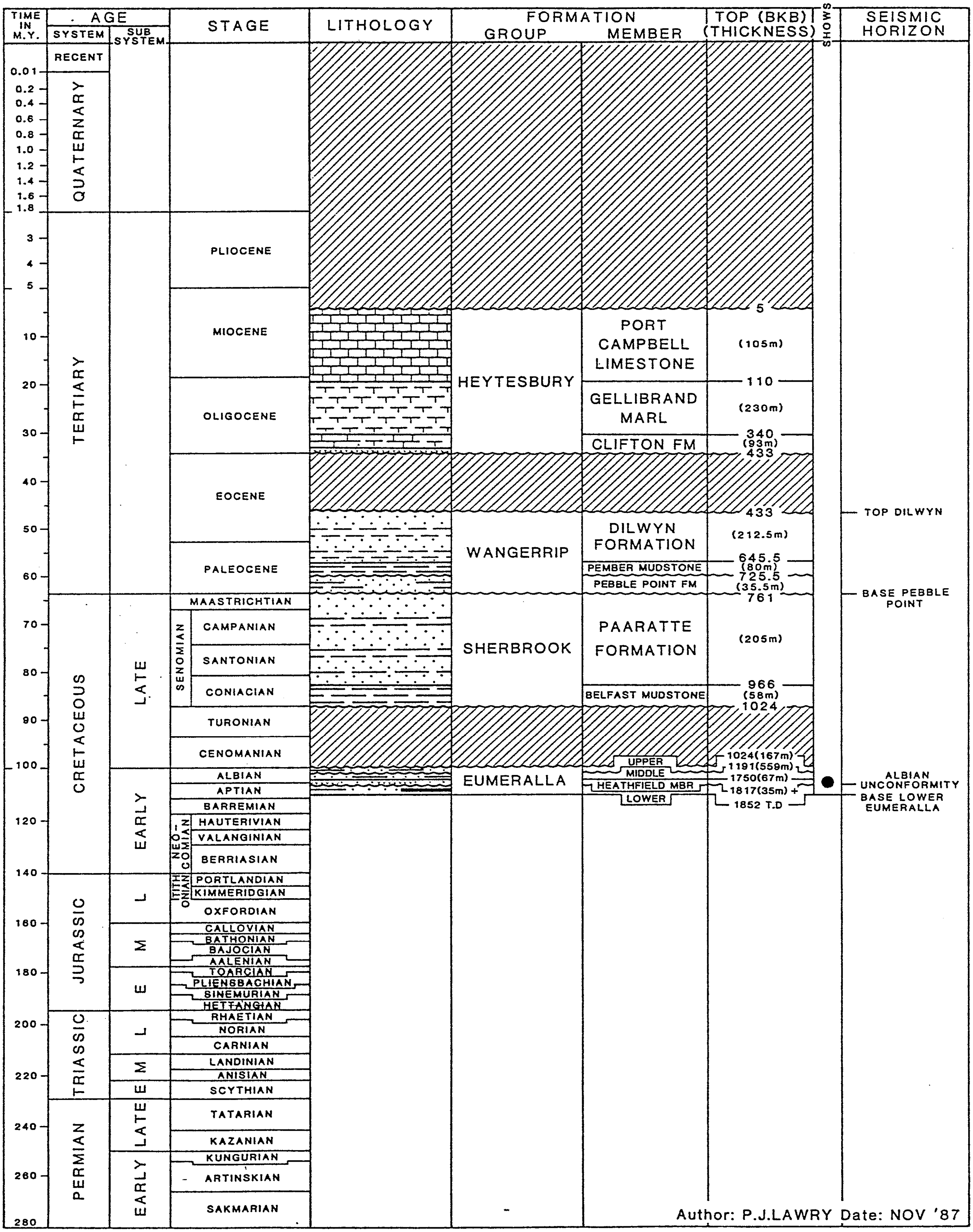
The Dilwyn Formation consists of a series of blocky and coarsening upwards marine beach barrier sandstones interbedded with shallow marine shales, overlain by lower coastal plain interbedded sandstone and carbonaceous shales. The beach barrier sandstones, below 480m, are clear to light brown, medium to coarse-grained, well sorted, with traces of fossil fragments and calcite and good visual porosity. The interbedded claystones are brown to olive grey, fossiliferous and calcareous in part and grade to marl in places. The overlying lower coastal plain sequence consists of clear to white, fine to coarse-grained, poorly to moderately sorted, porous sandstone interbedded with brown, silty, carbonaceous claystone.

FIGURE 10

MINORA RESOURCES NL

WINDERMERE-1
STRATIGRAPHIC TABLE

KB: 54mASL GL: 49mASL T.D: 1852mBKB



Author: P.J.LAWRY Date: NOV '87

645.5-725.5m **Pember Mudstone** (Palaeocene)

The Pember Mudstone is a thick shallow marine unit of olive grey to grey brown, soft, silty claystone which is calcareous and carbonaceous in part with traces of coal and sandstone.

725.5-761m **Pebble Point Formation** (Palaeocene)

This unit consists of sandstone with minor interbedded claystone. The sandstone is clear to brown, medium-grained, moderately well sorted, subangular to subrounded and friable with good visual porosity. The claytone is olive grey to dark brown, calcareous in part, soft and silty.

4.5.2 Cretaceous

761-966m **Paaratte Formation** (Campanian-Santonian)

The Paaratte Formation unconformably underlies the Pebble Point Formation and consists of interbedded blocky sandstone and claystones. The sandstones are clear, medium to coarse-grained, moderately sorted, subrounded and with good visual porosity. The claystones are dark grey-brown, soft and silty in part.

966-1024m **Belfast Mudstone** (Santonian-Coniacian)

Dark grey-brown, soft to firm, fossiliferous claystone comprises the Belfast Mudstone. The claystone is silty in part and grades to light grey-greeen subfissile, silty, slightly carbonaceous claystone with depth.

1024-1191m **Upper Eumeralla Sub-unit** (Albian)

The Eumeralla Formation unconformably underlies the Belfast Mudstone and parts of the Tyrendarra Embayment can be subdivided into an Upper, Middle and Lower Eumeralla Sub-units. The Upper Eumeralla Sub-Unit comprises a sequence of interbedded claystones and sandstones of continental origin. The claystones are greenish grey, silty and micromicaceous and the sandstones are clear to light grey, fine to medium-grained, moderately well sorted, subangular, lithic and argillaceous. Visual porosity is low.

1191-1750m **Middle Eumeralla Sub-unit** (Albian)

Unconformably underlying the Upper Eumeralla Sub-unit is the Middle Eumeralla Sub-unit. The unconformity is apparent on seismic data and on electric logs the break between the two is marked by a shift on the resistivity and sonic values. The Middle Eumeralla Sub-unit is lithologically similar to the Upper Eumeralla, with compositionally immature sandstones and consists of interbedded sandstone, light grey to greenish grey, fine-grained moderately to well sorted, subangular, argillaceous, calcareous in part with multicoloured lithic fragments, common chlorite and fair to low visual porosity; claystone, light brownish grey to olive grey, silty and slightly carbonaceous and micaceous and siltstone, light grey, argillaceous and sandy in part, slightly carbonaceous and micaceous.

1750-1817m **Heathfield Member** (Albian)

The Heathfield Member is included as the basal unit of the Middle Eumeralla Sub-unit. As in other areas of the basin an unconformity separates the Heathfield Member Sandstone (a lithologically more mature equivalent) from the underlying Lower Eumeralla sequence. The Heathfield Member in Windermere-1 has been identified as a tuff or tuffaceous sandstone from sidewall core petrology. This showed the lithology to be that of a lithic crystal tuff with fine to medium, well sorted, angular to subrounded grains comprising about 20% quartz, 20% feldspar, 55% unaltered lithic fragments (volcanics and metamorphics) and minor opaques and mica. Matrix and cement comprise 14-22% of the rock, with chlorite making up 60-93% of this fraction. The chlorite forms both grain rims and interstitial matrix. It is likely that many of the sandstone bodies in the Middle Eumeralla Sub-unit have a similar composition. Moderate fluorescence was observed in the tuff over the interval 1805-1810m. It was dull, yellowish with poor to nil crush cut and decreased from poor to trace from 1810 - 1815 m. Interbedded with the tuff are minor siltstone and claystone beds. The siltstone is light grey, argillaceous, carbonaceous and micaceous and the claystone is olive to light grey, soft and silty in part.

1817-1852m (TD) Lower Eumeralla Sub-unit (Albian-Aptian)

The upper boundary of this unit is an unconformity. The Lower Eumeralla sequence comprises interbedded claystone, siltstone, sandstone and minor coal. The presence of these coal beds near the top of the Lower Eumeralla is a characteristic feature of the formation in nearby wells, such as Eumeralla-1. The claystone is brownish grey, subfissile and carbonaceous, micaceous siltstone. Sandstones are grey, very fine-grained, well sorted subangular, argillaceous and clacareous in part and the coal is black and earthy.

4.6 Structure and Reservoir Geometry

Seismic data over the Windermere strcuture was reprocessed subsequent to the drilling of the well. The top Dilwyn Formation was not remapped after drilling, but data quality is good and a re-interpretation would not substantially change the structural interpretation at that level.

Post-drill mapping showed that the well was within closure on one of several culminations at Pebble Point level with the well lying at the north western extremeity of a small partly faulted high on the anticline. This is not the highest point on the structure at this level and in view of the interpreted fault throws being less than the thickness of the Pembler Mudstone seal, a valid trap may still exist updip at this level.

Below the base Tertiary, most horizons were encountered some 100 m low to prognosis. A thicker than expected Paratte Formation resulted in deeper horizons comming in low to prognosis. A lack of geophysical control was probably responsible.

The only Cretaceous horizons which were mapped post-drill were the top Heathfield Member and the Aptian unconformity (near base Eumeralla Formation). Prior to drilling, the drilling location was shown to be within closure at base Belfast level.

An increase in velocity at top Heathfield level gives rise to a locally mappable seismic horizon while the coals at the top of the Lower Eumeralla Sub-Unit give rise to a regional seismic marker. At top Heathfield level, the structure has anticlinal expression with several crestal faults and the well lying some 35 milliseconds (44 m) downdip from the crest. The well also lies some 10 milliseconds within the lowest closing contour. The only horizon with obvious oil shows in the Heathfield however occurs from 1805-1810m, some 55 m below the top of the Member and the base of the overlying Eumeralla seal. This suggests a number of trapping mechanisms, either diagenetic or stratigraphic, and possibly in combination with fault sealing. The relatively thick and largely blocky gamma ray log character of the individual sand bodies in the Heathfield Member suggests that the unit may be comprised of relatively few depositional cycles. From the Neocomian and subsequent growth history recognized from seismic data over the major basement related fault north of the well, it is possible that Windermere-1 penetrated an alluvial fan facies developed at the foot of a major growth fault related scarp. Correlation of the Heathfield Member with nearby wells shows it is thicker and slightly cleaner at Windermere-1. Thin zones of microlog separation between the oil bearing interval and the top of the Heathfield Member indicate that few permeable zones are developed in the unit and suggest that the reservoir may be either a diagenetic trap or a relatively thin zone in the lower depositional cycle of the member.

4.7 Occurrence of Hydrocarbons

Ditch gas readings were low over most of the sequence penetrated and there were no significant gas readings until the base of the Paaratte Formation. From 940 m, gas levels began to increase in strength and richness and over the interval 1740 - 1850 m C_3 and C_4 were recorded. The 35 m of Lower Eumeralla Sub-unit drilled before TD exhibited good gas shows, recording up to C_5 gases. The increased readings from 1075 m were one of the reasons they well was deepened from its original proposed total depth of 1400m. The mudlog is included as Enclosure 2.

The only hydrocrabon fluorescence was recognized in the Heathfield Member over the interval 1805-1810m, where 100% dull yellowish fluorescence with poor to nil crush cut was observed. Mud log shows indicated the only zone of significance in the well with possible reservoir development was the interval 1805-1810m in the Heathfield Member.

A comprehensive logging suite was recorded to evaluate these shows. The logs indicated three zones of anomalous resistivities in the Dilwyn Formation from 434-515m and 605-641m and the Pebble Point Formation from 725-758m. Initial log analysis of the Heathfield Member was complicated by the unusual lithology and was not definitive as to the presence of hydrocarbons. A computer log interpretation by Crocker Data Processing (Appendix E) handled the data interactively and indicated water saturations in the lower part of the Heathfield Member to be about 60%. This interpretation was calibrated against a water-bearing unit from 1367-1373m and the resistivity of water recovered from DST 1, which was 0.32 ohmm at 25°C. This resistivity is similar to the run 82 swab water Rw of 0.286 at 25°C from the zone 1798-1813m. The computer interpretation however also shows more optimistic water saturations and higher levels of movable oil in shallower Eumeralla sand bodies where no significant mud logging shows were recorded. The reliability of this relatively sophisticated log interpretation is therefore uncertain due to the complexity of the lithology and inability of "conventional" analysis methods to account for:

(a) high content of clay (chlorite) forming grain coatings and interstitial matrix.

(b) high and possible variable amounts of granular matrix formed by rock fragments giving a clay log response.

(c) variable salinities associated with high volumes of bound and interstitial water between various intervals.

On subsequent wells, conventional cores should be cut to calibrate the logs and enable more reliable quantitative interpretation.

Drill stem tests 1 and 2 were conducted over the interval with fluorescence and recovered 0.5 barrel and 31.9 barrels oil respectively. Details of the tests are given in Appendix G. The recovery of oil from this zone, which had negligible electric log response, and the existence of several high resistivity anomalies in the Tertiary sequence led to an SFT programme being undertaken. Although low permeabilities in the Eumeralla limited the usefulness of the tool, pressure gradients confirmed the water-bearing nature of sands in the Upper Eumeralla, Paaratte and Pebble Point Formations. Possible gas and oil pressure gradients were interpreted from 439-456m and 515-569m respectively. SW values of 70-100% are calculated for both these zones. Formation fluid samples taken at 535m and 435m recovered only water with no indications of hydrocarbons. Both water samples have evidence of filtrate contamination with potassium concentrations of 2600 and 9200 ppm. As the least contaminated sample at 435m near an interpreted gas show did not contain any show of gas it is likely that the top of the Dilwyn was conclusively tested and is water bearing. The sample at 535m is however less conclusive as the water sample was heavily contaminated with filtrate and the inferred fluid type from the pressure survey was oil.

Cased hole testing of the Heathfield Member failed to produce significant hydrocarbons and formation water was swabbed from the oil show interval during an extended evaluation programme.

The log analysis also showed several sands at the top of the Dilwyn Formation to have water saturations of between 40-60%. Self potential deflections between 434 and 900m however suggested that all but the 434-515m resistivity anomaly were likely to be related to salinity gradients recognized in other wells in the area.

4.8 Reservoir Porosity and Permeability

4.8.1 Lower Eumeralla Sub-unit

This unit was only partly logged but there appear to be no sandstones with any significant reservoir potential.

4.8.2 Heathfield Sandstone Member

No conventional cores were cut in the Heathfield Member as reservoir quality and hydrocarbon shows appeared poor while drilling. Porosity and permeability measurements are therefore restricted to the four sidewall cores between 1816m and 1802.3m in the lower part of the reservoir. The lithology is a lithic tuff, with matrix and cement comprising 14-22% of the rock and chlorite making up 60-93% of this fraction. The chlorite forms both grain rims and interstitial matrix and is partly associated with kaolin flakes. As a consequence the macroporosity observable in this section is less than 5%. However SEM images show high microporosity between the chlorite platelets and this observation is in keeping with the measurements from the sidewall cores (Appendix C), of porosity values from 22-24%. Permeabilities are low however, 1.2-1.6 md, similar to values interpreted from the open hole DST's. The porosity values are higher than those from electric log interpretation, and this may be a result of the sidewall coring process.

4.8.3 Middle and Upper Eumeralla Sub-units

No reservoir quality sandstones are interpreted from ditch cuttings samples from within this sequence. Although some porosities are interpreted in the range 25-30% the sandstones are considered to be low permeability. The microlog infers however that some permeability development is scattered through various sand bodies, particularly within the Middle Eumeralla eg. 1585-1589m and 1591-1598m. This suggests that Eumeralla zones other than the Heathfield may be prospective updip on the structure.

4.8.4 Paaratte Formation

Clear porous sandstones are interpreted within the Paaratte Formation, although they appear to lose reservoir quality with depth. Neutron Density porosities range 29 to 33% but v. clay increases with depth.

4.8.5 Pebble Point Formation

Clean porous permeable sandstones are interpreted in the Pebble Point Formation. Density/Neutron porosities are in the range 27-28% and permeabilities appear to be relatively good.

4.8.6 Dilwyn Formation

Good quality sandstones were encountered in the Dilwyn Formation. Porosities are calculated to range between 28 and 33%.

5. CONCLUSIONS AND CONTRIBUTIONS TO GEOLOGICAL KNOWLEDGE

Windermere-1 drilled a substantial closed antiform structure in the Tyrendarra Embayment of the Otway Basin.

Several closed potential reservoir units were tested by the well.

The Dilwyn formation contains good potential reservoirs and was penetrated within closure on the edge of the structure at that level. The top of the Dilwyn was interpreted to be gas bearing from logs and pressure data but one slightly contaiminated water sample suggests it is water-bearing. A deeper Dilwyn zone interpreted from pressure gradients to be possibly oil-bearing was sampled and the filtrate - contaminated water suggests that the zone may not have been conclusively tested.

Post-drill mapping based on reprocessed seismic data shows that the main objective, the Pebble Point Formation, was within closure but not on the highest culmination on the prospect. An adequate and substantially thicker than prognosed Pember Mudstone appears to seal the unit. The absence of hydrocarbons is probably due to a downdip location and/or a lack of migration paths from the deeper, thermally mature source rocks within the Eumeralla Formation. Reservoir quality of the Pebble Point is interpreted as very good. It is considered the Pebble Point Play is still valid but needs to be in proximity to source of oil migration paths and conduits.

The Paaratte Formation contains an excellent sequence of interbedded reservoirs and seals.

The base Belfast Mudstone play is productive on the Port Campbell high where it overlies the Waaree Sandstone. In the area of PEP 111 the Upper Eumeralla Sub-unit generally subcrops the Belfast Mudstone. Impermeable Upper Eumeralla Sub-unit sandstones subcrop to this potential seal in Windermere-1. Reservoir quality sandstones have been encountered nearby at the base Belfast horizon. At Codrington-1, 7½km south west Arkosic Sandstones cored in the Upper Eumeralla Sub-unit equivalent had core porosities 29-31% and permeabilities of 11-36 darcies. Reservoirs of this quality in closed position could be a very attractive objective. As prognosed, the best potential Eumeralla reservoirs were encountered in the Middle Eumeralla Sub-Unit. Although the Eumeralla sands generally appear to be highly argillaceous in ditch cuttings the microlog suggests that scattered poor to moderate permeabilities may be developed and that additional potential may exist updip on the structure.

Oil was discovered in the Heathfield Member of the Eumeralla Formation. A total of 31.9 barrels of oil was recovered from the interval 1790-1814m on open hole drill stem test No. 2 but a cased hole test over a similar interval (1798-1813m) recovered only filtrate and formation water with a slight trace of oil. The reasons for the failure of the cased hole test to reproduce the results of the earlier test in recovering significant hydrocarbons are unclear but may be due to i) the oil productive section is a transition zone, ii) preferential permeability of the reservoir, iii) damage due to the cementing and casing procedures, iv) lack of access of the perforations to oil-bearing layers, or v) DST 2 may have produced all the oil accessible by the well.

The steady inflow of formation water during swabbing operations refutes the possibility of damage being done during cementing and casing installation. A different completion technique may however prove more beneficial for oil production.

The fact that oil was recovered from the Heathfield Member indicates generation and migration of oil has occurred within the Eumeralla Formation in this part of the Otway Basin. Geochemical data suggest the maturity of the oil is about 0.57% VR, and it had probably been sourced from the coaly part of the Eumeralla Formation below the Heathfield Member, where VR's of 0.5% were measured.

The strongly humic sourced character of the Heathfield oil contrasts markedly with the more algal-rich source interpreted from the Pretty Hill Formation and Casterton Beds which are believed to have sourced the coastal bitumen strandings. It could also imply that the faults cutting the Windermere structure have not been conduits for migration from these deeper Otway Group source intervals and that the faults are sealed.

The variable nature and thickness of the Heathfield Sandstone is illustrated by wells in the area. Windermere-1 penetrated a gross 54 m Heathfield sand Member, among the thickest sections yet penetrated in the basin. Reservoir quality is poor but better than Pretty Hill-1, Eumeralla-1 and North Eumeralla-1. Proximity to the Windermere Fault may well be a factor in improving Heathfield reservoir development. The depositional environment at Windermere-1, based on log character and setting, is interpreted to have been located in a proximal alluvial fan position, whereas North Eumeralla-1 and Eumeralla-1 are interpreted to be in a distal position.

Further drilling and coring is required to determine the setting and reservoir development of the Heathfield Sand Member.

(P111F)

PE902220

This is an enclosure indicator page.
The enclosure PE902220 is enclosed within the container PE902219 at this location in this document.

The enclosure PE902220 has the following characteristics:

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CONTAINER_BARCODE =	PE902219
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BASIN =	OTWAY
PERMIT =	PEP 111
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DESCRIPTION =	Synthetic Seismogram (enclosure from WCR vol.1) for Windermere-1
REMARKS =	
DATE_CREATED =	22/04/87
DATE_RECEIVED =	25/02/88
W_NO =	W956
WELL_NAME =	Windermere-1
CONTRACTOR =	Digimap Geodata Services
CLIENT_OP_CO =	Minora Resources NL

(Inserted by DNRE - Vic Govt Mines Dept)

PE902221

This is an enclosure indicator page.
The enclosure PE902221 is enclosed within the container PE902219 at this location in this document.

The enclosure PE902221 has the following characteristics:

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          REMARKS =
     DATE_CREATED = 27/11/87
    DATE_RECEIVED = 25/02/88
             W_NO = W956
        WELL_NAME = Windermere-1
       CONTRACTOR = Crocker Data Processing
     CLIENT_OP_CO = Minora Resources NL
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(Inserted by DNRE - Vic Govt Mines Dept)

PE601093

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The enclosure PE601093 is enclosed within the container PE902219 at this location in this document.

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    DATE_RECEIVED = 25/02/88
             W_NO = W956
        WELL_NAME = Windermere-1
       CONTRACTOR = Gearhart Pty Ltd Geodata Services
     CLIENT_OP_CO = Minora Resources NL
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(Inserted by DNRE - Vic Govt Mines Dept)

PE601094

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The enclosure PE601094 is enclosed within the container PE902219 at this location in this document.

The enclosure PE601094 has the following characteristics:

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PERMIT = PEP 111
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REMARKS =
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DATE_RECEIVED = 25/02/88
W_NO = W956
WELL_NAME = Windermere-1
CONTRACTOR = Minora Resources NL
CLIENT_OP_CO = Minora Resources NL

(Inserted by DNRE - Vic Govt Mines Dept)

PE907856

This is an enclosure indicator page.
The enclosure PE907856 is enclosed within the container PE902219 at this location in this document.

The enclosure PE907856 has the following characteristics:

ITEM_BARCODE	= PE907856
CONTAINER_BARCODE	= PE902219
NAME	= Drilling Data Summary Sheet
BASIN	= OTWAY
PERMIT	= PEP 111
TYPE	= WELL
SUBTYPE	= DIAGRAM
DESCRIPTION	= Drilling Data Summary Sheet (figure 2 of Well Completion Report vol.1) for Windermere-1
REMARKS	=
DATE_CREATED	= 10/04/87
DATE_RECEIVED	= 25/02/88
W_NO	= W956
WELL_NAME	= Windermere-1
CONTRACTOR	= Minora Resources
CLIENT_OP_CO	= Minora Resources

(Inserted by DNRE - Vic Govt Mines Dept)

Appendix A

Sample Descriptions

APPENDIX A - SAMPLE DESCRIPTION

INTERVAL (m)	ROP min/m	LITHOLOGY
10 - 20	2	100% limestone, cream to grey, abundant fossil fragments, trace ferruginous material, soft to firm, good porosity.
20 - 30	2.5	100% limestone as above - predominantly cream. Trace carbonaceous material.
30 - 40	2.3	100% limestone as above
40 - 50	1.8	100% limestone as above.
50 - 60	1.9	100% limestone as above becoming light grey and with trace glauconite.
60 - 70	1.5	100% limestone as above, grading in part (10%) to grey marl, low porosity.
70 - 80	1.5	100% limestone as above.
80 - 90	0.8	100% limestone as above but with a smaller proportion of fossil fragments.
90 - 100	1.5	100% limestone as above - becoming finer grained and a little more argillaceous (about 10% acid insoluble).
100 - 110	1.7	100% limestone as above.
110 - 120	2.2	100% marl, light grey, slightly silty with trace carbonaceous material and glauconite, soft, nil porosity.
120 - 130	1.3	Marl, as above, with trace limestone.
130 - 140	1.2	100% marl as above, but softer.
140 - 150	2.0	100% marl - very soft
150 - 160	2.1	100% marl - very soft.
160 - 170	1.5	100% marl - very soft.
170 - 180	1.6	100% marl - very soft
180 - 190	1.7	100% marl - very soft.
190 - 200	1.8	100% marl - very soft.
200 - 210	1.7	100% marl - very soft.
210 - 220	2.3	100% marl - very soft.

220 - 230	1.6	100% marl - very soft.
230 - 240	1.4	100% marl - very soft.
240 - 250	1.6	100% marl, light grey, trace carbonaceous material, glauconite and finely crystalline grey limestone. The marl is very soft with zero porosity.
250 - 260	1.1	100% marl, as above.
260 - 270	1.0	100% marl, as above.
270 - 280	0.8	100% marl, as above.
280 - 290	0.9	100% marl, as above.
290 - 300	2.0	100% marl, light grey to olive grey with numerous fossil fragments. Traces of carbonaceous material and glauconite, very soft, zero porosity. The proportion of fossil fragments is dependent on the amount of washing.
300 - 305	1.5	100% marl as above.
305 - 310	1.4	100% marl as above.
310 - 315	2.0	100% marl as above.
315 - 320	2.4	100% marl as above.
320 - 325	3.2	100% marl as above.
325 - 330	2.2	100% marl as above.
330 - 335	2.6	100% marl as above.
335 - 340	1.4	100% marl as above. The fossil fragments are now buff in part rather than grey and a trace of limestone is present.
340 - 345	4.1	90% marl as above. 10% limestone, light grey to buff. Finely crystalline, firm, tight.
345 - 350	3.6	90% marl as above. 10% limestone as above.
350 - 355	4.3	100% marl.
355 - 360		100% marl as above becoming a little firmer.
360 - 365	2.8	80% marl as above. 20% limestone as above.

365 - 370	3.0	80% marl as above. 20% limestone as above.
370 - 375	2.2	80% marl as above 20% limestone as above.
375 - 380	1.8	60% marl as above. 40% Limestone as above.
380 - 385	1.1	50% marl, olive grey, grading to calcareous claystone, with traces of carbonaceous material and glauconite. Soft to firm, zero effective porosity. 50% limestone, buff, finely crystalline, firm, abundant buff fossil fragments and very low porosity.
385 - 390	1.8	60% marl as above. 40% limestone and fossil fragments.
390 - 395	1.6	80% marl as above. 20% limestone as above.
395 - 400	1.7	80% marl as above. 20% limestone as above.
400 - 405	1.3	80% marl as above. 20% limestone as above.
405 - 410	1.0	80% marl as above, darker grey and more argillaceous. 20% limestone as above.
410 - 415	2.6	40% marl as above. 40% limestone as above and minor brown crystalline limestone. 20% claystone, light grey to buff, calcareous, soft to firm.
415 - 420	2.4	40% marl as above. 40% limestone as above. 20% claystone as above. The whole sample is darker grey brown. Trace quartz grains.
420 - 425	8.4	100% volcanic rock, black, possibly dolerite.
425 - 430	27	100% dolerite - sample contaminated with caving due to slow drilling.

430 - 435	5.5	50% volcanics (dolerite?), dark grey to black, medium crystallinity. Composed of clear and white feldspar and black mafic mineral (hornblende?). Some greenish chloritic material and calcite grains. 50% marl and limestone as previously - probably cavings. Trace quartz grains - medium, angular to sub-rounded.
435 - 440	2.5	40% volcanics as above 10% calcite - coarsley crystalline. 50% sand, clear, medium-grained, sub-rounded, moderately sorted.
440 - 445	0.5	100% sand, clear and white, medium to coarse, dominantly medium, moderately sorted, sub-rounded individual quartz grains. No matrix and only trace calcite cement is present in washed samples. Unwashed samples contain a considerable amount of dark brown clay which is probably the sandstone matrix, trace of coarse mica flakes, apparent porosity is good.
445 - 450	1.4	100% sand, as above.
450 - 455	1.6	100% sand, as above with more coarse grains. Trace claystone, brown, carbonaceous, silty.
455 - 460	1.5	100% sand, as above.
460 - 465	1.0	100% sand, as above, finer grained.
465 - 470	2.4	100% sand, as above.
470 - 475		100% sand, as above.
475 - 480	4.1	100% sand, clear grains with brown stain, fine to coarse, dominantly medium-grained, poorly sorted, sub-rounded to rounded, no matrix in washed sample but probably soft brown argillaceous matrix in situ. Trace calcareous cement, numerous grains of crystalline calcite and trace white mica. Soft friable, good apparent porosity.
480 - 485	4.1	100% sand as above but cleaner and more coarse grains.
485 - 490	3.1	100% sand as above.

490 - 495	0.8	100% sand as above, very clean and moderately to well-sorted, although still numerous coarse grains.
495 - 500	1.9	40% sand as above but finer. 60% marl grading to calcareous claystone, light grey, soft to firm. Numerous fossil fragments - lithology is very similar to that of Clifton Formation but have no reason to suspect excessive casing.
500 - 505	4.6	60% sand as above. 40% marl/claystone as above.
505 - 510	1.9	70% sand. 30% marl/claystone as above.
510 - 515	0.6	70% sand as above. 30% marl/claystone as above.
515 - 520	0.4	100% sand as above, clean, clear quartz grains, very high porosity.
520 - 525	0.4	100% sand, as above.
525 - 530	1.6	100% sand, as above.
530 - 535	1.1	100% sand, clear, medium to coarse (mostly coarse) grained, sub-rounded quartz grains, moderately well sorted, very high porosity.
535 - 540	0.5	100% sand, as above. Trace fossil fragments and calcite - may be caving.
540 - 545	0.3	100% sand, as above.
545 - 550	2.3	80% sand as above, better sorted with few coarse grains. 20% claystone/marl, olive grey, soft. Fossil fragments and calcite.
550 - 555	2.8	70% sand as above. 30% claystone/marl as above.
555 - 560	1.5	60% sand. 40% claystone/marl as above.
560 - 565	6.0	50% sand as above. 50% claystone/marl as above.

565 - 570	1.4	50% sand as above. 50% claystone mostly brown, silty in part, carbonaceous, only slightly calcareous, soft.
570 - 575	1.0	40% sand, as above. 60% claystone, as above.
575 - 580	1.0	40% sand, as above. 60% claystone, as above.
580 - 585	1.9	100% sand, light brown to clear, medium to coarse, dominantly medium, sub-rounded, moderately sorted, no matrix, trace of calcite cement, traces of fossil fragments and calcite, soft and friable, high apparent porosity.
585 - 590	1.3	100% sand, as above, more coarse grains.
590 - 595	1.6	100% sand, clear with brown staining, fine to coarse, poorly sorted, sub-angular to sub-rounded, trace calcareous cement, no matrix (may be brown clay washed out), traces calcite grains, mica and fossil fragments, possibly caving, soft and friable, fair apparent porosity. Trace brown and olive-grey claystone.
595 - 600	1.6	100% sand as above.
600 - 605	1.4	90% sand as above. 10% claystone as above.
605 - 610	1.9	80% sand. 20% claystone - a large proportion of raw sample is dark brown very soft clay which washes away.
610 - 615	0.6	70% sand as above. 30% claystone as above.
615 - 620	0.7	70% sand as above. 30% claystone as above.
620 - 625	0.6	100% sand as above.
625 - 630	0.6	100% sand, as above.
630 - 635	0.6	100% sand, as above.
635 - 640	0.7	100% sand, as above.

640 - 645	0.7	80% sand as above. 20% claystone, as above, grading in part to siltstone, dark grey, carbonaceous, micaceous, argillaceous, soft.
645 - 650	0.8	100% sand, as above - better sorted with dominant grain size medium.
650 - 655	1.1	10% sand, as above. 90% claystone, olive grey and grey brown, grading to siltstone as above. Trace coal.
655 - 660	1.7	10% sand, as above. 90% claystone,as above.
660 - 665	6.6	30% sand, clear, medium with few coarse grains, moderately sorted, sub-rounded. No adhering matrix, trace calcite cement, calcite grains and fossil fragments common but probably caving, friable, fair apparent porosity. 70% claystone, olive grey to brown, soft, silty in part, mostly calcareous.
665 - 670	7.9	30% sand, as above. 70% claystone, as above.
670 - 675	2.8	20% sand as above. 80% claystone as above.
675 - 680	2.6	20% sand. 80% claystone.
680 - 685	5.7	10% sand, as above. 90% claystone, as above.
685 - 690	4.1	100% claystone, as above, trace sand.
690 - 695	6.6	100% claystone, as above.
695 - 700	5.1	100% claystone, as above, trace sand.
700 - 705	5.0	100% claystone, as above, trace sand.
705 - 710	5.0	100% claystone, as above, trace sand.
710 - 715	5.0	100% claystone, as above, trace sand.
715 - 720	4.6	100% claystone, as above, trace sand.

720 - 725	3.6	80% claystone, as above. 20% sand, clear to dark brown, medium to coarse, mostly medium-grained, poorly sorted, sub-angular to sub-rounded, brown argillaceous clay matrix adhering to grains, calcite and fossil fragments common but probably caving. The sand is friable and apparent porosity good to fair.
725 - 730	2.4	60% sand, clear to dark brown stained, dominantly medium grained, moderately well sorted, sub-angular to sub-rounded, brown clay matrix, no cement, very friable with good apparent porosity. 40% claystone, olive grey to dark brown, calcareous, soft, silty in part.
730 - 735	1.2	50% sand, as above. 50% claystone, as above, mostly brown non-calcareous.
735 - 740	1.2	40% sand, as above. 60% claystone, as above.
740 - 745	1.0	60% sand, as above. 40% claystone, as above.
745 - 750	1.0	70% sand, as above. 30% claystone, as above.
750 - 755	1.0	70% sand, as above, a little cleaner. 30% claystone, as above.
755 - 760	1.1	80% sand, as above. 20% claystone, as above.
760 - 765	1.1	80% sand, as above. 20% claystone, as above.
765 - 770	3.4	60% sand, clear to brown stained, dominantly medium with numerous coarse grains, moderately well sorted, sub-angular to rounded, brown clay matrix, no cement, friable to soft (matrix washes out), fair to good porosity. 40% claystone, dark grey-brown. Silty in part. Soft to very soft.
770 - 775	1.9	20% sand, as above. 80% claystone, as above.
775 - 780	2.9	10% sand, as above. 90% claystone, as above, very soft.

780 - 785	1.2	100% claystone, as above, trace sand.
785 - 790	1.1	100% claystone, as above, trace sand.
790 - 795	0.9	20% sand, as above. 80% claystone, as above.
795 - 800	1.0	100% claystone, as above, trace sand.
800 - 805	1.1	20% sand, as above (caving?). 80% claystone, as above.
805 - 810	1.1	100% claystone, as above.
810 - 815	1.8	100% claystone, as above.
815 - 820	1.7	100% claystone, as above.
820 - 825	1.2	100% claystone, as above.
825 - 830	1.7	100% claystone, as above, trace sand.
830 - 835	2.4	100% claystone, as above, trace sand.
835 - 840	5.7	100% claystone, as above, trace sand.
840 - 845	2.3	80% sandstone, clear, medium to coarse-grained, mostly medium, individual quartz grains, moderately sorted, sub-rounded, no matrix or cement in washed sample, soft and friable, excellent apparent porosity. 20% claystone, as above, very soft and dispersive. Can be completely removed by washing.
845 - 850	1.7	80% sand, clear, medium to coarse, mostly medium, poorly to moderately well sorted, sub-angular to sub-rounded, no matrix or cement in washed sample, soft and friable, good apparent porosity. 20% claystone, dark grey-brown, soft.
850 - 855	2.4	60% sand, as above. 40% claystone, as above.
855 - 860	1.9	50% sand, as above. 50% claystone, as above.
860 - 865	1.1	40% sand, as above. 60% claystone, as above.
865 - 870	2.5	10% sand, as above. 90% claystone, as above.

870 - 875	1.8	100% claystone, as above. Trace sand.
875 - 880	2.4	10% sand, as above. 90% claystone, as above.
880 - 885	2.6	100% claystone, as above. Trace sand.
885 - 890	2.0	100% claystone, as above.
890 - 985	4.9	100% claystone, as above.
895 - 900	3.0	100% claystone, as above.
900 - 905	2.5	100% claystone, as above. Trace sand.
905 - 910	1.7	100% claystone, as above. Trace sand.
910 - 915	6.2	100% claystone, as above.
915 - 920	2.8	100% claystone, as above.
920 - 925	10.0	100% claystone, as above.
925 - 930	6.4	100% claystone, as above. Trace sand.
930 - 935	3.9	100% claystone, as above.
935 - 940	4.1	100% claystone, as above. Trace sand.
940 - 945	1.8	80% sand, clear, medium-grained, well sorted, well rounded, little clay matrix, no cement, soft, porous. 20% claystone, as above.
945 - 950	0.9	80% sand, clear, fine to medium-grained dominantly medium, well sorted, sub-angular to rounded, minor clay matrix, no cement, minor calcite grains and rare fossil fragments, soft, with good porosity. 20% claystone, dark grey brown, soft to very soft.
950 - 955	1.2	80% sand, as above, with very minor orange coloured siliceous lithic fragments. 20% claystone, as above.
955 - 960	1.0	30% sand, as above. 70% claystone, as above, grading in part to siltstone.
960 - 965	2.8	60% sand, as above. 40% claystone, as above.

965 - 970	1.0	50% sand, as above. 50% claystone, as above, slightly firmer.
970 - 975	3.0	20% sand, as above. 80% claystone, as above, slightly firmer.
975 - 980	4.4	30% sand, as above, trace pyrite. 70% claystone, as above. The presence of calcite and fossil fragments may be due to caving.
980 - 985	4.0	20% sand, as above. 80% claystone, as above, becoming soft-firm.
985 - 990	12.0	30% sand, as above. 70% claystone, as above.
990 - 995	24.0	20% sand, as above. 80% claystone, as above.
995 - 1000	23.0	50% sand, as above, and brown stained, rounded grains are numerous, trace pyrite. 50% claystone, as above, numerous fossil fragments possibly due to caving.
1000 - 1005	21	30% sand, clear and brown stained, dominantly medium grained with numerous fine and coarse grains, poorly sorted, angular to sub-rounded, clay matrix, in part pyrite matrix, minor siliceous lithic fragments and chloritic material - soft to hard, low porosity. 70% claystone (i) dark grey brown, soft, silty in part, (ii) light grey-green sub-fissile.
1005 - 1010	9.4	100% claystone, dark grey-brown greenish in part, slightly carbonaceous, silty in part, trace sand, pyrite.
1010 - 1015	15.0	100% claystone, dark grey brown to olive grey, firm to soft, silty in part, slightly carbonaceous in part, trace sand, fossil fragments and calcite (cavings?).
1015 - 1020	7.0	100% claystone, as above.
1020 - 1025	21.0	50% sand, clear, medium to coarse, sub-rounded, moderately sorted quartz grains. 50% claystone, as above.

1025 - 1030	38.0	100% claystone (i) greenish grey with some glauconite grains, firm, (ii) grey brown with carbonaceous flecks, firm to soft.
1030 - 1035	58.0	100% claystone, as above, due to slow drilling abundant cavings are present.
1035 - 1040	1.7	80% sandstone, light, slightly greenish grey, fine-grained, sub-angular to sub-rounded, moderately well sorted, abundant white clay matrix, variably calcareous, green, orange and brown, also common siliceous and chloritic lithic fragments, moderately hard, low porosity. 20% claystone, as above.
1040 - 1045	24.0	20% sandstone, as above. 80% claystone, as above and about 20% off white, silty, micromicaceous claystone.
1045 - 1050	26.0	100% claystone, light olive grey to light grey in part, silty and micromicaceous, soft to firm. Trace sand grains and carbonaceous claystone.
1050 - 1055	12.5	100% claystone, as above.
1055 - 1060	26.0	100% claystone, light grey as above. Numerous fossil fragments, probably cavings due to slow drilling.
1060 - 1065	9.3	100% claystone, as above.
1065 - 1070	10.0	100% claystone, as above.
1070 - 1075	2.7	40% (i) sandstone, light grey, fine grained, moderately sorted, sub-angular, abundant clay matrix, lithic, firm, tight; (ii) clear, medium sub-rounded quartz grains. 60% claystone, olive grey, brownish grey and light grey - mixture due to trip.
1075 - 1080	1.2	90% sandstone, as (i) above. 10% claystone.
1080 - 1085	1.3	30% sandstone, as above. 70% claystone, as above.
1085 - 1090	2.8	70% sandstone, as above. 30% claystone, as above.

1090 - 1095	2.6	10% sandstone, as above. 90% claystone, as above.
1095 - 1100	4.6	10% sandstone, as above. 90% claystone, as above.
1100 - 1105	5.5	10% sandstone, as above. 90% claystone, as above.
1105 - 1110	1.3	10% sandstone, as above. 90% claystone, as above.
1110 - 1115	3.7	100% claystone, as above.
1115 - 1120	2.1	100% claystone, as above. Trace sand.
1120 - 1125	1.7	40% sandstone, light grey, fine-grained, moderately well sorted, sub-angular, abundant clay matrix, numerous coloured lithic grains, brown mica and carbonaceous? particles, firm to soft, low porosity. 60% claystone, light grey, silty and micromicaceous in part, soft to very soft.
1125 - 1130	1.2	30% sandstone, as above. 70% claystone, as above.
1130 - 1135	2.7	10% sandstone, as above. 90% claystone, as above.
1135 - 1140	2.6	10% sandstone, as above. 90% claystone, as above.
1140 - 1145	2.3	10% sandstone, as above. 90% claystone, as above.
1145 - 1150	1.5	100% claystone, as above.
1150 - 1155	1.8	10% sandstone, as above. 90% claystone, as above.
1155 - 1160	1.2	50% sandstone, as above. 50% claystone, as above.
1160 - 1165	0.5	60% sandstone, as above. 40% claystone, as above.
1165 - 1170	0.8	100% claystone, as above. Trace sand.
1170 - 1175	1.8	100% claystone, as above. Trace sand.
1175 - 1180	1.7	100% claystone, as above, Trace sand.
1180 - 1185	1.1	100% claystone. as above. Trace sand.

1185 - 1190	2.0	100% claystone, as above. Trace sand.
1190 - 1195	2.2	100% claystone, as above. Trace sand.
1195 - 1200	2.3	70% sandstone, as above. 30% claystone, as above.
1200 - 1205	0.9	60% sandstone, as above. 40% claystone, as above.
1205 - 1210	2.2	70% sandstone, light greenish grey, fine grained, well sorted, sub-angular, abundant white clay matrix, slightly calcareous in part, yellow, green and orange siliceous or chloritic lithics are present, minor calcite grains, minor to trace brown mica and carbonaceous particles, firm, fair to very poor porosity. 30% claystone, light brownish grey, silty in part, slightly carbonaceous in part, soft to mushy.
1210 - 1215	2.2	20% sandstone, as above. 80% claystone, as above.
1215 - 1220	1.9	60% sandstone, as above. 40% claystone, as above.
1220 - 1225	2.0	80% sandstone, as above. 20% claystone, as above.
1225 - 1230	1.5	90% sandstone, as above. 10% claystone, as above.
1230 - 1235	1.1	80% sandstone, as above. 20% claystone, as above.
1235 - 1240	1.3	70% sandstone, as above. 30% claystone, as above.
1240 - 1245	1.3	90% sandstone, as above. 10% claystone, as above.
1245 - 1250	2.0	70% sandstone, as above. 30% claystone, as above.
1250 - 1255	1.3	10% sandstone, as above. 90% claystone, as above.
1255 - 1260	2.8	20% sandstone, as above. 80% claystone, as above.

1260 - 1265	3.4	100% claystone, as above, more olive grey to greyish green, with a trace of sand.
1265 - 1270	3.6	100% claystone, olive grey to light brownish grey, slightly silty and carbonaceous in part, trace slightly micromicaceous, soft to firm, trace grains of calcite.
1270 - 1275	1.5	90% claystone, as above. 10% sand - individual, clear, medium quartz and lithic grains. Trace calcite grains and fossil fragments.
1275 - 1280	1.8	90% claystone, as above. 10% sand/sandstone, as above.
1280 - 1285	2.0	90% claystone, as above. 10% sandstone, as above.
1285 - 1290	2.4	90% claystone, as above. 10% sandstone, as above.
1290 - 1295	1.7	100% claystone, light grey, soft, silty in part. Slightly carbonaceous and micromicaceous in part. Trace sand, fine grained, lithic.
1295 - 1300 (1296.5 - 1297.5	6.0 17.0)	70% sandstone, light grey, fine grained, moderately well sorted, sub-angular, abundant argillaceous matrix, variably calcareous, common siliceous and chloritic lithic grains, trace brown mica, firm to friable, porosity very poor to fair. 30% claystone, as above.
1300 - 1305	2.8	60% sandstone, as above. 40% claystone, as above.
1305 - 1310	2.4	100% claystone, as above.
1310 - 1315	1.9	100% claystone, as above.
1315 - 1320	2.5	100% claystone, as above.
1320 - 1325	3.4	100% claystone, as above. Trace sand.
1325 - 1330	2.8	100% claystone, as above. A larger percentage is grading to siltstone. Trace sand and sandstone.
1330 - 1335	3.7	100% claystone, as above.

1335 - 1340	2.8	30% sandstone, as above. 70% claystone, as above.
1340 - 1345	3.2	10% sandstone, as above. 90% claystone, as above.
1345 - 1350	2.7	10% sandstone, as above. 90% claystone, as above.
1350 - 1355	3.0	100% claystone, as above. Trace sandstone and siltstone.
1355 - 1360	1.9	100% claystone, as above. Trace sandstone and siltstone.
1360 - 1365	1.1	50% siltstone, very light grey, very argillaceous, in part micromicaceous. 50% claystone, as above.
1365 - 1370	2.5	20% sandstone, light grey, fine-grained, moderately well sorted, sub-angular, clay matrix abundant and variably calcareous, coloured lithic grains common, trace of mica and carbonaceous material, firm to soft, very low porosity grading to siltstone. 40% siltstone, light grey, soft, argillaceous and sandy in part, variably calcareous, slightly carbonaceous and micaceous in part, grading to claystone. 40% claystone, light grey to light brownish grey, silty in part.
1370 - 1375	2.3	40% sandstone, as above. 20% siltstone, as above. 40% claystone, as above.
1375 - 1380	1.5	70% sandstone, as above. 10% siltstone, as above. 20% shale, as above.
1380 - 1385	1.3	60% sandstone, as above. 20% siltstone, as above. 20% claystone, as above.
1385 - 1390	2.1	60% sandstone, as above. 40% siltstone, as above. 20% claystone, as above.
1390 - 1395	2.3	20% sandstone, as above. 40% siltstone, as above. 40% claystone, as above.

1395 - 1400	3.1	70% sandstone, as above. 10% siltstone, as abhove. 20% claystone, as above.
1400 - 1405	3.5	40% siltstone, as above. 60% claystone, as above.
1405 - 1410	2.1	40% siltstone, as above. 60% claystone, as above.
1410 - 1415	2.1	30% siltstone, light grey, argillaceous, variably calcareous, soft, in part grading to sandstone, in part to claystone. 70% claystone, olive grey to light grey, brownish, in part calcareous, in part carbonaceous, trace sand.
1415 - 1420	2.1	30% siltstone, as above. 70% claystone, as above.
1420 - 1425	3.0	20% sandstone, light grey, fine grained, moderately sorted, sub-angular argilllaceous matrix, calcareous in part, lithic grains common, firm to soft, low porosity. 20% siltstone, as above. 60% claystone, as above.
1425 - 1430	2.1	20% sandstone, as above. 20% siltstone, as above. 60% claystone, as above.
1430 - 1435	2.5	10% sandstone, as above. 20% siltstone, as above. 70% claystone, as above.
1435 - 1440	6.1	10% sandstone, as above. 20% siltstone, as above. 70% claystone, as above.
1440 - 1445	4.8	20% sandstone, as above. 20% siltstone, as above. 60% claystone, as above.
1445 - 1450	3.5	30% siltstone, as above, trace sand. 70% claystone, as above, more calcareous.
1450 - 1455	4.1	20% siltstone, as above. 80% claystone, as above, trace coal.
1455 - 1460	4.1	30% siltstone, as above, trace sand. 70% claystone, as above.

1460 - 1465	3.3	40% sandstone, light grey, fine grained, moderately well sorted, sub-angular, white clay matrix, variably calcareous, common coloured lithic fragments, trace brown mica, soft to firm - low porosity. 30% siltstone, light grey to off-white, very argillaceous, sandy in part. 30% claystone, olive grey to light grey brown, in part calcareous, in part slightly carbonaceous, becoming firmer.
1465 - 1470	5.4	30% siltstone, as above. 70% claystone, as above. Trace sand.
1470 - 1475	6.0	20% siltstone, as above. 80% claystone, as above.
1475 - 1480	5.4	20% siltstone, as above. 80% claystone, as above.
1480 - 1485	4.0	20% siltstone, as above. 80% claystone, as above.
1485 - 1490	5.0	20% siltstone, as above. 80% claystone, as above.
1490 - 1495	2.6	30% siltstone, as above. 70% claystone, as above.
1495 - 1500	4.6	40% sandstone, as above. 20% siltstone, as above. 40% claystone, as above.
1500 - 1505	2.1	30% sandstone, as above. 20% siltstone, as above. 50% claystone, as above.
1505 - 1510	3.3	10% sandstone, as above. 20% siltstone, as above. 70% claystone, as above.
1510 - 1515	8.0	20% siltstone, as above. 80% claystone, as above. Trace Sand.
1515 - 1520	6.6	20% siltstone, light grey, very argillaceous, calcareous, sandy in part. 80% claystone, olive grey to brownish grey, variably calcareous, slightly carbonaceous and silty in part.

1520 - 1525	5.6	20% sandstone, light grey, fine grained, moderately sorted, lithic, argillaceous, calcareous, firm, tight. 20% siltstone, as above. 60% claystone, as above.
1525 - 1530	5.4	40% sandstone, as above. 20% siltstone, as above. 40% claystone, as above.
1530 - 1535	6.5	10% sandstone, as above. 20% siltstone, as above. 70% claystone, as above.
1535 - 1540	6.1	10% sandstone, as above. 20% siltstone, as above. 70% claystone, as above.
1540 - 1545	9.6	40% siltstone, as above. 60% claystone, as above.
1545 - 1550	5.0	30% siltstone, as above. 70% claystone, as above.
1550 - 1555	6.1	20% siltstone, as above. 80% claystone.
1555 - 1560	5.1	20% siltstone, as above. 80% claystone, as above.
1560 - 1565	4.7	20% siltstone, as above. 80% claystone, as above.
1565 - 1570	6.1	20% siltstone, light grey, very argillaceous, in part slightly micaceous and carbonaceous, in part grading to sandstone, firm to soft. 80% claystone, light grey to brownish grey, silty in part, soft.
1570 - 1575	20	30% siltstone, as above. 70% claystone, as above.
1575 - 1580	6.6	20% siltstone, as above. 80% claystone, as above.
1580 - 1585	14.0	40% siltstone, as above. 60% claystone.

1585 - 1590	2.1	70% sandstone, light grey, fine grained, moderately well sorted, sub-angular, abundant white clay matrix, variably calcareous, siliceous and chloritic lithic fragments common, trace mica and calcite grains, firm, low porosity. 10% siltstone, as above. 20% claystone, as above.
1590 - 1595	10.5	60% sandstone, as above. 10% siltstone, as above. 30% claystone, as above.
1595 - 1600	7.3	70% sandstone, as above, but less matrix, probably some porosity. 10% siltstone, as above. 20% claystone, as above.
1600 - 1605	7.6	20% sandstone, as above. 20% siltstone, as above. 60% claystone, as above.
1605 - 1610	8.4	30% sandstone, as above. 20% siltstone, as above. 50% claystone, as above.
1610 - 1615	9.4	10% siltstone, light grey, very argillaceous, sandy in part, soft. 90% claystone, light grey to light brownish grey, mostly non-calcareous, silty in part, soft.
1615 - 1620	12.6	30% siltstone, as above. 70% claystone, as above.
1620 - 1625	3.8	60% sandstone, light grey, fine grained, well sorted, sub-angular, white clay matrix sparse to abundant, slightly calcareous in part. Coloured lithic grains are common with traces of brown mica and calcite grains, firm to soft, porosity poor to fair. 10% siltstone, as above. 30% claystone, as above.
1625 - 1630	5.3	50% sandstone,as above. 10% siltstone, as above. 40% claystone, as above.
1630 - 1635	3.0	70% sandstone, as above. 10% siltstone, as above. 20% claystone, as above.

1635 - 1640	3.5	40% sandstone, as above. 20% siltstone, as above. 40% claystone, as above.
1640 - 1645	8.7	10% sandstone, as above. 20% siltstone, as above. 70% claystone, as above.
1645 - 1650	8.9	20% siltstone, as above. Trace sand. 80% claystone, as above.
1650 - 1655	8.9	100% claystone, as above. Trace of siltstone and sandstone.
1655 - 1660	7.1	30% sandstone, as above. 20% siltstone, as above. 50% claystone, as above.
1660 - 1665	4.7	40% sandstone, light grey, fine-grained, moderately well sorted, sub-angular, argillaceous matrix, calcareous in part, numerous lithic grains and trace of brown mica, firm, low porosity. 10% siltstone, light grey, very argillaceous, in part micromicaceous and silty. 50% claystone, light grey, brownish grey and olive grey, slightly carbonaceous, silty in part.
1665 - 1670	7.7	10% sandstone, as above. 20% siltstone, as above. 70% claystone, as above.
1670 - 1675	9.2	30% siltstone, as above. 70% claystone, as above, trace of sand.
1675 - 1680	11.0	10% sandstone, as above. 20% siltstone, as above. 70% claystone, as above.
1680 - 1685	8.5	40% siltstone, as above. 60% claystone, as above.
1685 - 1690	8.5	40% siltstone, as above. 60% claystone, as above.
1690 - 1695	7.0	40% siltstone, as above. 60% claystone, as above.
1695 - 1700	8.2	20% siltstone, as above. 80% claystone,as above.

1700 - 1705	8.2	20% siltstone, as above. 80% claystone, as above.
1705 - 1710	6.3	10% sandstone, as above. 20% siltstone, as above. 70% claystone, as above.
1710 - 1715	8.4	10% sandstone, as above. 30% siltstone, as above. 60% claystone, as above.
1715 - 1720	5.8	10% sandstone, light grey, fine-grained, moderately well sorted, sub-angular, off-white clay matrix, slightly calcareous in part, common coloured lithic grains with trace brown mica and rare carbonaceous fragments, firm to soft, poor porosity. 40% siltstone, light grey, very argillaceous, soft. 50% claystone, olive grey, light grey and greenish grey, silty, in part soft.
1720 - 1725	6.3	10% sandstone, as above. 30% siltstone, as above. 60% claystone, as above.
1725 - 1730	9.2	40% siltstone, as above. 60% claystone, as above.
1730 - 1735	10.0	30% siltstone, as above. 70% claystone, as above.
1735 - 1740	11.9	10% sandstone, as above. 40% siltstone, as above. 50% claystone, as above.
1740 - 1745	15.7	40% siltstone, as above. 60% claystone, as above.
1745 - 1750	10.1	30% siltstone, as above. 70% claystone,as above.
1750 - 1755	10.5	20% sandstone, as above. 30% siltstone, as above. 50% claystone, as above.
1755 - 1760	8.7	30% sandstone, as above. 30% siltstone, as above. 40% claystone, as above.
1760 - 1765	12.0	20% sandstone, as above. 30% siltstone, as above. 50% claystone, as above.

1765 - 1770	9.6	30% sandstone, light grey, fine-grained, moderately well sorted, sub-angular, abundant white clay matrix, calcareous in part, abundant coloured lithic fragments, trace brown mica, calcite grains, soft to firm, low porosity. 30% siltstone, light grey, very argillaceous, in part slightly carbonaceous - partly micromicaceous. 40% claystone, olive grey, light grey and brownish grey, soft, silty in part.
1770 - 1775	6.8	50% sandstone, as above. 20% siltstone, as above. 30% claystone, as above.
1775 - 1780	9.4	60% sandstone, as above. 10% siltstone, as above. 30% claystone, as above.
1780 - 1785	4.4	60% sandstone, as above. 10% siltstone, as above. 30% claystone, as above.
1785 - 1790	5.8	50% sandstone, as above. 20% siltstone, as above. 30% claystone, as above.
1790 - 1795	5.2	40% sandstone, as above. 20% siltstone, as above. 40% claystone, as above.
1795 - 1800	12.6	70% sandstone, as above, with some coarse grains. 10% siltstone, as above. 20% claystone, as above.
1800 - 1805	6.8	70% sandstone, as above. 10% siltstone, as above. 20% claystone, as above.
1805 - 1810	3.3	90% sandstone, light grey to very light grey, fine to coarse, dominantly fine to medium-grained, poorly sorted, sub-angular to sub-rounded, abundant white clay matrix, very calcareous with numerous siliceous and chloritic lithic grains and a trace brown mica and carbonaceous material - firm to hard, very low porosity. 10% claystone, brownish grey to olive grey, silty in part, firm to soft. Trace coal, brown to black, earthy. Fluorescence is very dull (almost 100%), yellowish, very poor to nil crush cut.

1810 - 1815	3.3	60% sandstone, light grey, fine-grained, moderately sorted, sub-angular to sub-rounded, abundant white clay matrix, very calcareous, lithic grains, weathered ?feldspar and calcite grains common. Trace brown mica and carbonaceous material. Firm, very low apparent porosity. 20% siltstone, light grey, very argillaceous, micromicaceous in part. 20% claystone, light grey, olive grey and grey green to brownish grey, in part silty, in part carbonaceous, soft.
1815 - 1820	3.3	70% sandstone, as above. 20% siltstone, as above. 10% claystone, as above.
1820 - 1825	8.0	40% sandstone, as above. 20% siltstone, as above. 35% claystone, as above. 5% coal, black, earthy.
1825 - 1830	8.2	20% siltstone. 80% claystone, as above, mostly light grey, as above. Trace sand.
1830 - 1835	8.9	Trace sandstone, as above. 10% siltstone, as above. 70% claystone, as above. 20% coal, as above.
1835 - 1838	8.5	10% siltstone, as above. 90% claystone, as above. Trace coal.
1838 - 1852	1 - 17	Predominantly claystone, grading in part to siltstone, light to dark grey, grey brown, firm, sub fissile, carbonaceous. 0% - 10% sandstone, light grey to grey, very fine-grained, well sorted, sub-angular, light grey, argillaceous matrix, very calcareous, poor visual porosity, no fluorescent or cut.

Appendix B

sidewall Core Descriptions

APPENDIX B

MINORA RESOURCES NL

SIDE WALL CORE DESCRIPTION

WELL: WINDERMERE-1

RUN No: 1 & 2 ATTEMPT: 47 REC: 17 DEPTH FROM: 464M - 1816.5M LOG DATE: 30/3/87 GEOLOGIST: B. SELL SHEET 1 OF 1

SWC No.	DEPTH	RECOV (cm)	ROCK TYPE	%	COLOUR	MAJOR GRAIN SIZE	MAJOR GRAIN SHAPE	MAJOR GRAIN TYPE	MAJOR GRAIN SRTG	MINOR GRAIN TYPE	MINOR GRAIN %	MINOR GRAIN TYPE	MINOR GRAIN %	INDURATION	TEXTURE	MATRIX COL	MATRIX TYPE	CAL	DOL	CEMENT	Ø	K	STAIN	FLUORESCENCE %	FLUORESCENCE COL	FLUORESCENCE TYPE	CUT COL	CUT TYPE	CUT RESD	REMARKS
1	1816.5	2.5	SST	100	LIGHT GREY	FINE	SUB-ANG	LITH	GD	QZ		FELD CHLOR				WH	ARG	SL			POOR				NIL			NIL		MANY LITHIC FRAGS REPL. BY CHLORITE
2	1811	3.0	SST	100	LIGHT GREY	FINE	SUB-ANG	LITH	GD	QZ		FELD CHLOR				WH	ARG	SL			POOR				NIL			NIL		
3	1806.3	3.0	SST	100	LIGHT GREY	FINE	SUB-ANG	LITH	GD	QZ		FELD				WH	ARG	SL			POOR				NIL			NIL		
4	1802.3	3.0	SST	100	LIGHT GREY	MED.	SUB-ANG	LITH	PR	QZ		FELD									POOR				NIL			NIL		
5	1512.5	2.5	CLST	100	DK BROWN GREY										SOFT - FIRM										NIL			NIL		
6	1205	3.0	CLST	100	LIGHT GREY										FIRM										NIL			NIL		
8	945	3.5	SST	100	LT GREY-OFF WHT	FINE	SUB-RND	QZ	GD	LITH					FRIABLE-SOFT	N I L					GD	GD			NIL			NIL		NON-CALCAREOUS
9	931.5	4.0	CLST	100	DK GREY BROWN					QZ	TR	MICA	TR												NIL			NIL		TR COAL-LIKE MATERIAL
11	802	4.0	CLST	100	DK GREY BROWN																				NIL			NIL		TR SLTST
12	793	4.0	SST	95	LIGHT BROWN	FINE	SUB-RND	QZ	GD							N I L				NIL	GD	GD			NIL			NIL		
			CLST	5	DK GREY-BROWN																									
13	779	4.0	SST	100	LT BROWN-GREY	FINE	SUB-ANG SUB-RND	QZ	V. GD	LITH	TR	CARB	TR	SFT		N I L				NIL	GD				NIL			NIL		
25	1180	3.5	CLST	100	OLIVE GREY									FRM-SFT											NIL			NIL		TRACE MICA
26	876.3	4.0	CLST	90	DK GREY-BROWN									FRM											NIL			NIL		
			SST	10	WHITE	FINE-MED.		QZ																	NIL			NIL		
27	778	4.0	SST	100	MED. GREY	FINE-MED.	SUB-ANG		PR	LITH	TR			SFT		GREY	ARG	-			POOR				NIL			NIL		
29	605.3	4.0	SLTST	100	GREY BROWN									FRM											NIL			NIL		ARG, SANDY, CARB. IN PART
31	494	3.5	SST	100	BROWNISH GREY	FINE	SUB-ANG-RND		GD							N I L				NIL	GD	GD			NIL			NIL		
35	464	4.0	SST	100		MED-CRS	SUB-RND		PR	LITH	TR					CREAM-BRN	ARG	-			GD	GD			NIL			NIL		

E 836

Appendix C

Porosity & Permiability Results from Sidewall Samples

WINDERMERE -1

PRELIMINARY POROSITY AND PERMEABILITY RESULTS

FROM SIDEWALL SAMPLES

Sample I.D.	Depth Metres	Perm to Air, MD	Porosity Percent	Grain Density
1	1816.5	NOT SUITABLE	24.2	2.71
2	1811.0	1.2	21.9	2.69
3	1806.3	1.6	22.4	2.72
4	1802.3	NOT SUITABLE	22.9	2.68

Ref: P111H

CORE ANALYSIS REPORT

FOR

MINORA RECOURCES N.L.

WINDERMERE 1
WILDCAT

Litton
Core Lab

Core Laboratories Australia Pty. Ltd
6 Marlow Road, Keswick,
South Australia 5035
(08) 297 0777

5th May, 1987

Minora Resources N.L.
55 St. George's Terrace
Perth W.A. 6000

Attention: Mr Ed. Kopson

Subject : Core Analysis
Well : Windermere #1
File : WA-CA-380

Dear Sir,

Core Laboratories Australia Pty Ltd was requested by Mr. Kopson to perform porosity, permeability and grain density determinations on four sidewall core samples from the subject well.

Preliminary data was reported by telex on 16th April, 1987. This report now finalizes all data.

Thank you for the opportunity to have been of service. If you have any questions please do not hesitate to contact us.

Yours faithfully,
CORE LABORATORIES AUSTRALIA PTY LTD

Peter Lane
Laboratory Supervisor

PRL:jc:64

CORE LABORATORIES AUSTRALIA PTY., LTD.

Company : MINORA RECOURCES N.L.
Well : WINDERMERE 1
Location :
Country :

Field : WILDCAT
Formation :
Coring Fluid :
Core Diameter: 20 mm

File : WACA380
Date : 30-APRIL-87
Analysts: OEK

CORE ANALYSIS RESULTS

SAMPLE NUMBER	DEPTH m	PERMEABILITY (HORIZONTAL) Kair md	POROSITY (HELIUM) %	GRAIN DENSITY gm/cc
1	1816.50		24.2	2.71
2	1811.00	1.6	21.9	2.69
3	1806.30	1.2	22.4	2.72
4	1802.30		22.9	2.68

Appendix D
Petrology

ANALABS
A Division of Macdonald Hamilton & Co. Pty. Ltd.
ANALYTICAL CHEMISTS

PERTH:
52 MURRAY ROAD,
WELSHPOOL, WESTERN AUSTRALIA, 6106
TELEPHONE (09) 458 7999
TELEX: ANALAB AA 92560
P.O. BOX 210, BENTLEY, W.A. 6102

Mr E Kopsen,

Minora Resources,

55 St Georges Tce,

Perth

28-4-87

1000 0 07 71

Preparation of four thin sections and petrographic descriptions of four core plugs Windermere No 1.

SEM examination of four plugs.

R Townend.

Summary

The four samples are similar, except that core 4. is much less well sorted due to the presence of coarse dimension muddy sediments. The other three are classified as tuffs on the basis of the dominance of their volcanic clast and feldspar crystal component, although vitroclastic material was not identified.

The tuffaceous origin is supported by the ubiquity of a chlorite cement, that forms narrow rims to most of the clasts. Otherwise matrix is confined to minor kaolin.This chlorite may represent devitrified glass. Core 4 has a much higher component of non volcanic material, including possible plutonic acid igneous material.

The tuffs have a low porosity /permiability due to the close packing of the originally ?plastic volcanic fragments, plus the pervasiveness of the chlorite cement.This may have reduced alteration of the potentially unstable lithic fragments by acting as a barrier.Likewise the quartz apparently did not develop overgrowths.

Windermere 1 1816.5m

Lithology	Lithic Crystal Tuff.
Sorting	Good,fine to medium sand.
Grainsize	0.1-0.3mm
Grainshape	subrounded to angular;euhedral to subeuhedral.

Modal Constituents

Framework	78.4%	
Quartz	17.8%	Monocrystalline,0.1-0.3mm,habit subangular dominant, rare subround or angular;equant=elongate.Overgrowths not visible.
Feldspar	29.7%	Plagioclase and K feldspar about =. Crystals euhedral to subeuhedral, also angular cleavage fragments of plag.Dimensions 0.15-0.3mm. Plag. well twinned Na>Ca.,K feldspar includes microcline perthite.Both feldspars fresh,except for slight sericite spotting of plag.
Lithics	50.4%	Volcanics>others;dimensions as for feldspars.Habits angular to subangular;Plagioclase-rich porps. common, often trachytic textured. Foliated micaceous ?volcanics also common.Microcrystalline clasts either cherts or aphanitic volcs.
Micas	1.3%	Rare coarse deformed partly chloritised biotite to 0.3mm.or similar muscovite.
Heavies	0.4%	Leucoxene 0.1mm subrounded,rare zircon, round. rare epidote
Opaques	0.4%	Single 0.5x0.3mm mass of h/carbon. Sulphides occur within some lithic pieces.
Matrix/Cement	21.6%	
Chlorite	60%	Ubiquitous as rim or coating to framework clasts.Identified as Fe chlorite(SEM).Common separating almost touching framework,less common with cavity nucleus of clay. Width consistent around (?) microns.
Clay	40%	Kaolin? rich fine pore filling flakes,probably authigenic,sporadic enclosed by chlorite rim.

Windermere No 1 1816m cont.

Porosity

The macroporosity measured at 3.5%.Erratic isolated due to loss of clay?Dissolution of feldspars negligible, except for rare part leached trachytic volcanic.Low intergranular pore development partly due to the accommodation of more plastic volcanic material under burial.

Diagenesis

The main diagenetic activity was the deposition of chlorite as a rim or coating to the clasts.This was followed by authigenic kaolin filling the occasional intergranular pore. The source of the Fe chlorite may be devitrified glass, as the bulk of the minerals particularly the feldspars remain relatively fresh in the clasts.

PHOTO 1 ALKALI FELDSPAR CRYSTAL PARTLY REPLACED BY KAOLIN, ARROW 2, AND RIMMED BY CHLORITE, ARROW 1. NIC UNC. FIELD WIDTH 0.25MM

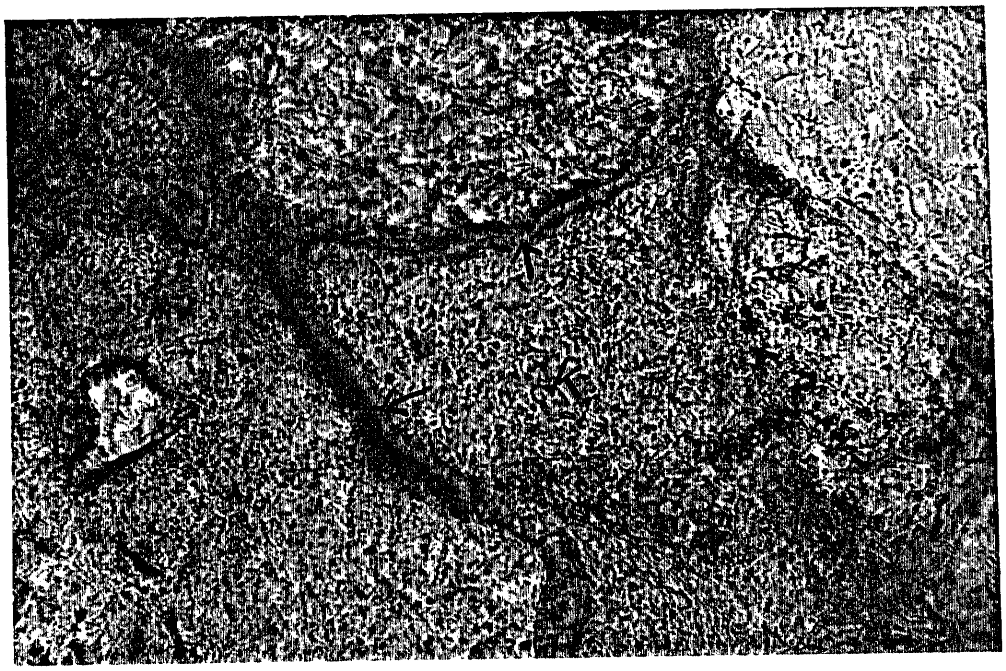

PHOTO 2 KAOLIN FILLED PORE(K), WITH CHLORITE (ARROW) LINING CLASTS . NOTE DYE PENETRATION OF KAOLIN. NIC UNC. FIELD WIDTH 0.25MM

Windermere No 1 1811.0m

Lithology	Lithic Crystal Tuff	
Sorting	Good,V fine to medium sand.	
Grainsize	0.075-0.3mm	
Grainshape	Angular to subangular,euhedral to subeuhedral.	
Modal Constituents		
Framework	83.4%	
Quartz	15.9%	Monomineralic,0.075-0.25mm. habit is angular to subangular,rarely sub rounded or subhedral (phenocryst).Equant = elongate.
Feldspar	19.1%	Plagioclase=K feldspar.Dimensions 0.1-0.3mm.habit euhedral to subhedral, rare angular cleavage crystal or subrounded. Alteration limited to sericite spotting Occasional fracturing with chlorite rims on broken faces.Plagioclase Na>Ca.
Lithics	61.8%	Volcanics< metamorphics. Habit more elongate than equant, some orientation. dimensions 0.1-0.3mm.Volcanics fresh porphyritic and aphyric plagioclase-rich some trachytic textured.Part sericitic volcanics common, also some saussurite, resulting in semischists. Microcrystalline grey polarising mosaic textured clasts either cherts or felsic volcanic.Rare partly leached plag. volc.
Micas	2.4%	Biotite>Muscovite. Coarse deformed flake,biotite part chloritised.Can measure 0.5x0.1mm
Heavies	0.8%	Sphene,0.2mm subrounded,leucoxene.
Matrix/Cement	16.6%	
Chlorite	78%	Ubiquitous rim or coating to clasts. separates many lithic and crystal fragments as narrow ,~10 micron, deposit with individuals roughly normal to contact surface.
Clay	22%	Kaolin flakes infilling occasional intergranular pores lined by chlorite.

Windermere No 1 1811m cont.

Porosity

The macroporosity measured at 0.3%.The macroporosity is low due to the compaction of plastic tuffaceous fragments and the crystallization of authigenic chlorite lining the clasts and filling the cavities except for the occasional coarser intergranular pore, that was subsequently filled by authigenic kaolin.

Diagenesis

As for sample 1816.5m.

Windermere No 1 1806.3m

Lithology	Lithic Crystal Tuff.
Sorting	good, very fine to medium sand.
Grainsize	0.08-0.5mm
Grainshape	Angular to sub angular,euhedral to subhedral

Modal constituents

Framework	85.7%	
Quartz	21.4%	Monomineralic,dimensions 0.1-0.35m with one equant grain of 0.5mm.Habit is angular to subangular, equant > elongate Slight corrosion by matrix.Overgrowths not visible.
Feldspar	21.0%	Plagioclase = K feldspar. habits tabular laths plag.,to rhombic crystals for microcline.Subhedral plag.for smaller crystals.Alteration limited to spotting of sericite on plag.Rare leaching of plag. produces secondary porosity.Sizes 0.08-0.4mm.Some slight deformation of plagioclase leading to splitting on twinning.
Lithics	56.8%	Volcanics and altered volcanics dominant lithology.Plagioclase porphyry and plag. aphyric volcanic of variable fabric including trachytic.Most of these quite fresh.Habit subangular, dimensions as for quartz.Uncommon leaching to give secondary porosity.?intrusive textured quartz feldspar type common, with mica spotting.Well foliated micaceous chips may be meta volcanics. Graphic qtz/feld. pieces minor .
Micas	0.8%	Biotite, part chloritised,rare heavily puckered narrow long flakes around clasts.
Heavies	0.1%	Zircon,0.2mm subhedral,sphene wedge,and tourmaline, angular.
Matrix/Cement	14.3%	
Chlorite	93%	Chlorite occurs as a ubiquitous rim or coating to most clasts, commonly separating them.Partly brown coloured due to oxidation of an iron-rich type.
Clay	7%	Kaolin as a very minor pore filling enclosed by the chlorite.

Windermere No 1 1806.3m cont.

Porosity

No macroporosity was measured.This is due to the coalescence of the "plastic" volcanoclastic fragments, plus their sealing with the authigenic chlorite. There is a little secondary porosity where some plag. -rich volcanics were leached, and clay is lacking.

Diagenesis

As for the 1816.5m interval.

Windermere No 1 1802.3m

Lithology	Tuffaceous sandstone.	
Sorting	Poor,V. fine sand to V. coarse sand.	
Grainsize	0.1-2mm	
Grainshape	angular to subrounded,subhedral.	

Modal Constituents

Framework	79.2%	
Quartz	33.0%	Monomineralic,dimensions from 0.1 to 1.5mm.Coarse to v coarse quartz sand is rather angular,prob. due to plutonic origin.Finer quartz commonly between 0.1 and 0.2mm.and angular.
Feldspar	16.7%	K feldspar > plagioclase.Exceptional microcline of 2mm slightly leached and subhedral.Most below 0.5mm with alteratn limited to sericite spotting.Crystals commonly broken.
Lithics	48.9%	Coarse sediments dominate over finer volcanics.Former to 2.5mm are non laminated mudstones ,some silty,with semi-rounded outlines. Plutonic textured quartz alkali feldspar clasts common around 1mm.Volcanic clasts are under 0.3mm, mostly plagioclase-rich, and aphyric.Some of the coarser examples show leaching.Foliated micaceous chips are quite minor.
Micas	1.3%	Biotite , some part chloritised. Deformed against clasts.
Opaques	0.1%	Part leucoxenised, plus equant 0.1mm chromites.
Matrix/Cement	20.8%	
Chlorite	90.9%	Chlorite forms ubiquitous rims against clasts, as sub 10 micron plates roughly normal to the clast surface.It is rarely absent from clast surface locally infilling of intergranular pore is also coarse chlorite.
Clay	9.1%	Kaolin is a sporadic pore filling rimmed by the chlorite.

Windermere No 1 1802.3m cont.

Porosity

The macroporosity is 3.7%. This is both intergranular and secondary. The latter is due to the leaching of feldspar volcanics, or the removal of kaolin leaving chlorite shells.

Diagenesis

Similar to the 1816.5m sample.

SEM Examinations

Pieces of the core plugs were taken and mounted on stubs, gold coated and examined with an SEM.

All samples displayed a similar phenomenon, that is concentrations of authigenic chlorite .These form a series of semi-hexagonal plates that have grown normal to the clast surface.Their packing is relatively open and thus some microporosity may be present.However their format may result in a low permiability.

Examples from each sample are illustrated in the following pages.

PE907857

This is an enclosure indicator page.
The enclosure PE907857 is enclosed within the container PE902219 at this location in this document.

The enclosure PE907857 has the following characteristics:

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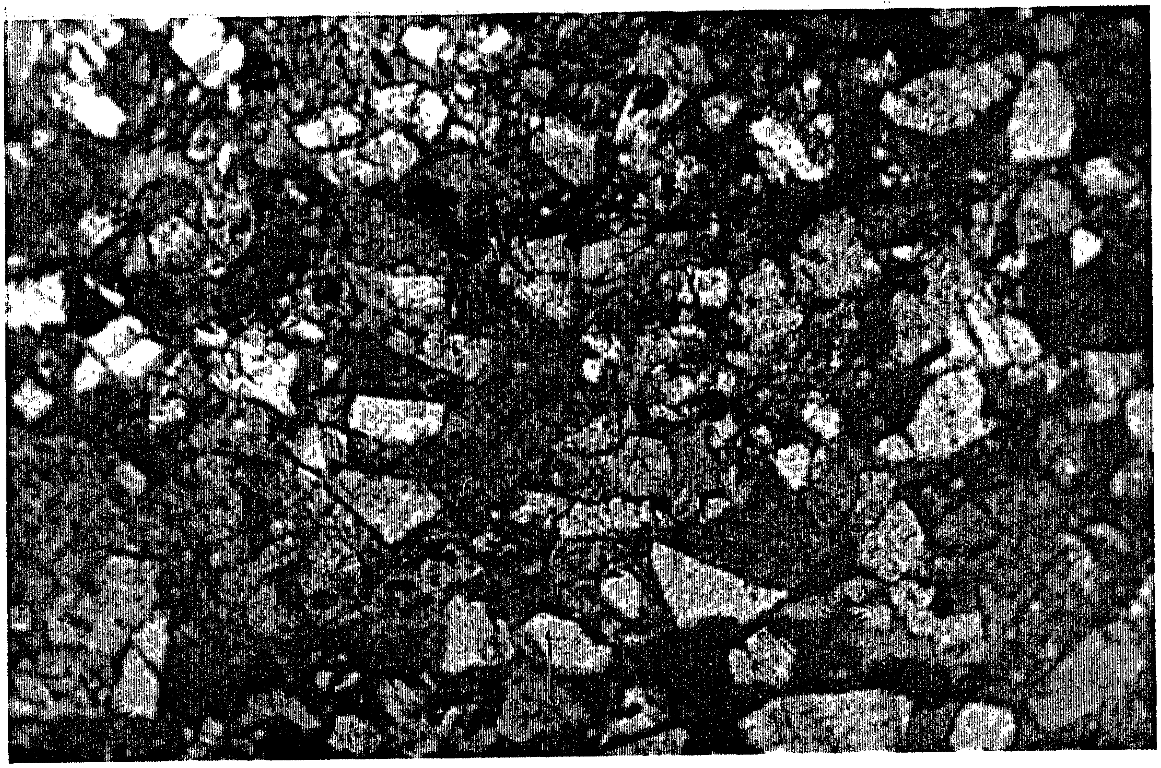
     ITEM_BARCODE = PE907857
CONTAINER_BARCODE = PE902219
             NAME = Thinsection Core Photographs
            BASIN = OTWAY
           PERMIT = PEP 111
             TYPE = WELL
          SUBTYPE = CORE_PHOTOS
      DESCRIPTION = Thinsection Core Photographs (photo 1 &
                    2 from Well Completion Report vol.1)
                    for Windermere-1
          REMARKS =
     DATE_CREATED =
    DATE_RECEIVED = 25/02/88
             W_NO = W956
        WELL_NAME = Windermere-1
       CONTRACTOR =
     CLIENT_OP_CO = Minora Resources
```

(Inserted by DNRE - Vic Govt Mines Dept)

PHOTO 1 1816.5M WELL SORTED LITHIC CRYSTAL TUFF.NIC UNC.
FIELD WIDTH 1.8MM



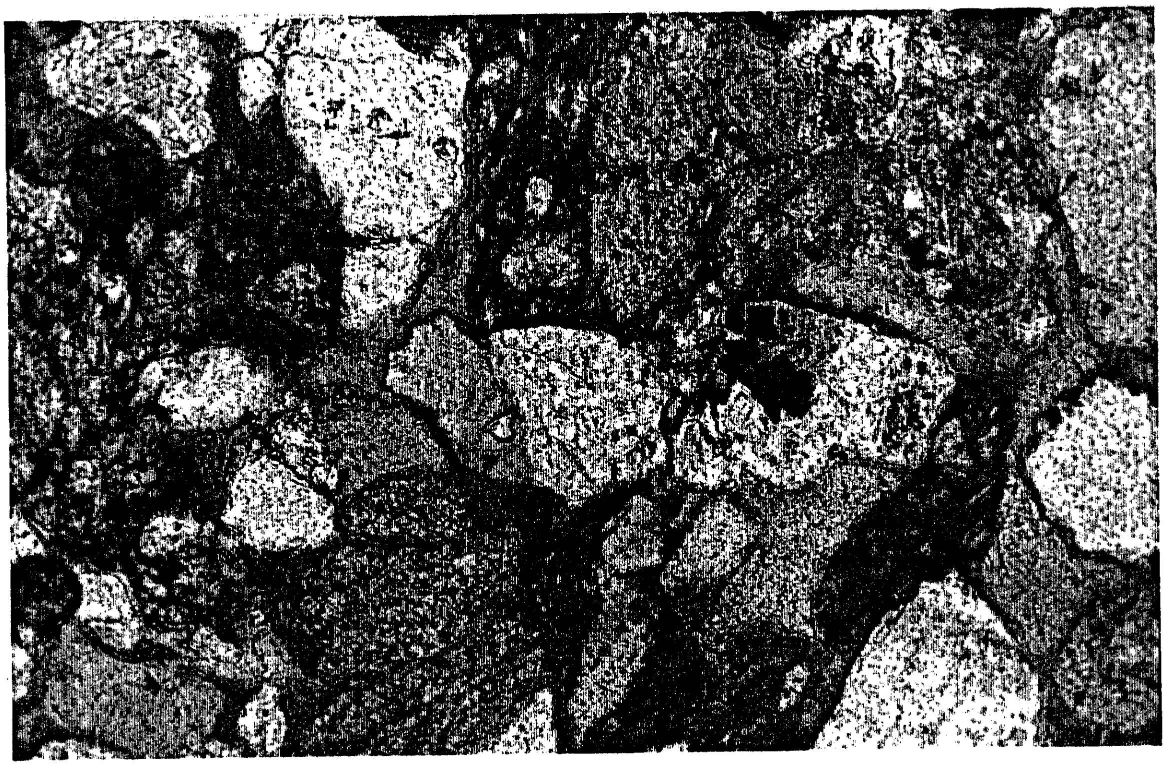


PHOTO 2 1816.5M TUFF SHOWING RARE POROSITY,HETEROGENEOUS CLAST COMPONENTS,AND NARROW CHLORITE RIM TO CLASTS.
NIC UNC. FIELD WIDTH 0.7MM

PE907858

This is an enclosure indicator page.
The enclosure PE907858 is enclosed within the container PE902219 at this location in this document.

The enclosure PE907858 has the following characteristics:

ITEM_BARCODE = PE907858
CONTAINER_BARCODE = PE902219
NAME = Thinsection Core Photographs
BASIN = OTWAY
PERMIT = PEP 111
TYPE = WELL
SUBTYPE = CORE_PHOTOS
DESCRIPTION = Thinsection Core Photographs (photo 3 & 4 from Well Completion Report vol.1) for Windermere-1
REMARKS =
DATE_CREATED =
DATE_RECEIVED = 25/02/88
W_NO = W956
WELL_NAME = Windermere-1
CONTRACTOR =
CLIENT_OP_CO = Minora Resources

(Inserted by DNRE - Vic Govt Mines Dept)

PHOTO 3 1811.0M WELL SORTED LITHIC CRYSTAL TUFF. NIC UNC.
FIELD WIDTH 1.8MM

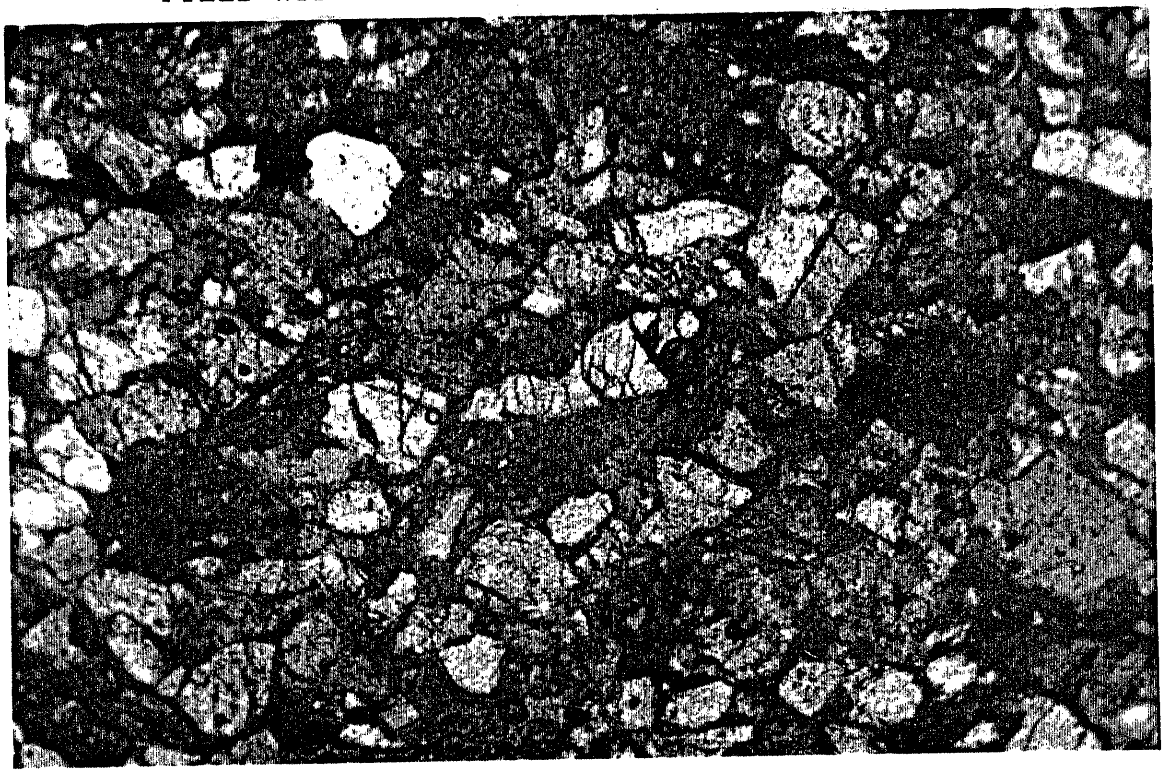


PHOTO 4 1811.0M LITHIC CRYSTAL TUFF SHOWING NARROW CHLORITE
RIMS. NIC UNC. FIELD WIDTH 0.7MM

PE907859

This is an enclosure indicator page.
The enclosure PE907859 is enclosed within the container PE902219 at this location in this document.

The enclosure PE907859 has the following characteristics:

ITEM_BARCODE = PE907859
CONTAINER_BARCODE = PE902219
NAME = Thinsection Core Photographs
BASIN = OTWAY
PERMIT = PEP 111
TYPE = WELL
SUBTYPE = CORE_PHOTOS
DESCRIPTION = Thinsection Core Photographs (photo 4 & 5from Well Completion Report vol.1) for Windermere-1
REMARKS =
DATE_CREATED =
DATE_RECEIVED = 25/02/88
W_NO = W956
WELL_NAME = Windermere-1
CONTRACTOR =
CLIENT_OP_CO = Minora Resources

(Inserted by DNRE - Vic Govt Mines Dept)

PHOTO 5 1806.3M WELL SORTED LITHIC CRYSTAL TUFF, SHOWING SLIGHT ALIGNMENT OF CLASTS. NIC UNC. FIELD WIDTH 1.8MM

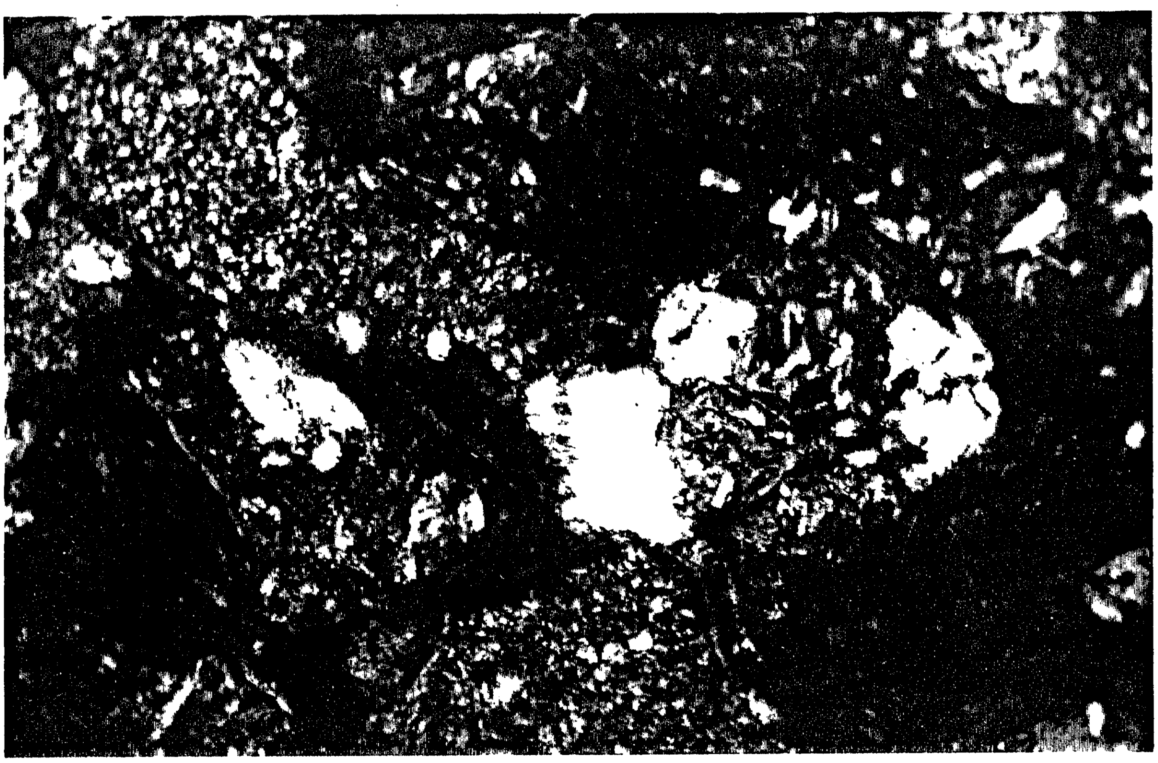


PHOTO 6 1806.3M VOLCANIC CLASTS IN LITHIC TUFF, PLUS CHLORITE RIM. NIC CROS. FIELD WIDTH 1.8MM

PE907860

This is an enclosure indicator page.
The enclosure PE907860 is enclosed within the container PE902219 at this location in this document.

The enclosure PE907860 has the following characteristics:

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CONTAINER_BARCODE = PE902219
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BASIN = OTWAY
PERMIT = PEP 111
TYPE = WELL
SUBTYPE = CORE_PHOTOS
DESCRIPTION = Thinsection Core Photographs (photo 5 & 6 from Well Completion Report vol.1) for Windermere-1
REMARKS =
DATE_CREATED =
DATE_RECEIVED = 25/02/88
W_NO = W956
WELL_NAME = Windermere-1
CONTRACTOR =
CLIENT_OP_CO = Minora Resources

(Inserted by DNRE - Vic Govt Mines Dept)

PHOTO 7 1802.3M POORLY SORTED TUFFACEOUS SANDSTONE.
NIC CROS. FIELD WIDTH 1.8MM

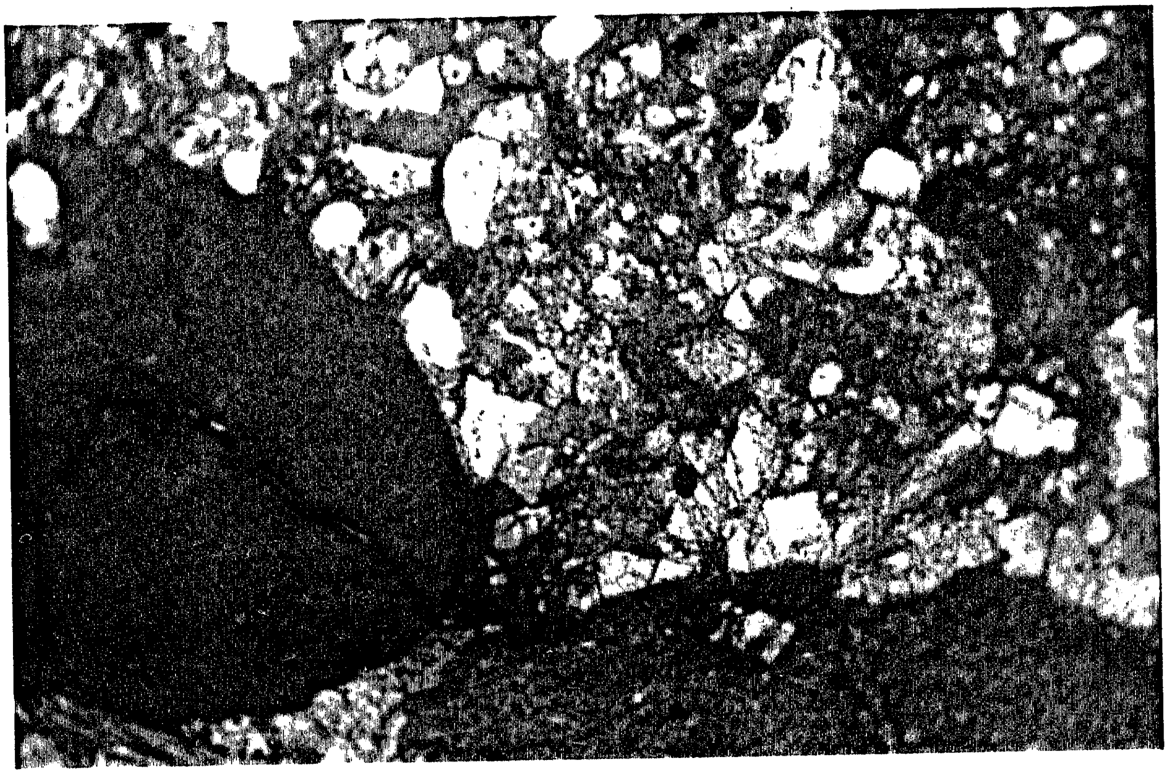
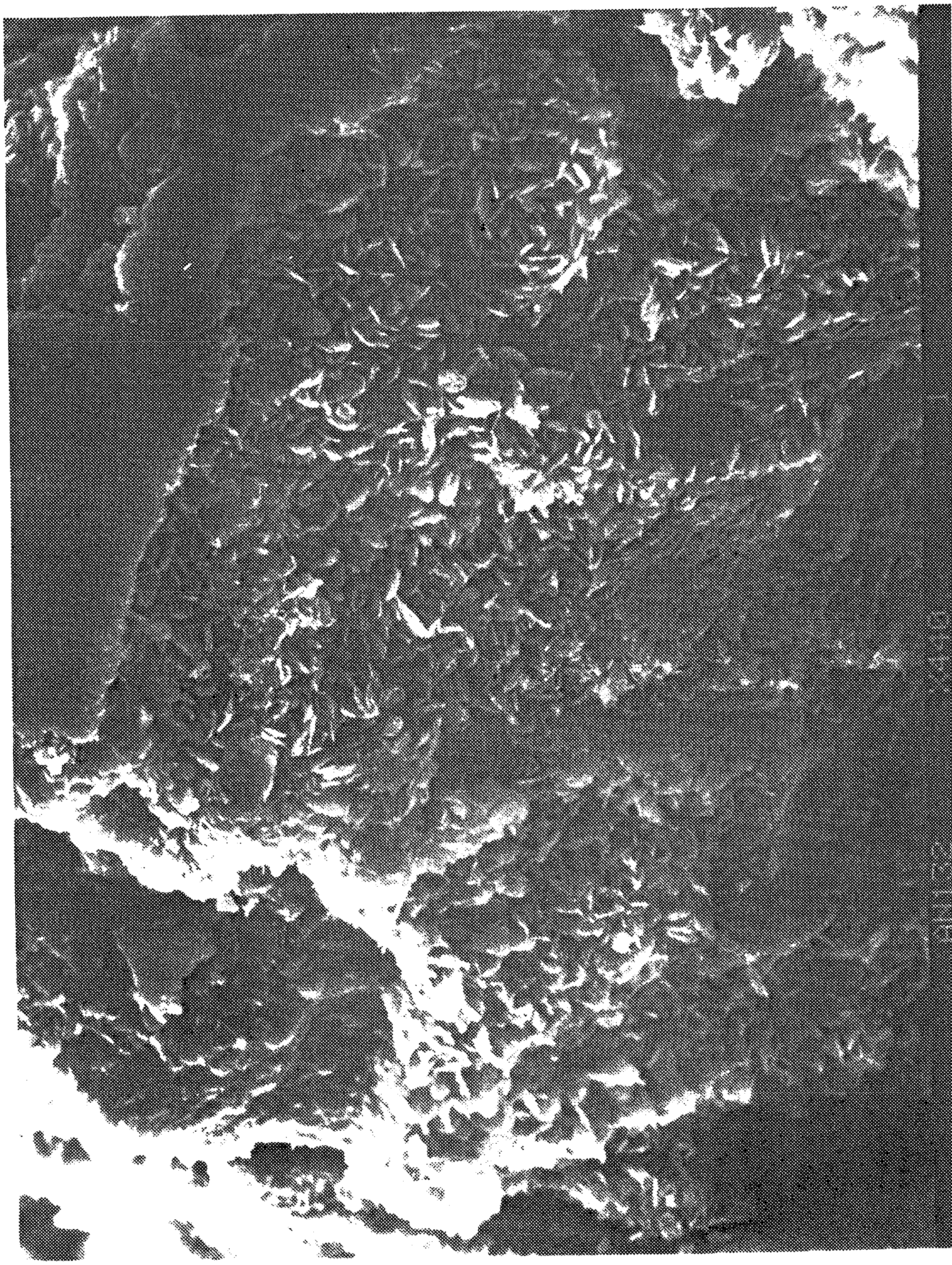


PHOTO 8 1802.3M SUBROUNDED QUARTZ,ALTERED BIOTITE ,VOLCANICS,
AND PARTLY LEACHED PLAGIOCLASE(X) IN SANDSTONE.
NIC CROS. FIELD WIDTH 0.7MM

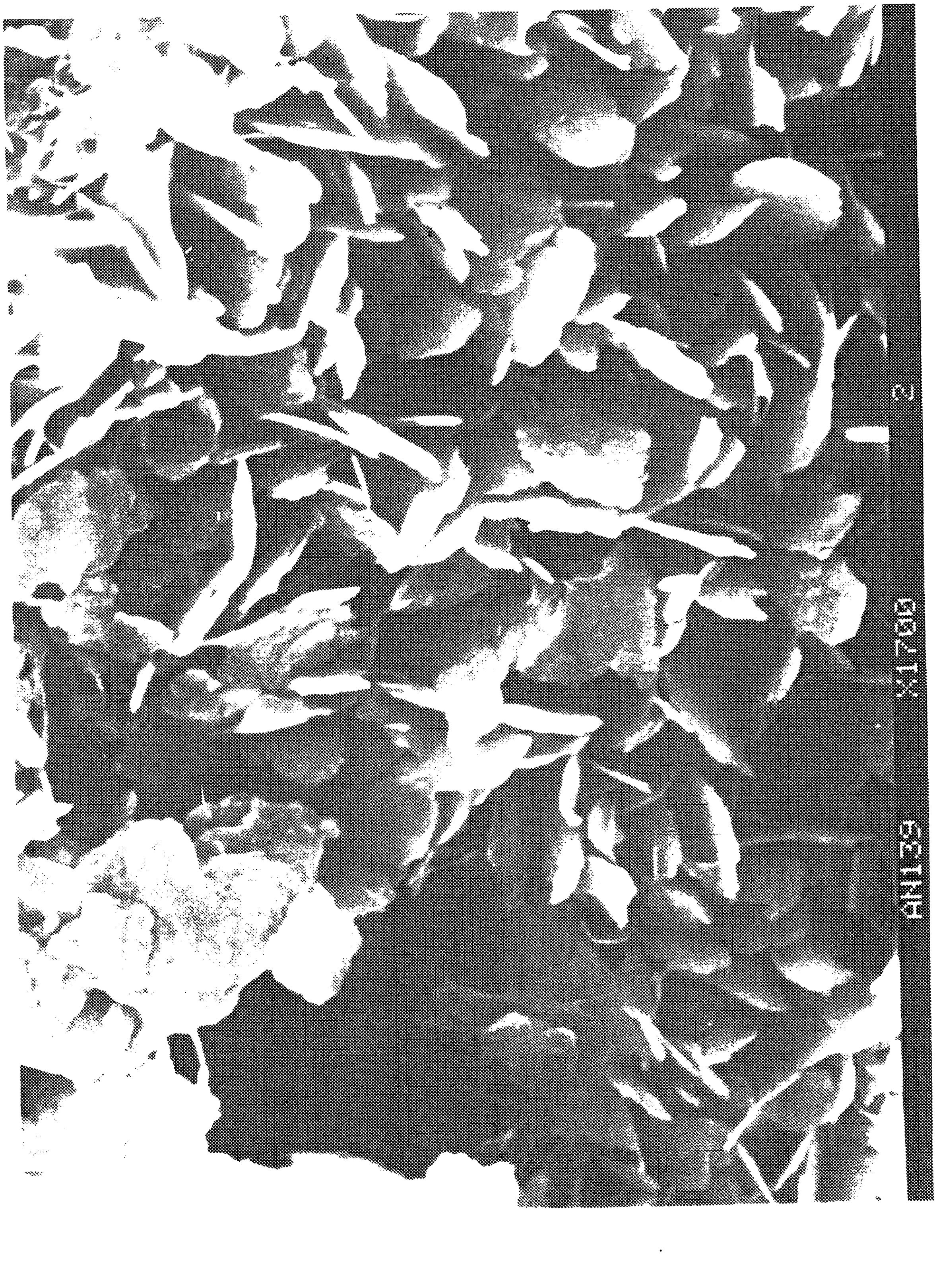
SEM PHOTO 1 1816.5M CHLORITE DOMINANT CEMENT LINING CLAST.
MAG 1320X.



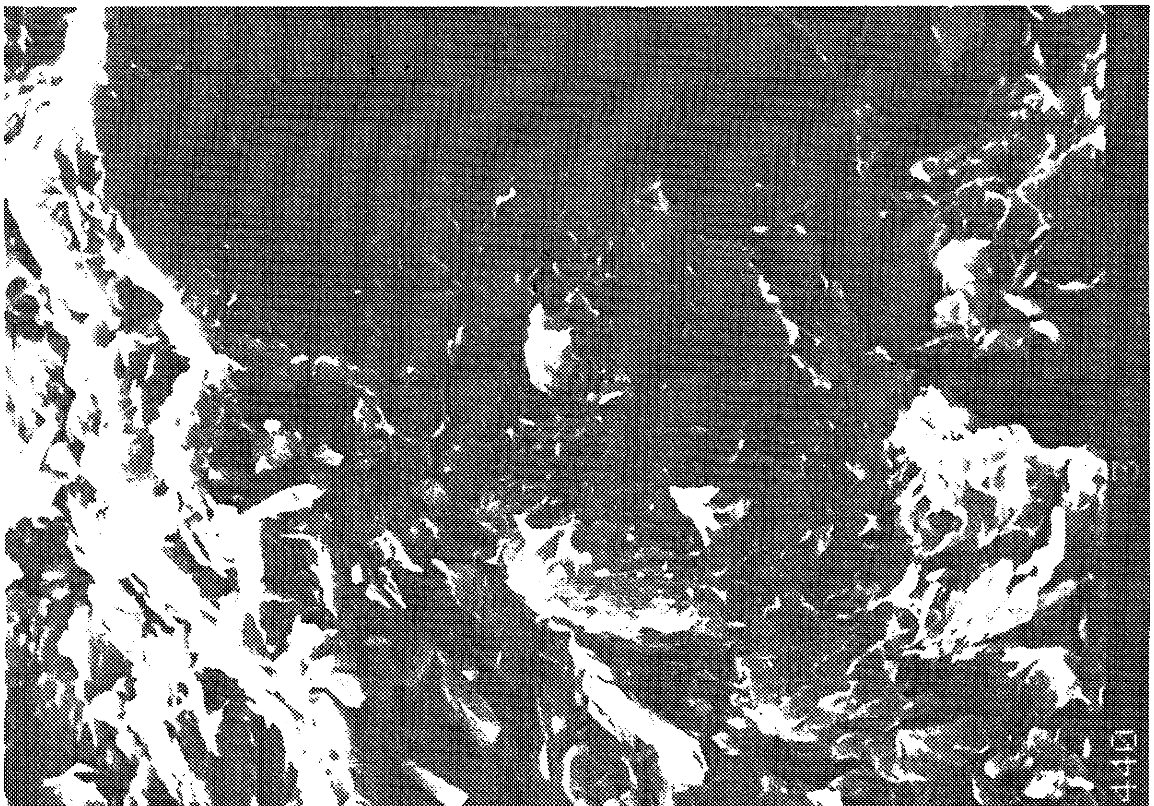
SEM PHOTO 2 1816.5M CONCENTRATION OF CHLORITE BETWEEN SURFACES OF CLASTS. MAG 2580X

SEM PHOTO 3 1811.0M CHLORITE DEPOSIT AGAINST CLAST.
MAG 2580X

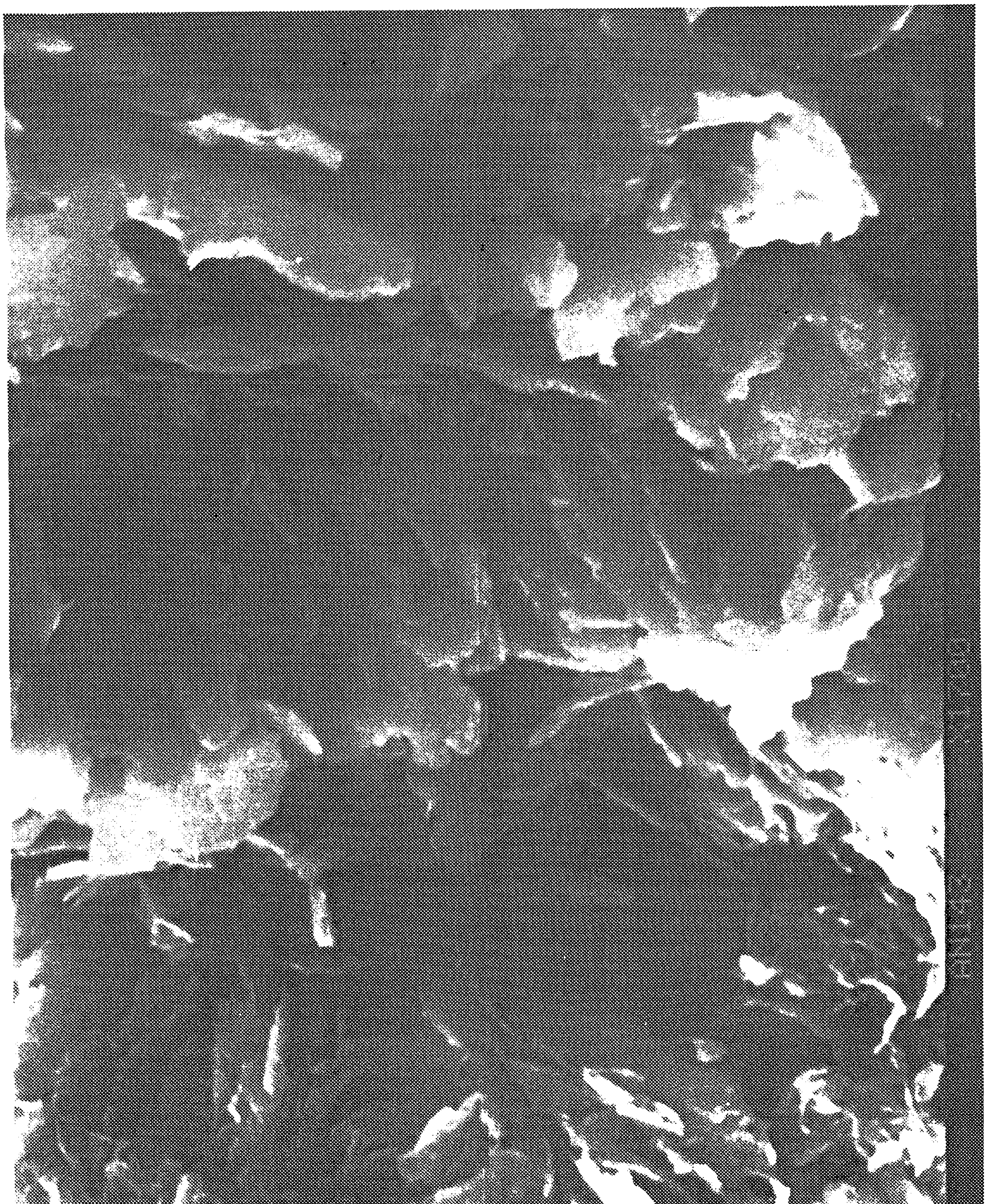
SEM PHOTO 4 1811.0M CHLORITE SHOWING SUBHEXAGONAL SLIGHTLY IRREGULAR MARGIN, AND POROSITY. MAG 5100X



SEM PHOTO 5 1806.3M SURFACE OF VOLCANIC? ROCK FRAGMENT PLUS FACE (RIGHT) WITH REMNANT CHLORITE. MAG 1320 X



SEM PHOTO 6 1806.3M CLOSE UP OF CHLORITE SHOWING ELONGATE FLAKES AND MORE PARALLELISM THAN IN OTHER SAMPLES. MAG 5100X



SEM PHOTO 7 1802.3M AUTHIGENIC CHLORITE SHOWING NON PARALLELISM .(ORIGIN OF SPOTS UNKNOWN). MAG 5100 X

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RECEIVED
13 MAY 1987
MINORA

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Perth

1000 0 07 71

Further examination of core plug sample Windermere No 1 1816.5m by thin section, XRD and SEM/EDS.

R Townend.

Windermere No 1 1816.5m

Lithology Feldspathic Litharenite.

Framework

Quartz — A few quartzes show fracturing producing slivers and some associated macroporosity.

Feldspar — The SEM found that all plagioclases examined as single crystals were albite.A high proportion of both feldspars are quite fresh, ie, are not the source of the matrix kaolin.

Lithics — The SEM found that all volcanics examined were composed of alkali feldspars.Classified as rhyolitic or trachytic depending on qtz. content. Sericite fragments also contained alkali feldspar supporting altered acid volcanics.
Cherts confirmed by SEM, also pyrite in fine quartzite host.Rare possible plutonic textured association of K feldspar and quartz.

Matrix/Cement

Clay — XRD of clay fraction confirms kaolin with chlorite and muscovite subordinate.

Porosity

Macroporosity as measured in this report is classified as primary visible holes in the thin section, emphasized by the blue dye. This is intergranular porosity. Secondary porosity due to the dissolution of minerals post deposition where coarse enough would also be included. Microporosity is not measured by point counting. It may form a significant part of the overall porosity in this sample as suggested by the penetration of the dye through the kaolin and chlorite matrix.

Comment on genesis/nomenclature

The classification of Lithic Crystal Tuff was based on the very high proportion of feldspars/lithic material mainly volcanic, about 80% of the framework, and the lack of a clastic cement.It was also thought that the unusual chlorite may represent devitrified glass. The proportion of framework to matrix was also quite high. Features that are not typical of greywackes are the high content of K feldspar, the non detrital matrix and the good sorting. Features that are not typical of lithic arenites were the low quartz content,the high Na_2O content, and the relative uniformity of the volcanic material, plus the lack of carbonate.

Genesis/nomenclature cont.

With regard to the matrix, the Tuscaloosa Fmn from the Upper Cretaceous of Louisiana, appears very similar from the literature illustrations. A copy of a photomicrograph showing the chlorite rim, and an SEM showing a later kaolin is attached. The chlorite from this Fmn was also studied by Curtis et al (Clay Minerals, 19, p471, 1984) who described the host as a Litharenite. Others are classified as Feldspathic Litharenites and can have porosities >25%. However comments in the AAPG Memoir 28 on the matrix of this Litharenite refer to a considerable intercrystalline porosity but very low intercrystalline permiability. (P.138).

In the absence of unequivocal evidence such as vitroclastic material, the Windermere sample is reclassified as a Feldspathic Litharenite, and its authigenic matrix appears to be very similar to that of the Cretaceous Tuscaloosa Fmn.

CHLORITE

$(Mg,Al,Fe)_{12}\ [(Si,Al)_8O_{20}]\ (OH)_{16}$

Sample Source: Chevron L. Crochet #1 well, Louisiana
Formation (Age): Tuscaloosa Formation (Cretaceous)
Depth of Sample: 19,985 feet

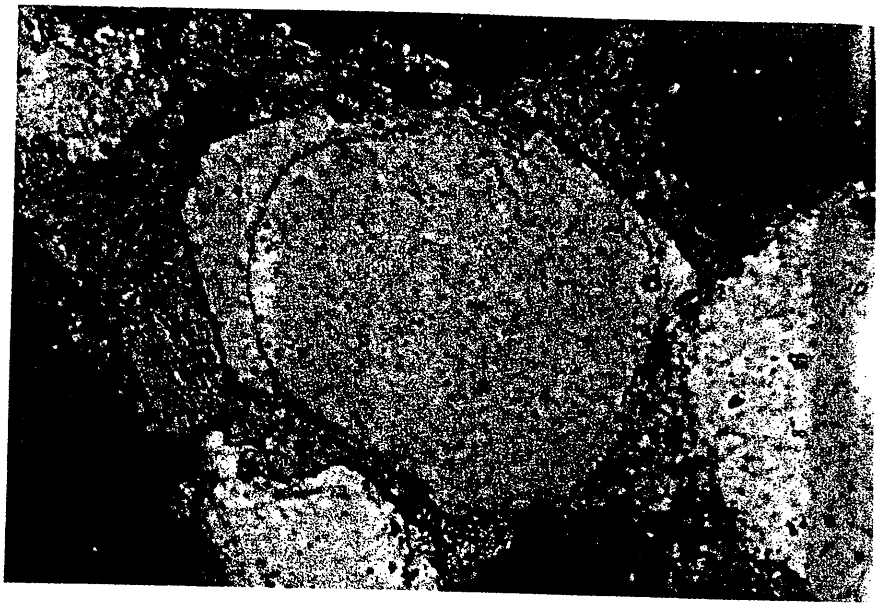
Pore-lining authigenic chlorite (C). In thin section (Figure A), authigenic chlorite forms thin, uniform, green rims (see arrows) around the detrital grains. These green rims consist of small (2 to 5μm) euhedral, pseudohexagonal crystals (Figures B and C). Individual crystals are oriented on edge, with faces perpendicular to the detrital grain surfaces (see Figure D for close-up of chlorite morphology). Chlorite EDX analysis yields the major elements Si, Al, Mg, and Fe (see EDX on facing page). The amount of iron is highly variable; this particular example is iron-rich. Bald areas outlined by dashed lines in Figure B are areas of former grain contact and are devoid of chlorite.

Magnification: (A) thin section, plane light, 50x; (B) 500x; (C) 1,000x; (D) 1,500x

Lower Permian Brushy Canyon Fm.
Texas

Complex cementation of sandstone. Quartz overgrowths formed as the first generation of cement and were followed by calcite which both filled pore space and marginally replaced the quartz overgrowths. Such textural relationships can be determined with relatively little expense in time and effort using petrography.

XN 0.06 mm



Upper Cretaceous Frontier Fm.
Wyoming ca. 610 m (2,000 ft)

Multiple stages of cementation and their relative timing can also be determined using SEM techniques. In this example, montmorillonite coats detrital grains and is followed by a later generation of kaolinite cement (upper part of photo). Photo by E. D. Pittman.

SEM 7 μm

→ Upper Cretaceous Tuscaloosa Fm. *
Louisiana 5,073 m (16,645 ft)

An example of multiple generations of cementation visible using SEM. Detrital grains are completely coated with a rind of radially oriented, platy chlorite crystals. These are succeeded by a second generation of kaolinite (or dickite) cement in the form of short, vermicular stacks of pseudohexagonal crystals. Considerable remnant, intercrystalline porosity can still be seen. Photo by G. W. Smith.

SEM 12 μm

AAPG MEMOIR 28.

Appendix E

Petrophysical Evaluation
&
Log Interpretation

APPENDIX E

WELL: WINDERMERE-1, UPPER EUMERALLA

TD (m):	1832	RHOma:	2.65	Rsh:	2.5	GRmin:	30
BHT:	81	RHOfl:	1	DTma:	55.5	GRmax:	104
ST:	22	RHOSH:	2.22	DTfl:	189	a:	0.065
GRAD:	0.032	PHISH:	38	DTsh:	130	m:	2.15
Rm@ST:	0	RW (SP):	0.37			n:	2
Rmf@ST:	0.24	RW (RTO):	0.06				
Rmc@ST:	0	SP:	15				

INTERVAL (m) FROM	TO	FM TEMP (C)	Rmf@TEMP (ohmm)	RW@TEMP (ohmm)	GR (API)	Rmsfl (ohmm)	Rlls (ohmm)	Rlld (ohmm)	Rt (ohmm)	DT (ms/f)	POR SONIC	Rhob	POR NEU	POR DEN	POR N/D	VSH GR	SW SIM	SW INDO
1,025.0	1,027.0	55	0.136	0.211	76	2.6	1.0	1.1	1.2	118	47%	2.28	35	6%	25%	62%	122%	81%
1,064.0	1,066.0	56	0.134	0.208	75	1.4	1.4	1.4	1.4	112	42%	2.15	36	14%	27%	61%	102%	69%
1,097.0	1,100.0	57	0.132	0.205	78	1.1	1.2	1.2	1.2	105	37%	2.17	35	12%	26%	65%	113%	73%
1,114.0	1,116.0	58	0.132	0.203	75	1.5	1.0	1.0	1.0	107	39%	2.2	39	11%	29%	61%	118%	79%
1,156.0	1,164.0	59	0.129	0.200	75	2.6	2.3	2.3	2.3	103	36%	2.23	37	10%	27%	61%	75%	52%

WELL: WINDERMERE-1, MIDDLE EUMERALLA FORMATION

TD (m):	1832	RHOma:	2.65	Rsh:	2.0	GRmin:	28
BHT:	81	RHOfl:	1	DTma:	55.5	GRmax:	105
ST:	22	RHOSH:	2.25	DTfl:	189	a:	0.065
GRAD:	0.032	PHISH:	39	DTsh:	105	m:	2.15
Rm@ST:	0	RW (SP):	0.34			n:	2
Rmf@ST:	0.24	RW (RTO):	0.05				
Rmc@ST:	0	SP:	13				

- High Vclay content of these "sands" results in too low Sw values

INTERVAL (m) FROM	TO	FM TEMP (C)	Rmf@TEMP (ohmm)	RW@TEMP (ohmm)	GR (API)	Rmsfl (ohmm)	Rlls (ohmm)	Rlld (ohmm)	Rt (ohmm)	DT (ms/f)	POR SONIC	Rhob	POR NEU	POR DEN	POR N/D	VSH GR	SW SIM	SW INDO
1,196.0	1,197.0	61	0.127	0.182	70	3.6	2.8	2.7	2.6	96	30%	2.31	32	7%	23%	55%	71%	54%
1,220.0	1,221.0	61	0.126	0.180	70	3.0	2.5	2.5	2.5	92	27%	2.3	33	8%	24%	55%	72%	54%
1,225.0	1,226.0	61	0.126	0.180	75	3.0	2.4	2.4	2.4	99	33%	2.3	35	6%	25%	61%	69%	49%
1,306.0	1,307.0	64	0.122	0.174	75	4.5	3.0	3.0	3.0	100	33%	2.25	34	9%	25%	61%	59%	42%
1,356.0	1,357.0	66	0.120	0.171	74	3.2	2.5	2.5	2.5	97	31%	2.26	38	9%	28%	60%	62%	44%
1,490.0	1,491.0	70	0.114	0.163	70	4.0	3.4	3.4	3.4	87	24%	2.29	31	9%	23%	55%	58%	44%
1,657.0	1,658.0	75	0.108	0.154	72	3.9	3.3	3.2	3.1	92	27%	2.3	30	7%	22%	57%	61%	46%
1,705.0	1,706.0	77	0.106	0.151	81	7.0	5.0	5.0	5.0	90	26%	2.34	35	2%	25%	69%	37%	26%

WELL: WINDERMERE-1, HEATHFIELD SANDSTONE MEMBER

TD (m):	1832	RHOma:	2.65	Rsh:	5.0	GRmin:	28
BHT:	81	RHOfl:	1	DTma:	55.5	GRmax:	105
ST:	22	RHOSH:	2.45	DTfl:	189	a:	0.065
GRAD:	0.032	PHISH:	36	DTsh:	95	m:	2.15
Rm@ST:	0	RW (SP):	0.31			n:	2
Rmf@ST:	0.24	RW (RTO):	0.04				
Rmc@ST:	0	SP:	11				
		RW(SWAB):	0.268				

- High Vclay content of these "sands" results in too low Sw values
- Rw used from swab water (ohmm @ 25C)

INTERVAL (m) FROM	TO	FM TEMP (C)	Rmf@TEMP (ohmm)	RW@TEMP (ohmm)	GR (API)	Rmsfl (ohmm)	Rlls (ohmm)	Rlld (ohmm)	Rt (ohmm)	DT (ms/f)	POR SONIC	Rhob	POR NEU	POR DEN	POR N/D	VSH GR	SW SIM	SW INDO
1,752.0	1,753.0	78	0.104	0.117	70	7.0	5.5	5.5	5.5	91	27%	2.35	31	12%	23%	55%	47%	34%
1,754.0	1,755.0	78	0.104	0.117	77	6.0	4.6	4.6	4.6	84	21%	2.37	32	9%	24%	64%	51%	33%
1,755.0	1,756.0	79	0.104	0.117	82	5.0	3.9	3.9	3.9	85	22%	2.37	30	8%	22%	70%	58%	35%
1,756.0	1,757.0	79	0.104	0.117	72	5.2	4.0	4.0	4.0	88	24%	2.37	30	10%	22%	57%	58%	40%
1,762.0	1,763.0	79	0.104	0.116	75	5.5	4.2	4.2	4.2	88	24%	2.37	30	10%	22%	61%	56%	37%
1,768.0	1,769.0	79	0.104	0.116	75	8.0	5.2	5.2	5.2	89	25%	2.37	29	10%	22%	61%	51%	34%
1,770.0	1,771.0	79	0.104	0.116	75	7.5	5.2	5.2	5.2	83	21%	2.52	28	0%	20%	61%	55%	37%
1,772.0	1,773.0	79	0.104	0.116	72	3.8	4.5	4.5	4.5	90	26%	2.3	32	14%	25%	57%	50%	34%
1,775.0	1,776.0	79	0.104	0.116	72	8.0	5.0	5.0	5.0	78	17%	2.35	30	11%	23%	57%	51%	35%
1,779.0	1,780.0	79	0.104	0.116	75	5.0	5.0	5.0	5.0	89	25%	2.33	30	12%	23%	61%	50%	33%
1,787.0	1,788.0	80	0.103	0.115	75	6.0	4.2	4.2	4.2	88	24%	2.34	30	11%	23%	61%	55%	37%
1,802.0	1,803.0	80	0.103	0.115	76	5.0	4.2	4.2	4.2	89	25%	2.32	32	12%	24%	62%	52%	34%
1,807.0	1,808.0	80	0.103	0.115	75	5.7	4.8	4.8	4.8	86	23%	2.36	32	10%	24%	61%	49%	33%
1,808.0	1,809.0	80	0.103	0.115	74	5.7	4.8	4.8	4.8	77	16%	2.34	31	12%	23%	60%	50%	34%
1,812.0	1,813.0	80	0.102	0.114	74	5.5	4.6	4.6	4.6	86	23%	2.35	31	11%	23%	60%	51%	35%

WELL: WINDERMERE-1, DILWYN FORMATION

TD (m):	1832	RHOma:	2.65	Rsh:	11.3	GRmin:	20
BHT:	81	RHOfl:	1	DTma:	55.5	GRmax:	82
ST:	22	RHOSH:	2.1	DTfl:	189	a:	0.065
GRAD:	0.032	PHISH:	37	DTsh:	130	m:	2.15
Rm@ST:	0	RW (SP):	0.88			n:	2
Rmf@ST:	0.24	RW (RTO):	3.14				
Rmc@ST:	0	SP:	34				

- Using ratio method for Rw calc
- Sonic values not available

INTERVAL (m) FROM	TO	FM TEMP (C)	Rmf@TEMP (ohmm)	RW@TEMP (ohmm)	GR (API)	Rmsfl (ohmm)	Rlls (ohmm)	Rlld (ohmm)	Rt (ohmm)	DT (ms/f)	POR SONIC	Rhob	POR NEU	POR DEN	POR N/D	VSH GR	SW SIM	SW INDO
435.0	441.0	36	0.182	2.372	42	1.0	6.0	12.0	16.2	-		1.97	36	29%	33%	35%	80%	68%
454.0	458.0	37	0.180	2.347	25	1.2	12.0	20.0	25.6	-		2.15	30	28%	29%	8%	86%	83%
507.0	-	38	0.175	2.280	20	1.4	18.0	21.0	23.1	-		2.07	30	35%	33%	0%	86%	86%
508.0	-	38	0.174	2.279	22	1.2	15	18	20.1	-		2.07	33	34%	34%	3%	88%	86%
509.0	-	38	0.174	2.278	24	0.9	7	9	10.4	-		2.04	33	35%	34%	6%	119%	115%
510.0	-	38	0.174	2.276	25	0.85	5.2	9.9	13.2	-		2.07	33	32%	33%	8%	108%	103%
534.0	-	39	0.172	2.247	39	0.8	8.4	13	16.2	-		2.07	36	25%	31%	31%	85%	74%
535.0	-	39	0.172	2.246	40	1.0	7.8	13.0	16.6	-		2.05	38	26%	32%	32%	80%	69%
536.0	-	39	0.172	2.245	36	0.88	8.5	12	14.5	-		2.06	37	27%	32%	26%	91%	80%
567.0	-	40	0.169	2.209	29	1.1	9.5	13	15.5	-		2.09	32	29%	31%	15%	99%	92%
568.0	-	40	0.169	2.208	33	1	10	15	18.5	-		2.05	33	29%	31%	21%	84%	76%
569.0	-	40	0.169	2.206	27	1	6.9	10	12.2	-		2.09	32	30%	31%	11%	114%	108%
570.0	-	40	0.169	2.205	29	1	9	15	19.2	-		2.10	31	28%	30%	15%	90%	84%
610.0	615.0	42	0.165	2.160	30	1.1	11	17	21.2	-		2.07	33	30%	31%	16%	79%	73%

WELL: WINDERMERE-1, PEBBLE POINT FORMATION

TD (m):	1832	RHOma:	2.65	Rsh:	11.0	GRmin:	35
BHT:	81	RHOfl:	1	DTma:	55.5	GRmax:	102
ST:	22	RHOSH:	2.24	DTfl:	189	a:	0.065
GRAD:	0.032	PHISH:	39	DTsh:	123	m:	2.15
Rm@ST:	0	RW (SP):	2.43			n:	2
Rmf@ST:	0.24	RW (RTO):	0.75				
Rmc@ST:	0	SP:	46				

INTERVAL (m) FROM	TO	FM TEMP (C)	Rmf@TEMP (ohmm)	RW@TEMP (ohmm)	GR (API)	Rmsfl (ohmm)	Rlls (ohmm)	Rlld (ohmm)	Rt (ohmm)	DT (ms/f)	POR SONIC	Rhob	POR NEU	POR DEN	POR N/D	VSH GR	SW SIM	SW INDO
727.0	746.0	45	0.156	1.578	42	1.7	10.0	14.0	16.8	102	35%	2.27	35	20%	29%	10%	89%	84%
755.0	758.0	46	0.154	1.557	49	1.7	7.0	11.5	14.7	105	37%	2.22	32	21%	27%	21%	93%	84%

WELL: WINDERMERE-1, PAARATTE FORMATION

TD (m):	1832	RHOma:	2.65	Rsh:	6.0	GRmin:	25
BHT:	81	RHOfl:	1	DTma:	55.5	GRmax:	117
ST:	22	RHOSH:	2.25	DTfl:	189	a:	0.065
GRAD:	0.032	PHISH:	39	DTsh:	123	m:	2.15
Rm@ST:	0	RW (SP):	0.76			n:	2
Rmf@ST:	0.24	RW (RTO):	0.26				
Rmc@ST:	0	SP:	32				

INTERVAL (m) FROM	TO	FM TEMP (C)	Rmf@TEMP (ohmm)	RW@TEMP (ohmm)	GR (API)	Rmsfl (ohmm)	Rlls (ohmm)	Rlld (ohmm)	Rt (ohmm)	DT (ms/f)	POR SONIC	Rhob	POR NEU	POR DEN	POR N/D	VSH GR	SW SIM	SW INDO
780.0	792.0	47	0.152	0.483	28	1.3	4.0	6.0	7.4	120	48%	2.14	37	30%	34%	3%	67%	66%
817.0	820.0	48	0.150	0.475	32	0.9	2.5	3.2	3.7	130	56%	2.12	32	30%	31%	8%	101%	97%
838.0	840.0	49	0.148	0.470	45	1.0	2.0	2.3	2.5	124	51%	2.03	37	32%	35%	22%	106%	94%
901.0	903.0	51	0.144	0.457	47	10.0	4.6	4.6	4.6	117	46%	2.13	42	26%	35%	24%	75%	66%
937.0	938.0	52	0.142	0.450	44	1.0	1.2	1.6	1.9	113	43%	2.15	35	25%	31%	21%	137%	122%
960.0	962.0	53	0.140	0.445	45	1.2	1.4	1.6	1.7	113	43%	2.17	42	24%	34%	22%	127%	113%

Appendix F

Drilling Fluid Report

&

Bit Record

DRILLING FLUID

Chemical additives and mud control services were supplied by Baroid Australia Pty Ltd.

A Quikgel Spud Mud was used from surface to 9 5/8" casing point (290m). Drill from 290m - Total Depth using 3% - 5% KCL/Polymer Mud System.

MUD PROPERTIES

Date	WT (PPG)	Vis (Secs)	Chloride (Hg/L)	pH	Solids (%)	PV	YP
18.3.87	9.0	35			5.0	5	12
19.3.87	9.0	38			6.0	6	20
21.3.87	9.1	37	22500	11.0	3.7	6	10
22.3.87	9.1/9.2	42/32	18500	10.0/11.0	6.0/7.0	15	7/9
23.3.87	9.4/9.3	41/40	21000	11.0/10.5	8.0	16/14	7/8
24.3.87	9.3+	42	29000	11.0	8.0	12	8
25.3.87	9.4/9.5	44/38	29000	9.5/10.5	8.0/9.0	19/11	11/7
26.3.87	9.3/9.6	40/38	28000	11.0/10.0	9.0	14/12	7
27.3.87	9.3/9.4	39	21000	11.0/10.0	8.0	14/12	8
28.3.87	9.4	38/40	21000	11.2/10.5	8.0	13/16	7
29.3.87	9.4	40	16500	10.0	9.0	14	8
31.3.87	9.4	42	13000	11.0	8.0	14	10
4.4.87	9.3/9.4	38/42	38000	10.5	4.0	10/11	23/20
5.4.87	9.4	38	38000	10.5	4.0	13	14
6.4.87	9.4	39	35000	10.5	4.0	10	14
7.4.87	9.5	39	30000	9.5	6.0	12	16
8.4.87	9.5	38	30000	10.5	6.0	14	14
9.4.87	9.4+	36	28000	10.5	6.0	9	14

Water Loss was in the Range 4.0 cc - 9.0 cc with the average being 5.0 - 6.0 cc.

MATERIALS/CHEMICALS USED

Quikgel	67 Sacks	(25 kg sks)	1675 kgs
Aquagel	174 Sacks	(100 lb sks)	7909 kgs
Kwikseal	6 sacks	(40 lb sks)	112 kgs
Soda Ash	4 sacks	(40 kg sks)	160 kgs
Caustic Soda	41 sacks	(25 kg sks)	1025 kgs
Bicarbonate of Soda	2 sacks	(40 kg sks)	80 kgs
Dextrid	122 sacks	(50 lb sks)	2773 kgs
Condet	4	(200 ltr Drum)	800 litres
PAC-R	90 sacks	(50 lb sks)	2045 kgs
Barite	172 sacks	(50 kg sks)	8600 kgs
KCL	491 sacks	(50 kg sks)	24550 kgs

DRILLING BITS

A total of seven (7) bit runs were made to drill Windermere -1 utilizing five bits and two re-runs.

Bit No.	1	2	3	4
Size (Inches)	12 1/4	8 1/2	8 1/2	8 1/2
Type	SHITH S-11	HTC JD3	HTC J-22	HTC JD3
Depth In (M)	8	290	430	1024
Depth Out (M)	290	430	1024	1070
Metreage	182	140	594	46
Condition	4-4-IN	?	2-2-1/16	8-8-IN
Hours	16.5	11	40	11.5
W.O.B. (lbs)	10,000	10-14,000	5-15,000	10-15,000
R.P.M.	110	100	100-110	100
G.P.M.	400-450	240-260	240	240
Pressure (PSI)	900	500	700	680
Nozzles	3 x 13	3 x 11	3 x 11	3 x 11

Bit No.	5 (R.R.3)	6	7 (R.R.6)
Size (Inches)	8 1/2	8 1/2	8 1/2
Type	HTC J-22	CHRIST C-2	CHRIST C-2
Depth In (M)	1070	1568	1838
Depth Out (M)	1568	1838	1852
Metreage	498	270	14
Condition	4-4 1/8	2-2-in	2-2-in
Hours	73	43	3
W.O.B.	10,000	25-30,000	30,000
R.P.M.	60	75	80
G.P.M.	240	200-250	200-260
Pressure (PSI)	680-850	850	900
Nozzles	3 x 11	3 x 11	3 x 11

Ref: P111H

MINORA RESOURCES NL

DRILLING FLUID RECAP

WINDERMERE NO. 1.

Prepared By : M. Thackray

Dated : March 1987

TABLE OF CONTENTS

WELL SUMMARY

Operator	:	Minora Resources NL
Well Number	:	Windermere No. 1
Location	:	PEP 111, Otway Basin Victoria
Contractor	:	Gearhart
Rig	:	No. 2
Rig on Location	:	16 March 1987
Spud Date	:	17 March 1987
Total Depth	:	1838 ft
* Date Reached T.D.	:	28 March 1987
* Total Days Drilling	:	14
Rig off Location	:	-
Total Days on Well	:	-

Drilling Fluid Type	Interval	Hole Size	Cost
	Surface - 290 m	$12^1/4$"	$686.50
	290 - 1383 m	$8^1/2$"	$19,906.14
	MUD MATERIALS CHARGED TO DRILLING		$20,592.04

Engineer on Location from : 15/03/87 to 30/03/87

* Mud Engineering : 15 days @ $375/day	$5,625.00
* TOTAL DRILLING COST MATERIALS & ENGINEERING SERVICE	$26,217.04
Mud Materials not charged to Drilling	$2,182.20
Mud Materials used for Testing and Suspension	$5,747.13

Casing Program	:	$9^5/8$" @ 281 m
Drilling Supervisors	:	G. Jackman
Baroid Mud Engineers	:	M. Thackray

MINORA RESOURCES NL

WINDERMERE NO. 1

INTRODUCTION

Windermere No. 1 was spudded on 17th March, 1987 and drilled to a T.D. of 1838 m in 14 days. A thicker more dispersive Eumeralla Formation than other Otway wells was intersected resulting in higher than anticipated mud costs.

The soft dispersive clays of the Belfast and Upper Eumeralla Formations caused some bit balling resulting in slower drilling rates and higher mud weights. Faster methods of drilling these sections should be examined. Stratapax type bits or four jet toothed bits with carefully controlled hydraulics, could provide great improvements.

MINORA RESOURCES NL

WINDERMERE NO. 1

DISCUSSION BY INTERVAL

$12^{1}/4$" HOLE

Surface - 290 m $9^{5}/8$" Casing @ 281 m

Windemere No. 1 was spudded on the 17th March, 1987 and a $12^{1}/4$" hole drilled to 290 m in 16.5 hours rotating time.

A Quik Gel Spud Mud was initially used, but after the conductor pipe was recemented, a cement flocculated Gel-Native Clay mud was used to the casing point.

Viscosity was maintained at 35 - 40 secs by small additions of prehydrated gel although the Gellibrand Marl provided an excellent spud mud in a Caustic-Lime environment.

Following a wiper trip at casing point, a large quantity of cuttings and mud ring was circulated to surface choking the flowline. The well was circulated for over an hour and cavings were still evident over the Shaker Screens.

A Hi-Vis Pill was spotted on bottom and $9^{5}/8$" casing run to 281 m and cemented with good returns to surface.

MINORA RESOURCES NL

WINDERMERE NO. 1

DISCUSSION BY INTERVAL

$8^{1}/2$" HOLE TO 1838 M

While nippling up BOP's, the mud pits were dumped and cleaned, and 400 bbls of KCl-Polymer mud mixed.

Water was used to drill out the shoe and for the leak off test giving an equivalent mud weight of 14.0 ppg. Due to a leaking valve, 80 bbls of cement contaminated water was added to the KCl-Polymer mud severely flocculating it and requiring high concentrations of Dextrid to control fluid loss.

Although the KCl content was held at 5-6% through the Gellibrand and Clifton Marls, the Caliper logs indicated this section was washed out to 12" probably as a result of the high fluid loss +15 ml.

Very fast drilling (60 m/hr) occurred through the underlying Dilwyn Sands 436 - 658 m. To reduce mud losses, the lower Shaker Screens were changed from 60 x 60# to 60 x 40#. The KCl content was allowed to drop to 4%. With the arrival of further chemical stock, the fluid loss was reduced to around 6.5 ml and the rheology stabilised by 500 m. High Viscosity Pills were periodically circulated to sweep the hole clean.

The Pember Mudstone, Pebble Point and Paarate Sandstones at 658, 726 and 765 m respectively, also drilled rapidly with 4% KCl mud. No problems were encountered in this sector and the Caliper log showed the hole to be in good condition.

Some balling of the J22 bit occurred in the Belfast mudstone (866 m), but was alleviated by additions of Condet. The KCl content had fallen to 3.5% due to supply shortages and the level of excess polymer was subsequently increased to reduce dispersion rates. Very high dilution rates were required to keep the mud weight less than 9.2 ppg even with the Desilter now operational. Caliper logs indicated this section to be in excellent condition.

DISCUSSION BY INTERVAL

$8^1/2$" HOLE TO 1838 M (Cont.)

The Eumeralla Clay - Sand sequence was intersected at 931 m and continued to around 1800 m. Further bit balling occurred in the upper section and was only partially alleviated by additions of Condet. These clays were almost "Gumbo" and showed a great capacity for base exchange as well as requiring high dilution rates to keep mud weights less than 9.4 ppg.

At 1024 m, a Hughes JD-3 was run to improve drilling rates but was removed after 11.5 hours having averaged 4 m/hr. The cones were locked and the bit had been skidding, explaining the low R.O.P. and the lack of cuttings over the Shakers. Caliper logs showed this section to be washed out up to 13" despite increasing the KCl content to 4.5% and maintaining high concentrations of excess polymer.

The J22 bit used earlier was rerun as the cones rotated more freely than a new journal bearing bit, and the chances of skidding would be reduced. This bit drilled to 1668 m averaging 15.1 m/hr. Very high dilution rates were required through this section and the mud weight allowed to increase to 9.5 ppg to reduce chemical costs. All solids control equipment was run continuously and the possum belly and sand trap dumped frequently.

Bit No. 6 was run and completed the well to 1838 m through the Middle Eumeralla Formation and Heathfield Sand. The KCl content was allowed to fall to 2.8% as the reactive clay content of the formations reduced with depth. Excess polymer was still maintained to reduce dispersion rates and stabilise upper formations.

Caliper logs showed the well to be "gun barrel" from 1025 to 1838 m indicating this section of well to be adequately stabilised by 3-4% KCl and excess polymer.

The well was logged prior to a testing program. The mud engineer was released prior to testing to hand carry logs to Perth office.

CONCLUSIONS AND RECOMMENDATIONS

$12^1/4$" Hole

In a Caustic/Lime environment, the Gellibrand Marl provided an excellent Spud Mud requiring only small additions of prehydrated gel to maintain adequate properties. Surface hole in future wells would be better drilled with prehydrated Aquagel flocculated as required with Lime.

$8^1/2$" Hole

Windermere No. 1 intersected almost 900 m of Upper and Middle Eumeralla Formation. Although caliper logs indicated this formation was generally stabilised by 3-4% KCl with excess polymer, the first 100 m of very sticky clay was washed out and will require higher concentrations in future nearby wells.

Very high dilution rates were required through the Eumeralla Formation due to the dispersive nature of the clays. If mud weights are to be kept to a minimum and costs reduced, improved methods of solids control or chemical salvage must be looked at.

A Centrifuge would be the ideal piece of solids control equipment in low solids KCl muds, but its cost effectiveness on single two week wells is doubtful.

KCl was a major chemical cost on this well. Some of this KCl could be recovered by surface skimming the sump and reusing this brine in the mud system. Addition of polyacrylamide flocculants would enhance recovery.

To minimise hole enlargement in the Marls beneath the $9^5/8$" shoe and in the Upper Eumeralla Formations, future mud programs should allow for 7-10% KCl through these sections and an excess of partially hydrolised polyacrylamide. The KCl content and polymer excess can be relaxed once these sections have been drilled.

Baroid Australia PTY. LTD./NL INDUSTRIES INC.

MATERIAL RECAP

COMPANY MINORA RESOURCES
WELL WINDERMERE NO.1
LOCATION PEP 111, VICTORIA
COST/DAY $686.50
COST/M $ 2.37
COST/M³ $ 7.89
RECAPPED BY M. THACKRAY
DATE 30-03-87

MUD TYPES GEL SPUD MUD

CONTRACTOR GEARHART
DRILLING DAYS/PHASE 1
ROTATING HRS/PHASE 16.5

HOLE SIZE $12\frac{1}{4}$"
INTERVAL TO 290
FROM 0
MTRS DRILLED 290

MUD CONSUMPTION FACTOR 0.3 m³/m

MATERIAL	UNIT	UNIT COST	ESTIMATED USED	ESTIMATED KG/M³	ACTUAL USED	ACTUAL KG/M³	TOTAL COST ESTIMATED	TOTAL COST ACTUAL
QUIK GEL	25 kg	9.08			60		1316.00	544.80
SODA ASH	40 kg	17.86			1			17.86
AQUAGEL	100 lb	15.48			8			123.84

CHEMICAL VOLUME	2 m³		
FRESH WATER	85 m³		
SEA WATER			
TOTAL MUD MADE	87 m³		
COST LESS BARYTES		1316.00	$686.50
COST WITH BARYTES			

COMMENTS

SECTION DRILLED PREDOMINANTLY WITH CEMENT FLOCCULATED BENTONITE AND NATIVE CLAY.

Baroid Australia PTY. LTD./NL INDUSTRIES INC.

MATERIAL RECAP

COMPANY MINORA RESOURCES
WELL WINDERMERE NO.1
LOCATION PEP 111, VICTORIA
COST/DAY $2211.79
COST/M $ 12.86
COST/M³ $ 44.40
RECAPPED BY M. THACKRAY
DATE 31-03-87

MUD TYPES KCl-POLYMER

CONTRACTOR GEARHART RIG 2
DRILLING DAYS/PHASE 9
ROTATING HRS/PHASE 138.50

HOLE SIZE 8½"
INTERVAL TO 1838
FROM 290
MTRS DRILLED 1548

MUD CONSUMPTION FACTOR 0.29 m³/m

MATERIAL	UNIT	UNIT COST	ESTIMATED		ACTUAL		TOTAL COST	
			USED	KG/M³	USED	KG/M³	ESTIMATED	ACTUAL
AQUAGEL	100 lb	15.48	127		116	11.8	1965.96	1795.68
QUIK GEL	25 kg	9.08	–		4	.2	–	63.32
SODA ASH	40 kg	17.86	14		3	.3	205.04	53.58
BICARBONATE OF SODA	40 kg	21.83	–		2	.2	–	43.66
DEXTRID	25 kg	39.99	90		96	5.4	3599.10	3839.04
PAC-R	25 kg	76.92	40		76	4.1	3076.80	5845.92
CONDET	200 lt	195.84	–		4	1.8	–	783.36
CAUSTIC SODA	25 kg	22.03	26		34	1.9	572.78	749.02
KCl	50 kg	19.48	196		347	38.7	3818.08	6759.56

CHEMICAL VOLUME
FRESH WATER 25
SEA WATER 423
TOTAL MUD MADE 448 m³
COST LESS BARYTES 13282.76 19906.14
COST WITH BARYTES
COMMENTS

Baroid Australia PTY. LTD./NL INDUSTRIES INC.

MATERIAL RECAP

COMPANY
WELL
LOCATION
COST/DAY
COST/M
COST/M³
RECAPPED BY
DATE

MUD TYPES

MATERIAL NOT CHARGED TO DRILLING

CONTRACTOR
DRILLING DAYS/PHASE
ROTATING HRS/PHASE

HOLE SIZE
INTERVAL TO
FROM
MTRS DRILLED

MUD CONSUMPTION FACTOR m³/m

MATERIAL	UNIT	UNIT COST	ESTIMATED USED	ESTIMATED KG/M³	ACTUAL USED	ACTUAL KG/M³	TOTAL COST ESTIMATED	TOTAL COST ACTUAL
CEMENTING MATERIALS								
AQUAGEL	100 lb	15.48			16			247.68
KWIK SEAL	40 lb	36.98			10			369.80
								617.48
MATERIAL NOT CHARGED TO DRILLING								
SODIUM NITRATE	54 kg	40.81			2			81.62
BARITE	100 lb	9.28			121			1122.88
								1204.50
DAMAGED STOCK								
QUIK GEL	25 kg	9.08			5			45.40
KWIK SEAL	40 lb	36.98			5			184.90
BARITE	100 lb	9.28			14			129.92
								360.22

CHEMICAL VOLUME
FRESH WATER
SEA WATER
TOTAL MUD MADE
~~COST/LESS/BARYTES~~
~~COST/WITH/BARYTES~~
COMMENTS

TOTAL MATERIAL NOT CHARGED TO DRILLING 2182.20

BARITE USED ONLY FOR TRIPS. DAMAGED STOCK CAUSED BY STORMS DURING FINAL WEEK.

Baroid Australia PTY. LTD./NL INDUSTRIES INC.

MATERIAL SUMMARY

COMPANY	MINORA RESOURCES	MUD TYPE	GEL SPUD MUD	HOLE SIZE	METRES DRILLED	DRILLING DAYS
WELL	WINDERMERE NO.1		KCl-POLYMER			
LOCATION	PEP 111, Victoria			$12\frac{1}{4}$	290	1
COST/DAY				$8\frac{1}{2}$	1548	9
COST/M		TOTAL ROTATING HRS				
COST/M³		TOTAL DAYS ON HOLE				
RECAPPED BY		TOTAL DEPTH		TOTAL	1838	
		MUD CONSUMPTION : WELL AVERAGE				

MATERIAL	UNIT	UNIT COST	ESTIMATED USED	ESTIMATED KG/M³	ACTUAL USED	ACTUAL KG/M³	TOTAL COST ESTIMATED	TOTAL COST ACTUAL
AQUAGEL	100 lb	15.48	127		124		1965.96	1919.52
QUIK GEL	25 kg	9.08	145		64		1316.60	581.12
SODA ASH	40 kg	17.86	14		4		250.04	71.44
BICARBONATE OF SODA	40 kg	21.83	0		2		-	43.66
CAUSTIC SODA	25 kg	22.03	26		34		572.78	749.02
DEXTRID	25 kg	39.99	90		96		3599.10	3839.04
PAC-R	25 kg	76.92	40		76		3076.80	5845.92
CONDET	200 kg	195.84	0		4		-	783.76
KCl	50 kg	19.48	196		347		3818.08	6759.56
							14599.36	20592.04

TOTAL MATERIAL NOT CHARGED TO DRILLING

AQUAGEL	100 lb	15.48	16	247.68
QUIK GEL	25 kg	9.08	5	45.40
KWIK SEAL	40 lb	36.98	15	554.70
SODIUM NITRATE	54 kg	40.81	2	81.62
BARITE	100 lb	9.28	135	1252.80
				2182.20

CHEMICAL VOLUME		
FRESH WATER		
SEA WATER		
TOTAL MUD MADE		
COST LESS BARYTES	14599.36	21521.44
COST WITH BARYTES		22774.24

COMMENTS

TOTAL COST INCLUDES ALL DAMAGED STOCK,
CEMENTING CHEMICALS AND TRACERS USED TO 30-03-87.
DOES NOT INCLUDE STOCK USED OR DAMAGED FROM 30-03-87
TO END OF TESTING.

Baroid Australia PTY. LTD./NL INDUSTRIES INC.

DRILLING FLUID PROPERTY RECAP

COMPANY MINORA RESOURCES

WELL WINDERMERE NO. 1

DATE	DEPTH m	HOLE SIZE	KCl %	WEIGHT SG	VIS SEC	PV	YP	GELS 10 sec	GELS 10 min	WATER LOSS API	CAKE mm	pH	Pf	Mf	Cl mg/l	Ca mg/l	SAND %	CORR. SOLIDS %	WATER %	OIL %	MBC kg/m	REMARKS TREATMENT	FORMATION
18/3	246	12¼	-	1.08	35	5	12	4	6	N/C	-						1					Gel, Native clay, Spud Mud.	Limestone, Marl.
19/3	290	12¼	-	1.08	38	6	20	12	25	N/C	-						1					Cmt csg, mix KCl mud.	
20/3	290																					W.O.C. Nipple up BOP.	-
21/3	430	8½	5	1.09	37	6	10	4	13	14.6	3	11.0	.5	.9	22500	80	.2	3.7	94	0	49	Mud Flocculated by Cmt.	Marl.
22/3	750	8½	4	1.10	38	15	9	2	3	6.4	2	11.0	.3	.6	18000	80	TR	5.0	93	0	43	Mud dispersed with Pac R.	Sands.
23/3	1010	8½	3.4	1.12	40	14	8	1	2	6.2	2	10.5	.2	.6	21000	120	TR	6.0	92	0	50	Rapid Solids build up.	Clays.
24/3	1050	8½	4.2	1.12	42	12	8	1	2	6.0	2	11	.3	.6	29000	100	TR	5.3	92	0	43	High dilution required.	Clays.
25/3	1290	8½	4.8	1.14	38	11	7	1	2	5.3	2	10.5	.3	.6	25000	120	TR	6.6	91	0	50	High dilution required.	Clays.
26/3	1568	8½	3.5	1.15	38	12	7	2	2	6.7	2	10	.15	.2	22000	160	TR	6.9	91	0	50	Fast Drilling.	Clays, Sands.
27/3	1658	8½	2.8	1.13	39	12	8	2	2	6.0	2	10	.1	.3	16000	240	TR	6.4	92	0	50		Clay, Siltstone.
28/3	1810	8½	3.2	1.13	40	16	7	1	2	5.9	2	10.5	.2	.4	17500	80	TR	6.3	92	0	43		Clays.
29/3	1838	8½	2.8	1.13	40	14	8	2	3	5.8	2	10	.15	.35	16500	160	TR	7.4	91	0	50		T.D.

Baroid Australia PTY. LTD./NL INDUSTRIES INC.

BIT RECORD

COMPANY MINORA RESOURCES WELL WINDERMERE NO.1 CONTRACTOR/RIG GEARHART RIG NO.2

LOCATION PEP 111, VICTORIA SPUD DATE 17/03/87 DATE REACHED T.D.

COMPANY SUPERVISORS G. JACKMAN TOOLPUSHERS B. FOWLER

PUMPS: MAKE, TYPE G.D. P28 LINERS USED 8" DRILL COLLARS $6\frac{1}{4}$, 8" DRILL PIPE $4\frac{1}{2}$

MUD SYSTEMS, DEPTHS 0 - 290 SPUD MUD

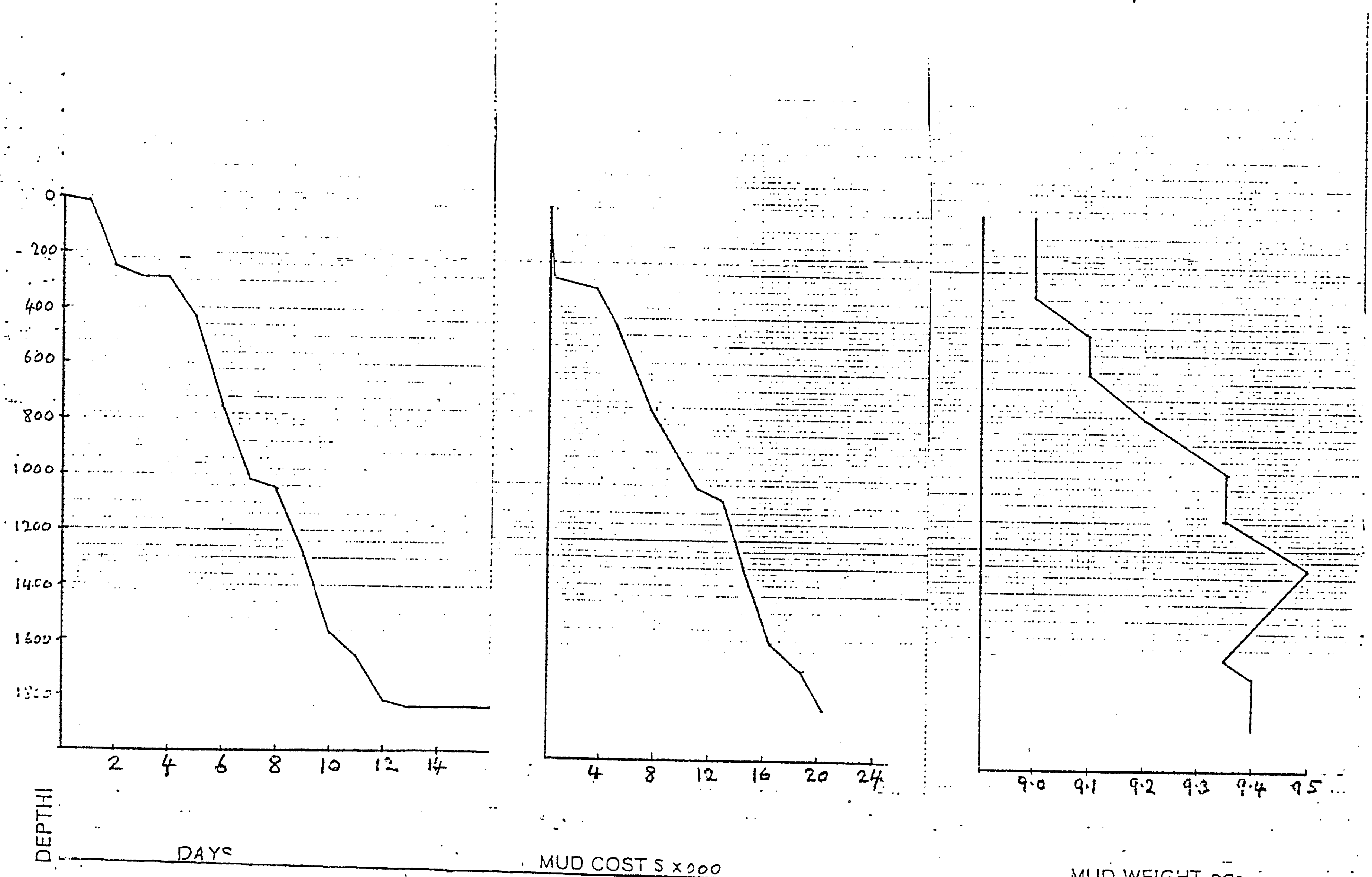
DATE	No.	SIZE	MAKE	TYPE	JETS 32nd"	DEPTH OUT m	METRES DRILLED	HOURS	MTRS/HR	ACCUM DRLG HOURS	BIT WEIGHT LBS	RPM	VERT DEV'N	PUMP PRESSURE p.s.i.	PUMP RATE spm	WT S.G.	MUD VIS sec	CONDITION T	CONDITION B	CONDITION G	FORMATION	REMARKS
17/3	RR1	$12\frac{1}{4}$	SMITH	S-11	3 x 13	290	284	16.5	17.6	16.5	10	110	1/4	900	150	1.07	38	4	4	I	Limestone, Marl.	RR.
20/3	2	$8\frac{1}{2}$	HTC	SD3	3 x 11	430	140	11	12.7	27.5	10/14	100	1/4	500	90	1.09	37	4	4	I	Marl.	
21/3	3	$8\frac{1}{2}$	HTC	S22	3 x 11	1024	594	40	14.9	67.5	5/15	110	3/4	600	88	1.12	40	2	2	1/16	Sands / Clays.	
23/3	4	$8\frac{1}{2}$	HTC	JD3	3 x 11	1070	46	11.5	4.0	79	10/15	100	$1\frac{1}{2}$	600	90	1.14	38	8	8	I	Clays - Cones Locked.	
24/3	5	$8\frac{1}{2}$	HTC	S22	3 x 11	1568	498	33	15.1	112	22/28	60/90	3/4	850	80	1.14	38	4	4	1/8	Clays.	RR 3.
25/3	6	$8\frac{1}{2}$	CHRIST	C2	3 x 11	1838	270	43	6.3	155	22/30	70/80	4	900	82	1.14	40	2	2	1/16	Clays, Sands.	T.D.

Baroid Australia PTY. LTD./NL INDUSTRIES INC.

GRAPH SUMMARY

OPERATOR *MINORA*

WELL *WINDERMERE - 1*



MINORA RESOURCES NL
WINDERMERE NO. 1

TESTING

Following wireline logging a testing program lasting 8 days was embarked on and included drilling a further 12 m of rathole.

During this time the KCl content ranged from 2 to 4% and the hole remained stable.

Typical mud properties were:

Mud Weight	:	9.4 ppg
Viscosity	:	39 secs
YP	:	9 lb/100 ft^2
Filtrate	:	5 cc/30 min
Chloride	:	30,000 mg/l
KCl%	:	3

After testing, 7" casing was run and perforated.

The well was completed as an oil producer.

TESTING

Baroid Australia PTY. LTD./NL INDUSTRIES INC.

MATERIAL SUMMARY

COMPANY MINORA RESOURCES
WELL WINDERMERE NO.1
LOCATION PEP 111, VICTORIA
COST/DAY
COST/M
COST/M³
RECAPPED BY

MUD TYPE KCl-POLYMER

TOTAL ROTATING HRS
TOTAL DAYS ON HOLE
TOTAL DEPTH
MUD CONSUMPTION : WELL AVERAGE

HOLE SIZE	METRES DRILLED	DRILLING DAYS
TESTING PROGRAMME		
TOTAL		

MATERIAL	UNIT	UNIT COST	ESTIMATED USED	ESTIMATED KG/M³	ACTUAL USED	ACTUAL KG/M³	TOTAL COST ESTIMATED	TOTAL COST ACTUAL
CAUSTIC SODA	25 kg	22.03			5			110.15
QUIK GEL	25 kg	9.08			3			27.24
AQUAGEL	100 lb	15.48			34			526.32
DEXTRID	25 kg	39.99			26			1039.74
PAC R	25 kg	76.92			12			923.04
KCl	50 kg	19.48			44			2805.12
BARITE	100 lb	9.28			34			315.52

CHEMICAL VOLUME
FRESH WATER
SEA WATER
TOTAL MUD MADE 47.7 m^3
COST LESS BARYTES 5431.61
COST WITH BARYTES 5747.13
COMMENTS

Appendix G

DST Reports

WINDERMERE-1

SUMMARY OF TESTING OPERATIONS

Testing operations on this well consisted of five (5) drill stem tests (DST's fifty two (52) selective formation tests (SFT's) and six (6) days of swabbing.

DST's 1 and 2 were conducted during the period 31 March - 2 April 1987 and the intervals tested were 1791m - 1838m and 1790m - 1814m respectively.

DST-1 did not flow to surface (except gas) but produced sixteen (16) barrels of fluid from the formation (15.5 barrels of muddy water and 0.5 barrels of crude oil).

DST-2 also did not flow to surface but was not far below and produced approximately 30 barrels plus of oil and gas cut oil with about 20 barrels of water.

SFT's (52) were run over a period of 4 days (3-6 April 1987) and brief results of these are shown in this appendix detailed results were distributed to the Joint Venture Partners.

DST-3 was conducted on 7 April 1987 but was considered a failure due to mechanical malfunction of downhole test tools.

DST's 4 and 5 were conducted during the period 16 - 19 May 1987 and the intervals tested were 1798m - 1813m and 1782m - 1787m respectively. DST-4 did not flow to surface but produced 5.6 barrels of brine with a trace of crude oil.

DST -5 did not flow to surface and very little fluid was produced.

Swabbing operations commenced on 23 May 1987 and continued until 29 May 1987 recovering approximately 33 barrels of fluid from the formation (Filtrate and Formation Water). Swab reports are included in this appendix.

DST-1

Was a conventional open hole off bottom test conducted over the interval 1791m - 1838m.

Test tool was opened at 0737 hrs on 31 March 1987 for Initial Flow and closed at 0743 hrs for Initial Shut In. Second flow period was of 2 hrs duration commencing at 0815 hrs. Well was flowed through bubble hose only and a maximum pressure of 3 psi was recorded. Gas came to surface approximately 1 hr and 20 mins after tool was closed at 1015 hrs. The well was opened to flare pit on a 96/64" choke and gas burnt bright orange (no smoke) with a 1-3 foot flame. Test tool was again opened at 1417 hrs for a period of 18 mins, after which the tool was closed and packer unseated at 1437 hrs. Test string was pulled out of the hole and fluid recovered was 15.5 barrels of muddy water and 0.5 barrels of crude oil.

DST -2

Was an off bottom open hole straddle test and was conducted over the interval 1790m -1814m.

Test tool was opened at 1745 hrs on 1 April 1987 for Initial Flow and closed at 1750 hrs for Initial Shut-In. Second flow period was of 13 hrs and 14 mins duration commencing at 1824 hrs, moderate blow was recorded through bubble hose and gas came to surface at 1945 hrs with a maximum FWHP of 2 PSI. Well continued to flow until test tool was shut in at 0738 hrs on 2 April 1987. Final Shut-In period continued until 1416 hrs when packer was unseated and test string pulled out. Recovery from this test during reverse circulation was in excess of 30 barrels of oil/gas and approximately 20 barrels of water.

DST -3

Was an off bottom open hole straddle test conducted over the interval 1750m - 1790m.

Test tool was opened at 0633 hrs on 7 April 1987 and shut in for Initial Shut-In at 0638 hrs. Second flow period commenced at 0740 hrs but mechanical failure of test string component caused this test to be considered a failure and therefore no valid data was obtained.

DST -4

Was a conventional off bottom cased hole test conducted over the interval 1798m - 1813m.

Test tool was opened at 0728 hrs on 17 May 1987 and closed for Initial Shut-In at 0735 hrs. Second flow period was of 10 hrs 13 mins duration commencing at 0837 hrs and ending at 1900 hrs. Final Shut-In period was from 1900 hrs to 0130 hrs on 18 May 1987. Recovery from reverse circulation was 5.6 barrels of brine with trace of crude oil.

DST -5

Was an off bottom cased hole straddle test conducted over the interval 1782m - 1787m.

Test tool was opened at 1932 hrs on 19 May 1987 and closed for Initial Shut-In at 1938 hrs. Second flow period commenced at 2049 hrs and continued until 2120 hrs with the only indication of flow being very weak blow from bubble hose for approximately 15 mins. Packer was unseated at 2208 hrs and test string pulled out. The only recovery from this test was a small amount of water with a trace of crude oil.

SUBJECT: WINDERMERE-1 DST-1 1791-1838M - SYNOPSIS

DST-1 is a valid test and indicates oil recovery from a low productivity/permeability zone conventionally pressurised to 0.43-0.44 psi/ft.

Low productivity, without benefit of chart interrogation, is possibly due to shock loading of formation due to no water cushion and/or excessive mud hydrostatic of circa 500 psi.

Recoveries from test over a 2 hour flow period were:

Oil	0.5 bbl
Gas/Cut Mud/Water	3.8 bbls
Mud (Sump)	7.7 bbls
Total	12.0 bbls

As Well was continuing to flow against increasing pipe hydrostatic head, it is recommended that this test interval is repeated and the flow period extended.

P11146/A/300687

SUBJECT: WINDERMERE-1 DST-1 - BUILD-UP ANALYSIS

Further to the interpretation from Schlumberger Sydney, on behalf of Dowell Schlumberger, for the subject test selected parameters for input to analysis were:

	DST 1
Q, Res. bbls per day	240
Thickness ft	75

Resultant output from Horner Plot Computerised analysis is:

M, psi/cycle	577
P 1hr psia	2279
P (extrap) psia	2554
Pwb psia	429.7
Kh md ft	34
K md	0.45
Skin	-0.299

DST#1 interpretation is invalid due to the limited flow period precluding reservoir investigation. Note that Horner Plot techniques as used are invalid unless constant flow is achieved preferably to surface. Horner interpretation is more valid and acceptable for DST#2. As DST#2 was a repeat of the DST#1 interval further investigation of DST#1 with Ramey-Agarwal-Martin type curves is not justified.

P11119/300687

SUBJECT: WINDERMERE-1 DST-2 1791-1815M - SYNOPSIS

DST-2 recovered 57.8 bbls of fluid in 13.23 hours.

Recoveries were:

- 11.~~3~~5 bbls Gas Cut Oil (surface bubble)
- 20.4 bbls Oil (41° API)
- 20.3 bbls Gas Cut Water RW=0.32 ohm m at 71°F
- 5.8 bbls Mud

Test was conducted without a water cushion to repeat the DST-1 which proved oil. Well continued to produce to time of shut-in.

Test is valid and exhibits low productivity and permeability. However, the interval tested appears to be capable of producing in excess of 100 barrels of fluid per day on current recoveries.

P11146/B/300687

SUBJECT: WINDERMERE-1 DST-2 - BUILD-UP ANALYSIS

Further to the interpretation from Schlumberger Sydney, on behalf of Dowell Schlumberger, for the subject test selected parameters for input to analysis were:

	DST 2
Q, Res. bbls per day	131.5
Thickness ft	75

Resultant output from Horner Plot Computerised analysis is:

	(1)	(2)
M, psi/cycle	191	223
P 1hr psia	2410	2286
P (extrap) psia	2630	2543
Pwb psia	1113.7	1086
Kh md ft	56	48
K md	0.75	0.64
Skin	+3.58	+2.0

(1) Facsimilied charts used for interpretation due to misdirection of actual charts.
(2) Actual charts used 24/6/87. Results unchanged materially.

Horner interpretation is more valid and acceptable for DST#2. As DST#2 was a repeat of the DST#1 interval further investigation of DST#1 with Ramey-Agarwal-Martin type curves is not justified.

P11119/B/300687

SUBJECT: WINDERMERE-1 DST-3 1750-1790M - SYNOPSIS

DST-3 failed due to mechanical reasons while running-in the hole with tools. Pipe filled with mud and necessitated aborting the test.

JV agreed not to repeat test but reconsider after installation of 7" casing.

P11146/C/300687

SUBJECT: WINDERMERE-1 DST-4 SFT PROGRAMME - SYNOPSIS

Due to the apparent multiplicity of potential hydrocarbon intervals from log interpretation, the SFT Programme was initiated to define the hydrostatic gradient, identify zones for testing through 7" casing and obtain samples where warranted.

Fifty points were attempted from 439M to 1806M and samples were recovered from 435M and 535M.

Results are summarised in the attached tabulations and pressure depth plots.

Indications are that a regional gradient of 0.43 to 0.44 psi/ft exists in most permeable zones with anomalies in sands at 435, 535, 1050 and 1370 M, the latter anomalies of 1050 and 1370M being probably due to thin sand development and paucity of data points.

Low permeability precluded obtaining valid data from circa 1400 M to 1806 M.

P11146/D/300687

SUBJECT: WINDERMERE #1 DST #4 1798 - 1813m - SYNOPSIS

DST #4 recovered 5.6 bbls of fluid and trace of oil. Gas bubble reported was air due to use of low volume but accurate displacement pump during start of reverse circulation.

Recovery was brine 37,400/36,500 ppm Cl. Thus test recovered almost entirely sump volume brine and filtrate. Spotting diesel for perforation and sump fluid was ineffective. Annulus did not drop during test.

Test is valid and exhibits low productivity and permeability as known. Reservoir fluid recovery is masked by brine recovery.

SWABBING DST#4 INTERVAL 1798 - 1813m - SYNOPSIS

Status: 2 7/8" EUE 6.5 lb/ft tubing with closed sliding sleeve at 1786.5 metres, OTIS packer at 1789m and tailpipe to 1800m. Well full of brine 8.7 lb/gallon salinity 35,000 PPM Cl. (NB Well previously perforated in 8.7 lb/gallon brine with diesel spotted across perforation interval, shot at 8 shots/ft with 5" guns).

A total of 113.68 barrels of fluid were recovered in 88 runs including two fishing operations over an effective 9 days swabbing operation.

Chlorides content was measured on each recovered swab volume and results are appended in the daily swabbing report sheets 1-9 inclusive.

Recovery was calculated as:

Completion brine	34.0	barrels
Diesel, circa	2.0	barrels
Oil, less than	1.0	barrels
Formation water	76.68	barrels.

Final fluid sample from Run No. 88 was analysed as follows:

Annulus (2 7/8"/7") was monitored and found full before, during and after swabbing operations.

P11146/E/300687

SUBJECT: WINDERMERE #1 DST #5 1782 - 1787m - SYNOPSIS

DST 5 is a valid test. An initial flow was not achieved and resulted in a pseudo build-up prior to the initial build-up. Build-up was rapid achieving 75% of reservoir pressure (extrapolated) in one hour indicating little damage. Formation was exposed to 2600 psi drawdown with only 3000 cc of filtrate, diesel and trace of possible oil being recovered in a 77 min flow period. No displacement was observed at surface and tools were cycled with no improvement in flow. Tools were pulled without reverse circulating to ensure 100% fluid recovery. DST #5 exhibits extremely low productivity for an apparent low permeability.

P11146/F/300687

FLOPETROL JOHNSTON
Schlumberger

FORMATION TESTING REPORT

COMPANY	:	Minora Resources NL
FIELD	:	Otway Basin
WELL	:	Windermere 1
DST No	:	1
DATE	:	31 March, 1987
COUNTRY	:	Australia
LOCATION	:	Victoria
ZONE	:	1791m - 1838m RKB

REGION	:	ANZ
DISTRICT	:	LEA
BASE	:	LEF
REPORT No	:	87-4-1

CLIENT Minora FIELD Windermere WELL 1 DST No 1 DATE 31/3/87	FORMATION TESTING REPORT WELL AND JOB DATA	FLOPETROL JOHNSTON Schlumberger REPORT No 87-4-1 PAGE No 1

Type test Open hole

Total depth 1838 m — Test Interval, from 1791 to : 1838 m — Elevation 54 m

Main hole size 8.5 ins — Casing size – — Liner size –

Down to 1838 m — Casing weight – — Liner weight –

Rat hole size – — Casing shoe depth – — Liner top depth –

All depths measured from RKB — Cement plug top – — Cement plug top –

PERFORATIONS –

FORMATION - System Lower Eumerella — Estimated porosity 0.15

Geologie level — Estimated permeability –

Lithology Sandstone — Estimated productive interval 23 m

MUD, Type KCL — Wt 9.4 — Viscosity 4.0 — W.L. 5.8 cc — Chloride PPM 13000

CUSHION, Type NIL — Length — Top Depth — Weight

TIMES													
Ist flow	from	07:37	on	31	to	07:43	on	31					
Ist shut-in	from	07:43	on	31	to	08:15	on	31					
2nd flow	from	08:15	on	31	to	10:15	on	31					
2nd shut-in	from	10:15	on	31	to	14:17	on	31					
3rd flow	from	14:18	on	31	to	14:35	on	31	Reverse circulation		on		to
3rd shut-in	from		on		to		on		Final equalization		on		

TOOL SEQUENCE - Tool	O.D (in)	I.D. (in)	Length (m)	Depth (m)
Test Head				
Drill Pipe	4.5	3.5	1539.0	1533.1
Drill Collars	6.25	2.375	245.42	1748.5
Pump Out Sub	6.25	2.75	.35	1748.85
Drill Collars	6.25	2.375	27.82	1776.67
Knock out Sub	6.25	2.75	.35	1777.02
Xover	6.25	2.75	.35	
Catcher Sub	4.75	.75	.16	1777.53
Recorder Carrier Hydrostatic	4.875	–	1.8	1779.33
M F E	5.0	.875	3.1	1782.43
Bypass	5.0	1.12	.9	1783.33
T R Jar	4.75	1.75	2.6	1785.93
Safety Joint	4.75	2.5	.65	1786.58
Safety Seal	6.00	1.5	1.51	1788.09
Packer	7.5	1.5	1.52	1789.61
Packer	7.5	1.15	2.15	1791.76
Recorder Carrier Inside	4.875	–	1.8	1898.56
Recorder Carrier Inside	4.875	–	1.8	1796.36
Perf. Anchor	4.75	2.25	4.88	1800.24
Xover	6.25	2.75	.35	1800.6
Drill Collars	6.25	2.375	36.77	1837.36
Shoe	6.25	–	.64	1838.0
Total Drill Pipe			1539	
Total Drill Collar			279.99	

Bottom choke size : 0.75 ins

CLIENT Minora
FIELD Windermere
WELL 1
DST No 1
DATE 31-3-87

FORMATION TESTING REPORT

FLUID RECOVERY

FLOPETROL JOHNSTON
Schlumberger

REPORT No 87-4-1
PAGE No 2

DESCRIPTION OF FLUIDS RECOVERED

Air blow :

During 2nd and 3rd flow periods
3rd flow started very slowly, building
to a moderate blow in bucket with
flareline closed.

Flowed at surface during test :	Amount
No surface recoverv	

Reversed out :	Amount
Mud and water cut mud	15.3 BBL
Oil	0.7 BBL

(Maximum Pumping pressure)

Recovered in DP and DC'S	Amount

SURFACE OBSERVATIONS

Description	Time hr	Pressure	Surface choke
Packer set at 1791m	07:34		
Tool open for first			
flow	07:37		
No blow at bubble			
hose.			
Tool closed for first			
shut-in	07:43		
Tool open for 2nd flow	08:15		
No blow at bubble			
hose	08:15		
Low blow in bucket	08:30		
Moderate blow in			
bucket	08:40	2 psig	
Moderate blow in			
bucket	09:40	3	
Tool closed for 2nd			
shut-in	10:15	3	
Gas to surface in low			
blow	11:35	0	
- 1 ft flame on flare			
line			
Tool open for 3rd			
flow	14:17		
Moderate blow in			
bucket	14:17	0	
Closed tool	14:35		
Pulled packer loose	14:37		

(Maximum surface pressure)

RECOVERY DESCRIPTION	FEET	BARRELS	% OIL	% WATER	% OTHERS	API GRAVITY (a) °F	RESISTIVITY (a) °F	CHL PPM
Mud/Water Cut Mud	1,076	15.3	n.a	n.a	n.a	(a) °F	0.37 (a) 64 °F	
						(a) °F	(a) °F	
Oil- dark greenish brown	49	0.7	100	-	-	38+ (A) 64 °F	(a) °F	
Est. pour point 70°F						(A) °F	(A) °F	
						(A) °F	(a) °F	
						(a) °F	(a) °F	
						(a) °F	(a) °F	

MFE/PCT FLUID SAMPLE

Sampler Pressure Blocked by waxy oil at Surface
Recovery Cu. Ft Gas Too small to measure
cc. Oil cc 400
cc. Water cc 600
cc. Mud cc
Tot. Liquid cc
Gravity ______ °API ______ °F
Gaz/Oil Ratio ______ cu. ft/bbl ☐ m³/m³ ☐

	RESISTIVITY	CHLORIDE CONTENT
Recovery Water	______ (A) ______ °F	______ PPM
Recovery Mud	______ (a) ______ °F	
Recovery Mud Filtrate	______ (a) ______ °F	______ PPM
Mud Pit Sample	______ (a) ______ °F	
Mud Pit Sample Filtrate	______ (a) ______ °F	______ PPM

Technician I Scott

DS 003

CLIENT Minora
FIELD Windermere
WELL 1
DST No 1
DATE 31/3/87

FORMATION TESTING REPORT

PRESSURE CHART SUMMARY

FLOPETROL JOHNSTON
Schlumberger

REPORT No 87-4-1
PAGE No 3

PRESSURE READINGS

Type and Number	J 1782	J 2197	J 2196	
Capacity (Psi)	4700	4700	4700	
Depth (ft) (m)	1779 m	1793 m	1795 m	
Temperature (°F) (°C)				
Position	Inside-above	Inside-below	Outside-below	
Clock number	3777	4110	1636	
Clock capacity (hr)	96	96	96	
Clock travel (in/min) (mm/mn)				
				Given time / **Computed Time**
A Initial Hydrostatic Mud Pressure		2885		
B1 First flow initial pressure		46		
C1 First flow final pressure		110		mn / T1 = mn
D1 First shut-in pressure	*	2360 *	*	mn / mn
B2 Second flow initial pressure		144		
C2 Second flow final pressure		415		mn / T2 = mn
D2 Second shut-in pressure	*	2439 *	*	mn / mn
B3 Third flow initial pressure		465		
C3 Third flow final pressure		469		mn / T3 = mn
D3 Third shut- in pressure				mn / mn
				mn / T4 = mn
Fluid cushion pressure		0		mn / mn
E Final hydrostatic mud pressure		2890		
Calculated hyd. mud pressure		2875		Total time mn
Calc. fluid cushion pressure		0		

(*) Shut-in pressure did not reach static reservoir pressure.

All pressures measured in bars ☐ psi ☒

PRESSURE READINGS

Type and Number				
Capacity (Psi)				
Depth (ft) (m)				
Temperature (°F) (°C)				
Position				
Clock number				
Clock capacity (hr)				
Clock travel (in/min) (mm/mn)				
				Given time / **Computed Time**
A Initial Hydrostatic Mud Pressure				
B1 First flow initial pressure				
C1 First flow final pressure				mn / T1 = mn
D1 First shut-in pressure	*	*	*	mn / mn
B2 Second flow initial pressure				
C2 Second flow final pressure				mn / T2 = mn
D2 Second shut-in pressure	*	*	*	mn / mn
B3 Third flow initial pressure				
C3 Third flow final pressure				mn / T3 = mn
D3 Third shut- in pressure				mn / mn
				mn / T4 = mn
Fluid cushion pressure				mn / mn
E Final hydrostatic mud pressure				
Calculated hyd. mud pressure				Total time mn
Calc. fluid cushion pressure				

(*) Shut-in pressure did not reach static reservoir pressure.

All pressures measured in bars ☐ psi ☐

REMARKS
All pressures A,M and temperature corrected.

CLIENT Minora FIELD Windermere WELL 1 DST No 1 DATE 31/3/87	FORMATION TESTING REPORT PRESSURE DATA	FLOPETROL JOHNSTON Schlumberger REPORT No 87-4-1 PAGE No 4

PRESSURE DATA FOR RECORDER :

LABEL POINT	ΔT (mins)	PRESSURE	$\frac{T + \Delta T}{\Delta T}$	LOG	Pbu – Pwf	COMMENTS
A		2885				Initial hydrostatic pressure
B1	0	46				Initial Open at 07:37
	1	55				
	2	69				
	3	80				
	4	88				
	5	96				
C1	6	110				
C1	0	110				Initial Shut In at 07:43
	1	139				
	2	207				
	3	318				
	4	465				
	5	666				
	6	888				
	7	1109				
	12	1991				
	17	2231				
	22	2315				
D1	27	2360				
B2	0	144				Open for Second flow 08:15
	1	152				
	2	163				
	3	169				
	4	173				
	5	177				
	6	180				
	7	182				
	8	186				
	9	188				
	10	193				
	15	195				
	20	223				
	25	240				
	30	256				
	35	271				
	40	284				
	45	299				
	55	314				
	65	321				
	75	332				
	85	344				
	95	361				
	105	378				
	115	394				
C2	120	415				

DST / 84008

CLIENT Minora FIELD Windermere WELL 1 DST No 1 DATE 31/3/87	FORMATION TESTING REPORT PRESSURE DATA	FLOPETROL JOHNSTON Schlumberger REPORT No 87-4-1 PAGE No 5

PRESSURE DATA FOR RECORDER :

LABEL POINT	ΔT	PRESSURE	$\frac{T + \Delta T}{\Delta T}$	LOG	Pbu – Pwf	COMMENTS
	0	415			0	Second Shut-In at 10:15
	1	446	121.387		31	
	2	488	61.097		73	
	3	529	41.043		114	
	4	568	31.024		153	
	5	610	25.015		195	
	6	657	21.011		242	
	7	703	18.151		288	
	8	753	16.006		338	
	9	816	14.338		401	
	10	869	13.004		454	
	11	931	11.912		516	
	12	992	11.003		577	
	13	1061	10.223		646	
	14	1125	9.573		710	
	15	1187	9.002		772	
	16	1260	8.502		845	
	17	1330	8.060		915	
	18	1397	7.668		982	
	19	1462	7.317		1047	
	20	1529	7.001		1114	
	21	1589	6.715		1174	
	22	1642	6.455		1227	
	23	1695	6.218		1280	
	24	1817	6.001		1402	
	26	1826	5.616		1411	
	27	1862	5.445		1447	
	28	1894	5.286		1479	
	29	1922	5.138		1507	
	30	1949	5.000		1534	
	31	1971	4.871		1556	
	32	1994	4.750		1579	
	33	2012	4.637		1597	
	34	2029	4.530		1614	
	35	2046	4.429		1631	
	36	2059	4.334		1644	
	37	2073	4.244		1658	
	38	2085	4.158		1670	
	39	2099	4.077		1684	
	40	2109	4.000		1694	
	45	2153	3.667		1738	
	50	2188	3.400		1773	
	55	2217	3.182		1802	
	60	2241	3.000		1826	
	65	2260	2.846		1845	
	70	2276	2.714		1861	
	75	2291	2.600		1876	
	80	2303	2.500		1888	
	85	2315	2.412		1900	

DST / 84008

CLIENT Minora FIELD Windermere WELL 1 DST No 1 DATE 31/3/87	FORMATION TESTING REPORT PRESSURE DATA	FLOPETROL JOHNSTON Schlumberger REPORT No 87-4-1 PAGE No 6

PRESSURE DATA FOR RECORDER :

LABEL POINT	ΔT (mins)	PRESSURE	(T + ΔT) / ΔT	LOG	Pbu – Pwf	COMMENTS
	90	2324	2.333		1909	
	95	2333	2.263		1918	
	100	2343	2.200		1928	
	105	2349	2.143		1934	
	135	2380	1.889		1965	
	165	2403	1.727		1988	
	195	2419	1.615		2004	
	225	2432	1.533		2017	
	240	2438	1.500		2023	
D2	242	2439	1.496		2024	
	0	2439				Open for 3rd flow at 14:17
B3	1	465				
	2	465				
	3	464				
	4	464				
	5	465				
	6	464				
	7	465				
	8	465				
	9	467				
	14	467				
	19	468				
C3	24	469				
						Close tool at 14:35
						All pressures have been A, M, temperature corrected.

DST / 8308

MINORA RESOURCES

Well No : WINDERMERE 1 DST 1
Test Date : 01 APRIL 1987
Field : WILDCAT

Interpretation by : F HALFORD
Interpretation date : 27-APR-87

ADVANCED RESERVOIR TESTING INTERPRETATION

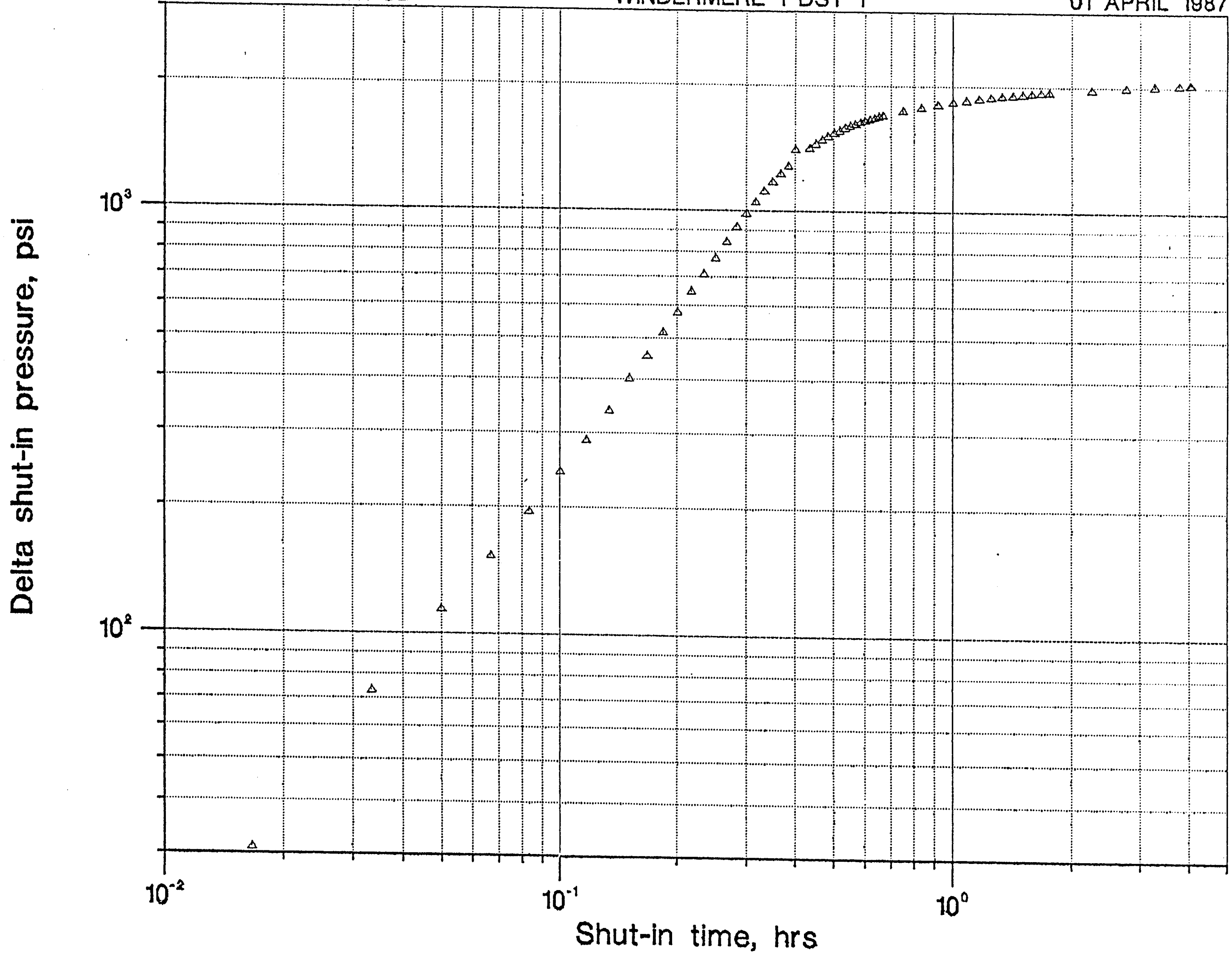
ADVRT

Schlumberger

ADVRT – 001H04

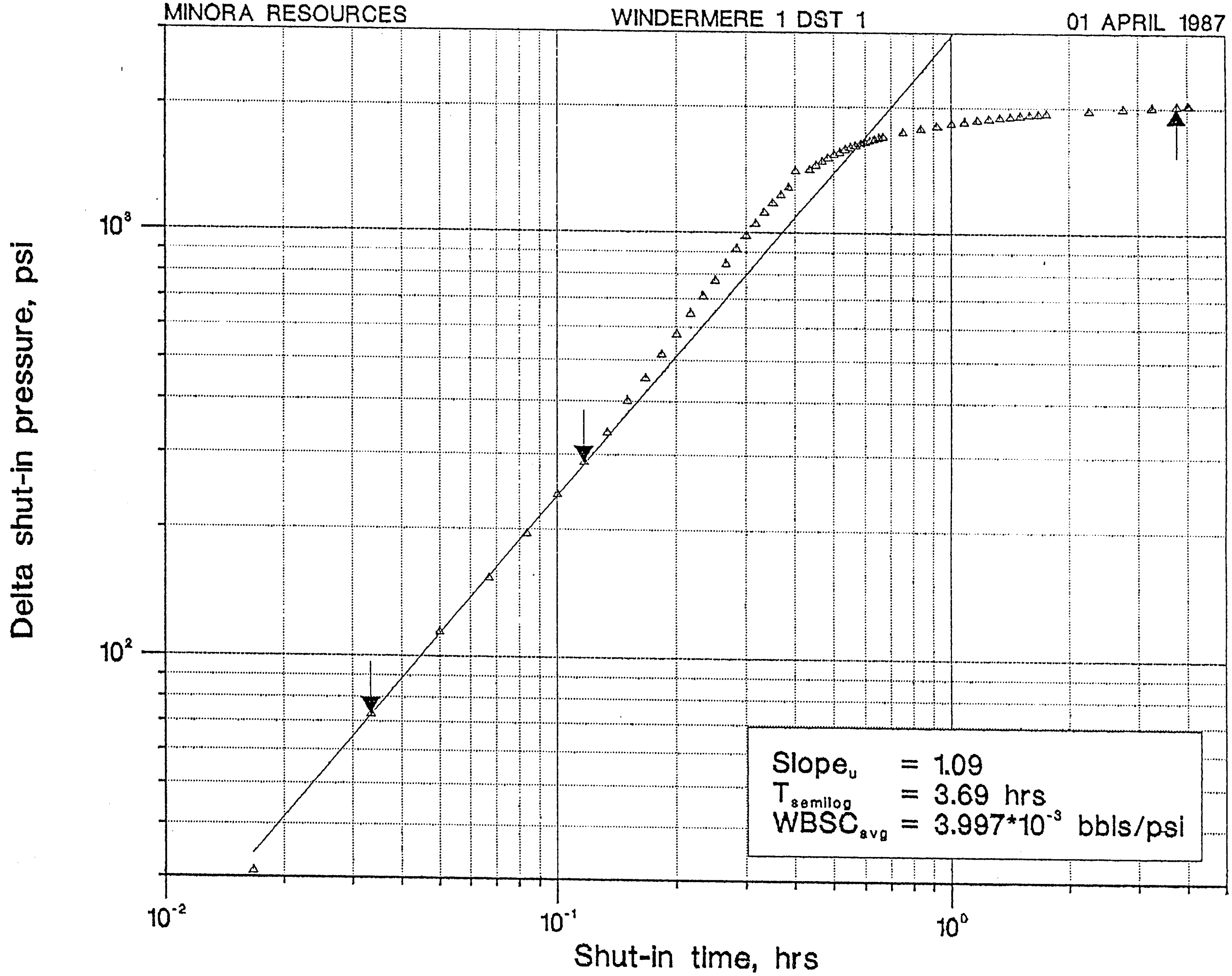
LOG - LOG PLOT

MINORA RESOURCES — WINDERMERE 1 DST 1 — 01 APRIL 1987



27-APR-87

LOG - LOG PLOT



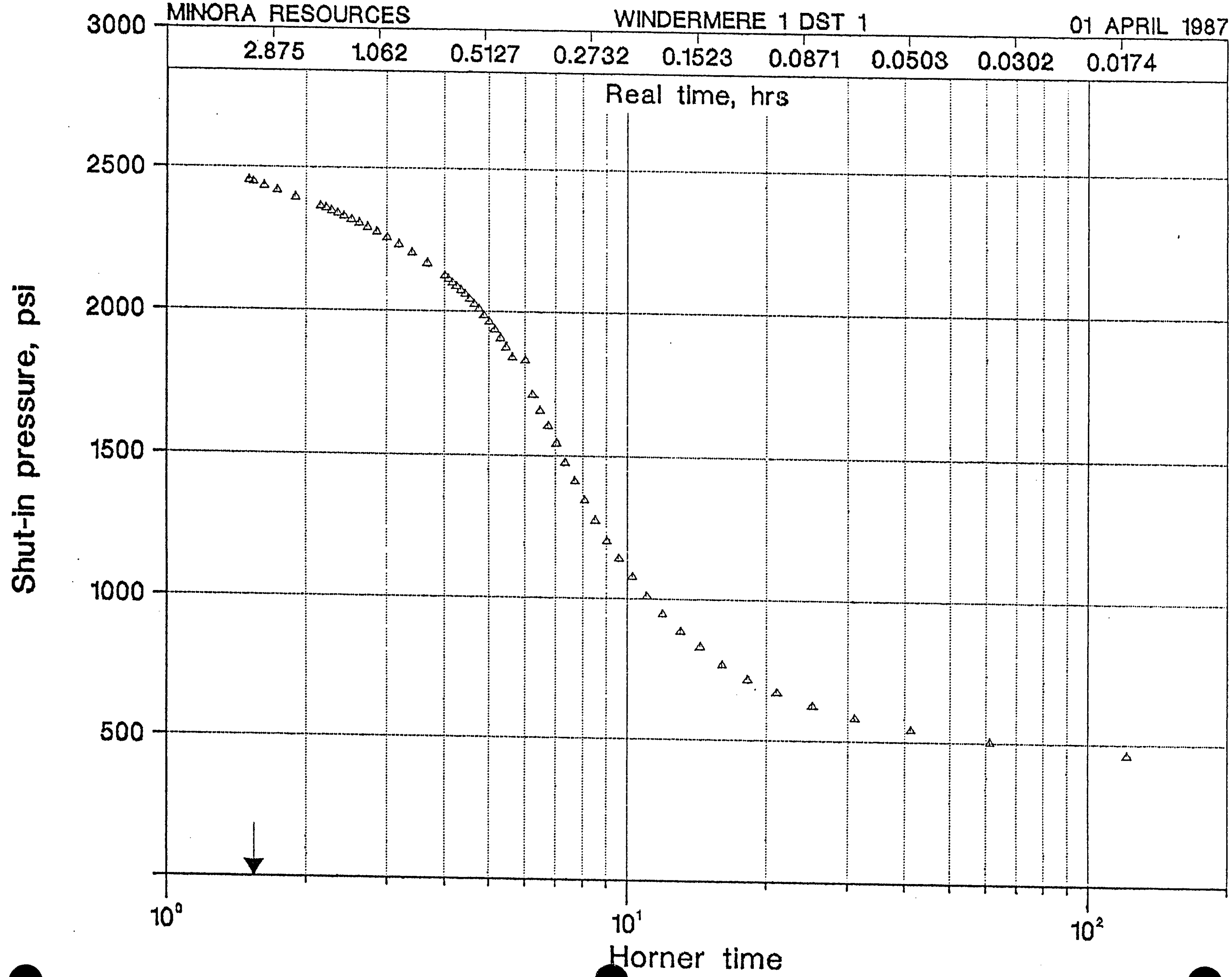
27-APR-87

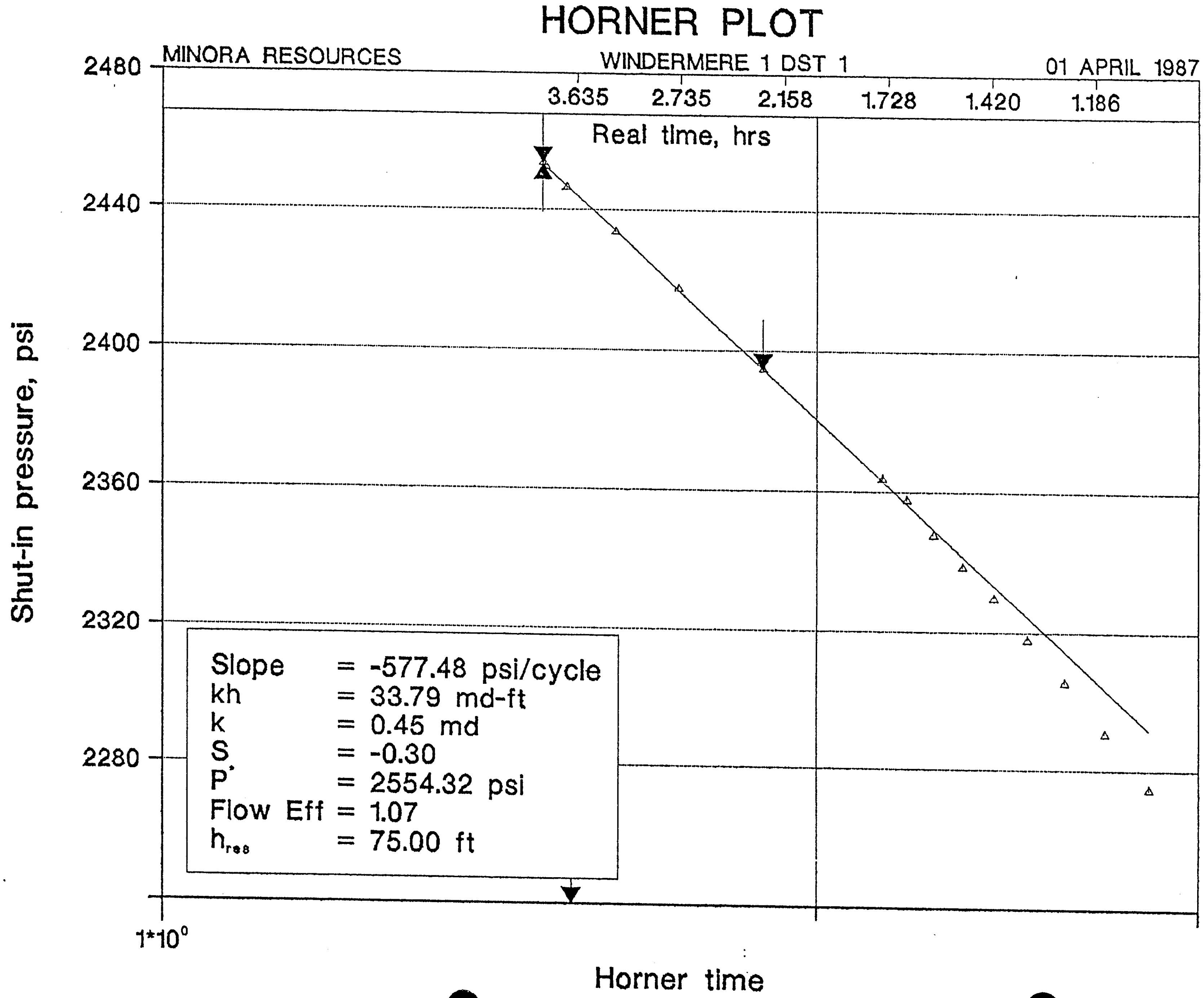
LOG-LOG INTERPRETATION

Start of straight line	= 0.033 hrs
End of straight line	= 0.117 hrs
Slope	= 1.089
Start semi-log (1.5 cycle rule)	= 3.688 hrs
Avg. well-bore storage coeff.	= $3.997*10^{-3}$ bbls/psi

27-APR-87

HORNER PLOT


MINORA RESOURCES
WINDERMERE 1 DST 1
01 APRIL 1987
2.875
1.062
0.5127
0.2732
0.1523
0.0871
0.0503
0.0302
0.0174
Real time, hrs
3000
2500
2000
1500
1000
500
Shut-in pressure, psi
10^0
10^1
10^2
Horner time



HORNER PLOT
MINORA RESOURCES
WINDERMERE 1 DST 1
01 APRIL 1987
3.635
2.735
2.158
1.728
1.420
1.186
Real time, hrs
2480
2440
2400
2360
2320
2280
Shut-in pressure, psi
Slope = -577.48 psi/cycle
kh = 33.79 md-ft
k = 0.45 md
S = -0.30
P* = 2554.32 psi
Flow Eff = 1.07
h_{res} = 75.00 ft
1*10⁰
Horner time

27 1-87

HORNER INTERPRETATION

Start of semi-log straight line	= 2.250 hrs
End of semi-log straight line	= 4.033 hrs
Computed start of semi-log straight line	= 9.642 hrs
Start of semi-log straight line	= 1.889 Horner time
End of semi-log straight line	= 1.496 Horner time
Computed start of semi-log straight line	= 1.207 Horner time
Pressure at 1 hour	= 2278.792 psi
Slope	= -577.482 psi/cycle
Permeability-thickness product	= 33.788 md-ft
Reservoir thickness	= 75.000 ft
Permeability	= 0.451 md
Skin	= -0.299
Pressure drop due to skin	= -150.339 psi
Extrapolated pressure (P^*)	= 2554.321 psi
Wellbore flowing pressure (P_{wf})	= 429.696 psi
Flow Efficiency	= 1.071

27-APR-87

CONSTANTS SUMMARY

Porosity	= 0.150
Well radius	= 0.354 ft
Reservoir thickness	= 75.000 ft
Perforation thickness	= 75.000 ft
Viscosity	= 0.500 cp
Pressure (t=0)	= 429.696 psi
Total producing time	= 2.000 hrs
Production rate	= 240.000 RB/D
Water saturation	= 0.650
Gas saturation	= 0.000
Water compressibility	= $2.000*10^{-6}$ psi^{-1}
Oil compressibility	= $1.000*10^{-5}$ psi^{-1}
Gas compressibility	= $3.900*10^{-4}$ psi^{-1}
Formation compressibility	= $5.000*10^{-6}$ psi^{-1}
Total compressibility	= $9.800*10^{-6}$ psi^{-1}

MINORA RESOURCES WINDERMERE 1 DST 1 01 APRIL 1987

Time, hrs	Pressure, psi	Delta-P, psi	Horner time
0.000	429.696	0.000	*
0.017	460.696	31.000	121.387
0.033	502.696	73.000	61.097
0.050	543.696	114.000	41.043
0.067	582.696	153.000	31.024
0.083	624.696	195.000	25.015
0.100	671.696	242.000	21.011
0.117	717.696	288.000	18.151
0.133	767.696	338.000	16.006
0.150	830.696	401.000	14.338
0.167	883.696	454.000	13.004
0.183	945.696	516.000	11.912
0.200	1006.696	577.000	11.003
0.217	1075.696	646.000	10.233
0.233	1139.696	710.000	9.573
0.250	1201.696	772.000	9.002
0.267	1274.696	845.000	8.502
0.283	1344.696	915.000	8.060
0.300	1411.696	982.000	7.668
0.317	1476.696	1047.000	7.317
0.333	1543.696	1114.000	7.001
0.350	1603.696	1174.000	6.715
0.367	1656.696	1227.000	6.455
0.383	1709.696	1280.000	6.218
0.400	1831.696	1402.000	6.001
0.433	1840.696	1411.000	5.616
0.450	1876.696	1447.000	5.445
0.467	1908.696	1479.000	5.286
0.483	1936.696	1507.000	5.138
0.500	1963.696	1534.000	5.000
0.517	1985.696	1556.000	4.871
0.533	2008.696	1579.000	4.750
0.550	2026.696	1597.000	4.637
0.567	2043.696	1614.000	4.530
0.583	2060.696	1631.000	4.429
0.600	2073.696	1644.000	4.334
0.617	2087.696	1658.000	4.244
0.633	2099.696	1670.000	4.158
0.650	2113.696	1684.000	4.077
0.667	2123.696	1694.000	4.000
0.750	2167.696	1738.000	3.667
0.833	2202.696	1773.000	3.400
0.917	2231.696	1802.000	3.182
1.000	2255.696	1826.000	3.000
1.083	2274.696	1845.000	2.846
1.167	2290.696	1861.000	2.714
1.250	2305.696	1876.000	2.600
1.333	2317.696	1888.000	2.500
1.417	2329.696	1900.000	2.412
1.500	2338.696	1909.000	2.333

27-APR-87

MINORA RESOURCES WINDERMERE 1 DST 1 01 APRIL 1987

Time, hrs	Pressure, psi	Delta-P, psi	Horner time
1.583	2347.696	1918.000	2.263
1.667	2357.696	1928.000	2.200
1.750	2363.696	1934.000	2.143
2.250	2394.696	1965.000	1.889
2.750	2417.696	1988.000	1.727
3.250	2433.696	2004.000	1.615
3.750	2446.696	2017.000	1.533
4.000	2452.696	2023.000	1.500
4.033	2453.696	2024.000	1.496

27-APR-87

FLOPETROL JOHNSTON
Schlumberger

FORMATION TESTING REPORT

COMPANY : Minora Resources NL

FIELD : Otway Basin

WELL : Windermere 1

DST No : 2

DATE : 1-2 April, 1987

COUNTRY : Australia

LOCATION : Victoria

ZONE : 1790 m - 1814 m RKB

REGION : ANZ

DISTRICT : LEA

BASE : LEF

REPORT No : 87-4-2

/ 84001

FLOPETROL JOHNSTON
Schlumberger

FORMATION TESTING REPORT

FLUID RECOVERY

CLIENT Minora
FIELD Windermere
WELL 1
DST No 2
DATE 1-2/4/87

REPORT No 87-4-2
PAGE No 2

DESCRIPTION OF FLUIDS RECOVERED

Air blow :

Moderate blow during 2nd flow

Flowed at surface during test :	Amount
Gas to surface at 19:45	-

Reversed out :	Amount
Gas cut oil (surface bubbles)	11.5 BBL
Oil	20.4 BBL
Water - gas cut	20.3 BBL
Mud	5.8 BBL

Oil : 0.82 g/cc
Water : 1.01 g/cc
Mud : 1.12 g/cc

(Maximum Pumping pressure)

Recovered in DP and DC'S	Amount

SURFACE OBSERVATIONS

Description	Time hr	Pressure	Surface choke
Packer set at 1790m	17:40		
Tool open for 1st flow	17:45		
Tool closed for 1st shut-in	17:50		
Tool open for 2nd flow	18:24		
Mod. blow bubble hose	18:25	0	
Mod blow at bubble hose	18:35	1	
Gas to surface	19:45	2	$1\frac{1}{2}$
	21:00	1	$1\frac{1}{2}$
Tool closed for 2nd shut-in	07:38		
Reverse Circ. start	12:15	100	
Reverse Circ. finish	14:05		
Unseat packer	14:16		

(Maximum surface pressure)

RECOVERY DESCRIPTION	FEET	BARRELS	% OIL	% WATER	% OTHERS	API GRAVITY (a) °F	RESISTIVITY (a) °F	CHL PPM
Gas cut oil (surface bubbles)		11.5				41 (a) 71 °F	(a) °F	
Oil		20.4				41 (a) 71 °F	(a) °F	
Water - gas cut		20.3				(A) °F	0.32 (a) 71 °F	
Mud		5.8				(A) °F	(A) °F	
						(A) °F	(a) °F	
						(a) °F	(a) °F	
						(a) °F	(a) °F	

MFE/PCT FLUID SAMPLE

Sampler Pressure 260 psi at Surface
Recovery Cu Ft Gas
cc. Oil cc 400
cc. Water cc 800
cc. Mud cc
Tot. Liquid cc 1200
Gravity 41 °API 77 °F
Gaz/Oil Ratio ______ cu. ft/bbl ☐ m³/m³ ☐

	RESISTIVITY	CHLORIDE CONTENT
Recovery Water	(A) °F	PPM
Recovery Mud	(a) °F	
Recovery Mud Filtrate	(a) °F	PPM
Mud Pit Sample	(a) °F	
Mud Pit Sample Filtrate	(a) °F	PPM

Technician I SCOTT

DST 7-003

CLIENT Minora
FIELD Windermere
WELL 1
DST No 2
DATE 1-2/4/87

FORMATION TESTING REPORT

PRESSURE CHART SUMMARY

FLOPETROL JOHNSTON
Schlumberger

REPORT No 87-4-2
PAGE No 3

Type and Number	J 1782	J 2197	J 2196	(*) Shut-in pressure did not reach static reservoir pressure.
Capacity (Psi)	4700	4700	4700	
Depth (ft) (m)	1776 m	1781m	1818 m	
Temperature (°F) (°C)				
Position	Inside Above	Inside Below	Inside Below	
Clock number	3777	4110	1636	All pressures measured in bars ☐
Clock capacity (hr)	96	96	96	psi ☒
Clock travel (in/min) (mm/mn)				

PRESSURE READINGS					Given time	Computed Time
A Initial Hydrostatic Mud Pressure		2888				
B1 First flow initial pressure		77				
C1 First flow final pressure		87			mn	T1 = mn
D1 First shut-in pressure	*	2360 *	*		mn	mn
B2 Second flow initial pressure		134				
C2 Second flow final pressure		1071			mn	T2 = mn
D2 Second shut-in pressure	*	2420 *	*		mn	mn
B3 Third flow initial pressure						
C3 Third flow final pressure					mn	T3 = mn
D3 Third shut- in pressure					mn	mn
					mn	T4 = mn
Fluid cushion pressure		0			mn	mn
E Final hydrostatic mud pressure		2893				
Calculated hyd. mud pressure		2856			Total time ________ mn	
Calc. fluid cushion pressure		0				

Type and Number				(*) Shut-in pressure did not reach static reservoir pressure.
Capacity (Psi)				
Depth (ft) (m)				
Temperature (°F) (°C)				
Position				
Clock number				All pressures measured in bars ☐
Clock capacity (hr)				psi ☐
Clock travel (in/min) (mm/mn)				

PRESSURE READINGS				Given time	Computed Time
A Initial Hydrostatic Mud Pressure					
B1 First flow initial pressure					
C1 First flow final pressure				mn	T1 = mn
D1 First shut-in pressure	*	*	*	mn	mn
B2 Second flow initial pressure					
C2 Second flow final pressure				mn	T2 = mn
D2 Second shut-in pressure	*	*	*	mn	mn
B3 Third flow initial pressure					
C3 Third flow final pressure				mn	T3 = mn
D3 Third shut- in pressure				mn	mn
				mn	T4 = mn
Fluid cushion pressure				mn	mn
E Final hydrostatic mud pressure					
Calculated hyd. mud pressure				Total time ________ mn	
Calc. fluid cushion pressure					

REMARKS

All pressures A, M and temperature corrected.

DST ...006

CLIENT Minora FIELD Windermere WELL 1 DST No 2 DATE	FORMATION TESTING REPORT PRESSURE DATA	FLOPETROL JOHNSTON Schlumberger REPORT No 87-4-2 PAGE No 4

PRESSURE DATA FOR RECORDER :

LABEL POINT	ΔT	PRESSURE	$\frac{T + \Delta T}{\Delta T}$	LOG	Pbu − Pwf	COMMENTS
A		2888				Initial Hydrostatic Pressure
B1	3	77				Initial Open at 17:45
	4	82				
C1	5	87				
C1	0	87				Initial Shut In at 17:50
	1	135				
	2	198				
	3	272				
	4	369				
	6	650				
	7	835				
	8	1030				
	9	1226				
	10	1407				
	15	2024				
	20	2215				
	25	2295				
	30	2341				
D1	34	2360				
B2	1	134				Open for 2nd flow at 18:24
	2	137				
	3	144				
	4	148				
	5	153				
	6	157				
	7	161				
	8	164				
	9	169				
	10	173				
	11	175				
	16	179				
	21	198				
	26	216				
	31	230				
	31	230				
	36	244				
	41	255				
	46	267				
	51	268				
	56	273				
	61	278				
	66	283				
	81	302				
	96	329				
	111	355				
	126	380				
	141	405				

DST 7 84008

CLIENT Minora FIELD Windermere WELL 1 DST No 2 DATE 1-2/4/87	FORMATION TESTING REPORT PRESSURE DATA	FLOPETROL JOHNSTON Schlumberger REPORT No 87-4-2 PAGE No 5

PRESSURE DATA FOR RECORDER :

LABEL POINT	ΔT	PRESSURE	(T + ΔT) / ΔT	LOG	Pbu − Pwf	COMMENTS
	156	430				
	186	475				
	216	517				
	246	543				
	276	573				
	306	618				
	336	650				
	366	685				
	396	716				
	426	746				
	456	776				
	486	806				
	516	831				
	546	856				
	576	900				
	606	911				
	636	938				
	666	962				
	696	984				
	726	1007				
	756	1029				
	786	1048				
C2	794	1071				
C2	0	1071			0	Second shut-in at 07:38
	1	1124	795		53	
	2	1228	398		157	
	3	1367	265.667		296	
	4	1478	199.500		407	
	5	1578	159.800		507	
	6	1666	133.333		595	
	7	1730	114.429		659	
	8	1808	100.250		737	
	9	1867	89.222		796	
	10	1909	80.400		838	
	11	1951	73.182		880	
	12	2006	67.167		935	
	13	2045	62.077		974	
	14	2069	57.714		998	
	15	2079	53.933		1008	
	16	2089	50.625		1018	
	17	2101	47.706		1030	
	18	2112	45.111		1041	
	19	2120	42.789		1049	
	20	2129	40.700		1058	
	21	2138	38.810		1067	
	22	2146	37.091		1075	

DST 008

CLIENT Minora FIELD Windermere WELL 1 DST No 2 DATE 1-2/4/87	FORMATION TESTING REPORT PRESSURE DATA	FLOPETROL JOHNSTON Schlumberger REPORT No 87-4-2 PAGE No 6

PRESSURE DATA FOR RECORDER :

LABEL POINT	ΔT	PRESSURE	$\frac{T + \Delta T}{\Delta T}$	LOG	Pbu – Pwf	COMMENTS
	23	2154	35.522		1083	
	24	2160	34.083		1089	
	25	2167	32.760		1096	
	26	2173	31.538		1102	
	27	2179	30.407		1108	
	29	2188	28.379		1117	
	30	2192	27.467		1121	
	31	2198	26.613		1127	
	32	2202	25.813		1131	
	37	2207	22.459		1136	
	42	2209	19.905		1138	
	47	2214	17.894		1143	
	52	2217	16.269		1146	
	57	2234	14.930		1163	
	62	2259	13.806		1188	
	67	2269	12.851		1198	
	72	2279	12.028		1208	
	77	2288	11.312		1217	
	82	2296	10.683		1225	
	97	2313	9.186		1242	
	112	2327	8.089		1256	
	127	2338	7.252		1267	
	142	2348	6.592		1277	
	172	2361	5.616		1290	
	202	2375	4.931		1304	
	232	2382	4.422		1311	
	262	2392	4.031		1321	
	292	2396	3.719		1325	
	322	2408	3.466		1337	
	352	2408	3.256		1337	
	382	2416	3.079		1345	
D2	398	2420	2.995		1349	End of 2nd shut-in period
		2893				Final Hydrostatic Pressure

DST 04008

MINORA RESOURCES

Well No : WINDERMERE 1 DST 2
Test Date : 01 APRIL 1987
Field : WILDCAT

Interpretation by : F HALFORD
Interpretation date :

REVISED INTERPRETATION MADE JUNE 24, 1987
USING CORRECTED AMERADA GAUGE DATA

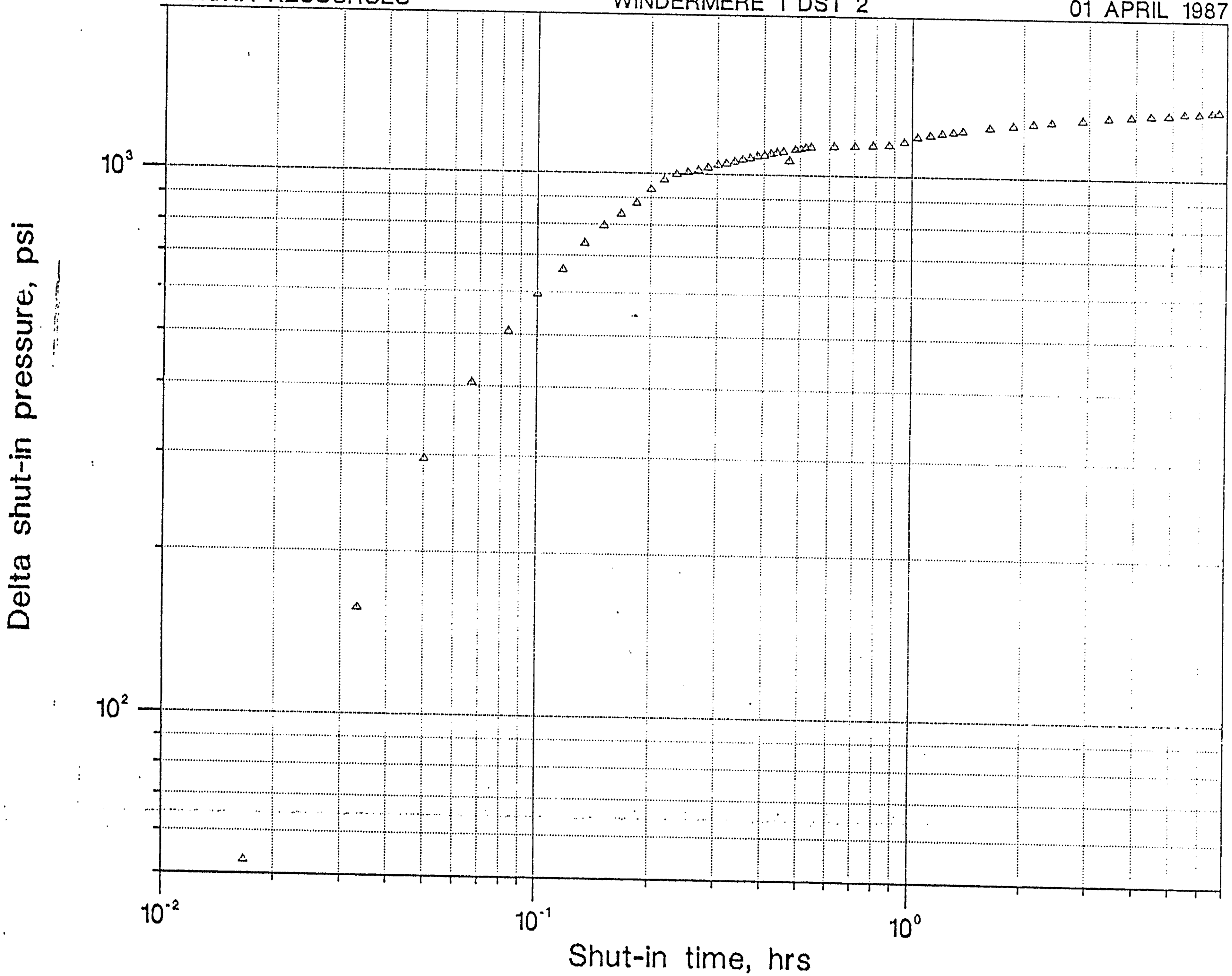
ADVANCED RESERVOIR TESTING INTERPRETATION

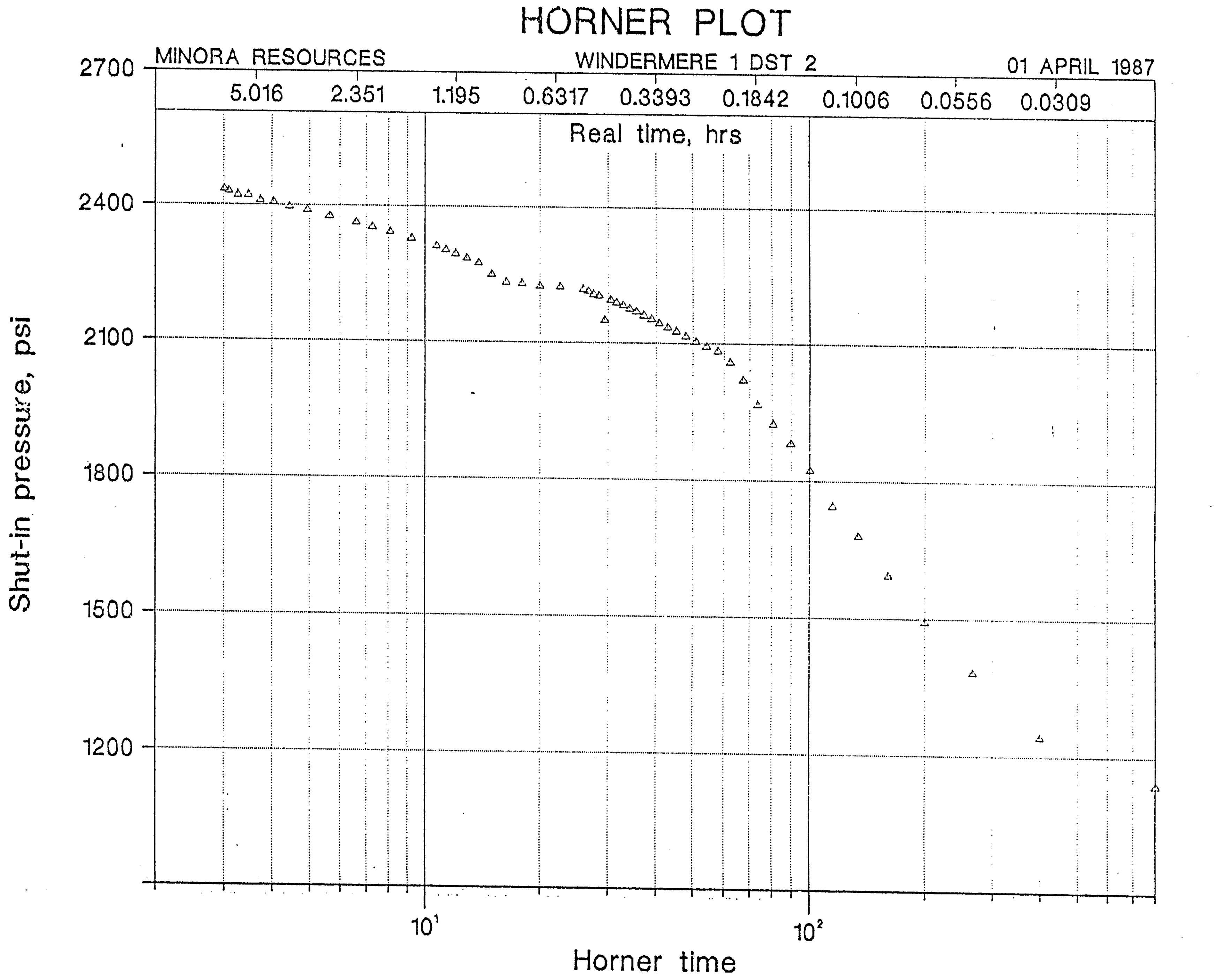
ADVRT

Schlumberger

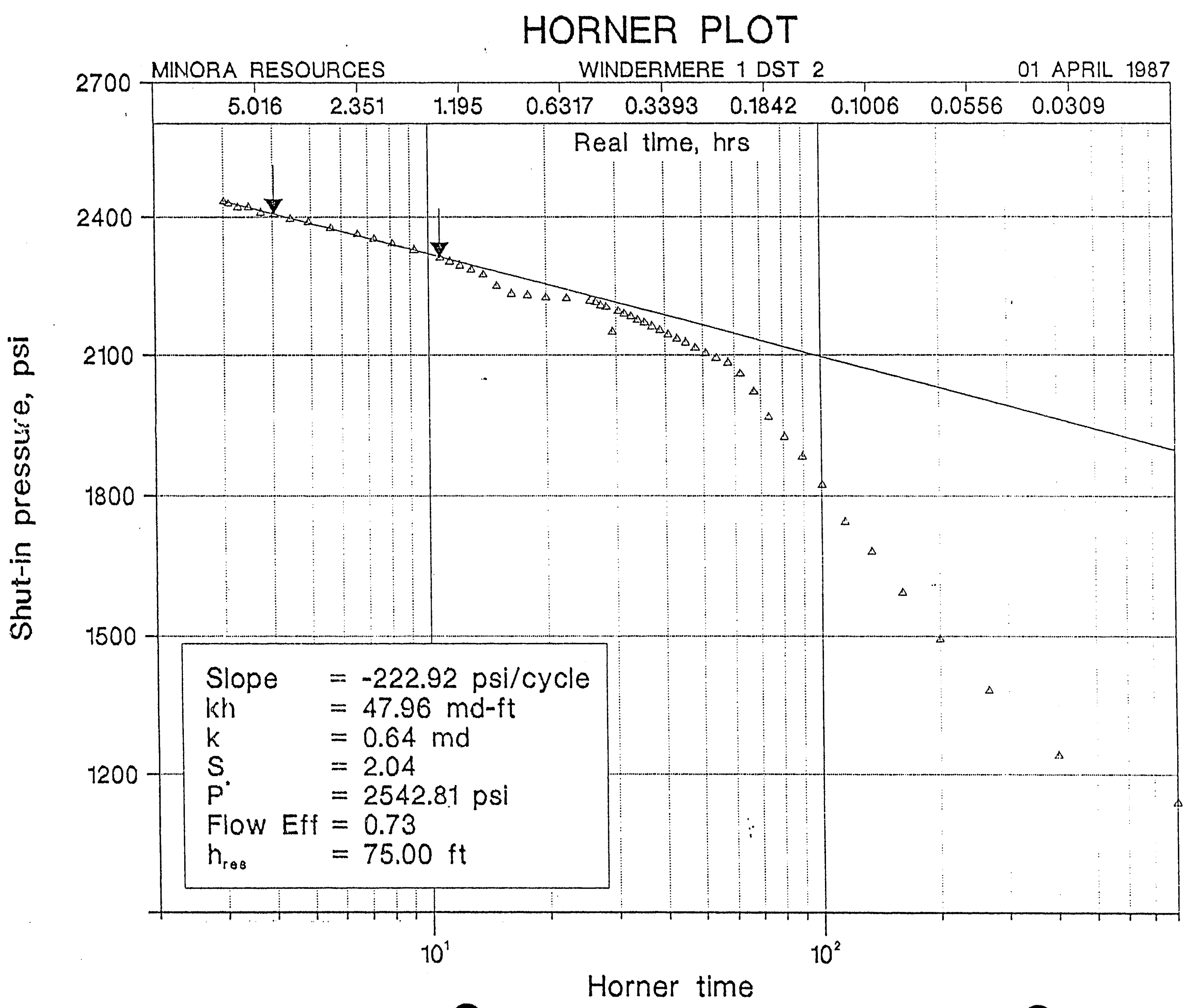
LOG - LOG PLOT

MINORA RESOURCES — WINDERMERE 1 DST 2 — 01 APRIL 1987





HORNER PLOT
MINORA RESOURCES
WINDERMERE 1 DST 2
01 APRIL 1987
5.016
2.351
1.195
0.6317
0.3393
0.1842
0.1006
0.0556
0.0309
Real time, hrs
2700
2400
2100
1800
1500
1200
Shut-in pressure, psi
10^1
10^2
Horner time



HORNER PLOT
MINORA RESOURCES
WINDERMERE 1 DST 2
01 APRIL 1987
5.016
2.351
1.195
0.6317
0.3393
0.1842
0.1006
0.0556
0.0309
Real time, hrs
2700
2400
2100
1800
1500
1200
Shut-in pressure, psi
Slope = -222.92 psi/cycle
kh = 47.96 md-ft
k = 0.64 md
S = 2.04
P* = 2542.81 psi
Flow Eff = 0.73
h_res = 75.00 ft
10^1
10^2
Horner time

HORNER INTERPRETATION

Start of semi-log straight line	= 1.367 hrs
End of semi-log straight line	= 4.367 hrs
Start of semi-log straight line	= 10.681 Horner time
End of semi-log straight line	= 4.030 Horner time
Pressure at 1 hour	= 2265.738 psi
Slope	= -222.923 psi/cycle
Permeability-thickness product	= 47.958 md-ft
Reservoir thickness	= 75.000 ft
Permeability	= 0.639 md
Skin	= 2.037
Pressure drop due to skin	= 395.040 psi
Extrapolated pressure (P^*)	= 2542.813 psi
Wellbore flowing pressure (P_{wf})	= 1085.696 psi
Flow Efficiency	= 0.729

CONSTANTS SUMMARY

Porosity	= 0.150
Well radius	= 0.354 ft
Reservoir thickness	= 75.000 ft
Perforation thickness	= 75.000 ft
Viscosity	= 0.500 cp
Pressure (t=0)	= 1085.696 psi
Total producing time	= 13.230 hrs
Production rate	= 131.500 RB/D
Water saturation	= 0.650
Gas saturation	= 0.000
Water compressibility	= $2.000 \cdot 10^{-6}$ psi^{-1}
Oil compressibility	= $1.000 \cdot 10^{-5}$ psi^{-1}
Gas compressibility	= $3.900 \cdot 10^{-4}$ psi^{-1}
Formation compressibility	= $5.000 \cdot 10^{-6}$ psi^{-1}
Total compressibility	= $9.800 \cdot 10^{-6}$ psi^{-1}

FLOPETROL JOHNSTON
Schlumberger

FORMATION TESTING REPORT

COMPANY : Minora Resources NL
FIELD : Otway Basin
WELL : Windermere 1
DST No : 4

DATE : 17 May, 1987
COUNTRY : Australia
LOCATION : Victoria
ZONE : 1798 m - 1813 m RKB

REGION : ANZ
DISTRICT : LEA
BASE : LEF
REPORT No : 87-5-1

DST / 84001

CLIENT Minora FIELD Windermere WELL 1 DST No 4 DATE 17-5-87	**FORMATION TESTING REPORT** **WELL AND JOB DATA**	FLOPETROL JOHNSTON **Schlumberger** REPORT No 87-5-1 PAGE No 1

Type test Cased Hole		
Total depth 1,835m	Test Interval, from 1,798m to : 1,813m	Elevation 54m
Main hole size 8.5 ins	Casing size 7"	Liner size -
Down to	Casing weight 26/29 lbs/ft	Liner weight -
Rat hole size	Casing shoe depth	Liner top depth -
All depths measured from RKB	Cement plug top	Cement plug top -

PERFORATIONS 1,798 - 1,813 m 8 spf 5" guns

FORMATION - System Lower Eumerella	Estimated porosity 0.15
Geologie level	Estimated permeability 0.64 md (DST-2)
Lithology Sandstone	Estimated productive interval

MUD, Type Brine Wt 8.7 ppg Viscosity W.L. Chloride PPM 35,000

CUSHION, Type Nil Length Top Depth Weight

TIMES

Ist flow	from	07:31	on	17	to	07:37	on	17
Ist shut-in	from	07:37	on	17	to	08:37	on	17
2nd flow	from	08:37	on	17	to	19:00	on	17
2nd shut-in	from	19:00	on	17	to	20:32	on	17
3rd flow	from		on		to		on	
3rd shut-in	from		on		to		on	

Reverse circulation	20:32	on	17	to	21:00	on 17
Final equalization	21:00	on	17			

TOOL SEQUENCE - Tool	O.D	I.D	Length
Drill Pipe	2 7/8	2 1/16	1,629.19 m
2 Single	2 7/8	2 1/16	17.87 m
Pup Joint	2 7/8	2 1/16	3.65 m
Drill Collars	4 3/32	2 1/16	143.15 m
Cross-Over			260.00 mm
Cross-Over			310.00 mm
Corss-Over			300.00 mm
Brake-Off			255.00 mm
Pump-Out			355.00 mm
Cross-Over			320.00 mm
Recorder			1,800.00 mm
Mulit-Flow Evaluator			3,010.00 mm
1" Bais			910.00 mm
Safety Joint			610.00 mm
Recorder			1,800.00 mm
Recorder			1,800.00 mm
Cross-Over			370.00 mm
Full Bore Positive Packer			1,320.00 mm

Bottom choke size :

DST / 84002

CLIENT	Minora
FIELD	Windermere
WELL	1
DST No	4
DATE	17-5-87

FORMATION TESTING REPORT

FLUID RECOVERY

FLOPETROL JOHNSTON
Schlumberger

REPORT No 87-5-1
PAGE No 2

DESCRIPTION OF FLUIDS RECOVERED

Air blow : Moderate blow during both flow periods.

Flowed at surface during test :	Amount
Nil	

Reversed out :	Amount
Oil Cut Mud	5 BBLS

(Maximum Pumping pressure)

Recovered in DP and DC'S	Amount

SURFACE OBSERVATIONS

Description	Time hr	Pressure	Surface choke
Set packers at 1,798m	07:30		
Open for initial flow	07:31		
Weak blow : Bubbles to surface	07:32	0	
Close for first shut-in	07:37		
Open for 2nd flow	08:37	0	
Bubbles to surface	08:39	0	
Open to flare 1" choke	08:48	0	1"
Bubbles to surface during entire flow period.			

(Maximum surface pressure)

RECOVERY DESCRIPTION	FEET	BARRELS	% OIL	% WATER	% OTHERS	API GRAVITY	RESISTIVITY	CHL PPM
Oil Cut Mud		5				(a) °F	(a) °F	
						(a) °F	(a) °F	
						(A) °F	(a) °F	
						(A) °F	(A) °F	
						(A) °F	(a) °F	
						(a) °F	(a) °F	
						(a) °F	(a) °F	

MFE/PCT FLUID SAMPLE

Sampler Pressure ______ at Surface
Recovery Cu. Ft Gas ______
cc. Oil cc ______
cc. Water cc ______
cc. Mud cc ______
Tot. Liquid cc ______
Gravity ______ °API ______ °F
Gaz/Oil Ratio ______ cu. ft/bbl ☐ m³/m³ ☐

	RESISTIVITY	CHLORIDE CONTENT
Recovery Water	(A) °F	PPM
Recovery Mud	(a) °F	
Recovery Mud Filtrate	(a) °F	PPM
Mud Pit Sample	(a) °F	
Mud Pit Sample Filtrate	(a) °F	PPM

Technician C. Daniels

DST 7-84003

CLIENT	Minora
FIELD	Windermere
WELL	1
DST No	4
DATE	17-5-87

FORMATION TESTING REPORT

PRESSURE CHART SUMMARY

FLOPETROL JOHNSTON
Schlumberger

REPORT No 87-5-1
PAGE No 3

PRESSURE READINGS

Type and Number	J 2,197	J 2,196		
Capacity (Psi)	4,700	4,700		
Depth (ft) (m)	1,792 m	1,794 m		
Temperature (°F) (°C)	180°F	180°F		
Position	Inside/below	Inside/below		
Clock number	3,777	3,775		
Clock capacity (hr)	96	96		
Clock travel (in/min) (mm/mn)				
A Initial Hydrostatic Mud Pressure	2,653	2,687		
B1 First flow initial pressure	81	94		
C1 First flow final pressure	81	94		
D1 First shut-in pressure	2,141 *	2,148 *	*	
B2 Second flow initial pressure	73	]		
C2 Second flow final pressure	488	] A, M Temp Corrected		
D2 Second shut-in pressure	2,222 *	] *	*	
B3 Third flow initial pressure				
C3 Third flow final pressure				
D3 Third shut-in pressure				
Fluid cushion pressure				
E Final hydrostatic mud pressure	2,660			
Calculated hyd. mud pressure	2,660			
Calc. fluid cushion pressure				

(*) Shut-in pressure did not reach static reservoir pressure.

All pressures measured in bars [ ] psi [X]

Given time	Computed Time
mn	T1 = mn
mn	mn
mn	T2 = mn
mn	mn
mn	T3 = mn
mn	mn
mn	T4 = mn
mn	mn

Total time ______ mn

PRESSURE READINGS

Type and Number				
Capacity (Psi)				
Depth (ft) (m)				
Temperature (°F) (°C)				
Position				
Clock number				
Clock capacity (hr)				
Clock travel (in/min) (mm/mn)				
A Initial Hydrostatic Mud Pressure				
B1 First flow initial pressure				
C1 First flow final pressure				
D1 First shut-in pressure	*	*	*	
B2 Second flow initial pressure				
C2 Second flow final pressure				
D2 Second shut-in pressure	*	*	*	
B3 Third flow initial pressure				
C3 Third flow final pressure				
D3 Third shut-in pressure				
Fluid cushion pressure				
E Final hydrostatic mud pressure				
Calculated hyd. mud pressure				
Calc. fluid cushion pressure				

(*) Shut-in pressure did not reach static reservoir pressure.

All pressures measured in bars [ ] psi [ ]

Given time	Computed Time
mn	T1 = mn
mn	mn
mn	T2 = mn
mn	mn
mn	T3 = mn
mn	mn
mn	T4 = mn
mn	mn

Total time ______ mn

REMARKS Pressure not A, M temperature corrected unless indicated.

DST / 84006

CLIENT Minora	FORMATION TESTING REPORT	FLOPETROL JOHNSTON Schlumberger
FIELD Windermere		
WELL 1	PRESSURE DATA	REPORT No 87-5-1
DST No 4		PAGE No 5
DATE 17-5-87		

PRESSURE DATA FOR RECORDER :

LABEL POINT	ΔT (Hrs)	PRESSURE	$\frac{T + \Delta T}{\Delta T}$	LOG	Pbu – Pwf	COMMENTS
	0.0623	906	163.457		418	
	0.0701	964	145.381		476	
	0.0779	1,010	130.924		522	
	0.0856	1,055	119.237		567	
	0.0934	1,106	109.363		618	
	0.1012	1,155	101.011		667	
	0.1090	1,202	93.854		714	
	0.1168	1,240	87.653		752	
	0.1246	1,278	82.229		790	
	0.1324	1,316	77.443		828	
	0.1401	1,350	73.242		862	
	0.1479	1,382	69.432		894	
	0.1557	1,413	66.004		925	
	0.1635	1,439	62.903		951	
	0.1713	1,469	60.084		981	
	0.1791	1,482	57.511		994	
	0.1869	1,516	55.152		1,028	
	0.1946	1,536	53.010		1,048	
	0.2024	1,556	51.005		1,068	
	0.2102	1,576	49.150		1,088	
	0.2258	1,613	45.823		1,125	
	0.2336	1,629	44.327		1,141	
	0.3114	1,775	33.502		1,287	
	0.3893	1,867	26.998		1,379	
	0.5450	1,981	19.571		1,493	
	0.6228	2,020	17.251		1,532	
	0.7007	2,051	15.444		1,563	
	0.7786	2,078	13.999		1,590	
	0.8564	2,099	12.818		1,611	
	0.9343	2,119	11.833		1,631	
	1.0121	2,136	11.000		1,648	
	1.0900	2,153	10.285		1,665	
	1.1678	2,166	9.667		1,678	
	1.2457	2,179	9.125		1,691	
	1.3235	2,192	8.647		1,704	
	1.4014	2,203	8.222		1,715	
	1.4792	2,212	7.842		1,724	
D2	1.5571	2,222	7.500		1,734	End of 2nd buildup

All pressures A, M, Temperature corrected.

DST / 8..8

MINORA RESOURCES

Well No : WINDERMERE 1 dst 4
Test Date : 17 MAY 1987
Field : WILDCAT

Interpretation by : F HALFORD
Interpretation date : 29-MAY-87

ADVANCED RESERVOIR TESTING INTERPRETATION

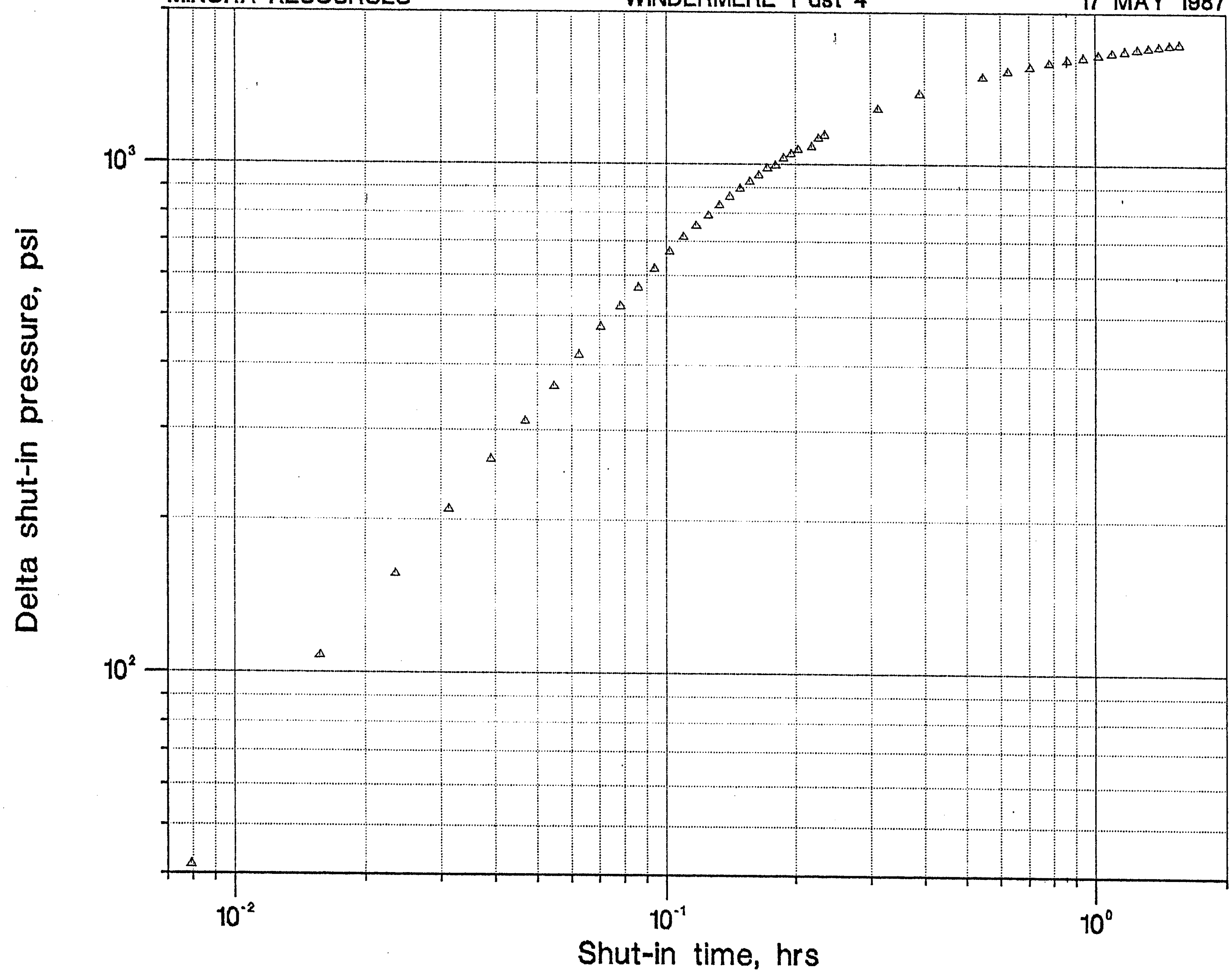
ADVRT

Schlumberger

ADVRT — 001H04

LOG - LOG PLOT

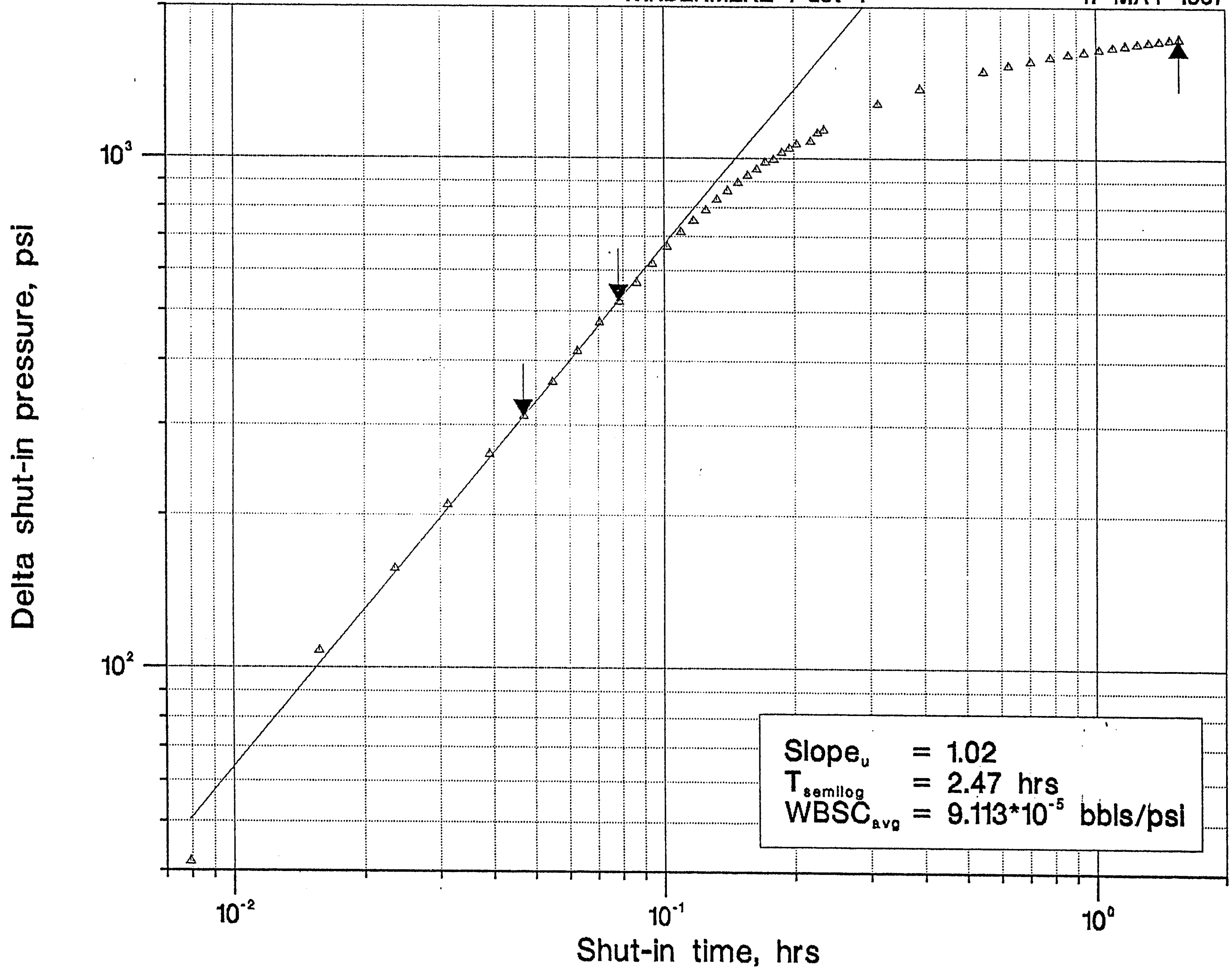
MINORA RESOURCES   WINDERMERE 1 dst 4   17 MAY 1987



29-MAY-87

LOG - LOG PLOT

MINORA RESOURCES | WINDERMERE 1 dst 4 | 17 MAY 1987

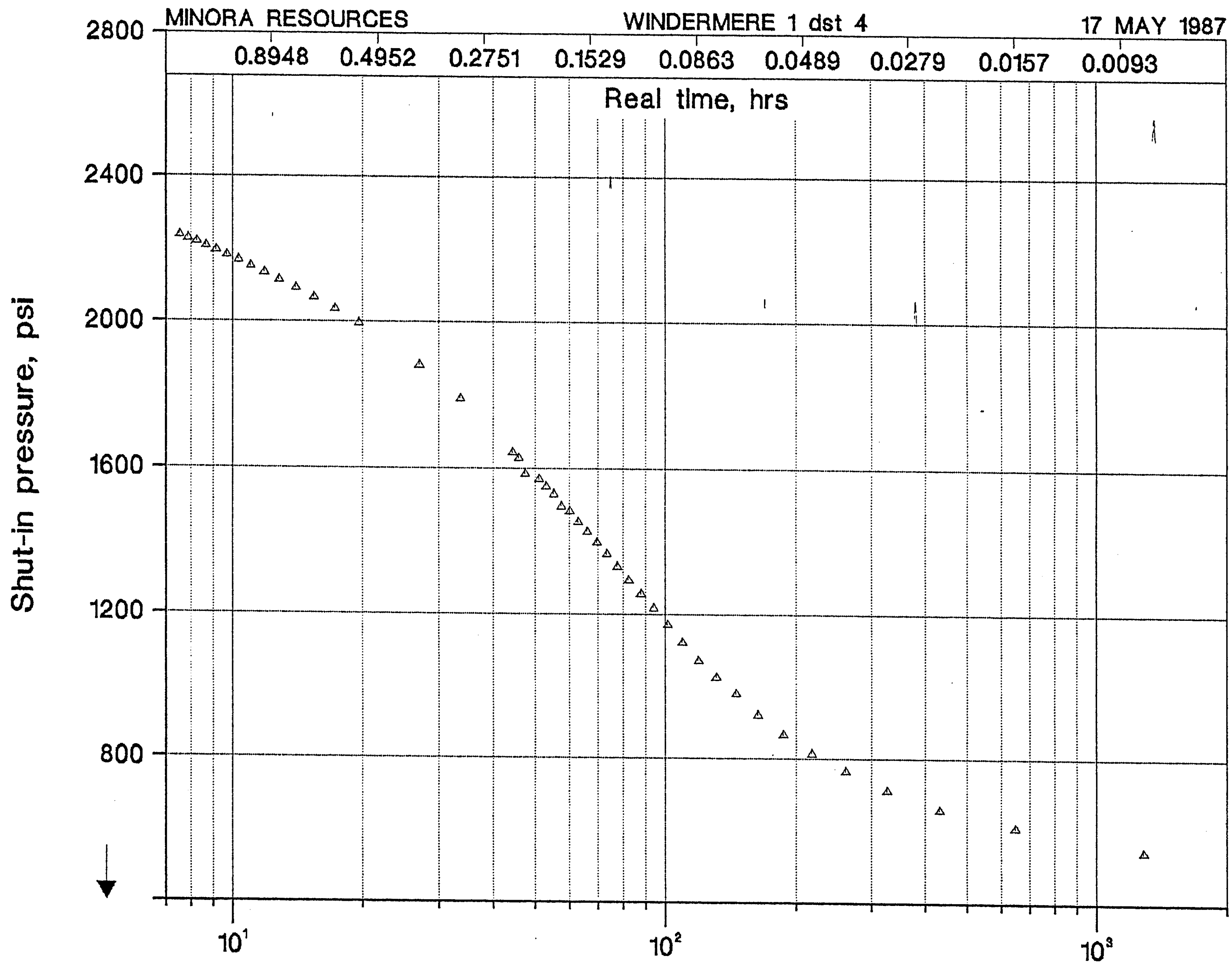


29-MAY-87

LOG-LOG INTERPRETATION

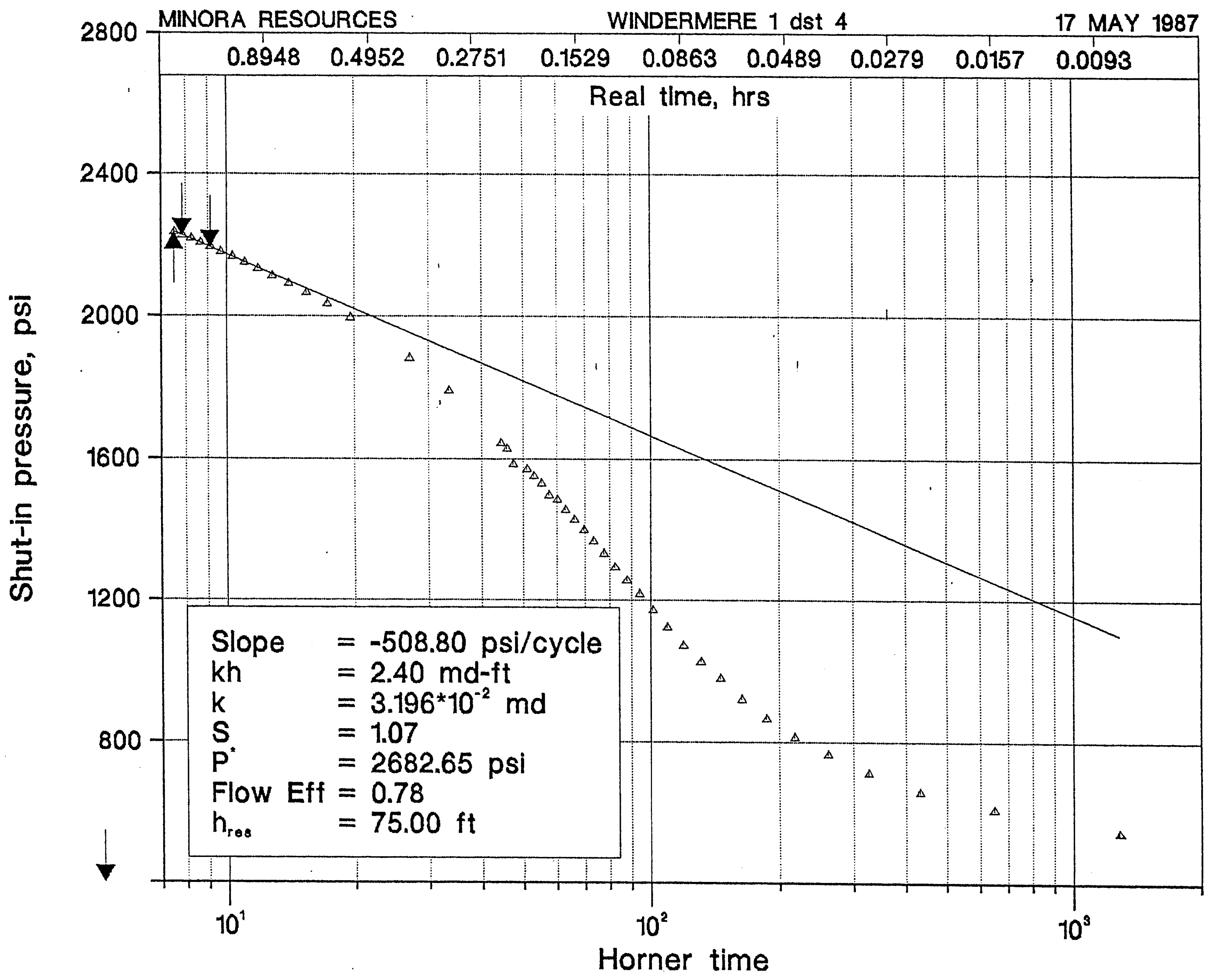
Start of straight line	= 0.047 hrs
End of straight line	= 0.078 hrs
Slope	= 1.023
Start semi-log (1.5 cycle rule)	= 2.466 hrs
Avg. well-bore storage coeff.	= $9.113*10^{-5}$ bbls/psi

HORNER PLOT



29-MAY-87

HORNER PLOT



29-MAY-87

HORNER INTERPRETATION

Start of semi-log straight line	= 1.246 hrs
End of semi-log straight line	= 1.479 hrs
Computed start of semi-log straight line	= 3.752 hrs
Start of semi-log straight line	= 9.124 Horner time
End of semi-log straight line	= 7.842 Horner time
Computed start of semi-log straight line	= 3.698 Horner time
Pressure at 1 hour	= 2150.373 psi
Slope	= -508.797 psi/cycle
Permeability-thickness product	= 2.397 md-ft
Reservoir thickness	= 75.000 ft
Permeability	= 0.032 md
Skin	= 1.066
Pressure drop due to skin	= 472.010 psi
Extrapolated pressure (P^*)	= 2682.649 psi
Wellbore flowing pressure (P_{wf})	= 502.396 psi
Flow Efficiency	= 0.784

CONSTANTS SUMMARY

Porosity	= 0.150
Well radius	= 0.354 ft
Reservoir thickness	= 75.000 ft
Perforation thickness	= 49.000 ft
Viscosity	= 0.500 cp
Pressure (t=0)	= 502.396 psi
Total producing time	= 10.121 hrs
Production rate	= 15.000 RB/D
Water saturation	= 0.650
Gas saturation	= 0.000
Water compressibility	= $2.000*10^{-6}$ psi^{-1}
Oil compressibility	= $1.000*10^{-5}$ psi^{-1}
Gas compressibility	= $3.900*10^{-4}$ psi^{-1}
Formation compressibility	= $5.000*10^{-6}$ psi^{-1}
Total compressibility	= $9.800*10^{-6}$ psi^{-1}

MINORA RESOURCES WINDERMERE 1 dst 4 17 MAY 1987

Time, hrs	Pressure, psi	Delta-P, psi	Horner time
0.000	502.396	0.000	*
0.008	544.096	41.700	1282.732
0.016	610.196	107.800	645.799
0.023	659.096	156.700	431.747
0.031	711.896	209.500	325.430
0.039	765.696	263.300	260.537
0.047	814.096	311.700	217.278
0.055	865.996	363.600	186.379
0.062	920.696	418.300	163.205
0.070	978.296	475.900	145.181
0.078	1024.696	522.300	130.762
0.086	1070.096	567.700	119.103
0.093	1121.096	618.700	109.250
0.101	1170.096	667.700	100.916
0.109	1216.696	714.300	93.772
0.117	1254.696	752.300	87.582
0.125	1292.796	790.400	82.166
0.132	1330.796	828.400	77.387
0.140	1365.096	862.700	73.192
0.148	1396.696	894.300	69.388
0.156	1427.296	924.900	65.963
0.164	1454.196	951.800	62.866
0.171	1483.896	981.500	60.051
0.179	1496.796	994.400	57.480
0.187	1530.296	1027.900	55.125
0.195	1550.696	1048.300	52.984
0.202	1571.096	1068.700	50.982
0.218	1583.996	1081.600	47.407
0.226	1627.696	1125.300	45.804
0.234	1643.396	1141.000	44.309
0.311	1789.896	1287.500	33.492
0.389	1881.796	1379.400	26.992
0.545	1995.996	1493.600	19.568
0.623	2034.896	1532.500	17.248
0.701	2065.496	1563.100	15.442
0.779	2092.396	1590.000	13.997
0.856	2113.796	1611.400	12.817
0.934	2133.296	1630.900	11.832
1.012	2150.896	1648.500	10.999
1.090	2167.596	1665.200	10.285
1.168	2180.596	1678.200	9.666
1.246	2193.596	1691.200	9.124
1.324	2206.496	1704.100	8.647
1.401	2217.696	1715.300	8.222
1.479	2226.996	1724.600	7.842
1.557	2236.296	1733.900	7.500

FLOPETROL JOHNSTON
Schlumberger

FORMATION TESTING REPORT

COMPANY	:	Minora Resources N.L
FIELD	:	Otway Basin
WELL	:	Windermere 1
DST No	:	5
DATE	:	19 May 1987
COUNTRY	:	Australia
LOCATION	:	Victoria
ZONE	:	1782m - 1787m

REGION	:	ANZ
DISTRICT	:	LEA
BASE	:	LEF
REPORT No	:	87-5-2

/ 84001

CLIENT Minora FIELD Windermere WELL 1 DST No 5 DATE 19-5-87	FORMATION TESTING REPORT **WELL AND JOB DATA**	FLOPETROL JOHNSTON **Schlumberger** REPORT No 87-5-2 PAGE No 1

Type test Cased Hole		
Total depth	Test Interval, from 1,782m to : 1,787m	Elevation 54m
Main hole size 8.5 ins	Casing size 7"	Liner size
Down to	Casing weight 27 lbs/ft	Liner weight
Rat hole size	Casing shoe depth	Liner top depth
All depths measured from	Cement plug top	Cement plug top

PERFORATIONS 1,782 - 1787m 8 spf 5" guns

FORMATION - System Lower Eumerella	Estimated porosity 0.15
Geologie level	Estimated permeability 0.64 md (DST 2)
Lithology Sandstone	Estimated productive interval

MUD, Type Brine Wt Viscosity W.L. Chloride PPM

CUSHION, Type Nil Length Top Depth Weight

TIMES

Ist flow	from	21:20	on	19	to	21:27	on	19							
Ist shut-in	from	21:27	on	19	to	22:34	on	19							
2nd flow	from	22:34	on	19	to	23:49	on	19							
2nd shut-in	from		on		to		on								
3rd flow	from		on		to		on		Reverse circulation		on		to		on
3rd shut-in	from		on		to		on		Final equalization		on				

TOOL SEQUENCE - Tool	Type	O. D.	Remarks

Bottom choke size :

DST ...002

CLIENT Minora FIELD Windermere WELL 1 DST No 5 DATE 19-5-87	FORMATION TESTING REPORT **FLUID RECOVERY**	FLOPETROL JOHNSTON Schlumberger REPORT No 87-5-2 PAGE No 2

DESCRIPTION OF FLUIDS RECOVERED

Air blow :

No blow observed.

Flowed at surface during test :	Amount
Nil	

Reversed out :	Amount
No reverse circulation to ensure 100% fluid recovery.	
(Maximum Pumping pressure)	

Recovered in DP and DC'S	Amount
Filtrate, diesel, possible oil traces.	3,000 ccs

SURFACE OBSERVATIONS

Description	Time hr	Pressure	Surface choke
Open for first flow	21:20	0	
No indication of flow	21:26	0	
Close for first shut-in	21:27	0	
Open for 2nd flow	22:34	0	
No indication of flow	23:48	0	

(Maximum surface pressure)

RECOVERY DESCRIPTION	FEET	BARRELS	% OIL	% WATER	% OTHERS	API GRAVITY	RESISTIVITY	CHL PPM
						(a) °F	(a) °F	
						(a) °F	(a) °F	
						(a) °F	(a) °F	
						(A) °F	(a) °F	
						(A) °F	(A) °F	
						(A) °F	(a) °F	
						(a) °F	(a) °F	
						(a) °F	(a) °F	

MFE/PCT FLUID SAMPLE

Sampler Pressure ______ at Surface

Recovery Cu. Ft Gas ______

cc. Oil cc ______

cc. Water cc ______

cc. Mud cc ______

Tot. Liquid cc ______

Gravity ______ °API ______ °F

Gaz/Oil Ratio ______ cu. ft/bbl ☐ m^3/m^3 ☐

	RESISTIVITY	CHLORIDE CONTENT
Recovery Water	____ (A) ____ °F	____ PPM
Recovery Mud	____ (a) ____ °F	
Recovery Mud Filtrate	____ (a) ____ °F	____ PPM
Mud Pit Sample	____ (a) ____ °F	
Mud Pit Sample Filtrate	____ (a) ____ °F	____ PPM

Technician

DST / 84003

CLIENT Minora	FORMATION TESTING REPORT		FLOPETROL JOHNSTON Schlumberger
FIELD Windermere			
WELL 1	PRESSURE CHART SUMMARY		REPORT No 87-5-2
DST No 5			PAGE No 3
DATE 19-5-87			

	Type and Number	J 2,196	J 2,197	J 1,663	(*) Shut-in pressure did not reach stat reservoir pressure.
	Capacity (Psi)	4,700	4,700	4,700	
	Depth (ft) (m)	1,773 m	1,775 m	1,787 m	
	Temperature (°F) (°C)	175°F	175°F	175°F	
	Position	Inside/below	Inside/below	Inside/below	
	Clock number	1,623	3,777	1,636	All pressures measured in bars / psi
	Clock capacity (hr)	96	96	96	
	Clock travel (in/min) (mm/mn)				Given time / Computed Time

PRESSURE READINGS					Given time	Computed Time
A	Initial Hydrostatic Mud Pressure	2,604	2,614			
B1	First flow initial pressure	474	656			
C1	First flow final pressure	847	860		mn	T1 = mn
D1	First shut-in pressure	1,938 •	1,908 •	•	mn	mn
B2	Second flow initial pressure	12	0			
C2	Second flow final pressure	12	0		mn	T2 = mn
D2	Second shut-in pressure	•	•	•	mn	mn
B3	Third flow initial pressure					
C3	Third flow final pressure				mn	T3 = mn
D3	Third shut- in pressure				mn	mn
	Pressure data not A,	M and Tem	perature cor	rected.	mn	T4 = mn
	Fluid cushion pressure				mn	mn
E	Final hydrostatic mud pressure	2,604	2,614	2,638	Total time ______ mn	
	Calculated hyd. mud pressure					
	Calc. fluid cushion pressure					

	Type and Number				(*) Shut-in pressure did not reach stati reservoir pressure.
	Capacity (Psi)				
	Depth (ft) (m)				
	Temperature (°F) (°C)				
	Position				
	Clock number				All pressures measured in bars / psi
	Clock capacity (hr)				
	Clock travel (in/min) (mm/mn)				Given time / Computed Time

PRESSURE READINGS					Given time	Computed Time
A	Initial Hydrostatic Mud Pressure					
B1	First flow initial pressure					
C1	First flow final pressure				mn	T1 = mn
D1	First shut-in pressure	•	•	•	mn	mn
B2	Second flow initial pressure					
C2	Second flow final pressure				mn	T2 = mn
D2	Second shut-in pressure	•	•	•	mn	mn
B3	Third flow initial pressure					
C3	Third flow final pressure				mn	T3 = mn
D3	Third shut- in pressure				mn	mn
					mn	T4 = mn
	Fluid cushion pressure				mn	mn
E	Final hydrostatic mud pressure				Total time ______ mn	
	Calculated hyd. mud pressure					
	Calc. fluid cushion pressure					

REMARKS

DST ...006

CLIENT Minora FIELD Windermere WELL 1 DST No 5 DATE 19-5-87	FORMATION TESTING REPORT **PRESSURE DATA**	FLOPETROL JOHNSTON Schlumberger REPORT No 87-5-2 PAGE No 4

PRESSURE DATA FOR RECORDER :

LABEL POINT	ΔT (Hrs)	PRESSURE	$\frac{T + \Delta T}{\Delta T}$	LOG	Pbu − Pwf	COMMENTS
B1	0	513				Open for 1st flow at 21:20
	0.0156	712				
	0.0311	746				
	0.0467	773				
	0.0623	797				
	0.0779	823				
	0.0934	847				
	0.1043	856				
C1	0.1168	703				
	0	703				Close for 1st shut-in at 21:27
	0.0389	768				
	0.0778	833				
	0.1168	951				
	0.1557	1,011				
	0.1946	1,072				
	0.2335	1,094				
	0.2725	1,131				
	0.3114	1,185				
	0.3503	1,241				
	0.3893	1,292				
	0.4282	1,342				
	0.4671	1,389				
	0.5060	1,435				
	0.5450	1,480				
	0.5839	1,523				
	0.6228	1,563				
	0.6617	1,603				
	0.7007	1,638				
	0.7396	1,672				
	0.7785	1,706				
	0.8175	1,735				
	0.8564	1,766				
	0.8953	1,795				
	0.9342	1,821				
	0.9732	1,847				
	1.0121	1,873				
	1.0510	1,895				
	1.0899	1,916				
C1	1.1133	1,926				End of 1st buildup at 22:34
B2	0	20				Start second flow at 22:34
	0.4780	20				
	1.2581	20				
						Conclude test

All pressure readings A, M and Temperature corrected.

DST 08

MINORA RESOURCES

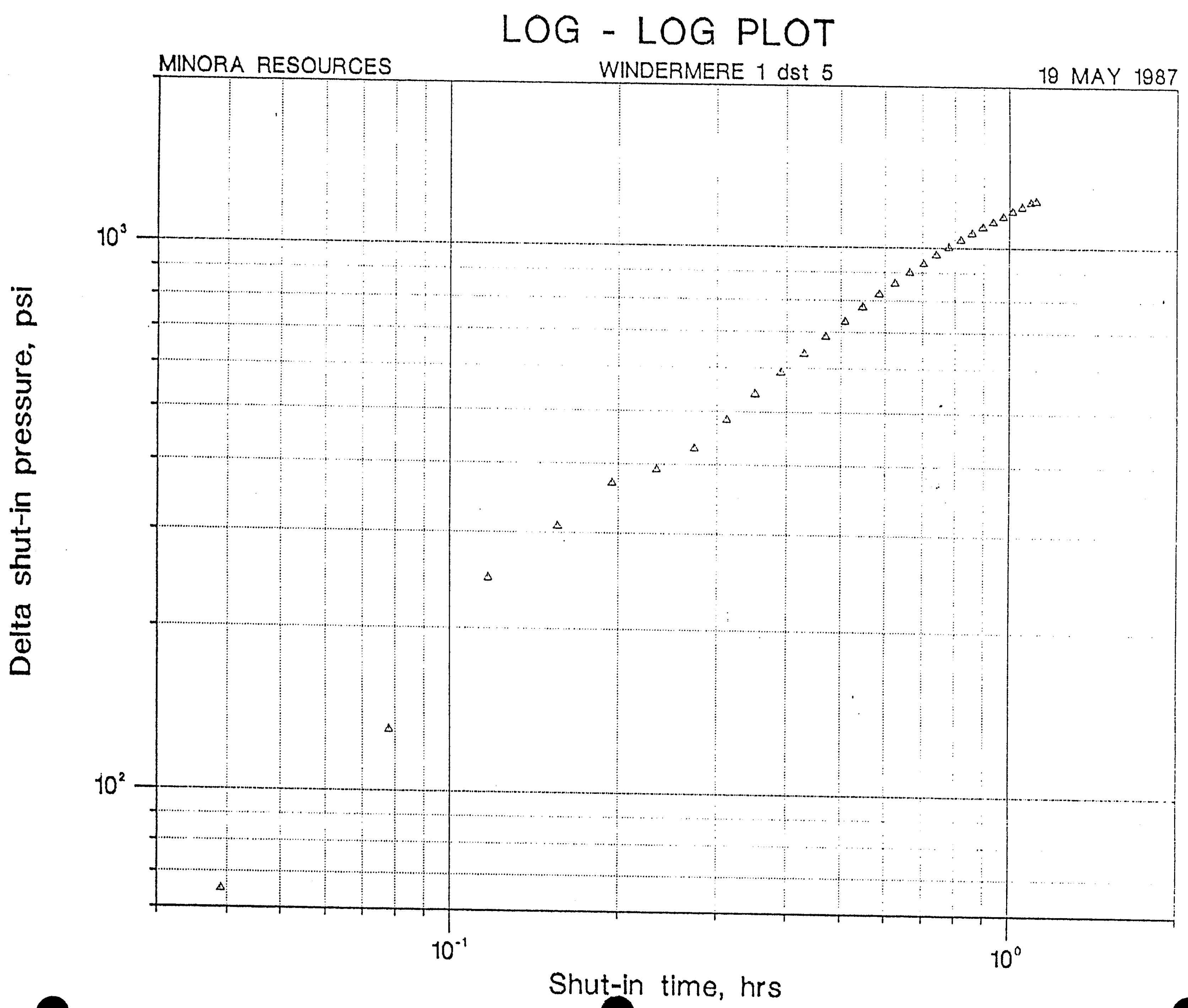
Well No : WINDERMERE 1 dst 5
Test Date : 19 MAY 1987
Field : WILDCAT

Interpretation by : F HALFORD
Interpretation date : 29-MAY-87

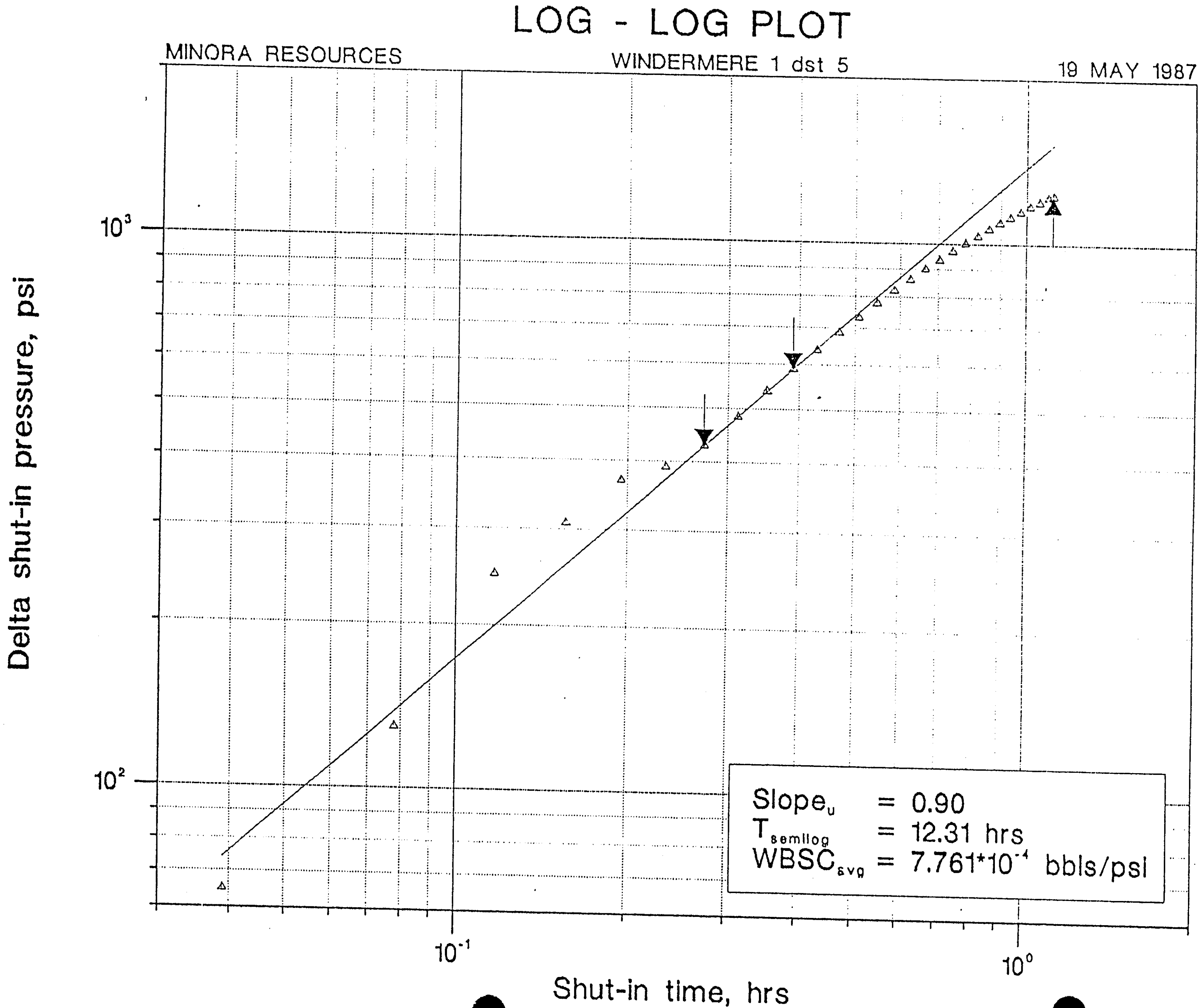
ADVANCED RESERVOIR TESTING INTERPRETATION

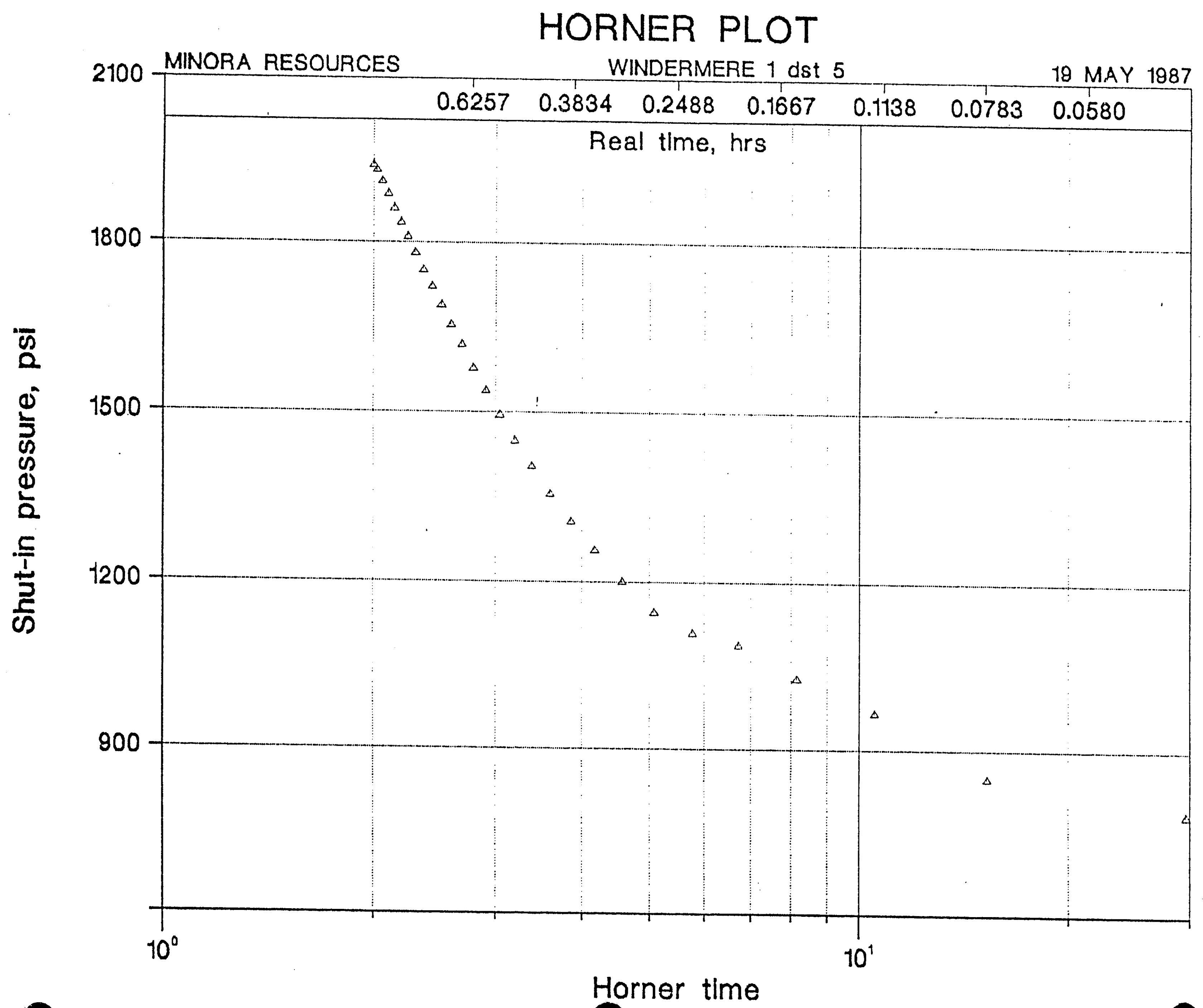
ADVRT

Schlumberger


LOG - LOG PLOT
MINORA RESOURCES
WINDERMERE 1 dst 5
19 MAY 1987
Delta shut-in pressure, psi
10^3
10^2
10^{-1}
10^0
Shut-in time, hrs

29-MAY-87


LOG - LOG PLOT
MINORA RESOURCES
WINDERMERE 1 dst 5
19 MAY 1987
Delta shut-in pressure, psi
10^3
10^2
10^-1
10^0
Shut-in time, hrs
Slope_u = 0.90
T_semilog = 12.31 hrs
WBSC_avg = 7.761*10^-4 bbls/psi



HORNER PLOT
MINORA RESOURCES
WINDERMERE 1 dst 5
19 MAY 1987
0.6257
0.3834
0.2488
0.1667
0.1138
0.0783
0.0580
Real time, hrs
2100
1800
1500
1200
900
Shut-in pressure, psi
10^0
10^1
Horner time

4-JUN-

CONSTANTS SUMMARY

Porosity	= 0.150
Well radius	= 0.354 ft
Reservoir thickness	= 75.000 ft
Perforation thickness	= 16.000 ft
Viscosity	= 0.500 cp
Pressure (t=0)	= 717.596 psi
Total producing time	= 1.110 hrs
Production rate	= 0.010 RB/D
Water saturation	= 0.850
Gas saturation	= 0.000
Water compressibility	= $2.000*10^{-6}$ psi^{-1}
Oil compressibility	= $1.000*10^{-5}$ psi^{-1}
Gas compressibility	= $3.900*10^{-4}$ psi^{-1}
Formation compressibility	= $5.000*10^{-6}$ psi^{-1}
Total compressibility	= $9.800*10^{-6}$ psi^{-1}