WCR, Blackwood-1, (W1152)

Cultus Petroleum, Oct 1997

CULTUS PETROLEUM N.L.
(ACN. 009 102 505)

Well Completion Report
Blackwood-1 (W1152)

WELL COMPLETION REPORT

BLACKWOOD-1

October 1997

COPY NO. Original

Compiled by: J A Watt

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PART 2 - DRILLING

WELL:	**BLACKWOOD #1**	**SPUD:**	1530 hours, 24-04-96
WELL TYPE:	EXPLORATION	**TD REACHED:**	
BLOCK/LICENCE::	PPL1 Otway Basin Victoria	**RIG RELEASED:**	1600 hours, 15-05-96
RIG:	ODE 30	**COMPLETED:**	
LATITUDE:	38^0 32' 51.81" S	**STATUS:**	Plugged & abandoned exploration well
LONGITUDE:	142^0 57' 42.81" E	**TYPE COMPLETION:**	Plugged & abandoned
X coord:	670 968.05 mE	**TYPE STRUCTURE:**	Graben
Y coord:	5 371 567.61 mN		
SEISMIC STATION:	Waarre 3D Xline 2340 inline 8415	**ZONE(S):**	
ELEVATION GL:	110 m MSL	**REMARKS:**	No DSTs conducted. Plug 1: 1520 - 1460 m; Plug 2: 720 - 650 m
RT:	114.3 m		
TD:	**(Logr Ext)** 2650 m MD (Drlr)		

CASING SIZE	SHOE DEPTH mRT	TYPE
9 5/8"	689.4	

AGE	FORMATION OR ZONE TOPS	DEPTH (m) LOGGERS MD	DEPTH (m) SUBSEA TVD	THICKNESS (metres)	HIGH (H) LOW (L)	Prelim. TWT (msec)
TERTIARY	PORT CAMPBELL LIMESTONE	4.3	+110	77.7+	NP	
	GELLIBRAND MARL	82	-32.3	239	NP	
TERTIARY	CLIFTON FORMATION	321	-206.7	17	03 m H	222
TERTIARY	NARRAWATURK MARL	338	-223.7	70	NP	
TERTIARY	MEPUNGA FORMATION	408	-293.7	53	04 m L	312
TERTIARY	DILWYN FORMATION	461	-346.7	187	05 m H	358
TERTIARY	PEMBER MUDSTONE	648	-533.7	75	NP	
TERTIARY	PEBBLE POINT FORMATION	723	-608.7	50	13 m L	578
LATE CRETACEOUS	PAARATTE FORMATION	773	-658.7	479	13 m H	616
LATE CRETACEOUS	SKULL CREEK MUDSTONE	1093	-978.7	159	18 m H	852
	NULLAWARRE GREENSAND	1252	-1137.7	111	12 m H	967
LATE CRETACEOUS	BELFAST MUDSTONE	1363	-1126	124	26 m H	1040
LATE CRETACEOUS	WAARRE FORMATION: UNIT D	1487	-1372.7	37.5	27 m H	1125
LATE CRETACEOUS	UNIT C	1524.5	-1410.2	47	NP	
LATE CRETACEOUS	UNIT B	1571.5	-1457.2	25.5	NP	
LATE CRETACEOUS	UNIT A	1597	-1482.7	14	NP	
EARLY CRETACEOUS	EUMERALLA FORMATION	1611	-1496.7	805	28 m H	1200
EARLY CRETACEOUS	HEATHFIELD MEMBER	2416	-2301.7	234	134 m H	1629
	T.D. (LOGR. EXTRAP.)	2650	-2535.7			

LOG INTERPRETATION (Interval Averages)						PERFORATIONS (4 shots/ft)	
ZONE	INTERVAL m MD	THICKNESS	NP m	POR %	SW %	ZONE	INTERVAL m MD
No pay is mapped			net res				
Waarre Fm	1487 - 1611	124	50.1	19.3	100		
						CORES	
						ZONE / NO. / INTERVAL m MD / CUT m / REC m	

LOG (BPB)	RUN	INTERVAL mRT	BHT/TIME	LOG	RUN	INTERVAL mRT	BHT/TIME
GR-CAL	1	2646.4-689	86C/17 hrs				
-DLS-SP-MLS-		2646.4-1480					
-LCS		2646.4-1910	tool failed				
PDS-CNL-GR-CAL	2	1870-689	86C/25 hrs				
Checkshot survey	3	15 levels 26 shots					
SWC	4	2634.7-1514.5	shot 24 rec 22				

PART 1 - INTERPRETATION

1.0 EXECUTIVE SUMMARY

The Blackwood-1 well is located in the northeastern corner of PPL1, a production license adjacent to the exploration permit in PEP 108, in southern Victoria. Cultus Petroleum NL was the sole participant and operator for the well.

PPL1 was granted to Beach Petroleum in early 1985 and in mid 1989 farmed out an interest to Gas and Fuel Corporation, who became GFE Resources in 1993. The company GFE Resources was sold to Cultus Petroleum on 15th September 1995. Basin Oil NL acquired PPL1 via an *in specie* distribution of GFE's assets on the 26th June, 1996. The Blackwood lead was identified following the Waarre 3D seismic program over PPL1, and extending into PEP 108, in early 1994. Cultus remapped and confirmed the lead as a prospect and Blackwood-1 was spudded on April 26th, 1996 at 15:30 hours. The well reached its total depth of 2650m in the Early Cretaceous Eumeralla Formation on May 15th, 1996 at 16:00 hours.

The well tested a stratigraphic section in the Port Campbell Embayment in the eastern part of the Otway Basin (Figure 1). It was drilled to ascertain the hydrocarbon prospectivity of Early and Late Cretaceous sandstones in a small graben between two east-west trending faults. The primary target was fluvial/lacustrine lithic sandstones of the Heathfield Member of the Eumeralla Formation and the secondary target was channel sands of the Waarre Formation. The reservoir characteristics were considered to be quite good prior to drilling, considering the proximity of the Port Campbell-4 well to the north and the North Paaratte wells to the south east, although they were in separate fault blocks. This was not verified by the well which intersected poor reservoir quality sandstones with extremely low porosity reduced by abundant argillaceous matrix and cements.

Sealing potential is fair for the Heathfield at Blackwood, as there is an overlying sequence of interbedded and interlaminated lithic sandstone, argillaceous sandstone, siltstone and claystone, making up the enclosing Eumeralla Formation. It is not known whether the faults to the north and south could have provided a seal, or perhaps leakage would have occurred if hydrocarbons were indeed present. The seal above "Unit C" of the Waarre Formation is of better quality, being a moderately silty claystone of the younger "Unit D", and overlying it, the massive claystones of the Belfast Mudstone.

The occurrence of hydrocarbons has already been proved by the existence of the number of producing fields in this portion of the Otway Basin, the Port Campbell Embayment. It is known that the Aptian to Albian Eumeralla Formation contains carbonaceous shale and coal in the lower and middle sections with high TOC, and has an oil generative potential with the level of maturity required. Analyses indicate that the source for the oil, gas and condensates recovered from the Eumeralla and Waarre appear to emanate from the Eumeralla itself. Hydrocarbons have also been traced to have been sourced from carbonaceous lacustrine shales in the older Late Jurassic to Early Cretaceous Casterton Formation, although not as organically rich as the younger source.

Blackwood-1 intersected the seismic objective and all well information indicates that the trap is consistent with the structural geometry mapped prior to drilling. Depth prediction of all horizons were very close to prognosis, with the top of the primary objective being 25m high.

No significant shows or indications of hydrocarbons were encountered in the well during or after drilling. No fluorescence was noted, although very minor gas readings were documented in the Eumeralla Formation.

In summary, Blackwood-1 tested a previously undrilled small downthrown fault block, forming a graben, in PPL1, in the eastern section of the Otway Basin. It failed to encounter any hydrocarbons, interpreted as being due to the lack of good quality reservoir, and perhaps seal, in the vicinity.

2. INTRODUCTION

2.1 Regional Geology

Blackwood-1 is located in Production Permit PPL 1 in the onshore section of the Otway Basin, in Victoria, approximately 120km west of Geelong and 190km west of Melbourne. It is situated in the Port Campbell Embayment, within which are several hydrocarbon producing fields, including North Paaratte, Wallaby Creek, Iona, Mylor, Grumby and Langley (Figure 2).

The Otway Basin, including that of South Australia, covers an area of approximately 140,000km^2 onshore and offshore (of which 40,000 km^2 lies onshore), extending just into Tasmanian waters.

Together with other basins along the southern margin of Australia, the Otway Basin resulted from the separation of Australia and Antarctica. It was during the Mesozoic that Gondwanaland fragmented into a number of discrete and diverging lesser continental plates. The tensional forces produced a complex of localised intra-cratonic sub-basins (GFE, 1994). The separation involved two main tectonic phases, a Late Jurassic to Early Cretaceous rift phase marked by extension and rapid subsidence, and a Late Cretaceous to Recent post-rift or drift phase characterised by slower subsidence, and at times compression (Abele et al, 1995).

The Otway Basin comprises four major sedimentary sequences, each deposited during different phases of separation of southern Australia from the Antarctic continental land mass. The earliest sequence consists of terrestrial sediments deposited in localised intra-cratonic Late Jurassic to Early Cretaceous grabens and half grabens, during a time of active extension. Organic-rich non marine sediments were laid down in the deeper portions of the grabens or more marginal low energy settings, and are classed into the Casterton and Laira formations.

Non marine sedimentation continued in an intra-cratonic sag basin, without significant extension. The Eumeralla Formation, forming the second major sequence, constitutes a widespread development of undifferentiated shales and lithic sandstones, and includes coaly deposits thought to represent the source for the oil and gas discovered throughout the basin.

The third sequence developed towards the beginning of the Late Cretaceous in response to the eventual separation of Australia from Antarctica. Although terrestrial sediments continued to be deposited, marine rocks formed an important part of the sequence for the first time, represented by the thick deltaic sequence, with marine influence, of the Sherbrook Group. At the base of the group, lies the Waarre Formation, one of the key reservoir units in the basin.

Major erosion followed uplift in the Late Cretaceous, forming an initial unconformity surface, a regionally mappable surface in the basin. Sedimentation resumed with the deposition of mainly non marine sediments, with minor marine influences. Further marine sedimentation and the outbuilding of coastal plain and submarine shelf deposits occurred, as more rapid separation of the continental masses took place during the Tertiary (GFE, 1994). This process is continuing to the present day.

2.2 Drilling History of the Region

The Otway Basin has been recognised as a potential petroleum province since the 1860s and was the location for Australia's first oil exploration well, Salt Creek, at Alfred Flat, South Australia, in 1866 (Sprigg, 1986). It was with the discovery of bitumen strandings, seepages, and oil scums that exploration had its beginnings in the basin. Over 150 wells have been drilled in the Otway since, both onshore and offshore, with the greatest number of discoveries of hydrocarbons in the coastal region between Port Campbell, westwards, to Mt. Gambier.

Mapping of anticlinal structures and intermittent drilling of shallow wells took place between the early 1890s and late 1950s, however, no discoveries were made during this period. The first discovery in the basin was Port Campbell-1, drilled in 1959, by Frome-Broken Hill. It flowed gas from the Late Cretaceous Waarre Formation at an initial rate of 1.5mmcfd, however was deemed not commercial, as the rate declined rapidly. Shell initiated drilling offshore in the Victorian portion of the basin in 1967, followed closely by Esso, though there were no large successes. It wasn't until 1979 that the first commercial hydrocarbon gas, from the Waarre Formation, was discovered at North Paaratte-1 by Beach Petroleum, near Port Campbell. The field was brought on stream in 1986. Following North Paaratte-1, Wallaby Creek and Grumby were two more fields discovered by Beach, (also the Waarre Formation) in 1981. Subsequent exploration resulted in the establishment, by Beach, of the substantial Iona gas field in 1988, then the Boggy Creek CO_2 field, by GFE Resources, in late 1991. In 1993, the first offshore success was with BHPP's Minerva-1, just off Port Campbell. The Mylor (Bridge/GFE) and Langley (GFE) fields were discovered in 1994, with the Mylor marking the first recovery of oil from the Waarre (Foster and Hodgson, 1995) (Figure 3).

All of the commercial discoveries to date are located within the Port Campbell region in Victoria. There are two production licences adjacent to PEP 108, PPL 1 and 2, where the fields are located :- North Paaratte, Wallaby Creek, Grumby and Iona with Mylor just to the north of the boundary (Figure 2). Boggy Creek, a CO_2 producing field is situated approximately five kilometres west in PPL3.

Given the modest cost of exploration and development in the region and the ready market for any discoveries, this area, especially PPL 1, has excellent potential to produce profitable returns (Traviati and Smith, 1994).

2.3 Objective

Blackwood-1 was designed primarily to test the hydrocarbon potential of the Early Cretaceous Heathfield Member of the Eumeralla Formation, in the Otway Group. The Heathfield Member is a sandy unit near the base of the Eumeralla, a thick monotonous sequence of volcanogenic mudstone and interbedded sandstone (Figure 4).

The well was drilled within a fault block on the downthrown side between two major east-west trending faults. Blackwood-1 was located within the graben bounded by the two faults which cut deep into the Early Cretaceous where the source is thought to exist.

The Heathfield is made up of dominantly lithic sandstone, the rock fragments mainly being unstable volcanogenic material. The rock fragments have in part deformed to clays which together with the formation of various cements consequently reduced much of the primary porosity. Nevertheless, rare more quartz-rich sandstones have been encountered and some appear to have maintained reasonable porosities and permeabilities (Foster and Hodgson, 1995). Port Campbell-4 intersected the Heathfield to the northeast only about a kilometre away, though in an adjacent fault block to the north. Oil was recovered from DSTs in the Eumeralla in the Port Campbell-4 well (Foster and Hodgson, 1995).

It has been concluded that the lower part of the Eumeralla Formation was deposited in low energy fluvio-lacustrine and lacustrine environments, with volcanism contemporaneous with sedimentation (Abele *et al.*, 1995).

In the Blackwood-1 well, the Heathfield Member was intersected at 2416m, with the top of the Eumeralla Formation at 1611m. It was predicted to be approximately 110m thick, with a gross column of 40m interpreted. At the well, the net thickness was 121m and gross sandstone measured approximately 85m. The Heathfield comprised of fine to medium-grained sandstone interlaminated and interbedded with claystone. The sandstone is off-white to very light brownish-grey, very fine to fine, moderately sorted, with abundant off-white argillaceous matrix, grading to arenaceous white claystone. It contains abundant altered feldspar grains, trace to common greyish-green and black, and trace red, lithics. There was no, to very poor, visible porosity, (maximum 5-10% sonic porosity but no density logs available over the interval) and no oil fluorescence. The claystone is off-white to medium brown, light grey to medium greenish-grey, non to occasionally very silty and finely arenaceous, with altered feldspar grains and varicoloured lithic grains.

The Late Cretaceous Waarre Formation, forming the basal unit of the Sherbrook Group, was considered a minor secondary objective at the Blackwood location. It rests upon the Eumeralla Formation, with a low-angle unconformity or disconformity. Quartz sandstone makes up an average of 65% of the formation while the rest is mudstone (Abele *et al.*, 1995). The formation was subdivided by Buffin in 1989 into four units, A,B,C and D, and where present, reservoir quality sandstones are present in "Unit C", in the upper portion of the formation. Generally it consists of light grey to white quartz sandstone, from very fine sand to granule and occasionally pebbly size, in bands. It is poorly sorted and clean, with good porosity developed in many beds. It is interpreted that they are channel sands probably deposited in an upper shelf plain (inner deltaic) environment, where fluviatile processes were dominant over marine and coastal ones (Abele *et al.*, 1995).

In the Blackwood-1 well the Waarre was encountered between 1487m and 1611m, with "Unit C" ("top porosity") at 1524.5m to 1571.5m, and was 47m thick. The sandstone is laminated and finely interbedded with claystone. The sandstone is light grey, very fine to coarse, poorly sorted, however it has varying degrees of siliceous and calcareous cement and a white argillaceous matrix. It has common black to brown coaly detritus, is friable but has poor to fair porosity (the best intervals indicate a porosity of about 20-24% on the density log with no sonic porosity available). No oil fluorescence was detected. The sandstone is finely interbedded with, and grades to, a medium brown to grey, very silty claystone. Individual well developed sandstone beds measure 1-5m in thickness.

3. GEOLOGICAL ANALYSIS

3.1 Stratigraphic Summary

The lithology and stratigraphy encountered in Blackwood-1 is illustrated in Figure 5 (Predicted *vs* Actual Stratigraphy) and is summarised below (all depths are metres KB). The sedimentary section drilled at Blackwood fits fairly well into the regional geological scheme. Descriptions of cuttings, sidewall cores, 'quick-look' wireline log interpretation, offset wells, and well correlations provide the basis for stratigraphic breakdown. (see Enclosure 1, the composite log and wellsite descriptions in Appendices 1, 2, and 4 for more detail).

3.1.1 Surface

(All depths are measured from kelly bushing elevation - 4.3m, with the ground elevation being 110.0m, above mean sea level)

3.1.2 Heytesbury Group (Late Oligocene to Late Miocene)

spud - 338m

3.1.2.1 spud-82m Port Campbell Limestone (Middle to Late Miocene)
Yellow-orange calcarenite at surface becoming light to medium grey with depth, very fine to medium grained, trace coarse to very coarse rounded quartz sand grains, trace to common bryozoa, in general increasing with depth, slightly to very argillaceous, increasing with depth, trace black carbonaceous detritus, rare pyrite, friable to moderately hard, poor intergranular porosity.

3.1.2.2 82-321m Gellibrand Marl (Early to Middle Eocene)
Medium grey marl, occasionally grading to medium greenish-grey to medium brownish-grey, in general becoming less calcareous with depth, common to abundant bryozoa, forams, shell fragments, trace echinoid spines and sponge spicules, trace pyrite, rare glauconite, very soft and sticky, non fissile.

3.1.2.3 321-338m Clifton Formation (very late Early Oligocene to very early Miocene)
Orange to medium greenish-grey calcarenite, dominantly medium orange brown, very fine to coarse grained, dominantly medium, abundant fossil fragments:- bryozoa, shell fragments, forams, sponge spicules, echinoid spines- intermixed with very fine to medium quartz sand grains, medium greenish-grey marl, medium grained calcareous grains, trace coarse to grit sized orange brown iron oxide pellets, trace black carbonaceous detritus, weak calcareous cement in part, friable, poor visible intergranular porosity.

3.1.3 Nirranda Group (Middle Eocene to Early Oligocene)

338-461m

3.1.3.1 338-408m Narrawaturk Marl (Late Eocene to Early Oligocene)
Medium greenish-grey to medium brownish-grey to dark brown marl, common to abundant bryozoa, shall fragments and forams, trace echinoid spines and sponge spicule, trace to common very fine to fine clear quartz sand grains, trace glauconite, trace pyrite, very soft, sticky, non fissile.

3.1.3.2 408-461m Mepunga Formation (Middle Eocene to Early Oligocene)
edium orange brown sandstone, very fine to grit size, dominantly coarse to very coarse, subrounded to well rounded, poorly sorted, very weak silica cement and weak to moderate calcareous cement at the top, trace to abundant dark brown argillaceous matrix, strong brown iron oxide rich clay stain on quartz grains, common glauconite at the top, trace fossil fragments, friable to unconsolidated, fair to very good porosity inferred, no oil fluorescence.

3.1.4 Wangerrip Group (Palaeocene to Early Eocene)

461-773m

3.1.4.1 461-648m Dilwyn Formation (Early Eocene)
Predominantly light grey to light brownish-grey sandstone, very fine to grit size, dominantly medium, subangular to rounded, moderately sorted, weak silica and trace pyrite cement, trace to abundant dark brown to medium grey argillaceous and silt matrix, clear to white quartz grains occasionally with light brownish clay stain, trace black carbonaceous detritus, rare coarse muscovite flakes, friable to unconsolidated, fair to very good porosity inferred, with minor interbedded, in part grading to claystone. It is medium to dark brown, occasionally light to medium grey, trace to abundant dispersed quartz sand grains, rare glauconite in part, non to occasionally very silty, trace to common pyrite, in part very carbonaceous, rare muscovite flakes, very soft, very dispersive and washing from samples, non fissile.

3.1.4.2 648-723m Pember Mudstone (Late Palaeocene to Early Eocene)
Medium to dark brownish-grey to medium grey claystone, moderately to very silty, common to abundant dispersed very fine to coarse clear quartz grains, common to abundant glauconite towards the base, trace black carbonaceous detritus, trace pyrite, slightly calcareous in part, very soft and dispersive, non fissile.

3.1.4.3 723-773m Pebble Point Formation (Maastrichtian)

Sandstone with interbedded claystone from 745m. Light brown, very fine to coarse sandstone, angular to subrounded, moderately to well sorted, weak silica and iron oxide cements, trace at the top, increasing to common and abundant medium brown argillaceous matrix, which grades to arenaceous claystone. Common clear to light brown and orange stain on quartz grains, trace glauconite at the top, common dark green argillaceous lithics, trace yellow to orange to brown, pink and dark green volcanic lithics, trace coarse mica flakes, trace pyrite, friable, good visible porosity, no oil fluorescence. It is interbedded with and grades to a medium orange-brown and dark greenish-grey claystone, iron oxide rich, moderately to very silty, common to abundant dispersed orange-brown stained fine to coarse quartz grains, trace coarse mica flakes, trace mafic volcanic lithics, soft, very dispersive, non fissile.

3.1.5 Sherbrook Group (Cenomanian to Maastrichtian)

773-1611m

3.1.5.1 773-1252m Paaratte Formation (Santonian to Maastrichtian)

Sandstone with minor interbedded claystone. Light grey, very fine to grit size, dominantly coarse to very coarse sandstone, angular to subrounded, poorly sorted, weak silica cement, trace to common medium to dark grey argillaceous and silty matrix, trace yellow, brown, green, and grey lithics, trace black coaly detritus often associated with pyrite, trace coarse clear and green mica flakes, friable, good visible porosity, no oil fluorescence. It is interbedded with and in part grades to medium to dark grey to dark brownish-grey claystone, moderately to very silty, common dispersed very fine to grit sized quartz sand grains in part, trace black coaly detritus in part associated with pyrite, trace micromica, soft, very dispersive, non to slightly subfissile.

3.1.5.1.1 1093-1252m Skull Creek Member (Santonian)

Mudstone with minor interlaminated and interbedded sandstone up to 2m in thickness. Off-white to medium grey to medium brownish-grey, very silty, in part very fine to finely arenaceous, trace to common black to brown carbonaceous flecks, trace pyrite, trace micromicaceous, soft, very dispersive, slightly subfissile, interlaminated and finely interbedded with, and grading to off-white to light brown sandstone. It is very fine to fine with common medium to very coarse grains, angular to subrounded, poorly sorted at the top and moderately to well sorted from just above 1200m. Moderate silica cement, in part moderate dolomite cement, common to abundant off-white argillaceous matrix, trace to common off-white partially feldspar grains at the top and trace to common green lithics throughout, trace fine carbonaceous grains, trace pyrite, moderately hard at the top with some friable sections in part below 1200m, no to very poor porosity and no oil fluorescence.

3.1.5.2 **1252-1363m Nullawarre Greensand** (Santonian to Campanian)
Predominantly medium green sandstone, to 1301m and orange-brown in part to 1341m, and light greenish-orange to 1363m. Very minor interlaminated medium to dark green and greenish-grey, with some mottled off- white, claystone. The sandstone is very fine to coarse, dominantly medium grained, subrounded to rounded from 1252-1301m becoming more angular below, moderately to well sorted, weak silica cement, weak iron oxide cement in part, common to abundant medium and dark green argillaceous matrix, in part abundant orange-brown iron oxide, and medium green glauconite-rich argillaceous matrix-matrix supported, green to orange and yellow stained quartz grains, trace dark green to black glauconite and pyrite, friable, poor to fair visible porosity, no oil fluorescence. The claystone is moderately to very silty, trace to abundant dispersed, very fine to very coarse green, orange and yellow-stained quartz grains, common glauconite at the top to 1300m, trace black carbonaceous matter, trace pyrite, very dispersive, non fissile.

3.1.5.3 **1363-1487m Belfast Mudstone** (Turonian to Campanian)
Medium to dark brownish-grey, in part dark grey to medium greenish-grey claystone, moderately to very silty below 1444m, common to abundant glauconite, trace medium brown cryptocrystalline dolomite in part to 1444m, and trace to common calcareous/dolomite nodules below 1444m. Rare very fine to medium clear quartz grains, trace to common black carbonaceous flecks and detritus, trace pyrite, trace to common micromica, soft to firm, very dispersive, slightly subfissile.

3.1.5.4 **1487-1611m Waarre Formation** (Cenomanian to Turonian)
The formation is made up of approximately 60-70% sandstone, the rest being mudstone, and has been divided by Buffin (1989) into units "A" to "D" ("A" being the oldest). Unit "D" is equivalent to the Flaxman Formation, by other authors.

1487-1524.5m Unit "D"- (also known as Flaxman Formation) very light to medium brown, medium bluish-grey, and light to medium green claystone, moderately to very silty, common to abundant glauconite in the upper portion to about 1500m and trace to 1518m, slightly calcareous in part to 1518m, trace quartz and partially altered feldspar grains, trace brown and black carbonaceous detritus, trace to common micromica, trace pyrite in part, soft to firm, moderately to very dispersive, slightly subfissile. From 1518-1520.5, a bed of medium to dark brown siderite .

1524.5-1571.5m Unit "C" - sandstone with minor finely interbedded and interlaminated claystone. Sandstone is light grey, very fine to grit size, dominantly coarse to very coarse, angular to subangular, poorly sorted, weak to strong silica cement (in general becoming more so with depth), weak to moderate calcareous cement, trace strong pyrite cement, trace to abundant white argillaceous matrix, trace clear crystalline calcite at the top, common black to brown coaly detritus in part associated with pyrite, friable, poor to fair porosity inferred, no oil fluorescence, however up to 10% dull yellowish-white calcite fluorescence. It is laminated, finely

interbedded with and grades to medium brown to medium grey claystone , with a maximum of 1-1.5m in thickness. Very silty, abundant dispersed quartz and partially altered feldspar grains in part, common to abundant black to brown carbonaceous flecks and detritus, slightly to very calcareous (in general decreasing with depth), trace to common pyrite, common micromica, firm, very dispersive, slightly subfissile.

1571.5-1597m Unit "B"- claystone laminated and interbedded with sandstone. Claystone is medium brownish-grey, in part medium to dark grey, in part off-white to light brownish-grey, very silty grading to argillaceous siltstone, trace very fine off-white sandstone laminae, slightly calcareous in part, trace to common black carbonaceous detritus, trace to common micromica, firm, very dispersive, slightly subfissile. It is laminated and finely interbedded with off- white, very fine to fine sandstone, angular to subrounded, moderately to well sorted, strong silica and weak calcareous cements, abundant white argillaceous matrix, trace very fine brown and green lithics, trace to common very fine off-white partially altered feldspar grains, abundant pyrite, common brown to black carbonaceous detritus, moderately hard, very poor visible porosity, no oil fluorescence.

1597-1611m Unit "A"- off-white to light brownish-grey, very fine to medium grained sandstone, in part coarse to very coarse, though dominantly fine, poor to moderate sorting, weak silica cement, trace weak calcareous cement, abundant white argillaceous matrix-matrix supported, quartzose with abundant red-yellow-brown-green-black lithics, trace to common partially altered feldspar grains, trace fine clear green and brown mica flakes, trace black coaly detritus, trace pyrite, friable, very poor visible porosity, no oil fluorescence.

3.1.6 Otway Group (Late Jurassic to Early Cretaceous)

1611-2650m (TD)

3.1.6.1 1611-2650m Eumeralla Formation (Early Cretaceous-Aptian to Albian)
A thick sequence of interbedded volcanolithic sandstone, siltstone and mudstone with minor coal. The sandstone is off-white, light to medium bluish-grey to light to medium greenish-grey, very fine to coarse, but dominantly medium-grained, angular to subrounded moderately to well sorted, weak silica and calcareous cements, abundant off-white to light grey to light to medium bluish-grey argillaceous and silty matrix, matrix supported in part, in part grading to silty claystone and siltstone, abundant green lithics, trace to common red-orange-brown-black-grey lithics, trace to common partially altered feldspar grains, trace brown to black carbonaceous detritus, trace pyrite, friable, no to very poor visible porosity (in places only inferred as merely disaggregated grains in PDC bit samples), no oil fluorescence. The sandstone is interlaminated, interbedded and grades to claystone which is off-white, light to medium bluish-grey to light to medium greenish-grey and light to medium brown, in part slightly moderately to very silty grading to argillaceous siltstone, in part very finely

arenaceous with quartz and partially altered feldspar grains, trace to abundant multicoloured lithics, trace to common brown to black carbonaceous detritus, trace to common micromica, in part trace pyrite, varies from soft to firm to moderately hard, non to subfissile.

Sandstone appears to dominate over claystone and siltstone in the upper portion down to approximately 1760m, below which the formation is much more silty and clay rich, with the individual sand lenses being thinner. The thicker sandy horizons tend to coarsen upwards between 1990m and 2000m.

3.1.6.2 2416-2650m Heathfield Member (Aptian/Albian)

Massive sandstone with very minor interbeds of claystone. Sandstone is off-white to very light brownish-grey to medium brown and very light to medium greenish-grey, and from 2450m to 2537m off-white to light green, very fine to fine to 2450m, very fine to medium, though dominantly fine below, to 2537m, subangular to subrounded, moderately sorted to 2450m, moderately to well sorted below, moderate silica cement, trace to weak calcareous cement, abundant off-white) argillaceous matrix grading to arenaceous white claystone, (light green in colour below 2450m, and matrix supported), abundant partially altered off-white feldspar grains, trace to common multicoloured lithic grains, in part trace coarse brown mica flakes, trace black carbonaceous matter, friable to 2450m and moderately hard to 2537m, no to very poor visible porosity, no oil fluorescence. Claystone varies from absent and trace to 30% of the samples throughout the Heathfield. It is off-white to medium brown and light grey to medium greenish-grey to 2496m below which it is light greenish-grey, non to very silty in part, tending to be more silty below 2496m, in part very fine to finely arenaceous with altered feldspar grains and minor quartz and varicoloured lithics, trace black carbonaceous flecks and detritus, and in part especially in the sample at 2500m claystone is very dark brown grading to argillaceous coal, trace to common micromica, firm to moderately hard, subfissile.

[NOTE:- Ages are derived from Abele, *et al* , 1995--Geological Report-Eastern Otway Basin, No. 103]

3.2 Geological History

Sedimentation began with the volcaniclastic and fluviatile Late Jurassic to Early Cretaceous Otway Group. In Victoria, the group comprises three formations- the Casterton Formation consisting of basalt with minor pyroclastics and sediments, being the oldest; the Pretty Hill Formation, quartz sandstone with minor mudstone; and the Eumeralla Formation, a thick megasequence of volcanogenic sandstone and mudstone, which forms the bulk of the Otway Group (Figure 4) and is the only outcropping formation. The group unconformably overlies Palaeozoic bedrock, comprising folded and faulted Cambrian to Lower Ordovician sedimentary rocks and Devonian granite. The non-marine Otway Group represents the early sedimentary fill of the rifted Otway Basin.

The first marine incursion is marked by the Late Cretaceous Sherbrook Group which was deposited in coastal, deltaic and fluviatile environments, with a predominantly terrigenous sediment source. The group comprises, from oldest to youngest, the Waarre Formation, Flaxman Formation (here named Unit "D" of the Waarre), Belfast Mudstone, Nullawarre Greensand, Paaratte Formation and its Skull Creek and Timboon Sand members. The Sherbrook Group unconformably overlies the Otway, and is unconformably overlain by the Wangerrip Group. The Palaeocene to Early Eocene Wangerrip Group was deposited in shallow marine and deltaic environments, also with a predominantly non marine source. The oldest formation, the Pebble Point, reflects the initial transgression. As the water deepened, a deltaic sequence prograded out into the basin, with the Pember Mudstone and the Dilwyn Formation representing the pro-delta and lower delta plain deposits respectively. [Two new formations, the marginal marine Moomowroong Sand and the non marine Wiridjil Gravel are included in the group, and are considered lateral equivalents to the Pebble Point Formation (Tickell, *et al.*, 1992 - Geol. Rpt. 95)]. The succeeding Middle Eocene to Early Oligocene Nirranda Group is predominantly marine with a mixed terrigenous/carbonate source, and was deposited in estuarine and coastal settings. The Mepunga Formation disconformably overlying the Dilwyn, is a beach barrier system which separates open marine deposits of the conformably overlying Narrawaturk Marl form lagoonal deposits of the Demons Bluff Formation on the landward side of the barrier (Blake, 1980).

Finally, the Late Oligocene to Late Miocene Heytesbury Group marks the first major development of shelf carbonates, with only a minor terrigenous sediment input. The group is made up of the Clifton Formation, a shallow marine sheet of carbonate sand, the Gellibrand Marl, deposited in a low energy, continental shelf environment, and the overlying Port Campbell Limestone, in a moderate continental shelf region, above fair weather base (from Abele *et al.*, 1995).

Regressive Pliocene deposits overlie the Port Campbell Limestone and older strata in the Otway Basin and are named the Hanson Plain Sand. The fine to coarse grained sand, with minor gravel is largely fluviatile in origin, but the clayey sand portions were probably laid down in a shallow marine environment. Volcanic activity followed major Cretaceous and Early Tertiary uplift and faulting of the eastern Otway Basin. The plain was covered by undifferentiated basalt flows, stony rise basalt flows and pyroclastic deposit. These are collectively known as the Newer Volcanics, and are Pliocene to Recent in age, the oldest in the Port Campbell Embayment being approximately 2.2 million years in age (Tickell *et al.*, 1992).

3.3 Relevance to the Occurrence of Hydrocarbons

3.3.1. Shows

The primary objective, the Heathfield Member of the Eumeralla Formation yielded no fluorescence, or gas shows during the drilling of Blackwood-1. However, a few shows were noted in the Eumeralla itself, at these depths:- 1987-1989m, 2068-2070m, 2127-2129m, 2169-2172m and 2561-2564m. The maximum gas reading was 161 total gas units, the range from 50 to 161 total gas units. No shows were recorded while drilling through the secondary objective, the Waarre Formation.

3.3.2. Source Potential and Maturation

No studies were initiated upon the Early Cretaceous, assumed to be the major source of the hydrocarbons in the Port Campbell Embayment, of the Otway Basin.

3.3.3. Reservoir

The Heathfield Member was predicted to form the reservoir at the Blackwood location. The sandstones intersected in the well, from 2416-2537m, however, contained abundant argillaceous matrix, so much so that the sand degenerated to an arenaceous claystone in places, reducing available pore spaces. Much of the primary porosity has also been lost by a substantial amount of silica cement in places, and a weak to moderate calcareous cement. Grain size was small, from very fine to fine, but was moderately sorted. The sand ranged from friable in the top 25-30m, to moderately hard below 2450m. In the top sand horizon no visible porosity was noted, but it increased slightly to very poor porosity between 2450m to 2537m. Only the sonic wireline log is available over this interval and a porosity of 5-10% is indicated. No fluorescence was noted.

From 2537m to TD, of 2650m, a massive sand package exists between 2560 and 2605m, in the lower Eumeralla Formation. It exhibits the same lithological characteristics as the Heathfield, is slightly better sorted, however contains abundant argillaceous matrix, and very poor porosity.

The Waarre Formation forms a major target for hydrocarbons in the Port Campbell region. In Blackwood-1, it was predicted as a secondary objective, especially "Unit C", bearing the most likely, optimum characteristics. The Waarre was intersected between 1487m and 1611m, with Unit "C" from 1524.5-1571.5m. Grain size was very fine to grit, though dominantly coarse to very coarse, was poorly sorted, contained weak to strong silica cement, increasing more with depth, and also a weak to moderate calcareous cement. Trace to abundant white argillaceous matrix was encountered, with a trace of clear crystalline calcite at the top. Thus, reservoir potential is downgraded by the lack of available pore space , which has been reduced both by cements and by abundant argillaceous material.

Individual sand packages ranged from 4 to 8m in thickness separated by less than 1m, to 3m thick claystone laminations and interbeds. The sandstone was friable and had a poor to fair porosity inferred, from the samples. The density wireline log indicates a good porosity of 20-24%, but as the sonic was not run over the same section, a check cannot be undertaken. No oil fluorescence was noted, although up to 10% dull yellowish-white calcite fluorescence occurred in some samples.

3.3.4 Seal

Seal for any hydrocarbons generated *in situ* in the Eumeralla Formation and/or migrating into the Heathfield Member would be provided by intraformational claystones and siltstones. The sands by their lenticular nature would not require any structuring (Abele *et al,* 1995). At the Blackwood-1 location, however, thick seal is not present above the Heathfield. There is an overlying sequence of interlaminated and interbedded lithic sandstone, argillaceous sandstone, siltstone and claystone, more

often than not with gradational contacts. It is unknown whether the two faults, north and south provide extra seal capacity or whether they could have formed conduits for any possible hydrocarbons.

Possible oil and gas entrapped in the upper part of the Waarre Formation, namely "Unit C", would be prevented from migrating out by the overlying "Unit D", with its finer grain size and dominantly argillaceous nature. "Unit D" consists of a moderately to very silty claystone, that is slightly calcareous in part. The Belfast Mudstone directly overlying it, would offer additional seal, as it is approximately 130m of massive claystone.

3.3.5 Structure

The Blackwood structure is situated within a fault block on the downthrown side of two major east-west trending faults, one to the north and the other to the south forming a graben (Figure 6) with approximately 2.3km^2 of structural closure. These two main faults cut deep within the Early Cretaceous where source is assumed to exist. The structure required shales in the Eumeralla Formation to maintain both vertical and lateral seal.

4. GEOPHYSICAL ANALYSIS

4.1 Seismic Coverage

The Blackwood-1 structure was identified from the Waarre 3D Seismic Survey. The Waarre 3D was conducted by Gas & Fuel Corporation of Victoria on behalf of Bridge Oil Limited and the acquisition contractor was Schlumberger-Geco Prakla Australia. The 3-Dimensional multiplicity of the recorded data was 12-fold in 12.5 x 12.5 metre bins.

Data quality around the Blackwood-1 prospect is good with reasonable continuity of reflectors at the Waarre and Heathfield levels.

4.2 Pre-Drill Mapping

Two-way time structure maps were generated at the Top Waarre Formation and the Top Heathfield Sandstone. The Top Waarre pick is based on the Top of the Waarre C Unit, the pick was tied to the seismic through generation of synthetics for each of the wells within the Waarre 3D. The sharp kick of the gamma ray log at the Belfast Mudstone - Waarre Formation boundary is clearly evident in all the wells within the Waarre 3D. Production of synthetics on these wells show a large peak (normal polarity) in amplitude for the interface between the clean sandstone of the Waarre Formation and the overlying mudstone of the Belfast. It was this large peak that was mapped as the Top Waarre Formation at Blackwood-1 and carried throughout the Waarre 3D. The pre-drill two-way time structure map showed structural closure at the Waarre Formation level, a depth map of the prospect was produced by GFE Resources prior to the take over by Cultus Petroleum in 1995. This depth map used a regional time / depth curve GFE used for all their wells in PEP132, PEP 108, PPL1 and PPL2.

No detailed depth map for the Blackwood prospect was produced by Cultus Petroleum. The Top Waarre TWT structure Map showed that the Blackwood-1 well was drilled within closure.

The Top of the Heathfield seismic marker was not as readily tied as the Top Waarre seismic event. Within the Waarre 3D only two wells penetrated the Heathfield Sandstone, the two wells being Braeside-1 and Port Campbell-4. Port Campbell 4 was drilled in 1964 and the quality of the data is poor. Beach Petroleum who operated Braeside-1 did not run a velocity survey at the well. Cultus picked the top of the Heathfield as a peak at the top of the seismic anomaly package within the base of the Upper Eumeralla Formation. The anomaly consists of two high peaks with a high trough in between, the top peak was mapped as the Top of the Heathfield. The Heathfield map showed structural closure to the east and west. Throws on the main north and south faults were not viewed as having been critical due to the thickness of the Upper Eumeralla seal. The map showed that this well would intersect the Heathfield within closure (Figure 7).

4.3 Post Drill Mapping

The actual top of the Waarre C Formation came in 9 m high. The minimal difference is interpreted to be the velocity used for the predicted section over the actual velocity The difference at the Waarre C level did not affected the integrity of the structure.

The actual top of the Heathfield Sandstone came in 36 metres higher, however mapping remains unchanged. The two-way time structure map will be maintained as defined in the pre-drill map. As a result of the 36 metre depth change the depth structure maps at the Top Heathfield level will be adjusted accordingly.

4.4 Velocities

The well velocity survey showed the variation of prognosed to actual depth (Appendix 3). The velocities used for the prognosed depth at the Waarre level were based on the North Paaratte wells. At the Heathfield level only the check shot data from Dunbar East-1 was used. The difference in pre and post-drill seismic velocities and depth conversions are shown in Table 2.

At the Waarre level the velocities of the check shot data for North Paaratte-2 were used to calculate the depths at Blackwood-1. The two wells proved to have similar velocities at the Waarre level as there was only a 9 metre difference.
At the Heathfield level the problem was the lack of control points at this depth from other wells in PPL1. A regional time depth curve was drawn up using five wells around Blackwood and extended at depth to reach the Heathfield Sandstone depth. The interpolated velocity proved to be higher than the actual velocity at Blackwood-1, with the actual top coming in 36 metres higher than prognosed.

Table 1 Time Depth Table used by GFE Resources

Depth (mss)	TWT (below SRD = 0m asl)
100	104
200	205
300	307
400	409
500	491
600	575
700	653
800	720
900	788
1000	861
1100	930
1200	1004
1300	1073
1400	1137
1500	1204
1600	1268
1700	1329
1800	1386
1900	1444

Table 2 Time -Depth Relationships for Blackwood-1

Horizon	Predicted			Actual		
	Depth m-subsea	TWT msec	Vint	Depth m-subsea	TWT msec	Vint
Clifton	210	224		207	222	
			1758			1933
Mepunga	290	315		294	312	
			2339			2304
Dilwyn	352	368		347	358	
			2259			2381
Pebble Point	596	584		609	578	
			3304			2631
Paaratte	672	630		659	616	
			2731			2712
Skull Creek	997	868		979	852	
			2732			2765
Nullawarre	1150	980		1138	967	
			2841			3041
Belfast	1275	1068		1249	1040	
			2717			2212
Waarre	1400	1160		1373	1125	
			2976			3307
Eumeralla	1525	1244		1497	1200	
			3862			3753
Heathfield	2436.5	1716		2302	1629	

5. CONTRIBUTIONS TO REGIONAL KNOWLEDGE

5.1 Sandstone of the Heathfield Member at Blackwood-1 is fine grained and highly argillaceous, and appears to have lost most of its primary porosity due to the siliceous and calcareous cement. It therefore has an overall poor reservoir potential at this location.

5.2 The Heathfield Member has never been formally defined, though it is in wide usage. No type section has been defined, but presumably refers to the sand in the mid Eumeralla Formation, occurring between 1254m and 1263m in the Heathfield-1 well (Morton *et al.,* 1994). Numerous sand packages exist within the Eumeralla and it has been noted by several authors that it is not possible to correlate any of these sands between wells as they seem to be laterally discontinuous (Abele, *et al.,* 1995).

5.3 In the Port Campbell-4 well in the adjacent fault block to the north, the Heathfield was intersected at the base of the well. Approximately 400m away, in Braeside-1, total depth was reached in what appears to be the Heathfield. The resistivity log character of the top of the sand in all three wells, including Blackwood, is very similar, thus the Heathfield may perhaps be laterally continuous over this short distance even though across the fault.

6. REFERENCES

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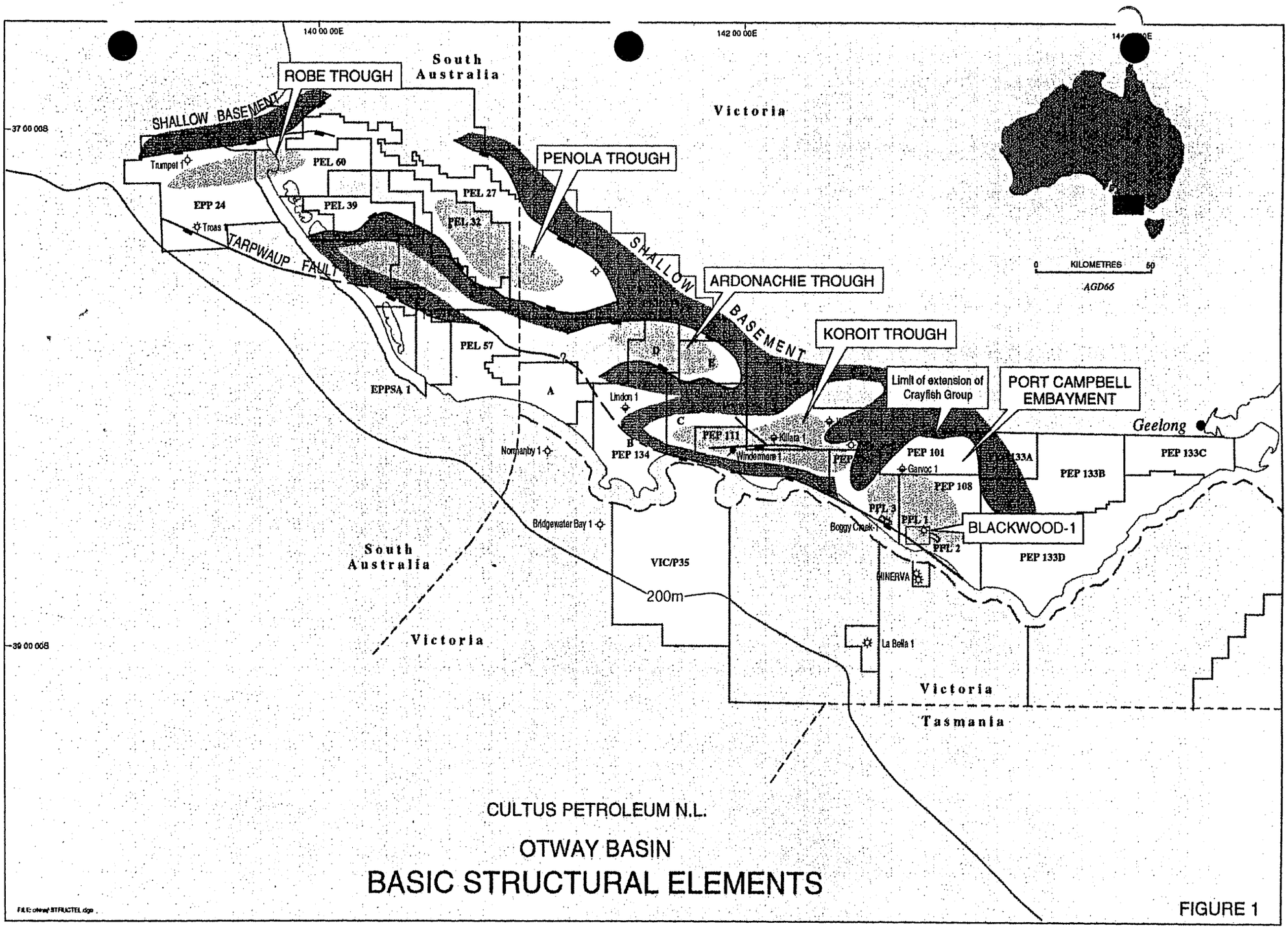
FIGURES



CULTUS PETROLEUM N.L.

OTWAY BASIN

BASIC STRUCTURAL ELEMENTS

FIGURE 1

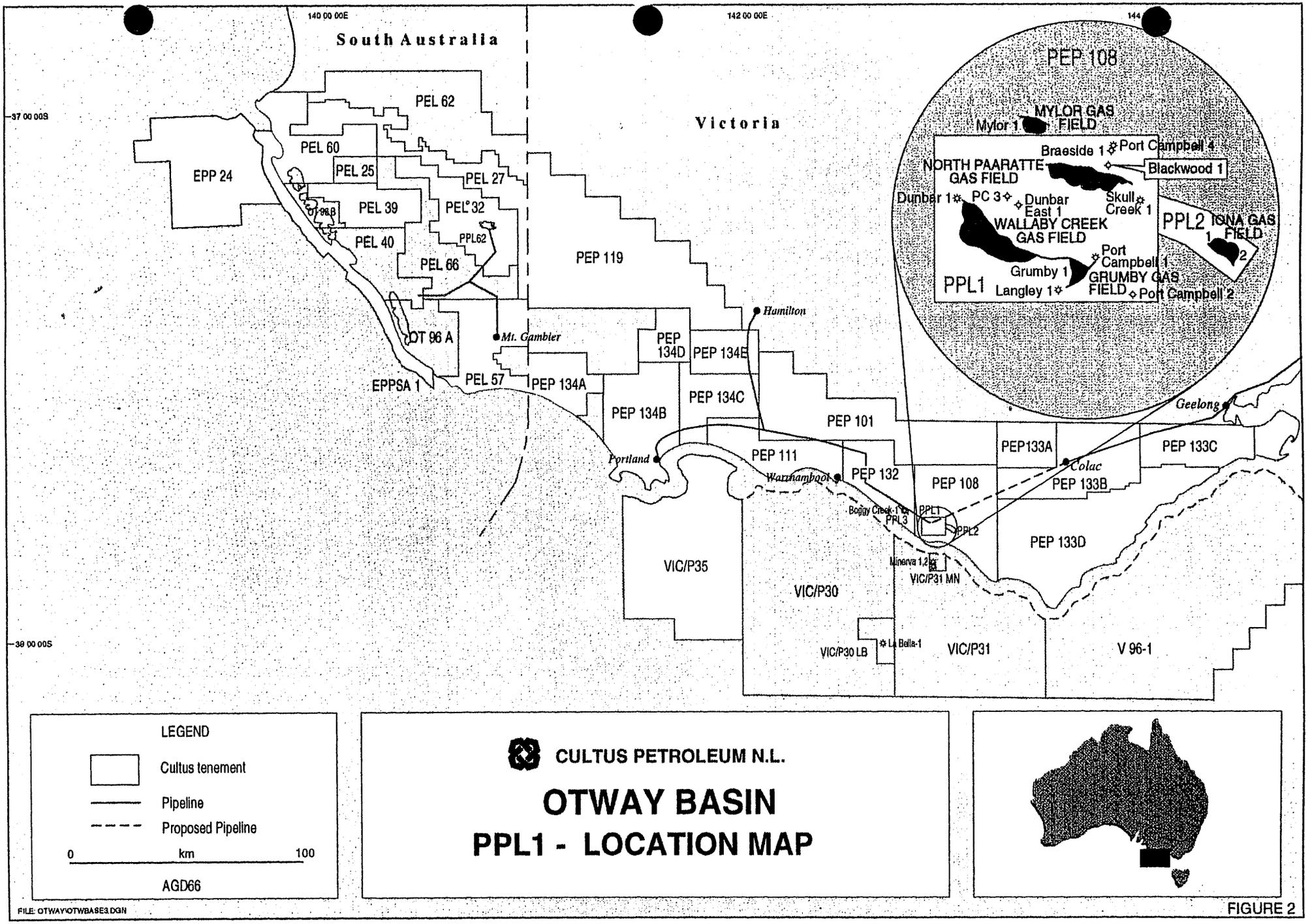
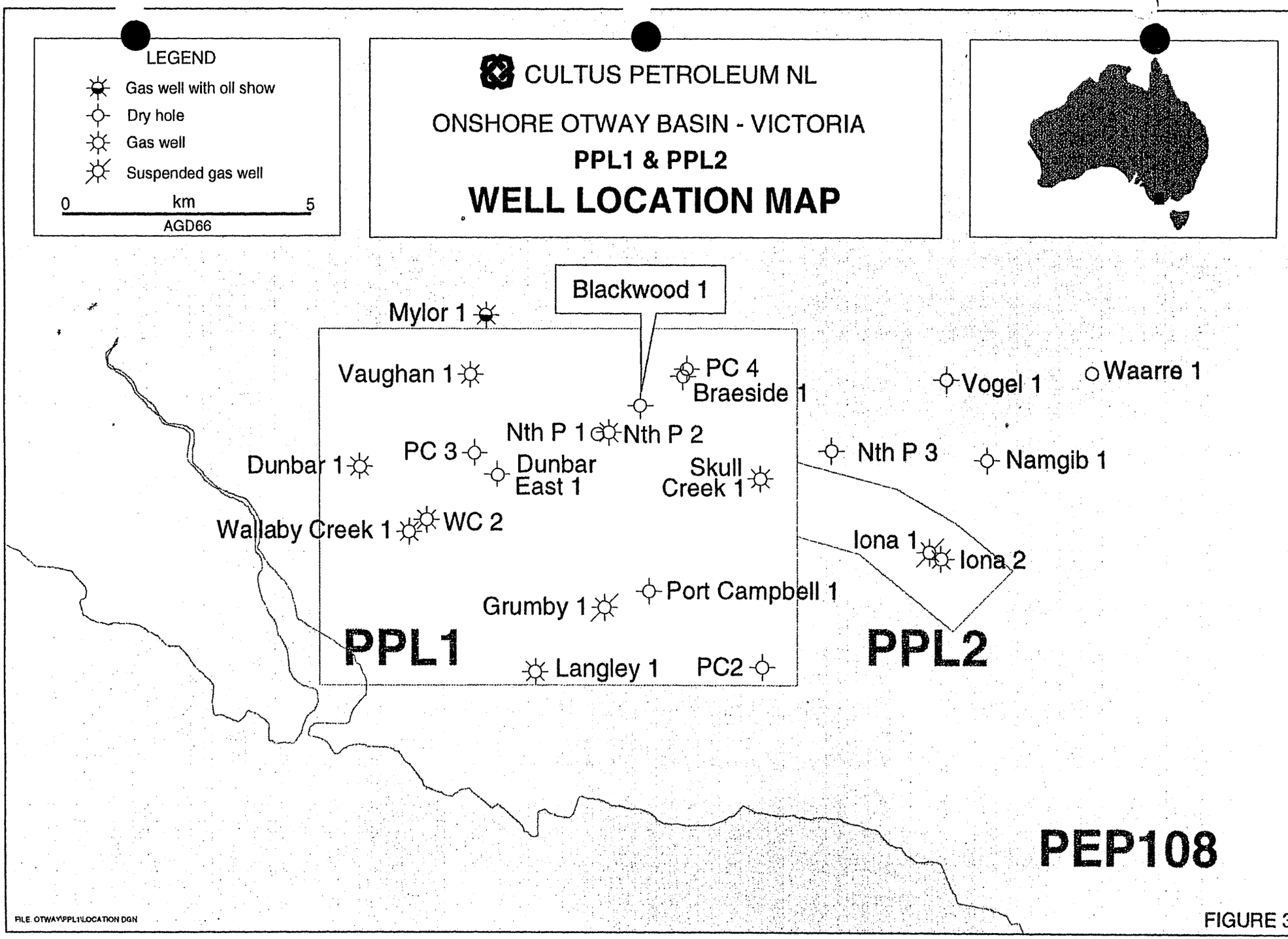
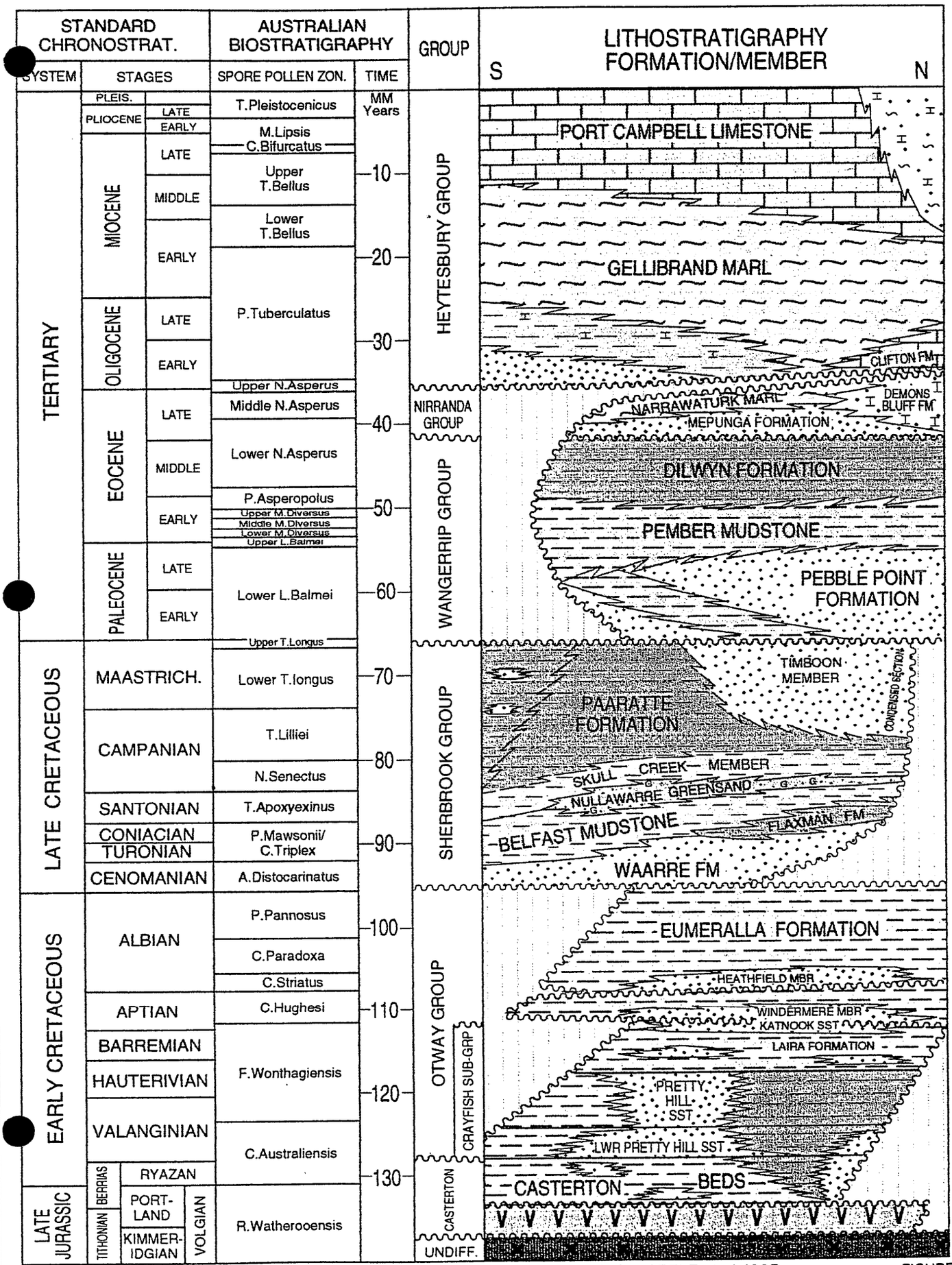

140 00 00E
142 00 00E
144
South Australia
Victoria
37 00 00S
39 00 00S
PEP 108
MYLOR GAS FIELD
Mylor 1
Braeside 1
Port Campbell 4
NORTH PAARATTE GAS FIELD
Blackwood 1
Dunbar 1
PC 3
Dunbar East 1
Skull Creek 1
WALLABY CREEK GAS FIELD
PPL2
IONA GAS FIELD
Port Campbell 1
Grumby 1
GRUMBY GAS FIELD
PPL1
Langley 1
Port Campbell 2
PEL 62
PEL 60
PEL 25
PEL 27
EPP 24
PEL 39
PEL 32
PEL 40
PPL62
PEL 66
PEP 119
Hamilton
OT 96 A
Mt. Gambier
PEP 134D
PEP 134E
EPPSA 1
PEL 57
PEP 134A
PEP 134C
PEP 134B
PEP 101
Geelong
PEP133A
PEP 133C
Portland
PEP 111
Warrnambool
PEP 132
Colac
PEP 108
PEP 133B
Boggy Creek-1
PPL3
PPL1
PPL2
PEP 133D
VIC/P35
Minerva 1,2
VIC/P31 MN
VIC/P30
VIC/P30 LB
La Bella-1
VIC/P31
V 96-1
LEGEND
Cultus tenement
Pipeline
Proposed Pipeline
0
km
100
AGD66
CULTUS PETROLEUM N.L.
OTWAY BASIN
PPL1 - LOCATION MAP
FILE: OTWAY\OTWBASE3.DGN

FIGURE 2


LEGEND
Gas well with oil show
Dry hole
Gas well
Suspended gas well
0
km
5
AGD66
CULTUS PETROLEUM NL
ONSHORE OTWAY BASIN - VICTORIA
PPL1 & PPL2
WELL LOCATION MAP
Blackwood 1
Mylor 1
Vaughan 1
PC 4
Braeside 1
Vogel 1
Waarre 1
Nth P 1
Nth P 2
PC 3
Dunbar 1
Dunbar East 1
Skull Creek 1
Nth P 3
Namgib 1
Wallaby Creek 1
WC 2
Iona 1
Iona 2
Grumby 1
Port Campbell 1
PPL1
PPL2
Langley 1
PC2
PEP108
FILE: OTWAY\PPL1\LOCATION.DGN
FIGURE 3

CULTUS PETROLEUM N.L. **OTWAY BASIN - VICTORIA**

SCHEMATIC STRATIGRAPHIC TABLE



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REVISED Feb.1997 after ABELE et al 1995

FIGURE 4

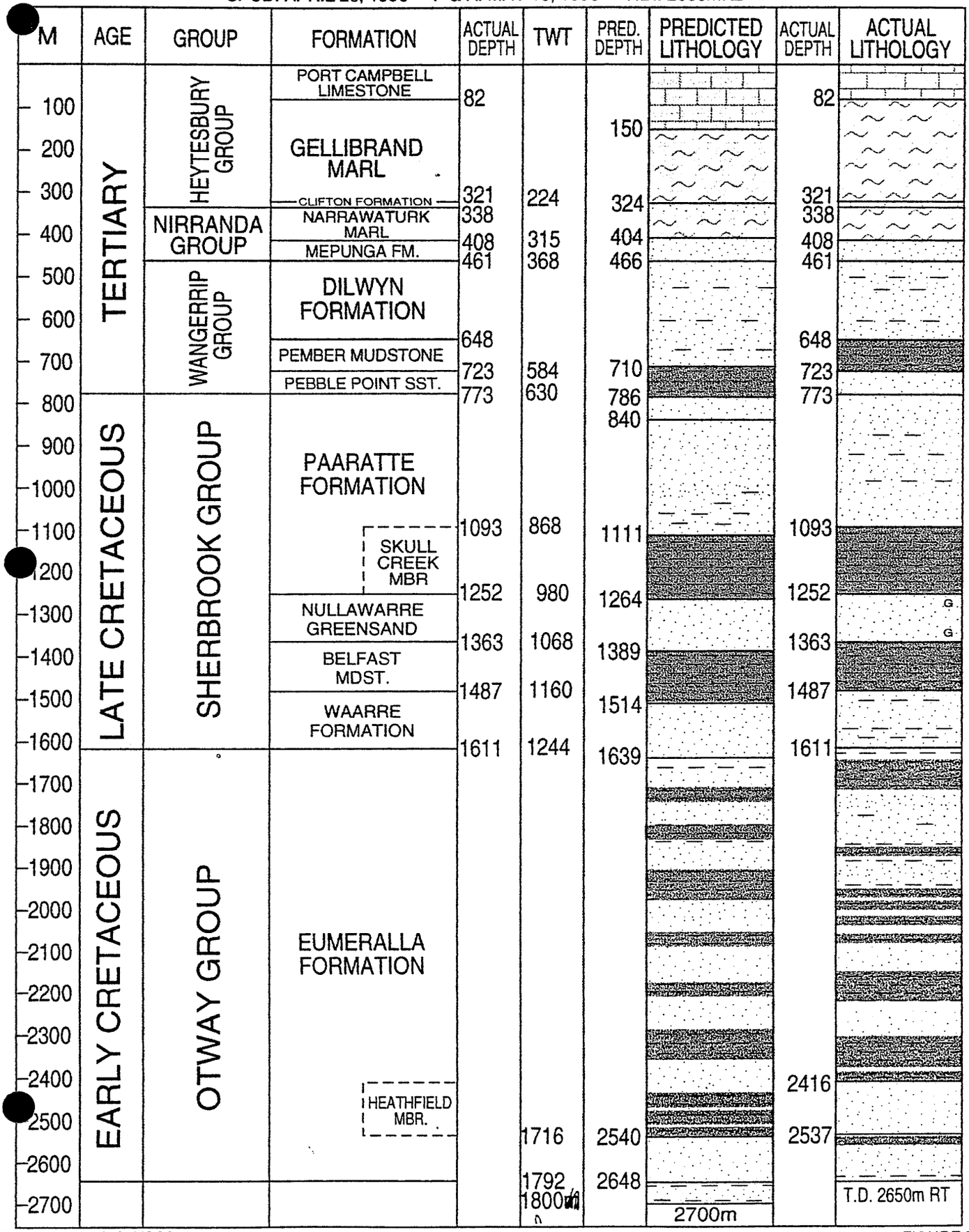
CULTUS

ONSHORE OTWAY BASIN - VICTORIA **PPL1**

BLACKWOOD-1

Predicted v. Actual Stratigraphic Section

G.L.: 110m LAT: 38°32'51.81" RIG: ODE RIG 30
R.T.: 4.3m LONG: 142°57'42.81"
SPUD: APRIL 26, 1996 P & A: MAY 15, 1996 T.D.: 2650mKB



FILE: OTWAY/PPL1/BLKWOOD.DGN

FIGURE 5

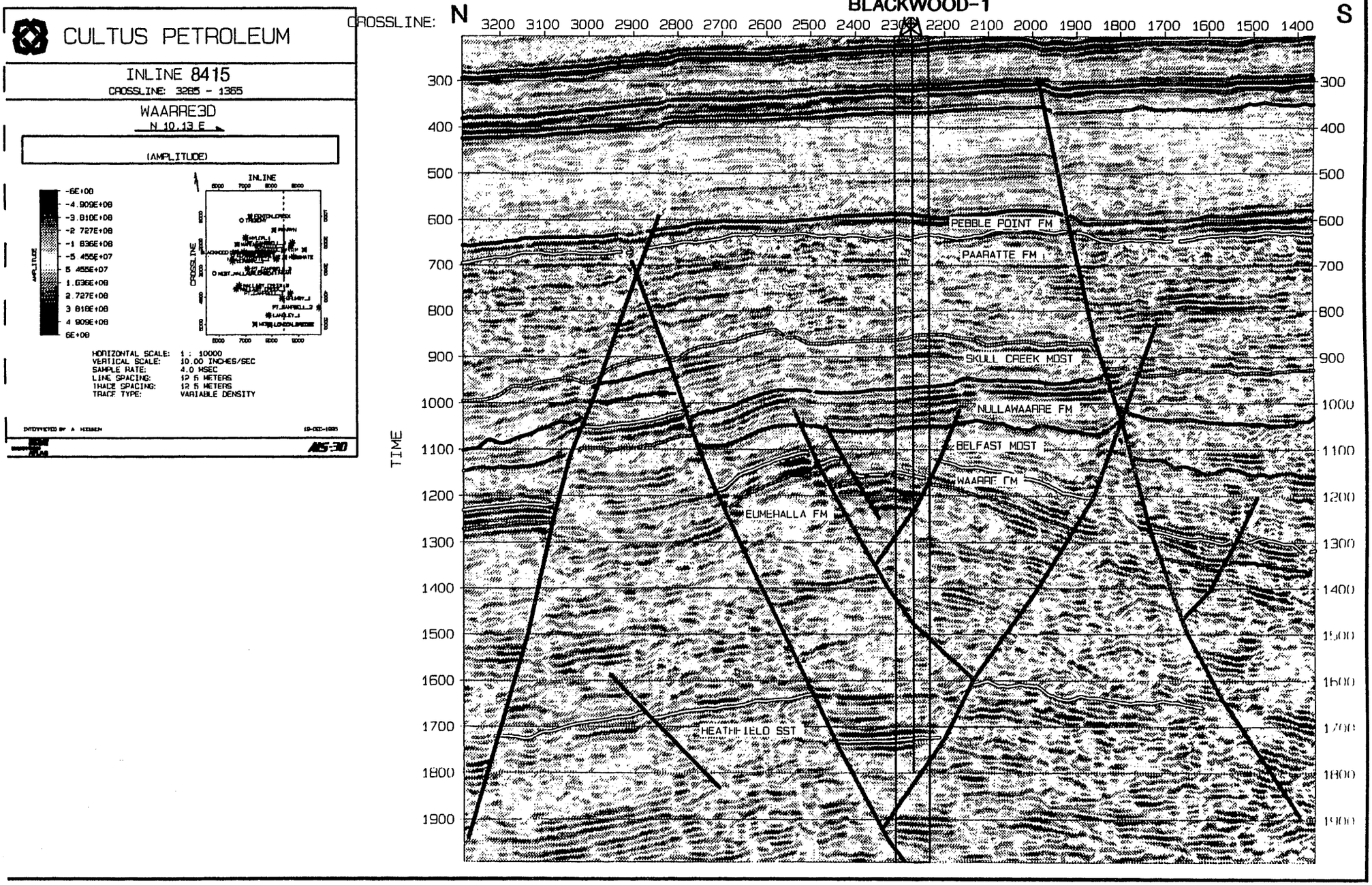
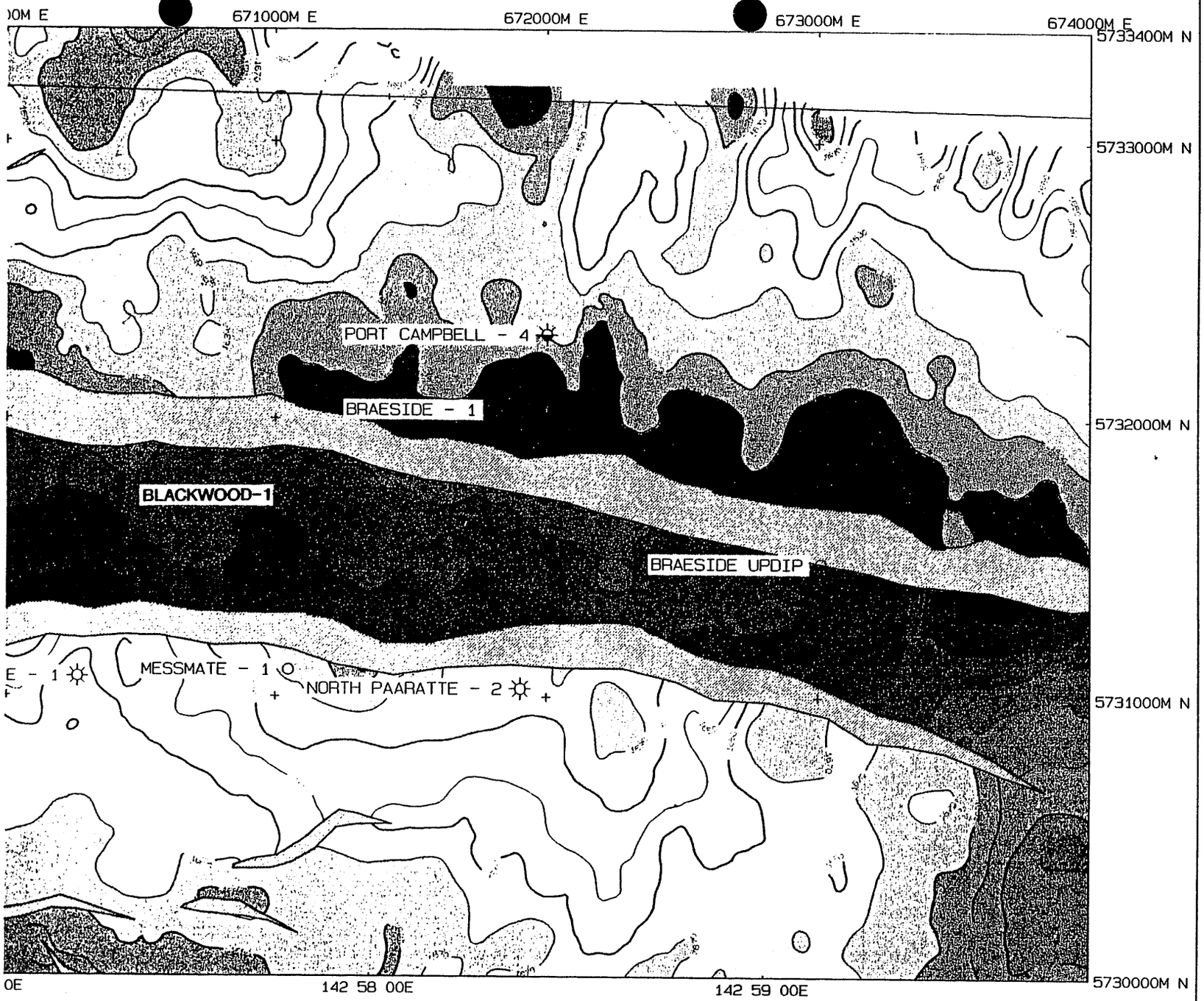

CULTUS PETROLEUM
INLINE 8415
CROSSLINE: 3285 - 1365
WAARRE3D
N 10.13 E
(AMPLITUDE)
-6E+00
-4.909E+08
-3.818E+08
-2.727E+08
-1.636E+08
-5.455E+07
5.455E+07
1.636E+08
2.727E+08
3.818E+08
4.909E+08
6E+08
AMPLITUDE
INLINE
CROSSLINE
HORIZONTAL SCALE: 1 : 10000
VERTICAL SCALE: 10.00 INCHES/SEC
SAMPLE RATE: 4.0 MSEC
LINE SPACING: 12.5 METERS
TRACE SPACING: 12.5 METERS
TRACE TYPE: VARIABLE DENSITY
AES-3D
BLACKWOOD-1
CROSSLINE:
N
S
3200 3100 3000 2900 2800 2700 2600 2500 2400 2300 2200 2100 2000 1900 1800 1700 1600 1500 1400
TIME
300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900
PEBBLE POINT FM
PAARATTE FM
SKULL CREEK MDST
NULLAWAARRE FM
BELFAST MDST
WAARRE FM
ELMEHALLA FM
HEATHFIELD SST

FIGURE 6



CULTUS PETROLEUM N.L.

PPL1 - Otway Basin

BLACKWOOD-1

TWT TOP HEATHFIELD MEMBER

FIGURE 7

APPENDIX 1

CUTTINGS DESCRIPTIONS

Lithological and Fluorescence Description:

Interval (m)	*ROP (Av.) (m/hr)*	*Description*
Spud-82	8-90 (30)	Calcarenite: yellow orange at surface becoming light to medium grey with depth, very fine to medium grained, dominantly fine, trace coarse to very coarse rounded quartz sand grains, trace to common bryozoa in general increasing with depth, slightly to very argillaceous in general increasing with depth, trace black carbonaceous detritus, rare pyrite, friable to moderately hard, poor intergranular porosity.
82-242	50-600 (90)	Marl: medium grey, occasionally grading to medium green grey to medium brown grey, in general becoming less calcareous with depth, common to abundant bryozoa, forams, shell fragments, trace echinoid spines and sponge spicules, trace pyrite, rare glauconite, very soft and sticky, non fissile.

Lithological and Fluorescence Description:

Interval (m)	*ROP (Av.) (m/hr)*	*Description*
242-321	15-120 (35)	Marl: medium green grey, medium grey to medium brown grey, in general becoming less calcareous with depth, abundant bryozoa, forams, shell fragments, trace echinoid spines and sponge spicules, trace pyrite, rare glauconite, very soft and sticky, non fissile.
321-338	55-600 (100)	Calcarenite: orange to medium green grey, dominantly medium orange brown, very fine to coarse grained, dominantly medium, abundant fossil fragments - bryozoa, shell fragments, forams, sponge spicules, echinoid spines - intermixed with very fine to medium quartz sand grains, medium green grey marl, medium grained calcareous grains, trace coarse to grit orange brown iron oxide stained frosted rounded quartz grains, trace very fine to medium brown iron oxide pellets, trace black carbonaceous detritus, weak calcareous cement in part, friable, poor visual intergranular porosity.
338-408	12-50 (24)	Marl: medium green grey to medium brown grey to dark brown, common to abundant bryozoa, shell fragments and forams, trace echinoid spines and sponge spicules, trace to common very fine to fine clear quartz sand grains, trace glauconite, trace pyrite, very soft, sticky, non fissile.
408-461	4-300 (20)	Sandstone: medium orange brown, very fine to grit, dominantly coarse to very coarse, subronded to well rounded, poorly sorted, very weak silica cement, weak to moderate calcareous cement at top, trace to abundant dark brown argillaceous matrix, strong brown iron oxide rick clay stain on quartz grains, common glauconite at top, trace fossil fragments, friable to unonsolidated, fair to very good inferred porosity, no oil fluorescence.
461-648	8-300 (50)	Sandstone: light grey to light brown grey, very fine to grit, dominantly medium, subangular to rounded, moderately sorted, weak silica cement, trace pyrite cement, trace to abundant dark brown to medium grey argillaceous and silt matrix, clear to white quartz grains occasionally with light brownish clay stain, trace black carbonaceous detritus, rare coarse muscovite flakes, friable to unconsolidated, fair to very goos inferred porosity, with minor interbedded and occasionally grading to Claystone: medium to dark brown, occasionally light to medium grey, trace to abundant dispersed quartz sand grains, rare glauconite in part, non to occasionally very silty, trace to common pyrite, occasionally very carbonaceous, rare coarse muscovite flakes, very soft, very dispersive and washing from samples, non fissile
648-689	9-40 (24)	Claystone: medium to dark brown grey to medium grey, moderately to dominantly very silty, common to abundant dispersed very fine to occasionally coarse quartz sand grains, trace black carbonaceous detritus, trace pyrite, slightly calcareous in part, very soft, very dispersive, non fissile

Lithological and Fluorescence Description:

Interval (m)	*ROP (Av.) (m/hr)*	*Description*
689-692	20-26 (24)	Claystone: medium to dark brown grey to medium grey, moderately to dominantly very silty, common to abundant dispersed very fine to occasionally coarse quartz sand grains, trace black carbonaceous detritus, trace pyrite, slightly calcareous in part, very soft, very dispersive, non fissile

CULTUS PETROLEUM N.L. APPENDIX

CUTTINGS DESCRIPTION

WELL NAME:	Blackwood-1	DATE:	01/05/96
GEOLOGIST:	Dave Horner	PAGE:	1

Interval (m)	%	Description
For geology report-5		
692-695	100	Claystone: medium brown grey, moderately to very silty, trace dispersed very fine to medium quartz and partially feldspar sand grains, trace glauconite, trace black coaly detritus, trace micromica, soft, non fissile.
695-700	100	Claystone: medium brown grey, moderately to very silty, trace dispersed very fine to medium quartz and partially feldspar sand grains, trace glauconite, trace black coaly detritus, trace pyrite, trace micromica, soft, non fissile.
700-705	100	Claystone: medium brown grey, moderately to very silty, trace dispersed very fine to medium quartz and partially feldspar sand grains, common glauconite, trace black coaly detritus, trace pyrite, trace micromica, soft, non fissile.
705-710	100	Claystone: medium brown to medium brown grey to medium green grey, common dispersed very fine to coarse clear quartz sand grains, common glauconite, trace micromica, soft, non fissile
710-715	90	Claystone: medium brown to medium brown grey to medium green grey, common to abundant dispersed very fine to coarse clear quartz sand grains, abundant glauconite, trace micromica, soft, non fissile
	10	Sandstone: medium green grey to light brown, very fine to very coarse, dominantly medium, angular to subrounded, moderately sorted, very weak silica cement, common to abundant medium brown argillaceous matrix, common glauconite, trace coarse white to green coarse mica flakes, trace partially altered feldspar grains, trace yellow-orange-brown volcanic lithics, trace pyrite, friable, fair inferred porosity, no oil fluorescence.
715-720	20	Claystone: medium brown to mediumbrown grey to medium green grey, common to abundant dispersed very fine to coarse clear quartz sand grains, abundant glauconite, trace micromica, soft, non fissile
	80	Sandstone: medium green grey to light brown, very fine to very coarse, dominantly medium, angular to subrounded, moderately sorted, very weak silica cement, common to abundant medium brown argillaceous matrix, common glauconite, trace coarse white to green coarse mica flakes, trace partially altered feldspar grains, trace yellow-orange-brown volcanic lithics, trace pyrite, friable, fair inferred porosity, no oil fluorescence.
720-725	100	Sandstone: light brown, very fine to very coarse, dominantly medium, angular to subrounded, moderately to well sorted, weak silica cement, trace to common medium brown argillaceous matrix, clear to light brown to yellow stained quartz grains, trace glauconite, trace yellow to orange to brown volcanic lithics, trace coarse white to green mica flakes, rare pyrite, friable, good visual porosity, no oil fluorescence
725-735	100	Sandstone: light brown, very fine to very coarse, dominantly medium, angular to subrounded, moderately to well sorted, weak silica cement, trace to common medium brown argillaceous matrix, clear to light brown to yellow stained quartz grains, trace glauconite, trace yellow to orange to brown volcanic lithics, trace coarse white to green mica flakes, rare pyrite, friable, good visual porosity, no oil fluorescence

(AJ/GFE:F53)

CULTUS PETROLEUM N.L. **APPENDIX**

CUTTINGS DESCRIPTION

WELL NAME:	Blackwood-1	**DATE:**	2-5-96
GEOLOGIST:	Dave Horner	**PAGE:**	1

For geological report-6

Interval (m)	%	Description
735-740	100	Sandstone: light brown, very fine to coarse, dominantly medium, angular to subrounded, moderately to well sorted, weak silica and iron oxide cements, trace to common medium to dark brown argillaceous matrix, common orange brown stain on quartz grains, common dark green argillaceous lithics, trace pink to yellow to brown to dark green volcanic lithics, trace coarse mica flakes, trace pyrite, friable, good inferred porosity, no oil fluorescence.
740-750	50	Sandstone: light brown, very fine to coarse, dominantly medium, angular to subrounded, moderately to well sorted, weak silica and iron oxide cements, common to abundant medium to dark brown argillaceous matrix grading to arenaceous claystone, common orange brown stain on quartz grains, common dark green argillaceous lithics, trace pink to yellow to brown to dark green volcanic lithics, trace coarse mica flakes, trace pyrite, friable, good inferred porosity, no oil fluorescence.
	50	Claystone: medium orange brown, dark green grey, iron oxide rich, moderately to very silty, common to abundant dispersed orange brown stained fine to coarse quartz grains, trace coarse mica flakes, trace mafic volcanic lithics, soft, very dispersive, no fissile.
750-755	80	Sandstone: light brown, very fine to coarse, dominantly medium, angular to subrounded, moderately to well sorted, weak silica and iron oxide cements, common to abundant medium to dark brown argillaceous matrix grading to arenaceous claystone in part, common orange brown stain on quartz grains, common dark green argillaceous lithics, trace pink to yellow to brown to dark green volcanic lithics, trace coarse mica flakes, trace pyrite, friable, good inferred porosity, no oil fluorescence.
	20	Claystone: medium orange brown, dark green grey, iron oxide rich, moderately to very silty, common to abundant dispersed orange brown stained fine to coarse quartz grains, trace coarse mica flakes, trace mafic volcanic lithics, soft, very dispersive, no fissile.
755-760	60	Sandstone: light brown, very fine to coarse, dominantly medium, angular to subrounded, moderately to well sorted, weak silica and iron oxide cements, common to abundant medium to dark brown argillaceous matrix grading to arenaceous claystone in part, common orange brown stain on quartz grains, common dark green argillaceous lithics, trace pink to yellow to brown to dark green volcanic lithics, trace coarse mica flakes, trace pyrite, friable,fair to good inferred porosity, no oil fluorescence.
	40	Claystone: medium to dark brown, trace dark green grey, moderatelyiron oxide rich, moderately to very silty, common to abundant dispersed orange brown stained fine to coarse quartz grains, trace coarse mica flakes, soft, very dispersive, no fissile.
760-770	70	Sandstone: light brown, very fine to coarse, dominantly medium, angular to subrounded, moderately to well sorted, weak silica and iron oxide cements, common to abundant medium to dark brown argillaceous matrix grading to arenaceous claystone in part, common orange brown stain on quartz grains, common dark green argillaceous lithics, trace pink to yellow to brown to dark green volcanic lithics, trace coarse mica flakes, trace pyrite, friable,fair to good inferred porosity, no oil fluorescence.
	30	Claystone: medium to dark brown, trace dark green grey, medium grey, orange brown, moderatelyiron oxide rich, moderately to very silty, common to abundant dispersed orange brown stained fine to coarse quartz grains, trace coarse mica flakes, soft, very dispersive, no fissile.

(AJ/GFE:F53)

Interval (m)	%	Description
770-775	100	Sandstone: very light brown grey, very fine to very coarse, dominantly coarse, angular to subrounded, moderately to well sorted, very weak silica cement, nil to common brown argillaceous matrix, clear to opaque quartz grains often with brown iron oxide stain, occasional yellow and pink quartz grains, trace red brown green pink black and orange volcanic lithics, trace black coaly detritus, trace brown mica flakes, trace pyrite, friable, good inferred porosity, no oil fluorescence.
775-785	100	Sandstone: very light brown grey, very fine to very coarse, dominantly coarse, angular to subrounded, moderately to well sorted, very weak silica cement, no visual matrix, clear to opaque quartz grains, occasional yellow and pink quartz grains, trace red brown green pink black and orange volcanic lithics, trace black coaly detritus, trace brown mica flakes, trace pyrite, friable with loose grains in sample, very good inferred porosity, no oil fluorescence.
785-795	100	Sandstone: very light brown grey, very fine to very coarse, dominantly coarse to very coarse, angular to subrounded, moderately to well sorted, very weak silica cement, no visual matrix, clear to opaque quartz grains, occasional yellow and pink quartz grains, common red brown green pink black and orange volcanic lithics, trace black coaly detritus, trace brown mica flakes, trace pyrite, friable with loose grains in sample, very good inferred porosity, no oil fluorescence.
795-800	100	Sandstone: very light brown grey, very fine to very coarse, dominantly very coarse, angular to subrounded, moderately to well sorted, very weak silica cement, no visual matrix, clear to opaque quartz grains, occasional yellow and pink quartz grains, common to abundant red brown green pink black and orange volcanic lithics, trace black coaly detritus, trace brown mica flakes, trace pyrite, friable with loose grains in sample, very good inferred porosity, no oil fluorescence.
800-810	100	Sandstone: light brown, fine to very coarse, dominantly coarse, angular to subrounded, moderately sorted, very weak silica cement, no visual matrix, clear to opaque quartz grains, common yellow orange quartz grains, common red brown yellow pink green grey and black volcanic lithics, trace clear to geen coarse mica flakes, trace black coaly detritus occasionally with associated pyrite, friable, very good inferred porosity, no oil fluorescence.
810-815	100	Sandstone: light brown, fine to very coarse, dominantly very coarse, angular to subrounded, moderately sorted, very weak silica cement, no visual matrix, clear to opaque quartz grains, common yellow orange quartz grains, common red brown yellow pink green grey and black volcanic lithics, trace clear to geen coarse mica flakes, trace black coaly detritus occasionally with associated pyrite, friable, very good inferred porosity, no oil fluorescence.
815-835	100	Sandstone: light brown grey, fine to very coarse, dominantly coarse, angular to subrounded, moderately sorted, very weak silica cement, no visual matrix, clear to opaque quartz grains, common yellow orange quartz grains, common red brown yellow pink green grey and black volcanic lithics, trace clear to geen coarse mica flakes, trace black coaly detritus occasionally with associated pyrite, friable, very good inferred porosity, no oil fluorescence.
835-850	100	Sandstone: light grey to light brown grey, fine to very coarse, dominantly very coarse, angular to subrounded, moderately sorted, very weak silica cement, no visual matrix, clear to opaque quartz grains, common yellow orange quartz grains, common red brown yellow pink green grey and black volcanic lithics, trace clear to geen coarse mica flakes, trace black coaly detritus occasionally with associated pyrite, friable, very good inferred porosity, no oil fluorescence.
850-855	100	Sandstone: light grey to light brown grey, fine to very coarse, dominantly very coarse, angular to subrounded, moderately sorted, very weak silica cement, no visual matrix, clear to opaque quartz grains, common yellow orange quartz grains, common red brown yellow pink green grey and black volcanic lithics, trace clear to geen coarse mica flakes, trace black coaly detritus occasionally with associated pyrite, friable, very good inferred porosity, no oil fluorescence.
	Tr	Claystone: medium dark grey, very silty, common dispersed very fine to coarse quartz and lithic sand grains, moderately carbonaceous in part, common black coaly detritus often with associated pyrite in part, soft, very dispersive, non fissile.

855-865	100	Sandstone: light grey to light brown grey, fine to very coarse, dominantly coarse, angular to subrounded, poor to moderately sorted, very weak silica cement, no visual matrix, clear to opaque quartz grains, common yellow orange quartz grains, common red brown yellow pink green grey and black volcanic lithics, trace clear to geen coarse mica flakes, trace black coaly detritus occasionally with associated pyrite, friable, very good inferred porosity, no oil fluorescence.
	Tr	Claystone: medium dark grey, very silty, common dispersed very fine to coarse quartz and lithic sand grains, moderately carbonaceous in part, common black coaly detritus often with associated pyrite in part, soft, very dispersive, non fissile.
865-870	100	Sandstone: light grey to light brown grey, fine to very coarse, dominantly very coarse, angular to subrounded, poor to moderately sorted, very weak silica cement, no visual matrix, clear to opaque quartz grains, common yellow orange quartz grains, common red brown yellow pink green grey and black volcanic lithics, trace clear to geen coarse mica flakes, common black coaly detritus occasionally with associated pyrite, friable, very good inferred porosity, no oil fluorescence.
870-875	80	Sandstone: light grey to light brown grey, fine to very coarse, dominantly very coarse, angular to subrounded, poor to moderately sorted, very weak silica cement, no visual matrix, clear to opaque quartz grains, common yellow orange quartz grains, common red brown yellow pink green grey and black volcanic lithics, trace clear to geen coarse mica flakes, common black coaly detritus occasionally with associated pyrite, friable, very good inferred porosity, no oil fluorescence.
	20	Claystone: medium dark grey, very silty, common dispersed very fine to coarse quartz and lithic sand grains, moderately carbonaceous in part, trace to common black coaly detritus often with associated pyrite, trace coarse mica flakes, trace micromica, soft, very dispersive, non fissile.
875-880	60	Sandstone: light grey to light brown grey, fine to very coarse, dominantly very coarse, angular to subrounded, poorly sorted, very weak silica cement, no visual matrix, clear to opaque quartz grains, trace yellow orange quartz grains, common red brown yellow pink green grey and black volcanic lithics, trace clear to geen coarse mica flakes, common black coaly detritus occasionally with associated pyrite, friable, very good inferred porosity, no oil fluorescence.
	40	Claystone: medium dark grey, very silty, common dispersed very fine to coarse quartz and lithic sand grains, moderately carbonaceous in part, trace to common black coaly detritus often with associated pyrite, trace coarse mica flakes, trace micromica, soft, very dispersive, non fissile.
880-885	70	Sandstone: light grey to light brown grey, fine to very coarse, dominantly very coarse, angular to subrounded, poorly sorted, very weak silica cement, no visual matrix, clear to opaque quartz grains, trace yellow orange quartz grains, common red brown yellow pink green grey and black volcanic lithics, trace clear to geen coarse mica flakes, common black coaly detritus occasionally with associated pyrite, friable, very good inferred porosity, no oil fluorescence.
	30	Claystone: medium dark grey, very silty, common dispersed very fine to coarse quartz and lithic sand grains, moderately carbonaceous in part, trace to common black coaly detritus often with associated pyrite, trace coarse mica flakes, trace micromica, soft, very dispersive, non fissile.
885-890	70	Sandstone: light grey to light brown grey, fine to grit, dominantly very coarse, angular to subrounded, poorly sorted, very weak silica cement, no visual matrix, clear to opaque quartz grains, trace yellow orange quartz grains, common red brown yellow pink green grey and black volcanic lithics, trace clear to geen coarse mica flakes, common black coaly detritus occasionally with associated pyrite, friable, very good inferred porosity, no oil fluorescence.
	30	Claystone: medium dark grey, very silty, common dispersed very fine to coarse quartz and lithic sand grains, moderately carbonaceous in part, trace to common black coaly detritus often with associated pyrite, trace coarse mica flakes, trace micromica, soft, very dispersive, non fissile.

Interval (m)	%	Description PAGE: 4
890-900	90	Sandstone: light grey to light brown grey, fine to grit, dominantly very coarse, angular to subrounded, poorly sorted, very weak silica cement, no visual matrix, clear to opaque quartz grains, trace yellow orange quartz grains, common red brown yellow pink green grey and black volcanic lithics, trace clear to geen coarse mica flakes, common black coaly detritus occasionally with associated pyrite, friable, very good inferred porosity, no oil fluorescence.
	10	Claystone: medium dark grey, very silty, common dispersed very fine to coarse quartz and lithic sand grains, moderately carbonaceous in part, trace to common black coaly detritus often with associated pyrite, trace coarse mica flakes, trace micromica, soft, very dispersive, non fissile.
900-905	100	Sandstone: light grey to light brown grey, fine to grit, dominantly very coarse, angular to subrounded, poorly sorted, very weak silica cement, trace pyrite cement, trace medium dark grey argillaceous matrix in part, clear to opaque quartz grains, trace yellow orange quartz grains, common red brown yellow pink green grey and black volcanic lithics, trace clear to geen coarse mica flakes, common black coaly detritus occasionally with associated pyrite, friable, very good inferred porosity, no oil fluorescence.
905-910	70	Sandstone: light grey to light brown grey, fine to grit, dominantly very coarse to grit, angular to subrounded, poorly sorted, very weak silica cement, trace to common pyrite cement, trace medium dark grey argillaceous matrix in part, clear to opaque quartz grains, trace yellow orange quartz grains, common red brown yellow pink green grey and black volcanic lithics, trace clear to geen coarse mica flakes, common black coaly detritus occasionally with associated pyrite, friable, very good inferred porosity, no oil fluorescence.
	30	Claystone: medium dark grey, very silty, common dispersed very fine to coarse quartz and lithic sand grains, moderately carbonaceous in part, trace to common black coaly detritus often with associated pyrite, trace coarse mica flakes, trace micromica, soft, very dispersive, non fissile.
910-920	80	Sandstone: light grey, very fine to grit, dominantly coarse, angular to subrounded, poorly sorted, weak silica cement, trace to common medium dark grey argillaceous and silt matrix, trace yellow brown green and grey volcanic lithics, trace black coaly detritus often with associated pyrite, trace coarse clear and green mica flakes, friable, good visual porosity, no oil fluorescence.
	20	Claystone: medium dark grey, very silty, common dispersed very fine to coarse quartz and lithic sand grains, moderately carbonaceous in part, trace black coaly detritus often with associated pyrite, trace coarse mica flakes, trace micromica, soft, very dispersive, non fissile.
920-930	90	Sandstone: light grey, very fine to grit, dominantly coarse to very coarse, angular to subrounded, poorly sorted, weak silica cement, trace to common medium dark grey argillaceous and silt matrix, trace yellow brown green and grey volcanic lithics, trace black coaly detritus often with associated pyrite, trace coarse clear and green mica flakes, friable, good visual porosity, no oil fluorescence.
	10	Claystone: medium dark grey, very silty, common dispersed very fine to coarse quartz and lithic sand grains, moderately carbonaceous in part, trace black coaly detritus often with associated pyrite, trace coarse mica flakes, trace micromica, soft, very dispersive, non fissile.
930-940	80	Sandstone: light grey, very fine to grit, dominantly coarse to very coarse, angular to subrounded, poorly sorted, weak silica cement, trace to common medium dark grey argillaceous and silt matrix, trace yellow brown green and grey volcanic lithics, common black coaly detritus often with associated pyrite, trace coarse clear and green mica flakes, friable, good visual porosity, no oil fluorescence.
	20	Claystone: medium dark grey, very silty, common dispersed very fine to coarse quartz and lithic sand grains, moderately carbonaceous in part, common black coaly detritus often with associated pyrite, trace coarse mica flakes, trace micromica, soft, very dispersive, non fissile.

Interval (m)	%	Description
940-945	100	Sandstone: light grey, very fine to grit, dominantly coarse to very coarse, angular to subrounded, poorly sorted, weak silica cement, trace to common medium dark grey argillaceous and silt matrix, trace yellow brown green and grey volcanic lithics, trace black coaly detritus often with associated pyrite, trace coarse clear and green mica flakes, friable, good visual porosity, no oil fluorescence.
	Tr	Claystone: medium dark grey, very silty, common dispersed very fine to coarse quartz and lithic sand grains, moderately carbonaceous in part, trace black coaly detritus often with associated pyrite, trace coarse mica flakes, trace micromica, soft, very dispersive, non fissile.
945-960	80	Sandstone: light grey, very fine to grit, dominantly coarse to very coarse, angular to subrounded, poorly sorted, weak silica cement, trace to common medium dark grey argillaceous and silt matrix, trace yellow brown green and grey volcanic lithics, trace black coaly detritus often with associated pyrite, trace coarse clear and green mica flakes, friable, good visual porosity, no oil fluorescence.
	20	Claystone: medium dark grey to dark brown grey, moderately to very silty, common dispersed very fine to grit quartz sand grains in part, trace black coaly detritus often with associated pyrite, trace micromica, soft, very dispersive, non to slightly subfissile.
960-965	100	Sandstone: light grey, very fine to grit, dominantly coarse to very coarse, angular to subrounded, poorly sorted, weak silica cement, trace to common medium dark grey argillaceous and silt matrix, trace yellow brown green and grey volcanic lithics, trace black coaly detritus often with associated pyrite, trace coarse clear and green mica flakes, friable, good visual porosity, no oil fluorescence.
	Tr	Claystone: medium dark grey to dark brown grey, moderately to very silty, common dispersed very fine to grit quartz sand grains in part, trace black coaly detritus often with associated pyrite, trace micromica, soft, very dispersive, non to slightly subfissile.
965-970	50	Sandstone: light grey, very fine to grit, dominantly coarse to very coarse, angular to subrounded, poorly sorted, weak silica cement, trace to common medium dark grey argillaceous and silt matrix, trace yellow brown green and grey volcanic lithics, trace black coaly detritus often with associated pyrite, trace coarse clear and green mica flakes, friable, good visual porosity, no oil fluorescence.
	50	Claystone: medium dark grey to dark brown grey, moderately to very silty, common dispersed very fine to grit quartz sand grains in part, trace black coaly detritus often with associated pyrite, trace micromica, soft, very dispersive, non to slightly subfissile.
970-975	10	Sandstone: light grey, very fine to grit, dominantly coarse to very coarse, angular to subrounded, poorly sorted, weak silica cement, trace to common medium dark grey argillaceous and silt matrix, trace yellow brown green and grey volcanic lithics, trace black coaly detritus often with associated pyrite, trace coarse clear and green mica flakes, friable, good visual porosity, no oil fluorescence.
	90	Claystone: medium dark grey to dark brown grey, moderately to very silty, common dispersed very fine to grit quartz sand grains in part, common black coaly detritus often with associated pyrite, trace micromica, soft, very dispersive, non to slightly subfissile.
975-980	60	Sandstone: light grey, very fine to grit, dominantly coarse to very coarse, angular to subrounded, poorly sorted, weak silica cement, trace to common medium dark grey argillaceous and silt matrix, trace yellow brown green and grey volcanic lithics, trace black coaly detritus often with associated pyrite, trace coarse clear and green mica flakes, friable, good visual porosity, no oil fluorescence.
	40	Claystone: medium dark grey to dark brown grey, moderately to very silty, common dispersed very fine to grit quartz sand grains in part, trace black coaly detritus often with associated pyrite, trace micromica, soft, very dispersive, non to slightly subfissile.
980-990	70	Sandstone: light grey, very fine to grit, dominantly coarse to very coarse, angular to subrounded, poorly sorted, weak silica cement, trace to common medium dark grey argillaceous and silt matrix, trace yellow brown green and grey volcanic lithics, trace black coaly detritus often with associated pyrite, trace coarse clear and green mica flakes, friable, good visual porosity, no oil fluorescence.

	30	Claystone: medium dark grey to dark brown grey, moderately to very silty, common dispersed very fine to grit quartz sand grains in part, trace black coaly detritus often with associated pyrite, trace micromica, soft, very dispersive, non to slightly subfissile.
990-995	80	Sandstone: light grey, very fine to grit, dominantly coarse to very coarse, angular to subrounded, poorly sorted, weak silica cement, trace to common medium dark grey argillaceous and silt matrix, trace yellow brown green and grey volcanic lithics, trace black coaly detritus often with associated pyrite, trace coarse clear and green mica flakes, friable, good visual porosity, no oil fluorescence.
	20	Claystone: medium dark grey to dark brown grey, moderately to very silty, common dispersed very fine to grit quartz sand grains in part, trace black coaly detritus often with associated pyrite, trace micromica, soft, very dispersive, non to slightly subfissile.
995-1000	n/s	Lost sample.
1000-1010	20	Sandstone: light grey, very fine to grit, dominantly coarse to very coarse, angular to subrounded, poorly sorted, weak silica cement, common medium dark grey argillaceous and silt matrix, trace yellow brown green and grey volcanic lithics, trace black coaly detritus often with associated pyrite, trace coarse clear and green mica flakes, friable, poor visual porosity, no oil fluorescence.
	80	Claystone: medium dark grey to dark brown grey, moderately to very silty, common dispersed very fine to grit quartz sand grains in part, trace black coaly detritus, common pyrite, trace micromica, soft, very dispersive, non to slightly subfissile.
1010-1015	10	Sandstone: light grey, very fine to grit, dominantly coarse to very coarse, angular to subrounded, poorly sorted, weak silica cement, common medium dark grey argillaceous and silt matrix, trace yellow brown green and grey volcanic lithics, trace black coaly detritus often with associated pyrite, trace coarse clear and green mica flakes, friable, poor visual porosity, no oil fluorescence.
	90	Claystone: medium to dark grey to dark brown grey, moderately to very silty, common dispersed very fine to grit quartz sand grains in part, trace black coaly detritus, common pyrite, trace micromica, soft, very dispersive, non to slightly subfissile.
1015-1020	30	Sandstone: light grey, very fine to grit, dominantly very coarse, angular to subrounded, poorly sorted, weak silica cement, trace pyrite cement, common to abundant medium to dark grey argillaceous and silt matrix, trace green grey lithics, trace black coaly detritus often with associated pyrite, rare mica flakes, friable, poor visual porosity, no oil fluorescence.
	70	Claystone: medium to dark grey to dark brown grey, moderately to very silty, common dispersed very fine to grit quartz sand grains in part, trace black coaly detritus, common pyrite, trace micromica, soft, very dispersive, non to slightly subfissile.
1020-1025	50	Sandstone: light grey, very fine to grit, dominantly fine and very coarse, angular to subrounded, very poorly sorted, weak silica cement, trace pyrite cement, trace to abundant medium grey argillaceous and silt matrix, common white argillaceous matrix where fine, trace grey green lithics, trace to common black coal detritus often with associated pyrite, friable, poor to fair visual porosity, no oil fluorescence.
	50	Claystone: medium to dark grey to dark brown grey, moderately to very silty, common dispersed very fine to grit quartz sand grains in part, trace black coaly detritus, common pyrite, trace micromica, soft, very dispersive, non to slightly subfissile.
1025-1035	60	Sandstone: light grey, very fine to grit, dominantly fine, angular to subrounded, very poorly sorted, weak silica cement, trace pyrite cement, trace to abundant medium grey argillaceous and silt matrix, common white argillaceous matrix where fine, trace grey green lithics, trace to common black coal detritus often with associated pyrite, friable, poor to fair visual porosity, no oil fluorescence.
	40	Claystone: medium to dark grey, moderately to very silty, common dispersed very fine to grit quartz sand grains in part, trace black coaly detritus, common pyrite, trace micromica, soft, very dispersive, non to slightly subfissile.
1035-1045	n/s	No sample - shaker screen blinding.

1045-1050	70	Sandstone: light grey, very fine to grit, dominantly very coarse, angular to subrounded, very poorly sorted, weak silica cement, trace pyrite cement, trace to abundant medium grey argillaceous and silt matrix, common white argillaceous matrix, trace grey green lithics, trace to common black coal detritus often with associated pyrite, friable, poor to fair visual porosity, no oil fluorescence.
	30	Claystone: medium to dark grey, moderately to very silty, common dispersed very fine to grit quartz sand grains in part, trace black coaly detritus, common pyrite, trace micromica, soft, very dispersive, non to slightly subfissile.
1050-1060	40	Sandstone: light grey, very fine to grit, dominantly very coarse, angular to subrounded, very poorly sorted, weak silica cement, trace pyrite cement, trace to abundant medium grey argillaceous and silt matrix, common white argillaceous matrix, trace grey green lithics, trace to common black coal detritus often with associated pyrite, friable, poor to fair visual porosity, no oil fluorescence.
	40	Sandstone: off white, very fine to fine, angular to subrounded, well sorted, moderate silica and dolomite cements, common to abundant off white argillaceous matrix, common very fine black carbonaceous grains, trace pyrite, trace green lithics, hard, no visual porosity, no oil fluorescence.
	20	Claystone: medium to dark grey, moderately to very silty, common dispersed very fine to rarely grit quartz sand grains in part, trace black coaly detritus, common pyrite, trace micromica, soft, very dispersive, non to slightly subfissile.
1060-1070	50	Sandstone: off white, very fine to fine, angular to subrounded, well sorted, weak silica and dolomite cements, abundant off white argillaceous matrix, common very fine black carbonaceous grains, trace pyrite, trace green lithics, friable to moderately hard, nil to very poor visual porosity, no oil fluorescence.
	50	Claystone: medium to dark grey, moderately to very silty, common dispersed very fine to fine quartz sand grains in part, trace black coaly detritus, common pyrite, trace micromica, soft, very dispersive, non to slightly subfissile.
1070-1075	60	Sandstone: light grey, very fine to grit, dominantly very coarse, angular to subrounded, very poorly sorted, weak silica cement, trace pyrite cement, trace to abundant medium grey argillaceous and silt matrix, common white argillaceous matrix, trace grey green lithics, trace to common black coal detritus often with associated pyrite, friable, poor to fair visual porosity, no oil fluorescence.
	10	Sandstone: off white, very fine to fine, angular to subrounded, well sorted, weak silica and dolomite cements, abundant off white argillaceous matrix, common very fine black carbonaceous grains, trace pyrite, trace green lithics, friable to moderately hard, nil to very poor visual porosity, no oil fluorescence.
	30	Claystone: medium to dark grey, moderately to very silty, common dispersed very fine to occasionally grit quartz sand grains in part, trace black coaly detritus, common pyrite, trace micromica, soft, very dispersive, non to slightly subfissile.

CULTUS PETROLEUM N.L. **APPENDIX**

CUTTINGS DESCRIPTION

WELL NAME:	Blackwood-1	**DATE:**	2-5-96
GEOLOGIST:	Dave Horner	**PAGE:**	1

For geological report-6 (file 2 of 2)

Interval (m)	%	Description
1075-1080	60	Sandstone: light grey, very fine to grit, dominantly very coarse, angular to subrounded, very poorly sorted, weak silica cement, trace pyrite cement, trace to abundant medium grey argillaceous and silt matrix, common white argillaceous matrix, trace grey green lithics, trace to common black coal detritus often with associated pyrite, friable, poor to fair visual porosity, no oil fluorescence.
	10	Sandstone: off white, very fine to fine, angular to subrounded, well sorted, weak silica and dolomite cements, abundant off white argillaceous matrix, common very fine black carbonaceous grains, trace pyrite, trace green lithics, friable to moderately hard, nil to very poor visual porosity, no oil fluorescence.
	30	Claystone: medium to dark grey, moderately to very silty, common dispersed very fine to occasionally grit quartz sand grains in part, trace black coaly detritus, common pyrite, trace micromica, soft, very dispersive, non to slightly subfissile.
1080-1085	20	Sandstone: light grey, very fine to grit, dominantly fine and very coarse, angular to subrounded, very poorly sorted, weak silica cement, strong dolmite cement in part, trace pyrite cement, trace to abundant medium grey argillaceous and silt matrix, common white argillaceous matrix where fine, trace grey green lithics, trace to common black coal detritus often with associated pyrite, friable, poor to fair visual porosity, no oil fluorescence.
	80	Claystone: medium to dark grey, moderately to very silty, common dispersed very fine to occasionally grit quartz sand grains in part, trace black coaly detritus, common pyrite, trace micromica, soft, very dispersive, non to slightly subfissile.
1085-1090	20	Sandstone: off white, very fine to fine, angular to subrounded, well sorted, weak silica and dolomite cements, abundant off white argillaceous matrix, common very fine black carbonaceous grains, trace pyrite, trace green lithics, friable to moderately hard, nil to very poor visual porosity, no oil fluorescence.
	80	Claystone: off white to medium grey, very silty, common dispersed very fine to occasionally grit quartz sand grains in part, trace black coaly detritus, common pyrite, trace micromica, soft, very dispersive, non to slightly subfissile.
1090-1095	70	Sandstone: off white to light brown, very fine to fine, angular to subrounded, moderately to well sorted, moderate silica and dolomite cements, comm to abundant off white argillaceous matrix, trace green grey lithics, trace pyrite, trace very fine black carbonaceous detritus, moderately hard to hard, nil to very poor visual porosity, no oil fluorescence.
	30	Claystone: off white to medium grey, very silty, common dispersed very fine to occasionally grit quartz sand grains in part, trace black coaly detritus, common pyrite, trace micromica, soft, very dispersive, non to slightly subfissile.
1095-1100	100	Claystone: off white to dominantly medium grey, very silty, often very finely arenaceous grading in part to silty sandstone, trace black carbonaceous detritus and flecks, trace pyrite, trace micromica, soft, very dispersive, slightly subfissile
	Tr	Sandstone: off white, very fine to occasionally fine, trace dispersed medium to grit sized grains, angular to subrounded, moderately sorted, weak to moderate silica cement, abundant off white argillaceous matrix, trace green lithics, trace carbonaceous detritus, trace pyrite, friable, no visual porosity, no oil fluorescence.

(AJ/GFE:F53)

Interval (m)	%	Description	PAGE: 2
1100-1110	95	Claystone: off white to dominantly medium grey, very silty, often very finely arenaceous grading in part to silty sandstone, trace black carbonaceous detritus and flecks, trace pyrite, trace micromica, soft, very dispersive, slightly subfissile	
	5	Sandstone: off white, very fine to occasionally fine, trace dispersed medium to grit sized grains, angular to subrounded, moderately sorted, weak to moderate silica cement, abundant off white argillaceous matrix, trace green lithics, trace carbonaceous detritus, trace pyrite, friable, no visual porosity, no oil fluorescence.	
1110-1120	90	Claystone: off white to dominantly medium grey, very silty, often very finely arenaceous grading in part to silty sandstone, trace black carbonaceous detritus and flecks, trace pyrite, trace micromica, soft, very dispersive, slightly subfissile	
	10	Sandstone: off white, very fine to occasionally fine, trace dispersed medium to grit sized grains, angular to subrounded, moderately sorted, weak to moderate silica cement, abundant off white argillaceous matrix, trace green lithics, trace carbonaceous detritus, trace pyrite, friable, no visual porosity, no oil fluorescence.	
1120-1125	90	Claystone: off white to dominantly medium grey, very silty, often very finely arenaceous grading in part to silty sandstone, trace black carbonaceous detritus and flecks, trace pyrite, trace micromica, soft, very dispersive, slightly subfissile	
	10	Sandstone: off white, very fine to occasionally fine, trace dispersed medium to grit sized grains, angular to subrounded, moderately sorted, moderate silica cement, trace strong dolomite cement, abundant off white argillaceous matrix, trace green lithics, trace carbonaceous detritus, trace pyrite, friable, no visual porosity, no oil fluorescence.	
1125-1130	80	Claystone: off white to dominantly medium grey, very silty, often very finely arenaceous grading in part to silty sandstone, trace black carbonaceous detritus and flecks, trace pyrite, trace micromica, soft, very dispersive, slightly subfissile	
	20	Sandstone: off white, very fine to occasionally fine, trace dispersed medium to grit sized grains, angular to subrounded, moderately sorted, moderate silica cement, trace strong dolomite cement, abundant off white argillaceous matrix, trace green lithics, trace carbonaceous detritus, trace pyrite, friable, no visual porosity, no oil fluorescence.	
1130-1135	60	Claystone: off white to dominantly medium grey, very silty, often very finely arenaceous grading in part to silty sandstone, trace black carbonaceous detritus and flecks, trace pyrite, trace micromica, soft, very dispersive, slightly subfissile	
	40	Sandstone: off white to light brown, very fine to dominantly fine, angular to subrounded, moderately to well sorted, moderate silica and occasionally moderate dolomite cement, common to abundant off white argillaceous matrix, trace green lithics, trace fine black carbonaceous detritus, trace pyrite, friable to moderately hard, nil to very poor visual porosity, no oil fluorescence.	
1135-1150	100	Claystone: off white to medium grey to medium brown grey, very silty, often very finely arenaceous grading to silty sandstone, trace to common black to brown carbonaceous flecks, trace pyrite, trace micromica, soft, very dispersive, slightly subfissile.	
	Tr	Sandstone: off white to light brown, very fine to dominantly fine, angular to subrounded, moderately to well sorted, moderate silica and occasionally moderate dolomite cement, common to abundant off white argillaceous matrix, trace green lithics, trace fine black carbonaceous detritus, trace pyrite, friable to moderately hard, nil to very poor visual porosity, no oil fluorescence.	
1150-1155	60	Claystone: off white to medium grey to medium brown grey, very silty, often very finely arenaceous grading to silty sandstone, trace to common black to brown carbonaceous flecks, trace pyrite, trace micromica, soft, very dispersive, slightly subfissile.	
	40	Sandstone: off white to light brown, very fine to fine with common to abundant dispersed medium to grit sized quartz sand grains, angular to subrounded, poorly sorted, moderate silica and dolomite cements, common to abundant off white argillaceous matrix, trace to common off white partially altered feldspar grains, trace to common green lithics, trace very fine carbonaceous grains, trace pyrite, moderately hard, nil to very poor visual porosity, no oil fluorescence.	

Interval (m)	%	Description
1155-1165	60	Claystone: off white to medium grey to medium brown grey, very silty, often very finely arenaceous grading to silty sandstone, trace to common black to brown carbonaceous flecks, trace pyrite, trace micromica, soft, very dispersive, slightly subfissile.
	40	Sandstone: off white to light brown, very fine to fine with common to abundant dispersed medium to grit sized quartz sand grains, angular to subrounded, poorly sorted, moderate silica and dolomite cements, common to abundant off white argillaceous matrix, trace to common off white partially altered feldspar grains, trace to common green lithics, trace very fine carbonaceous grains, trace pyrite, moderately hard, nil to very poor visual porosity, no oil fluorescence.
1165-1170	40	Claystone: off white to medium grey to medium brown grey, very silty, often very finely arenaceous grading to silty sandstone, trace to common black to brown carbonaceous flecks, trace pyrite, trace micromica, soft, very dispersive, slightly subfissile.
	60	Sandstone: off white to light brown, very fine to fine with common to abundant dispersed medium to grit sized quartz sand grains, angular to subrounded, poorly sorted, moderate silica and dolomite cements, common to abundant off white argillaceous matrix, trace to common off white partially altered feldspar grains, trace to common green lithics, trace very fine carbonaceous grains, trace pyrite, moderately hard, nil to very poor visual porosity, no oil fluorescence.
1170-1175	90	Claystone: off white to medium grey to medium brown grey, very silty, often very finely arenaceous grading to silty sandstone, trace to common black to brown carbonaceous flecks, trace pyrite, trace micromica, soft, very dispersive, slightly subfissile.
	10	Sandstone: off white to light brown, very fine to dominantly fine, angular to subrounded, moderately to well sorted, moderate silica and occasionally moderate dolomite cement, common to abundant off white argillaceous matrix, trace green lithics, trace fine black carbonaceous detritus, trace pyrite, friable to moderately hard, nil to very poor visual porosity, no oil fluorescence.
1175-1185	100	Claystone: off white to medium grey to medium brown grey, very silty, often very finely arenaceous grading to silty sandstone, trace light brown argillaceous dolomite nodules, trace to common black to brown carbonaceous flecks, trace pyrite, trace micromica, soft, very dispersive, slightly subfissile.
	Tr	Sandstone: off white to light brown, very fine to dominantly fine, angular to subrounded, moderately to well sorted, moderate silica and occasionally moderate dolomite cement, common to abundant off white argillaceous matrix, trace green lithics, trace fine black carbonaceous detritus, trace pyrite, friable to moderately hard, nil to very poor visual porosity, no oil fluorescence.

CULTUS PETROLEUM N.L. **APPENDIX**

CUTTINGS DESCRIPTION

WELL NAME:	Blackwood-1	**DATE:**	3-5-96
GEOLOGIST:	Dave Horner	**PAGE:**	1

Interval (m)	%	Description
For geology report-7		
1185-1190	100	Claystone: off white to medium grey to medium brown grey, dominantly medium grey, very silty, often very finely to finely arenaceous,trace light to medium brown dolomite nodules, trace to common black to brown carbonaceous flecks, trace pyrite, trace micromica, soft, very dispersive, slightly subfissile.
	Tr	Sandstone: off white to light brown, very fine to dominantly fine, trace medium to very coarse grains, angular to subrounded, moderately to well sorted, moderate silica and occasionally moderate dolomite cement, common to abundant off white argillaceous matrix, trace green lithics, trace fine black carbonaceous detritus, trace pyrite, friable to moderately hard, nil to very poor visual porosity, no oil fluorescence.
1190-1195	95	Claystone: off white to medium grey to medium brown grey, dominantly medium grey, very silty, often very finely to finely arenaceous,trace light to medium brown dolomite nodules, trace to common black to brown carbonaceous flecks, trace pyrite, trace micromica, soft, very dispersive, slightly subfissile.
	5	Sandstone: off white to light brown, very fine to dominantly fine, trace medium to very coarse grains, angular to subrounded, moderately to well sorted, moderate silica and occasionally moderate dolomite cement, common to abundant off white argillaceous matrix, trace green lithics, trace fine black carbonaceous detritus, trace pyrite, friable to moderately hard, nil to very poor visual porosity, no oil fluorescence.
1195-1200	90	Claystone: off white to medium grey to medium brown grey, dominantly medium grey, very silty, often very finely to finely arenaceous,trace light to medium brown dolomite nodules, trace to common black to brown carbonaceous flecks, trace pyrite, trace micromica, soft, very dispersive, slightly subfissile.
	10	Sandstone: off white to light brown, very fine to dominantly fine, common medium to very coarse grains, angular to subrounded, moderately to well sorted, moderate silica and occasionally moderate dolomite cement, common to abundant off white argillaceous matrix, trace green lithics, trace fine black carbonaceous detritus, trace pyrite, friable to moderately hard, nil to very poor visual porosity, no oil fluorescence.
1200-1210	100	Claystone: off white to medium grey to medium brown grey, dominantly medium grey, very silty, often very finely to finely arenaceous,trace light to medium brown dolomite nodules, trace to common black to brown carbonaceous flecks, trace pyrite, trace micromica, soft, very dispersive, slightly subfissile.
	Tr	Sandstone: off white to light brown, very fine to dominantly fine, common medium to very coarse grains, angular to subrounded, moderately to well sorted, moderate silica and occasionally moderate dolomite cement, common to abundant off white argillaceous matrix, trace green lithics, trace fine black carbonaceous detritus, trace pyrite, friable to moderately hard, nil to very poor visual porosity, no oil fluorescence.
1210-1220	100	Claystone: off white to medium grey to medium brown grey, dominantly medium brown grey, very silty, often very finely to finely arenaceous,trace light to medium brown dolomite nodules, trace to common black to brown carbonaceous flecks, trace pyrite, trace micromica, soft, very dispersive, slightly subfissile.
1220-1225	100	Claystone: off white to medium grey to medium brown grey, dominantly medium brown grey, very silty, often very finely to finely arenaceous,trace light to medium brown dolomite nodules, trace to common black to brown carbonaceous flecks, trace pyrite, trace micromica, soft, very dispersive, slightly subfissile.

(AJ/GFE:F53)

Interval (m)	%	Description	PAGE: 2
	Tr	Sandstone: off white to light brown, very fine to fine, angular to subrounded, moderately to well sorted, moderate silica cement, minor weak dolomite cement, common to abundant off white argillaceous matrix, trace green lithics, trace fine black carbonaceous detritus, trace pyrite, friable to moderately hard, nil to very poor visual porosity, no oil fluorescence.
1225-1230	95	Claystone: off white to medium grey to medium brown grey, dominantly medium brown grey, very silty, often very finely to finely arenaceous,trace light to medium brown dolomite nodules, trace to common black to brown carbonaceous flecks, trace pyrite, trace micromica, soft, very dispersive, slightly subfissile.
	5	Sandstone: off white to light brown, very fine to fine, angular to subrounded, moderately to well sorted, moderate silica cement, minor weak dolomite cement, common to abundant off white argillaceous matrix, trace green lithics, trace fine black carbonaceous detritus, trace pyrite, friable to moderately hard, nil to very poor visual porosity, no oil fluorescence.
1230-1250	100	Claystone: medium brown grey to medium grey, very silty, minor off white very fine sandstone laminations, trace light to medium brown dolomite nodules, trace to common black to brown carbonaceous flecks, trace pyrite, trace micromica, soft, very dispersive, slightly subfissile.
1250-1255	80	Claystone: medium brown grey to medium grey, very silty, minor off white very fine sandstone laminations, trace light to medium brown dolomite nodules, trace to common black to brown carbonaceous flecks, trace pyrite, trace micromica, soft, very dispersive, slightly subfissile.
	20	Claystone: medium dark green, common very fine to coarse green stained quartz grains, very glauconitic, soft, very dispersive, non fissile.
1255-1265	70	Sandstone: medium green, occasionally mottled with off white to light green, very fine to very coarse, dominantly medium, subrounded to rounded, poorly sorted, weak silica cement, abundant medium dark green argillaceous matrix often mottled with off white light green clay, green to occasionally yellow orange glauconite stained quartz grains, trace to common glauconite, friable, very poor visual porosity, no oil fluorescence.
	30	Claystone: medium dark green, common very fine to coarse green stained quartz grains, very glauconitic, soft, very dispersive, non fissile.
1265-1270	50	Sandstone: medium green, occasionally mottled with off white to light green, very fine to very coarse, dominantly medium, subrounded to rounded, poorly sorted, weak silica cement, abundant medium dark green argillaceous matrix often mottled with off white light green clay - matrix supported and grading to arenaceous claystone, green to occasionally yellow orange glauconite stained quartz grains, trace to common glauconite, friable, very poor visual porosity, no oil fluorescence.
	50	Claystone: medium dark green often mottled with off white, minor medium brown, common to abundant dispersed very fine to very coarse green stained quartz grains, common glauconite, soft, very dispersive, non fissile.
1270-1275	70	Sandstone: medium green, occasionally mottled with off white to light green, very fine to very coarse, dominantly medium, subrounded to rounded, poorly sorted, weak silica cement, abundant medium dark green argillaceous matrix often mottled with off white light green clay - matrix supported and grading to arenaceous claystone, green to occasionally yellow orange glauconite stained quartz grains, trace to common dark green to black glauconite, friable, very poor visual porosity, no oil fluorescence.
	30	Claystone: medium dark green often mottled with off white, common to abundant dispersed very fine to very coarse green stained quartz grains, common glauconite, soft, very dispersive, non fissile.
1275-1285	80	Sandstone: medium green, occasionally mottled with off white to light green, very fine to very coarse, dominantly medium, subrounded to rounded, poorly sorted, weak silica cement, abundant medium dark green argillaceous matrix often mottled with off white light green clay - matrix supported and grading to arenaceous claystone, green to occasionally yellow orange glauconite stained quartz grains, trace to common dark green to black glauconite, friable, very poor visual porosity, no oil fluorescence.

Interval (m)	%	Description
	20	Claystone: medium dark green often mottled with off white, common to abundant dispersed very fine to very coarse green stained quartz grains, common glauconite, soft, very dispersive, non fissile.
1285-1290	90	Sandstone: medium green, fine to coarse, dominantly medium to coarse, subrounded to rounded, moderately to well sorted, weak silica cement, common to abundant dark green argillaceous matrix, light green to yellow stained quartz grains, trace dark green to black glauconite, trace black carbonaceous matter, rare pyrite, friable, poor to fair visual porosity, no oil fluorescence.
	10	Claystone: medium dark green often mottled with off white, common to abundant dispersed very fine to very coarse green stained quartz grains, common dark green to black glauconite, soft, very dispersive, non fissile.
1290-1299	100	Sandstone: light to medium green, fine to coarse, dominantly medium to coarse, subrounded to rounded, moderately to well sorted, weak silica cement, common to abundant dark green argillaceous matrix, common black carbonaceous matrix in part, light green to yellow stained quartz grains, trace dark green to black glauconite, trace black carbonaceous matter, trace pyrite, friable, poor to fair visual porosity, no oil fluorescence.
1299-1302	80	Sandstone: medium green to light orange, fine to coarse, dominantly medium to coarse, subrounded to rounded, moderately to well sorted, weak silica cement, abundant medium green to orange argillaceous matrix, common black carbonaceous matrix in part, light green to yellow stained quartz grains, trace dark green to black glauconite, trace black carbonaceous matter, trace pyrite, friable, poor visual porosity, no oil fluorescence.
	20	Claystone: medium green, yellowish orange to red, common to abundant dispersed very fine to very coarse orange stained quartz grains, trace dark green to black glauconite, soft, very dispersive, non fissile.
1302-1311	50	Sandstone: orange brown, minor medium green, very fine to very coarse, dominantly medium, angular to rounded, poorly sorted, weak silica and iron oxide cements, abundant orange brown iron oxide rich argillaceous matrix - matrix supported, occasionally abundant medium green argillaceous matrix, quartzose with moderately strong orange stain on grains, common green stained quartz grains, trace black carbonaceous matter, trace pyrite, friable, very poor visual porosity, no oil fluorescence.
	50	Claystone: medium orange brown to yellow to red, occasionally medium green, moderately silty, trace to abundant dispersed very fine to coarse orange stained quartz grains, trace black carbonaceous matter, trace pyrite, soft, very dispersive, non fissile.
1311-1317	80	Sandstone: orange brown, minor medium green, very fine to very coarse, dominantly medium, angular to rounded, poorly sorted, weak silica and iron oxide cements, common orange brown iron oxide rich argillaceous matrix, occasionally common medium green argillaceous matrix, quartzose with moderately strong orange stain on grains, common green stained quartz grains, trace black carbonaceous matter, trace pyrite, friable, very poor visual porosity, no oil fluorescence.
	20	Claystone: medium orange brown to yellow to red, occasionally medium green, moderately silty, trace to abundant dispersed very fine to coarse orange stained quartz grains, trace black carbonaceous matter, trace pyrite, soft, very dispersive, non fissile.
1317-1323	80	Sandstone: orange brown, medium green, very fine to very coarse, dominantly medium to coarse, angular to subrounded, poorly sorted, weak silica and iron oxide cements, abundant medium orange brown iron oxide rich and medium green glauconite rich argillaceous matrix, orange brown and light green stained quartz grains, trace black cabonaceous matter, friable, poor visual porosity, no oil fluorescence.
	20	Claystone: medium orange brown, medium green, moderately silty, trace to abundant dispersed very fine to coarse orange and light green stained quartz grains, trace black carbonaceous matter, trace pyrite, soft, very dispersive, non fissile.
1323-1329	60	Sandstone: orange brown, medium green, very fine to very coarse, dominantly medium to coarse, angular to subrounded, poorly sorted, weak silica and iron oxide cements, abundant medium orange brown iron oxide rich and medium green glauconite rich argillaceous matrix, orange brown and light green stained quartz grains, trace black cabonaceous matter, friable, poor to fair visual porosity, no oil fluorescence.

	40	Claystone: medium orange brown, medium green, moderately silty, trace to abundant dispersed very fine to coarse orange and light green stained quartz grains, trace black carbonaceous matter, trace pyrite, soft, very dispersive, non fissile.
1329-1341	40	Sandstone: medium green, orange brown, very fine to very coarse, dominantly medium to coarse, angular to subrounded, poorly sorted, weak silica and iron oxide cements, abundant medium green glauconite rich and orange brown iron oxide rich argillaceous matrix, orange brown and light green stained quartz grains, trace black cabonaceous matter, friable, poor visual porosity, no oil fluorescence.
	60	Claystone: medium green, medium orange brown, moderately silty, trace to abundant dispersed very fine to coarse light green orange brown stained quartz grains, trace black carbonaceous matter, trace pyrite, soft, very dispersive, non fissile.
1341-1347	80	Sandstone: light greenish orange, very fine to very coarse, dominantly medium, subangular to subrounded, moderately to well sorted, weak silica cement, common orange and medium green argillaceous matrix, yellow to brown to light green stained quartz grains, trace pyrite, trace black carbonaceous matter, friable, fair visual porosity, no oil fluorescence.
	20	Claystone: medium green, medium orange brown, moderately silty, trace to abundant dispersed very fine to coarse light green orange brown stained quartz grains, trace black carbonaceous matter, trace pyrite, soft, very dispersive, non fissile.
1347-1356	50	Sandstone: light greenish orange, very fine to very coarse, dominantly medium, subangular to subrounded, moderately to well sorted, weak silica cement, common orange and medium green argillaceous matrix, yellow to brown to light green stained quartz grains, trace pyrite, trace black carbonaceous matter, friable, fair visual porosity, no oil fluorescence.
	50	Claystone: medium green, medium orange brown, often mottled with white, moderately silty, trace to abundant dispersed very fine to coarse light green orange brown stained quartz grains, trace black carbonaceous matter, trace pyrite, soft, very dispersive, non fissile.
1356-1362	70	Sandstone: light greenish orange, very fine to very coarse, dominantly medium, subangular to subrounded, moderately to well sorted, weak silica cement, common orange and medium green argillaceous matrix, yellow to brown to light green stained quartz grains, trace pyrite, trace black carbonaceous matter, friable, fair visual porosity, no oil fluorescence.
	30	Claystone: medium green grey mottled with white, moderately to very silty, abundant dispersed very fine to coarse yellow orange to light green stained quartz grains, trace black carbonaceous matter, trace pyrite, soft, very dispersive, non fissile.
1362-1365	90	Sandstone: light greenish orange, very fine to very coarse, dominantly medium, subangular to subrounded, moderately to well sorted, weak silica cement, common orange and medium green argillaceous matrix, yellow to brown to light green stained quartz grains, trace pyrite, trace black carbonaceous matter, friable, fair visual porosity, no oil fluorescence.
	10	Claystone: medium green grey mottled with white, moderately to very silty, abundant dispersed very fine to coarse yellow orange to light green stained quartz grains, trace black carbonaceous matter, trace pyrite, soft, very dispersive, non fissile.
1365-1371	70	Claystone: medium dark brown grey, moderately to very silty, trace dispersed very fine to medium clear quartz grains, trace to common very fine glauconite, trace black carbonaceous detritus and flecks, trace pyrite, soft, very dispersive, slightly subfissile.
	30	Sandstone: light greenish orange, very fine to very coarse, dominantly medium, subangular to subrounded, moderately to well sorted, weak silica cement, common orange and medium green argillaceous matrix, yellow to brown to light green stained quartz grains, trace pyrite, trace black carbonaceous matter, friable, fair visual porosity, no oil fluorescence.
1371-1377	100	Claystone: medium dark brown grey, moderately to very silty, trace dispersed very fine to medium clear quartz grains, trace to common very fine glauconite, trace black carbonaceous detritus and flecks, trace pyrite, soft, very dispersive, slightly subfissile.

	Tr	Sandstone: light greenish orange, very fine to very coarse, dominantly medium, subangular to subrounded, moderately to well sorted, weak silica cement, common orange and medium green argillaceous matrix, yellow to brown to light green stained quartz grains, trace pyrite, trace black carbonaceous matter, friable, fair visual porosity, no oil fluorescence.
1377-1380	100	Claystone: medium dark brown grey, moderately to very silty, trace dispersed very fine to medium clear quartz grains, trace to common very fine glauconite, trace black carbonaceous detritus and flecks, trace pyrite, soft, very dispersive, slightly subfissile.
1380-1389	100	Claystone: medium dark brown grey to occasionally medium green grey, moderately to very silty, trace dispersed very fine to medium clear quartz grains, common to abundant glauconite, trace black carbonaceous detritus and flecks, trace pyrite, soft, very dispersive, slightly subfissile.
1389-1395	100	Claystone: medium dark brown grey, occasionally dark grey, common glauconite, rare very fine to medium clear quartz grains, trace to common black carbonaceous flecks, trace pyrite, trace micromica, soft-firm, very dispersive, slightly subfissile.
1395-1410	100	Claystone: medium dark brown grey, occasionally dark grey, often medium green grey, common glauconite, trace medium brown cryptocrystalline dolomite, trace to common black carbonaceous flecks, rare very fine to medium clear quartz grains, trace pyrite, trace micromica, soft-firm, very dispersive, slightly subfissile.
1410-1416	100	Claystone: medium dark brown grey, occasionally dark grey, trace medium green grey, common glauconite, trace medium brown cryptocrystalline dolomite, rare very fine to medium clear quartz grains, trace to common black carbonaceous flecks, trace pyrite, trace micromica, soft-firm, very dispersive, slightly subfissile.
1416-1434	100	Claystone: medium dark brown grey, occasionally dark grey, common glauconite, rare very fine to medium clear quartz grains, trace to common black carbonaceous flecks, trace pyrite, trace micromica, soft-firm, very dispersive, slightly subfissile.
1434-1443	100	Claystone: medium to dominantly dark brown grey, common glauconite, rare very fine to medium clear quartz grains, trace to common black carbonaceous flecks, trace pyrite, trace micromica, soft-firm, very dispersive, slightly subfissile.

CULTUS PETROLEUM N.L. APPENDIX

CUTTINGS DESCRIPTION

WELL NAME:	Blackwood-1	**DATE:**	3-5-96
GEOLOGIST:	Dave Horner	**PAGE:**	1

Interval (m)	%	Description
For geology report-8		
1443-1458	100	Claystone: medium to dark brown grey, medium to dark grey, moderately to very silty, common glauconite, trace black carbonaceous flecks, rare pyrite, trace to common micromica, soft to firm, very dispersive, slightly subfissile.
1458-1467	100	Claystone: medium to dark brown grey, medium to dark grey, moderately to very silty, common to abundant glauconite, trace black carbonaceous flecks, trace pyrite, trace to common micromica, soft to firm, very dispersive, slightly subfissile.
1467-1470	100	Claystone: medium to dark brown grey, medium to dark grey, moderately to very silty, common to abundant glauconite, trace medium brown cryptocrystalline dolomite, trace black carbonaceous flecks, trace pyrite, trace to common micromica, soft to firm, very dispersive, slightly subfissile.
1470-1473	100	Claystone: medium to dark brown grey, occasionally medium green grey and very glauconitic, moderately to very silty, common to abundant glauconite, common light to medium brown cryptocrystalline calcareous/dolomitic nodules often with associated glauconite, trace black carbonaceous flecks, trace pyrite, trace to common micromica, soft to firm, very dispersive, slightly subfissile.
1473-1476	100	Claystone: medium to dark brown grey to medium green grey, moderately to very silty, common to abundant glauconite, common black carbonaceous detritus, trace pyrite, rare dispersed very fine to medium clear quartz sand grains, common micromica, soft to firm, very dispersive, slightly subfissile.
1476-1485	100	Claystone: medium to dark brown grey to medium green grey, moderately to very silty, common to abundant glauconite, trace to common calcareous/dolomite nodules, common black carbonaceous detritus, trace pyrite, rare dispersed very fine to medium clear quartz sand grains, common micromica, soft to firm, very dispersive, slightly subfissile.
1485-1488	100	Claystone: medium to dark brown grey to medium green grey, moderately to very silty, trace to common glauconite, trace black carbonaceous detritus, rare pyrite, trace micromica, soft to firm, very dispersive, slightly subfissile.
1488-1491	100	Claystone: medium brown, medium blue grey, medium green, moderately silty, common to abundant glauconite, slightly calcareous in part, trace medium to coarse dispersed quartz sand grains, trace black carbonaceous detritus, trace micromica, soft to firm, very dispersive, slightly subfissile.
1491-1497	100	Claystone: medium brown, medium blue grey, medium green, moderately silty, common to abundant glauconite, slightly calcareous in part, trace medium to coarse dispersed quartz sand grains, trace black carbonaceous detritus, trace micromica, soft to firm, very dispersive, slightly subfissile.
1497-1503	100	Claystone: medium brown, minor bluish green grey, moderately silty, trace glauconite, trace fine black carbonaceous detritus, rare pyrite, trace micromica, soft to firm, very dispersive, slightly subfissile.
1503-1506	100	Claystone: medium brown grey to medium blue grey, moderately silty, trace glauconite, trace fine black carbonaceous detritus, slightly calcareous in part, trace pyrite, trace micromica, soft to firm, very dispersive, slightly subfissile.
1506-1512	100	Claystone: medium brown, medium green, off white, moderately silty, trace glauconite, trace fine black carbonaceous detritus, slightly calcareous in part, trace pyrite, trace micromica, soft to firm, very dispersive, slightly subfissile.

(AJ/GFE:F53)

Interval (m)	%	Description
1512-1515	100	Claystone: medium brown grey, off white, moderately silty, trace glauconite, trace fine black carbonaceous detritus, slightly calcareous in part, trace pyrite, trace micromica, soft to firm, very dispersive, slightly subfissile.
1515-1518	100	Claystone: medium brown grey, off white to very light brown, moderately silty, trace glauconite, trace fine black carbonaceous detritus, slightly calcareous in part, common medium brown cryptocrystalline siderite, trace pyrite, trace micromica, soft to firm, very dispersive, slightly subfissile.
1518-1521	95	Claystone: very light brown to medium brown, light green, very silty, common dispersed very fine quartz and partially altered feldspar grains, trace brown to black carbonaceous detritus, common micromica, trace pyrite, soft to firm, moderately dispersive, slightly subfissile.
	5	Siderite: medium to dark brown, cryptocrystalline, common fine glauconite, trace fine partially altered feldspars, trace very fine to very coarse clear quartz sand grains, slightly to moderately argillaceous, very hard, no visual porosity.
1521-1522	100	Claystone: very light brown to medium brown, light green, very silty, common dispersed very fine quartz and partially altered feldspar grains, trace brown to black carbonaceous detritus, common micromica, trace pyrite, soft to firm, moderately dispersive, slightly subfissile.

WELL NAME:	Blackwood-1	**DATE:**	7-5-96
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Interval (m)	%	Description
For geology report-11		
1522-1524	100	Very poor sample due to contamination after wiper trip. Claystone: very light brown to medium brown, light green, very silty, common dispersed very fine quartz and partially altered feldspar grains, trace brown to black carbonaceous detritus, common micromica, trace pyrite, soft to firm, moderately dispersive, slightly subfissile.
1524-1527	100	Claystone: light to medium brown, very silty, common dispersed very fine to occasionally coarse quartz sand grains, slightly to moderately calcareous, common black to brown carbonaceous flecks and detritus, trace pyrite, trace micromica, firm, very dispersive, slightly subfissile.
1527-1528.7	30	Sandstone: very light grey, very fine to coarse, dominantly medium, angular to subrounded, poorly sorted, weak silica cement, trace white argillaceous matrix, common to abundant medium brown argillaceous matrix in part, trace pyrite, trace black to brown coaly detritus, friable, fair inferred porosity, no oil fluorescence.
	70	Claystone: light to medium brown, very silty, common dispersed very fine to occasionally coarse quartz sand grains, slightly to moderately calcareous, common black to brown carbonaceous flecks and detritus, trace pyrite, trace micromica, firm, very dispersive, slightly subfissile.
1528.7-1530	40	Sandstone: light grey, very fine to coarse, dominantly coarse, angular to subangular, poorly sorted, weak silica cement, moderate calcareous cement, common white argillaceous matrix, common black caoly detritus often with pyrite, friable, fair inferred porosity, no oil fluorescence but trace dull yellow-white calcite fluorescence, no cut.
	60	Claystone: medium brown grey to medium grey, very silty, common to abundant black to brown carbonaceous flecks and detritus, trace pyrite, moderately calcareous in part, common micromica, abundant very fine quartz and partially altered feldspar grains in part, firm, very dispersive, slightly subfissile.
1530-1533	60	Sandstone: light grey, very fine to grit, dominantly coarse, angular to subangular, poorly sorted, weak silica cement, moderate calcareous cement, common pyrite cement, common to abundant white argillaceous matrix, common clear crystalline calcite in part, common black caoly detritus often with pyrite, friable, fair inferred porosity, no oil fluorescence but 5% dull yellow-white calcite fluorescence, no cut.
	40	Claystone: medium brown grey to medium grey, very silty, common to abundant black to brown carbonaceous flecks and detritus, trace pyrite, moderately calcareous in part, common micromica, abundant very fine quartz and partially altered feldspar grains in part, firm, very dispersive, slightly subfissile.
1533-1536	70	Sandstone: light grey, very fine to grit, dominantly coarse, angular to subangular, poorly sorted, weak silica cement, moderate calcareous cement, trace pyrite cement, common to abundant white argillaceous matrix, trace clear crystalline calcite in part, common black caoly detritus often with pyrite, friable, fair inferred porosity, no oil fluorescence but 10% dull yellow-white calcite fluorescence, no cut.
	30	Claystone: medium brown grey to medium grey, very silty, common to abundant black to brown carbonaceous flecks and detritus, trace pyrite, moderately calcareous in part, common micromica, trace coarse green mica flakes, abundant very fine quartz and partially altered feldspar grains in part, firm, very dispersive, slightly subfissile.

Interval (m)	%	Description	PAGE: 2
1536-1539	60	Sandstone: light grey, very fine to grit, dominantly coarse, angular to subangular, poorly sorted, weak silica cement, moderate calcareous cement, trace pyrite cement, abundant white argillaceous matrix, trace clear crystalline calcite in part, common black caoly detritus often with pyrite, friable, poor to fair inferred porosity, no oil fluorescence but 10% dull yellow-white calcite fluorescence, no cut.
	40	Claystone: medium brown to medium grey, very silty, abundant dispersed quartz and partially altered feldspar grains in part, common to abundant black to brown carbonaceous flecks and detritus, moderately to very calcareous often with clear crystalline calcite, trace to common pyrite, common micromica, firm, very dispersive, slightly subfissile.
1539-1545	70	Sandstone: very light grey, very fine to grit, dominantly medium, angular to subangular, poorly sorted, weak silica cement, moderate calcareous cement, common to abundant white argillaceous matrix, friable, poor to fair visual porosity, no oil fluorescence, 5% dull yellow white calcite fluorescence, no cut.
	30	Claystone: medium brown to to occasionally medium grey, very silty, abundant dispersed quartz and partially altered feldspar grains in part, common to abundant black to brown carbonaceous flecks and detritus, moderately to very calcareous often with clear crystalline calcite, trace medium brown cryptocrystalline siderite, trace to common pyrite, common micromica, firm, very dispersive, slightly subfissile.
1545-1548	60	Sandstone: very light grey, very fine to grit, dominantly coarse, angular to subangular, poorly sorted, moderate silica cement, trace moderate calcareous cement, common to abundant white argillaceous matrix, friable, poor to fair visual porosity, no oil fluorescence, trace dull yellow white calcite fluorescence, no cut.
	40	Claystone: medium brown to to occasionally medium grey, very silty, abundant dispersed quartz and partially altered feldspar grains in part, common to abundant black to brown carbonaceous flecks and detritus, moderately to very calcareous often with clear crystalline calcite, trace medium brown cryptocrystalline siderite, trace to common pyrite, common micromica, firm, very dispersive, slightly subfissile.
1548-1551	80	Sandstone: very light grey, very fine to grit, dominantly very coarse, angular to subangular, poorly sorted, moderate silica cement, moderate calcareous cement, common to abundant white argillaceous matrix, friable, poor to fair visual porosity, no oil fluorescence, 5% dull yellow white calcite fluorescence, no cut.
	20	Claystone: medium brown to to occasionally medium grey, very silty, abundant dispersed quartz and partially altered feldspar grains in part, common to abundant black to brown carbonaceous flecks and detritus, moderately to very calcareous often with clear crystalline calcite, trace medium brown cryptocrystalline siderite, trace to common pyrite, common micromica, firm, very dispersive, slightly subfissile.
1551-1554	90	Sandstone: very light grey, very fine to grit, dominantly very coarse, angular to subangular, poorly sorted, moderate silica cement, moderate calcareous cement, common to abundant white argillaceous matrix, friable, poor to fair visual porosity, no oil fluorescence, 5% dull yellow white calcite fluorescence, no cut.
	10	Claystone: medium brown to to occasionally medium grey, very silty, abundant dispersed quartz and partially altered feldspar grains in part, common to abundant black to brown carbonaceous flecks and detritus, moderately to very calcareous often with clear crystalline calcite, trace medium brown cryptocrystalline siderite, trace to common pyrite, common micromica, firm, very dispersive, slightly subfissile.
1554-1560	90	Sandstone: light grey, very fine to grit, dominantly very coarse, angular to subangular, poorly sorted, moderate to strong silica and calcareous cements, common white argillaceous matrix, common black coaly detritus, moderately hard, poor to fair inferred porosity, no oil fluorescence, trace dull yellow white calcite fluorescence, no cut.
	10	Claystone: medium to dark grey, medium to dark brown grey, very silty, occasionally very finely arenaceous, common black to brown carbonaceous detritus and flecks, moderately calcareous in part, trace medium brown cryptocrystalline dolomite, trace to common pyrite, common micromica, firm, very dispersive, slightly subfissile.

Interval (m)	%	Description
1560-1563	90	Sandstone: light grey, very fine to grit, dominantly very coarse, angular to subangular, poorly sorted, strong silica cement, occasional strong calcareous cement, common white argillaceous matrix, common black coaly detritus, moderately hard, poor to fair inferred porosity, no oil fluorescence, trace dull yellow white calcite fluorescence, no cut.
	10	Claystone: medium to dark grey, medium to dark brown grey, very silty, occasionally very finely arenaceous, common black to brown carbonaceous detritus and flecks, moderately calcareous in part, trace medium brown cryptocrystalline dolomite, trace to common pyrite, common micromica, firm, very dispersive, slightly subfissile.
1563-1566	70	Sandstone: light grey, very fine to grit, dominantly very coarse, angular to subangular, poorly sorted, strong silica cement, occasional strong calcareous cement, common white argillaceous matrix, common black coaly detritus, moderately hard, poor to fair inferred porosity, no oil fluorescence.
	30	Claystone: medium to dark grey, medium to dark brown grey, very silty, occasionally very finely arenaceous, common black to brown carbonaceous detritus and flecks, moderately calcareous in part, trace medium brown cryptocrystalline dolomite, trace to common pyrite, common micromica, firm, very dispersive, slightly subfissile.
1566-1569	70	Sandstone: light grey, very fine to grit, dominantly very coarse, angular to subangular, poorly sorted, strong silica cement, occasional strong calcareous cement, common white to light green argillaceous matrix, common black coaly detritus, moderately hard, poor to fair inferred porosity, no oil fluorescence, trace dull yellow white calcite fluorescence, no cut.
	30	Claystone: medium to dark grey, medium to dark brown grey, very silty, occasionally very finely arenaceous, common black to brown carbonaceous detritus and flecks, moderately calcareous in part, trace medium brown cryptocrystalline dolomite, trace to common pyrite, common micromica, firm, very dispersive, slightly subfissile.
1569-1572	90	Sandstone: light grey, very fine to grit, dominantly very coarse, angular to subangular, poorly sorted, strong silica cement, occasional strong calcareous cement, trace strong pyrite cement, common white to light green argillaceous matrix, common black coaly detritus, moderately hard, poor to fair inferred porosity, no oil fluorescence, trace dull yellow white calcite fluorescence, no cut.
	10	Claystone: medium grey to medium brown grey, very silty, occasionally very finely arenaceous, common black to brown carbonaceous detritus and flecks, moderately calcareous in part, trace medium brown cryptocrystalline dolomite, trace to common pyrite, common micromica, firm, very dispersive, slightly subfissile.
1572-1578	70	Sandstone: light grey, very fine to grit, dominantly very coarse, common fine grained aggregates, angular to subangular, poorly sorted, strong silica cement, occasional strong calcareous cement, trace pyrite cement, common white to light green argillaceous matrix, common black coaly detritus, moderately hard, poor to fair inferred porosity, no oil fluorescence, trace dull yellow white calcite fluorescence, no cut.
	30	Claystone: medium grey to medium brown grey, very silty, occasionally very finely arenaceous, common black to brown carbonaceous detritus and flecks, moderately calcareous in part, trace medium brown cryptocrystalline dolomite, trace to common pyrite, common micromica, firm, very dispersive, slightly subfissile.
1578-1581	40	Sandstone: light grey, very fine to grit, dominantly coarse, angular to subangular, poorly sorted, strong silica cement, occasional strong calcareous cement, trace strong pyrite cement, common white argillaceous matrix, common black coaly detritus, moderately hard, poor to fair inferred porosity, no oil fluorescence.
	60	Claystone: medium brown grey, occasionally medium to dark grey, occasionally off white to light brown grey, very silty grading to argillaceous siltstone, trace very fine off white sandstone laminae, slightly calcareous in part, trace to common black carbonaceous detritus, trace to common micromica, firm, very dispersive, slightly subfissile.
1581-1584	20	Sandstone: light grey, very fine to grit, dominantly coarse, angular to subangular, poorly sorted, strong silica cement, occasional strong calcareous cement, trace strong pyrite cement, common white argillaceous matrix, common black coaly detritus, moderately hard, poor to fair inferred porosity, no oil fluorescence.

Interval (m)	%	Description
	80	Claystone: medium brown grey, occasionally medium to dark grey, occasionally off white to light brown grey, very silty grading to argillaceous siltstone, trace very fine off white sandstone laminae, slightly calcareous in part, trace to common black carbonaceous detritus, trace to common micromica, firm, very dispersive, slightly subfissile.
1584-1587	10	Sandstone: light grey, very fine to grit, dominantly coarse, angular to subangular, poorly sorted, strong silica cement, occasional strong calcareous cement, trace strong pyrite cement, common white argillaceous matrix, common black coaly detritus, moderately hard, poor to fair inferred porosity, no oil fluorescence.
	30	Sandstone: off white, very fine to fine, angular to subrounded, moderately to well sorted, strong silica and weak calcareous cements, abundant white argillaceous matrix, trace very fine brown and green lithics, trace to common very fine off white partially altered feldspar grains, common pyrite, common brown to black coaly detritus, moderately hard, very poor visual porosity, no oil fluorescence.
	60	Claystone: medium brown grey, occasionally medium to dark grey, occasionally off white to light brown grey, very silty grading to argillaceous siltstone, trace very fine off white sandstone laminae, slightly calcareous in part, trace to common black carbonaceous detritus, trace to common micromica, firm, very dispersive, slightly subfissile.
1587-1590	50	Sandstone: off white, very fine to fine, angular to subrounded, moderately to well sorted, strong silica and weak calcareous cements, abundant white argillaceous matrix, trace very fine brown and green lithics, trace to common very fine off white partially altered feldspar grains, abundant pyrite, common brown to black coaly detritus, moderately hard, very poor visual porosity, no oil fluorescence.
	50	Claystone: medium brown grey, occasionally medium to dark grey, occasionally off white to light brown grey, very silty grading to argillaceous siltstone, trace very fine off white sandstone laminae, slightly calcareous in part, trace to common black carbonaceous detritus, trace to common micromica, firm, very dispersive, slightly subfissile.
1590-1593	40	Sandstone: off white, very fine to fine, angular to subrounded, moderately to well sorted, strong silica and weak calcareous cements, abundant white argillaceous matrix, trace very fine brown and green lithics, trace to common very fine off white partially altered feldspar grains, common to abundant pyrite, common brown to black coaly detritus, moderately hard, very poor visual porosity, no oil fluorescence.
	60	Claystone: medium brown grey, occasionally medium to dark grey, occasionally off white to light brown grey, very silty grading to argillaceous siltstone, trace very fine off white sandstone laminae, slightly calcareous in part, trace to common black carbonaceous detritus, trace to common micromica, firm, very dispersive, slightly subfissile.
1593-1596	20	Sandstone: off white, very fine to fine, angular to subrounded, moderately to well sorted, strong silica and weak calcareous cements, abundant white argillaceous matrix, trace very fine brown and green lithics, trace to common very fine off white partially altered feldspar grains, common to abundant pyrite, common brown to black coaly detritus, moderately hard, very poor visual porosity, no oil fluorescence.
	80	Claystone: medium brown grey, occasionally medium to dark grey, occasionally off white to light brown grey, very silty grading to argillaceous siltstone, trace very fine off white sandstone laminae, slightly calcareous in part, trace to common black carbonaceous detritus, trace to common micromica, firm, very dispersive, slightly subfissile.
1596-1599	5	Sandstone: off white, very fine to fine, angular to subrounded, moderately to well sorted, strong silica and weak calcareous cements, abundant white argillaceous matrix, common very fine to fine multicoloured lithics, common very fine off white partially altered feldspar grains, common pyrite, common brown to black coaly detritus, moderately hard, very poor visual porosity, no oil fluorescence.
	95	Claystone: medium brown grey, occasionally medium to dark grey, occasionally off white to light brown grey, very silty grading to argillaceous siltstone, trace very fine off white sandstone laminae, slightly calcareous in part, trace to common black carbonaceous detritus, trace to common micromica, firm, very dispersive, slightly subfissile.

Interval (m)	%	Description
1599-1602	80	Sandstone: off white to light brown grey, very fine to medium, occasional coarse to very coarse grains, dominantly fine, angular to subrounded, poor to moderate sorting, weak silica cement, trace weak calcareous cement, abundant white argillaceous matrix - matrix supported, quartzose with abundant red-yellow-brown-green-black lithics, trace to common partially altered feldspar grains, trace fine clear green and brown mica flakes, trace black coaly detritus, trace pyrite, friable, very poor visual porosity, no oil fluorescence.
	20	Claystone: medium brown grey, occasionally medium to dark grey, occasionally off white to light brown grey, very silty grading to argillaceous siltstone, trace very fine off white sandstone laminae, slightly calcareous in part, trace to common black carbonaceous detritus, trace to common micromica, firm, very dispersive, slightly subfissile.
1602-1605	90	Sandstone: off white to light brown grey, very fine to medium, occasional coarse to very coarse grains, dominantly fine, angular to subrounded, poor to moderate sorting, weak silica cement, trace weak calcareous cement, abundant white argillaceous matrix - matrix supported, quartzose with abundant red-yellow-brown-green-black lithics, trace to common partially altered feldspar grains, trace fine clear green and brown mica flakes, trace black coaly detritus, trace pyrite, friable, very poor visual porosity, no oil fluorescence.
	10	Claystone: medium brown grey, occasionally medium to dark grey, occasionally off white to light brown grey, very silty grading to argillaceous siltstone, trace very fine off white sandstone laminae, slightly calcareous in part, trace to common black carbonaceous detritus, trace to common micromica, firm, very dispersive, slightly subfissile.
1605-1608	100	Sandstone: off white to light brown grey, very fine to medium, common coarse to very coarse grains, dominantly fine, angular to subrounded, poor to moderate sorting, weak silica cement, trace weak calcareous cement, abundant white argillaceous matrix - matrix supported, quartzose with abundant red-yellow-brown-green-black lithics, trace to common partially altered feldspar grains, trace fine clear green and brown mica flakes, trace black coaly detritus, trace pyrite, friable, very poor visual porosity, no oil fluorescence.
1608-1611	100	Sandstone: off white to light brown grey, very fine to medium, abundant coarse to grit quartz grains, dominantly medium, angular to subrounded, poor to moderate sorting, weak silica cement, trace weak calcareous cement, abundant white argillaceous matrix - matrix supported, quartzose with abundant red-yellow-brown-green-black lithics, trace to common partially altered feldspar grains, trace fine clear green and brown mica flakes, trace black coaly detritus, trace pyrite, friable, very poor visual porosity, no oil fluorescence.
1611-1614	100	Sandstone: off white to light grey, very fine to medium, common coarse to grit quartz grains, dominantly medium, angular to subrounded, moderately sorted, weak silica and calcareous cements, abundant off white argillaceous matrix - matrix supported, common to abundant multicoloured lithics, common partially altered feldspar grains, trace pyrite, trace to common black to brown carbonaceous detritus, friable, very poor to poor visual porosity, no oil fluorescence.
1614-1617	80	Sandstone: off white to light grey, very fine to medium, common coarse to grit quartz grains, dominantly medium, angular to subrounded, moderately sorted, weak silica and calcareous cements, abundant off white argillaceous matrix - matrix supported, common to abundant multicoloured lithics, common partially altered feldspar grains, trace pyrite, trace to common black to brown carbonaceous detritus, friable, very poor to poor visual porosity, no oil fluorescence.
	20	Claystone: light blue grey, common to abundant dispersed very fine to medium quartz and lithic sand grains grading to argillaceous sandstone, common black to brown carbonaceous detritus, trace pyrite, soft, non to slightly subfissile.
1617-1620	70	Sandstone: light blue grey, very fine to coarse, dominantly medium, angular to subangular, moderately sorted, weak to moderate silica and calcareous cements, abundant light blue white argillaceous matrix - matrix supported, abundant green lithics, common red-yellow-brown-black lithics, trace brown mica flakes, trace black carbonaceous detritus, trace pyrite, friable, very poor visual porosity, no oil fluorescence.
	30	Claystone: light blue grey, common to abundant dispersed very fine to medium quartz and lithic sand grains grading to argillaceous sandstone, common black to brown carbonaceous detritus, trace pyrite, soft, non to slightly subfissile.

Interval (m)	%	Description
1620-1626	80	Sandstone: light blue grey, very fine to coarse, dominantly medium, angular to subangular, moderately sorted, weak to moderate silica and calcareous cements, abundant light blue white argillaceous matrix - matrix supported, abundant green lithics, common red-yellow-brown-black lithics, trace brown mica flakes, trace black carbonaceous detritus, trace pyrite, friable, very poor visual porosity, no oil fluorescence.
	20	Claystone: light blue grey, common to abundant dispersed very fine to medium quartz and lithic sand grains grading to argillaceous sandstone, common black to brown carbonaceous detritus, trace pyrite, soft, non to slightly subfissile.
1626-1629	90	Sandstone: light blue grey, very fine to coarse, dominantly medium, angular to subangular, moderately sorted, weak to moderate silica and calcareous cements, abundant light blue white argillaceous matrix - matrix supported, abundant green lithics, common red-yellow-brown-black lithics, trace brown mica flakes, trace black carbonaceous detritus, trace pyrite, friable, very poor visual porosity, no oil fluorescence.
	10	Claystone: light blue grey, common to abundant dispersed very fine to medium quartz and lithic sand grains grading to argillaceous sandstone, common black to brown carbonaceous detritus, trace pyrite, soft, non to slightly subfissile.
1629-1632	70	Sandstone: light blue grey to light green grey to off white, very fine to coarse, dominantly medium, angular to subrounded, moderately to well sorted, weak silica and calcareous cements, abundant light blue grey argillaceous matrix, abundant green lithics, common red-brown-black lithics, common partially altered feldspar grains, trace black to brown carbonaceous detritus, trace pyrite, trace brown mica flakes, friable, very poor visual porosity, no oil fluorescence.
	30	Claystone: light blue grey, trace to abundant multicoloured lithics, quartz and partially altered feldspar sand grains in part, trace black to brown carbonaceous detritus, trace pyrite, trace micromica, soft, non fissile.
1632-1635	50	Sandstone: light blue grey to light green grey to off white, very fine to coarse, dominantly medium, angular to subrounded, moderately to well sorted, weak silica and calcareous cements, abundant light blue grey argillaceous matrix, abundant green lithics, common red-brown-black lithics, common partially altered feldspar grains, trace black to brown carbonaceous detritus, trace pyrite, trace brown mica flakes, friable, very poor visual porosity, no oil fluorescence.
	50	Claystone: light blue grey, trace to abundant multicoloured lithics, quartz and partially altered feldspar sand grains in part, trace black to brown carbonaceous detritus, trace pyrite, trace micromica, soft, non fissile.
1635-1641	60	Sandstone: light blue grey to light green grey to off white, very fine to coarse, dominantly medium, angular to subrounded, moderately to well sorted, weak silica and calcareous cements, abundant light blue grey argillaceous matrix, abundant green lithics, common red-brown-black lithics, common partially altered feldspar grains, trace black to brown carbonaceous detritus, trace pyrite, trace brown mica flakes, friable, very poor visual porosity, no oil fluorescence.
	40	Claystone: light blue grey, trace to abundant multicoloured lithics, quartz and partially altered feldspar sand grains in part, trace black to brown carbonaceous detritus, trace pyrite, trace micromica, soft, non fissile.
1641-1644	20	Sandstone: light blue grey to light green grey to off white, very fine to coarse, dominantly medium, angular to subrounded, moderately to well sorted, weak silica and calcareous cements, abundant light blue grey argillaceous matrix, abundant green lithics, common red-brown-black lithics, common partially altered feldspar grains, trace black to brown carbonaceous detritus, trace pyrite, trace brown mica flakes, friable, very poor visual porosity, no oil fluorescence.
	80	Claystone: light blue grey to light green grey, trace to abundant multicoloured lithics, quartz and partially altered feldspar sand grains in part, trace black to brown carbonaceous detritus, trace pyrite, trace micromica, soft, non fissile.

Interval (m)	%	Description
1644-1647	50	Sandstone: light blue grey to light green grey, very fine to coarse, dominantly medium, angular to subrounded, moderately to well sorted, weak silica and calcareous cements, abundant light blue grey argillaceous matrix, abundant green lithics, common red-brown-black lithics, common partially altered feldspar grains, trace black to brown carbonaceous detritus, trace pyrite, friable, very poor visual porosity, no oil fluorescence.
	50	Claystone: light blue greyto occasionally light green grey, trace to abundant multicoloured lithics, quartz and partially altered feldspar sand grains in part, trace black to brown carbonaceous detritus, trace pyrite, trace micromica, soft, non fissile.
1647-1651	40	Sandstone: light blue grey to light green grey, very fine to coarse, dominantly medium, angular to subrounded, moderately to well sorted, weak silica and calcareous cements, abundant light blue grey argillaceous matrix, abundant green lithics, common red-brown-black lithics, common partially altered feldspar grains, trace black to brown carbonaceous detritus, trace pyrite, friable, very poor visual porosity, no oil fluorescence.
	60	Claystone: light blue grey to occasionally light green grey, trace to abundant multicoloured lithics, quartz and partially altered feldspar sand grains in part, trace black to brown carbonaceous detritus, trace pyrite, trace micromica, soft, non fissile.

CULTUS PETROLEUM N.L. **APPENDIX**

CUTTINGS DESCRIPTION

WELL NAME:	Blackwood-1	**DATE:**	8-5-96
GEOLOGIST:	Dave Horner	**PAGE:**	1

Interval (m)	%	Description
For geology report-12		
1651-1653	60	Poor sample - abundant caving after trip. Claystone: light blue grey to occasionally light green grey, trace to abundant multicoloured lithics, quartz and partially altered feldspar sand grains in part, trace black to brown carbonaceous detritus, trace pyrite, trace micromica, soft, non fissile.
	40	Sandstone: light blue grey to light green grey, very fine to coarse, dominantly medium, angular to subrounded, moderately to well sorted, weak silica and calcareous cements, abundant light blue grey argillaceous matrix, abundant green lithics, common red-brown-black lithics, common partially altered feldspar grains, trace black to brown carbonaceous detritus, trace pyrite, friable, very poor visual porosity, no oil fluorescence.
1653-1656	60	Sandstone: light to medium blue grey, light to medium green grey, very fine to coarse, dominantly medium, subangular to subrounded, moderately to well sorted, weak silica and calcareous cements, abundant light to medium blue grey argillaceous matrix, abundant green lithics, common red brown grey and black lithics, trace partially altered feldspar grains, trace black carbonaceous detritus, trace pyrite, friable, very poor inferred porosity - only disaggregated grains in sample from PDC bit, no oil fluorescence.
	40	Claystone: light to medium blue grey, light to medium green grey, slightly silty, trace black carbonaceous detritus, trace pyrite, trace micromica, soft, sticky, non fissile
1656-1662	20	Sandstone: light to medium blue grey, light to medium green grey, very fine to coarse, dominantly medium, subangular to subrounded, moderately to well sorted, weak silica and calcareous cements, abundant light to medium blue grey argillaceous matrix, abundant green lithics, common red brown grey and black lithics, trace partially altered feldspar grains, trace black carbonaceous detritus, trace pyrite, friable, very poor inferred porosity - only disaggregated grains in sample from PDC bit, no oil fluorescence.
	80	Claystone: light to medium blue grey, light to medium green grey, slightly silty, trace black carbonaceous detritus, trace pyrite, trace micromica, soft, sticky, non fissile
1662-1665	40	Sandstone: light to medium blue grey, light to medium green grey, very fine to coarse, dominantly medium, subangular to subrounded, moderately to well sorted, weak silica and calcareous cements, abundant light to medium blue grey argillaceous matrix, abundant green lithics, common red brown grey and black lithics, trace partially altered feldspar grains, trace black carbonaceous detritus, trace pyrite, friable, very poor inferred porosity - only disaggregated grains in sample from PDC bit, no oil fluorescence.
	60	Claystone: light to medium blue grey, light to medium green grey, minor light to medium brown, slightly silty, trace black carbonaceous detritus, trace pyrite, trace micromica, soft, sticky, non fissile
1665-1671	60	Sandstone: light to medium blue grey, light to medium green grey, very fine to coarse, dominantly medium, subangular to subrounded, moderately to well sorted, weak silica and calcareous cements, abundant light to medium blue grey argillaceous matrix, abundant green lithics, common red brown grey and black lithics, trace to common partially altered feldspar grains, trace black carbonaceous detritus, trace pyrite, friable, very poor inferred porosity - only disaggregated grains in sample from PDC bit, no oil fluorescence.
	40	Claystone: light to medium blue grey, light to medium green grey, minor light to medium brown, slightly silty, trace black carbonaceous detritus, trace pyrite, trace micromica, soft, sticky, non fissile

Interval (m)	%	Description	PAGE: 2
1671-1674	30	Sandstone: light to medium blue grey, light to medium green grey, very fine to coarse, dominantly medium, subangular to subrounded, moderately to well sorted, weak silica and calcareous cements, abundant light to medium blue grey argillaceous matrix, abundant green lithics, trace to common red brown grey and black lithics, trace to common partially altered feldspar grains, trace black carbonaceous detritus, trace pyrite, friable, very poor inferred porosity - only disaggregated grains in sample from PDC bit, no oil fluorescence.
	70	Claystone: off white to medium blue grey, light to medium green grey, minor light to medium brown, slightly silty, trace black carbonaceous detritus, trace pyrite, trace micromica, soft, sticky, non fissile
1674-1677	40	Sandstone: light to medium blue grey, light to medium green grey, very fine to coarse, dominantly medium, subangular to subrounded, moderately to well sorted, weak silica and calcareous cements, abundant light to medium blue grey argillaceous matrix, abundant green lithics, trace to common red brown grey and black lithics, trace to common partially altered feldspar grains, trace black carbonaceous detritus, trace pyrite, friable, very poor inferred porosity - only disaggregated grains in sample from PDC bit, no oil fluorescence.
	60	Claystone: off white to medium blue grey, light medium green grey, minor light brown, slightly silty, trace black carbonaceous detritus, trace pyrite, trace micromica, soft, sticky, non fissile
1677-1680	60	Sandstone: light to medium blue grey, light to medium green grey, very fine to coarse, dominantly medium, subangular to subrounded, moderately to well sorted, weak silica and calcareous cements, abundant light to medium blue grey argillaceous matrix, abundant green lithics, trace to common red brown grey and black lithics, trace to common partially altered feldspar grains, trace black carbonaceous detritus, trace pyrite, friable, very poor inferred porosity - only disaggregated grains in sample from PDC bit, no oil fluorescence.
	40	Claystone: off white to medium blue grey, light medium green grey, minor light brown, slightly silty, trace black carbonaceous detritus, trace pyrite, trace micromica, soft, sticky, non fissile
1680-1683	50	Sandstone: light to medium blue grey, light to medium green grey, very fine to coarse, dominantly medium, subangular to subrounded, moderately to well sorted, weak silica and calcareous cements, abundant light to medium blue grey argillaceous matrix, abundant green lithics, trace to common red brown grey and black lithics, trace to common partially altered feldspar grains, trace black carbonaceous detritus, trace pyrite, friable, very poor inferred porosity - only disaggregated grains in sample from PDC bit, no oil fluorescence.
	50	Claystone: off white to medium blue grey, light medium green grey, minor light brown, slightly silty, trace black carbonaceous detritus, trace pyrite, trace micromica, soft, sticky, non fissile
1683-1689	40	Sandstone: light to medium blue grey, light to medium green grey, very fine to coarse, dominantly fine to medium, subangular to subrounded, moderately to well sorted, weak silica and calcareous cements, abundant light to medium blue grey argillaceous and silt matrix - matrix supported, abundant green lithics, trace to common red brown grey and black lithics, trace to common partially altered feldspar grains, trace black carbonaceous detritus, trace pyrite, friable, very poor inferred porosity , no oil fluorescence.
	60	Claystone: off white to medium blue grey, light medium green grey, minor light brown, slightly to occasionally very silty, occasionally very finely arenaceous, trace black carbonaceous detritus, trace pyrite, trace micromica, soft, sticky, non fissile
1689-1698	50	Sandstone: light to medium blue grey, light to medium green grey, very fine to coarse, dominantly fine to medium, subangular to subrounded, moderately to well sorted, weak silica and calcareous cements, abundant light to medium blue grey argillaceous and silt matrix - matrix supported, abundant green lithics, trace to common red brown grey and black lithics, trace to common partially altered feldspar grains, trace black carbonaceous detritus, trace pyrite, friable, very poor inferred porosity , no oil fluorescence.
	50	Claystone: off white to medium blue grey, light medium green grey, minor light brown, slightly to occasionally very silty, occasionally very finely arenaceous, trace black carbonaceous detritus, trace pyrite, trace micromica, soft, sticky, non fissile

CULTUS PETROLEUM N.L. APPENDIX

CUTTINGS DESCRIPTION

WELL NAME:	Blackwood-1	DATE:	9-5-96
GEOLOGIST:	Dave Horner	PAGE:	1

Interval (m)	%	Description
For geology report-13		
1698-1704	20	Sandstone: off white to light grey to medium green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, weak to moderate silica cement, weak calcareous cement, abundant off white to light grey argillaceous and silt matrix - matrix supported, common to abundant green lithics and partially altered feldspar grains, trace red-brown-grey-black lithics, trace to common fine brown to black carbonaceous detritus, trace pyrite, trace very fine mica flakes, friable to moderately hard, no visual porosity, no oil fluorescence.
	80	Claystone: off white to light brown grey, occasionally light to medium grey, light to medium blue grey, often very silty, occasionally very finely arenaceous with quartz and partially altered feldspar grains, common black to brown carbonaceous flecks and fine detritus, trace micromica, firm, slightly subfissile.
1704-1710	70	Sandstone: off white to medium green grey, very fine to coarse, dominantly medium, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cement, abundant off white argillaceous and silt matrix, abundant green grey lithics, common orange-brown-black lithics and off white partially altered feldspar grains, trace clear and green mica flakes, trace black carbonaceous detritus, trace pyrite, friable, very poor visual porosity, no oil fluorescence.
	30	Claystone: off white to light brown grey, occasionally light to medium grey, light to medium blue grey, often very silty, occasionally very finely arenaceous with quartz and partially altered feldspar grains, common black to brown carbonaceous flecks and fine detritus, trace micromica, firm, slightly subfissile.
1710-1713	80	Sandstone: off white to medium green grey, very fine to coarse, dominantly medium, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cement, abundant off white argillaceous and silt matrix, abundant green grey lithics, common orange-brown-black lithics and off white partially altered feldspar grains, trace clear and green mica flakes, trace black carbonaceous detritus, trace pyrite, friable, very poor visual porosity, no oil fluorescence.
	20	Claystone: off white to light brown grey, occasionally light to medium grey, light to medium blue grey, often very silty, occasionally very finely arenaceous with quartz and partially altered feldspar grains, common black to brown carbonaceous flecks and fine detritus, trace micromica, firm, slightly subfissile.
1713-1716	70	Sandstone: off white to medium green grey, very fine to coarse, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cement, abundant off white argillaceous and silt matrix, abundant green grey lithics, common orange-brown-black lithics and off white partially altered feldspar grains, trace clear and green mica flakes, trace black carbonaceous detritus, trace pyrite, friable, very poor visual porosity, no oil fluorescence.
	30	Claystone: off white to light brown grey, occasionally light to medium grey, light to medium blue grey, often very silty, occasionally very finely arenaceous with quartz and partially altered feldspar grains, common black to brown carbonaceous flecks and fine detritus, trace micromica, firm, slightly subfissile.

Interval (m)	%	Description
1716-1722	50	Sandstone: off white to light green grey, very fine to coarse, dominantly medium, subangular to subrounded, moderately to well sorted, weak silica and calcareous cement, abundant off white argillaceous and silt matrix - matrix supported and grading to arenaceous claystone, abundant green grey lithics, common orange-brown-black lithics and off white partially altered feldspar grains, trace clear and green mica flakes, trace black carbonaceous detritus, trace pyrite, friable, no visual porosity, no oil fluorescence.
	50	Claystone: off white to medium blue grey, slightly to very silty, abundant dispersed quartz lithic and partially altered feldspar grains grading to argillaceous sandstone, common black to brown carbonaceous flecks and fine detritus, trace micromica, firm, slightly subfissile.
1722-1725	70	Sandstone: off white to light green grey, very fine to coarse, dominantly medium, subangular to subrounded, moderately to well sorted, weak silica and calcareous cement, abundant off white argillaceous and silt matrix - matrix supported and grading to arenaceous claystone, abundant green grey lithics, common orange-brown-black lithics and off white partially altered feldspar grains, trace clear and green mica flakes, trace black carbonaceous detritus, trace pyrite, friable, no visual porosity, no oil fluorescence.
	30	Claystone: off white to medium green grey, slightly to very silty, abundant dispersed quartz lithic and partially altered feldspar grains grading to argillaceous sandstone, common black to brown carbonaceous flecks and fine detritus, trace micromica, firm, slightly subfissile.
1725-1731	30	Sandstone: off white to medium green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and trace weak calcareous cements, abundant off white to light green argillaceous and silt matrix, abundant green lithics, common to abundant partly altered feldspar grains, common orange brown to black lithics, trace to common brown to black carbonaceous detritus, trace very fine mica flakes, rare pyrite, moderately hard, no visual porosity, no oil fluorescence.
	70	Claystone: off white to medium green grey, light to medium brown, moderately to very silty, occasionally very finely arenaceous with altered feldspar quartz and multicoloured lithic grains, common brown to black carbonaceous matter especially where brown, common micromica, firm to moderately hard, subfissile.
1731-1737	10	Sandstone: off white to medium green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and trace weak calcareous cements, abundant off white to light green argillaceous and silt matrix, abundant green lithics, common to abundant partly altered feldspar grains, common orange brown to black lithics, trace to common brown to black carbonaceous detritus, trace very fine mica flakes, rare pyrite, moderately hard, no visual porosity, no oil fluorescence.
	90	Claystone: off white to medium green grey, light to medium brown, moderately to very silty, occasionally very finely arenaceous with altered feldspar quartz and multicoloured lithic grains, common brown to black carbonaceous matter especially where brown, common micromica, firm to moderately hard, subfissile.
1737-1740	70	Sandstone: light green grey, very fine to coarse, dominantly fine to medium, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light green argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine mica flakes, trace pyrite, friable, very poor visual porosity, no oil fluorescence.
	30	Claystone: off white to medium green grey, light to medium brown, moderately to very silty, occasionally very finely arenaceous with altered feldspar quartz and multicoloured lithic grains, common brown to black carbonaceous matter especially where brown, common micromica, firm to moderately hard, subfissile.
1740-1743	80	Sandstone: light green grey, very fine to coarse, dominantly fine to medium, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light green argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine mica flakes, trace pyrite, friable, very poor visual porosity, no oil fluorescence.

	20	Claystone: off white to medium green grey, light to medium brown, moderately to very silty, occasionally very finely arenaceous with altered feldspar quartz and multicoloured lithic grains, common brown to black carbonaceous matter especially where brown, common micromica, firm to moderately hard, subfissile.
1743-1746	70	Sandstone: light green grey, very fine to coarse, dominantly fine to medium, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light green argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine mica flakes, trace pyrite, friable, very poor visual porosity, no oil fluorescence.
	30	Claystone: off white to medium green grey, light to medium brown, moderately to very silty, occasionally very finely arenaceous with altered feldspar quartz and multicoloured lithic grains, common brown to black carbonaceous matter especially where brown, common micromica, firm to moderately hard, subfissile.
1746-1755	60	Sandstone: light green grey, very fine to coarse, dominantly fine to medium, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light green argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine mica flakes, trace pyrite, friable, very poor visual porosity, no oil fluorescence.
	40	Claystone: off white to medium green grey, light to medium brown, moderately to very silty, occasionally very finely arenaceous with altered feldspar quartz and multicoloured lithic grains, common brown to black carbonaceous matter especially where brown, common micromica, firm to moderately hard, subfissile.
1755-1761	70	Sandstone: light green grey, very fine to coarse, dominantly fine to medium, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine mica flakes, trace pyrite, friable, very poor visual porosity, no oil fluorescence.
	30	Claystone: off white to medium grey, light to medium brown, light to medium green grey, moderately to very silty, occasionally very finely arenaceous with altered feldspar quartz and multicoloured lithic grains, common brown to black carbonaceous matter especially where brown, common micromica, firm to moderately hard, subfissile.
1761-1764	40	Sandstone: light green grey, very fine to coarse, dominantly fine to medium, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine mica flakes, trace pyrite, friable, very poor visual porosity, no oil fluorescence.
	60	Claystone: off white to medium brown, light to medium grey, light to medium green grey, moderately to very silty, occasionally very finely arenaceous with altered feldspar quartz and multicoloured lithic grains, common brown to black carbonaceous matter especially where brown, common micromica, firm to moderately hard, subfissile.
1764-1767	10	Sandstone: light green grey, very fine to coarse, dominantly fine to medium, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine mica flakes, trace pyrite, friable, very poor visual porosity, no oil fluorescence.
	10	Sandstone: off white to light grey to medium green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, weak to moderate silica cement, weak calcareous cement, abundant off white to light grey argillaceous and silt matrix - matrix supported, common to abundant green lithics and partially altered feldspar grains, trace red-brown-grey-black lithics, trace to common fine brown to black carbonaceous detritus, trace pyrite, trace very fine mica flakes, friable to moderately hard, no visual porosity, no oil fluorescence.

(AJ/GFE:F53)

Interval (m)	%	Description
	80	Claystone: off white to medium grey, light to medium brown, occasionally light to medium green grey, moderately to very silty, occasionally very finely arenaceous with altered feldspar quartz and multicoloured lithic grains, common brown to black carbonaceous matter, common micromica, firm to moderately hard, subfissile.
1767-1773	20	Sandstone: off white to light grey to medium green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, weak to moderate silica cement, weak calcareous cement, abundant off white to light grey argillaceous and silt matrix - matrix supported, common to abundant green lithics and partially altered feldspar grains, trace red-brown-grey-black lithics, trace to common fine brown to black carbonaceous detritus, trace pyrite, trace very fine mica flakes, friable to moderately hard, no visual porosity, no oil fluorescence.
	80	Claystone: off white to medium green, light to medium brown, occasionally light to medium grey, moderately to very silty, occasionally very finely arenaceous with altered feldspar quartz and multicoloured lithic grains, common brown to black carbonaceous matter, common micromica, firm to moderately hard, subfissile.
1773-1779	10	Sandstone: off white to light grey to medium green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, weak to moderate silica cement, weak calcareous cement, abundant off white to light grey argillaceous and silt matrix - matrix supported, common to abundant green lithics and partially altered feldspar grains, trace red-brown-grey-black lithics, trace to common fine brown to black carbonaceous detritus, trace pyrite, trace very fine mica flakes, friable to moderately hard, no visual porosity, no oil fluorescence.
	90	Claystone: off white to light green, light brown, occasionally grey and medium brown, moderately to very silty, occasionally very finely arenaceous with altered feldspar quartz and multicoloured lithic grains, common brown to black carbonaceous matter, common micromica, firm to moderately hard, subfissile.
1779-1782	40	Sandstone: off white to light grey to medium green grey, very fine to fine, dominantly very fine, subangular to subrounded, moderately to well sorted, weak to moderate silica cement, trace weak calcareous cement, abundant off white to light grey argillaceous and silt matrix - matrix supported, common green lithics, abundant partially altered feldspar grains, trace red-brown-grey-black lithics, trace to common fine brown to black carbonaceous detritus, rare pyrite, trace micro to very fine mica flakes, friable to moderately hard, no visual porosity, no oil fluorescence.
	60	Claystone: off white to medium green grey, light medium brown, moderately to very silty, often very finely arenaceous with altered feldspar quartz and multicoloured lithic grains, common brown to black carbonaceous matter, common micromica, firm to moderately hard, subfissile.
1782-1785	10	Sandstone: off white to light grey to medium green grey, very fine to fine, dominantly very fine, subangular to subrounded, moderately to well sorted, weak to moderate silica cement, trace weak calcareous cement, abundant off white to light grey argillaceous and silt matrix - matrix supported, common green lithics, abundant partially altered feldspar grains, trace red-brown-grey-black lithics, trace to common fine brown to black carbonaceous detritus, rare pyrite, trace micro to very fine mica flakes, friable to moderately hard, no visual porosity, no oil fluorescence.
	90	Claystone: off white to medium green grey, light medium brown, moderately to very silty, often very finely arenaceous with altered feldspar quartz and multicoloured lithic grains, common brown to black carbonaceous matter, common micromica, firm to moderately hard, subfissile.
1785-1794	70	Sandstone: off white to light grey to medium green grey, very fine to fine, dominantly very fine, subangular to subrounded, moderately to well sorted, weak to moderate silica cement, trace weak calcareous cement, abundant off white to light grey argillaceous and silt matrix - matrix supported, common green lithics, abundant partially altered feldspar grains, trace red-brown-grey-black lithics, trace to common fine brown to black carbonaceous detritus, rare pyrite, trace micro to very fine mica flakes, friable to moderately hard, no visual porosity, no oil fluorescence.

	30	Claystone: off white to medium green grey, light medium brown, moderately to very silty, often very finely arenaceous with altered feldspar quartz and multicoloured lithic grains, common brown to black carbonaceous matter, common micromica, firm to moderately hard, subfissile.
1794-1797	40	Sandstone: off white to light grey to medium green grey, very fine to fine, dominantly very fine, subangular to subrounded, moderately to well sorted, weak to moderate silica cement, trace weak calcareous cement, abundant off white to light grey argillaceous and silt matrix - matrix supported, common green lithics, abundant partially altered feldspar grains, trace red-brown-grey-black lithics, trace to common fine brown to black carbonaceous detritus, rare pyrite, trace micro to very fine mica flakes, friable to moderately hard, no visual porosity, no oil fluorescence.
	60	Claystone: off white to medium green grey, light to medium brown, dominantly light greenish grey to light brown, moderately to very silty, often very finely arenaceous with altered feldspar quartz and multicoloured lithic grains, common brown to black carbonaceous matter, common micromica, firm to moderately hard, subfissile.
1797-1803	40	Sandstone: off white to light green grey, very fine to fine, subangular to subrounded, moderately to well sorted, weak silica and trace weak calcareous cements, abundant off white argillaceous matrix - matrix supported, abundant partially altered feldspar grains, common green and trace multicoloured lithics, trace micro and very fine mica flakes, trace black to brown carbonaceous matter, friable, no visual porosity, no oil fluorescence.
	60	Claystone: off white to medium grey, light to medium brown, light to medium green grey, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.
1803-1809	30	Sandstone: off white to light green grey, very fine to fine, subangular to subrounded, moderately to well sorted, weak silica and trace weak calcareous cements, abundant off white argillaceous matrix - matrix supported, abundant partially altered feldspar grains, common green and trace multicoloured lithics, trace micro and very fine mica flakes, trace black to brown carbonaceous matter, friable, no visual porosity, no oil fluorescence.
	70	Claystone: off white to medium grey, light to medium brown, light to medium green grey, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.
1809-1815	10	Sandstone: off white to light green grey, very fine to fine, subangular to subrounded, moderately to well sorted, weak silica and trace weak calcareous cements, abundant off white argillaceous matrix - matrix supported, abundant partially altered feldspar grains, common green and trace multicoloured lithics, trace micro and very fine mica flakes, trace black to brown carbonaceous matter, friable, no visual porosity, no oil fluorescence.
	85	Claystone: off white to medium grey, light to medium brown, light to medium green grey, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.
	5	Coal: black to dark brown, platy to blocky fracture, earthy to subvitreous lustre, moderately to very argillaceous where dark brown, hard, brittle.
1815-1818	30	Sandstone: off white to light green grey, very fine to fine, subangular to subrounded, moderately to well sorted, weak silica and trace weak calcareous cements, abundant off white argillaceous matrix - matrix supported, abundant partially altered feldspar grains, common green and trace multicoloured lithics, trace micro and very fine mica flakes, trace black to brown carbonaceous matter, friable, no visual porosity, no oil fluorescence.
	70	Claystone: off white to medium grey, light to medium brown, light to medium green grey, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.

Interval (m)	%	Description PAGE: 6
1818-1821	50	Sandstone: off white to light green grey, very fine to fine, subangular to subrounded, moderately to well sorted, weak silica and trace weak calcareous cements, abundant off white argillaceous matrix - matrix supported, abundant partially altered feldspar grains, common green and trace multicoloured lithics, trace micro and very fine mica flakes, trace black to brown carbonaceous matter, friable, no visual porosity, no oil fluorescence.
	50	Claystone: off white to medium grey, light to medium brown, light to medium green grey, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.
1821-1827	80	Sandstone: light green grey, very fine to coarse, dominantly fine to medium, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, very poor visual porosity, no oil fluorescence.
	20	Claystone: off white to medium grey, light to medium brown, light to medium green grey, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.
1827-1833	50	Sandstone: off white to light green grey, very fine to fine, subangular to subrounded, moderately to well sorted, weak silica and trace weak calcareous cements, abundant off white argillaceous matrix - matrix supported, abundant partially altered feldspar grains, common green and trace multicoloured lithics, trace micro and very fine mica flakes, trace black to brown carbonaceous matter, friable, no visual porosity, no oil fluorescence.
	50	Claystone: off white to medium grey, light to medium brown, light to medium green grey, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.
1833-1839	60	Sandstone: off white to light green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, weak silica and trace weak calcareous cements, abundant off white argillaceous matrix - matrix supported, abundant partially altered feldspar grains, common green and trace multicoloured lithics, trace micro and very fine mica flakes, trace black to brown carbonaceous matter, friable, no visual porosity, no oil fluorescence.
	35	Claystone: off white to medium grey, light to medium brown, light to medium green grey, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.
	5	Calcilutite: off white to very light brown, kaolin rich calcareous soft sticky clay - possible fracture infill.
1839-1842	50	Sandstone: light green grey, very fine to coarse, dominantly fine to medium, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, very poor visual porosity, no oil fluorescence.
	10	Sandstone: off white to light green grey, very fine to fine, subangular to subrounded, moderately to well sorted, weak silica and trace weak calcareous cements, abundant off white argillaceous matrix - matrix supported, abundant partially altered feldspar grains, common green and trace multicoloured lithics, trace micro and very fine mica flakes, trace black to brown carbonaceous matter, friable, no visual porosity, no oil fluorescence.
	40	Claystone: off white to medium grey, light to medium brown, light to medium green grey, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.

1842-1851	20	Sandstone: off white to light green grey, very fine to fine, subangular to subrounded, moderately to well sorted, weak silica and trace weak calcareous cements, abundant off white argillaceous matrix - matrix supported, abundant partially altered feldspar grains, common green and trace multicoloured lithics, trace micro and very fine mica flakes, trace black to brown carbonaceous matter, friable, no visual porosity, no oil fluorescence.
	80	Claystone: off white to medium grey, light to medium brown, light to medium green grey, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.
1851-1860	80	Sandstone: off white to light green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, weak silica and trace weak calcareous cements, abundant off white argillaceous matrix - matrix supported, abundant partially altered feldspar grains, common green and trace multicoloured lithics, trace micro and very fine mica flakes, trace black to brown carbonaceous matter, friable, no visual porosity, no oil fluorescence.
	20	Claystone: off white to medium grey, light to medium brown, light to medium green grey, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.
1860-1866	70	Sandstone: light green grey, very fine to coarse, dominantly fine to medium, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, very poor visual porosity, no oil fluorescence.
	30	Claystone: off white to medium grey, light to medium brown, light to medium green grey, dominantly medium grey, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.
1866-1872	60	Sandstone: light green grey, very fine to medium, dominantly medium, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, very poor visual porosity, no oil fluorescence.
	40	Claystone: off white to medium grey, light to medium brown, light to medium green grey, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.
1872-1878	80	Sandstone: light green grey, very fine to medium, dominantly medium, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, very poor visual porosity, no oil fluorescence.
	20	Claystone: off white to medium grey, light to medium brown, light to medium green grey, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.
1878-1881	60	Sandstone: light green grey, very fine to coarse, dominantly fine to medium, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, very poor visual porosity, no oil fluorescence.

	40	Claystone: off white to medium grey, light to medium brown, light to medium green grey, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.
1881-1887	20	Sandstone: off white to light green grey, very fine to fine, subangular to subrounded, moderately to well sorted, weak silica and trace weak calcareous cements, abundant off white argillaceous matrix - matrix supported, abundant partially altered feldspar grains, common green and trace multicoloured lithics, trace micro and very fine mica flakes, trace black to brown carbonaceous matter, friable, no visual porosity, no oil fluorescence.
	80	Claystone: off white to medium grey, light to medium brown, light to medium green grey, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.

CULTUS PETROLEUM N.L. APPENDIX

CUTTINGS DESCRIPTION

WELL NAME:	Blackwood-1	**DATE:**	9-5-96
GEOLOGIST:	Dave Horner	**PAGE:**	1

Interval (m)	%	Description
Continuation for report-13		
1887-1893	70	Sandstone: light green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, very poor visual porosity, no oil fluorescence.
	30	Claystone: off white to medium grey, light to medium brown, light to medium green grey, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.
1893-1896	90	Sandstone: light green grey, very fine to medium, dominantly medium, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, very poor visual porosity, no oil fluorescence.
	10	Claystone: off white to medium grey, light to medium brown, light to medium green grey, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.
1896-1899	40	Sandstone: light green grey, very fine to medium, dominantly medium, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, very poor visual porosity, no oil fluorescence.
	60	Claystone: off white to medium green grey, light to medium grey, light brown, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.
1899-1905	20	Sandstone: light green grey, very fine to fine, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, no visual porosity, no oil fluorescence.
	80	Claystone: off white to medium green grey, light to medium grey, light brown, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.

Interval (m)	%	Description	PAGE: 2
1905-1914	70	Sandstone: light green grey, very fine to coarse, dominantly medium, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, very poor visual porosity, no oil fluorescence.
	30	Claystone: off white to medium green grey, light to medium grey, light brown, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.
1914-1926	80	Sandstone: light green grey, very fine to coarse, dominantly medium, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, very poor visual porosity, no oil fluorescence.
	20	Claystone: off white to medium green grey, light to medium grey, light brown, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.
1926-1932	70	Sandstone: light green grey, very fine to coarse, dominantly medium, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, very poor visual porosity, no oil fluorescence.
	30	Claystone: off white to medium green grey, light to medium grey, light brown, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.
1932-1935	60	Sandstone: light green grey, very fine to coarse, dominantly medium, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, very poor visual porosity, no oil fluorescence.
	40	Claystone: off white to medium green grey, light to medium grey, light brown, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.
1935-1938	40	Sandstone: light green grey, very fine to coarse, dominantly medium, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, very poor visual porosity, no oil fluorescence.
	60	Claystone: off white to medium green grey, light to medium grey, light brown, trace medium brown and moderately carbonaceous, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.
1938-1944	20	Sandstone: light green grey, very fine to coarse, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, very poor visual porosity, no oil fluorescence.

Interval (m)	%	Description PAGE: 3
	80	Claystone: off white to medium green grey, light to medium grey, light brown, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter and black coal detritus, trace to common micromica, firm, moderately dispersive, subfissile.
1944-1950	20	Sandstone: light green grey, very fine to fine, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, no visual porosity, no oil fluorescence.
	80	Claystone: off white to medium green grey, light to medium grey, light brown, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter and trace black coal detritus, trace to common micromica, firm, moderately dispersive, subfissile.
1950-1956	40	Sandstone: light green grey, very fine to fine, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, no visual porosity, no oil fluorescence.
	60	Claystone: off white to medium green grey, light to medium grey, light brown, trace medium brown and moderately carbonaceous, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.
1956-1959	40	Sandstone: light green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, very poor visual porosity, no oil fluorescence.
	60	Claystone: off white to medium green grey, light to medium grey, light brown, trace medium brown and moderately carbonaceous, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.
1959-1968	80	Sandstone: light green grey, very fine to fine, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, no visual porosity, no oil fluorescence.
	20	Claystone: off white to medium green grey, light to medium grey, light brown, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter and trace black coal detritus, trace to common micromica, firm, moderately dispersive, subfissile.
1968-1971	70	Sandstone: light green grey, very fine to fine, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, no visual porosity, no oil fluorescence.
	30	Claystone: off white to medium green grey, light to medium grey, light brown, trace medium brown and moderately carbonaceous, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.

(AJ/GFE:F53)

1971-1977	50	Sandstone: light green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, very poor visual porosity, no oil fluorescence.
	50	Claystone: off white to medium green grey, light to medium grey, light brown, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter and trace black coal detritus, common pyrite, trace to common micromica, firm, moderately dispersive, subfissile.
1977-1980	80	Sandstone: light green grey, very fine to coarse, dominantly medium, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, very poor visual porosity, no oil fluorescence.
	20	Claystone: off white to medium green grey, light to medium grey, light brown, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace pyrite, trace to common micromica, firm, moderately dispersive, subfissile.
1980-1983	90	Sandstone: light green grey, very fine to medium, dominantly medium, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, very poor visual porosity, no oil fluorescence.
	10	Claystone: off white to medium green grey, light to medium grey, light brown, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.
1983-1986	80	Sandstone: light green grey, very fine to coarse, dominantly medium, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, very poor visual porosity, no oil fluorescence.
	20	Claystone: off white to medium green grey, light to medium grey, light brown, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.
1986-1989	60	Sandstone: light green grey, very fine to coarse, dominantly medium, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, very poor visual porosity, no oil fluorescence.
	40	Claystone: off white to medium green grey, light to medium grey, common light brown, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.
1989-1998	50	Sandstone: light green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, very poor visual porosity, no oil fluorescence.

	50	Claystone: off white to medium green grey, light to medium grey, trace light brown, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.
1998-2004	60	Sandstone: light green grey, very fine to fine, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, very poor visual porosity, no oil fluorescence.
	40	Claystone: off white to medium green grey, light to medium grey, trace light brown, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.
2004-2010	70	Sandstone: light green grey, very fine to fine, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, very poor visual porosity, no oil fluorescence.
	30	Claystone: off white to medium green grey, light to medium grey, trace light brown, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.
2010-2016	80	Sandstone: light green grey, very fine to fine, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, very poor visual porosity, no oil fluorescence.
	20	Claystone: off white to medium green grey, light to medium grey, trace light brown, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.
2016-2019	70	Sandstone: light green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, very poor visual porosity, no oil fluorescence.
	30	Claystone: off white to medium green grey, light to medium grey, trace light brown, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.

CULTUS PETROLEUM N.L. **APPENDIX**

CUTTINGS DESCRIPTION

WELL NAME:	Blackwood-1	**DATE:**	10-5-96
GEOLOGIST:	Dave Horner	**PAGE:**	1

For geology report-14

Interval (m)	%	Description
2019-2028	30	Sandstone: light green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, very poor visual porosity, no oil fluorescence.
	70	Claystone: off white to medium green grey, light to medium grey, trace light brown, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm, moderately dispersive, subfissile.
2028-2037	60	Sandstone: light green grey to light brown grey, very fine to fine, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light brown grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, no visual porosity, no oil fluorescence.
	40	Claystone: off white to medium green grey, light brown, light to medium grey, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm to moderately hard, slightly to moderately dispersive, subfissile.
2037-2040	70	Sandstone: light green grey to light brown grey, very fine to fine, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light brown grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, no visual porosity, no oil fluorescence.
	30	Claystone: off white to medium green grey, light brown, light to medium grey, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm to moderately hard, slightly to moderately dispersive, subfissile.
2040-2046	80	Sandstone: light green grey to light brown grey, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light brown grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, no visual porosity, no oil fluorescence.
	20	Claystone: off white to medium green grey, light brown, light to medium grey, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm to moderately hard, slightly to moderately dispersive, subfissile.

2046-2052	40	Sandstone: light green grey to light brown grey, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light brown grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, no visual porosity, no oil fluorescence.
	60	Claystone: off white to medium green grey, light brown, light to medium grey, dominantly very light brown grey, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm to moderately hard, slightly to moderately dispersive, subfissile.
2052-2055	50	Sandstone: light green grey to light brown grey, very fine to fine, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light brown grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, no visual porosity, no oil fluorescence.
	50	Claystone: off white to medium green grey, light brown, light to medium grey, dominantly very light brown grey, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm to moderately hard, slightly to moderately dispersive, subfissile.
2055-2061	20	Sandstone: light green grey to light brown grey, very fine to fine, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light brown grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, no visual porosity, no oil fluorescence.
	80	Claystone: off white to medium green grey, light brown, light to medium grey, dominantly light green grey, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm to moderately hard, slightly to moderately dispersive, subfissile.
2061-2064	50	Sandstone: light green grey to light brown grey, very fine to fine, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light brown grey argillaceous and silt matrix - matrix supported, abundant green lithics and partially altered feldspar grains, common orange brown to black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, no visual porosity, no oil fluorescence.
	50	Claystone: off white to medium green grey, light brown, light to medium grey, dominantly light brown grey, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm to moderately hard, slightly to moderately dispersive, subfissile.
2064-2067	70	Sandstone: light green grey to light brown grey, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light brown grey argillaceous and silt matrix - matrix supported, abundant partially altered feldspar grains, common green lithics, trace red-orange-brown-black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, no visual porosity, no oil fluorescence.
	30	Claystone: off white to medium green grey, light brown, light to medium grey, dominantly light brown grey, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm to moderately hard, slightly to moderately dispersive, subfissile.

Interval (m)	%	Description
2067-2076	50	Sandstone: light green grey to light brown grey, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light brown grey argillaceous and silt matrix - matrix supported, abundant partially altered feldspar grains, common green lithics, trace red-orange-brown-black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, very poor visual porosity, no oil fluorescence.
	50	Claystone: off white to medium green grey, light brown, light to medium grey, dominantly light brown grey, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm to moderately hard, slightly to moderately dispersive, subfissile.
2076-2085	40	Sandstone: light green grey to light brown grey, very fine to fine, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light brown grey argillaceous and silt matrix - matrix supported, abundant partially altered feldspar grains, common green lithics, trace red-orange-brown-black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, no visual porosity, no oil fluorescence.
	60	Claystone: off white to medium green grey, light to medium brown, light to medium grey, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm to moderately hard, slightly to moderately dispersive, subfissile.
2085-2088	50	Sandstone: light green grey to light brown grey, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light brown grey argillaceous and silt matrix - matrix supported, abundant partially altered feldspar grains, common green lithics, trace red-orange-brown-black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, no visual porosity, no oil fluorescence.
	50	Claystone: off white to medium green grey, light to medium brown, light to medium grey, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm to moderately hard, slightly to moderately dispersive, subfissile.
2088-2094	80	Sandstone: light green grey to light brown grey, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light brown grey argillaceous and silt matrix - matrix supported, abundant partially altered feldspar grains, common green lithics, trace red-orange-brown-black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, no visual porosity, no oil fluorescence.
	20	Claystone: off white to medium green grey, light to medium brown, light to medium grey, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm to moderately hard, slightly to moderately dispersive, subfissile.
2094-2100	60	Sandstone: light green grey to light brown grey, very fine to fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cements, abundant white to light brown grey argillaceous and silt matrix - matrix supported, abundant partially altered feldspar grains, common green lithics, trace red-orange-brown-black lithics, trace brown to black carbonaceous detritus, trace fine clear and brown mica flakes, friable, no visual porosity, no oil fluorescence.
	40	Claystone: off white to medium green grey, light to medium brown, light to medium grey, moderately to very silty, often very finely arenaceous with partially altered feldspar quartz and multicoloured lithics sand grains, common black to brown carbonaceous matter, trace to common micromica, firm to moderately hard, slightly to moderately dispersive, subfissile.

Interval (m)	%	Description
2100-2106	20	Sandstone: off white to light green grey, very fine, subangular to subrounded, moderately to well sorted, moderate silica and occasional weak to moderate calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, common green lithics, trace red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace to common micro to fine clear and brown mica flakes, friable to moderately hard, no visual porosity, no oil fluorescence.
	80	Claystone: off white to medium green grey, often light to medium brown, light to medium grey, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars, quartz and varicoloured lithics, common black to brown carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2106-2112	10	Sandstone: off white to light green grey, very fine, subangular to subrounded, moderately to well sorted, moderate silica and occasional weak to moderate calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, common green lithics, trace red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace to common micro to fine clear and brown mica flakes, friable to moderately hard, no visual porosity, no oil fluorescence.
	90	Claystone: off white to medium green grey, often light to medium brown, light to medium grey, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars, quartz and varicoloured lithics, common black to brown carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2112-2118	20	Sandstone: off white to light green grey, very fine to fine, subangular to subrounded, moderately to well sorted, moderate silica and occasional weak to moderate calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, common green lithics, trace red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace to common micro to fine clear and brown mica flakes, friable to moderately hard, no visual porosity, no oil fluorescence.
	80	Claystone: off white to medium green grey, often light to medium brown, light to medium grey, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars, quartz and varicoloured lithics, common black to brown carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2118-2121	40	Sandstone: off white to light green grey, very fine to fine, subangular to subrounded, moderately to well sorted, moderate silica and occasional weak to moderate calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, common green lithics, trace red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace to common micro to fine clear and brown mica flakes, friable to moderately hard, no visual porosity, no oil fluorescence.
	60	Claystone: off white to medium green grey, often light to medium brown, light to medium grey, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars, quartz and varicoloured lithics, common black to brown carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2121-2124	50	Sandstone: off white to light green grey, very fine to fine, subangular to subrounded, moderately to well sorted, moderate silica and occasional weak to moderate calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, common green lithics, trace red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace to common micro to fine clear and brown mica flakes, friable to moderately hard, no visual porosity, no oil fluorescence.
	50	Claystone: off white to medium green grey, often light to medium brown, light to medium grey, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars, quartz and varicoloured lithics, common black to brown carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.

2124-2127	50	Sandstone: off white to light green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and occasional weak to moderate calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, common green lithics, trace red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace to common micro to fine clear and brown mica flakes, friable to moderately hard, very poor visual porosity, no oil fluorescence.
	50	Claystone: off white to medium green grey, often light to medium brown, light to medium grey, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars, quartz and varicoloured lithics, common black to brown carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2127-2133	80	Sandstone: off white to light green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and occasional weak to moderate calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, common green lithics, trace red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace to common micro to fine clear and brown mica flakes, friable to moderately hard, very poor visual porosity, no oil fluorescence.
	20	Claystone: off white to medium green grey, often light to medium brown, light to medium grey, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars, quartz and varicoloured lithics, common black to brown carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2133-2139	90	Sandstone: off white to light green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and occasional weak to moderate calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, common green lithics, trace red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace to common micro to fine clear and brown mica flakes, friable to moderately hard, very poor visual porosity, no oil fluorescence.
	10	Claystone: off white to medium green grey, often light to medium brown, light to medium grey, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars, quartz and varicoloured lithics, common black to brown carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2139-2142	100	Sandstone: off white to light green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and occasional weak to moderate calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, common green lithics, trace red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace to common micro to fine clear and brown mica flakes, trace pyrite, friable to moderately hard, very poor visual porosity, no oil fluorescence.
2142-2145	80	Sandstone: off white to light green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and occasional weak to moderate calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, common green lithics, trace red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace to common micro to fine clear and brown mica flakes, friable to moderately hard, very poor visual porosity, no oil fluorescence.
	20	Claystone: off white to medium green grey, often light to medium brown, light to medium grey, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars, quartz and varicoloured lithics, common black to brown carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.

2145-2148	40	Sandstone: off white to light green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and occasional weak to moderate calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, common green lithics, trace red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace to common micro to fine clear and brown mica flakes, friable to moderately hard, very poor visual porosity, no oil fluorescence.
	60	Claystone: off white to medium green grey, light brown, light to medium grey, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars, quartz and varicoloured lithics, common black to brown carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2148-2157	60	Sandstone: off white to light green grey, very fine to fine, subangular to subrounded, moderately to well sorted, moderate silica and occasional weak to moderate calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, common green lithics, trace red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace to common micro to fine clear and brown mica flakes, friable to moderately hard, very poor visual porosity, no oil fluorescence.
	40	Claystone: off white to medium green grey, light brown, light to medium grey, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars, quartz and varicoloured lithics, common black to brown carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2157-2160	80	Sandstone: off white to light green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and occasional weak to moderate calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, common green lithics, trace red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace to common micro to fine clear and brown mica flakes, friable to moderately hard, very poor visual porosity, no oil fluorescence.
	20	Claystone: off white to medium green grey, light brown, light to medium grey, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars, quartz and varicoloured lithics, common black to brown carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2160-2169	90	Sandstone: off white to light green grey, very fine to fine, subangular to subrounded, moderately to well sorted, moderate silica and occasional weak to moderate calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, common green lithics, trace red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace to common micro to fine clear and brown mica flakes, friable to moderately hard, very poor visual porosity, no oil fluorescence.
	10	Claystone: off white to medium green grey, light brown, light to medium grey, dominantly light brown grey, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars, quartz and varicoloured lithics, common black to brown carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2169-2175	90	Sandstone: off white to light green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and occasional weak to moderate calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, common green lithics, trace red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace to common micro to fine clear and brown mica flakes, friable to moderately hard, very poor visual porosity, no oil fluorescence.
	10	Claystone: off white to medium green grey, light brown, light to medium grey, dominantly light brown grey, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars, quartz and varicoloured lithics, common black to brown carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.

Interval (m)	%	Description
2175-2178	40	Sandstone: off white to light green grey, very fine to fine, subangular to subrounded, moderately to well sorted, moderate silica and occasional weak to moderate calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, common green lithics, trace red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace to common micro to fine clear and brown mica flakes, friable to moderately hard, very poor visual porosity, no oil fluorescence.
	60	Claystone: off white to medium green grey, light brown, light to medium grey, dominantly medium green grey, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars, quartz and varicoloured lithics, common black to brown carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2178-2181	50	Sandstone: off white to light green grey, very fine to fine, subangular to subrounded, moderately to well sorted, moderate silica and occasional weak to moderate calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, common green lithics, trace red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace to common micro to fine clear and brown mica flakes, friable to moderately hard, very poor visual porosity, no oil fluorescence.
	50	Claystone: off white to medium green grey, light brown, light to medium grey, dominantly very light green grey, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars, quartz and varicoloured lithics, common black to brown carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2181-2184	80	Sandstone: off white to light green grey to light brown grey, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and occasional weak to moderate calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, common green lithics, trace red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace to common micro to fine clear and brown mica flakes, friable to moderately hard, very poor visual porosity, no oil fluorescence.
	20	Claystone: off white to medium green grey, light brown, light to medium grey, dominantly very light green grey, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars, quartz and varicoloured lithics, common black to brown carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2184-2187	40	Sandstone: off white to light green grey to light brown grey, very fine to fine, subangular to subrounded, moderately to well sorted, moderate silica and occasional weak to moderate calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, common green lithics, trace red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace to common micro to fine clear and brown mica flakes, friable to moderately hard, very poor visual porosity, no oil fluorescence.
	60	Claystone: off white to medium green grey, light brown, light to medium grey, dominantly light green grey, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars, quartz and varicoloured lithics, common black to brown carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2187-2190	90	Sandstone: off white to light green grey to light brown grey, very fine to fine, subangular to subrounded, moderately to well sorted, moderate silica and occasional weak to moderate calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, common green lithics, trace red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace to common micro to fine clear and brown mica flakes, friable to moderately hard, very poor visual porosity, no oil fluorescence.

	10	Claystone: off white to medium green grey, light brown, light to medium grey, dominantly light green grey, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars, quartz and varicoloured lithics, common black to brown carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2190-2196	70	Sandstone: off white to light green grey to light brown grey, very fine to fine, subangular to subrounded, moderately to well sorted, moderate silica and occasional weak to moderate calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, common green lithics, trace red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace to common micro to fine clear and brown mica flakes, friable to moderately hard, very poor visual porosity, no oil fluorescence.
	30	Claystone: off white to medium green grey, light brown, light to medium grey, dominantly light green grey, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars, quartz and varicoloured lithics, common black to brown carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2199-2202	90	Sandstone: off white to light green grey to light brown grey, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and occasional weak to moderate calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, common green lithics, trace red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace to common micro to fine clear and brown mica flakes, friable to moderately hard, very poor visual porosity, no oil fluorescence.
	10	Claystone: off white to medium green grey, light brown, light to medium grey, dominantly light green grey, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars, quartz and varicoloured lithics, common black to brown carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2202-2205	60	Sandstone: off white to light green grey to light brown grey, very fine to fine, subangular to subrounded, moderately to well sorted, moderate silica and occasional weak to moderate calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, common green lithics, trace red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace to common micro to fine clear and brown mica flakes, friable to moderately hard, very poor visual porosity, no oil fluorescence.
	40	Claystone: off white to medium green grey, light brown, light to medium grey, dominantly light green grey, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars, quartz and varicoloured lithics, common black to brown carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2205-2207	80	Sandstone: off white to light green grey to light brown grey, very fine to fine, subangular to subrounded, moderately to well sorted, moderate silica and occasional weak to moderate calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, common green lithics, trace red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace to common micro to fine clear and brown mica flakes, friable to moderately hard, very poor visual porosity, no oil fluorescence.
	20	Claystone: off white to medium green grey, light brown, light to medium grey, dominantly light green grey, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars, quartz and varicoloured lithics, common black to brown carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.

Interval (m)	%	Description
2207-2217	10	Sandstone: off white to light green grey, very fine to occasionally fine, subangular to subrounded, moderately to well sorted, moderate silica and weak to moderate calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, trace to common green-red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace micromica, moderately hard, no visual porosity, no oil fluorescence.
	90	Claystone: off white to medium green grey, light brown, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2217-2226	20	Sandstone: off white to light green grey, very fine to occasionally fine, subangular to subrounded, moderately to well sorted, moderate silica and weak to moderate calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, trace to common green-red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace micromica, moderately hard, no visual porosity, no oil fluorescence.
	80	Claystone: off white to medium green grey, light brown, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, trace pyrite, common micromica, firm to moderately hard, subfissile.

CULTUS PETROLEUM N.L. APPENDIX

CUTTINGS DESCRIPTION

WELL NAME:	Blackwood-1	**DATE:**	10-5-96
GEOLOGIST:	Dave Horner	**PAGE:**	1

Interval (m)	%	Description
Continuation for geology report-14		
2226-2235	10	Sandstone: off white to light green grey, very fine to occasionally fine, subangular to subrounded, moderately to well sorted, moderate silica and weak to moderate calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, trace to common green-red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace micromica, moderately hard, no visual porosity, no oil fluorescence.
	90	Claystone: off white to medium green grey, light brown, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2235-2238	20	Sandstone: off white to light green grey, very fine to occasionally fine, subangular to subrounded, moderately to well sorted, moderate silica and weak to moderate calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, trace to common green-red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace micromica, moderately hard, no visual porosity, no oil fluorescence.
	80	Claystone: off white to medium green grey, common light brown, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2238-2241	40	Sandstone: off white to light green grey, very fine to occasionally fine, subangular to subrounded, moderately to well sorted, moderate silica and weak to moderate calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, trace to common green-red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace micromica, moderately hard, no visual porosity, no oil fluorescence.
	60	Claystone: off white to medium green grey, trace light brown, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2241-2244	60	Sandstone: off white to light green grey, very fine to occasionally fine, subangular to subrounded, moderately to well sorted, moderate silica and weak to moderate calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, trace to common green-red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace micromica, moderately hard, no visual porosity, no oil fluorescence.
	40	Claystone: off white to medium green grey, trace light brown, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.

Interval (m)	%	Description PAGE: 2
2244-2247	10	Sandstone: off white to light green grey, very fine to occasionally fine, subangular to subrounded, moderately to well sorted, moderate silica and weak to moderate calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, trace to common green-red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace micromica, moderately hard, no visual porosity, no oil fluorescence.
	90	Claystone: off white to medium green grey, trace light brown, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, trace light green soft soapy anhydrite?, common micromica, firm to moderately hard, subfissile.
2247-2259	100	Claystone: off white to medium green grey, trace light brown, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2259-2262	30	Sandstone: off white to light green grey, very fine to occasionally fine, subangular to subrounded, moderately to well sorted, moderate silica and calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, trace to common green- red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace micromica, moderately hard, no visual porosity, no oil fluorescence.
	70	Claystone: off white to medium green grey, light brown, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2262-2271	50	Sandstone: off white to light green grey, very fine to occasionally fine, subangular to subrounded, moderately to well sorted, moderate silica and calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, trace to common green- red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace micromica, moderately hard, no visual porosity, no oil fluorescence.
	50	Claystone: off white to medium green grey, common light brown, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2271-2274	30	Sandstone: off white to light green grey, silty to very fine, subangular to subrounded, moderately to well sorted, moderate silica and calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, trace to common green- red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace micromica, moderately hard, no visual porosity, no oil fluorescence.
	70	Claystone: off white to medium green grey, common light brown, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2274-2277	40	Sandstone: off white to light green grey, silty to very fine, subangular to subrounded, moderately to well sorted, moderate silica and calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, trace to common green- red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace micromica, moderately hard, no visual porosity, no oil fluorescence.
	60	Claystone: off white to medium green grey, common light brown, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.

2277-2280	40	Sandstone: off white to light green grey, silty to very fine, subangular to subrounded, moderately to well sorted, moderate silica and calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, trace to common green- red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace micromica, moderately hard, no visual porosity, no oil fluorescence.
	60	Claystone: off white to medium green grey, light brown, common medium brown and moderately carbonaceous, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2280-2283	50	Sandstone: off white to light green grey, silty to very fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, trace to common green- red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace micromica, moderately hard, no visual porosity, no oil fluorescence.
	50	Claystone: off white to medium green grey, minor light brown, trace medium brown and moderately carbonaceous, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2283-2286	40	Sandstone: off white to light green grey, silty to very fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, trace to common green- red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace micromica, moderately hard, no visual porosity, no oil fluorescence.
	60	Claystone: off white to medium green grey, minor light brown, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2286-2292	20	Sandstone: off white to light green grey, silty to very fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, trace to common green- red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace micromica, moderately hard, no visual porosity, no oil fluorescence.
	80	Claystone: off white to medium green grey, minor light brown, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2292-2295	60	Sandstone: off white to light green grey, silty to very fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, trace to common green- red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace micromica, moderately hard, no visual porosity, no oil fluorescence.
	40	Claystone: off white to medium green grey, minor light brown, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.

Interval (m)	%	Description	PAGE: 4
2295-2298	80	Sandstone: off white to light green grey, very fine to fine, occasional medium, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, trace to common green- red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace micromica, moderately hard, no visual porosity, no oil fluorescence.
	20	Claystone: off white to medium green grey, minor light brown, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.

CULTUS PETROLEUM N.L. **APPENDIX**

CUTTINGS DESCRIPTION

WELL NAME:	Blackwood-1	**DATE:**	11-5-96
GEOLOGIST:	Dave Horner	**PAGE:**	1

Interval (m)	%	Description
For geology report-15		
2298-2301	40	Sandstone: off white to light brown grey, very fine to fine, rare medium grains, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, trace to common green- red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace micromica, moderately hard, no visual porosity, no oil fluorescence.
	60	Claystone: off white to medium green grey, minor light brown, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2310-2304	70	Sandstone: off white to light brown grey, very fine to fine, rare medium grains, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cement, abundant off white to medium green grey argillaceous and silt matrix - grades to silty claystone, abundant off white partially altered feldspar grains, trace to common green- red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace micromica, moderately hard, no visual porosity, no oil fluorescence.
	30	Claystone: off white to light brown grey, light to medium green grey, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2304-2307	80	Sandstone: off white to light brown grey, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cement, abundant off white argillaceous and silt matrix - grades to claystone, abundant off white partially altered feldspar grains, trace to common green- red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace micromica, moderately hard, no visual porosity, no oil fluorescence.
	20	Claystone: off white to light brown grey, light to medium green grey, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2307-2310	40	Sandstone: off white to light brown grey, very fine to medium, dominantly very fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cement, abundant off white argillaceous and silt matrix - grades to claystone, abundant off white partially altered feldspar grains, trace to common green- red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace micromica, moderately hard, no visual porosity, no oil fluorescence.
	60	Claystone: off white to medium green grey, light to medium grey, light brown grey, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.

Interval (m)	%	Description PAGE: 2
2310-2313	30	Sandstone: off white to light brown grey to medium green, very fine to medium, dominantly very fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cement, abundant off white argillaceous and silt matrix - grades to claystone, abundant off white partially altered feldspar grains, trace to common green- red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace micromica, moderately hard, no visual porosity, no oil fluorescence.
	70	Claystone: off white to medium green grey, light to medium grey, light brown grey, dominantly very light brown, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2313-2316	30	Sandstone: off white to light brown grey to medium green, very fine to medium, dominantly very fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cement, abundant off white argillaceous and silt matrix - grades to claystone, abundant off white partially altered feldspar grains, trace to common green- red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace micromica, moderately hard, no visual porosity, no oil fluorescence.
	70	Claystone: off white to medium green grey, light to medium grey, light brown grey, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2316-2319	20	Sandstone: off white to light brown grey to medium green, very fine to medium, dominantly very fine, subangular to subrounded, moderately to well sorted, moderate silica and weak calcareous cement, abundant off white argillaceous and silt matrix - grades to claystone, abundant off white partially altered feldspar grains, trace to common green- red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace micromica, moderately hard, no visual porosity, no oil fluorescence.
	80	Claystone: off white to medium green grey, light to medium grey, light brown grey, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2319-2325	100	Claystone: off white to medium green grey, light to medium grey, light brown grey, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2325-2328	10	Sandstone: off white to light brown grey to rarely medium green, very fine, subangular to subrounded, moderately to well sorted, moderate silica and trace weak calcareous cement, abundant off white argillaceous matrix - grades to white claystone, abundant off white partially altered feldspar grains, trace to common green- red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace micromica, moderately hard, no visual porosity, no oil fluorescence.
	90	Claystone: off white to medium green grey, light to medium grey, light brown grey, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2328-2331	30	Sandstone: off white to light brown grey to rarely medium green, very fine to rarely fine, subangular to subrounded, moderately to well sorted, moderate silica and trace weak calcareous cement, abundant off white argillaceous matrix - grades to white claystone, abundant off white partially altered feldspar grains, trace to common green- red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace micromica, moderately hard, no visual porosity, no oil fluorescence.
	70	Claystone: off white to medium green grey, light to medium grey, light brown grey, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.

2331-2334	70	Sandstone: off white to light brown grey to rarely medium green, very fine to rarely fine, subangular to subrounded, moderately to well sorted, moderate silica and trace weak calcareous cement, abundant off white argillaceous matrix - grades to white claystone, abundant off white partially altered feldspar grains, trace to common green- red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace micromica, moderately hard, no visual porosity, no oil fluorescence.
	30	Claystone: off white to medium green grey, light to medium grey, light brown grey, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2334-2337	30	Sandstone: off white to light brown grey to rarely medium green, very fine to rarely fine, subangular to subrounded, moderately to well sorted, moderate silica and trace weak calcareous cement, abundant off white argillaceous matrix - grades to white claystone, abundant off white partially altered feldspar grains, trace to common green- red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace micromica, moderately hard, no visual porosity, no oil fluorescence.
	70	Claystone: off white to medium green grey, light to medium grey, light brown grey, dominantly light brown, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2337-2340	10	Sandstone: off white to light brown grey to rarely medium green, very fine to rarely fine, subangular to subrounded, moderately to well sorted, moderate silica and trace weak calcareous cement, abundant off white argillaceous matrix - grades to white claystone, abundant off white partially altered feldspar grains, trace to common green- red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace micromica, moderately hard, no visual porosity, no oil fluorescence.
	90	Claystone: off white to medium green grey, light to medium grey, light brown grey, dominantly light brown, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2340-2343	80	Sandstone: off white to light brown grey to rarely medium green, very fine to rarely fine, subangular to subrounded, moderately to well sorted, moderate silica and trace weak calcareous cement, abundant off white argillaceous matrix - grades to white claystone, abundant off white partially altered feldspar grains, trace to common green- red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace micromica, moderately hard, no visual porosity, no oil fluorescence.
	20	Claystone: off white to medium green grey, light to medium grey, light brown grey, dominantly light brown, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2343-2346	50	Sandstone: off white to light brown grey to rarely medium green, very fine to rarely fine, subangular to subrounded, moderately to well sorted, moderate silica and trace weak calcareous cement, abundant off white argillaceous matrix - grades to white claystone, abundant off white partially altered feldspar grains, trace to common green- red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace micromica, moderately hard, no visual porosity, no oil fluorescence.
	50	Claystone: off white to medium green grey, light to medium grey, light brown grey, dominantly light brown, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.

Interval (m)	%	Description
2346-2349	30	Sandstone: off white to light brown grey to rarely medium green, very fine to rarely fine, subangular to subrounded, moderately to well sorted, moderate silica and trace weak calcareous cement, abundant off white argillaceous matrix - grades to white claystone, abundant off white partially altered feldspar grains, trace to common green- red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace micromica, moderately hard, no visual porosity, no oil fluorescence.
	70	Claystone: off white to medium green grey, light to medium grey, light brown grey, dominantly light brown, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2349-2352	60	Sandstone: off white to light brown grey to rarely medium green, very fine to rarely fine, subangular to subrounded, moderately to well sorted, moderate silica and trace weak calcareous cement, abundant off white argillaceous matrix - grades to white claystone, abundant off white partially altered feldspar grains, trace to common green- red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace micromica, moderately hard, no visual porosity, no oil fluorescence.
	40	Claystone: off white to medium green grey, light to medium grey, light brown grey, dominantly light brown, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2352-2355	80	Sandstone: off white to light brown grey to rarely medium green, very fine to rarely fine, subangular to subrounded, moderately to well sorted, moderate silica and trace weak calcareous cement, abundant off white argillaceous matrix - grades to white claystone, abundant off white partially altered feldspar grains, trace to common green- red-brown-grey-black lithics, trace to occasionally common brown to black carbonaceous matter, trace micromica, moderately hard, no visual porosity, no oil fluorescence.
	20	Claystone: off white to medium green grey, light to medium grey, light brown grey, dominantly light brown, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2355-2358	90	Sandstone: off white to very light green grey, very fine to occasionally medium, dominantly fine, subangular to subrounded, moderately sorted, weak silica and calcareous cements, abundant white to very light green argillaceous matrix - grading to white arenaceous claystone, trace to common green grey red and black lithics, abundant partially altered feldspar grains, trace black to brown carbonaceous detritus, friable, no visual porosity, no oil fluorescence.
	10	Claystone: off white to medium green grey, light to medium grey, light brown grey, dominantly light brown, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2358-2361	80	Sandstone: off white to very light green grey, very fine to occasionally medium, dominantly fine, subangular to subrounded, moderately sorted, weak silica and calcareous cements, abundant white to very light green argillaceous matrix - grading to white arenaceous claystone, trace to common green grey red and black lithics, abundant partially altered feldspar grains, trace black to brown carbonaceous detritus, friable, no visual porosity, no oil fluorescence.
	20	Claystone: off white to medium green grey, light to medium grey, light brown grey, dominantly light brown, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.

Interval (m)	%	Description	PAGE: 5
2361-2364	100	Sandstone: very light green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately sorted, moderate silica and calcareous cements, abundant very light green argillaceous matrix, abundant partially altered feldspar grains, common grey green and black lithics, trace red brown lithics, trace black carbonaceous detritus, friable, nil to very poor visual porosity, no oil fluorescence.
2364-2367	90	Sandstone: very light green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately sorted, moderate silica and calcareous cements, abundant very light green argillaceous matrix, abundant partially altered feldspar grains, common grey green and black lithics, trace red brown lithics, trace black carbonaceous detritus, friable, nil to very poor visual porosity, no oil fluorescence.
	10	Claystone: off white to medium green grey, light to medium grey, light brown grey, dominantly light brown, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2367-2370	70	Sandstone: very light green grey, very fine to fine, dominantly very fine, subangular to subrounded, moderately sorted, moderate silica and weak calcareous cement, abundant very light green argillaceous matrix - matrix supported, abundant partially altered feldspar grains, trace to common grey green and black lithics, trace red brown lithics, trace black carbonaceous detritus, friable, no visual porosity, no oil fluorescence.
	30	Claystone: off white to medium green grey, light to medium grey, light brown grey, dominantly light brown, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2370-2376	100	Sandstone: very light green grey, very fine to fine, dominantly very fine, subangular to subrounded, moderately sorted, moderate silica and weak calcareous cement, abundant very light green argillaceous matrix - matrix supported, abundant partially altered feldspar grains, trace to common grey green and black lithics, trace red brown lithics, trace black carbonaceous detritus, friable, no visual porosity, no oil fluorescence.
2376-2379	80	Sandstone: very light green grey, very fine to fine, dominantly very fine, subangular to subrounded, moderately sorted, moderate silica and weak calcareous cement, abundant very light green argillaceous matrix - matrix supported, abundant partially altered feldspar grains, trace to common grey green and black lithics, trace red brown lithics, trace black carbonaceous detritus, friable, no visual porosity, no oil fluorescence.
	20	Claystone: off white to medium green grey, light to medium grey, light brown grey, dominantly light to medium brown and moderately carbonaceous, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2379-2383	100	Sandstone: very light green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately sorted, moderate silica and weak calcareous cement, abundant very light green argillaceous matrix - matrix supported, abundant partially altered feldspar grains, trace to common grey green and black lithics, trace red brown lithics, trace black carbonaceous detritus, friable, no visual porosity, no oil fluorescence.

(AJ/GFE:F53)

CULTUS PETROLEUM N.L. APPENDIX

CUTTINGS DESCRIPTION

WELL NAME:	Blackwood-1	**DATE:**	12-5-96
GEOLOGIST:	Dave Horner	**PAGE:**	1

Interval (m)	%	Description
For geology report-16		
2383-2385	30	Poor sample due to abundant cavings after trip. Sandstone: very light green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately sorted, moderate silica and calcareous cements, abundant very light green argillaceous matrix, abundant partially altered feldspar grains, common grey green and black lithics, trace red brown lithics, trace black carbonaceous detritus, friable, nil to very poor visual porosity, no oil fluorescence.
	70	Claystone: off white to medium green grey, light to medium grey, light brown grey, dominantly light brown, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2385-2388	90	Sandstone: very light green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately sorted, moderate silica cement, trace weak calcareous cement, abundant very light green argillaceous matrix - matrix supported, abundant partially altered feldspar grains, common grey green and black lithics, trace red brown lithics, trace black carbonaceous detritus, trace pyrite, friable, nil to very poor visual porosity, no oil fluorescence.
	10	Claystone: off white to medium green grey, light to medium grey, light brown grey, dominantly light brown, often very silty gading to argillaceous siltstone, often very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2388-2391	100	Sandstone: very light green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately sorted, moderate silica cement, trace weak calcareous cement, abundant very light green argillaceous matrix - matrix supported, abundant partially altered feldspar grains, common grey green and black lithics, trace red brown lithics, trace black carbonaceous detritus, friable, nil to very poor visual porosity, no oil fluorescence.
2391-2394	90	Sandstone: very light green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately sorted, moderate silica cement, trace weak calcareous cement, abundant very light green argillaceous matrix - matrix supported, abundant partially altered feldspar grains, common grey green and black lithics, trace red brown lithics, trace black carbonaceous detritus, friable, nil to very poor visual porosity, no oil fluorescence.
	10	Claystone: off white to medium green grey, light brown, often very silty gading to argillaceous siltstone, occasionally very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.
2394-2397	50	Sandstone: very light green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately sorted, moderate silica cement, trace weak calcareous cement, abundant very light green argillaceous matrix - matrix supported, abundant partially altered feldspar grains, common grey green and black lithics, trace red brown lithics, trace black carbonaceous detritus, friable, nil to very poor visual porosity, no oil fluorescence.
	50	Claystone: off white to medium green grey, light brown, often very silty gading to argillaceous siltstone, occasionally very finely arenaceous with partially altered feldspars and minor quartz and varicoloured lithics, trace black carbonaceous matter and flecks, common micromica, firm to moderately hard, subfissile.

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2397-2400	40	Sandstone: off white to very light brown grey, very fine to fine, dominantly fine, subangular to subrounded, moderately sorted, moderate silica cement, trace weak calcareous cement, abundant off white argillaceous matrix - grading to arenaceous white claystone, abundant altered feldspar grains, trace to common grey green and black lithics, trace red brown lithics, trace black carbonaceous detritus, friable, no visual porosity, no oil fluorescence.
	60	Claystone: off white to light brown, light grey to medium green grey, non to occasionally very silty, rarely very finely to finely arenaceous with altered feldspar grains and minor quartz and varicoloured lithics, trace to common black carbonaceous flecks and detritus, trace to common micromica, firm to moderately hard, subfissile.
2400-2403	50	Sandstone: off white to very light brown grey, very fine to fine, dominantly fine, subangular to subrounded, moderately sorted, moderate silica cement, trace weak calcareous cement, abundant off white argillaceous matrix - grading to arenaceous white claystone, abundant altered feldspar grains, trace to common grey green and black lithics, trace red brown lithics, trace black carbonaceous detritus, friable, no visual porosity, no oil fluorescence.
	50	Claystone: off white to light brown, light grey to medium green grey, non to occasionally very silty, rarely very finely to finely arenaceous with altered feldspar grains and minor quartz and varicoloured lithics, trace to common black carbonaceous flecks and detritus, trace to common micromica, firm to moderately hard, subfissile.
2403-2406	70	Sandstone: off white to very light brown grey, very fine to fine, dominantly fine, subangular to subrounded, moderately sorted, moderate silica cement, trace weak calcareous cement, abundant off white argillaceous matrix - grading to arenaceous white claystone, abundant altered feldspar grains, trace to common grey green and black lithics, trace red brown lithics, trace black carbonaceous detritus, friable, no visual porosity, no oil fluorescence.
	30	Claystone: off white to light brown, light grey to medium green grey, non to occasionally very silty, rarely very finely to finely arenaceous with altered feldspar grains and minor quartz and varicoloured lithics, trace to common black carbonaceous flecks and detritus, trace to common micromica, firm to moderately hard, subfissile.
2406-2409	80	Sandstone: off white to very light brown grey, very fine to medium, dominantly fine, subangular to subrounded, moderately sorted, moderate silica cement, trace weak calcareous cement, abundant off white argillaceous matrix - grading to arenaceous white claystone, abundant altered feldspar grains, trace to common grey green and black lithics, trace red brown lithics, trace black carbonaceous detritus, friable, no visual porosity, no oil fluorescence.
	20	Claystone: off white to light brown, light grey to medium green grey, minor medium brown, non to occasionally very silty, rarely very finely to finely arenaceous with altered feldspar grains and minor quartz and varicoloured lithics, trace to common black carbonaceous flecks and detritus, trace to common micromica, firm to moderately hard, subfissile.
2409-2412	80	Sandstone: off white to very light brown grey, very fine to fine, dominantly very fine, subangular to subrounded, moderately sorted, moderate silica cement, trace weak calcareous cement, abundant off white argillaceous matrix - grading to arenaceous white claystone, abundant altered feldspar grains, trace to common grey green and black lithics, trace red brown lithics, trace black carbonaceous detritus, friable, no visual porosity, no oil fluorescence.
	20	Claystone: off white to light brown, light grey to medium green grey, common medium brown and dark grey, non to occasionally very silty, rarely very finely to finely arenaceous with altered feldspar grains and minor quartz and varicoloured lithics, trace to common black carbonaceous flecks and detritus, trace to common micromica, firm to moderately hard, subfissile.

Interval (m)	%	Description
2412-2418	70	Sandstone: off white to very light brown grey, very fine to fine, dominantly very fine, subangular to subrounded, moderately sorted, moderate silica cement, trace weak calcareous cement, abundant off white argillaceous matrix - grading to arenaceous white claystone, abundant altered feldspar grains, trace to common grey green and black lithics, trace red brown lithics, trace black carbonaceous detritus, friable, no visual porosity, no oil fluorescence.
	30	Claystone: off white to medium brown, light grey to medium green grey, non to occasionally very silty, rarely very finely to finely arenaceous with altered feldspar grains and minor quartz and varicoloured lithics, trace to common black carbonaceous flecks and detritus, trace to common micromica, firm to moderately hard, subfissile.
2418-2421	80	Sandstone: off white to very light brown grey, very fine to occasionally fine, subangular to subrounded, moderately sorted, moderate silica cement, trace weak calcareous cement, abundant off white argillaceous matrix - grading to arenaceous white claystone, abundant altered feldspar grains, trace to common grey green and black lithics, trace red brown lithics, trace black carbonaceous detritus, friable, no visual porosity, no oil fluorescence.
	20	Claystone: off white to medium brown, light grey to medium green grey, non to occasionally very silty, rarely very finely to finely arenaceous with altered feldspar grains and minor quartz and varicoloured lithics, trace to common black carbonaceous flecks and detritus, trace to common micromica, firm to moderately hard, subfissile.
2421-2424	90	Sandstone: off white to very light brown grey, very fine to fine, subangular to subrounded, moderately sorted, moderate silica cement, trace weak calcareous cement, abundant off white argillaceous matrix - grading to arenaceous white claystone, abundant altered feldspar grains, trace to common grey green and black lithics, trace red brown lithics, trace black carbonaceous detritus, friable, no visual porosity, no oil fluorescence.
	10	Claystone: off white to medium brown, light grey to medium green grey, non to occasionally very silty, rarely very finely to finely arenaceous with altered feldspar grains and minor quartz and varicoloured lithics, trace to common black carbonaceous flecks and detritus, trace to common micromica, firm to moderately hard, subfissile.
2424-2430	90	Sandstone: off white to very light brown grey, very fine to occasionally medium, dominantly fine, subangular to subrounded, moderately sorted, moderate silica cement, trace weak calcareous cement, abundant off white argillaceous matrix - grading to arenaceous white claystone, abundant altered feldspar grains, trace to common grey green and black lithics, trace red brown lithics, trace black carbonaceous detritus, friable, very poor visual porosity, no oil fluorescence.
	10	Claystone: off white to medium brown, light grey to medium green grey, non to occasionally very silty, rarely very finely to finely arenaceous with altered feldspar grains and minor quartz and varicoloured lithics, trace to common black carbonaceous flecks and detritus, trace to common micromica, firm to moderately hard, subfissile.
2430-2448	100	Sandstone: off white to very light green grey to very light brown grey, very fine to occasionally medium, dominantly fine, subangular to subrounded, moderately sorted, moderate silica cement, trace weak calcareous cement, abundant off white argillaceous matrix - grading to arenaceous white claystone, abundant altered feldspar grains, trace to common grey green and black lithics, trace red brown lithics, trace black carbonaceous detritus, friable, very poor visual porosity, no oil fluorescence.
2448-2454	90	Sandstone: off white to very light green grey to very light brown grey, very fine to occasionally medium, dominantly fine, subangular to subrounded, moderately sorted, moderate silica cement, trace weak calcareous cement, abundant off white argillaceous matrix - grading to arenaceous white claystone, abundant altered feldspar grains, trace to common grey green and black lithics, trace red brown lithics, trace black carbonaceous detritus, friable, very poor visual porosity, no oil fluorescence.
	10	Claystone: off white to medium brown, light grey to medium green grey, minor very dark brown and grading to argillaceous coal, non to occasionally very silty, rarely very finely to finely arenaceous with altered feldspar grains and minor quartz and varicoloured lithics, trace to common black carbonaceous flecks and detritus, trace to common micromica, firm to moderately hard, subfissile.

2454-2457	100	Sandstone: off white to very light green grey to very light brown grey, very fine to occasionally medium, dominantly fine, subangular to subrounded, moderately sorted, moderate silica cement, trace weak calcareous cement, abundant off white argillaceous matrix - grading to arenaceous white claystone, abundant altered feldspar grains, trace to common grey green and black lithics, trace red brown lithics, trace black carbonaceous detritus, friable, very poor visual porosity, no oil fluorescence.
2457-2478	100	Sandstone: light green, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica cement, abundant light green argillaceous matrix - matrix supported, abundant off white partially altered feldspar grains, trace to common green grey red brown black lithics, trace coarse brown mica flakes, trace black carbonaceous matter, moderately hard, very poor visual porosity, no oil fluorescence.
2478-2496	100	Sandstone: light green, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica cement, trace weak calcareous cement, abundant light green argillaceous matrix - matrix supported, abundant off white partially altered feldspar grains, trace to common green grey red brown black lithics, trace coarse brown mica flakes, trace black carbonaceous matter, moderately hard, very poor visual porosity, no oil fluorescence.
2496-2499	100	Sandstone: light green, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica cement, trace weak calcareous cement, abundant light green argillaceous matrix - matrix supported, abundant off white partially altered feldspar grains, trace to common green grey red brown black lithics, trace coarse brown mica flakes, trace black carbonaceous matter, moderately hard, very poor visual porosity, no oil fluorescence.
	Tr	Claystone: light green grey, very silty, occasionally very finely arenaceous with altered feldspar grains, trace black carbonaceous flecks, moderately hard, moderately dispersive, subfissile.
2499-2502	100	Sandstone: light green, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica cement, trace weak calcareous cement, abundant light green argillaceous matrix - matrix supported, abundant off white partially altered feldspar grains, trace to common green grey red brown black lithics, trace coarse brown mica flakes, trace black carbonaceous matter, moderately hard, very poor visual porosity, no oil fluorescence.
2502-2505	95	Sandstone: light green, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica cement, trace weak calcareous cement, abundant light green argillaceous matrix - matrix supported, abundant off white partially altered feldspar grains, trace to common green grey red brown black lithics, trace coarse brown mica flakes, trace black carbonaceous matter, moderately hard, very poor visual porosity, no oil fluorescence.
	5	Claystone: light green grey, very silty, occasionally very finely arenaceous with altered feldspar grains, trace black carbonaceous flecks, moderately hard, moderately dispersive, subfissile.
2505-2508	100	Sandstone: light green, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica cement, moderate calcareous cement, abundant light green argillaceous matrix - matrix supported, abundant off white partially altered feldspar grains, trace to common green grey red brown black lithics, trace coarse brown mica flakes, trace black carbonaceous matter, moderately hard, very poor visual porosity, no oil fluorescence.
2508-2511	70	Sandstone: light green, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica cement, trace weak calcareous cement, abundant light green argillaceous matrix - matrix supported, abundant off white partially altered feldspar grains, trace to common green grey red brown black lithics, trace coarse brown mica flakes, trace black carbonaceous matter, moderately hard, very poor visual porosity, no oil fluorescence.
	30	Claystone: light green grey, very silty, occasionally very finely arenaceous with altered feldspar grains, trace black carbonaceous flecks, moderately hard, moderately dispersive, subfissile.

2511-2514	80	Sandstone: light green, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica cement, trace weak calcareous cement, abundant light green argillaceous matrix - matrix supported, abundant off white partially altered feldspar grains, trace to common green grey red brown black lithics, trace coarse brown mica flakes, trace black carbonaceous matter, moderately hard, very poor visual porosity, no oil fluorescence.
	20	Claystone: light green grey, very silty, occasionally very finely arenaceous with altered feldspar grains, trace black carbonaceous flecks, moderately hard, moderately dispersive, subfissile.
2514-2523	90	Sandstone: off white to light green, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica cement, trace weak calcareous cement, abundant light green argillaceous matrix - matrix supported, abundant off white partially altered feldspar grains, trace to common green grey red brown black lithics, trace coarse brown mica flakes, trace black carbonaceous matter, moderately hard, very poor visual porosity, no oil fluorescence.
	10	Claystone: light green grey, very silty, occasionally very finely arenaceous with altered feldspar grains, trace black carbonaceous flecks, moderately hard, moderately dispersive, subfissile.
2523-2529	100	Sandstone: off white to light green, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica cement, trace weak calcareous cement, abundant light green argillaceous matrix - matrix supported, abundant off white partially altered feldspar grains, trace to common green grey red brown black lithics, trace coarse brown mica flakes, trace black carbonaceous matter, moderately hard, very poor visual porosity, no oil fluorescence.
	Tr	Claystone: light green grey, very silty, occasionally very finely arenaceous with altered feldspar grains, trace black carbonaceous flecks, moderately hard, moderately dispersive, subfissile.
2529-2535	100	Sandstone: off white to light green, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica cement, trace weak calcareous cement, abundant light green argillaceous matrix - matrix supported, abundant off white partially altered feldspar grains, trace to common green grey red brown black lithics, trace coarse brown mica flakes, trace black carbonaceous matter, moderately hard, very poor visual porosity, no oil fluorescence.
2535-2538	90	Sandstone: off white to light green, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica cement, trace weak calcareous cement, abundant light green argillaceous matrix - matrix supported, abundant off white partially altered feldspar grains, trace to common green grey red brown black lithics, trace coarse brown mica flakes, trace black carbonaceous matter, moderately hard, very poor visual porosity, no oil fluorescence.
	10	Claystone: light to medium brown grey, very silty, common dispersed very fine altered feldspar grains, common black carbonaceous flecks and detrital, common micromica, firm, subfissile.
2538-2541	70	Sandstone: off white to light green, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica cement, trace weak calcareous cement, abundant off white argillaceous matrix - grading to white arenaceous claystone, abundant off white partially altered feldspar grains, trace to common green grey red brown black lithics, trace coarse brown mica flakes, trace black carbonaceous matter, moderately hard, very poor visual porosity, no oil fluorescence.
	30	Claystone: light to medium brown grey to medium brown, very silty, common dispersed very fine altered feldspar grains, common black carbonaceous flecks and detrital, common micromica, firm, subfissile.

Interval (m)	%	Description	PAGE: 6
2541-2544	70	Sandstone: off white to light green, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica cement, trace weak calcareous cement, abundant off white argillaceous matrix - grading to white arenaceous claystone, abundant off white partially altered feldspar grains, trace to common green grey red brown black lithics, common coarse brown mica flakes, trace black carbonaceous matter, moderately hard, very poor visual porosity, no oil fluorescence.
	30	Claystone: light to medium brown grey to medium brown, very silty, common dispersed very fine altered feldspar grains, common black carbonaceous flecks and detrital, common micromica, firm, subfissile.
2544-2547	50	Sandstone: off white to light green, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica cement, trace weak calcareous cement, abundant off white argillaceous matrix - grading to white arenaceous claystone, abundant off white partially altered feldspar grains, trace to common green grey red brown black lithics, common coarse brown mica flakes, trace black carbonaceous matter, moderately hard, very poor visual porosity, no oil fluorescence.
	50	Claystone: light to medium brown grey to medium brown, very silty, common dispersed very fine altered feldspar grains, common black carbonaceous flecks and detrital, common micromica, firm, subfissile.
2547-2550	60	Sandstone: off white to light green, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica cement, trace weak calcareous cement, abundant off white argillaceous matrix - grading to white arenaceous claystone, abundant off white partially altered feldspar grains, trace to common green grey red brown black lithics, common coarse brown mica flakes, common black coaly detritus and laminae, moderately hard, very poor visual porosity, no oil fluorescence.
	40	Claystone: light to medium brown grey to medium brown, very silty, common dispersed very fine altered feldspar grains, common to abundant black coaly detrital and laminae, common micromica, firm, subfissile.
2550-2553	60	Sandstone: off white to very light green, very fine to occasionally fine, subangular to subrounded, moderately to well sorted, moderate silica cement, trace weak calcareous cement, abundant off white argillaceous matrix - grading to white arenaceous claystone, abundant off white partially altered feldspar grains, trace to common green grey red brown black lithics, common coarse brown mica flakes, trace black coaly detritus, moderately hard, no visual porosity, no oil fluorescence.
	40	Claystone: light to medium brown grey to medium brown, very silty, common dispersed very fine altered feldspar grains, trace to common black carbonaceous flecks and detrital, common micromica, firm, subfissile.
2553-2556	50	Sandstone: off white to very light green, very fine to occasionally fine, subangular to subrounded, moderately to well sorted, moderate silica cement, trace weak calcareous cement, abundant off white argillaceous matrix - grading to white arenaceous claystone, abundant off white partially altered feldspar grains, trace to common green grey red brown black lithics, common coarse brown mica flakes, trace black coaly detritus, moderately hard, no visual porosity, no oil fluorescence.
	50	Claystone: off white to medium grey, light to medium brown, very silty, often very finely arenaceous with altered feldspar grains and minor quartz and varicoloured lithics, common black carbonaceous flecks, common micromica, moderately hard, moderately dispersive, subfissile.

CULTUS PETROLEUM N.L. **APPENDIX**

CUTTINGS DESCRIPTION

WELL NAME:	Blackwood-1	**DATE:**	13-5-96
GEOLOGIST:	Dave Horner	**PAGE:**	1

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Interval (m)	%	Description
2556-2559	50	Sandstone: off white to very light green, very fine to occasionally fine, subangular to subrounded, moderately to well sorted, moderate silica cement, trace weak calcareous cement, abundant off white argillaceous matrix - grading to white arenaceous claystone, abundant off white partially altered feldspar grains, trace to common green grey red brown black lithics, common coarse brown mica flakes, trace black coaly detritus, moderately hard, very poor visual porosity, no oil fluorescence.
	50	Claystone: off white to light brown, medium grey, very silty, often very finely arenaceous with altered feldspar grains and minor quartz and varicoloured lithics, common black carbonaceous flecks, common micromica, moderately hard, moderately dispersive, subfissile.
2559-2562	60	Sandstone: off white to very light green, very fine to occasionally fine, subangular to subrounded, moderately to well sorted, moderate silica cement, trace weak calcareous cement, abundant off white argillaceous matrix - grading to white arenaceous claystone, abundant off white partially altered feldspar grains, trace to common green grey red brown black lithics, common coarse brown mica flakes, trace black coaly detritus, moderately hard, very poor visual porosity, no oil fluorescence.
	40	Claystone: off white to light brown, medium grey, very silty, often very finely arenaceous with altered feldspar grains and minor quartz and varicoloured lithics, common black carbonaceous flecks, common micromica, moderately hard, moderately dispersive, subfissile.
2562-2565	80	Sandstone: off white to light grey to light greenish grey, very fine to fine, subangular to subrounded, moderately to well sorted, moderate silica cement, abundant white argillaceous matrix, abundant altered feldspar grains, common green grey black lithics, trace red brown lithics, trace to common coarse brown mica flakes, common brown to black carbonaceous matter, moderately hard, very poor visual porosity, no oil fluorescence.
	20	Claystone: off white to light brown, medium grey, very silty, often very finely arenaceous with altered feldspar grains and minor quartz and varicoloured lithics, common black carbonaceous flecks, common micromica, moderately hard, moderately dispersive, subfissile.
2565-2568	90	Sandstone: off white to light grey to light green, very fine to fine, subangular to subrounded, moderately to well sorted, moderate silica cement, abundant white argillaceous matrix, abundant altered feldspar grains, common green grey black lithics, trace red brown lithics, trace to common coarse brown mica flakes, common brown to black carbonaceous matter, moderately hard, very poor visual porosity, no oil fluorescence.
	10	Claystone: off white to light brown, medium grey, very silty, often very finely arenaceous with altered feldspar grains and minor quartz and varicoloured lithics, common black carbonaceous flecks, common micromica, moderately hard, moderately dispersive, subfissile.
2568-2574	100	Sandstone: off white to medium green grey, very fine to medium, dominantly fine to medium, subangular to subrounded, moderately to well sorted, moderate silica cement, trace weak calcareous cement, abundant white argillaceous matrix, abundant altered feldspar grains, common green grey black lithics, trace red brown lithics, trace to common coarse brown mica flakes, common brown to black carbonaceous matter, moderately hard, very poor visual porosity, no oil fluorescence.

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2574-2577	100	Sandstone: off white to medium green grey, very fine to medium, dominantly fine to medium, subangular to subrounded, moderately to well sorted, moderate silica cement, trace weak calcareous cement, abundant white argillaceous matrix, abundant altered feldspar grains, common green grey black lithics, trace red brown lithics, trace to common coarse brown mica flakes, common brown to black carbonaceous matter, moderately hard, very poor visual porosity, no oil fluorescence.
	Tr	Claystone: off white to medium green grey, light brown grey to medium grey, very silty, often very finely arenaceous with altered feldspar grains and minor quartz and varicoloured lithics, common black carbonaceous flecks, common micromica, trace fine brown mica flakes in part, moderately hard, moderately dispersive, subfissile.
2577-2580	100	Sandstone: off white to medium green grey, very fine to medium, dominantly fine to medium, subangular to subrounded, moderately to well sorted, moderate silica cement, trace weak calcareous cement, abundant white argillaceous matrix, abundant altered feldspar grains, common green grey black lithics, trace red brown lithics, trace to common coarse brown mica flakes, common brown to black carbonaceous matter, moderately hard, very poor visual porosity, no oil fluorescence.
	Tr	Claystone: off white to medium green grey, light brown grey to medium grey, very silty, often very finely arenaceous with altered feldspar grains and minor quartz and varicoloured lithics, common black carbonaceous flecks, common micromica, trace fine brown mica flakes in part, moderately hard, moderately dispersive, subfissile.
2580-2583	100	Sandstone: off white to medium green grey, very fine to medium, dominantly fine to medium, subangular to subrounded, moderately to well sorted, moderate silica cement, trace weak calcareous cement, abundant white argillaceous matrix, abundant altered feldspar grains, common green grey black lithics, trace red brown lithics, trace to common coarse brown mica flakes, common to abundant brown to black carbonaceous matter, moderately hard, very poor visual porosity, no oil fluorescence.
	Tr	Claystone: off white to medium green grey, light brown grey to medium grey, very silty, often very finely arenaceous with altered feldspar grains and minor quartz and varicoloured lithics, common black carbonaceous flecks, common micromica, trace fine brown mica flakes in part, moderately hard, moderately dispersive, subfissile.
2583-2604	100	Sandstone: off white to medium green grey, very fine to medium, dominantly fine to medium, subangular to subrounded, moderately to well sorted, moderate silica cement, trace weak calcareous cement, abundant white argillaceous matrix, abundant altered feldspar grains, common green grey black lithics, trace red brown lithics, trace to common coarse brown mica flakes, common brown to black carbonaceous matter, moderately hard, very poor visual porosity, no oil fluorescence.
2604-2607	100	Sandstone: off white to medium green grey, very fine to medium, dominantly fine to medium, subangular to subrounded, moderately to well sorted, moderate silica cement, trace weak calcareous cement, abundant white argillaceous matrix, abundant altered feldspar grains, common green grey black lithics, trace red brown lithics, trace to common coarse brown mica flakes, common brown to black carbonaceous matter, moderately hard, very poor visual porosity, no oil fluorescence.
	Tr	Claystone: off white to medium green grey, light brown grey to medium grey, very silty, often very finely arenaceous with altered feldspar grains and minor quartz and varicoloured lithics, common black carbonaceous flecks, common micromica, common fine brown mica flakes in part, moderately hard, moderately dispersive, subfissile.
2607-2610	100	Sandstone: off white to very light green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica cement, trace weak calcareous cement, abundant white argillaceous matrix - matrix supported, abundant altered feldspar grains, common green grey black lithics, trace red brown lithics, trace to common coarse brown mica flakes, common brown to black carbonaceous matter, moderately hard, very poor visual porosity, no oil fluorescence.
	Tr	Claystone: off white to medium green grey, light brown grey to medium grey, very silty, often very finely arenaceous with altered feldspar grains and minor quartz and varicoloured lithics, common black carbonaceous flecks, common micromica, common fine brown mica flakes in part, moderately hard, moderately dispersive, subfissile.

Interval (m)	%	Description
2610-2613	90	Sandstone: off white to very light green grey, very fine to dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica cement, trace weak calcareous cement, abundant white argillaceous matrix - matrix supported, abundant altered feldspar grains, common green grey black lithics, trace red brown lithics, trace to common coarse brown mica flakes, common brown to black carbonaceous matter, moderately hard, nil to very poor visual porosity, no oil fluorescence.
	10	Claystone: off white to medium green grey, light brown to medium grey, very silty, often very finely arenaceous with altered feldspar grains and minor quartz and varicoloured lithics, common black carbonaceous flecks, common micromica, common fine brown mica flakes in part, moderately hard, moderately dispersive, subfissile.
2613-2616	80	Sandstone: off white to very light green grey, very fine to occasionally fine, subangular to subrounded, moderately to well sorted, moderate silica cement, trace weak calcareous cement, abundant white argillaceous matrix - grades to white arenaceous claystone, abundant altered feldspar grains, common green grey black lithics, trace red brown lithics, trace to common coarse brown mica flakes, common brown to black carbonaceous matter, moderately hard, no visual porosity, no oil fluorescence.
	20	Claystone: off white to medium green grey, light brown to medium grey, very silty, often very finely arenaceous with altered feldspar grains and minor quartz and varicoloured lithics, common black carbonaceous flecks, common micromica, common fine brown mica flakes in part, moderately hard, moderately dispersive, subfissile.
2616-2619	70	Sandstone: off white to very light green grey, very fine to occasionally fine, subangular to subrounded, moderately to well sorted, moderate silica cement, trace weak calcareous cement, abundant white argillaceous matrix - grades to white arenaceous claystone, abundant altered feldspar grains, common green grey black lithics, trace red brown lithics, trace to common coarse brown mica flakes, common brown to black carbonaceous matter, moderately hard, no visual porosity, no oil fluorescence.
	30	Claystone: off white to light brown to medium grey to medium green grey, very silty, often very finely arenaceous with altered feldspar grains and minor quartz and varicoloured lithics, common black carbonaceous flecks and occasional detritus, common micromica, common fine brown mica flakes in part, moderately hard, moderately dispersive, subfissile.
2619-2622	90	Sandstone: off white to very light green grey, very fine to occasionally medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica cement, trace weak calcareous cement, abundant white argillaceous matrix - grades to white arenaceous claystone, abundant altered feldspar grains, common green grey black lithics, trace red brown lithics, trace to common coarse brown mica flakes, common to abundant brown to black carbonaceous matter, moderately hard, very poor visual porosity, no oil fluorescence.
	10	Claystone: off white to light brown to medium grey to medium green grey, very silty, often very finely arenaceous with altered feldspar grains and minor quartz and varicoloured lithics, common black carbonaceous flecks and occasional detritus, common micromica, common fine brown mica flakes in part, moderately hard, moderately dispersive, subfissile.
2622-2628	100	Sandstone: off white to very light green grey, very fine to medium, dominantly medium, subangular to subrounded, moderately to well sorted, moderate silica cement, trace weak calcareous cement, abundant white argillaceous matrix - grades to white arenaceous claystone, abundant altered feldspar grains, common green grey black lithics, trace red brown lithics, trace to common coarse brown mica flakes, common to abundant brown to black carbonaceous matter, moderately hard, very poor visual porosity, no oil fluorescence.
	Tr	Claystone: off white to light brown to medium grey to medium green grey, very silty, often very finely arenaceous with altered feldspar grains and minor quartz and varicoloured lithics, common black carbonaceous flecks and occasional detritus, common micromica, common fine brown mica flakes in part, moderately hard, moderately dispersive, subfissile.
2628-2637	70	Sandstone: off white to very light green grey, very fine to medium, dominantly very fine, subangular to subrounded, moderately to well sorted, moderate silica cement, trace weak calcareous cement, abundant white argillaceous matrix - grades to white arenaceous claystone, abundant altered feldspar grains, common green grey black lithics, trace red brown lithics, trace to common coarse brown mica flakes, common to abundant brown to black carbonaceous matter, moderately hard, very poor visual porosity, no oil fluorescence.

Interval (m)	%	Description
	30	Claystone: off white to light brown to medium grey to medium green grey, very silty grading to siltstone, often very finely arenaceous with altered feldspar grains and minor quartz and varicoloured lithics, common black carbonaceous flecks and occasional detritus, common micromica, common fine brown mica flakes in part, moderately hard, moderately dispersive, subfissile.
2637-2640	60	Sandstone: off white to very light green grey, very fine to medium, dominantly very fine, subangular to subrounded, moderately to well sorted, moderate silica cement, trace weak calcareous cement, abundant white argillaceous matrix - grades to white arenaceous claystone, abundant altered feldspar grains, common green grey black lithics, trace red brown lithics, trace to common coarse brown mica flakes, common to abundant brown to black carbonaceous matter, moderately hard, very poor visual porosity, no oil fluorescence.
	40	Claystone: off white to light brown to medium grey to medium green grey, very silty grading to siltstone, often very finely arenaceous with altered feldspar grains and minor quartz and varicoloured lithics, common black carbonaceous flecks and occasional detritus, common micromica, common fine brown mica flakes in part, moderately hard, moderately dispersive, subfissile.
2640-2643	70	Sandstone: off white to very light green grey, very fine to fine, occasionally medium, subangular to subrounded, moderately to well sorted, moderate silica cement, trace weak calcareous cement, abundant white argillaceous matrix - grades to white arenaceous claystone, abundant altered feldspar grains, common green grey black lithics, trace red brown lithics, trace to common coarse brown mica flakes, common brown to black carbonaceous matter, moderately hard, very poor visual porosity, no oil fluorescence.
	30	Claystone: off white to light brown to medium grey to medium green grey, very silty grading to siltstone, often very finely arenaceous with altered feldspar grains and minor quartz and varicoloured lithics, common black carbonaceous flecks and occasional detritus, common micromica, common fine brown mica flakes in part, moderately hard, moderately dispersive, subfissile.
2643-2646	80	Sandstone: off white to very light green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica cement, trace weak calcareous cement, abundant white argillaceous matrix - grades to white arenaceous claystone, abundant altered feldspar grains, common green grey black lithics, trace red brown lithics, trace coarse brown mica flakes, common brown to black carbonaceous matter, moderately hard, very poor visual porosity, no oil fluorescence.
	20	Claystone: off white to light brown to medium grey to medium green grey, very silty grading to siltstone, often very finely arenaceous with altered feldspar grains and minor quartz and varicoloured lithics, common black carbonaceous flecks and occasional detritus, common micromica, common fine brown mica flakes in part, moderately hard, moderately dispersive, subfissile.
2646-2650	100	Sandstone: off white to very light green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica cement, trace weak calcareous cement, abundant white argillaceous matrix - grades to white arenaceous claystone, abundant altered feldspar grains, common green grey black lithics, trace red brown lithics, trace coarse brown mica flakes, common brown to black carbonaceous matter, moderately hard, very poor visual porosity, no oil fluorescence.
T.D.	Tr	Sandstone: off white to very light green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately to well sorted, moderate silica cement, trace weak calcareous cement, abundant white argillaceous matrix - grades to white arenaceous claystone, abundant altered feldspar grains, common green grey black lithics, trace red brown lithics, trace coarse brown mica flakes, common brown to black carbonaceous matter, moderately hard, very poor visual porosity, no oil fluorescence.

APPENDIX 2

SIDEWALL CORE DESCRIPTIONS

CULTUS PETROLEUM N.L.	APPENDIX **SIDEWALL CORE DESCRIPTION**

WELL NAME:	Blackwood-1	**DATE:**	14-5-96
GEOLOGIST:	Dave Horner	**PAGE:**	1

SWC No.	DEPTH (m)	REC'D (mm)	DESCRIPTION
Cut 24 Recovered 22			
1	2634.7	23	Claystone: medium blue green grey, slightly silty, trace very fine black carbonaceous flecks, trace micromica, moderately hard, slightly subfissile.
2	2625.8	10	Silty Sandstone: medium grey, silt to very fine, strong silica cement, no visible matrix, quartzose, common very fine altered feldspars, trace black carbonaceous flecks, hard, no visual porosity, no oil fluorescence.
3	2620.7	13	Sandstone: off white to medium brown, very fine to fine, subangular to subrounded, moderately to well sorted, moderate to strong silica and calcareous cements, common white argillaceous matrix, common multicoloured lithics, abundant altered feldspar grains, trace black carbonaceous detritus, hard, no visual porosity, no oil fluorescence.
4	2606.0	17	Silty Claystone: off white to medium green grey, common very fine altered feldspars, common brown to black carbonaceous flecks, trace micromica, moderately hard, slightly subfissile.
5	2586.8	14	Sandstone: medium green grey, very fine to dominantly fine, angular to subrounded, moderately to well sorted, weak silica and calcareous cements, abundant white to medium green grey argillaceous and silt matrix, common multicoloured lithics, trace fine mica flakes, trace carbonaceous detritus, friable to sticky, no visual porosity, no oil fluorescence.
6	2560.4	10	Sandstone: light grey, very fine to fine, dominantly very fine, subangular to subrounded, moderately to well sorted, weak silica cement, abundant light grey argillaceous and silt matrix, abundant altered feldspar gains, common multicoloured lithics, trace to common brown to black carbonaceous flecks, trace brown mica flakes, friable to sticky, no visual porosity, no oil fluorescence.
7	2552.5	21	Sandstone: light grey to light brown, very fine, subangular to subrounded, well sorted, weak silica and calcareous cements, abundant white argillaceous and silt matrix, abundant alterd feldspar grains, trace multicoloured lithics, common black carbonaceous flecks and minor laminae, trace micromica, fiable, no visual porosity, no oil fluorescence.
8	2537.3	20	Sandstone: light green grey, very fine to dominantly fine, subangular to subrounded, moderately to well sorted, weak silica cement, abundant light green argillaceous matrix, abundant altered feldspars, common multicoloured lithics, common brown mica flakes, friable, no visual porosity, no oil fluorescence.
9	2500.4	NR	Lost bullet.
10	2494.0	NR	Lost bullet.
11	2473.2	15	Sandstone: medium green, very fine to dominantly fine, subangular to subrounded, moderately to well sorted, weak silica and very weak calcareous cements, abundant medium green argillaceous matrix, abundant altered feldspars, common multicoloured lithics, trace black carbonaceous matter, friable to sticky, no visual porosity, no oil fluorescence.

SWC No.	DEPTH (m)	REC'D (mm)	DESCRIPTION	PAGE: 2
12	2447.5	13	Claystone: medium to dark grey, slightly silty, trace micromica, soft to firm, slightly subfissile.	
13	2425.5	20	Sandstone: light green grey, very fine to dominantly fine, ocasional medium grains, subangular to subrounded, moderately to well sorted, weak silica and moderate calcareous cements, common very light green grey argillaceous matrix, abundant altered feldspars, common multicoloured lithics, friable, very poor visual porosity, no oil fluorescence.	
14	2395.0	12	Sandstone: light grey, very fine to fine, subangular to subrounded, moderately to well sorted, moderate silica cement, common to abundant off white argillaceous and silt matrix, common altered feldspars, trace multicoloured lithics, trace carbonaceous detritus, friable to hard, no visual porosity, no oil fluorescence.	
15	2384.5	16	Sandstone: light grey, very fine to dominantly fine, trace medium grains, subangular to subrounded, moderately sorted, weak silica and calcareous cements, common to abundant white argillaceous matrix, abundant altered feldspars, common multicoloured lithics, trace carbonaceous matter, friable, very poor visual porosity, no oil fluorescence.	
16	2336.0	25	Claystone: medium to dark grey, slightly silty, occasionally common dispersed black coaly matter, very slightly calcareous in part, trace micromica, firm, slightly subfissile.	
17	2244.0	15	Claystone: medium to dark grey, slightly silty, slightly calcareous, trace to common micromica, firm, slightly subfissile.	
18	2127.0	23	Sandstone: light green grey, very fine to dominantly fine, subangular to subrounded, well sorted, weak silica cement, trace weak calcareous cement, common to abundant white argillaceous matrix, common altered feldspars, abundant multicoloured lithics, trace black carbonaceous detritus, friable, poor visual porosity, no oil fluorescence.	
19	2067.0	21	Sandstone: light grey, very fine to medium, dominantly very fine to fine, subangular to subrounded, poor to moderately sorted, weak silica cement, trace white to light green argillaceous and silt matrix, common to abundant altered feldspars, common multicoloured lithics, trace black carbonaceous detritus, friable, poor visual porosity, no oil fluorescence.	
20	2001.5	12	Claystone: medium to dark gey, slightly silty, very silightly calcareous, trace black carbonaceous matter, trace micromica, firm, slightly subfissile.	
21	1904.0	20	Claystone: medium to dark grey, moderately to very silty, trace black carbonaceous flecks, trace to common micromica, firm, slightly subfissile.	
22	1781.0	25	Siltstone: medium brown grey, slightly to moderately argillaceous, trace black carbonaceous flecks and detritus, common micromica, firm, slightly subfissile.	
23	1524.0	25	Silty Claystone: dark brown grey, occasional abundant dispersed very fine quartz sand grains, moderately carbonaceous, common micromica, firm, slightly subfissile, intermixed with irregular patches of Sandstone: light brown, very fine, angular to subangular, moderately sorted, weak silica cement, common very light brown argillaceous matrix, quartzose, trace micromica, trace very fine black carbonaceous flecks, friable, very poor visual porosity, no oil fluorescence.	
24	1514.5	15	Sideritic Sandstone: medium brown, very fine to very coarse, dominantly fine, angular to subangular, very poorly sorted, very strong siderite or dolomite cement, common light green lithics, very hard, no visual porosity, no oil fluorescence.	

APPENDIX 3

ELECTRIC LOG SUMMARY

CULTUS PETROLEUM N.L.
ELECTIC LOGGING REPORT SHEET

Well Name: Blackwood-1	**Permit:** PPL1	**Observer:** Dave Horner	**Date:** 14-5-96

TIME	OPERATION
0830	Rig-up DLL-MSFL-LSS
1100	Start repeat section
1150	Start main log
1300	Computer failure
1345	Change to system 1
1400	Sonde failure
1500	Start logging DLL-MSFL-GR only - suspect sonic failure
1640	Finish logging DLL-MSFL-GR
1745	Rig-up PDS-LCS
1910	Casing check with LCS turned off
1930	Log repeat section
1955	Log main log PDS
2130	Rig down PDS - Rig up velocity tool
0500	Rig down velocity tool - rig up coregun
1215	Finish core gun run - rig down

APPENDIX 4

VELOCITY SURVEY

Velocity Data

VELOCITY SURVEY

BLACKWOOD No.1

PPL 1

OTWAY BASIN
VICTORIA

for

CULTUS PETROLEUM N.L.

recorded by

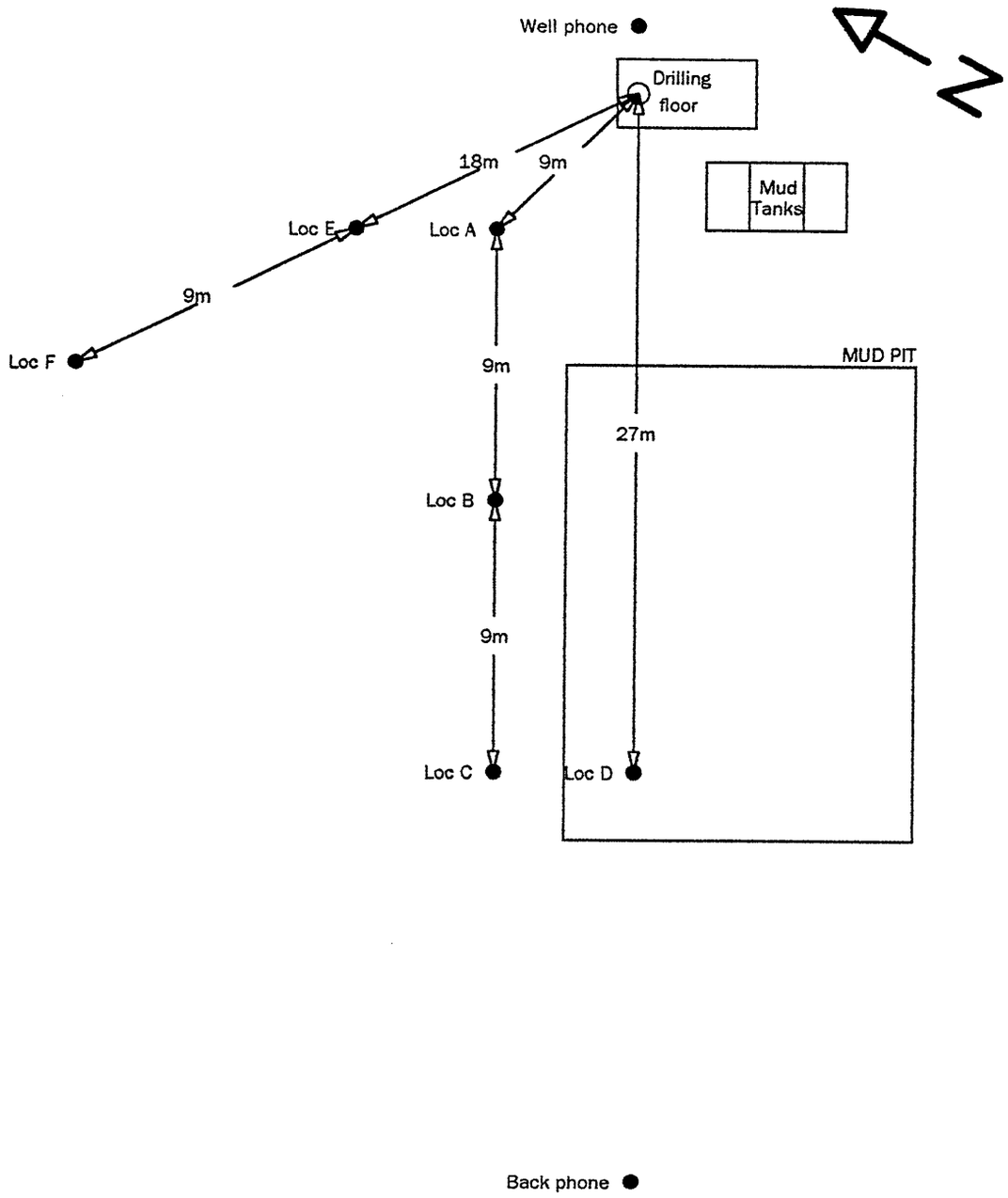
VELOCITY DATA PTY LTD

Processed by

Velseis Processing Pty Ltd

Brisbane, Australia
26 September 1996

VELSEIS PTY LTD
Integrated Seismic Technologies



BLACKWOOD #1

SHOT POINT LOCATION SKETCH

CULTUS

Figure 1

CONTENTS

SUMMARY

Velocity Data Pty Ltd conducted a velocity survey for Cultus Petroleum N.L. in the Blackwood No. 1 well, PPL 1, Otway Basin, Victoria. The date of the survey was the 13 May, 1996.

The results of the survey, which are considered to be reliable, have been used to calibrate the sonic log.

Explosives were used as an energy source with shots being fired in the mud pit in the majority of instances.

GENERAL INFORMATION

Name of Well	: Blackwood No. 1
Location	: PPL 1
Coordinates	: 5731567.6 N : 670968.0 E
Date of Survey	: 13 May, 1996
Wireline Logging	: BPB Wireline Services
Weather	: Fine
Operational Base	: Brisbane
Operator	: D. Blick
Shooter	: J. Brown
Client Representative	: Mr. D. Horner

EQUIPMENT

Downhole Tool

Veldata Camlock 100 (90 mm)

Sensors:

6 HSI 4.5 Hz 215 ohm, high temperature (300 degrees F) detectors connected in series parallel. Frequency response 8-300 Hz within 3 dB.

Preamplifier:

48 dB fixed gain.
Frequency response 5-200 Hz within 3 dB.

Reference Geophone

Mark Products L1 4.5 Hz

Recording Instrument

(1) System VDL 16

Windows based high resolution seismic acquisition instruments

Computer :	386 Portable computer
Resolution :	A/D conversion 16 bits
Dynamic Range :	96dB
Total Gain :	136dB
Data channels :	8
Display :	A4 Bubble Jet Printer 300 D.P.I.

RECORDING

Energy Source	: Explosive, Powergel
Shot Location	: Mud pit
Charge Size	: 0.25 - 5 sticks
Average Shot Depth	: 1.5 metre
Mud Pit Shot Offset	: 27.0 metres
Recording Geometry	: Figure 1

Shots were recorded on $3^1/_2$" floppy disc. Printouts of the shots used are included with this report.

The sample rate was 0.5 millseconds across the entire survey.

The scale of the graphic display varies with signal strength and is noted on each playout. The times were picked from a sample by sample screen plot. A full set of these trace displays can be seen at the rear of the report.

PROCESSING

Elevation Data

Elevation of KB	: 114.3 metres above A.S.L.
Elevation of Ground	: 110.0 metres above A.S.L.
Elevation of Seismic Datum	: 0.0 metres A.S.L.
Depth Surveyed	: 2642.0 metres below KB
Total Depth	: 2650.0 metres below KB
Depth of Casing	: 689.0 metres below KB
Sonic Log Interval	: 1907.3 to 2650.0 metres below KB

PROCESSING

Recorded Data

Number of Shots Processed : 26

Number of Levels Recorded : 15

Data Quality : Good

Noise Level : Moderate

Correction for Instrument Delay and Shot Offset

The 'corrected' times shown on the calculation sheets have been obtained by:

1. Subtraction of the instrument delay (2.0 milliseconds) from the recorded arrival times.
2. Geometric correction for non-verticality of ray paths resulting from shot offset.
3. Shot static correction to correct for the depth of shot below ground level at the well head using a correction velocity of 2000 metres/second.
4. Additional 1.5 milliseconds uphole time was added to all shots external to the mud.
5. 5.8 milliseconds bulk shift applied to all shots discharged within the mud pit to tie them to shots external to the pit.
6. Re-addition of the instrument delay (2.0 milliseconds).

Pit Fatigue Analysis

An examination of surface channel information indicated the presence of fatigue associated with a number of shots located in the Mud pit. Thus it has been necessary to compensate for this effect and the table below outlines shots and the appropriate correction applied.

Shot Number	Correction (msec)
13	-1.0
15	-4.5
16	-1.5
17	-1.5
18	-1.5
19	-1.5

Correction to Datum

The datum chosen was 0.0 metres ASL that is 114.3 metres below KB. This level was shot eight (8) times during the survey and an effective datum correction time of 69.4 milliseconds was calculated.

This value includes the 2.0 milliseconds instrument delay which must be subtracted to obtain the raw time.

PROCESSING

Calibration of Sonic Log - Method

Sonic times were adjusted to checkshot times using a polynomial derived least squares fit correction of the sonic transient times. The sonic log that lay within the casing was deleted from the calibration.

Differences between the check shot and sonic times arise as the sonic tool measures the local velocity characteristics of the formation with a high frequency signal, whereas the downhole geophone records the bulk velocity character using a signal of significantly lower frequency.

Calibration of Sonic Log - Results (Enclosure 1)

Sonic values were only available between the interval 1907.3 and 2642.0m below KB.

The discrepancies between shot and sonic interval velocities were small. The largest of these occurred over the interval 2611.0 to 2642.0 metres which yielded an interval sonic drift of 45.16 µsec/m.

In aggregate, the shot and sonic interval times differed by 2.5 milliseconds over the logged portion of the well.

PROCESSING

Trace Playouts (Figure 3)

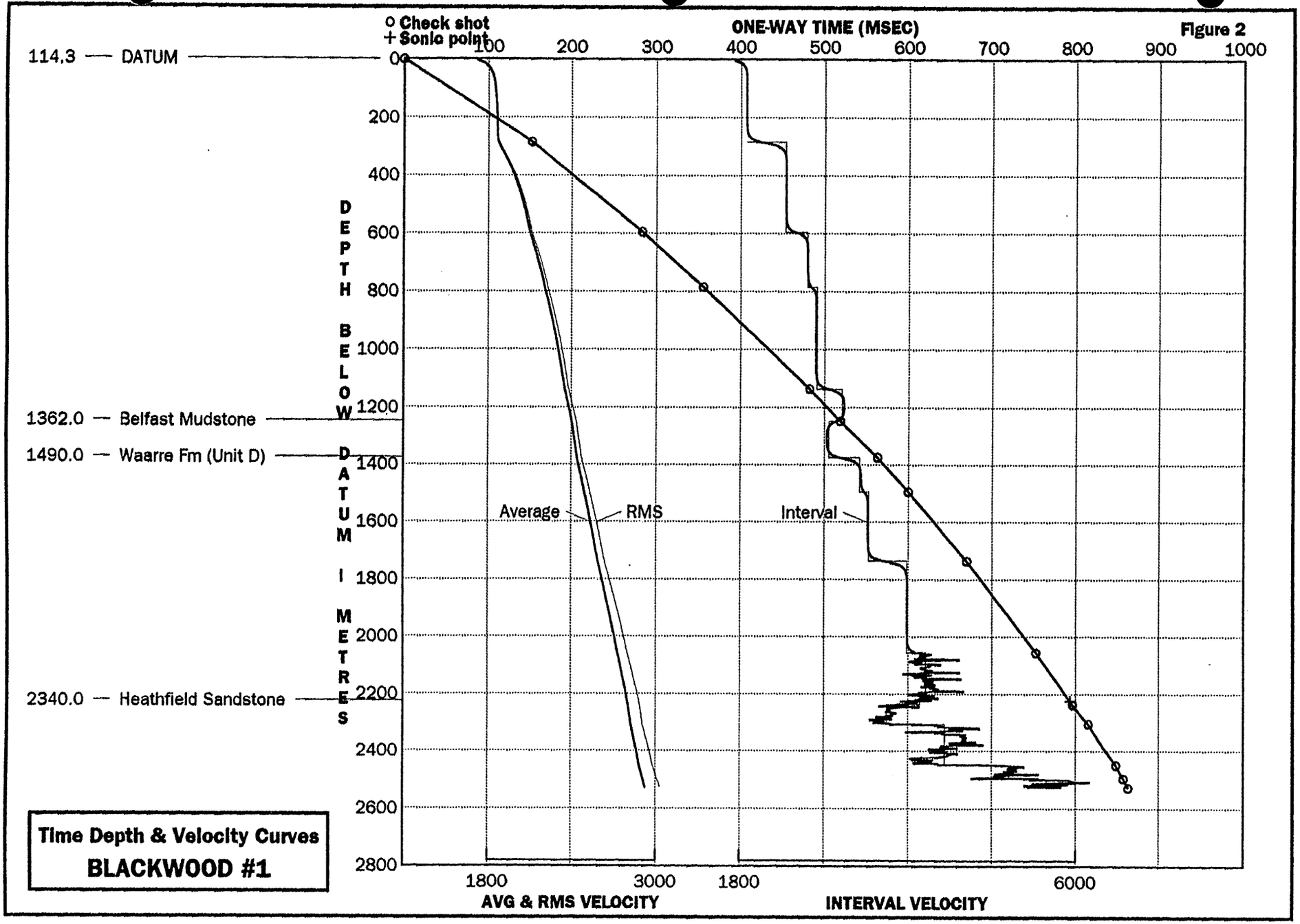
Figure 3A is a plot of all raw data traces used.

Figure 3B is a plot to scale in depth and time of selected traces.

Figure 3C is a plot of selected surface traces. .

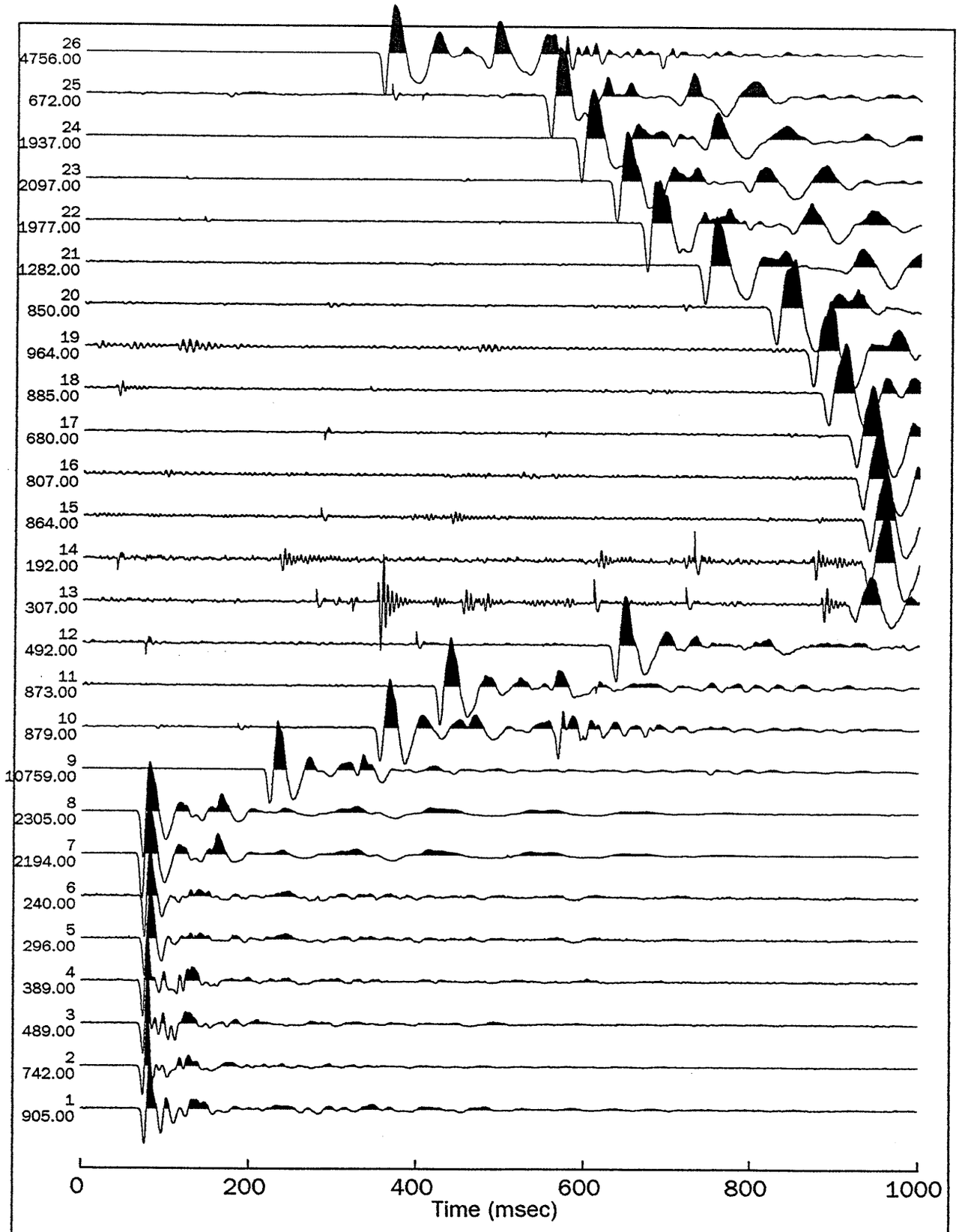
Troy Peters
Geophysicist

Figure 2



Time Depth & Velocity Curves

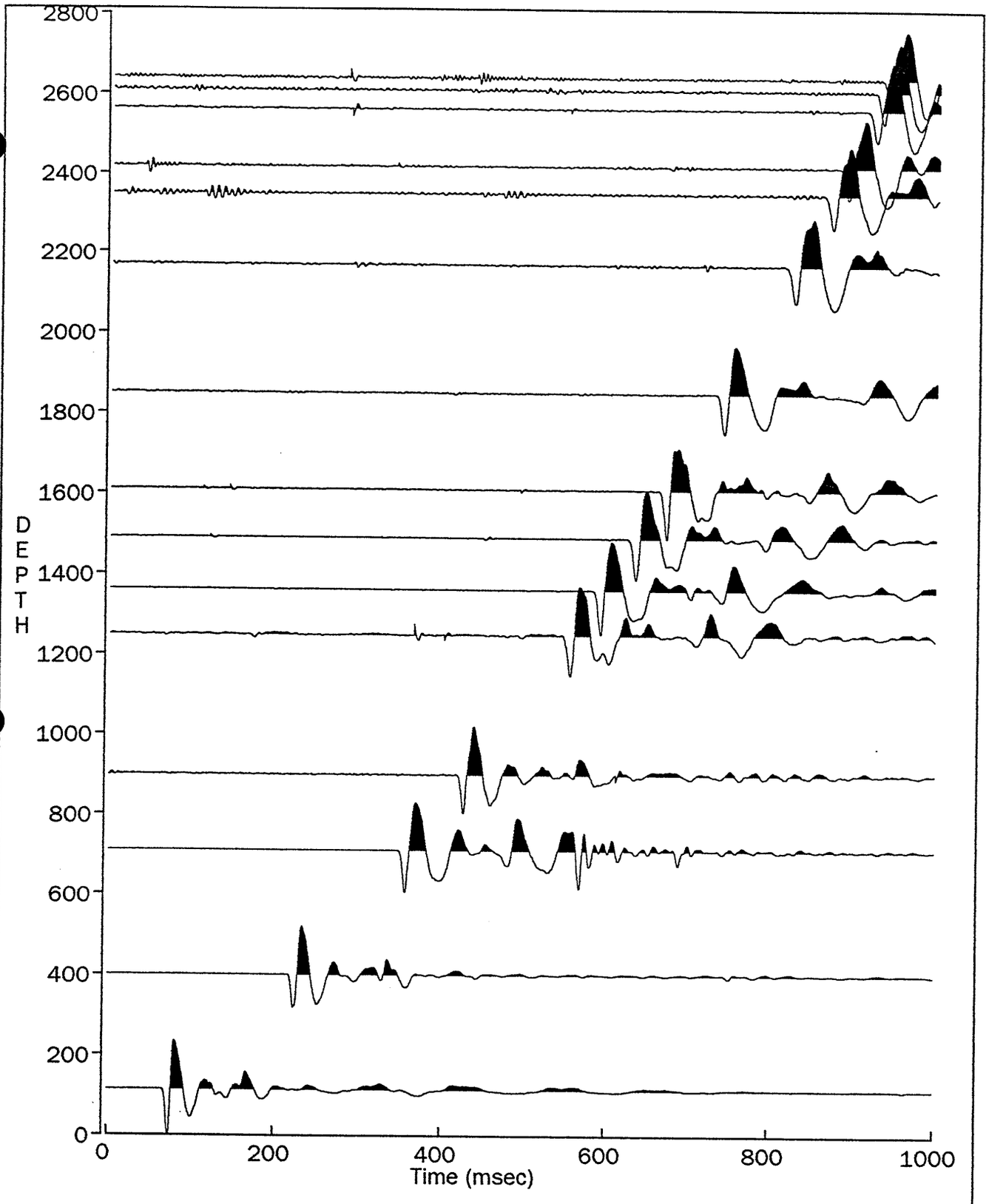
BLACKWOOD #1



BLACKWOOD #1

VELOCITY SURVEY TRACE DISPLAY

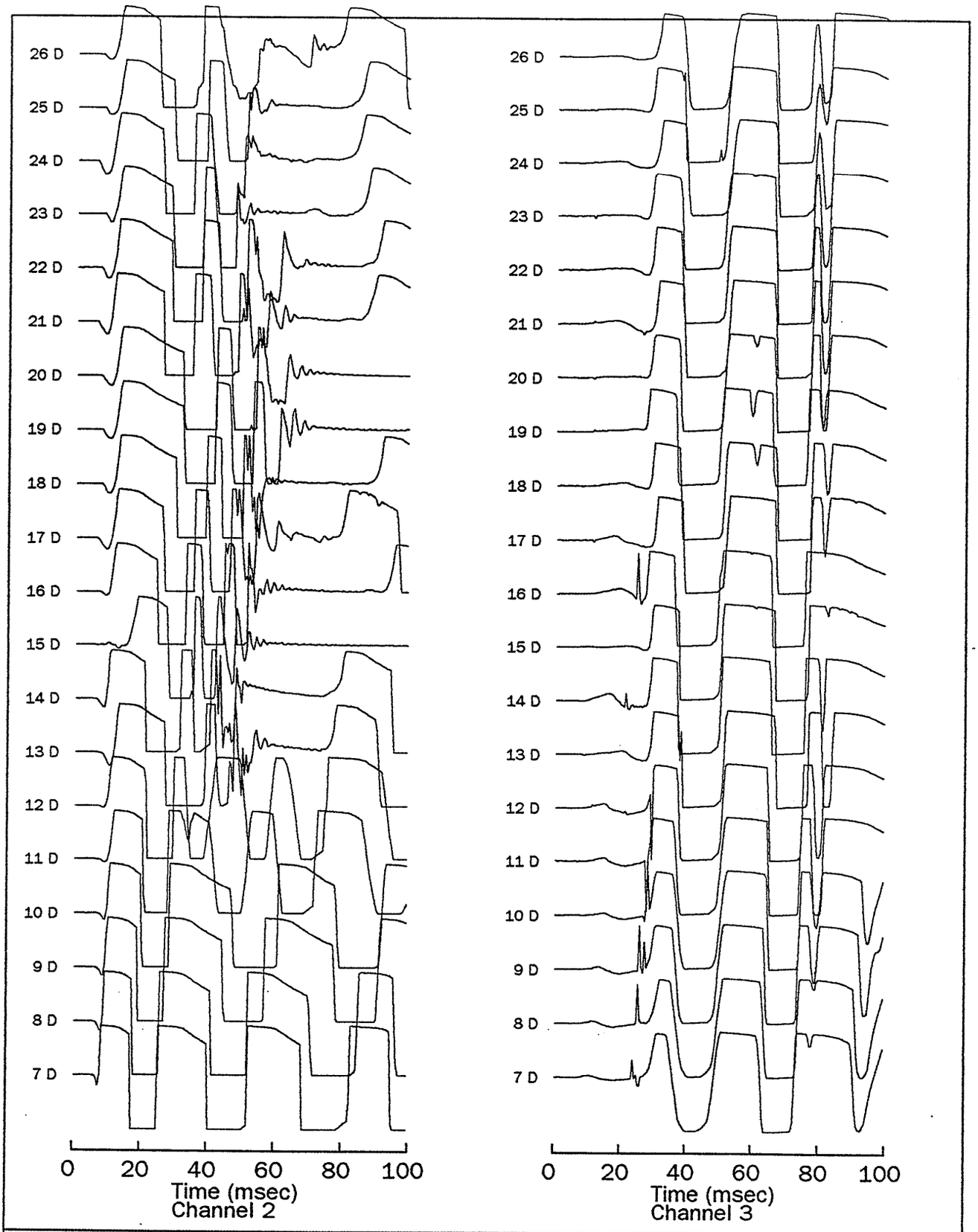
Figure 3A



BLACKWOOD #1

VELOCITY SURVEY TRACE DISPLAY

Figure 3B



BLACKWOOD #1

VELOCITY SURVEY TRACE DISPLAY
AUXILIARY CHANNELS

Figure 3C

TABLE 1 **Time depth curve values** **Page 1**

Well : BLACKWOOD #1 Client : CULTUS
Survey units : METRES Datum : 0.0
Calibrated sonic velocities used from 2057.5 to 2527.5

Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval	Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval
2.5	1.5	1721	1721	1721	102.5	55.3	1853	1853	1874
5.0	2.9	1734	1734	1748	105.0	56.7	1853	1854	1874
7.5	4.3	1746	1746	1770	107.5	58.0	1854	1854	1874
10.0	5.7	1756	1757	1789	110.0	59.3	1854	1855	1874
12.5	7.1	1766	1766	1804	112.5	60.7	1855	1855	1874
15.0	8.5	1774	1774	1817	115.0	62.0	1855	1855	1874
17.5	9.8	1781	1782	1827	117.5	63.3	1855	1856	1874
20.0	11.2	1788	1788	1836	120.0	64.7	1856	1856	1874
22.5	12.5	1794	1794	1843	122.5	66.0	1856	1857	1874
25.0	13.9	1799	1800	1849	125.0	67.3	1857	1857	1874
27.5	15.2	1804	1805	1853	127.5	68.7	1857	1857	1874
30.0	16.6	1808	1809	1857	130.0	70.0	1857	1858	1874
32.5	17.9	1812	1813	1860	132.5	71.3	1858	1858	1874
35.0	19.3	1816	1816	1863	135.0	72.7	1858	1858	1874
37.5	20.6	1819	1820	1865	137.5	74.0	1858	1858	1874
40.0	22.0	1822	1823	1867	140.0	75.3	1858	1859	1874
42.5	23.3	1825	1825	1868	142.5	76.7	1859	1859	1874
45.0	24.6	1827	1828	1869	145.0	78.0	1859	1859	1874
47.5	26.0	1829	1830	1870	147.5	79.3	1859	1860	1874
50.0	27.3	1831	1832	1871	150.0	80.7	1859	1860	1874
52.5	28.6	1833	1834	1872	152.5	82.0	1860	1860	1874
55.0	30.0	1835	1835	1872	155.0	83.3	1860	1860	1874
57.5	31.3	1837	1837	1872	157.5	84.7	1860	1860	1874
60.0	32.6	1838	1839	1873	160.0	86.0	1860	1861	1874
62.5	34.0	1839	1840	1873	162.5	87.3	1861	1861	1874
65.0	35.3	1841	1841	1873	165.0	88.7	1861	1861	1874
67.5	36.6	1842	1842	1873	167.5	90.0	1861	1861	1874
70.0	38.0	1843	1843	1874	170.0	91.3	1861	1861	1874
72.5	39.3	1844	1844	1874	172.5	92.7	1861	1862	1874
75.0	40.7	1845	1845	1874	175.0	94.0	1862	1862	1874
77.5	42.0	1846	1846	1874	177.5	95.3	1862	1862	1874
80.0	43.3	1847	1847	1874	180.0	96.7	1862	1862	1874
82.5	44.7	1848	1848	1874	182.5	98.0	1862	1862	1874
85.0	46.0	1848	1849	1874	185.0	99.3	1862	1862	1874
87.5	47.3	1849	1850	1874	187.5	100.7	1862	1863	1874
90.0	48.7	1850	1850	1874	190.0	102.0	1863	1863	1874
92.5	50.0	1850	1851	1874	192.5	103.3	1863	1863	1874
95.0	51.3	1851	1851	1874	195.0	104.7	1863	1863	1874
97.5	52.7	1852	1852	1874	197.5	106.0	1863	1863	1874
100.0	54.0	1852	1853	1874	200.0	107.3	1863	1863	1874

TABLE 1 **Time depth curve values** **Page 2**

Well : BLACKWOOD #1 Client : CULTUS
Survey units : METRES Datum : 0.0
Calibrated sonic velocities used from 2057.5 to 2527.5

Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval	Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval
202.5	108.7	1863	1864	1874	302.5	160.0	1891	1892	2287
205.0	110.0	1863	1864	1874	305.0	161.1	1893	1896	2302
207.5	111.3	1864	1864	1874	307.5	162.2	1896	1899	2315
210.0	112.7	1864	1864	1875	310.0	163.2	1899	1902	2325
212.5	114.0	1864	1864	1875	312.5	164.3	1902	1905	2333
215.0	115.3	1864	1864	1875	315.0	165.4	1905	1908	2340
217.5	116.7	1864	1864	1875	317.5	166.4	1908	1911	2346
220.0	118.0	1864	1864	1875	320.0	167.5	1910	1914	2350
222.5	119.3	1864	1865	1875	322.5	168.6	1913	1917	2354
225.0	120.7	1864	1865	1875	325.0	169.6	1916	1920	2357
227.5	122.0	1865	1865	1876	327.5	170.7	1919	1923	2359
230.0	123.3	1865	1865	1876	330.0	171.7	1921	1926	2361
232.5	124.7	1865	1865	1876	332.5	172.8	1924	1929	2363
235.0	126.0	1865	1865	1877	335.0	173.9	1927	1932	2364
237.5	127.3	1865	1865	1877	337.5	174.9	1929	1935	2366
240.0	128.7	1865	1865	1878	340.0	176.0	1932	1938	2366
242.5	130.0	1865	1866	1879	342.5	177.0	1935	1941	2367
245.0	131.3	1865	1866	1880	345.0	178.1	1937	1944	2368
247.5	132.7	1866	1866	1882	347.5	179.1	1940	1947	2368
250.0	134.0	1866	1866	1883	350.0	180.2	1942	1949	2369
252.5	135.3	1866	1866	1886	352.5	181.3	1945	1952	2369
255.0	136.6	1866	1866	1888	355.0	182.3	1947	1955	2369
257.5	138.0	1866	1867	1891	357.5	183.4	1950	1957	2369
260.0	139.3	1867	1867	1895	360.0	184.4	1952	1960	2370
262.5	140.6	1867	1867	1900	362.5	185.5	1954	1962	2370
265.0	141.9	1867	1868	1906	365.0	186.5	1957	1965	2370
267.5	143.2	1868	1868	1914	367.5	187.6	1959	1968	2370
270.0	144.5	1868	1869	1924	370.0	188.6	1961	1970	2370
272.5	145.8	1869	1869	1935	372.5	189.7	1964	1972	2370
275.0	147.1	1870	1870	1950	375.0	190.7	1966	1975	2370
277.5	148.4	1870	1871	1968	377.5	191.8	1968	1977	2370
280.0	149.6	1872	1872	1991	380.0	192.9	1970	1980	2370
282.5	150.8	1873	1873	2021	382.5	193.9	1973	1982	2370
285.0	152.1	1874	1875	2058	385.0	195.0	1975	1984	2370
287.5	153.3	1876	1876	2104	387.5	196.0	1977	1987	2370
290.0	154.4	1878	1879	2149	390.0	197.1	1979	1989	2370
292.5	155.6	1880	1881	2187	392.5	198.1	1981	1991	2370
295.0	156.7	1883	1884	2220	395.0	199.2	1983	1993	2370
297.5	157.8	1885	1887	2246	397.5	200.2	1985	1995	2370
300.0	158.9	1888	1889	2269	400.0	201.3	1987	1998	2370

TABLE 1 **Time depth curve values**

Well : BLACKWOOD #1 Client : CULTUS
Survey units : METRES Datum : 0.0
Calibrated sonic velocities used from 2057.5 to 2527.5

Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval	Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval
402.5	202.3	1989	2000	2370	502.5	244.5	2055	2068	2370
405.0	203.4	1991	2002	2370	505.0	245.6	2056	2070	2370
407.5	204.5	1993	2004	2370	507.5	246.6	2058	2071	2370
410.0	205.5	1995	2006	2370	510.0	247.7	2059	2072	2370
412.5	206.6	1997	2008	2370	512.5	248.8	2060	2074	2370
415.0	207.6	1999	2010	2370	515.0	249.8	2062	2075	2370
417.5	208.7	2001	2012	2370	517.5	250.9	2063	2077	2370
420.0	209.7	2003	2014	2370	520.0	251.9	2064	2078	2370
422.5	210.8	2004	2016	2370	522.5	253.0	2065	2079	2371
425.0	211.8	2006	2018	2370	525.0	254.0	2067	2080	2371
427.5	212.9	2008	2020	2370	527.5	255.1	2068	2082	2371
430.0	214.0	2010	2022	2370	530.0	256.1	2069	2083	2371
432.5	215.0	2012	2023	2370	532.5	257.2	2070	2084	2371
435.0	216.1	2013	2025	2370	535.0	258.2	2072	2085	2371
437.5	217.1	2015	2027	2370	537.5	259.3	2073	2087	2371
440.0	218.2	2017	2029	2370	540.0	260.4	2074	2088	2371
442.5	219.2	2018	2031	2370	542.5	261.4	2075	2089	2372
445.0	220.3	2020	2032	2370	545.0	262.5	2076	2090	2372
447.5	221.3	2022	2034	2370	547.5	263.5	2078	2092	2372
450.0	222.4	2023	2036	2370	550.0	264.6	2079	2093	2373
452.5	223.4	2025	2038	2370	552.5	265.6	2080	2094	2373
455.0	224.5	2027	2039	2370	555.0	266.7	2081	2095	2374
457.5	225.6	2028	2041	2370	557.5	267.7	2082	2096	2375
460.0	226.6	2030	2043	2370	560.0	268.8	2083	2097	2376
462.5	227.7	2032	2044	2370	562.5	269.8	2085	2099	2377
465.0	228.7	2033	2046	2370	565.0	270.9	2086	2100	2379
467.5	229.8	2035	2047	2370	567.5	271.9	2087	2101	2381
470.0	230.8	2036	2049	2370	570.0	273.0	2088	2102	2383
472.5	231.9	2038	2051	2370	572.5	274.0	2089	2103	2386
475.0	232.9	2039	2052	2370	575.0	275.1	2090	2104	2390
477.5	234.0	2041	2054	2370	577.5	276.1	2091	2106	2395
480.0	235.0	2042	2055	2370	580.0	277.2	2093	2107	2400
482.5	236.1	2044	2057	2370	582.5	278.2	2094	2108	2408
485.0	237.2	2045	2058	2370	585.0	279.2	2095	2109	2416
487.5	238.2	2047	2060	2370	587.5	280.3	2096	2110	2427
490.0	239.3	2048	2061	2370	590.0	281.3	2097	2112	2441
492.5	240.3	2049	2063	2370	592.5	282.3	2099	2113	2458
495.0	241.4	2051	2064	2370	595.0	283.3	2100	2115	2479
497.5	242.4	2052	2066	2370	597.5	284.3	2102	2116	2504
500.0	243.5	2054	2067	2370	600.0	285.3	2103	2118	2529

TABLE 1 **Time depth curve values** **Page 4**

Well : BLACKWOOD #1 Client : CULTUS
Survey units : METRES Datum : 0.0
Calibrated sonic velocities used from 2057.5 to 2527.5

Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval	Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval
602.5	286.3	2105	2119	2549	702.5	324.3	2166	2185	2642
605.0	287.3	2106	2121	2566	705.0	325.2	2168	2187	2641
607.5	288.2	2108	2123	2580	707.5	326.2	2169	2188	2642
610.0	289.2	2109	2124	2591	710.0	327.1	2170	2190	2642
612.5	290.2	2111	2126	2600	712.5	328.1	2172	2191	2642
615.0	291.1	2113	2128	2608	715.0	329.0	2173	2193	2642
617.5	292.1	2114	2130	2614	717.5	330.0	2174	2194	2642
620.0	293.0	2116	2131	2619	720.0	330.9	2176	2196	2642
622.5	294.0	2118	2133	2624	722.5	331.9	2177	2197	2642
625.0	294.9	2119	2135	2627	725.0	332.8	2178	2198	2642
627.5	295.9	2121	2137	2630	727.5	333.8	2180	2200	2642
630.0	296.8	2122	2139	2632	730.0	334.7	2181	2201	2642
632.5	297.8	2124	2140	2634	732.5	335.6	2182	2202	2642
635.0	298.7	2126	2142	2635	735.0	336.6	2184	2204	2642
637.5	299.7	2127	2144	2636	737.5	337.5	2185	2205	2642
640.0	300.6	2129	2146	2637	740.0	338.5	2186	2206	2643
642.5	301.6	2130	2147	2638	742.5	339.4	2187	2208	2643
645.0	302.5	2132	2149	2639	745.0	340.4	2189	2209	2643
647.5	303.5	2134	2151	2639	747.5	341.3	2190	2210	2643
650.0	304.4	2135	2152	2640	750.0	342.3	2191	2212	2644
652.5	305.4	2137	2154	2640	752.5	343.2	2192	2213	2644
655.0	306.3	2138	2156	2640	755.0	344.2	2194	2214	2645
657.5	307.3	2140	2157	2641	757.5	345.1	2195	2216	2646
660.0	308.2	2141	2159	2641	760.0	346.1	2196	2217	2647
662.5	309.1	2143	2161	2641	762.5	347.0	2197	2218	2648
665.0	310.1	2145	2162	2641	765.0	347.9	2199	2220	2650
667.5	311.0	2146	2164	2641	767.5	348.9	2200	2221	2652
670.0	312.0	2148	2166	2641	770.0	349.8	2201	2222	2654
672.5	312.9	2149	2167	2641	772.5	350.8	2202	2223	2657
675.0	313.9	2150	2169	2641	775.0	351.7	2204	2225	2661
677.5	314.8	2152	2170	2641	777.5	352.6	2205	2226	2666
680.0	315.8	2153	2172	2641	780.0	353.6	2206	2227	2671
682.5	316.7	2155	2173	2641	782.5	354.5	2207	2229	2678
685.0	317.7	2156	2175	2641	785.0	355.4	2209	2230	2687
687.5	318.6	2158	2176	2641	787.5	356.4	2210	2231	2697
690.0	319.6	2159	2178	2641	790.0	357.3	2211	2233	2707
692.5	320.5	2161	2180	2641	792.5	358.2	2212	2234	2715
695.0	321.5	2162	2181	2641	795.0	359.1	2214	2235	2722
697.5	322.4	2163	2183	2641	797.5	360.0	2215	2237	2727
700.0	323.3	2165	2184	2641	800.0	361.0	2216	2238	2731

TABLE 1 **Time depth curve values**

Well : BLACKWOOD #1 Client : CULTUS
Survey units : METRES Datum : 0.0
Calibrated sonic velocities used from 2057.5 to 2527.5

Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval	Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval
802.5	361.9	2218	2240	2735	902.5	398.3	2266	2291	2750
805.0	362.8	2219	2241	2738	905.0	399.2	2267	2292	2750
807.5	363.7	2220	2242	2740	907.5	400.1	2268	2293	2750
810.0	364.6	2222	2244	2742	910.0	401.0	2269	2294	2750
812.5	365.5	2223	2245	2744	912.5	401.9	2270	2295	2750
815.0	366.4	2224	2246	2745	915.0	402.8	2272	2296	2750
817.5	367.3	2225	2248	2746	917.5	403.7	2273	2298	2750
820.0	368.3	2227	2249	2747	920.0	404.6	2274	2299	2750
822.5	369.2	2228	2251	2747	922.5	405.5	2275	2300	2750
825.0	370.1	2229	2252	2748	925.0	406.4	2276	2301	2750
827.5	371.0	2231	2253	2748	927.5	407.3	2277	2302	2750
830.0	371.9	2232	2255	2749	930.0	408.3	2278	2303	2750
832.5	372.8	2233	2256	2749	932.5	409.2	2279	2304	2750
835.0	373.7	2234	2257	2749	935.0	410.1	2280	2305	2750
837.5	374.6	2236	2259	2749	937.5	411.0	2281	2306	2750
840.0	375.5	2237	2260	2750	940.0	411.9	2282	2307	2750
842.5	376.4	2238	2261	2750	942.5	412.8	2283	2308	2750
845.0	377.4	2239	2263	2750	945.0	413.7	2284	2310	2750
847.5	378.3	2241	2264	2750	947.5	414.6	2285	2311	2750
850.0	379.2	2242	2265	2750	950.0	415.5	2286	2312	2750
852.5	380.1	2243	2266	2750	952.5	416.4	2287	2313	2750
855.0	381.0	2244	2268	2750	955.0	417.3	2288	2314	2750
857.5	381.9	2245	2269	2750	957.5	418.3	2289	2315	2750
860.0	382.8	2247	2270	2750	960.0	419.2	2290	2316	2750
862.5	383.7	2248	2272	2750	962.5	420.1	2291	2317	2750
865.0	384.6	2249	2273	2750	965.0	421.0	2292	2318	2750
867.5	385.5	2250	2274	2750	967.5	421.9	2293	2319	2750
870.0	386.4	2251	2275	2750	970.0	422.8	2294	2320	2750
872.5	387.4	2252	2276	2750	972.5	423.7	2295	2321	2750
875.0	388.3	2254	2278	2750	975.0	424.6	2296	2322	2750
877.5	389.2	2255	2279	2750	977.5	425.5	2297	2323	2750
880.0	390.1	2256	2280	2750	980.0	426.4	2298	2324	2750
882.5	391.0	2257	2281	2750	982.5	427.3	2299	2325	2750
885.0	391.9	2258	2283	2750	985.0	428.3	2300	2326	2750
887.5	392.8	2259	2284	2750	987.5	429.2	2301	2327	2750
890.0	393.7	2261	2285	2750	990.0	430.1	2302	2328	2750
892.5	394.6	2262	2286	2750	992.5	431.0	2303	2329	2750
895.0	395.5	2263	2287	2750	995.0	431.9	2304	2330	2750
897.5	396.4	2264	2288	2750	997.5	432.8	2305	2331	2750
900.0	397.3	2265	2290	2750	1000.0	433.7	2306	2332	2750

Well : BLACKWOOD #1 Client : CULTUS
Survey units : METRES Datum : 0.0
Calibrated sonic velocities used from 2057.5 to 2527.5

Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval	Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval
1002.5	434.6	2307	2333	2750	1102.5	471.0	2341	2368	2759
1005.0	435.5	2308	2334	2750	1105.0	471.9	2342	2368	2761
1007.5	436.4	2308	2335	2750	1107.5	472.8	2343	2369	2764
1010.0	437.3	2309	2336	2750	1110.0	473.7	2343	2370	2767
1012.5	438.3	2310	2336	2750	1112.5	474.6	2344	2371	2771
1015.0	439.2	2311	2337	2750	1115.0	475.5	2345	2372	2776
1017.5	440.1	2312	2338	2750	1117.5	476.4	2346	2373	2782
1020.0	441.0	2313	2339	2750	1120.0	477.3	2347	2373	2789
1022.5	441.9	2314	2340	2750	1122.5	478.2	2348	2374	2798
1025.0	442.8	2315	2341	2750	1125.0	479.1	2348	2375	2809
1027.5	443.7	2316	2342	2750	1127.5	479.9	2349	2376	2824
1030.0	444.6	2317	2343	2750	1130.0	480.8	2350	2377	2841
1032.5	445.5	2317	2344	2750	1132.5	481.7	2351	2378	2863
1035.0	446.4	2318	2345	2750	1135.0	482.6	2352	2379	2890
1037.5	447.3	2319	2346	2750	1137.5	483.4	2353	2380	2923
1040.0	448.3	2320	2346	2750	1140.0	484.3	2354	2381	2955
1042.5	449.2	2321	2347	2750	1142.5	485.1	2355	2382	2982
1045.0	450.1	2322	2348	2750	1145.0	485.9	2356	2384	3003
1047.5	451.0	2323	2349	2750	1147.5	486.8	2357	2385	3022
1050.0	451.9	2324	2350	2750	1150.0	487.6	2359	2386	3036
1052.5	452.8	2324	2351	2750	1152.5	488.4	2360	2387	3049
1055.0	453.7	2325	2352	2750	1155.0	489.2	2361	2389	3058
1057.5	454.6	2326	2353	2751	1157.5	490.0	2362	2390	3067
1060.0	455.5	2327	2353	2751	1160.0	490.8	2363	2391	3073
1062.5	456.4	2328	2354	2751	1162.5	491.7	2364	2392	3078
1065.0	457.3	2329	2355	2751	1165.0	492.5	2366	2394	3083
1067.5	458.3	2330	2356	2751	1167.5	493.3	2367	2395	3086
1070.0	459.2	2330	2357	2751	1170.0	494.1	2368	2396	3089
1072.5	460.1	2331	2358	2751	1172.5	494.9	2369	2398	3092
1075.0	461.0	2332	2359	2751	1175.0	495.7	2370	2399	3094
1077.5	461.9	2333	2359	2751	1177.5	496.5	2372	2400	3095
1080.0	462.8	2334	2360	2752	1180.0	497.3	2373	2402	3096
1082.5	463.7	2334	2361	2752	1182.5	498.1	2374	2403	3097
1085.0	464.6	2335	2362	2752	1185.0	498.9	2375	2404	3098
1087.5	465.5	2336	2363	2753	1187.5	499.7	2376	2405	3099
1090.0	466.4	2337	2364	2754	1190.0	500.6	2377	2407	3099
1092.5	467.3	2338	2364	2754	1192.5	501.4	2379	2408	3099
1095.0	468.2	2339	2365	2755	1195.0	502.2	2380	2409	3099
1097.5	469.1	2339	2366	2756	1197.5	503.0	2381	2411	3099
1100.0	470.1	2340	2367	2758	1200.0	503.8	2382	2412	3099

TABLE 1 **Time depth curve values**

Well : BLACKWOOD #1 Client : CULTUS
Survey units : METRES Datum : 0.0
Calibrated sonic velocities used from 2057.5 to 2527.5

Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval	Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval
1202.5	504.6	2383	2413	3099	1302.5	538.2	2420	2452	2883
1205.0	505.4	2384	2414	3098	1305.0	539.0	2421	2453	2883
1207.5	506.2	2385	2416	3098	1307.5	539.9	2422	2454	2883
1210.0	507.0	2387	2417	3097	1310.0	540.8	2422	2454	2883
1212.5	507.8	2388	2418	3096	1312.5	541.6	2423	2455	2883
1215.0	508.6	2389	2419	3095	1315.0	542.5	2424	2456	2883
1217.5	509.4	2390	2420	3093	1317.5	543.4	2425	2457	2883
1220.0	510.2	2391	2422	3091	1320.0	544.2	2425	2457	2884
1222.5	511.0	2392	2423	3089	1322.5	545.1	2426	2458	2884
1225.0	511.9	2393	2424	3086	1325.0	546.0	2427	2459	2885
1227.5	512.7	2394	2425	3082	1327.5	546.8	2428	2460	2885
1230.0	513.5	2395	2426	3078	1330.0	547.7	2428	2460	2886
1232.5	514.3	2396	2428	3072	1332.5	548.6	2429	2461	2887
1235.0	515.1	2398	2429	3065	1335.0	549.4	2430	2462	2888
1237.5	515.9	2399	2430	3057	1337.5	550.3	2430	2463	2889
1240.0	516.7	2400	2431	3047	1340.0	551.2	2431	2463	2890
1242.5	517.6	2401	2432	3034	1342.5	552.0	2432	2464	2892
1245.0	518.4	2402	2433	3019	1345.0	552.9	2433	2465	2895
1247.5	519.2	2403	2434	3000	1347.5	553.8	2433	2465	2898
1250.0	520.1	2404	2435	2979	1350.0	554.6	2434	2466	2902
1252.5	520.9	2404	2436	2960	1352.5	555.5	2435	2467	2906
1255.0	521.8	2405	2437	2945	1355.0	556.3	2436	2468	2912
1257.5	522.6	2406	2438	2933	1357.5	557.2	2436	2468	2919
1260.0	523.5	2407	2439	2923	1360.0	558.0	2437	2469	2928
1262.5	524.3	2408	2440	2916	1362.5	558.9	2438	2470	2939
1265.0	525.2	2409	2440	2909	1365.0	559.7	2439	2471	2952
1267.5	526.1	2409	2441	2904	1367.5	560.6	2439	2472	2969
1270.0	526.9	2410	2442	2900	1370.0	561.4	2440	2472	2990
1272.5	527.8	2411	2443	2896	1372.5	562.3	2441	2473	3016
1275.0	528.6	2412	2444	2894	1375.0	563.1	2442	2474	3049
1277.5	529.5	2413	2444	2891	1377.5	563.9	2443	2475	3089
1280.0	530.4	2413	2445	2890	1380.0	564.7	2444	2476	3128
1282.5	531.2	2414	2446	2888	1382.5	565.5	2445	2477	3160
1285.0	532.1	2415	2447	2887	1385.0	566.3	2446	2479	3187
1287.5	533.0	2416	2448	2886	1387.5	567.0	2447	2480	3209
1290.0	533.8	2416	2448	2885	1390.0	567.8	2448	2481	3227
1292.5	534.7	2417	2449	2885	1392.5	568.6	2449	2482	3242
1295.0	535.6	2418	2450	2884	1395.0	569.3	2450	2483	3254
1297.5	536.4	2419	2451	2884	1397.5	570.1	2451	2484	3264
1300.0	537.3	2419	2451	2883	1400.0	570.9	2452	2486	3272

TABLE 1 **Time depth curve values**

Well : BLACKWOOD #1 Client : CULTUS
Survey units : METRES Datum : 0.0
Calibrated sonic velocities used from 2057.5 to 2527.5

Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval	Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval
1402.5	571.6	2453	2487	3279	1502.5	601.8	2497	2535	3368
1405.0	572.4	2455	2488	3284	1505.0	602.6	2498	2536	3373
1407.5	573.2	2456	2489	3289	1507.5	603.3	2499	2537	3377
1410.0	573.9	2457	2491	3292	1510.0	604.0	2500	2538	3381
1412.5	574.7	2458	2492	3295	1512.5	604.8	2501	2540	3383
1415.0	575.4	2459	2493	3297	1515.0	605.5	2502	2541	3386
1417.5	576.2	2460	2494	3300	1517.5	606.3	2503	2542	3387
1420.0	577.0	2461	2496	3301	1520.0	607.0	2504	2543	3389
1422.5	577.7	2462	2497	3302	1522.5	607.7	2505	2544	3390
1425.0	578.5	2463	2498	3303	1525.0	608.5	2506	2546	3391
1427.5	579.2	2464	2499	3304	1527.5	609.2	2507	2547	3392
1430.0	580.0	2466	2500	3305	1530.0	609.9	2508	2548	3393
1432.5	580.7	2467	2502	3306	1532.5	610.7	2509	2549	3393
1435.0	581.5	2468	2503	3306	1535.0	611.4	2511	2550	3394
1437.5	582.3	2469	2504	3306	1537.5	612.2	2512	2552	3394
1440.0	583.0	2470	2505	3307	1540.0	612.9	2513	2553	3394
1442.5	583.8	2471	2506	3307	1542.5	613.6	2514	2554	3395
1445.0	584.5	2472	2508	3307	1545.0	614.4	2515	2555	3395
1447.5	585.3	2473	2509	3308	1547.5	615.1	2516	2556	3395
1450.0	586.0	2474	2510	3308	1550.0	615.8	2517	2557	3395
1452.5	586.8	2475	2511	3308	1552.5	616.6	2518	2559	3396
1455.0	587.5	2476	2512	3309	1555.0	617.3	2519	2560	3396
1457.5	588.3	2477	2514	3309	1557.5	618.0	2520	2561	3395
1460.0	589.1	2479	2515	3309	1560.0	618.8	2521	2562	3396
1462.5	589.8	2480	2516	3310	1562.5	619.5	2522	2563	3396
1465.0	590.6	2481	2517	3311	1565.0	620.3	2523	2564	3396
1467.5	591.3	2482	2518	3311	1567.5	621.0	2524	2565	3396
1470.0	592.1	2483	2520	3312	1570.0	621.7	2525	2567	3396
1472.5	592.8	2484	2521	3313	1572.5	622.5	2526	2568	3396
1475.0	593.6	2485	2522	3314	1575.0	623.2	2527	2569	3396
1477.5	594.3	2486	2523	3316	1577.5	623.9	2528	2570	3396
1480.0	595.1	2487	2524	3318	1580.0	624.7	2529	2571	3396
1482.5	595.8	2488	2525	3321	1582.5	625.4	2530	2572	3396
1485.0	596.6	2489	2527	3324	1585.0	626.1	2531	2573	3396
1487.5	597.3	2490	2528	3327	1587.5	626.9	2532	2575	3396
1490.0	598.1	2491	2529	3332	1590.0	627.6	2533	2576	3396
1492.5	598.8	2492	2530	3338	1592.5	628.4	2534	2577	3396
1495.0	599.6	2493	2531	3344	1595.0	629.1	2535	2578	3396
1497.5	600.3	2494	2532	3353	1597.5	629.8	2536	2579	3396
1500.0	601.1	2496	2534	3361	1600.0	630.6	2537	2580	3396

TABLE 1 **Time depth curve values**

Well : BLACKWOOD #1 Client : CULTUS
Survey units : METRES Datum : 0.0
Calibrated sonic velocities used from 2057.5 to 2527.5

Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval	Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval
1602.5	631.3	2538	2581	3396	1702.5	660.7	2577	2623	3408
1605.0	632.0	2539	2582	3396	1705.0	661.5	2578	2624	3411
1607.5	632.8	2540	2583	3396	1707.5	662.2	2579	2625	3414
1610.0	633.5	2541	2584	3396	1710.0	662.9	2579	2626	3419
1612.5	634.2	2542	2586	3396	1712.5	663.7	2580	2627	3424
1615.0	635.0	2543	2587	3396	1715.0	664.4	2581	2628	3430
1617.5	635.7	2544	2588	3396	1717.5	665.1	2582	2629	3439
1620.0	636.5	2545	2589	3396	1720.0	665.8	2583	2630	3449
1622.5	637.2	2546	2590	3396	1722.5	666.6	2584	2631	3462
1625.0	637.9	2547	2591	3396	1725.0	667.3	2585	2632	3477
1627.5	638.7	2548	2592	3396	1727.5	668.0	2586	2633	3496
1630.0	639.4	2549	2593	3396	1730.0	668.7	2587	2634	3520
1632.5	640.1	2550	2594	3396	1732.5	669.4	2588	2635	3550
1635.0	640.9	2551	2595	3396	1735.0	670.1	2589	2637	3588
1637.5	641.6	2552	2596	3396	1737.5	670.8	2590	2638	3634
1640.0	642.3	2553	2597	3396	1740.0	671.5	2591	2639	3678
1642.5	643.1	2554	2598	3396	1742.5	672.1	2592	2640	3716
1645.0	643.8	2555	2599	3396	1745.0	672.8	2594	2642	3746
1647.5	644.5	2556	2601	3396	1747.5	673.5	2595	2643	3772
1650.0	645.3	2557	2602	3396	1750.0	674.1	2596	2644	3792
1652.5	646.0	2558	2603	3396	1752.5	674.8	2597	2646	3809
1655.0	646.8	2559	2604	3396	1755.0	675.4	2598	2647	3823
1657.5	647.5	2560	2605	3396	1757.5	676.1	2599	2649	3834
1660.0	648.2	2561	2606	3396	1760.0	676.7	2601	2650	3844
1662.5	649.0	2562	2607	3396	1762.5	677.4	2602	2651	3851
1665.0	649.7	2563	2608	3396	1765.0	678.0	2603	2653	3858
1667.5	650.4	2564	2609	3397	1767.5	678.7	2604	2654	3863
1670.0	651.2	2565	2610	3397	1770.0	679.3	2605	2656	3867
1672.5	651.9	2566	2611	3397	1772.5	680.0	2607	2657	3870
1675.0	652.6	2566	2612	3397	1775.0	680.6	2608	2659	3873
1677.5	653.4	2567	2613	3397	1777.5	681.3	2609	2660	3875
1680.0	654.1	2568	2614	3398	1780.0	681.9	2610	2661	3877
1682.5	654.9	2569	2615	3398	1782.5	682.6	2611	2663	3878
1685.0	655.6	2570	2616	3399	1785.0	683.2	2613	2664	3880
1687.5	656.3	2571	2617	3399	1787.5	683.9	2614	2666	3880
1690.0	657.1	2572	2618	3400	1790.0	684.5	2615	2667	3881
1692.5	657.8	2573	2619	3401	1792.5	685.1	2616	2668	3882
1695.0	658.5	2574	2620	3402	1795.0	685.8	2617	2670	3882
1697.5	659.3	2575	2621	3404	1797.5	686.4	2619	2671	3883
1700.0	660.0	2576	2622	3406	1800.0	687.1	2620	2673	3883

Well : BLACKWOOD #1 Client : CULTUS
Survey units : METRES Datum : 0.0
Calibrated sonic velocities used from 2057.5 to 2527.5

Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval	Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval
1802.5	687.7	2621	2674	3884	1902.5	713.5	2667	2727	3885
1805.0	688.4	2622	2675	3884	1905.0	714.1	2668	2728	3885
1807.5	689.0	2623	2677	3884	1907.5	714.7	2669	2730	3885
1810.0	689.6	2625	2678	3884	1910.0	715.4	2670	2731	3885
1812.5	690.3	2626	2680	3884	1912.5	716.0	2671	2732	3885
1815.0	690.9	2627	2681	3884	1915.0	716.7	2672	2733	3885
1817.5	691.6	2628	2682	3884	1917.5	717.3	2673	2735	3885
1820.0	692.2	2629	2684	3884	1920.0	718.0	2674	2736	3885
1822.5	692.9	2630	2685	3885	1922.5	718.6	2675	2737	3885
1825.0	693.5	2632	2686	3884	1925.0	719.3	2676	2738	3885
1827.5	694.2	2633	2688	3885	1927.5	719.9	2677	2740	3885
1830.0	694.8	2634	2689	3884	1930.0	720.5	2679	2741	3885
1832.5	695.4	2635	2690	3885	1932.5	721.2	2680	2742	3885
1835.0	696.1	2636	2692	3885	1935.0	721.8	2681	2743	3885
1837.5	696.7	2637	2693	3885	1937.5	722.5	2682	2744	3885
1840.0	697.4	2638	2694	3885	1940.0	723.1	2683	2746	3885
1842.5	698.0	2640	2696	3884	1942.5	723.8	2684	2747	3885
1845.0	698.7	2641	2697	3885	1945.0	724.4	2685	2748	3885
1847.5	699.3	2642	2698	3885	1947.5	725.0	2686	2749	3885
1850.0	699.9	2643	2700	3885	1950.0	725.7	2687	2751	3885
1852.5	700.6	2644	2701	3885	1952.5	726.3	2688	2752	3885
1855.0	701.2	2645	2702	3885	1955.0	727.0	2689	2753	3885
1857.5	701.9	2646	2704	3885	1957.5	727.6	2690	2754	3885
1860.0	702.5	2648	2705	3885	1960.0	728.3	2691	2755	3885
1862.5	703.2	2649	2706	3885	1962.5	728.9	2692	2757	3885
1865.0	703.8	2650	2708	3885	1965.0	729.5	2693	2758	3885
1867.5	704.5	2651	2709	3885	1967.5	730.2	2694	2759	3885
1870.0	705.1	2652	2710	3885	1970.0	730.8	2696	2760	3885
1872.5	705.7	2653	2712	3885	1972.5	731.5	2697	2761	3885
1875.0	706.4	2654	2713	3885	1975.0	732.1	2698	2763	3885
1877.5	707.0	2655	2714	3885	1977.5	732.8	2699	2764	3885
1880.0	707.7	2657	2716	3885	1980.0	733.4	2700	2765	3885
1882.5	708.3	2658	2717	3885	1982.5	734.1	2701	2766	3885
1885.0	709.0	2659	2718	3885	1985.0	734.7	2702	2767	3885
1887.5	709.6	2660	2719	3885	1987.5	735.3	2703	2768	3885
1890.0	710.2	2661	2721	3885	1990.0	736.0	2704	2770	3885
1892.5	710.9	2662	2722	3885	1992.5	736.6	2705	2771	3885
1895.0	711.5	2663	2723	3885	1995.0	737.3	2706	2772	3885
1897.5	712.2	2664	2724	3885	1997.5	737.9	2707	2773	3885
1900.0	712.8	2665	2726	3885	2000.0	738.6	2708	2774	3886

TABLE 1 **Time depth curve values**

Well : BLACKWOOD #1 Client : CULTUS
Survey units : METRES Datum : 0.0
Calibrated sonic velocities used from 2057.5 to 2527.5

Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval	Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval
2002.5	739.2	2709	2775	3886	2102.5	764.2	2751	2824	4177
2005.0	739.8	2710	2777	3886	2105.0	764.8	2752	2825	4160
2007.5	740.5	2711	2778	3887	2107.5	765.4	2753	2827	4103
2010.0	741.1	2712	2779	3887	2110.0	766.0	2755	2828	4062
2012.5	741.8	2713	2780	3888	2112.5	766.6	2756	2829	4079
2015.0	742.4	2714	2781	3888	2115.0	767.2	2757	2830	4120
2017.5	743.1	2715	2782	3889	2117.5	767.8	2758	2832	4139
2020.0	743.7	2716	2784	3891	2120.0	768.4	2759	2833	4207
2022.5	744.3	2717	2785	3892	2122.5	769.0	2760	2834	4098
2025.0	745.0	2718	2786	3894	2125.0	769.6	2761	2836	4546
2027.5	745.6	2719	2787	3895	2127.5	770.2	2762	2837	4025
2030.0	746.3	2720	2788	3898	2130.0	770.9	2763	2838	3840
2032.5	746.9	2721	2789	3901	2132.5	771.5	2764	2839	3941
2035.0	747.6	2722	2790	3905	2135.0	772.1	2765	2840	4190
2037.5	748.2	2723	2792	3909	2137.5	772.7	2766	2842	4120
2040.0	748.8	2724	2793	3915	2140.0	773.3	2767	2843	3980
2042.5	749.5	2725	2794	3922	2142.5	773.9	2768	2844	4099
2045.0	750.1	2726	2795	3931	2145.0	774.6	2769	2845	4077
2047.5	750.7	2727	2796	3942	2147.5	775.1	2771	2847	4566
2050.0	751.4	2728	2797	3955	2150.0	775.7	2772	2848	4113
2052.5	752.0	2729	2799	3972	2152.5	776.3	2773	2849	4090
2055.0	752.6	2730	2800	3992	2155.0	776.9	2774	2850	4185
2057.5	753.2	2732	2801	4111	2157.5	777.5	2775	2852	4216
2060.0	753.8	2733	2802	4055	2160.0	778.1	2776	2853	4207
2062.5	754.4	2734	2804	4187	2162.5	778.7	2777	2854	4108
2065.0	755.1	2735	2805	4143	2165.0	779.3	2778	2855	4140
2067.5	755.7	2736	2806	4107	2167.5	779.9	2779	2857	4236
2070.0	756.3	2737	2808	4047	2170.0	780.5	2780	2858	4102
2072.5	756.9	2738	2809	4044	2172.5	781.1	2781	2859	4204
2075.0	757.5	2739	2810	4099	2175.0	781.7	2782	2860	4071
2077.5	758.1	2740	2811	3991	2177.5	782.3	2783	2861	4232
2080.0	758.7	2742	2813	4541	2180.0	782.9	2784	2863	4180
2082.5	759.3	2743	2814	4212	2182.5	783.5	2786	2864	4281
2085.0	759.9	2744	2815	3940	2185.0	784.1	2787	2865	4240
2087.5	760.5	2745	2816	3921	2187.5	784.7	2788	2867	4216
2090.0	761.2	2746	2818	4071	2190.0	785.2	2789	2868	4597
2092.5	761.8	2747	2819	4028	2192.5	785.8	2790	2869	4113
2095.0	762.4	2748	2820	3992	2195.0	786.5	2791	2870	4038
2097.5	763.0	2749	2822	4307	2197.5	787.1	2792	2872	4136
2100.0	763.6	2750	2823	4146	2200.0	787.7	2793	2873	3965

TABLE 1 **Time depth curve values**

Well : BLACKWOOD #1 Client : CULTUS
Survey units : METRES Datum : 0.0
Calibrated sonic velocities used from 2057.5 to 2527.5

Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval	Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval
2202.5	788.3	2794	2874	3915	2302.5	814.9	2826	2907	3623
2205.0	788.9	2795	2875	4070	2305.0	815.6	2826	2908	3688
2207.5	789.5	2796	2876	4228	2307.5	816.2	2827	2909	4202
2210.0	790.1	2797	2877	4162	2310.0	816.7	2828	2910	4306
2212.5	790.7	2798	2878	4056	2312.5	817.3	2829	2912	4278
2215.0	791.3	2799	2880	4275	2315.0	817.9	2830	2913	4370
2217.5	791.9	2800	2881	4140	2317.5	818.4	2832	2914	4693
2220.0	792.6	2801	2882	3996	2320.0	818.9	2833	2916	4798
2222.5	793.2	2802	2883	4193	2322.5	819.5	2834	2917	4424
2225.0	793.8	2803	2884	3810	2325.0	820.1	2835	2919	4584
2227.5	794.4	2804	2885	4019	2327.5	820.6	2836	2920	4589
2230.0	795.1	2805	2886	3953	2330.0	821.2	2837	2921	4310
2232.5	795.7	2806	2887	3904	2332.5	821.8	2838	2922	3877
2235.0	796.4	2807	2888	3864	2335.0	822.4	2839	2923	4359
2237.5	797.0	2807	2889	3730	2337.5	823.0	2840	2925	4328
2240.0	797.7	2808	2889	3697	2340.0	823.5	2841	2926	4371
2242.5	798.4	2809	2890	3538	2342.5	824.1	2843	2927	4626
2245.0	799.0	2810	2891	4039	2345.0	824.6	2844	2929	4562
2247.5	799.7	2810	2892	3710	2347.5	825.2	2845	2930	4584
2250.0	800.4	2811	2893	3640	2350.0	825.7	2846	2932	4612
2252.5	801.1	2812	2893	3664	2352.5	826.3	2847	2933	4638
2255.0	801.8	2813	2894	3675	2355.0	826.8	2848	2934	4590
2257.5	802.4	2813	2895	3673	2357.5	827.3	2849	2936	4608
2260.0	803.1	2814	2896	3663	2360.0	827.9	2851	2937	4623
2262.5	803.8	2815	2896	3626	2362.5	828.4	2852	2939	4632
2265.0	804.5	2815	2897	3721	2365.0	829.0	2853	2940	4577
2267.5	805.1	2816	2898	3749	2367.5	829.5	2854	2942	4754
2270.0	805.8	2817	2899	3690	2370.0	830.1	2855	2943	4428
2272.5	806.5	2818	2899	3702	2372.5	830.6	2856	2944	4659
2275.0	807.2	2818	2900	3706	2375.0	831.1	2858	2946	4744
2277.5	807.9	2819	2901	3609	2377.5	831.6	2859	2947	4843
2280.0	808.6	2820	2902	3510	2380.0	832.2	2860	2949	4320
2282.5	809.3	2820	2902	3686	2382.5	832.8	2861	2950	4405
2285.0	810.0	2821	2903	3528	2385.0	833.4	2862	2951	4322
2287.5	810.6	2822	2904	3697	2387.5	834.0	2863	2952	4300
2290.0	811.4	2822	2904	3431	2390.0	834.5	2864	2953	4521
2292.5	812.1	2823	2905	3543	2392.5	835.1	2865	2954	4163
2295.0	812.8	2824	2905	3569	2395.0	835.7	2866	2956	4337
2297.5	813.5	2824	2906	3604	2397.5	836.3	2867	2957	4350
2300.0	814.2	2825	2907	3476	2400.0	836.8	2868	2958	4222

TABLE 1 **Time depth curve values**

Well : BLACKWOOD #1 Client : CULTUS
Survey units : METRES Datum : 0.0
Calibrated sonic velocities used from 2057.5 to 2527.5

Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval	Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval
2402.5	837.4	2869	2959	4388	2502.5	858.7	2914	3016	5923
2405.0	838.0	2870	2960	4183	2505.0	859.1	2916	3018	5947
2407.5	838.6	2871	2961	4412	2507.5	859.5	2917	3020	5986
2410.0	839.1	2872	2963	4524	2510.0	859.9	2919	3022	6177
2412.5	839.7	2873	2964	4411	2512.5	860.4	2920	3024	5672
2415.0	840.3	2874	2965	4416	2515.0	860.8	2922	3026	5464
2417.5	840.8	2875	2966	4391	2517.5	861.2	2923	3028	5903
2420.0	841.4	2876	2967	4359	2520.0	861.7	2924	3030	5361
2422.5	842.0	2877	2969	4270	2522.5	862.2	2926	3032	5411
2425.0	842.6	2878	2969	3989	2525.0	862.6	2927	3033	5411
2427.5	843.3	2879	2970	3929	2527.5	863.1	2929	3035	5820
2430.0	843.9	2880	2971	3961					
2432.5	844.5	2880	2972	4208					
2435.0	845.1	2881	2973	4191					
2437.5	845.7	2882	2974	4046					
2440.0	846.3	2883	2975	4058					
2442.5	846.9	2884	2976	3978					
2445.0	847.5	2885	2977	4281					
2447.5	848.1	2886	2978	4284					
2450.0	848.6	2887	2980	5009					
2452.5	849.1	2888	2981	5192					
2455.0	849.6	2890	2983	5352					
2457.5	850.0	2891	2985	5258					
2460.0	850.5	2892	2987	5267					
2462.5	851.0	2894	2989	5157					
2465.0	851.5	2895	2990	5184					
2467.5	852.0	2896	2992	5168					
2470.0	852.4	2898	2994	5266					
2472.5	852.9	2899	2995	5108					
2475.0	853.4	2900	2997	5208					
2477.5	853.9	2901	2999	5223					
2480.0	854.4	2903	3000	4998					
2482.5	854.8	2904	3002	5538					
2485.0	855.3	2905	3004	5124					
2487.5	855.8	2907	3005	4979					
2490.0	856.3	2908	3007	5096					
2492.5	856.8	2909	3009	5012					
2495.0	857.3	2910	3010	4706					
2497.5	857.8	2912	3012	5539					
2500.0	858.3	2913	3014	5432					

COMPANY : CULTUS
WELL : BLACKWOOD #1

Latitude : 5731567.61 N Longitude : 670968.05 E Survey date : 13-May-96
Elevations : Datum : 0 Ground : 110 Kelly : 114.3

Survey units : METRES
Times : MILLISECONDS

Shot data : Location Elevation Offset

A	110.0	9.0
B	110.0	18.0
C	109.0	27.0
E	110.0	18.0
F	110.0	27.0
D	109.0	27.0

Rig identification : O.D.E. RIG 30
Energy source : POWERGEL
Logger : B.P.B.
Elevation velocity
for shot statics : 2000
Instrument delay : 2.0 msec

SHOT CALCULATIONS :

Shot no.	Geophone depth Kelly	Geophone depth Datum	Shot Locn	Shot Depth	TIMES Record	TIMES Corr.	TIMES Avg.	TIMES Datum	Check shot interval distance	Check shot interval time	Velocities Average	Velocities RMS	Velocities Interval
DATUM													
1	114.3	0.0	F	0.5	69.5	69.0							
2	114.3	0.0	E	0.5	68.5	69.1							
3	114.3	0.0	A	0.5	68.5	69.8							
4	114.3	0.0	B	0.5	68.0	68.6 n/u							
5	114.3	0.0	C	0.5	69.5	69.5							
6	114.3	0.0	C	0.5	69.5	69.5							
7	114.3	0.0	D	1.0	65.0	69.4							
8	114.3	0.0	D	1.0	65.0	69.4	69.4	0.0					
									285.7	152.4			1874.7
9	400.0	285.7	D	1.0	216.0	221.8	221.8	152.4			1874.7	1874.7	
10	710.0	595.7	D	1.0	347.0	353.0			310.0	131.2			2362.8
26	710.0	595.7	D	1.5	347.0	353.0	353.0	283.6			2100.5	2114.5	
									190.0	72.1			2635.2
11	900.0	785.7	D	1.0	419.0	425.1	425.1	355.7			2208.9	2229.9	
									350.0	127.1			2753.7
25	1250.0	1135.7	D	1.5	546.0	552.2	552.2	482.8			2352.3	2379.0	

SHOT CALCULATIONS : (cont)

Shot no.	Geophone depth Kelly	Geophone depth Datum	Shot Locn	Shot Depth	TIMES Record	TIMES Corr.	TIMES Avg.	TIMES Datum	Check shot distance	Check shot time	Velocities Average	Velocities RMS	Velocities Interval
Belfast Mudstone													
									112.0	36.5			3068.5
24	1362.0	1247.7	D	1.5	582.5	588.7	588.7	519.3			2402.7	2433.9	
Waarre Fm (Unit D)													
12	1490.0	1375.7	D	1.5	627.5	633.7			128.0	44.0			2909.1
23	1490.0	1375.7	D	2.0	625.5	631.7	632.7	563.3			2442.2	2474.3	
									120.0	36.5			3287.7
22	1610.0	1495.7	D	1.5	663.0	669.2	669.2	599.8			2493.7	2531.3	
									240.0	70.5			3404.3
21	1850.0	1735.7	D	1.2	733.5	739.7	739.7	670.3			2589.4	2636.7	
									320.0	82.5			3878.8
20	2170.0	2055.7	D	1.5	816.0	822.2	822.2	752.8			2730.7	2799.9	
									181.0	44.0			4113.6
19	2351.0	2236.7	D	2.0	860.0	866.2	866.2	796.8			2807.1	2888.0	
									69.0	19.0			3631.6
18	2420.0	2305.7	D	1.5	879.0	885.2	885.2	815.8			2826.3	2907.5	
13	2564.0	2449.7	D	1.5	914.0	920.2 n/u			144.0	33.0			4363.6
17	2564.0	2449.7	D	1.5	912.0	918.2	918.2	848.8			2886.1	2977.5	
									47.0	9.1			5164.8
16	2611.0	2496.7	D	2.0	921.0	927.3	927.3	857.9			2910.2	3009.0	
14	2642.0	2527.7	D	1.5	933.5	939.8 n/u			31.0	5.5			5636.4
15	2642.0	2527.7	D	1.5	926.5	932.8	932.8	863.4			2927.6	3033.0	

COMPANY : CULTUS
WELL : BLACKWOOD #1

Latitude : 5731567.61 N Longitude : 670968.05 E Survey date : 13-May-96 Survey units : METRES
Elevations : Datum : 0 Ground : 110 Kelly : 114.3 Times : MILLISECONDS

SONIC DRIFT :

Geophone depth Kelly — Datum		Check shot times Average - Below Datum		Check shot interval Distance -- Time		Sonic Int. time	Interval sonic drift usec/m – msec		Cumulative drift msec
DATUM									
114.3	0.0	69.4	0.0						
				285.7	152.4				
400.0	285.7	221.8	152.4						
				310.0	131.2				
710.0	595.7	353.0	283.6						
				190.0	72.1				
900.0	785.7	425.1	355.7						
				350.0	127.1				
1250.0	1135.7	552.2	482.8						
				112.0	36.5				
Belfast Mudstone									
1362.0	1247.7	588.7	519.3						
				128.0	44.0				
Waarre Fm (Unit D)									
1490.0	1375.7	632.7	563.3						
				120.0	36.5				
1610.0	1495.7	669.2	599.8						
				240.0	70.5				
1850.0	1735.7	739.7	670.3						
				320.0	82.5				
2170.0	2055.7	822.2	752.8						
				181.0	44.0	43.7	1.66	0.3	0.3
2351.0	2236.7	866.2	796.8						

SONIC DRIFT : (cont)

Geophone depth Kelly — Datum		Check shot times Average - Below Datum		Check shot interval Distance -- Time		Sonic Int. time	Interval sonic drift usec/m -- msec		Cumulative drift msec
2351.0	2236.7	866.2	796.8						
				69.0	19.0	16.2	40.58	2.8	3.1
2420.0	2305.7	885.2	815.8						
				144.0	33.0	31.5	10.42	1.5	4.6
2564.0	2449.7	918.2	848.8						
				47.0	9.1	9.8	-14.89	-0.7	3.9
2611.0	2496.7	927.3	857.9						
				31.0	5.5	6.9	-45.16	-1.4	2.5
2642.0	2527.7	932.8	863.4						

COMPANY : CULTUS
WELL : BLACKWOOD #1

Latitude : 5731567.61 N Longitude : 670968.05 E Survey date : 13-May-96 Survey units : METRES
Elevations : Datum : 0 Ground : 110 Kelly : 114.3 Times : MILLISECONDS

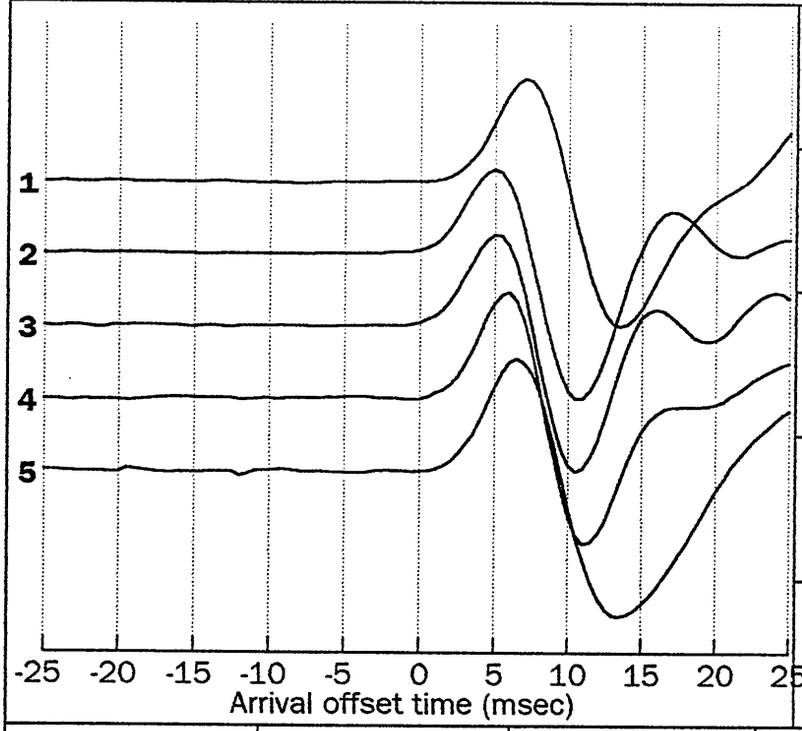
SONIC CALIBRATION :

Geophone depth Kelly	Datum	Interval Distance	Original sonic times Interval	Cumulative	Adjusted sonic times Interval	Calibrated	Velocities Average	RMS	Interval
DATUM									
114.3	0.0								
		285.7							1874.7
400.0	285.7						1874.7	1874.7	
		310.0							2362.8
710.0	595.7						2100.5	2114.5	
		190.0							2635.2
900.0	785.7						2208.9	2229.9	
		350.0							2753.7
1250.0	1135.7						2352.3	2379.0	
		112.0							3068.5
Belfast Mudstone									
1362.0	1247.7						2402.7	2433.9	
		128.0							2909.1
Waarre Fm (Unit D)									
1490.0	1375.7						2442.2	2474.3	
		120.0							3287.7
1610.0	1495.7						2493.7	2531.3	
		240.0							3404.3
1850.0	1735.7						2589.4	2636.7	
		320.0							3878.8
2170.0	2055.7						2730.7	2799.9	
		170.0	41.0		41.3				4118.1
Heathfield Sandstone									
2340.0	2225.7			41.0		794.1	2802.9	2883.3	

SONIC CALIBRATION : (cont)

Geophone depth Kelly	Datum	Interval Distance	Original sonic times Interval	Cumulative	Adjusted sonic times Interval	Calibrated	Velocities Average	RMS	Interval
Heathfield Sandstone									
2340.0	2225.7						2802.9	2883.3	
		11.0	2.7		2.7				4046.3
2351.0	2236.7			43.7		796.8	2807.1	2888.0	
		69.0	16.2		19.0				3631.6
2420.0	2305.7			59.9		815.8	2826.3	2907.5	
		144.0	31.5		33.0				4363.6
2564.0	2449.7			91.4		848.8	2886.1	2977.5	
		47.0	9.8		9.1				5164.8
2611.0	2496.7			101.2		857.9	2910.2	3009.0	
		31.0	6.9		5.5				5636.4
2642.0	2527.7			108.1		863.4	2927.6	3033.0	

First arrivals plot : BLACKWOOD #1



Shot 1 Location : F
Charge depth 0.5 Size 0.25
Phone depth : 114.3
Arrival time : 69.5 msec

Shot 2 Location : E
Charge depth 0.5 Size 0.25
Phone depth : 114.3
Arrival time : 68.5 msec

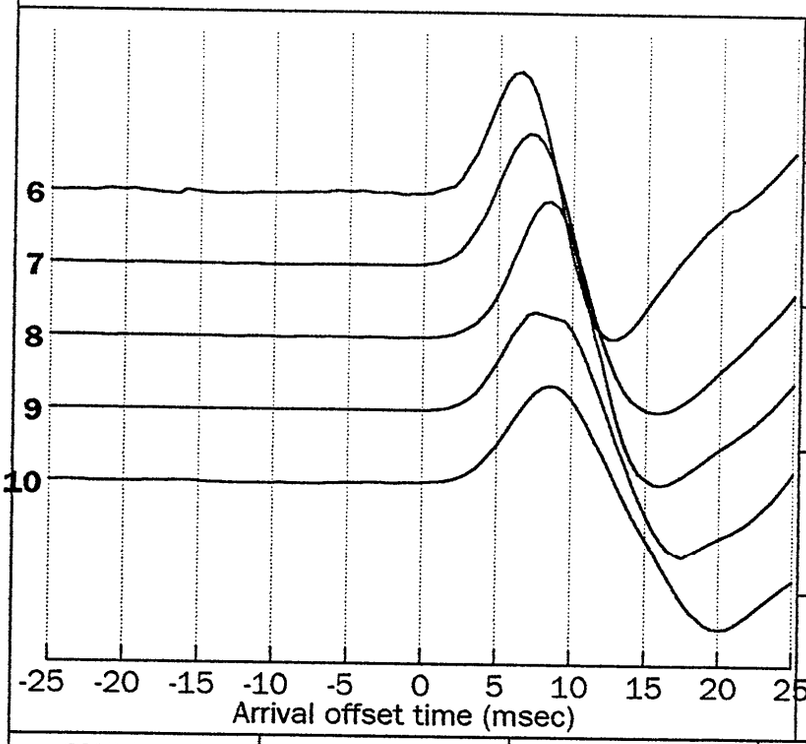
Shot 3 Location : A
Charge depth 0.5 Size 0.25
Phone depth : 114.3
Arrival time : 68.5 msec

Shot 4 Location : B
Charge depth 0.5 Size 0.25
Phone depth : 114.3
Arrival time : 68.0 msec

Shot 5 Location : C
Charge depth 0.5 Size 0.25
Phone depth : 114.3
Arrival time : 69.5 msec

SHOT 1		SHOT 2		SHOT 3		SHOT 4		SHOT 5	
Time	**Ampl**	**Time**	**Ampl**	**Time**	**Ampl**	**Time**	**Ampl**	**Time**	**Ampl**
58.0	-1.00	58.0	0.00	58.0	-1.00	57.0	1.00	58.0	-1.00
58.5	2.00	58.5	1.00	58.5	-1.00	57.5	-1.00	58.5	-2.00
59.0	0.00	59.0	1.00	59.0	-1.00	58.0	-2.00	59.0	-2.00
59.5	-1.00	59.5	0.00	59.5	-2.00	58.5	1.00	59.5	-4.00
60.0	3.00	60.0	0.00	60.0	-2.00	59.0	-1.00	60.0	-4.00
60.5	4.00	60.5	1.00	60.5	0.00	59.5	-2.00	60.5	-2.00
61.0	7.00	61.0	2.00	61.0	0.00	60.0	-2.00	61.0	0.00
61.5	3.00	61.5	2.00	61.5	0.00	60.5	-1.00	61.5	1.00
62.0	2.00	62.0	-1.00	62.0	1.00	61.0	-1.00	62.0	0.00
62.5	-1.00	62.5	-1.00	62.5	1.00	61.5	-2.00	62.5	0.00
63.0	-2.00	63.0	-2.00	63.0	1.00	62.0	-4.00	63.0	2.00
63.5	-2.00	63.5	-2.00	63.5	0.00	62.5	-3.00	63.5	2.00
64.0	-3.00	64.0	-2.00	64.0	-1.00	63.0	-6.00	64.0	2.00
64.5	-3.00	64.5	-3.00	64.5	-2.00	63.5	-6.00	64.5	3.00
65.0	-3.00	65.0	-3.00	65.0	0.00	64.0	-5.00	65.0	3.00
65.5	-2.00	65.5	-4.00	65.5	-2.00	64.5	-5.00	65.5	2.00
66.0	-3.00	66.0	-3.00	66.0	-2.00	65.0	-3.00	66.0	-1.00
66.5	-5.00	66.5	-4.00	66.5	-2.00	65.5	-2.00	66.5	-2.00
67.0	-5.00	67.0	-10.00	67.0	-2.00	66.0	-1.00	67.0	-2.00
67.5	-6.00	67.5	-9.00	67.5	-3.00	66.5	-1.00	67.5	-1.00
68.0	-5.00	68.0	-9.00	68.0	-3.00	67.0	1.00	68.0	-1.00
68.5	-6.00	**68.5**	**-11.00**	**68.5**	**-7.00**	67.5	1.00	68.5	1.00
69.0	-5.00	69.0	-19.00	69.0	-13.00	**68.0**	**0.00**	69.0	-1.00
69.5	**-9.00**	69.5	-32.00	69.5	-25.00	68.5	-5.00	**69.5**	**-1.00**
70.0	-14.00	70.0	-50.00	70.0	-36.00	69.0	-17.00	70.0	-5.00
70.5	-22.00	70.5	-84.00	70.5	-56.00	69.5	-23.00	70.5	-11.00
71.0	-38.00	71.0	-130.00	71.0	-87.00	70.0	-38.00	71.0	-21.00
71.5	-62.00	71.5	-189.00	71.5	-124.00	70.5	-60.00	71.5	-36.00
72.0	-102.00	72.0	-256.00	72.0	-170.00	71.0	-92.00	72.0	-55.00
72.5	-154.00	72.5	-325.00	72.5	-217.00	71.5	-131.00	72.5	-75.00
73.0	-212.00	73.0	-386.00	73.0	-262.00	72.0	-176.00	73.0	-106.00
73.5	-292.00	73.5	-422.00	73.5	-291.00	72.5	-222.00	73.5	-140.00
74.0	-386.00	74.0	-441.00	74.0	-309.00	73.0	-257.00	74.0	-172.00
74.5	-481.00	74.5	-424.00	74.5	-305.00	73.5	-279.00	74.5	-202.00
75.0	-562.00	75.0	-364.00	75.0	-271.00	74.0	-285.00	75.0	-223.00
75.5	-626.00	75.5	-265.00	75.5	-208.00	74.5	-262.00	75.5	-231.00
76.0	-656.00	76.0	-127.00	76.0	-118.00	75.0	-211.00	76.0	-221.00
76.5	-641.00	76.5	33.00	76.5	-4.00	75.5	-134.00	76.5	-201.00
77.0	-586.00	77.0	183.00	77.0	119.00	76.0	-39.00	77.0	-166.00
77.5	-482.00	77.5	348.00	77.5	221.00	76.5	68.00	77.5	-117.00
78.0	-339.00	78.0	498.00	78.0	328.00	77.0	158.00	78.0	-57.00
78.5	-159.00	78.5	619.00	78.5	414.00	77.5	247.00	78.5	8.00
79.0	43.00	79.0	703.00	79.0	468.00	78.0	318.00	79.0	75.00
79.5	245.00	79.5	742.00	79.5	489.00	78.5	366.00	79.5	136.00
80.0	408.00	80.0	736.00	80.0	478.00	79.0	389.00	80.0	181.00

First arrivals plot : BLACKWOOD #1



Shot 6 Location : C
Charge depth 0.5 Size 0.25
Phone depth : 114.3
Arrival time : 69.5 msec

Shot 7 Location : D
Charge depth 1.0 Size 0.25
Phone depth : 114.3
Arrival time : 65.0 msec

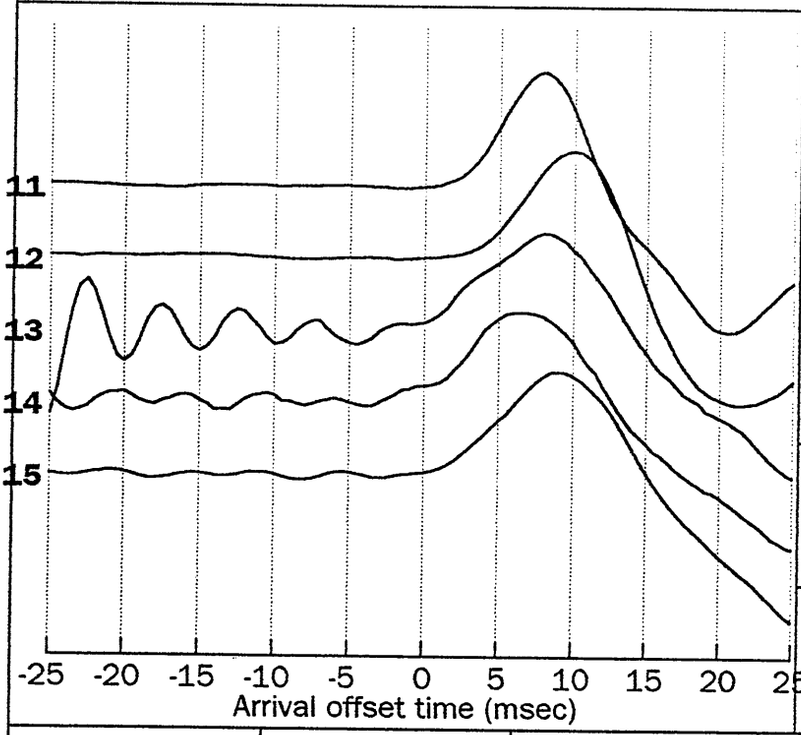
Shot 8 Location : D
Charge depth 1.0 Size 0.25
Phone depth : 114.3
Arrival time : 65.0 msec

Shot 9 Location : D
Charge depth 1.0 Size 0.5
Phone depth : 400.0
Arrival time : 216.0 msec

Shot 10 Location : D
Charge depth 1.0 Size 0.5
Phone depth : 710.0
Arrival time : 347.0 msec

SHOT 6		SHOT 7		SHOT 8		SHOT 9		SHOT 10	
Time	**Ampl**	**Time**	**Ampl**	**Time**	**Ampl**	**Time**	**Ampl**	**Time**	**Ampl**
58.0	1.00	54.0	5.00	54.0	-2.00	205.0	-5.00	336.0	3.00
58.5	1.00	54.5	8.00	54.5	-3.00	205.5	-2.00	336.5	6.00
59.0	1.00	55.0	10.00	55.0	-2.00	206.0	-1.00	337.0	6.00
59.5	1.00	55.5	11.00	55.5	1.00	206.5	-1.00	337.5	1.00
60.0	-1.00	56.0	9.00	56.0	1.00	207.0	-1.00	338.0	6.00
60.5	0.00	56.5	8.00	56.5	0.00	207.5	2.00	338.5	7.00
61.0	0.00	57.0	7.00	57.0	0.00	208.0	2.00	339.0	6.00
61.5	-1.00	57.5	5.00	57.5	0.00	208.5	4.00	339.5	7.00
62.0	-1.00	58.0	5.00	58.0	0.00	209.0	5.00	340.0	6.00
62.5	-2.00	58.5	4.00	58.5	0.00	209.5	7.00	340.5	4.00
63.0	-3.00	59.0	6.00	59.0	-1.00	210.0	7.00	341.0	5.00
63.5	-3.00	59.5	2.00	59.5	0.00	210.5	7.00	341.5	1.00
64.0	-2.00	60.0	3.00	60.0	-1.00	211.0	7.00	342.0	-1.00
64.5	-3.00	60.5	2.00	60.5	1.00	211.5	3.00	342.5	-1.00
65.0	-3.00	61.0	0.00	61.0	-4.00	212.0	1.00	343.0	-2.00
65.5	-2.00	61.5	1.00	61.5	-13.00	212.5	0.00	343.5	-4.00
66.0	-1.00	62.0	1.00	62.0	-6.00	213.0	-1.00	344.0	-4.00
66.5	-1.00	62.5	0.00	62.5	-1.00	213.5	-2.00	344.5	-3.00
67.0	-1.00	63.0	1.00	63.0	2.00	214.0	-3.00	345.0	0.00
67.5	2.00	63.5	1.00	63.5	1.00	214.5	-2.00	345.5	-2.00
68.0	1.00	64.0	0.00	64.0	0.00	215.0	-4.00	346.0	-4.00
68.5	1.00	64.5	-5.00	64.5	0.00	215.5	-8.00	346.5	-4.00
69.0	0.00	**65.0**	**-8.00**	**65.0**	**-2.00**	**216.0**	**-16.00**	**347.0**	**-5.00**
69.5	**-1.00**	65.5	-26.00	65.5	-9.00	216.5	-37.00	347.5	-8.00
70.0	-6.00	66.0	-47.00	66.0	-17.00	217.0	-81.00	348.0	-11.00
70.5	-9.00	66.5	-89.00	66.5	-34.00	217.5	-167.00	348.5	-15.00
71.0	-13.00	67.0	-153.00	67.0	-62.00	218.0	-319.00	349.0	-25.00
71.5	-26.00	67.5	-248.00	67.5	-106.00	218.5	-517.00	349.5	-40.00
72.0	-48.00	68.0	-389.00	68.0	-163.00	219.0	-859.00	350.0	-62.00
72.5	-68.00	68.5	-562.00	68.5	-243.00	219.5	-1343.00	350.5	-92.00
73.0	-98.00	69.0	-743.00	69.0	-357.00	220.0	-1977.00	351.0	-135.00
73.5	-128.00	69.5	-992.00	69.5	-494.00	220.5	-2762.00	351.5	-186.00
74.0	-158.00	70.0	-1263.00	70.0	-684.00	221.0	-3667.00	352.0	-235.00
74.5	-185.00	70.5	-1533.00	70.5	-932.00	221.5	-4653.00	352.5	-302.00
75.0	-200.00	71.0	-1768.00	71.0	-1217.00	222.0	-5640.00	353.0	-373.00
75.5	-203.00	71.5	-1943.00	71.5	-1516.00	222.5	-6404.00	353.5	-441.00
76.0	-192.00	72.0	-2026.00	72.0	-1800.00	223.0	-7187.00	354.0	-503.00
76.5	-165.00	72.5	-2001.00	72.5	-2032.00	223.5	-7375.00	354.5	-554.00
77.0	-124.00	73.0	-1878.00	73.0	-2176.00	224.0	-7213.00	355.0	-587.00
77.5	-75.00	73.5	-1649.00	73.5	-2196.00	224.5	-7056.00	355.5	-597.00
78.0	-14.00	74.0	-1326.00	74.0	-2110.00	225.0	-6905.00	356.0	-591.00
78.5	46.00	74.5	-935.00	74.5	-1892.00	225.5	-6758.00	356.5	-565.00
79.0	103.00	75.0	-502.00	75.0	-1554.00	226.0	-6055.00	357.0	-515.00
79.5	145.00	75.5	-54.00	75.5	-1119.00	226.5	-5007.00	357.5	-446.00
80.0	184.00	76.0	323.00	76.0	-618.00	227.0	-3738.00	358.0	-367.00

First arrivals plot : BLACKWOOD #1



Shot 11 Location : D
Charge depth 1.0 Size 1.0
Phone depth : 900.0
Arrival time : 419.0 msec

Shot 12 Location : D
Charge depth 1.5 Size 2.0
Phone depth : 1490.0
Arrival time : 627.5 msec

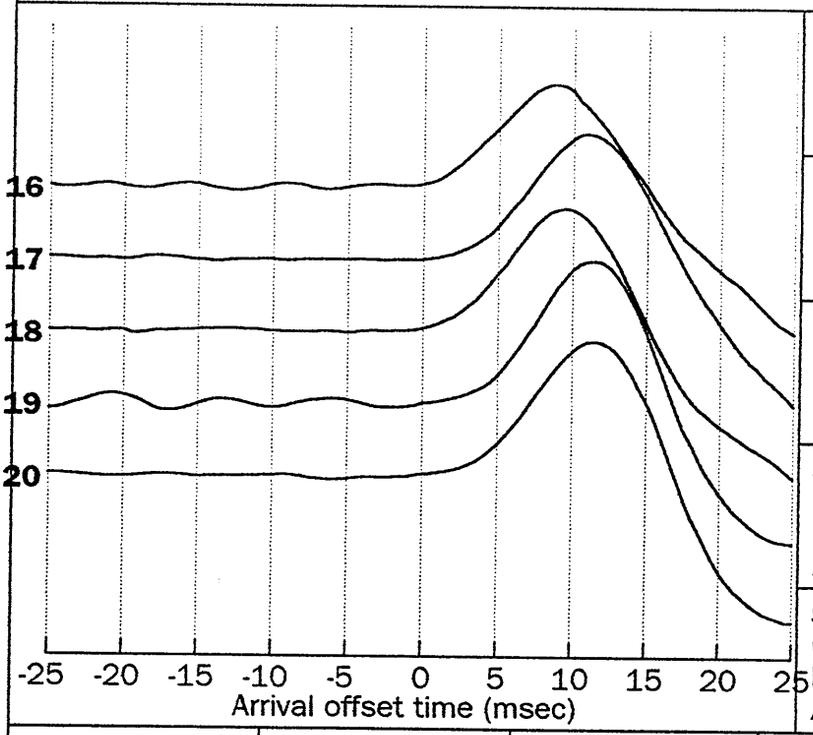
Shot 13 Location : D
Charge depth 1.5 Size 4.0
Phone depth : 2564.0
Arrival time : 915.0 msec

Shot 14 Location : D
Charge depth 1.5 Size 5.0
Phone depth : 2642.0
Arrival time : 933.5 msec

Shot 15 Location : D
Charge depth 1.5 Size 5.0
Phone depth : 2642.0
Arrival time : 931.0 msec

SHOT 11		SHOT 12		SHOT 13		SHOT 14		SHOT 15	
Time	Ampl	Time	Ampl	Time	Ampl	Time	Ampl	Time	Ampl
408.0	-3.00	616.0	-2.00	904.0	-3.00	922.0	-11.00	920.0	-14.00
408.5	-2.00	616.5	-3.00	904.5	8.00	922.5	-13.00	920.5	-13.00
409.0	0.00	617.0	-2.00	905.0	15.00	923.0	-10.00	921.0	-4.00
409.5	3.00	617.5	-1.00	905.5	13.00	923.5	-3.00	921.5	8.00
410.0	1.00	618.0	2.00	906.0	8.00	924.0	-2.00	922.0	18.00
410.5	1.00	618.5	3.00	906.5	0.00	924.5	1.00	922.5	26.00
411.0	0.00	619.0	3.00	907.0	-7.00	925.0	4.00	923.0	25.00
411.5	-1.00	619.5	3.00	907.5	-11.00	925.5	1.00	923.5	20.00
412.0	-2.00	620.0	0.00	908.0	-11.00	926.0	-2.00	924.0	8.00
412.5	-3.00	620.5	0.00	908.5	-2.00	926.5	-4.00	924.5	-5.00
413.0	-4.00	621.0	-1.00	909.0	5.00	927.0	-6.00	925.0	-15.00
413.5	-6.00	621.5	-2.00	909.5	10.00	927.5	-4.00	925.5	-19.00
414.0	-5.00	622.0	-3.00	910.0	13.00	928.0	-1.00	926.0	-16.00
414.5	-4.00	622.5	-3.00	910.5	15.00	928.5	2.00	926.5	-9.00
415.0	-2.00	623.0	-4.00	911.0	12.00	929.0	4.00	927.0	0.00
415.5	0.00	623.5	-4.00	911.5	8.00	929.5	4.00	927.5	10.00
416.0	2.00	624.0	-3.00	912.0	1.00	930.0	-1.00	928.0	13.00
416.5	3.00	624.5	-3.00	912.5	-4.00	930.5	-6.00	928.5	11.00
417.0	11.00	625.0	2.00	913.0	-7.00	931.0	-11.00	929.0	4.00
417.5	8.00	625.5	1.00	913.5	-8.00	931.5	-18.00	929.5	-4.00
418.0	9.00	626.0	0.00	914.0	-7.00	932.0	-19.00	930.0	-8.00
418.5	2.00	626.5	-3.00	914.5	-8.00	932.5	-23.00	930.5	-12.00
419.0	**-1.00**	627.0	-4.00	**915.0**	**-9.00**	933.0	-23.00	**931.0**	**-17.00**
419.5	-4.00	**627.5**	**-5.00**	915.5	-13.00	**933.5**	**-25.00**	931.5	-23.00
420.0	-10.00	628.0	-7.00	916.0	-19.00	934.0	-28.00	932.0	-37.00
420.5	-27.00	628.5	-11.00	916.5	-26.00	934.5	-34.00	932.5	-57.00
421.0	-44.00	629.0	-13.00	917.0	-37.00	935.0	-45.00	933.0	-80.00
421.5	-65.00	629.5	-18.00	917.5	-47.00	935.5	-54.00	933.5	-113.00
422.0	-104.00	630.0	-25.00	918.0	-54.00	936.0	-67.00	934.0	-149.00
422.5	-153.00	630.5	-37.00	918.5	-61.00	936.5	-83.00	934.5	-184.00
423.0	-216.00	631.0	-53.00	919.0	-66.00	937.0	-97.00	935.0	-220.00
423.5	-288.00	631.5	-74.00	919.5	-71.00	937.5	-106.00	935.5	-258.00
424.0	-369.00	632.0	-99.00	920.0	-76.00	938.0	-113.00	936.0	-296.00
424.5	-454.00	632.5	-130.00	920.5	-82.00	938.5	-119.00	936.5	-328.00
425.0	-521.00	633.0	-160.00	921.0	-87.00	939.0	-121.00	937.0	-373.00
425.5	-595.00	633.5	-198.00	921.5	-95.00	939.5	-122.00	937.5	-419.00
426.0	-652.00	634.0	-234.00	922.0	-101.00	940.0	-121.00	938.0	-463.00
426.5	-687.00	634.5	-271.00	922.5	-106.00	940.5	-119.00	938.5	-501.00
427.0	-698.00	635.0	-305.00	923.0	-109.00	941.0	-116.00	939.0	-530.00
427.5	-678.00	635.5	-333.00	923.5	-108.00	941.5	-110.00	939.5	-551.00
428.0	-627.00	636.0	-356.00	924.0	-104.00	942.0	-102.00	940.0	-553.00
428.5	-562.00	636.5	-367.00	924.5	-99.00	942.5	-93.00	940.5	-548.00
429.0	-466.00	637.0	-373.00	925.0	-90.00	943.0	-82.00	941.0	-532.00
429.5	-358.00	637.5	-367.00	925.5	-83.00	943.5	-66.00	941.5	-508.00
430.0	-242.00	638.0	-350.00	926.0	-72.00	944.0	-52.00	942.0	-475.00

First arrivals plot : BLACKWOOD #1



Shot 16 Location : D
Charge depth 2.0 Size 4.0
Phone depth : 2611.0
Arrival time : 922.5 msec

Shot 17 Location : D
Charge depth 1.5 Size 4.0
Phone depth : 2564.0
Arrival time : 913.5 msec

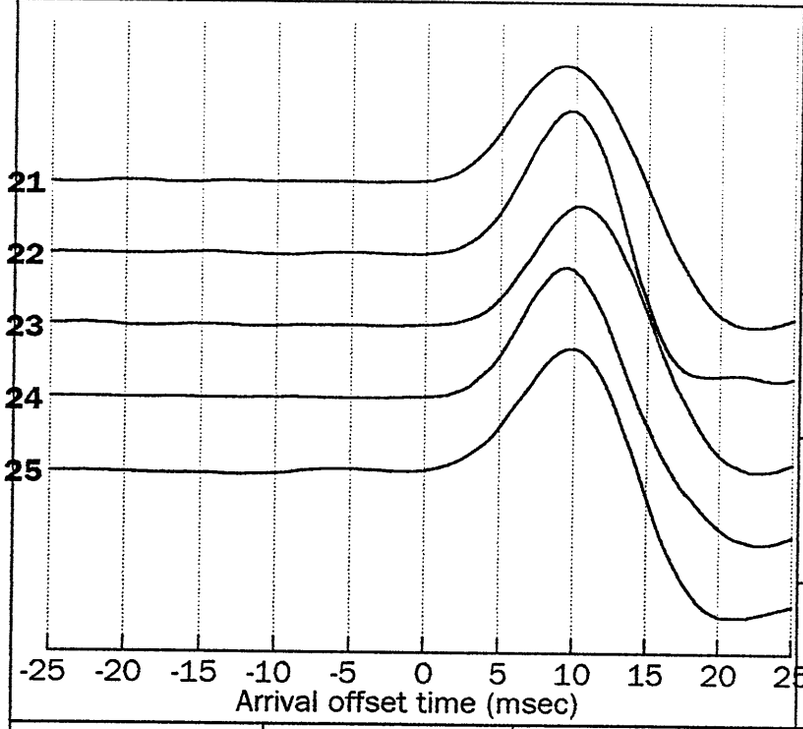
Shot 18 Location : D
Charge depth 1.5 Size 4.0
Phone depth : 2420.0
Arrival time : 880.5 msec

Shot 19 Location : D
Charge depth 2.0 Size 4.0
Phone depth : 2351.0
Arrival time : 861.5 msec

Shot 20 Location : D
Charge depth 1.5 Size 3.0
Phone depth : 2170.0
Arrival time : 816.0 msec

SHOT 16		SHOT 17		SHOT 18		SHOT 19		SHOT 20	
Time	**Ampl**	**Time**	**Ampl**	**Time**	**Ampl**	**Time**	**Ampl**	**Time**	**Ampl**
912.0	8.00	902.0	1.00	870.0	-7.00	850.0	14.00	805.0	1.00
912.5	-3.00	902.5	0.00	870.5	-4.00	850.5	20.00	805.5	-4.00
913.0	-11.00	903.0	1.00	871.0	-2.00	851.0	19.00	806.0	-3.00
913.5	-16.00	903.5	4.00	871.5	-1.00	851.5	17.00	806.5	-8.00
914.0	-15.00	904.0	4.00	872.0	1.00	852.0	10.00	807.0	-6.00
914.5	-12.00	904.5	3.00	872.5	2.00	852.5	0.00	807.5	-2.00
915.0	-7.00	905.0	1.00	873.0	1.00	853.0	-9.00	808.0	3.00
915.5	2.00	905.5	0.00	873.5	1.00	853.5	-18.00	808.5	9.00
916.0	9.00	906.0	1.00	874.0	-1.00	854.0	-19.00	809.0	13.00
916.5	13.00	906.5	0.00	874.5	0.00	854.5	-24.00	809.5	16.00
917.0	11.00	907.0	0.00	875.0	0.00	855.0	-25.00	810.0	16.00
917.5	7.00	907.5	0.00	875.5	1.00	855.5	-23.00	810.5	14.00
918.0	1.00	908.0	0.00	876.0	3.00	856.0	-18.00	811.0	13.00
918.5	-4.00	908.5	-1.00	876.5	2.00	856.5	-10.00	811.5	8.00
919.0	-10.00	909.0	-1.00	877.0	-3.00	857.0	-1.00	812.0	5.00
919.5	-13.00	909.5	1.00	877.5	-5.00	857.5	9.00	812.5	4.00
920.0	-14.00	910.0	1.00	878.0	-5.00	858.0	17.00	813.0	4.00
920.5	-12.00	910.5	2.00	878.5	-4.00	858.5	18.00	813.5	5.00
921.0	-10.00	911.0	0.00	879.0	-5.00	859.0	18.00	814.0	3.00
921.5	-7.00	911.5	0.00	879.5	-5.00	859.5	16.00	814.5	3.00
922.0	-7.00	912.0	-1.00	880.0	-8.00	860.0	12.00	815.0	0.00
922.5	**-8.00**	912.5	0.00	**880.5**	**-10.00**	860.5	7.00	815.5	-6.00
923.0	-15.00	913.0	-1.00	881.0	-17.00	861.0	-5.00	**816.0**	**-11.00**
923.5	-25.00	**913.5**	**-4.00**	881.5	-27.00	**861.5**	**-8.00**	816.5	-14.00
924.0	-39.00	914.0	-9.00	882.0	-40.00	862.0	-14.00	817.0	-18.00
924.5	-63.00	914.5	-15.00	882.5	-55.00	862.5	-20.00	817.5	-23.00
925.0	-91.00	915.0	-21.00	883.0	-71.00	863.0	-27.00	818.0	-30.00
925.5	-119.00	915.5	-31.00	883.5	-95.00	863.5	-37.00	818.5	-41.00
926.0	-155.00	916.0	-42.00	884.0	-122.00	864.0	-50.00	819.0	-54.00
926.5	-194.00	916.5	-56.00	884.5	-152.00	864.5	-67.00	819.5	-71.00
927.0	-233.00	917.0	-74.00	885.0	-190.00	865.0	-84.00	820.0	-95.00
927.5	-264.00	917.5	-92.00	885.5	-234.00	865.5	-111.00	820.5	-124.00
928.0	-304.00	918.0	-119.00	886.0	-278.00	866.0	-144.00	821.0	-155.00
928.5	-342.00	918.5	-150.00	886.5	-318.00	866.5	-187.00	821.5	-193.00
929.0	-383.00	919.0	-181.00	887.0	-369.00	867.0	-234.00	822.0	-236.00
929.5	-422.00	919.5	-212.00	887.5	-416.00	867.5	-289.00	822.5	-281.00
930.0	-460.00	920.0	-248.00	888.0	-463.00	868.0	-348.00	823.0	-331.00
930.5	-492.00	920.5	-283.00	888.5	-506.00	868.5	-394.00	823.5	-382.00
931.0	-511.00	921.0	-317.00	889.0	-538.00	869.0	-457.00	824.0	-428.00
931.5	-528.00	921.5	-349.00	889.5	-564.00	869.5	-517.00	824.5	-476.00
932.0	-528.00	922.0	-381.00	890.0	-576.00	870.0	-575.00	825.0	-520.00
932.5	-520.00	922.5	-401.00	890.5	-582.00	870.5	-623.00	825.5	-559.00
933.0	-497.00	923.0	-422.00	891.0	-576.00	871.0	-665.00	826.0	-592.00
933.5	-444.00	923.5	-436.00	891.5	-560.00	871.5	-693.00	826.5	-622.00
934.0	-410.00	924.0	-440.00	892.0	-531.00	872.0	-704.00	827.0	-639.00

First arrivals plot : BLACKWOOD #1



Shot 21 Location : D
Charge depth 1.2 Size 3.0
Phone depth : 1850.0
Arrival time : 733.5 msec

Shot 22 Location : D
Charge depth 1.5 Size 3.0
Phone depth : 1610.0
Arrival time : 663.0 msec

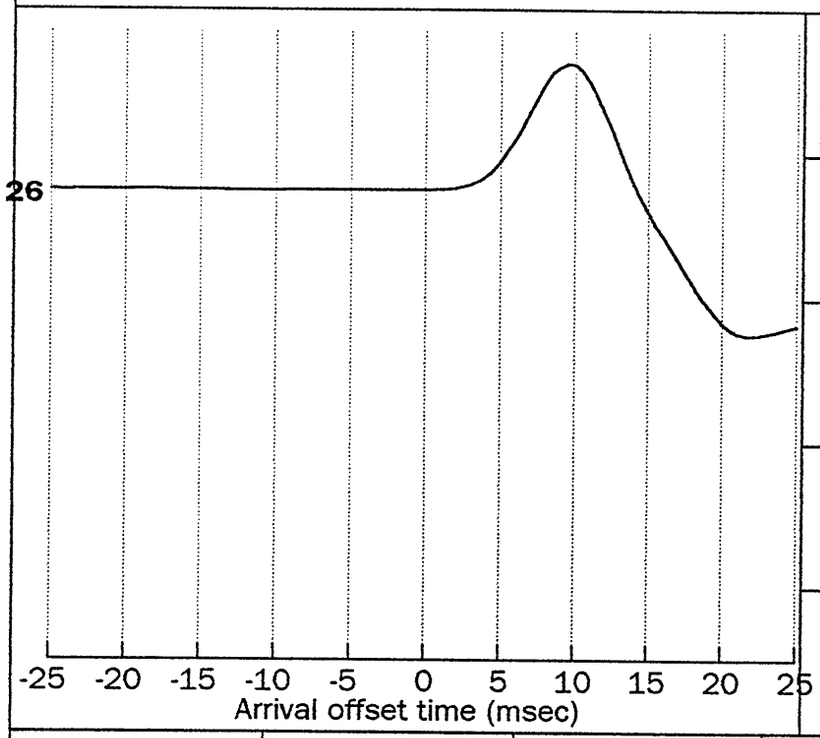
Shot 23 Location : D
Charge depth 2.0 Size 2.0
Phone depth : 1490.0
Arrival time : 625.5 msec

Shot 24 Location : D
Charge depth 1.5 Size 2.0
Phone depth : 1362.0
Arrival time : 582.5 msec

Shot 25 Location : D
Charge depth 1.5 Size 2.0
Phone depth : 1250.0
Arrival time : 546.0 msec

SHOT 21		SHOT 22		SHOT 23		SHOT 24		SHOT 25	
Time	**Ampl**	**Time**	**Ampl**	**Time**	**Ampl**	**Time**	**Ampl**	**Time**	**Ampl**
722.0	1.00	652.0	10.00	614.0	10.00	572.0	-2.00	535.0	19.00
722.5	3.00	652.5	13.00	614.5	10.00	572.5	-3.00	535.5	16.00
723.0	2.00	653.0	15.00	615.0	8.00	573.0	-4.00	536.0	14.00
723.5	1.00	653.5	16.00	615.5	1.00	573.5	-5.00	536.5	14.00
724.0	0.00	654.0	13.00	616.0	0.00	574.0	-5.00	537.0	9.00
724.5	0.00	654.5	8.00	616.5	-1.00	574.5	-6.00	537.5	4.00
725.0	1.00	655.0	2.00	617.0	-5.00	575.0	-3.00	538.0	1.00
725.5	1.00	655.5	-5.00	617.5	-4.00	575.5	-2.00	538.5	-2.00
726.0	0.00	656.0	-9.00	618.0	-5.00	576.0	0.00	539.0	-4.00
726.5	1.00	656.5	-12.00	618.5	-7.00	576.5	6.00	539.5	-4.00
727.0	2.00	657.0	-13.00	619.0	-6.00	577.0	8.00	540.0	-4.00
727.5	2.00	657.5	-12.00	619.5	-4.00	577.5	5.00	540.5	-5.00
728.0	0.00	658.0	-11.00	620.0	-8.00	578.0	7.00	541.0	-5.00
728.5	2.00	658.5	-10.00	620.5	-4.00	578.5	7.00	541.5	-4.00
729.0	3.00	659.0	-11.00	621.0	0.00	579.0	5.00	542.0	-3.00
729.5	6.00	659.5	-7.00	621.5	2.00	579.5	4.00	542.5	0.00
730.0	4.00	660.0	-3.00	622.0	6.00	580.0	3.00	543.0	1.00
730.5	2.00	660.5	-1.00	622.5	3.00	580.5	0.00	543.5	4.00
731.0	1.00	661.0	5.00	623.0	1.00	581.0	-1.00	544.0	4.00
731.5	-1.00	661.5	7.00	623.5	-2.00	581.5	-5.00	544.5	4.00
732.0	0.00	662.0	8.00	624.0	-5.00	582.0	-6.00	545.0	6.00
732.5	-4.00	662.5	6.00	624.5	-7.00	**582.5**	**-10.00**	545.5	3.00
733.0	-10.00	**663.0**	**-1.00**	625.0	-11.00	583.0	-14.00	**546.0**	**0.00**
733.5	**-14.00**	663.5	-10.00	**625.5**	**-15.00**	583.5	-20.00	546.5	-7.00
734.0	-30.00	664.0	-21.00	626.0	-25.00	584.0	-31.00	547.0	-13.00
734.5	-50.00	664.5	-41.00	626.5	-34.00	584.5	-45.00	547.5	-23.00
735.0	-75.00	665.0	-70.00	627.0	-49.00	585.0	-73.00	548.0	-37.00
735.5	-115.00	665.5	-113.00	627.5	-76.00	585.5	-112.00	548.5	-54.00
736.0	-164.00	666.0	-170.00	628.0	-110.00	586.0	-167.00	549.0	-76.00
736.5	-228.00	666.5	-245.00	628.5	-151.00	586.5	-259.00	549.5	-102.00
737.0	-288.00	667.0	-342.00	629.0	-213.00	587.0	-345.00	550.0	-128.00
737.5	-370.00	667.5	-442.00	629.5	-300.00	587.5	-439.00	550.5	-162.00
738.0	-460.00	668.0	-583.00	630.0	-407.00	588.0	-579.00	551.0	-204.00
738.5	-556.00	668.5	-745.00	630.5	-539.00	588.5	-734.00	551.5	-251.00
739.0	-663.00	669.0	-927.00	631.0	-682.00	589.0	-911.00	552.0	-300.00
739.5	-757.00	669.5	-1123.00	631.5	-846.00	589.5	-1096.00	552.5	-348.00
740.0	-843.00	670.0	-1324.00	632.0	-988.00	590.0	-1276.00	553.0	-391.00
740.5	-905.00	670.5	-1520.00	632.5	-1161.00	590.5	-1446.00	553.5	-441.00
741.0	-968.00	671.0	-1663.00	633.0	-1326.00	591.0	-1562.00	554.0	-488.00
741.5	-1015.00	671.5	-1813.00	633.5	-1475.00	591.5	-1677.00	554.5	-525.00
742.0	-1039.00	672.0	-1922.00	634.0	-1603.00	592.0	-1745.00	555.0	-554.00
742.5	-1042.00	672.5	-1977.00	634.5	-1698.00	592.5	-1762.00	555.5	-569.00
743.0	-1023.00	673.0	-1971.00	635.0	-1753.00	593.0	-1725.00	556.0	-570.00
743.5	-979.00	673.5	-1899.00	635.5	-1757.00	593.5	-1635.00	556.5	-558.00
744.0	-920.00	674.0	-1761.00	636.0	-1728.00	594.0	-1490.00	557.0	-530.00

First arrivals plot : BLACKWOOD #1



Shot 26 Location : D
Charge depth 1.5 Size 1.0
Phone depth : 710.0
Arrival time : 347.0 msec

SHOT	26
Time	**Ampl**
336.0	13.00
336.5	13.00
337.0	12.00
337.5	9.00
338.0	6.00
338.5	3.00
339.0	-3.00
339.5	-7.00
340.0	-7.00
340.5	-6.00
341.0	-6.00
341.5	-4.00
342.0	-1.00
342.5	2.00
343.0	5.00
343.5	7.00
344.0	7.00
344.5	7.00
345.0	6.00
345.5	4.00
346.0	2.00
346.5	-1.00
347.0	**-5.00**
347.5	-10.00
348.0	-20.00
348.5	-36.00
349.0	-70.00
349.5	-112.00
350.0	-190.00
350.5	-304.00
351.0	-467.00
351.5	-691.00
352.0	-979.00
352.5	-1318.00
353.0	-1675.00
353.5	-2129.00
354.0	-2610.00
354.5	-3087.00
355.0	-3522.00
355.5	-3877.00
356.0	-4066.00
356.5	-4183.00
357.0	-4143.00
357.5	-3942.00
358.0	-3593.00

APPENDIX 5

PETROPHYSICAL ANALYSIS

VICTORIA

ONSHORE OTWAY BASIN

PPL 1

BLACKWOOD 1

ELECTRIC LOG INTERPRETATION

WAARRE FORMATION

&

HEATHFIELD MEMBER

G. O'Neill
Cultus Petroleum
Exploration Department
November, 1997

BLACKWOOD 1 ELECTRIC LOG INTERPRETATION

CONTENTS

TABLES

APPENDICES

ENCLOSURES

1. EXECUTIVE SUMMARY

Blackwood 1 was drilled by Cultus Petroleum in May 1996 as an exploration well in the NE corner of PPL 1.

The well targeted Early Cretaceous sandstones of the Heathfield Member and Late Cretaceous sandstones of the Waarre Formation.

No significant hydrocarbon shows were encountered in the well. Quicklook electric log analysis indicates that the Waarre Formation is water saturated and that the Heathfield Member is tight and water saturated.

No wireline samples were attempted. No drill stem tests were conducted.

Blackwood 1 was plugged and abandoned.

2. PAY SUMMARY

No net pay is mapped in Blackwood 1 with all potential reservoir sections interpreted to be water saturated.

Cut-off parameters used to derive the net reservoir and pay were as follows:

Vsh	<= 40%
Porosity	>= 10%
Sw	<= 70%.

Enclosures 1 & 2, the Log Evaluation Plots, visually presents these data.

The **Waarre Formation** contains 50.1 metres of net reservoir (Phie 19.3%, Vsh 21.3%) through 124 metres of section. The net to gross ratio for this interval is 40%.

Appendix 2 details the net reservoir intervals in the Waarre Formation.

The **Heathfield Member** contains a large section of shaly, tight sandstone which is sub reservoir quality.

3. MUDLOG SHOWS

Oil fluorescence was not observed in Blackwood 1. Background gas averaged 10 units through both the Waarre Formation and Heathfield Member with no significant peaks.

4. ELECTRIC LOGGING

One suite of electric logs was run by BPB, in Blackwood 1, at total depth as detailed in Table 1 below.

TABLE 1: ELECTRIC LOGGING SUMMARY

Run	Log	Interval mRT	Comments
1	GR-CAL DLS-MLS-SP LCS	2646.4 - 689 2646.4 -1480 2646.4 - 1910	86.0°C @ 2646 mRT, 17 hours since circ
2	GR-PDS-CNS-CAL	1870 - 689	86.0°C @ 1870 mRT, 25 hours since circ.
3	Checkshot survey	2642 - surface	15 levels, 26 shots
4	SWC	2634.7 - 1514.5	Shot 24, recovered 22

5. CORING

No full hole cores were cut in Blackwood 1. 22 of 24 sidewall cores were recovered.

6. DRILL STEM TESTS

No drill stem tests were conducted in Blackwood 1.

7. HOLE SUMMARY

Electric logs were acquired in a 8.5" borehole. Hole conditions through the Waarre Formation (where the density porosity is calculated) are good apart from the top Waarre Formation, Unit D where washout and rugosity are noted.

Hole quality through the Heathfield Member are good.

Badhole was not flagged on the log interpretation plot. Sonic data were not acquired over the Waarre Formation as a backup for density logs in washed out hole. Consequently Wyllie sonic porosity could not be calculated where the density tool lost pad contact.

8. MUD DATA

The mud data while recording electric logs were as follows:

Mud type:	KCl PHPA polymer
Mud weight:	9.1 ppg
Mud resistivity:	0.399 ohm-m at 17.7°C
Mud filtrate resistivity:	0.355 ohm-m at 17.7°C
Mud cake resistivity:	0.882 ohm-m at 17.7°C
Bottom hole temperature:	86.0°C (DLS logging run)

9. INTERPRETATION PROCEDURES

Standard environmental corrections were applied to the electric logging measurements using Mincom's Geolog deterministic program. Key evaluation parameters and techniques are listed in Tables 2 & 3.

Shale Volume

The GR log was used to derive shale volume.

Porosity

The density equation was used to derive matrix porosity (Phie) in the Waarre Formation. The Wyllie sonic equation was used to derive matrix porosity (Phie) in the Heathfield Member as density data were not acquired over this interval.

Water Saturation

The Indonesia equation was used to derive values of water saturation.

A Rw of 0.4 ohm-m at 25°C (15 000 ppm NaCl eq) was used for the Waarre Formation. This was derived from analysis of a water sample collected in Skull Creek West 1, DST 2.

Heathfield water sample data are unknown. A Pickett plot (appended) was used to derive (Rwa 0.2 ohm-m at 82°C; 13 000 ppm NaCl eq) a water salinity for the Heathfield Member in Blackwood 1.

10. REFERENCES

Cultus, 1997	Blackwood 1 Well Completion Report- unpublished.
Cultus, 1997	Skull Creek West 1 Preliminary Data Report- unpublished.

TABLE 2: KEY EVALUATION PARAMETERS & TECHNIQUES

WAARRE FORMATION

	Waarre Formation	Source
Interval	1487-1611	
Vsh equation	GR	
GR matrix	15 API	Xplot
GR shale	130 API	Xplot
Porosity equation	Density	
Rho matrix	2.64 g/cc	quartz
Rho shale	2.4 g/cc	Xplot
Rho fluid	1.01 g/cc	saline fluid
Bad hole Porosity	not applicable	
Sw equation	Indonesia	
Rw matrix	0.4 ohm-m @ 25C	Skull Ck West 1
a	1	standard
m	2	standard
n	2	standard
Cutoff Parameters		
Vsh cutoff	0.4	
Net sand porosity cutoff	0.05	
Net res porosity cutoff	0.10	
Sw cutoff	0.7	
Min net sand	1 metre	
Min net reservoir	1 metre	
Min net pay	1 metre	

TABLE 3: KEY EVALUATION PARAMETERS & TECHNIQUES

HEATHFIELD MEMBER

	Heathfield Member	Source
Interval	2340 - 2650	
Vsh equation	GR	
GR matrix	40 API	Xplot
GR shale	140 API	Xplot
Porosity equation	Wyllie	
DT fluid	189 us/ft	
DT matrix	55.5 us/ft	quartz
DT shale	72 us/ft	Xplot
Sw equation	Indonesia	
Rw matrix	0.2 ohm-m @ 82C	Pickett Plot
a	1	standard
m	2	standard
n	2	standard
Cutoff Parameters		
Vsh cutoff	0.4	
Net sand porosity cutoff	0.01	
Net res porosity cutoff	0.10	
Sw cutoff	0.7	
Min net sand	1 metre	
Min net reservoir	1 metre	
Min net pay	1 metre	

APPENDIX 1: CROSS PLOTS

PE905679

This is an enclosure indicator page.
The enclosure PE905679 is enclosed within the container PE900834 at this location in this document.

The enclosure PE905679 has the following characteristics:

ITEM_BARCODE	= PE905679
CONTAINER_BARCODE	= PE900834
NAME	= Petrophysical Crossplot
BASIN	= OTWAY
PERMIT	= PPL1
TYPE	= wELL
SUBTYPE	= DIAGRAM
DESCRIPTION	= Blackwood-1 Petrophysical Crossplot, Wire.RT_O vs Wire.GR_COR_2 from Well Completion Report
REMARKS	=
DATE_CREATED	=
DATE_RECEIVED	= 12/11/97
W_NO	= W1152
WELL_NAME	= BLACKWOOD-1
CONTRACTOR	=
CLIENT_OP_CO	= CULTUS PETROLEUM N.L.

(Inserted by DNRE - Vic Govt Mines Dept)

PE905680

This is an enclosure indicator page.
The enclosure PE905680 is enclosed within the container PE900834 at this location in this document.

The enclosure PE905680 has the following characteristics:

ITEM_BARCODE	= PE905680
CONTAINER_BARCODE	= PE900834
NAME	= Petrophysical Crossplot
BASIN	= OTWAY
PERMIT	= PPL1
TYPE	= wELL
SUBTYPE	= DIAGRAM
DESCRIPTION	= Blackwood-1 Petrophysical Crossplot, RHO vs NPHI from Well Completion Report
REMARKS	=
DATE_CREATED	=
DATE_RECEIVED	= 12/11/97
W_NO	= W1152
WELL_NAME	= BLACKWOOD-1
CONTRACTOR	=
CLIENT_OP_CO	= CULTUS PETROLEUM N.L.

(Inserted by DNRE - Vic Govt Mines Dept)

Part 2 : Drilling . . . .

TABLE OF CONTENTS

PART 2 - DRILLING

PART 2 - DRILLING DATA

1.0 DRILLING DATA

1.1 General Information

Well Name	Blackwood - 1	
Block	PPL 1, Onshore Otway Basin, Victoria	
	8.5 x 11 km 3D Seismic Grid	
Seismic Line	Waarre 3D x line 2340 Inline 8415	
Surface Location	X: 670968.05 E Y: 5731567.61 N	
Block Equity Percentage	GFE Resources Ltd.	100.00%
Type of Well	Exploration	
Well Status	Plug and Abandoned	
Spud Release	15:30 hrs 26/4/96 16:00 hrs 15/5/96	
Total Rig Days	20 days	
Actual Total Depth Proposed Total Depth	2650 m RT MD 2700 m RT TVD	
Operator Personnel on Site	Drilling Supervisor Engineer/Night Supervisor Geologist	
Drilling Contractor	Oil Drilling and Exploration Pty Ltd (O.D.&E.) Rig #30	
Drilling Fluids	Independent Drilling Fluid Services Pty Ltd	
Cementing	Halliburton	
Motors	Halliburton	
Mud Logging	Halliburton	
Coring & Testing	Australian DST	
Wireline Logging	BPB Logging	
Well Cost	1130 A$K	

DIAGRAM 1

BLACKWOOD-1

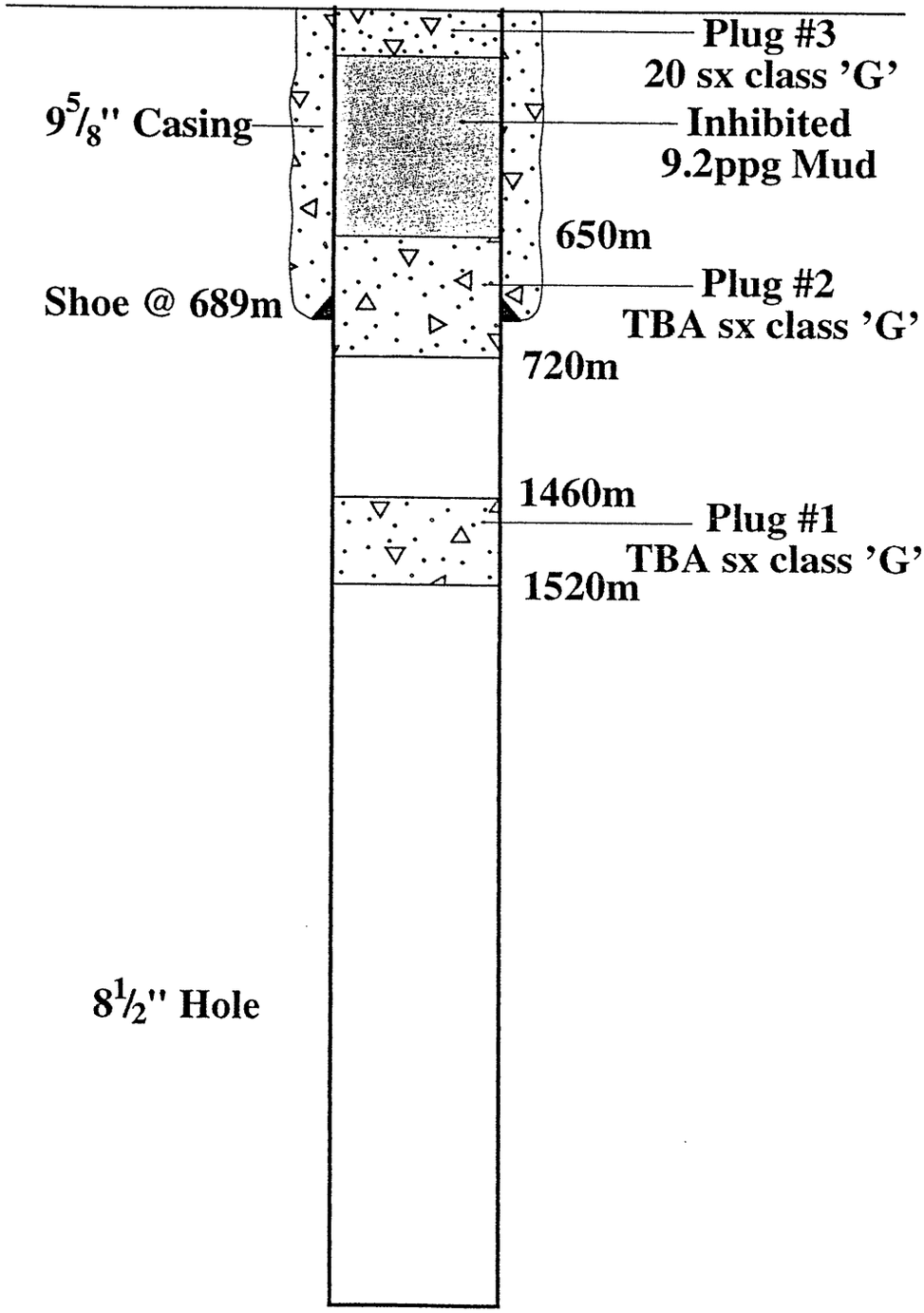
WELL SCHEMATIC

(See following page)

CULTUS

Diagram 1

Blackwood-1
Well Schematic



Total Depth 2650mMD

FILE: OTWAY/BLCKWDWS.DGN

1.2 Drilling Summary

Blackwood #1 was spudded at 15:30hrs on 26 April 1996 in PPL-1, onshore Otway Basin with OD&E Rig #30. The well was drilled vertically with a 12 1/4" surface hole to 692 mMD, and reached a TD of 2650m in 8 1/2" hole. The Waarre and Heathfield objectives were sub-economic, subsequently the well was plugged and abandoned and the rig released at 16:00hrs on 15 May 1996.

12¼" Hole

A single 12 1/4" tricone bit was used to drill the surface hole to a casing point of 692m in 39 hours (19.1 hours on bottom) using a semi-stiff assembly. This section was drilled with a RPM between 100-140, WOB between 7-25 klbs and pump rate between 560-600 gpm and an average deviation of 0.5°.

A fresh water gel spud mud was used without problems to drill this section. At the casing point, a wiper trip to surface was run with tight hole experienced in the Pember Mudstone and from the top Dilwyn through the Mepunga. While running in to circulate prior to running casing, tight hole was experienced through the Gellibrand Marl and again in the Mepunga. After washing and reaming to bottom the hole was conditioned prior to casing. 9 5/8" casing was run and landed at 689.4 mRT and cemented with 500 sx 12.8ppg lead and 232 sx 15.8ppg tail slurry. Cement returns were observed, the plug was bumped and the casing was successfully pressure tested to 3000 psi. A planned top up job was completed consisting of 29 sx after the annulus dropped. The BOP's were nippled up and pressure tested prior to drilling out.

8½" Production Hole

An 8½" insert bit was used to drill out the float collar, cement, float shoe and 3m of new formation. A formation integrity test was conducted with 8.5 ppg drilling fluid and EMW of 14.0 prior to drilling ahead.

Drilling continued with a packed hole assembly and 1% KCl PHPA mud. Drilled to 1215m then POH to shoe for a wiper trip. Tight hole was encountered through the Skull Creek Mudstone. RIH to 1215m then drilled ahead to 1522m.

At 1522m, the main shaft on the drawworks parted resulting in 59.5 hours lost time waiting for repairs, 7 hours on a wiper trip and reaming, and 1 hour repairing the right angle drive. On the wiper trip, tight hole was experienced in the Waarre Sandstone, Belfast Mudstone, Nullawarre Greensand, and Skull Creek Mudstone. Reaming was required through the Waarre.

Drilled ahead to 1651m, then POH to change bit because of hours and reduced ROP. An extended nozzle and some inserts were missing on the bit, so a junk run was made recovering 3 inserts plus several chips.

A PDC bit was made up on a motor, then RIH. Reaming was required through the Waarre. Drilled ahead to 2383m. ROP dropped to 6 m/hr so the bit was pulled. Tight hole was encountered through the Eumeralla, Waarre, and Belfast formations on the trip out of the hole. Rubber from the motor stator was found blocking the nozzles on the bit.

An insert bit was made up on the motor then RIH. Drilled ahead to TD at 2650m. Wiper trip to shoe showed hole in good condition. POH for logging.

Wireline logs were subsequently run as follows:

Logging Run #1 DLL-MSFL-GR-SP-CAL-Sonic (Sonic failed)
#2 LDL-CNL-GR-CAL
#3 Check Shot Survey

After logging, ran in hole open ended to set plug #1: 1520-1460m. Pulled out of the hole to 720m and set plug #2: 720-650m. Tagged plug #2 at 651m with 10 Klbs. Displaced inhibitive mud into the surface casing then laid down remaining drill pipe..

Laid down the kelly, swivel, nippled down the BOP's and released the rig on the 15th May 1996.

1.3 Drilling Fluid Summary

12¼" Surface Hole

A bentonite water based mud was used to drill the surface hole. 21 ppb gel spud mud was flocculated with lime to drill through the Port Campbell Limestone without problems. At 45m, the system was converted to an Alum based mud with sufficient dilutions to keep the mud weight down. The Gellibrand Marl was drilled without any problems. Once through the Marl, the system was reversed and the Native clays were flocculated to gain Yield. This system was used to drill to TD at 692m.

While performing the wiper trip, prior to running surface casing, a tight under gauge hole was encountered. This was believed to be caused by a thick layer of wall cake in the sand section, therefore a 20 bbl SAPP sweep was used to soften the barrier. This procedure softened the wall cake but it had the adverse effect of making the hole very "sticky", therefore a 20 bbl gel based high viscous sweep was used to "slicken" the borehole. This allowed the bit to be pulled out of the hole, but it also reacted with the Gelibrand Marl resulting in the flowline blocking. The bit was worked to the bottom of the hole and a 20 bbl high viscosity CFL sweep was used to condition the hole prior to running casing. No problems were encountered running the casing.

8½" Hole

A 1% KCl Polymer fluid was used to successfully drill the 8½" production hole to total depth. PHPA at a minimum 0.5 ppb and 1% KCl provided the necessary inhibition. The lower KCl content was successful in stabilising the hole and minimising cost. It also provided a considerable salinity contrast between formation water and filtrate thereby improving log analysis.

With the use of linear motion shakers, mud weight was kept to a minimum with no problems. Yield point was maintained above 15 lbs/100 sqft with Drispac and PHPA for good hole cleaning. Some tight hole was evident due to filter cake across Paaratte sands however regular wiper and bit trips eliminated further problems. In the Belfast Mudstone, PHPA was quickly absorbed together with a rise in rheology due to the increase in reactive clay drilled solids. Increased chemical consumption was required to maintain stable mud properties.

Generally the drilling fluid performed well, as minimal hole related time was lost. The caliper log showed the hole to be in good condition with all formation evaluation attempted being successful.

This drilling fluid is recommended for future wells of this type in the area. The final mud cost was approximately $27k resulting in a cost of $10.20 per metre.

For an in depth discussion of the drilling fluid refer to Appendix 1 (IDPS - Drilling Fluid Summary).

1.4 Casing and Cement

(See following pages)

Cultus

CEMENTING REPORT

Well Name : Blackwood #1 — **Date :** 29-Apr-96
Rig Name : ODE Rig 30 — **Casing Size :** 9 5/8"
Engineer : A. Bradley/K. Kelly — **Casing MD/TVD :** 692 m RT

Hole Geometry		Mud Properties		Gas Reading	
Hole Size :	12 1/4	Mud Wt :	9.5	Max Gas :	0
Hole MD :	692	Vis :	43	Bttms Up :	0
Hole TVD :		PV :	8	Final BG :	0
Hole Angle :	0.5	YP :	14		
Last Csg Size :		WL :	>35		
Last Csg MD :		BHCT :			
Last Csg TVD :		BHST :			

Casing Summary

Description	Wt (lb/ft)	Grade	Conn	Length	Depth, mRT
Float Shoe	43.5	N80	BTC	0.52	689.4
1 jt. casing	43.5	N80	BTC	11.86	688.88
Float collar	43.5	N80	BTC	0.39	677.02
57 jts casing	43.5	N80	BTC	671.16	676.63
Bradenhead	43.5	N80	8RD x BTC	0.67	5.47
RT to flange				4.8	4.8

Centralizers

Manufacturer	Type	Quantity	Remark / Placement
Davis Lynch	Bow spring	4	686m, 673m, 653m, 641m

Lead Cement Slurry Details

Weight (ppg)	Vol (bbl)	Mixwater (bbl)	# Sacks	S. Vol(ft3/sk)	Additives
12.5	189	142	500	2.12	3 % Gel

Tail Cement Slurry Details

Weight (ppg)	Vol (bbl)	Mixwater (bbl)	# Sacks	S. Vol(ft3/sk)	Additives
15.8	47.5	27	232	1.15	Neat

Top Up Cement Slurry Details

Weight (ppg)	Vol (bbl)	Mixwater (bbl)	# Sacks	S. Vol(ft3/sk)	Additives
15.8	6	3.5	29	1.15	3 % CaCl

Operation Description

	Circulation	Pre-Flush	Lead	Tail	Displacement
Volume (bbl)	200	20	189	47.5	165
Time (min)	20	2	21	9	22

Job Evaluation

Reciprocate : Yes
Full Returns : Yes
Cmt to Surface : Yes, 45 bbl
Bump Plug : Yes
Pressure Test: 3000 psi for 10 minutes, 2.5 bbl bleed back
ECP : No

Remarks

~~2nd~~ Casing & Cementing (cont'd)

BLACKWOOD #1

9 5/8" Casing Tally

Jt #	Length	Cumulative	Below RT	Description
F/Shoe	0.52	0.52	689.40	SHOE DEPTH
1	11.86	12.38	688.88	Shoe Joint - Cent.3m above pin
F/C	0.39	12.77	677.02	
2	11.85	24.62	676.63	F/C Joint - Cent.3m above pin
3	11.79	36.41	664.78	
4	11.86	48.27	652.99	Cent. across collar #3-#4
5	11.86	60.13	641.13	Cent. across collar #4-#5
6	11.85	71.98	629.27	
7	11.81	83.79	617.42	
8	11.86	95.65	605.61	
9	11.77	107.42	593.75	
10	11.63	119.05	581.98	
11	11.86	130.91	570.35	
12	11.69	142.60	558.49	
16	11.77	154.37	546.80	
17	11.86	166.23	535.03	
18	11.86	178.09	523.17	
19	11.64	189.73	511.31	
20	11.86	201.59	499.67	
21	11.86	213.45	487.81	
22	11.72	225.17	475.95	
23	11.86	237.03	464.23	
24	11.86	248.89	452.37	
25	11.73	260.62	440.51	
26	11.78	272.40	428.78	
27	11.76	284.16	417.00	
28	11.86	296.02	405.24	
29	11.86	307.88	393.38	
30	11.86	319.74	381.52	
31	11.75	331.49	369.66	
32	11.85	343.34	357.91	
33	11.82	355.16	346.06	
34	11.86	367.02	334.24	
35	11.86	378.88	322.38	
36	11.82	390.70	310.52	
37	11.86	402.56	298.70	
38	11.86	414.42	286.84	
39	11.37	425.79	274.98	
40	11.86	437.65	263.61	
41	11.85	449.50	251.75	
42	11.86	461.36	239.90	
43	11.64	473.00	228.04	
44	11.58	484.58	216.40	
45	11.39	495.97	204.82	
46	11.79	507.76	193.43	
47	11.74	519.50	181.64	
48	11.86	531.36	169.90	
49	11.78	543.14	158.04	
50	11.82	554.96	146.26	
51	11.54	566.50	134.44	
52	11.86	578.36	122.90	
53	11.80	590.16	111.04	
54	11.48	601.64	99.24	
55	11.86	613.50	87.76	
56	11.80	625.30	75.90	
57	11.39	636.69	64.10	
58	11.77	648.46	52.71	
59	11.76	660.22	40.94	
60	11.86	672.08	29.18	
61	11.85	683.93	17.32	
L/Jt	6.88	690.81	5.47	Landing Joint
			-1.41	Stick up above RT

1.5 Drilling Bits

(See following page)

BIT SUMMARY — Blackwood - 1 — PPL1 Onshore Otway Basin, VIC. — Cultus Petroleum N.L.

BIT NO.	SIZE in	TYPE	IADC	JETS	SERIAL NO.	DEPTH IN	DEPTH OUT	MTR	HRS	ROP	FORMATION	FORMATION BIT PERFORMANCE IN	OUT	MTR	HRS	ROP	BIT COST	BIT $ / Mtr	PARAMETERS MW	WOB	RPM	TORQ	GPM	PSI	IADC DULL GRADING I	O	D	L	B	G	O	R
1	12 1/4	L114	114	20,20,15	65302	10.0	692.0	682.0	36.5	19	Pt Campbell Limestone	10.0	82.0	72.0	2.9	25	3137	71	9.1	25	130	150	560	1200	3	2	FC	A	E	I	RG	TD
											Gellibrand Marl	82.0	321.0	239.0	4.7	51			Water - Gel Spud Mud														
											Clifton	321.0	338.0	17.0	0.2	100															
											Narrawaturk Marl	338.0	408.0	70.0	3.1	23															
											Mepunga	408.0	461.0	53.0	1.9	28															
											Dilwyn	461.0	648.0	187.0	3.7	51															
											Pember Mudstone	648.0	692.0	44.0	2.6	17															
2RR	8 1/2	ATM-GT18D	447	14,12,10	F34CP	692.0	1651.0	959.0	68.0	14	Pember Mudstone	692.0	710.0	18.0	1.8	10	6748	97	9.2	35/40	95/75	220	450	1900	5	8	BT	O	F	I	LT	PR
											Pebble Point	710.0	771.0	61.0	3.1	20			1% KCl PHPA Polymer												
											Parratte	771.0	1076.0	305.0	5.8	52			(NB: ½ of US$10,662)												
											Skull Creek Mudst	1076.0	1252.0	176.0	12.4	14															
											Nullawarre Greensd	1252.0	1361.0	109.0	3.2	34															
											Belfast Mudstone	1361.0	1490.0	129.0	9.4	14															
											Waarre "D"	1490.0	1526.0	36.0	5.0	7			NB: Includes 3m hard Siderite stringer 1 - 3 m/hr												
											Waarre "C"	1526.0	1568.0	42.0	2.6	16															
											Waarre "B"	1568.0	1598.0	30.0	3.2	9															
											Waarre "A"	1598.0	1613.0	15.0	0.5	28															
											Eumeralla	1613.0	1651.0	38.0	3.1	12															
3	8 1/2	M73P	PDC	6 x 10	JR0560	1651.0	2383.0	732.0	57.5	13	Eumeralla	1651.0	2340.0	689.0	36.9	19	35555	178	9.2	30/10	220	240/300	420	1900	1	2	WT	A	E	I	PN	PR
											Heathfield	2340.0	2383.0	43.0	4.7	9			(US$28,089)												
4	8 1/2	ATMGT-S20D	517	14,14,12	F28CC	2383.0	2650.0	267.0	32.0	8	Heathfield	2383.0	2650.0	267.0	26.0	10	15870	237	9.2	35	210	200/250	405	1900	3	3	WT	A	E	I	BT	TD
Bit Performance based on total hours including connections											Bit Performance by formation based on rotating hours only								(US$12,537)													

Cost per Metre based on $1,200 / hr Operating Cost, 1.5 hr / 1000 mtr trip speed, $290 / hr PDM cost

1.6 Bottom Hole Assembly Summary

(See following page)

1.6

~~2.3.6~~ Bottom Hole Assembly Summary

Bit #	1	2	3	4	5
BHA Type	Packed	Packed	Junk Run	Motor	Motor
Bit / Hole Size	12¼"	8½"	8½"	8½"	8½"
BHA Components	L114 N/B Stabiliser 8" DC Stabiliser 8" DC Stabiliser 8" DC crossover 12 x 6½" DC Drilling Jars 2 x 6½" DC 12 x 4½" HWDP	ATMGT-18D N/B Roller Reamer 6½" pony DC Roller Reamer Shock sub 6½" DC Roller Reamer 18 x 6½" DC Drilling Jars 2 x 6½" DC 12 x 4½" HWDP	MFDSSH Junk Sub Bit Sub Roller Reamer 6½" DC Roller Reamer 18 x 6½" DC Drilling Jars 2 x 6½" DC 12 x 4½" HWDP	M73P F2000S PDM crossover Roller Reamer 6½" DC Roller Reamer 18 x 6½" DC Drilling Jars 2 x 6½" DC 12 x 4½" HWDP	ATMGT-S20D F2000S PDM crossover Roller Reamer 6½" DC Roller Reamer 18 x 6½" DC Drilling Jars 2 x 6½" DC 12 x 4½" HWDP

1.7 Wellbore Pressure Summary

The Blackwood - 1 well was drilled to a total depth of 2650 KB with no evidence of any overpressure. Mud weights used were in the range of 8.4 - 9.3 ppg with no kicks or major losses experienced.

Offset information has shown mud weight increases were necessary in the past due to overpressure in the Belfast Mudstone. This was not necessary at Blackwood -1 as the mudstone was penetrated with 9.1 ppg without problems. The caliper log and cuttings description show no evidence of overpressure.

All pore pressures were assumed to be water gradient (8.34 ppg) or less and this was verified by drilling and evaluation data.

A formation integrity test was done below the surface casing shoe at 692m RT, with an equivalent mud weight of 14.0 ppg.

FIT and Pore Pressure Graphs are attached overleaf.

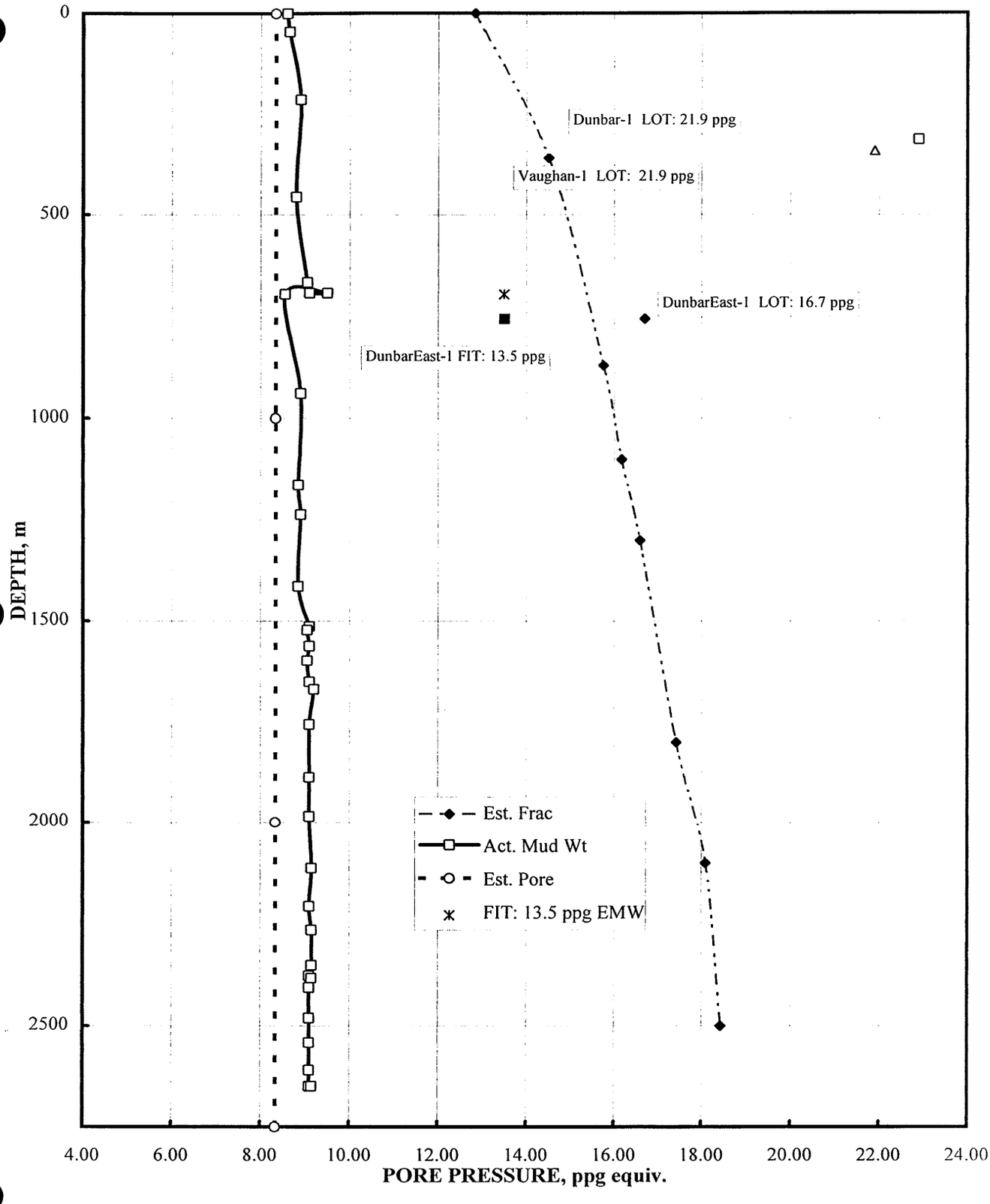
PORE PRESSURE ANALYSIS DIAGRAM

&

FORMATION INTEGRITY TEST

(See following pages)

PORE PRESSURE ANALYSIS



blr Blackwood #1 Sheet1 Chart 1

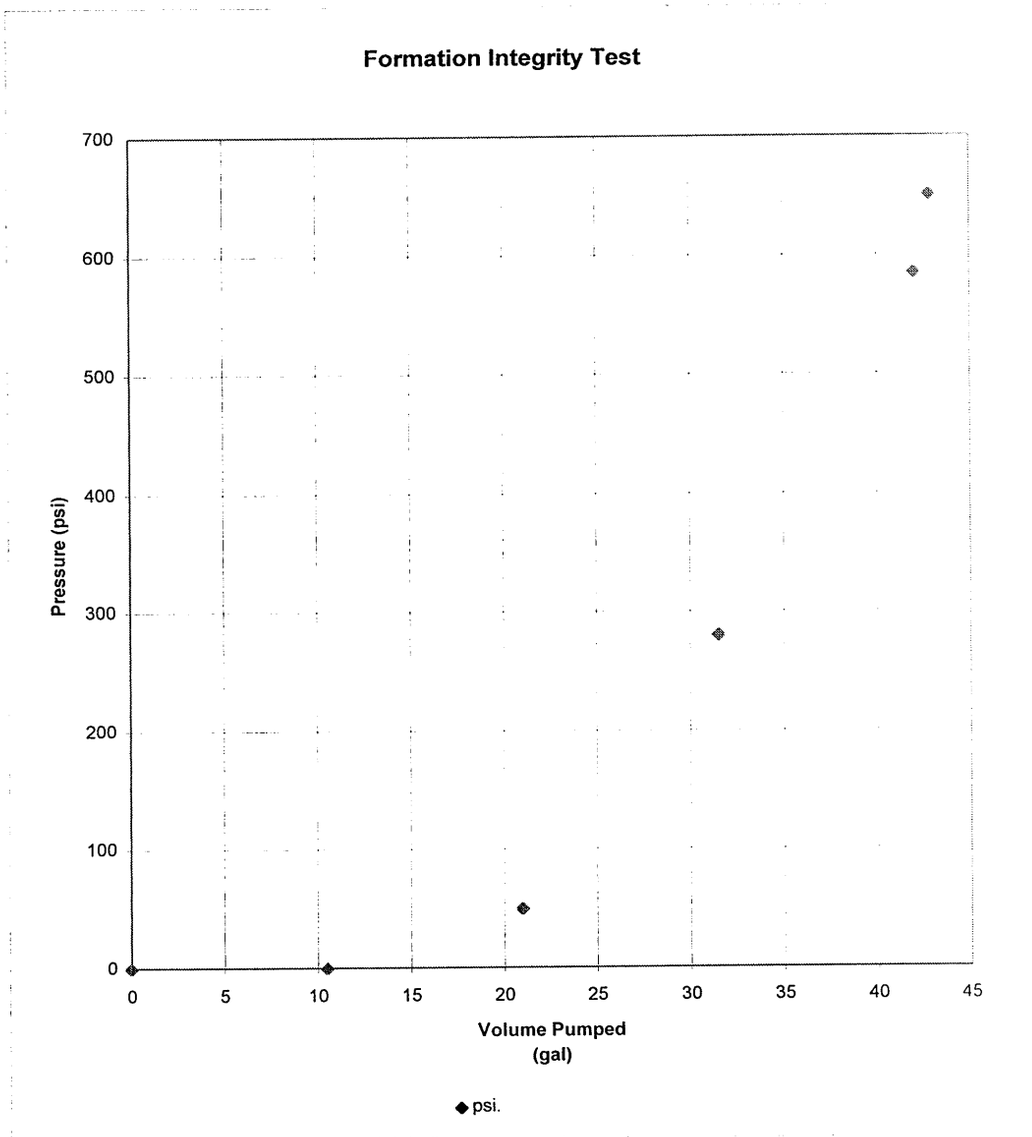
Cultus

Formation Integrity Test

Well Name:	Blackwood #1	Date: 1/5/96
Hole Size:	12.25	Rig: ODE Rig 30
TVD, m:	695	Pumps:
Casing Size:	9.625	Circ. Rate:
Casing Depth:	689.4	Mud Wt: 8.5

Raw Data

Volume gal.	Pressure psi.
0	0
10.5	0
21	50
31.5	280
42	585
42.84	650



Comments:

Test for EMW of 13.5 ppg. MW = 8.5 therefore max pressure at 695 m = 593 psi.
Pumped at approx 1/4 bbl/min up to 1.02 bbls (42.8 gal) and 650 psi. (585 psi at 42 gal)
Held pressure at 650 psi for 10 minutes.
EMW at 650 psi = 14 ppg

1.8 Recommendations

Offset wells have traditionally had problems as follows:

- Mud rings in surface hole
- Tight hole on the first 8½" bit trip across sands and shales
- Differential sticking across sands
- Failure to get logs to bottom at total depth.

The surface hole was drilled to TD with no problems until tight hole was encountered pulling out of the hole to run casing. To prevent tight hole on future wells, the following mud system is recommended. Drill through the Marl with the Alum based mud system. Once through the Marl, start adding some minor mud properties. Observe connections carefully for any tight hole, and if required, add a small (approximately 25 bbl) high viscosity, non flocculated sweep. Drill with maximum pump rate through the entire surface hole section and observe shakers carefully to be sure there are enough cuttings for the amount of hole that is being drilled. At no time should a SAPP pill be pumped.

Tight hole on offset wells was possibly due to a combination of filter cake build up on sands, reactive clays, and doglegs due to pendulum assemblies. A good quality filter cake is required and can be best achieved with regular prehydrated gel additions.

The strategy at Blackwood - 1 was to use packed hole assemblies with roller reamers down to the Waarre to eliminate doglegs and reduce torque, as shown on the BHA Summary. Below the Waarre, a motor, PDC bit, and roller reamers were used. In both cases this was successful in reducing tight hole considerably, reducing or eliminating torque, as well as providing good hole conditions for evaluation. All evaluations attempted were successful.

The drilling fluid density was kept as low as possible throughout to avoid differential sticking, and no problems were encountered. Various drilling fluids were used in offset wells with varying degrees of success. A 1% KCl Polymer was used with good results, as it was thought that high KCl concentrations may be "drying out" the clays.

Bit hydraulics were optimised with flow rates over 400 gpm in 8½" hole. This provided good penetration rates and hole cleaning, with no adverse effects on hole conditions as seen on the caliper log. Bit performance is best shown in the Bit Summary. The use of the motor and PDC below the Waarre was also successful, achieving ROPs of 19 m/hr in the Eumeralla and 10 m/hr in the Heathfield.

1.9 Time Analysis

1.9.1 Time Breakdown Database Activity Report

1.9.2 Time Breakdown by Class / Operation Codes

1.9.3 Trouble Time Summary

The Blackwood # 1 well accumulated 110 hours of troubled drilling time which is summarised on the enclosed report: TIME BREAKDOWN DATABASE - Trouble Drilling Analysis. Pages 3 and 5 of this report show the breakdown of the troubled drilling by operational code. These operations can be further broken down into the following events that caused the activity: parted drive shaft, failed drum brake cooling hose, plugged nozzles, lost inserts in the well, and mud problems in the surface hole and running surface casing.

Rig repairs contributed 61.5 hours or 58 % of downtime to the well. Of the 61.5 hours, 60.5 hours were caused by a parted drive shaft in the draw works and 1 hour by a failed drum brake cooling hose. OD&E did not have a spare drive shaft available, therefore they had to fabricate a new shaft. In addition to the actual repair of the shaft, an extra 5.5 hours was required for a wiper trip and 1.5 hours for reaming. Had a spare shaft been available, the downtime could probably have been reduced by approximately 60 % for the rig repair, plus less hole problems because of a reduction in waiting time.

Plugged nozzles in the PDC bit caused by rubber from the downhole motor stator resulted in 13.5 hours of extra tripping, reaming, and handling tools. Further investigation into the motor showed it had 272 hours of operation before going into Blackwood #1. At the point of failure, the motor had 339 hours. The manufacturer states that failures start after 300 hours, so it is clear that the motor was getting too close to the end of its life before it was run into Blackwood #1.

The bit pulled prior to running the PDC had a broken extended nozzle and missing inserts, therefore a junk run was required. This took 12 hours for the tripping, reaming, plus working the junk basket. Three inserts and some metal chips were recovered.

Tight hole and remedial action with a SAPP sweep followed by a Gel based sweep prior to running the surface casing resulted in an extra 13.5 hours of tripping, reaming and circulating and conditioning mud. The SAPP sweep softened the wall cake, but caused the hole to be "sticky", while the Gel sweep fixed the "sticky" hole, but it reacted with the Marl clays and caused mud rings.

While running the casing itself, the connections on joints 13, 14, and 15 were badly cut and had to be laid down, resulting in an extra hour. Another 1.5 hours was lost due to barbed threads on the collar when making up the bradenhead.

1.9.1 Time Breakdown Database - Activity Report

(See following pages)

1.9.1

TIME BREAKDOWN DATABASE - ACTIVITY REPORT

Well Name : BLACKWOOD #1

DATE	LCLASS	LOP	HR	DPTH	DESCRIPTION
26/04/96	PLANNED DRILLING	DRILLING	3.5	45.0	********** SPUD WELL ********** Drill 12 1/4 hole from spud to 45 m.
26/04/96	PLANNED DRILLING	SURVEY	0.5	45.0	Cir & survey @ 32 m - 0.75 deg
26/04/96	PLANNED DRILLING	DRILLING	4.5	120.0	Drill 12 1/4 inch hole from 45 to 120 m.
27/04/96	PLANNED DRILLING	DRILLING	4.0	205.0	Drill 12 1/4 inch hole from 120 to 205 m.
27/04/96	PLANNED DRILLING	SURVEY	0.5	205.0	Circ & survey
27/04/96	PLANNED DRILLING	DRILLING	6.5	335.0	Drill 12 1/4 inch hole from 205 to 335 m.
27/04/96	PLANNED DRILLING	RIG SERVICE	0.5	335.0	Rig service
27/04/96	PLANNED DRILLING	DRILLING	1.5	363.0	Drill 12 1/4 inch hole from 335 to 363 m.
27/04/96	PLANNED DRILLING	SURVEY	0.5	363.0	Circ & survey: 350 m at .75 deg
27/04/96	PLANNED DRILLING	DRILLING	7.0	512.0	Drill 12 1/4 inch hole from 363 to 512 m.
27/04/96	PLANNED DRILLING	SURVEY	0.5	512.0	Circ & survey: 500m at .5 deg.
27/04/96	PLANNED DRILLING	DRILLING	3.0	594.0	Drill 12 1/4 inch hole from 512 to 594 m.
28/04/96	PLANNED DRILLING	DRILLING	6.5	692.0	Drill 12 1/4" hole 594 to692m
28/04/96	PLANNED DRILLING	CIRCULATE	0.5	692.0	Circ & Survey
28/04/96	PLANNED DRILLING	WIPER TRIP	3.0	692.0	POOH for wiper trip. Tight hole 682-653m (20-30K overpull). Up to 80K overpull at 653m. Pick up kelly. Work pipe and pump out to 483m. Rack kelly and POOH - tight 483-400m (20-40K overpull).
28/04/96	TROUBLED DRILLING	WIPER TRIP	4.0	692.0	POOH for wiper trip. Tight hole 682-653m (20-30K overpull). Up to 80K overpull at 653m. Pick up kelly. Work pipe and pump out to 483m. Rack kelly and POOH - tight 483-400m (20-40K overpull).
28/04/96	PLANNED DRILLING	HANDLE TOOLS	0.5	692.0	Clean stabilizers and bit.
28/04/96	PLANNED DRILLING	SLIP/CUT LINE	1.0	692.0	Slip and cut drilling line.
28/04/96	PLANNED DRILLING	WIPER TRIP	1.0	692.0	RIH to 257m. Tight hole (50Kdrag)
28/04/96	TROUBLE DRILLING	CIRCULATE	0.5	692.0	Unable to circulate. Clean out large marl cuttings from flowline.
28/04/96	TROUBLE DRILLING	REAM/WASH	0.5	692.0	Wash and ream 257-297m
28/04/96	PLANNED DRILLING	TRIPPING IN/OUT	0.5	692.0	RIH to 426m. Tight hole (50k drag)
28/04/96	TROUBLE DRILLING	REAM/WASH	6.0	692.0	Wash and ream 426-674 m. Reaming on singles and P/U stands of drill pipe.
29/04/96	TROUBLE DRILLING	REAM/WASH	1.0	692.0	Cont to ream to bottom. From 674 to 692 m.
29/04/96	TROUBLE DRILLING	CIRCULATE	1.5	692.0	Sweep hole with H.V. pill, circ & condition mud, work pipe.
29/04/96	PLANNED DRILLING	TRIPPING IN/OUT	3.0	692.0	POH to run csg. Work tight hole (20 K drag) on way out. Wipe clean, strapout, L/O 2 x stab & bit.
29/04/96	PLANNED DRILLING	CSG & CMTNG	1.5	692.0	R/U to run 9 5/8" casing.
29/04/96	PLANNED DRILLING	CSG & CMTNG	2.0	692.0	RIH wiith 9 5/8" casing - 15 joints
29/04/96	TROUBLE DRILLING	CSG & CMTNG	1.0	692.0	Connection did not m/u due to badly cut pin. L/O joints 13, 14, 15.
29/04/96	PLANNED DRILLING	CSG & CMTNG	3.5	692.0	Continue RIH with 9 5/8" casing. Total of 58 joints.
29/04/96	PLANNED DRILLING	CSG & CMTNG	0.5	692.0	M/U cmt head & surface lines.
29/04/96	PLANNED DRILLING	CSG & CMTNG	0.5	692.0	Circulate with rig pumps; 200 bbl's.
29/04/96	PLANNED DRILLING	CSG & CMTNG	0.5	692.0	R/U to haliburton pump spacer, hold safety meeting, p/test surface lines.
29/04/96	PLANNED DRILLING	CSG & CMTNG	1.0	692.0	Lead 500 sx "G" with 3% PHG @ 12.5 ppg. Tail 232 sx "G" neat @ 15.8 ppg. Drop plug, pump 10 bbl water behind, switch to rig pump & displace with 155 bbl mud @ 390 gpm. 45 bbl cmt returns.
29/04/96	PLANNED DRILLING	CSG & CMTNG	0.5	692.0	Bumped plug, p/test casing to 3000 psi. Floats held OK
29/04/96	PLANNED DRILLING	CSG & CMTNG	0.5	692.0	Drain riser, cut window in conductor.
29/04/96	PLANNED DRILLING	CSG & CMTNG	0.5	692.0	Perform top up job. 29 sx of "G" cement with 3 % CaCl2.
29/04/96	PLANNED DRILLING	CSG & CMTNG	3.5	692.0	WOC
29/04/96	PLANNED DRILLING	CSG & CMTNG	0.5	692.0	Slack off on 9 5/8 csg, back out same
29/04/96	PLANNED DRILLING	CSG & CMTNG	0.5	692.0	Pump out cellar and cut conductor.
29/04/96	PLANNED DRILLING	CSG & CMTNG	0.5	692.0	L/out conductor and riser
29/04/96	TROUBLE DRILLING	WELL-HEAD	1.5	692.0	Attempt to M/U Bradenhead. Barbed thread in collar. Repair same
30/04/96	PLANNED DRILLING	WELL-HEAD	1.0	692.0	Finish installing Bradenhead.
30/04/96	PLANNED DRILLING	BOP's	12.0	692.0	Nipple up BOP's. Pressure test surface equipment while making up fllanges. (Upper kelly cock failed to test)
30/04/96	PLANNED DRILLING	BOP's	1.0	692.0	P/U and M/U cup tester. rig up surface lines, flush stack and manifold with water.
30/04/96	PLANNED DRILLING	BOP's	3.5	692.0	P/test choke manifold valves, pipe rams, kill & choke line valves to 300 psi/5 mins,3000 psi/10 mins. Hydrill 300psi/5 min, 1500 psi/10 min. Pull cup tester, test csg &b/rams to 300 psi/5 min, 3000 psi/10 min

TIME BREAKDOWN DATABASE - ACTIVITY REPORT

Well Name : BLACKWOOD #1

DATE	LCLASS	LOP	HR	DPTH	DESCRIPTION
30/04/96	PLANNED DRILLING	BOP's	2.0	692.0	N/U bell nipple & flow line
30/04/96	PLANNED DRILLING	LAY DOWN PIPE	1.0	692.0	Lay down 8" D/C's and 12 1/4" stab.
30/04/96	PLANNED DRILLING	TRIPPING IN/OUT	3.0	692.0	Make up 8 1/2" BHA, RIH to 669 m.
30/04/96	PLANNED DRILLING	LAY DOWN PIPE	0.5	692.0	Lay out 6 singles of DP
1/05/96	PLANNED DRILLING	TRIPPING IN/OUT	1.0	692.0	RIH - Tag cement at 676 m
1/05/96	PLANNED DRILLING	DRILLING	1.0	695.0	Drill out F/C, cement, and shoe. Clean out rathole to 692 m. Drill 692-695 m.
1/05/96	PLANNED DRILLING	CIRCULATE	0.5	695.0	Circulate b/up while changing to KCL/PHPA
1/05/96	PLANNED DRILLING	LEAK-OFF TEST	0.5	695.0	Perform FIT w/-Halliburton. 650 psi over 8.5 ppg = 14.0 EMW
1/05/96	PLANNED DRILLING	DRILLING	6.0	757.0	Drill 8 1/2" hole from 695 to 757 m. Slow drilling from 750-754 m w/- minor traces of steel cuttings. Work weight and rotary to recover ROP to 30 - 40 m/hr.
1/05/96	PLANNED DRILLING	RIG SERVICE	0.5	757.0	Rig service
1/05/96	PLANNED DRILLING	DRILLING	8.0	996.0	Drill 8 1/2" hole from 757 to 996 m.
1/05/96	PLANNED DRILLING	SURVEY	0.5	996.0	Circulate and survey
1/05/96	PLANNED DRILLING	DRILLING	0.5	1,006.0	Drill 8 1/2" hole from 996 to 1006 m.
1/05/96	TROUBLE EVALUATI	RIG REPAIR	0.5	1,006.0	Mud loggers work on ROP hose
1/05/96	PLANNED DRILLING	DRILLING	5.0	1,110.0	Drill 8 1/2" hole from 1006 to 1110 m.
2/05/96	PLANNED DRILLING	DRILLING	9.0	1,215.0	Drill 8 1/2" hole from 1110 to 1215 m.
2/05/96	PLANNED DRILLING	CIRCULATE	0.5	1,215.0	Circulate bottoms up.
2/05/96	PLANNED DRILLING	WIPER TRIP	1.5	1,215.0	POH to shoe. Tight hole (40 K overpull) at 1192, 1145, 1135, 1120, 1100, 1069-1066, 1054, 1043-1038. Drag of 10-30K through the rest of the Skull Creek.
2/05/96	PLANNED DRILLING	RIG SERVICE	0.5	1,215.0	Rig service.
2/05/96	TROUBLE DRILLING	RIG REPAIR	1.0	1,215.0	Repair main drum brake cooling hose.
2/05/96	PLANNED DRILLING	WIPER TRIP	1.0	1,215.0	RIH
2/05/96	PLANNED DRILLING	REAM/WASH	0.5	1,215.0	Pick up kelly and wash to bottom. 3m of fill.
2/05/96	PLANNED DRILLING	DRILLING	6.5	1,291.0	Drill 8 1/2" hole from 1215 to 1291 m.
2/05/96	PLANNED DRILLING	SURVEY	0.5	1,291.0	Circ and survey at 1268; 1 deg
2/05/96	PLANNED DRILLING	DRILLING	3.0	1,367.0	Drill 8 1/2" hole from 1291 to 1367 m.
3/05/96	PLANNED DRILLING	DRILLING	17.0	1,522.0	Drill 8 1/2" hole from 1367 to 1522 m.
3/05/96	TROUBLE DRILLING	RIG REPAIR	7.0	1,522.0	Snapped main draw works output shaft. Remove covers and prepare right angle drive box for removal. Rotate drill string every half hour.
4/05/96	TROUBLE DRILLING	RIG REPAIR	24.0	1,522.0	While waiting on right angle drive repairs, install new chain main drum drive, clean & paint, lift out transmission & right angle box (transport to work shop). Cont. to rotate pipe every 30 minutes.
5/05/96	TROUBLE DRILLING	RIG REPAIR	24.0	1,522.0	Waiting on repairs to main drive shaft. Install right angle drive box, remove to machine out off drillers side main drive boaring housing, re-install. Cont to rotate pipe
6/05/96	TROUBLE DRILLING	RIG REPAIR	4.5	1,522.0	Repair main shaft on drawworks.
6/05/96	TROUBLE DRILLING	WIPER TRIP	4.0	1,522.0	POH. Pump out w/-20-30k drag 1516-1460m. Pull stands 1460-1336 w/- 15-25k drag (1460-1358m) and 50-80k drag (1358-1336m).
6/05/96	TROUBLE DRILLING	WIPER TRIP	0.0	1,522.0	Pump out w/- 30-40k drag 1336-1241m. POH to free hole at 1012m - tight at 1229, 1164, 1155, 1150-1145, 1082-1078m.
6/05/96	TROUBLE DRILLING	WIPER TRIP	1.5	1,522.0	RIH. Start taking weight at 1484m.
6/05/96	TROUBLE DRILLING	REAM/WASH	1.5	1,522.0	Ream 1484-1516m. Wash to bottom at 1522m (1m fill).
6/05/96	PLANNED DRILLING	DRILLING	0.5	1,527.0	Drill 8 1/2" hole from 1522 to 1527 m.
6/05/96	TROUBLE DRILLING	RIG REPAIR	1.0	1,527.0	Install shims in input shaft on right angle drive.
6/05/96	PLANNED DRILLING	DRILLING	6.5	1,594.0	Drill 8 1/2" hole from 1527 to 1594 m.
6/05/96	PLANNED DRILLING	SURVEY	0.5	1,594.0	Circulate and survey at 1582 - 1.25 deg
6/05/96	PLANNED DRILLING	DRILLING	4.0	1,635.0	Drill 8 1/2" hole from 1594 to 1635 m.
7/05/96	PLANNED DRILLING	DRILLING	1.0	1,651.0	Drill 8 1/2" hole from 1635 to 1651 m.
7/05/96	PLANNED DRILLING	CIRCULATE	0.5	1,651.0	Circulate bottoms up prior to trip.
7/05/96	PLANNED DRILLING	TRIPPING IN/OUT	3.0	1,651.0	POH for new bit
7/05/96	PLANNED DRILLING	HANDLE TOOLS	1.5	1,651.0	Change BHA
7/05/96	TROUBLE DRILLING	TRIPPING IN/OUT	1.5	1,651.0	RIH w/- bit + junk sub to 350. Rerun MFDSSH S/N LF6918
7/05/96	PLANNED DRILLING	SLIP/CUT LINE	0.5	1,651.0	Slip drilling line.
7/05/96	TROUBLE DRILLING	TRIPPING IN/OUT	3.0	1,651.0	RIH

TIME BREAKDOWN DATABASE - ACTIVITY REPORT

Well Name : BLACKWOOD #1

DATE	LCLASS	LOP	HR	DPTH	DESCRIPTION
7/05/96	TROUBLE DRILLING	REAM/WASH	0.5	1,651.0	Wash and ream 1626 - 1651.
7/05/96	TROUBLE DRILLING	DRILLING	0.5	1,651.0	Work junk basket
7/05/96	TROUBLE DRILLING	TRIPPING IN/OUT	2.5	1,651.0	POH
7/05/96	PLANNED DRILLING	HANDLE TOOLS	1.0	1,651.0	Clean junk sub - recovered 3 inserts plus several chips. Install shims on roller reamer.
7/05/96	PLANNED DRILLING	HANDLE TOOLS	0.5	1,651.0	Pick up and make up motor.
7/05/96	PLANNED DRILLING	DOWN-HOLE EQUIP	0.5	1,651.0	Test mud motor in wellbore without bit. Record pressures at the following flow rates: 250, 300, 350, 400, 450 gal/min.
7/05/96	PLANNED DRILLING	TRIPPING IN/OUT	2.0	1,651.0	M/up bit and run in hole to 700 m.
7/05/96	PLANNED DRILLING	SLIP/CUT LINE	0.5	1,651.0	Slip 27 ft of drill line. Break circulation.
7/05/96	PLANNED DRILLING	TRIPPING IN/OUT	1.0	1,651.0	RIH to 1200 m taking 30 k.
7/05/96	PLANNED DRILLING	DOWN-HOLE EQUIP	0.5	1,651.0	Break circulation.
7/05/96	PLANNED DRILLING	TRIPPING IN/OUT	1.0	1,651.0	RIH from 1200 m to 1533 m.
7/05/96	TROUBLE DRILLING	REAM/WASH	2.5	1,651.0	Ream from 1533 to 1602 m.
8/05/96	TROUBLE DRILLING	REAM/WASH	1.5	1,651.0	Cont to ream f/- 1602 tp 1651 m. Tight hole.
8/05/96	PLANNED DRILLING	DRILLING	11.5	1,781.0	Drill 8 1/2" hole from 1651 to 1781 m.
8/05/96	PLANNED DRILLING	RIG SERVICE	0.5	1,781.0	Rig service
8/05/96	PLANNED DRILLING	DRILLING	8.0	1,895.0	Drill 8 1/2" hole from 1781 to 1895 m.
8/05/96	PLANNED DRILLING	CIRCULATE	0.5	1,895.0	Circ bottoms up, flow check (static)
8/05/96	PLANNED DRILLING	SURVEY	1.0	1,895.0	Survey
8/05/96	PLANNED DRILLING	WIPER TRIP	1.0	1,895.0	POH for wiper trip. 10 stnds, hole good. RIH
9/05/96	PLANNED DRILLING	WIPER TRIP	0.5	1,895.0	Continue RIH after wipeer trip. No fill
9/05/96	PLANNED DRILLING	DRILLING	8.0	2,056.0	Drill 8 1/2" hole from 1895 to 2056 m.
9/05/96	PLANNED DRILLING	RIG SERVICE	0.5	2,056.0	Service rig.
9/05/96	PLANNED DRILLING	DRILLING	11.5	2,206.0	Drill 8 1/2" hole from 2056 to 2206 m.
9/05/96	PLANNED DRILLING	CIRCULATE	0.5	2,206.0	Circulate bottoms up, f/check - static.
9/05/96	PLANNED DRILLING	SURVEY	0.5	2,206.0	Survey: 1/2 deg at 2194 m.
9/05/96	PLANNED DRILLING	WIPER TRIP	1.5	2,206.0	Wiper trip. POH f/- 2206 to 1883 m. RIH to to 2194 m, wash to btm (4 m fill). Trip gas 2689 ppm.
9/05/96	PLANNED DRILLING	DRILLING	1.0	2,210.0	Drill 8 1/2" hole from 2206 to 2210 m.
10/05/96	PLANNED DRILLING	DRILLING	8.0	2,311.0	Drill 8 1/2" hole from 2210 to 2311 m
10/05/96	PLANNED DRILLING	RIG SERVICE	0.5	2,311.0	Rig service
10/05/96	PLANNED DRILLING	DRILLING	9.5	2,383.0	Drill 8 1/2" hole from 2311 to 2383m. ROP dropped to 6m/hr. SPP increased, blocked nozzle(s)
10/05/96	PLANNED DRILLING	CIRCULATE	1.0	2,383.0	Circulate bottoms up, flowcheck - well static
10/05/96	TROUBLE DRILLING	TRIPPING IN/OUT	3.0	2,383.0	Pump trip slug, POH. Work tight hole from 1665-1637m 20-60k OP, 1579-1552m 40-70k OP, 1495-1468m 30/40k OP
10/05/96	PLANNED DRILLING	SLIP/CUT LINE	1.0	2,383.0	Slip 33ft, cut 84ft drilling line
10/05/96	TROUBLE DRILLING	TRIPPING IN/OUT	1.0	2,383.0	Continue to POH BHA
11/05/96	TROUBLE DRILLING	TRIPPING IN/OUT	1.0	2,383.0	POH BHA
11/05/96	TROUBLE DRILLING	HANDLE TOOLS	1.0	2,383.0	Change out balled bit, plugged nozzles with motor stator rubber. Change out motor and test same
11/05/96	TROUBLE DRILLING	TRIPPING IN/OUT	1.5	2,383.0	RIH 8.5 bit, motor and BHA on 4.5' DP to 696m
11/05/96	TROUBLE DRILLING	DOWN-HOLE EQUIP	0.5	2,383.0	Break circulation
11/05/96	TROUBLE DRILLING	TRIPPING IN/OUT	1.0	2,383.0	Continue RIH to 1514m. Encounter tight hole
11/05/96	TROUBLE DRILLING	REAM/WASH	0.5	2,383.0	Pick up kelly and ream from 1514 to 1585m
11/05/96	TROUBLE DRILLING	TRIPPING IN/OUT	2.0	2,383.0	Continue to RIH to 2363m. Encounter tight hole
11/05/96	TROUBLE DRILLING	WORK PIPE	1.0	2,383.0	Work DP, pick up kelly attemp to break circulation, no go. 70 k OP. Lay out single
11/05/96	TROUBLE DRILLING	REAM/WASH	1.0	2,383.0	Ream from 2356 to 2383m
11/05/96	PLANNED DRILLING	DRILLING	2.5	2,403.0	Break in new bit, drill 8.5" hole ahead from 2383 to 2403m.
11/05/96	PLANNED DRILLING	RIG SERVICE	0.5	2,403.0	Rig service
11/05/96	PLANNED DRILLING	DRILLING	11.5	2,511.0	Drill 8.5" hole from 2403 to 2511m
12/05/96	PLANNED DRILLING	SURVEY	1.0	2,511.0	Circulate and run TOTCO survey
12/05/96	PLANNED DRILLING	DRILLING	18.0	2,650.0	Drill 8.5' hole from 2511 to 2650m TD
12/05/96	PLANNED DRILLING	CIRCULATE	1.0	2,650.0	Circulate bottoms up

TIME BREAKDOWN DATABASE - ACTIVITY REPORT

Well Name : BLACKWOOD #1

DATE	LCLASS	LOP	HR	DPTH	DESCRIPTION
12/05/96	PLANNED DRILLING	WIPER TRIP	2.5	2,650.0	Wiper trip from 2650 TD to casing shoe @ 689m. Hole good, max OP 10klb.
12/05/96	PLANNED DRILLING	WIPER TRIP	1.5	2,650.0	RIH to clean out.
13/05/96	PLANNED DRILLING	WIPER TRIP	1.5	2,650.0	Continue to RIH on wiper trip to 2640m
13/05/96	PLANNED DRILLING	REAM/WASH	0.5	2,650.0	Pick up kelly, wash to bottom, no fill @ 2650m
13/05/96	PLANNED DRILLING	CIRCULATE	1.0	2,650.0	Circulate hole clean, flow check, pump heavy weight pill
13/05/96	PLANNED DRILLING	TRIPPING IN/OUT	4.5	2,650.0	Drop survey, POH SLM with flow check after 5 stands
13/05/96	PLANNED DRILLING	HANDLE TOOLS	1.0	2,650.0	Lay out jars, motor roller reamers, break out bit, motor and service same, laydown tools.
13/05/96	PLANNED EVALUATI	LOGGING	9.0	2,650.0	Rig up BPB. Run log #1 DLL/LSS(failed)/MLL
13/05/96	PLANNED EVALUATI	LOGGING	5.0	2,650.0	Run log #2 LDL/CNL/GR/CAL/LSS(failed) from 1870m to 689m
13/05/96	PLANNED EVALUATI	LOGGING	1.5	2,650.0	Rig to run velocity survey. Crew on cow alert during velocity survey.
14/05/96	PLANNED EVALUATI	LOGGING	6.0	2,560.0	Continue to run velecity survey.
14/05/96	PLANNED EVALUATI	LOGGING	6.5	2,650.0	Run log #4, sidewall cores, 24 shots, 22 recovered (92%)
14/05/96	PLANNED ABANDON	LAY DOWN PIPE	0.5	2,650.0	RIH HWDP, layout same
14/05/96	PLANNED ABANDON	TRIPPING IN/OUT	1.0	2,650.0	RIH open ended DP to casing shoe @ 689m
14/05/96	PLANNED ABANDON	SLIP/CUT LINE	0.5	2,650.0	Slip 33' drilling line
14/05/96	PLANNED ABANDON	TRIPPING IN/OUT	1.5	2,650.0	Continue to RIH open ended DP to 1520m
14/05/96	PLANNED ABANDON	CIRCULATE	0.5	2,650.0	Circulate bottoms up.
14/05/96	PLANNED ABANDON	CSG & CMTNG	1.5	2,650.0	Hold JSA, rig up cementing lines, pump abandonment plug #1 from 1520 - 1460m
14/05/96	PLANNED ABANDON	CSG & CMTNG	0.5	2,650.0	POH slowly 4 stands DP, Pick up kelly, circulate DP clean.
14/05/96	PLANNED ABANDON	LAY DOWN PIPE	2.0	2,650.0	POH to 720m, laying out drill pipe
14/05/96	PLANNED ABANDON	CSG & CMTNG	2.5	2,650.0	Rig in cementing lines, pump abandonment plug #2 from 720 - 650m.
14/05/96	PLANNED ABANDON	CSG & CMTNG	0.5	2,650.0	POH slowly 4 stands, circulate DP clean
14/05/96	PLANNED ABANDON	LAY DOWN PIPE	0.5	2,650.0	Continue to POH drill pipe and layout same.
15/05/96	PLANNED ABANDON	LAY DOWN PIPE	1.0	2,650.0	Complete POH and laying out drill pipe
15/05/96	PLANNED ABANDON	LAY DOWN PIPE	5.0	2,650.0	RIH DC's & excess DP. Pick up kelly and break out. Layout excess pipe and DC's.
15/05/96	PLANNED ABANDON	CSG & CMTNG	1.0	2,650.0	RIH open ended DP and tag plug #2 @ 651m with 10, 000 lbs
15/05/96	PLANNED ABANDON	CSG & CMTNG	1.0	2,650.0	Rig up circulating head, displace hole to inhibited mud & biocide treated mud.
15/05/96	PLANNED ABANDON	LAY DOWN PIPE	3.0	2,650.0	POH drill pipe, lay out same
15/05/96	PLANNED DRILLING	RIG DOWN	4.0	2,650.0	Layout mouse hole, kelly and swivel. Nipple down BOP's. Mix alum, drill pol & lime in mud tanks, dump and clean same. Release Rig @ 16:00 hrs 15/5/96

1.9.2 Time Breakdown Database - Single Well Analysis

(See following pages)

1.9.2.

TIME BREAKDOWN DATABASE - single well analysis

Well Name : BLACKWOOD #1

Note : TDI = Trouble Drilling Index (TD/PD)
TEI = Trouble Evaluating Index (TE/PE)

Quick-Look Statistical Analysis

TOTAL TIME (hrs)	TOTAL DEPTH (m)	Spud to TD (m/hr)	ROP- Drill hrs (m/hr)	TDI	TEI
456	2,650	5.82	13.62	0.233	0.001

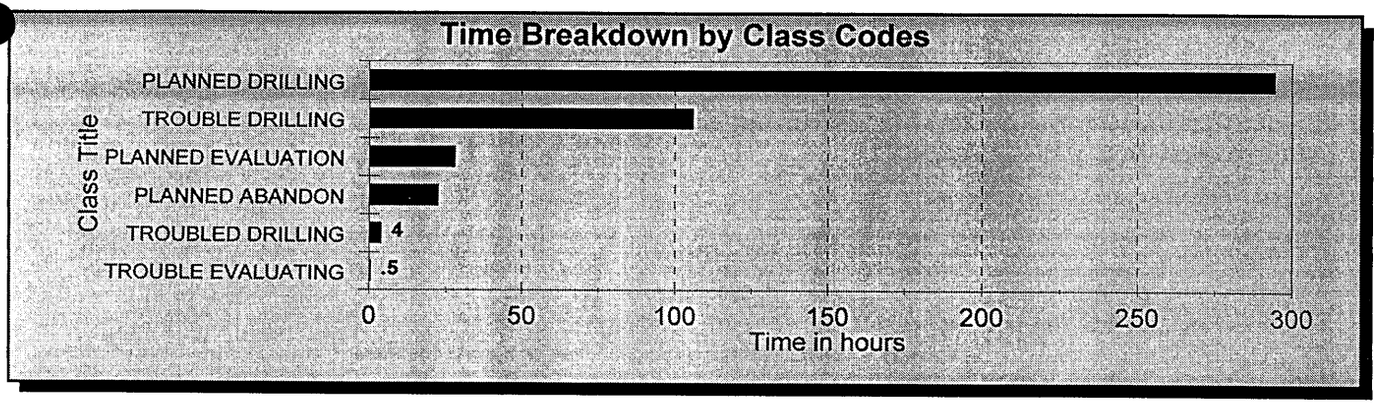
Time-Breakdown : Raw data

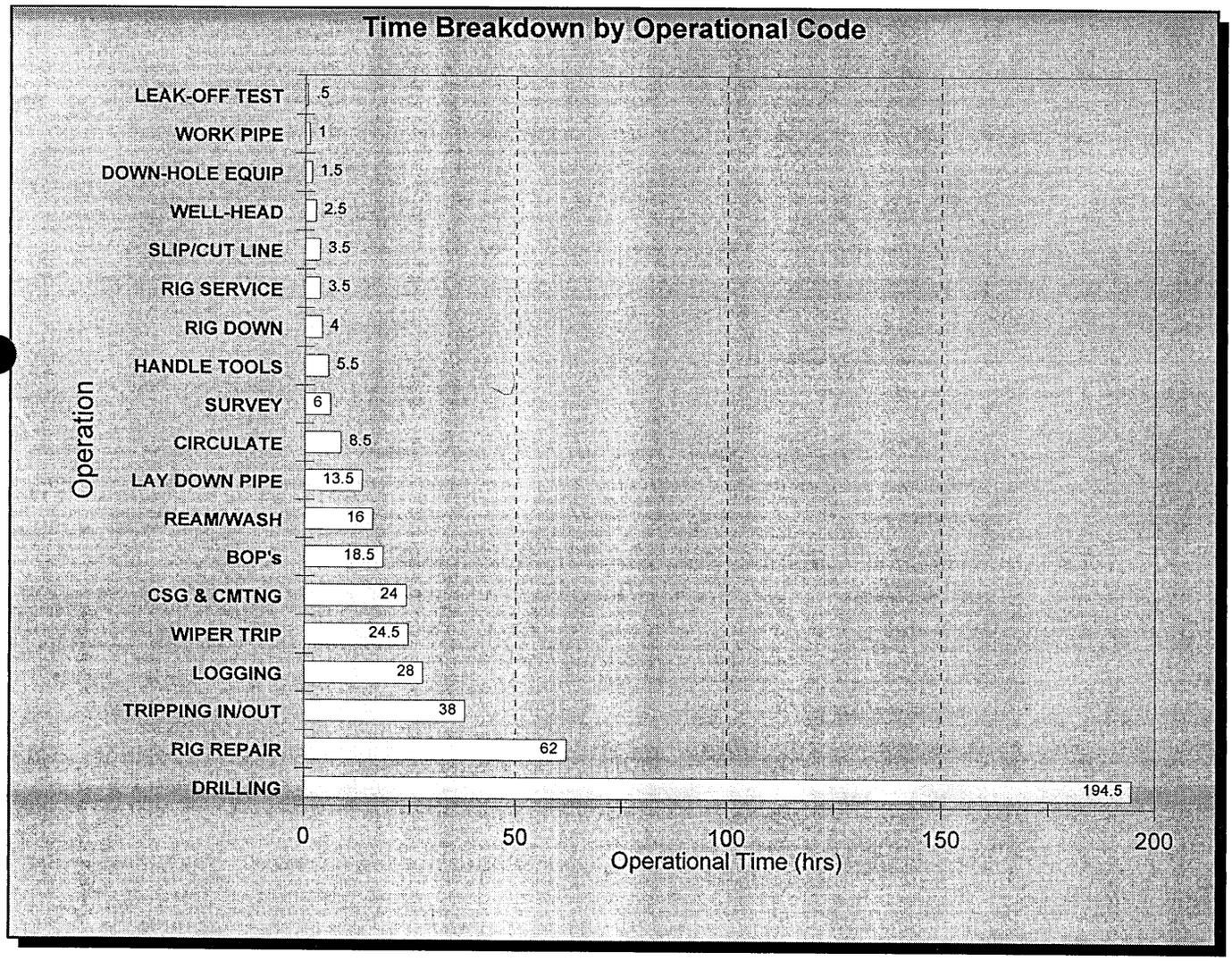
Class	Hrs
TROUBLE EVALUATIN	0.50
TROUBLED DRILLING	4.00
PLANNED ABANDON	22.50
PLANNED EVALUATIO	28.00
TROUBLE DRILLING	106.00
PLANNED DRILLING	294.50

Operation	Hrs
DRILLING	194.50
RIG REPAIR	62.00
TRIPPING IN/OUT	38.00
LOGGING	28.00
WIPER TRIP	24.50
CSG & CMTNG	24.00
BOP's	18.50
REAM/WASH	16.00
LAY DOWN PIPE	13.50
CIRCULATE	8.50
SURVEY	6.00
HANDLE TOOLS	5.50
RIG DOWN	4.00
RIG SERVICE	3.50
SLIP/CUT LINE	3.50
WELL-HEAD	2.50
DOWN-HOLE EQUIP	1.50
WORK PIPE	1.00
LEAK-OFF TEST	0.50

TIME BREAKDOWN DATABASE - single well analysis

BLACKWOOD #1



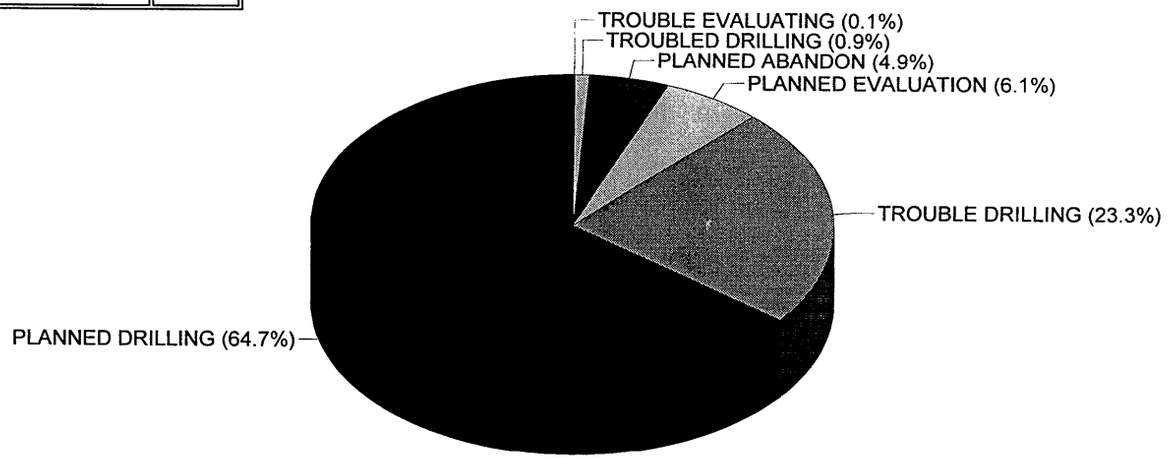


TIME BREAKDOWN DATABASE - single well analysis

BLACKWOOD #1

Time Analysis by Class Codes

Class	Hrs
TROUBLE EVALUATIN	0.50
TROUBLED DRILLING	4.00
PLANNED ABANDON	22.50
PLANNED EVALUATIO	28.00
TROUBLE DRILLING	106.00
PLANNED DRILLING	294.50

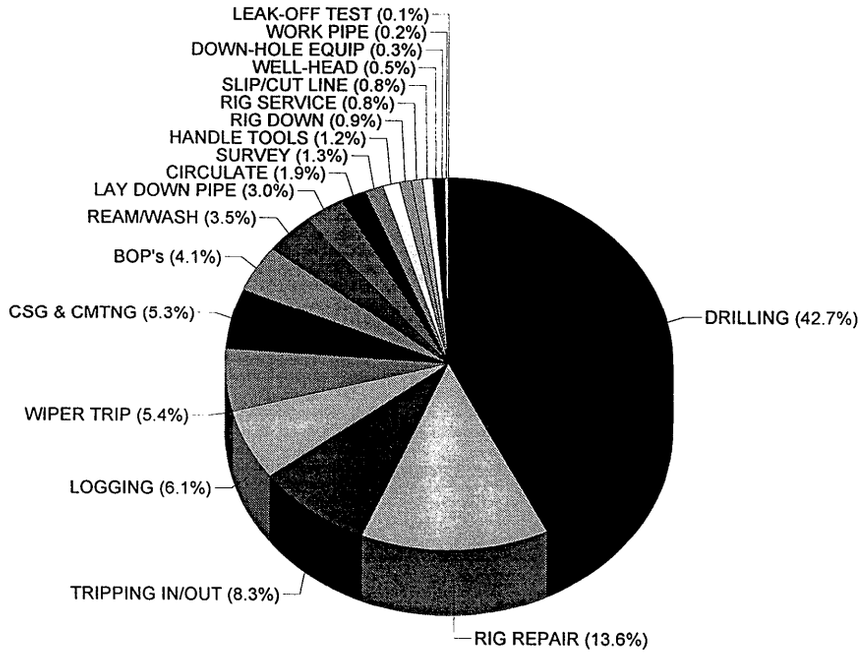


TIME BREAKDOWN DATABASE - single well analysis

BLACKWOOD #1

Time Analysis by Operational Codes

Operation	hrs
DRILLING	194.50
RIG REPAIR	62.00
TRIPPING IN/OU	38.00
LOGGING	28.00
WIPER TRIP	24.50
CSG & CMTNG	24.00
BOP's	18.50
REAM/WASH	16.00
LAY DOWN PIPE	13.50
CIRCULATE	8.50
SURVEY	6.00
HANDLE TOOLS	5.50
RIG DOWN	4.00
RIG SERVICE	3.50
SLIP/CUT LINE	3.50
WELL-HEAD	2.50
DOWN-HOLE EQ	1.50
WORK PIPE	1.00
LEAK-OFF TEST	0.50



1.9.3 Time Breakdown Database - Trouble Drilling Analysis

(See following pages)

Quick-Look Statistical Analysis

TIME BREAKDOWN DATABASE - Trouble Drilling analysis

Well Name : BLACKWOOD #1

Wednesday, 20 November 1996

Total hours	Total depth	ROP - Spud to TD	ROP- on-bottom hours	Trouble Drilling Index (Trble D. Hrs/Drill Hrs)	Trouble Eval Index (T.E.Hrs/P.E. hrs)	Tot. Trouble Hrs
455.50	2,650.00	5.82	13.62	0.233	0.001	106.00

Total Hours Lost per Phase

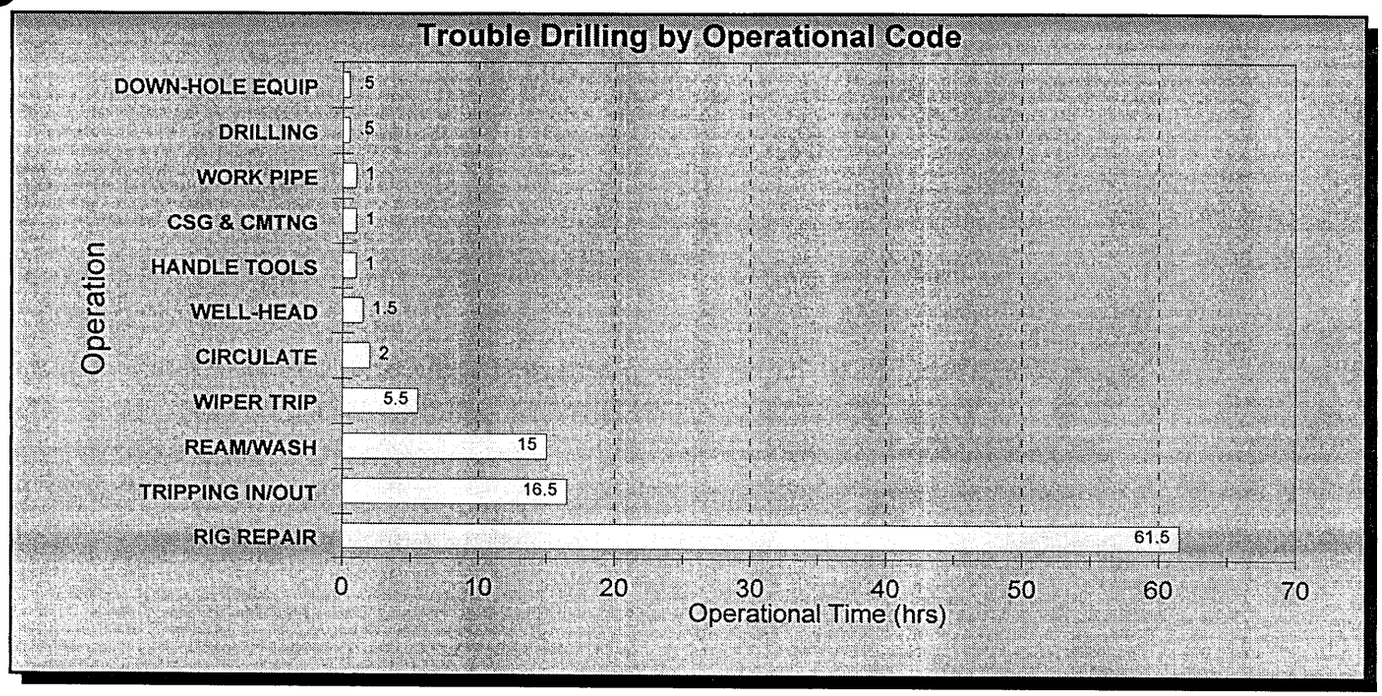
PHASE	HOURS LOST
	106.00

Trouble Drilling Time/Activity Analysis

OPERATION	HOURS LOST	DEPTH	DESCRIPTION	PHASE
CIRCULATE	1.50	-692.00	Sweep hole with H.V. pill, circ & condition mud, work pipe.	
CSG & CMTNG	1.00	-692.00	Connection did not m/u due to badly cut pin. L/O joints 13, 14, 15.	
WELL-HEAD	1.50	-692.00	Attempt to M/U Bradenhead. Barbed thread in collar. Repair same	
REAM/WASH	6.00	-692.00	Wash and ream 426-674 m. Reaming on singles and P/U stands of drill pipe.	
REAM/WASH	1.00	-692.00	Cont to ream to bottom. From 674 to 692 m.	
REAM/WASH	0.50	-692.00	Wash and ream 257-297m	
CIRCULATE	0.50	-692.00	Unable to circulate. Clean out large marl cuttings from flowline.	
RIG REPAIR	1.00	-1,215.00	Repair main drum brake cooling hose.	
RIG REPAIR	24.00	-1,522.00	While waiting on right angle drive repairs, install new chain main drum drive, clean & paint, lift out transmission & right angle box (transport to work shop). Cont. to rotate pipe every 30 minutes.	
REAM/WASH	1.50	-1,522.00	Ream 1484-1516m. Wash to bottom at 1522m (1m fill).	
RIG REPAIR	4.50	-1,522.00	Repair main shaft on drawworks.	
RIG REPAIR	7.00	-1,522.00	Snapped main draw works output shaft. Remove covers and prepare right angle drive box for removal. Rotate drill string every half hour.	
WIPER TRIP	0.00	-1,522.00	Pump out w/- 30-40k drag 1336-1241m. POH to free hole at 1012m - tight at 1229, 1164, 1155, 1150-1145, 1082-1078m.	
RIG REPAIR	24.00	-1,522.00	Waiting on repairs to main drive shaft. Install right angle drive box, remove to machine out off drillers side main drive boaring housing, re-install. Cont to rotate pipe	
WIPER TRIP	4.00	-1,522.00	POH. Pump out w/-20-30k drag 1516-1460m. Pull stands 1460-1336 w/- 15-25k drag (1460-1358m) and 50-80k drag (1358-1336m).	
WIPER TRIP	1.50	-1,522.00	RIH. Start taking weight at 1484m.	
RIG REPAIR	1.00	-1,527.00	Install shims in input shaft on right angle drive.	
DRILLING	0.50	-1,651.00	Work junk basket	
TRIPPING IN/OUT	1.50	-1,651.00	RIH w/- bit + junk sub to 350. Rerun MFDSSH S/N LF6918	
TRIPPING IN/OUT	2.50	-1,651.00	POH	
REAM/WASH	0.50	-1,651.00	Wash and ream 1626 - 1651.	
REAM/WASH	1.50	-1,651.00	Cont to ream f/- 1602 tp 1651 m. Tight hole.	
REAM/WASH	2.50	-1,651.00	Ream from 1533 to 1602 m.	
TRIPPING IN/OUT	3.00	-1,651.00	RIH	
TRIPPING IN/OUT	1.00	-2,383.00	Continue RIH to 1514m. Encounter tight hole	
TRIPPING IN/OUT	1.00	-2,383.00	POH BHA	
DOWN-HOLE EQU	0.50	-2,383.00	Break circulation	
HANDLE TOOLS	1.00	-2,383.00	Change out balled bit, plugged nozzles with motor stator rubber. Change out motor and test same	
REAM/WASH	1.00	-2,383.00	Ream from 2356 to 2383m	
WORK PIPE	1.00	-2,383.00	Work DP, pick up kelly attemp to break circulation, no go. 70 k OP. Lay out single	
TRIPPING IN/OUT	1.00	-2,383.00	Continue to POH BHA	
TRIPPING IN/OUT	3.00	-2,383.00	Pump trip slug, POH. Work tight hole from 1665-1637m 20-60k OP, 1579-1552m 40-70k OP, 1495-1468m 30/40k OP	
TRIPPING IN/OUT	2.00	-2,383.00	Continue to RIH to 2363m. Encounter tight hole	
REAM/WASH	0.50	-2,383.00	Pick up kelly and ream from 1514 to 1585m	
TRIPPING IN/OUT	1.50	-2,383.00	RIH 8.5 bit, motor and BHA on 4.5' DP to 696m	

TIME BREAKDOWN DATABASE - Trouble drilling analysis

Well Name : BLACKWOOD #1



Sum of hours lost by Operational Group

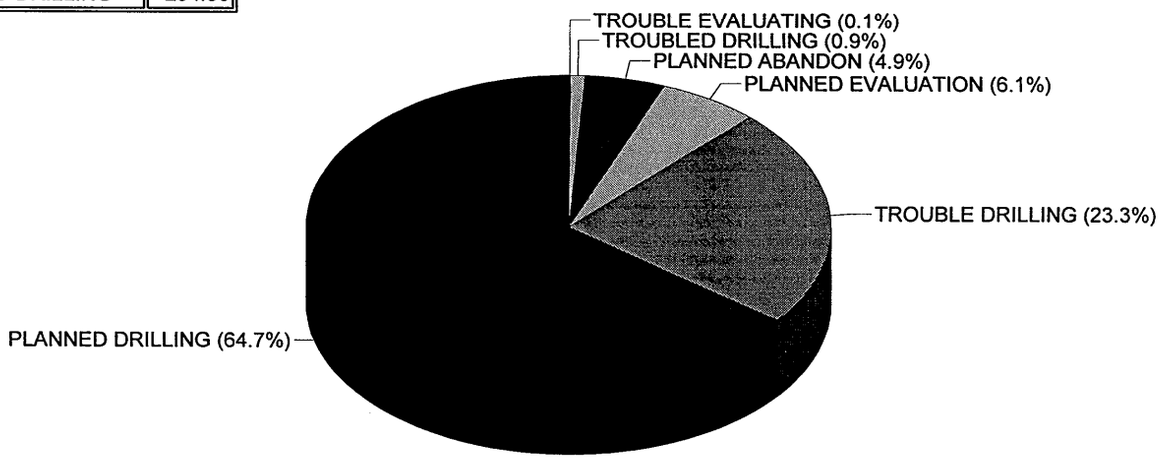
OPERATION	HOURS LOST
RIG REPAIR	61.50
TRIPPING IN/OUT	16.50
REAM/WASH	15.00
WIPER TRIP	5.50
CIRCULATE	2.00
WELL-HEAD	1.50
HANDLE TOOLS	1.00
CSG & CMTNG	1.00
WORK PIPE	1.00
DRILLING	0.50
DOWN-HOLE EQUIP	0.50

TIME BREAKDOWN DATABASE - Trouble drilling analysis

Well Name : BLACKWOOD #1

Time Analysis by Class Codes

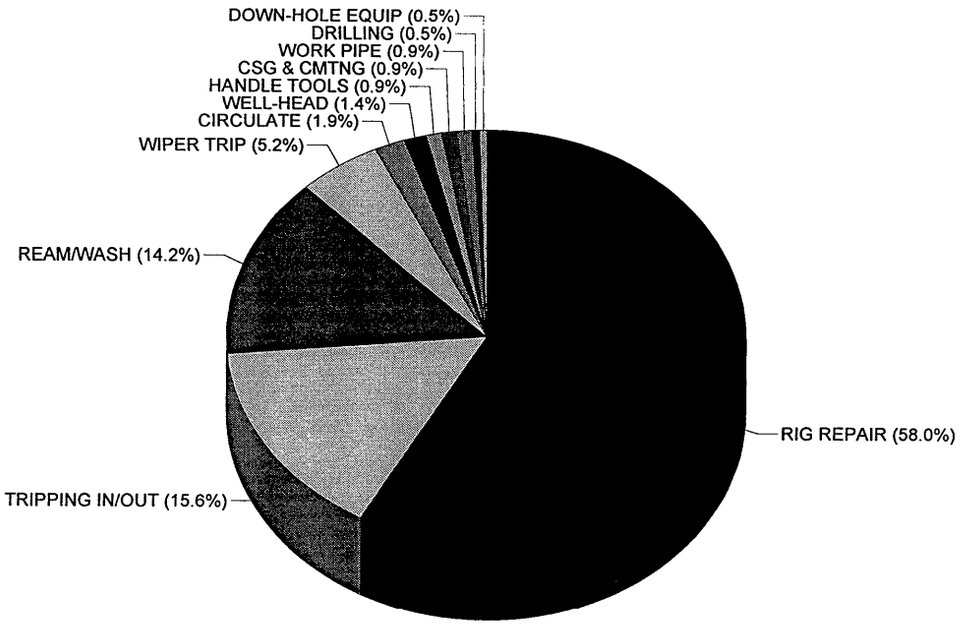
Class	Hrs
TROUBLE EVALUATIN	0.50
TROUBLED DRILLING	4.00
PLANNED ABANDON	22.50
PLANNED EVALUATIO	28.00
TROUBLE DRILLING	106.00
PLANNED DRILLING	294.50



TIME BREAKDOWN DATABASE - Trouble drilling analysis

Well Name : BLACKWOOD #1

Trouble Drilling Analysis by Operational Codes



1.9.4 Trouble Time Recommendations

Most of the drilling downtime, 58 % (61.5 hours), was due to rig repairs; broken drive shaft and failed drum brake cooling hose. Most of this time could have been prevented. A spare drive shaft dressed with bearings on site would probably have reduced the downtime by approximately 40 hours as well as reducing the time for the wiper trip once the drawworks were repaired.

The plugged nozzle on the PDC was most likely caused by excessive hours on the mud motor. To prevent motor failure in the future, no motor should be run in the hole with more than 200 hours on the stators.

As discussed in section 2.3.8, the surface hole should be drilled with maximum pump rates and a SAPP pill should not be run.

1.10 Multiwell Benchmark Analysis - Otway Basin

1.10.1 ROP - Spud to TD (m/hr)

1.10.2 ROP (on bottom) m/hr Plot

1.10.3 $/metre - Spud to TD

1.10.4 Tripping hours

1.10.5 Logging Hours

1.10.6 Casing Cementing Hours

1.10.7 Nipple Up / Down BOP Hours

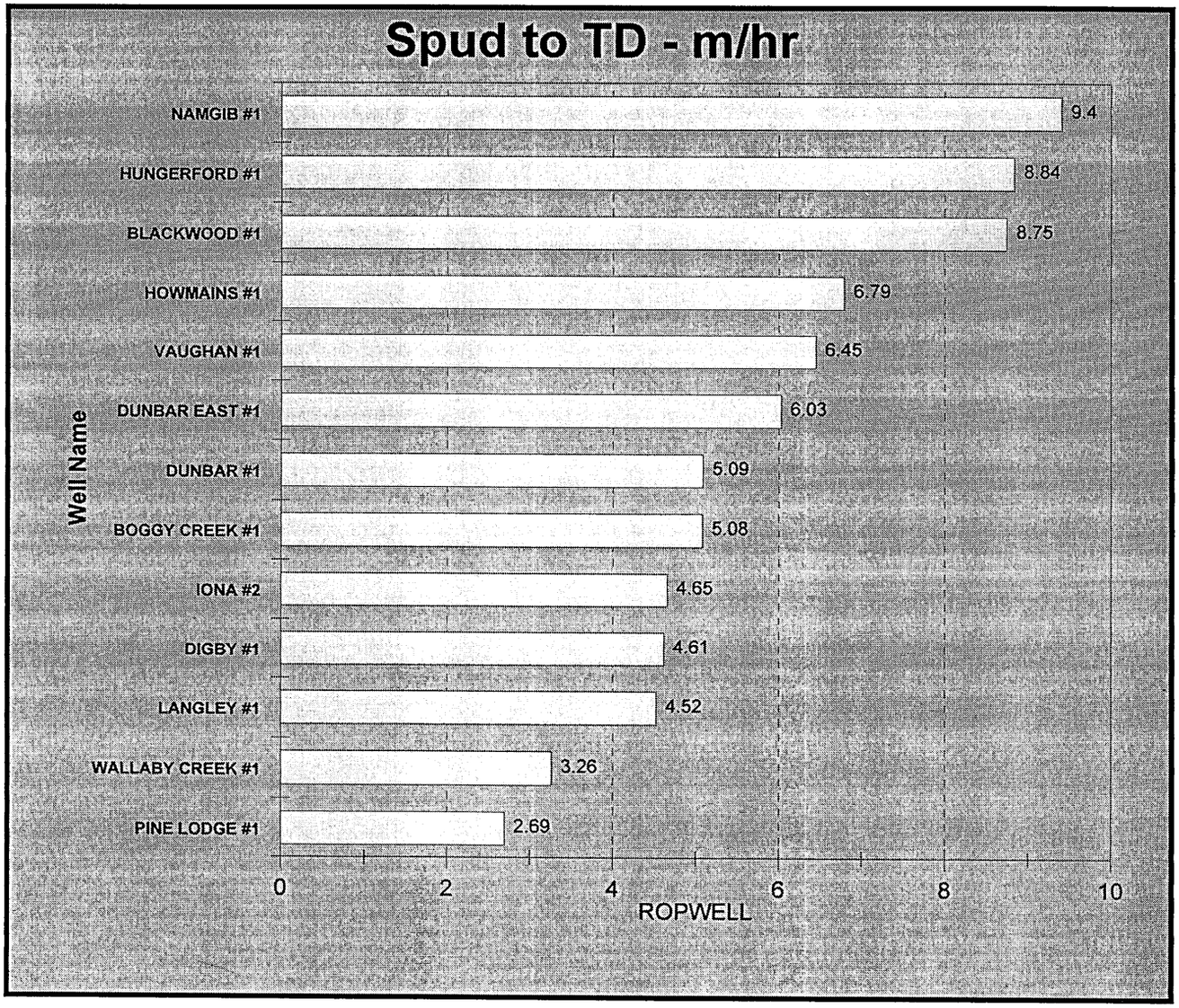
1.10.8 Discussion and Recommendations

Blackwood-1 was the second well operated by Cultus, in the Otway Basin. The drilling performance of Blackwood-1 showed noticeable improvements over the first well in the programme, Dunbar East-1. Improvements were made in ROP, nippling BOP's up and down, and tripping. On the whole, the Blackwood-1 well drilling performance was in the top 1/3 of the 13 wells in the benchmark study.

1.10.1 Sput to TD (m/hr)

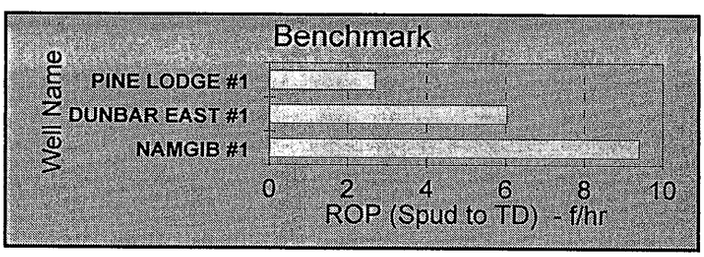
(See following page)

MULTI-WELL ANALYSIS
TIME BREAKDOWN BY SIGNIFICANT TASK



Performance Benchmarks

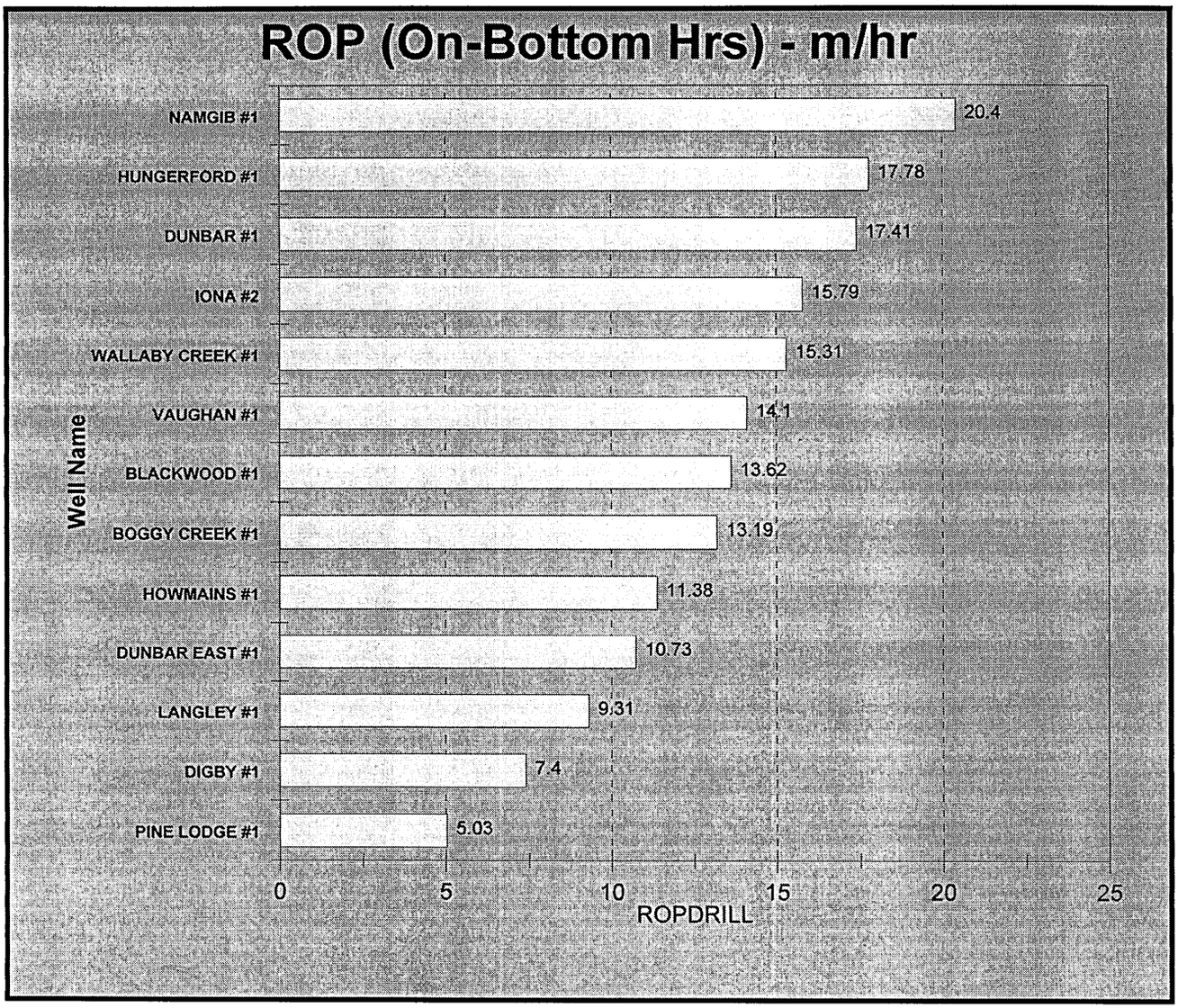
Well Name	ROP Spud/TD
NAMGIB #1	9.40
DUNBAR EAST #1	6.03
PINE LODGE #1	2.69



1.10.2 ROP (on bottom) m/hr Plot

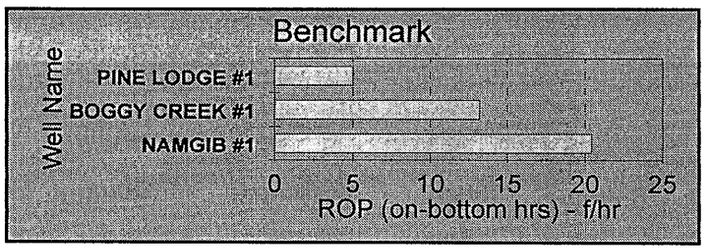
(See following page)

MULTI-WELL ANALYSIS
TIME BREAKDOWN BY SIGNIFICANT TASK



Performance Benchmarks

Well Name	ROP f/hr
NAMGIB #1	20.40
BOGGY CREEK #1	13.19
PINE LODGE #1	5.03

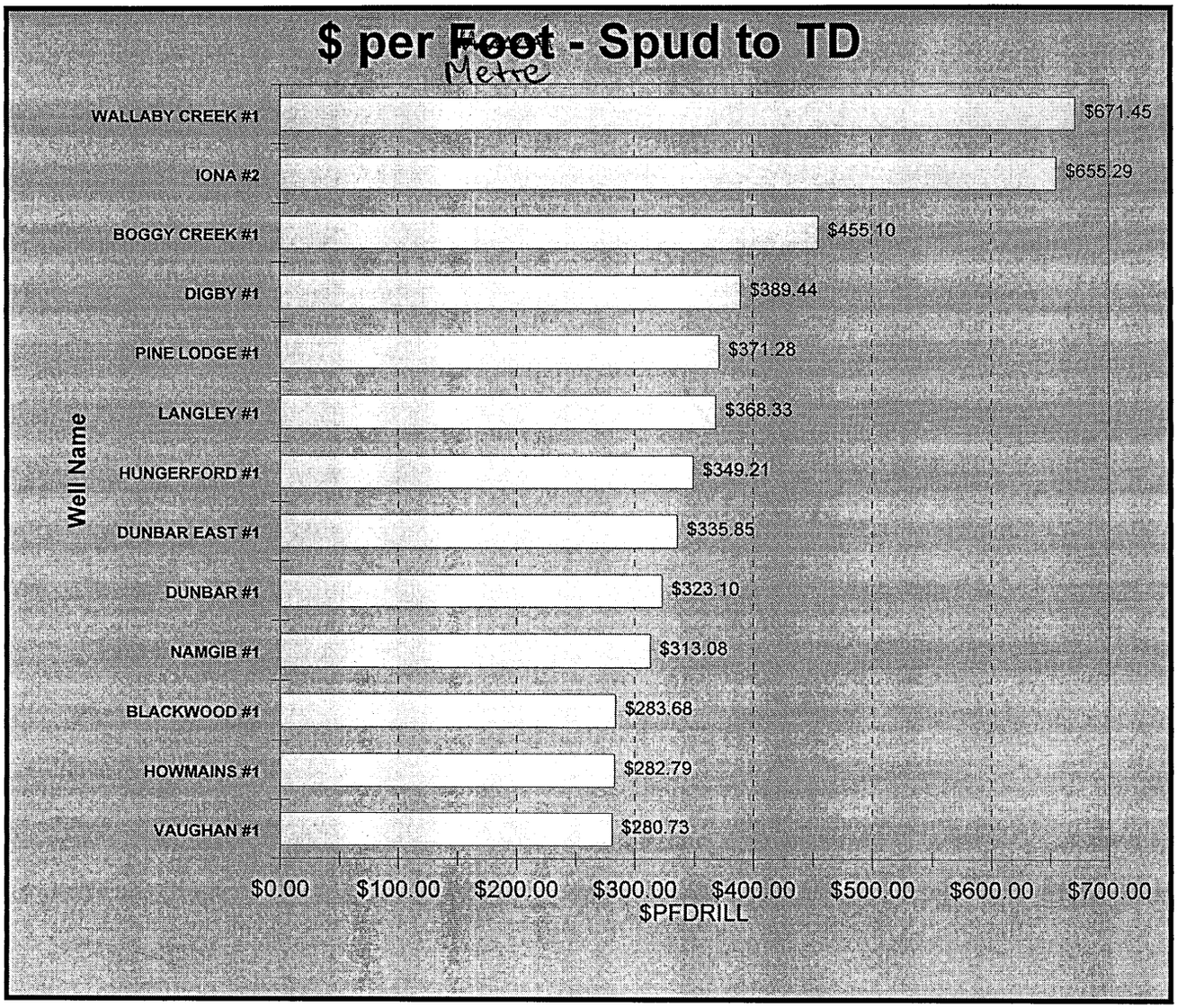


1-10-2

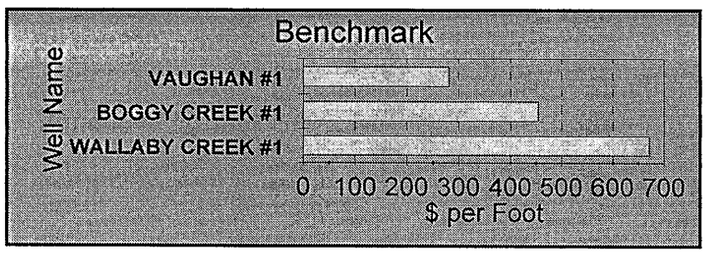
1.10.3 $, versus m/day Plot

(See following page)

MULTI-WELL ANALYSIS
TIME BREAKDOWN BY SIGNIFICANT TASK



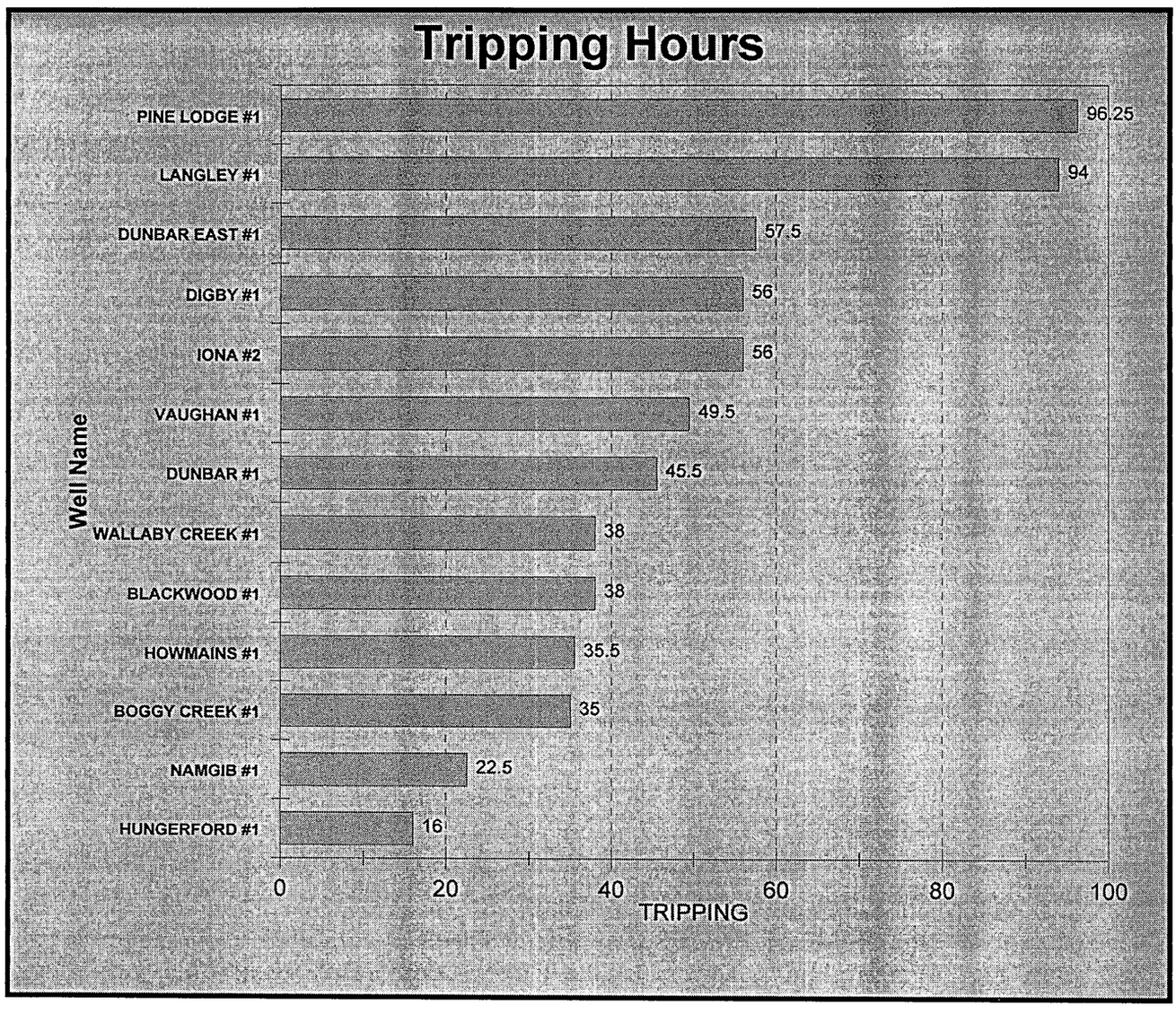
Well Name	$ per Foot
WALLABY CREEK #1	671
BOGGY CREEK #1	455
VAUGHAN #1	281



1.10.4 Tripping Hours

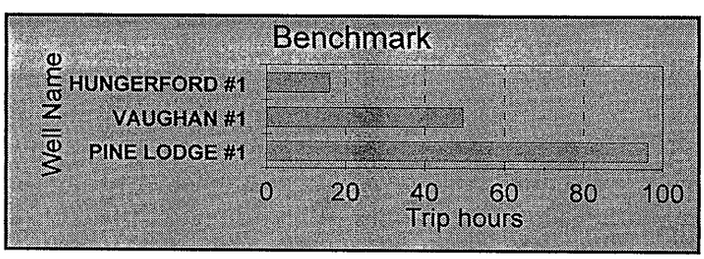
(See following page)

MULTI-WELL ANALYSIS
TIME BREAKDOWN BY SIGNIFICANT TASK



Performance Benchmarks

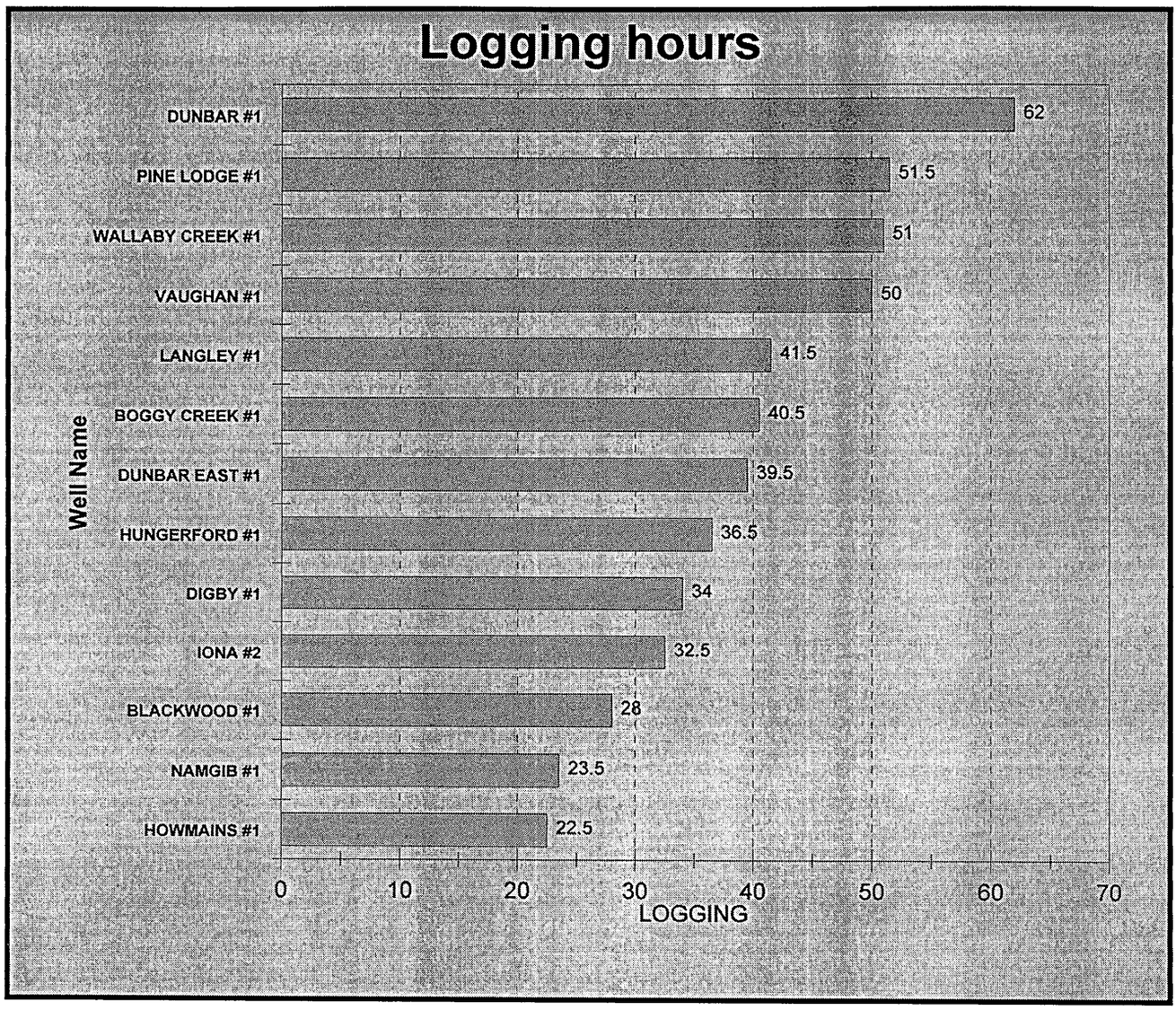
Well Name	Trip Hours
PINE LODGE #1	96.3
VAUGHAN #1	49.5
HUNGERFORD #1	16.0



1.10.5 Logging Hours

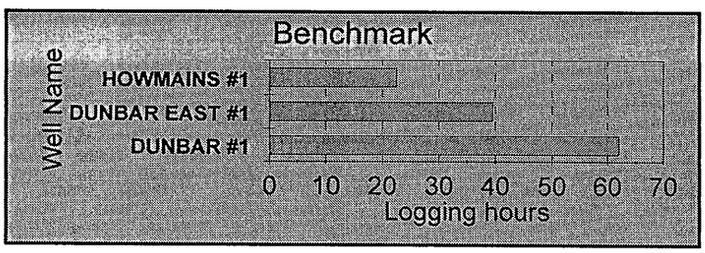
(See following page)

MULTI-WELL ANALYSIS
TIME BREAKDOWN BY SIGNIFICANT TASK



Performance Benchmarks

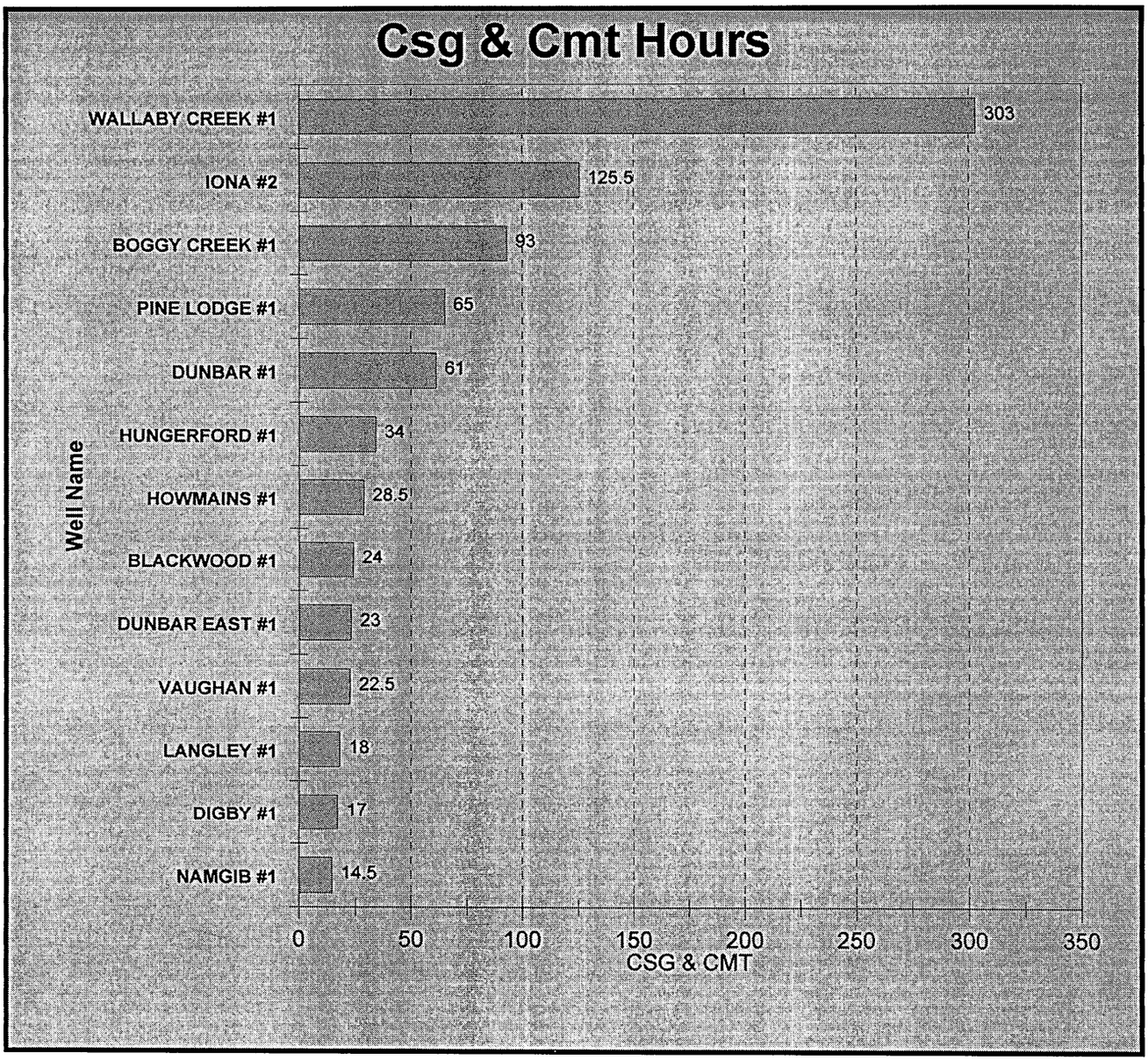
Well Name	Logging Hours
DUNBAR #1	62.00
DUNBAR EAST #1	39.50
HOWMAINS #1	22.50



1.10.6 Casing and Cementing Hours

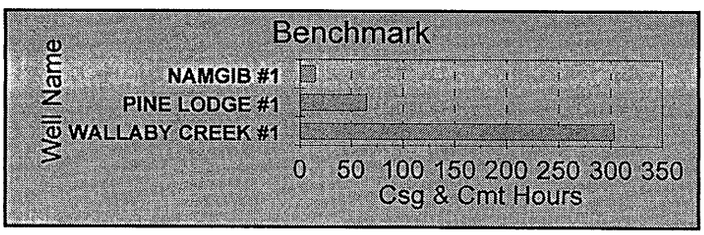
(See following page)

MULTI-WELL ANALYSIS
TIME BREAKDOWN BY SIGNIFICANT TASK



Performance Benchmarks

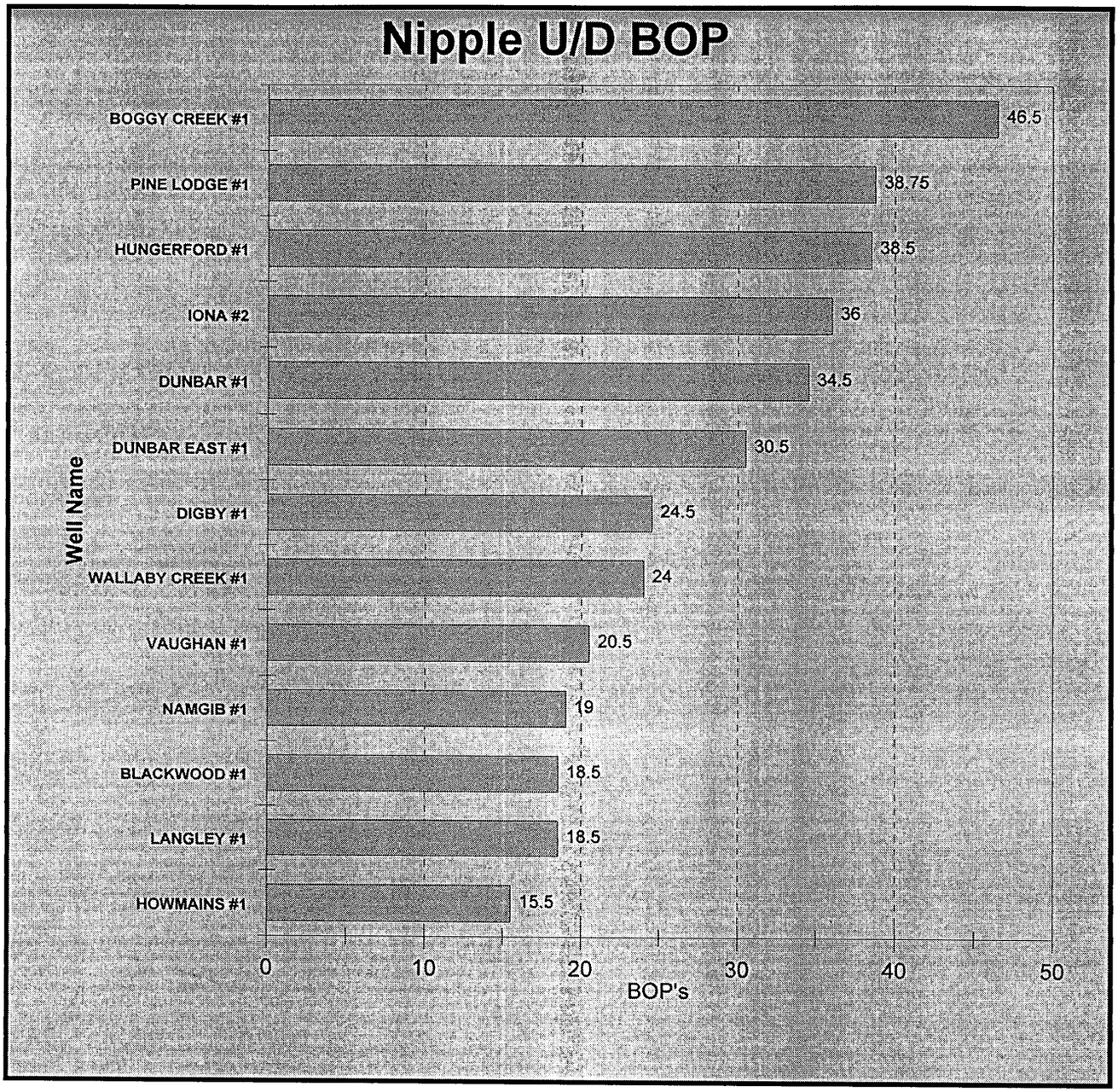
Well Name	Csg & Cmt Hours
WALLABY CREEK #1	303.00
PINE LODGE #1	65.00
NAMGIB #1	14.50



1.10.7 Nipple Up/Down Hours

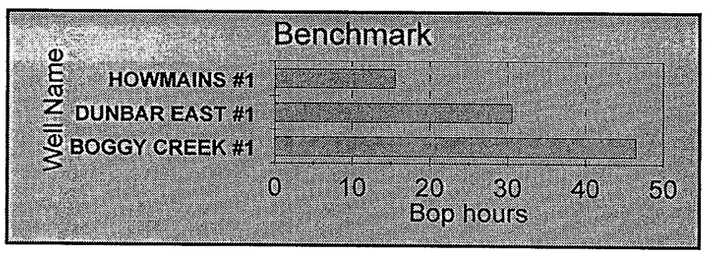
(See following page)

MULTI-WELL ANALYSIS
TIME BREAKDOWN BY SIGNIFICANT TASK



Performance Benchmarks

Well Name	BOP hrs
BOGGY CREEK #1	46.50
DUNBAR EAST #1	30.50
HOWMAINS #1	15.50



1.10.7

1.11 Incident Analysis

No incidents were reported during the drilling of Blackwood-1.

PE905681

This is an enclosure indicator page.
The enclosure PE905681 is enclosed within the container PE900834 at this location in this document.

The enclosure PE905681 has the following characteristics:

ITEM_BARCODE	= PE905681
CONTAINER_BARCODE	= PE900834
NAME	= Petrophysical Crossplot
BASIN	= OTWAY
PERMIT	= PPL1
TYPE	= wELL
SUBTYPE	= DIAGRAM
DESCRIPTION	= Blackwood-1 Petrophysical Crossplot, Wire.GR_COR_2 vs Wire.DTC1_O from Well Completion Report
REMARKS	=
DATE_CREATED	=
DATE_RECEIVED	= 12/11/97
W_NO	= W1152
WELL_NAME	= BLACKWOOD-1
CONTRACTOR	=
CLIENT_OP_CO	= CULTUS PETROLEUM N.L.

(Inserted by DNRE - Vic Govt Mines Dept)

PE905682

This is an enclosure indicator page.
The enclosure PE905682 is enclosed within the container PE900834 at this location in this document.

The enclosure PE905682 has the following characteristics:

ITEM_BARCODE	= PE905682
CONTAINER_BARCODE	= PE900834
NAME	= Petrophysical Crossplot
BASIN	= OTWAY
PERMIT	= PPL1
TYPE	= wELL
SUBTYPE	= DIAGRAM
DESCRIPTION	= Blackwood-1 Petrophysical Crossplot, Wire.VHS_1 vs Wire.RT_O from Well Completion Report
REMARKS	=
DATE_CREATED	=
DATE_RECEIVED	= 12/11/97
W_NO	= W1152
WELL_NAME	= BLACKWOOD-1
CONTRACTOR	=
CLIENT_OP_CO	= CULTUS PETROLEUM N.L.

(Inserted by DNRE - Vic Govt Mines Dept)

PE905683

This is an enclosure indicator page.
The enclosure PE905683 is enclosed within the container PE900834 at this location in this document.

The enclosure PE905683 has the following characteristics:

ITEM_BARCODE	= PE905683
CONTAINER_BARCODE	= PE900834
NAME	= Petrophysical Crossplot
BASIN	= OTWAY
PERMIT	= PPL1
TYPE	= wELL
SUBTYPE	= DIAGRAM
DESCRIPTION	= Blackwood-1 Petrophysical Crossplot, PHIE vs RT from Well Completion Report
REMARKS	=
DATE_CREATED	=
DATE_RECEIVED	= 12/11/97
W_NO	= W1152
WELL_NAME	= BLACKWOOD-1
CONTRACTOR	=
CLIENT_OP_CO	= CULTUS PETROLEUM N.L.

(Inserted by DNRE - Vic Govt Mines Dept)

APPENDIX 2: WAARRE FORMATION NET RESERVOIR SUMMARY REPORT

```
**********************************
*                                *
*       PAY SUMMARY REPORT       *
*                                *
*    Project : PEP108            *
*    User id : gjo               *
*    Date    : 27-Oct-97 15:41:03 *
*                                *
**********************************
```

WELL: BLACKWOOD-1

Interval name : WAARRE FORMATION
Interval top : 1487.000000 METRES
Interval bottom : 1611.000000 METRES

Cutoff Expression:
phie>=0.1 & vsh<=0.4

Minimum pay thickness : 1.000000 METRES

Maximum pay separation : 1.000000 METRES

Depth listing for pay depths.
Summation type is zone.

	Cutoff Logs			Summation			Averages		
Depth	PHIE	SWE_IN	VSH	PHIE	BVW	VSH	PHIE	SWE_IN	VSH
1524.500	0.182	1.105	0.351	0.018	0.020	0.035	0.182	1.105	0.351
1524.600	0.207	1.173	0.244	0.039	0.044	0.059	0.195	1.141	0.297
1524.700	0.221	1.224	0.176	0.061	0.071	0.077	0.203	1.171	0.257
1524.800	0.228	1.254	0.136	0.084	0.100	0.091	0.210	1.194	0.227
1524.900	0.229	1.265	0.125	0.107	0.129	0.103	0.213	1.209	0.206
1525.000	0.228	1.269	0.118	0.129	0.158	0.115	0.216	1.219	0.192
1525.100	0.223	1.269	0.128	0.152	0.186	0.128	0.217	1.227	0.183
1525.200	0.221	1.267	0.129	0.174	0.214	0.141	0.217	1.232	0.176
1525.300	0.221	1.262	0.132	0.196	0.242	0.154	0.218	1.235	0.171
1525.400	0.224	1.258	0.129	0.218	0.270	0.167	0.218	1.238	0.167
1525.500	0.229	1.252	0.130	0.241	0.299	0.180	0.219	1.239	0.163
1525.600	0.234	1.251	0.134	0.265	0.328	0.193	0.221	1.240	0.161
1525.700	0.237	1.254	0.149	0.288	0.358	0.208	0.222	1.241	0.160
1525.800	0.238	1.268	0.163	0.312	0.388	0.224	0.223	1.243	0.160
1525.900	0.237	1.289	0.172	0.336	0.419	0.241	0.224	1.246	0.161
1526.000	0.237	1.309	0.166	0.360	0.450	0.258	0.225	1.251	0.161
1526.100	0.235	1.334	0.156	0.383	0.481	0.274	0.225	1.256	0.161
1526.200	0.234	1.344	0.146	0.406	0.512	0.288	0.226	1.261	0.160
1526.300	0.231	1.342	0.138	0.430	0.543	0.302	0.226	1.265	0.159
1526.400	0.230	1.328	0.130	0.453	0.574	0.315	0.226	1.268	0.158
1526.500	0.229	1.303	0.136	0.475	0.604	0.329	0.226	1.270	0.157
1526.600	0.230	1.259	0.152	0.498	0.633	0.344	0.227	1.270	0.156
1526.700	0.230	1.216	0.178	0.521	0.661	0.362	0.227	1.267	0.157
1526.800	0.232	1.184	0.206	0.545	0.688	0.382	0.227	1.264	0.159
1526.900	0.230	1.181	0.233	0.568	0.715	0.406	0.227	1.260	0.162
1527.000	0.226	1.205	0.246	0.590	0.743	0.430	0.227	1.258	0.165
1527.100	0.228	1.228	0.241	0.613	0.771	0.454	0.227	1.257	0.168
1527.200	0.234	1.244	0.220	0.636	0.800	0.476	0.227	1.257	0.170
1527.300	0.233	1.285	0.194	0.660	0.830	0.496	0.227	1.258	0.171
1527.400	0.230	1.313	0.174	0.683	0.860	0.513	0.228	1.259	0.171
1527.500	0.222	1.189	0.172	0.705	0.886	0.530	0.227	1.257	0.171
1527.600	0.213	1.162	0.189	0.726	0.911	0.549	0.227	1.254	0.172
1527.700	0.205	1.274	0.219	0.747	0.937	0.571	0.226	1.255	0.173
1527.800	0.201	1.223	0.243	0.767	0.962	0.595	0.226	1.254	0.175
1527.900	0.200	1.187	0.262	0.787	0.986	0.621	0.225	1.252	0.178
1528.000	0.201	1.160	0.274	0.807	1.009	0.649	0.224	1.250	0.180

1528.100	0.204	1.150	0.279	0.827	1.032	0.677	0.224	1.248	0.183
1528.200	0.207	1.161	0.273	0.848	1.056	0.704	0.223	1.246	0.185
1528.300	0.209	1.185	0.269	0.869	1.081	0.731	0.223	1.244	0.187
1528.400	0.211	1.205	0.260	0.890	1.107	0.757	0.223	1.243	0.189
1528.500	0.214	1.222	0.253	0.912	1.133	0.782	0.222	1.243	0.191
1528.600	0.222	1.227	0.233	0.934	1.160	0.805	0.222	1.242	0.192
1528.700	0.231	1.227	0.215	0.957	1.188	0.827	0.223	1.242	0.192
1528.800	0.239	1.226	0.202	0.981	1.218	0.847	0.223	1.242	0.193
1528.900	0.241	1.237	0.197	1.005	1.247	0.867	0.223	1.241	0.193
1529.000	0.240	1.256	0.196	1.029	1.278	0.886	0.224	1.242	0.193
1529.100	0.231	1.312	0.190	1.052	1.308	0.905	0.224	1.243	0.193
1529.200	0.214	1.396	0.184	1.073	1.338	0.924	0.224	1.246	0.192
1529.300	0.194	1.479	0.178	1.093	1.366	0.942	0.223	1.250	0.192
1529.400	0.176	1.409	0.176	1.110	1.391	0.959	0.222	1.253	0.192
1529.500	0.166	1.516	0.175	1.127	1.416	0.977	0.221	1.257	0.192
1529.600	0.165	1.400	0.189	1.143	1.440	0.996	0.220	1.259	0.191
1529.700	0.174	1.236	0.212	1.161	1.461	1.017	0.219	1.259	0.192
1529.800	0.186	1.109	0.243	1.179	1.482	1.041	0.218	1.256	0.193
1529.900	0.198	1.052	0.267	1.199	1.503	1.068	0.218	1.253	0.194
1530.000	0.206	1.045	0.281	1.220	1.524	1.096	0.218	1.249	0.196
1530.100	0.210	1.078	0.281	1.241	1.547	1.124	0.218	1.246	0.197
1530.200	0.215	1.133	0.267	1.262	1.571	1.151	0.218	1.245	0.198
1530.300	0.222	1.178	0.245	1.285	1.597	1.175	0.218	1.243	0.199
1530.400	0.231	1.198	0.218	1.308	1.625	1.197	0.218	1.243	0.199
1530.500	0.237	1.218	0.198	1.331	1.654	1.217	0.218	1.242	0.199
1530.600	0.236	1.280	0.175	1.355	1.684	1.234	0.219	1.243	0.199
1530.700	0.220	1.387	0.168	1.377	1.714	1.251	0.219	1.245	0.199
1530.800	0.195	1.539	0.154	1.396	1.744	1.266	0.218	1.249	0.198
1530.900	0.160	1.738	0.156	1.412	1.772	1.282	0.217	1.255	0.197
1531.000	0.128	1.922	0.159	1.425	1.797	1.298	0.216	1.261	0.197
1531.100	0.105	1.791	0.182	1.436	1.816	1.316	0.214	1.265	0.196
1531.200	0.100	1.724	0.207	1.446	1.833	1.337	0.213	1.268	0.197
1531.300	0.111	1.404	0.225	1.457	1.848	1.359	0.211	1.269	0.197
1531.400	0.128	1.244	0.236	1.470	1.864	1.383	0.210	1.269	0.198
1531.500	0.144	1.230	0.231	1.484	1.882	1.406	0.209	1.268	0.198
1531.600	0.149	1.253	0.232	1.499	1.901	1.429	0.208	1.268	0.199
1531.700	0.147	1.318	0.231	1.514	1.920	1.452	0.207	1.269	0.199
1531.800	0.135	1.371	0.252	1.527	1.939	1.478	0.206	1.269	0.200
1531.900	0.125	1.412	0.297	1.540	1.956	1.507	0.205	1.271	0.201
1532.000	0.116	1.192	0.372	1.551	1.970	1.544	0.204	1.270	0.203
7.600				1.551	1.970	1.544	0.204	1.270	0.203
1533.700	0.183	1.445	0.356	1.569	1.996	1.580	0.204	1.272	0.205
1533.800	0.200	1.144	0.279	1.589	2.019	1.608	0.204	1.270	0.206
1533.900	0.213	1.212	0.212	1.611	2.045	1.629	0.204	1.270	0.206
1534.000	0.212	1.287	0.172	1.632	2.073	1.646	0.204	1.270	0.206
1534.100	0.203	1.370	0.144	1.652	2.100	1.661	0.204	1.271	0.205
1534.200	0.187	1.420	0.147	1.671	2.127	1.675	0.204	1.273	0.204
1534.300	0.170	1.795	0.173	1.688	2.157	1.693	0.203	1.278	0.204
1534.400	0.156	1.582	0.225	1.703	2.182	1.715	0.203	1.281	0.204
1534.500	0.150	1.373	0.285	1.718	2.202	1.744	0.202	1.282	0.205
1534.600	0.154	1.176	0.340	1.734	2.221	1.778	0.202	1.281	0.207
1534.700	0.164	1.108	0.367	1.750	2.239	1.814	0.201	1.279	0.209

1534.800	0.176	1.157	0.352	1.768	2.259	1.850	0.201	1.278	0.210
1534.900	0.185	1.461	0.302	1.786	2.286	1.880	0.201	1.280	0.211
1535.000	0.188	1.100	0.240	1.805	2.307	1.904	0.201	1.278	0.212
1535.100	0.186	1.169	0.195	1.824	2.328	1.923	0.200	1.277	0.211
1535.200	0.182	1.197	0.167	1.842	2.350	1.940	0.200	1.276	0.211
1535.300	0.183	1.593	0.160	1.860	2.379	1.956	0.200	1.279	0.210
1535.400	0.191	1.466	0.148	1.879	2.407	1.971	0.200	1.281	0.210
1535.500	0.207	1.368	0.127	1.900	2.436	1.984	0.200	1.282	0.209
1535.600	0.225	1.354	0.089	1.922	2.466	1.993	0.200	1.283	0.208
1535.700	0.239	1.401	0.057	1.946	2.500	1.998	0.201	1.284	0.206
1535.800	0.240	1.277	0.044	1.970	2.530	2.003	0.201	1.284	0.204
1535.900	0.234	1.360	0.052	1.994	2.562	2.008	0.201	1.285	0.203
1536.000	0.224	1.421	0.071	2.016	2.594	2.015	0.202	1.287	0.202
1536.100	0.212	1.449	0.099	2.037	2.625	2.025	0.202	1.288	0.200
1536.200	0.200	1.454	0.134	2.057	2.654	2.038	0.202	1.290	0.200
1536.300	0.192	1.426	0.161	2.077	2.681	2.054	0.202	1.291	0.199
1536.400	0.189	1.391	0.175	2.096	2.708	2.072	0.201	1.292	0.199
1536.500	0.193	1.361	0.170	2.115	2.734	2.089	0.201	1.293	0.199
1536.600	0.198	1.355	0.155	2.135	2.761	2.104	0.201	1.293	0.199
1536.700	0.201	1.357	0.138	2.155	2.788	2.118	0.201	1.294	0.198
1536.800	0.201	1.374	0.128	2.175	2.816	2.131	0.201	1.295	0.197
1536.900	0.200	1.385	0.130	2.195	2.843	2.144	0.201	1.295	0.197
1537.000	0.199	1.376	0.148	2.215	2.871	2.159	0.201	1.296	0.196
1537.100	0.198	1.364	0.165	2.235	2.898	2.175	0.201	1.297	0.196
1537.200	0.200	1.421	0.168	2.255	2.926	2.192	0.201	1.298	0.196
1537.300	0.200	1.389	0.152	2.275	2.954	2.207	0.201	1.299	0.195
1537.400	0.193	1.451	0.136	2.294	2.982	2.221	0.201	1.300	0.195
1537.500	0.177	1.532	0.133	2.312	3.009	2.234	0.201	1.302	0.194
1537.600	0.159	1.573	0.148	2.328	3.034	2.249	0.201	1.304	0.194
1537.700	0.143	1.533	0.184	2.342	3.056	2.267	0.200	1.305	0.194
1537.800	0.134	1.313	0.232	2.355	3.074	2.290	0.200	1.305	0.194
1537.900	0.135	1.284	0.267	2.369	3.091	2.317	0.199	1.305	0.195
1538.000	0.144	1.198	0.273	2.383	3.108	2.344	0.199	1.304	0.195
1538.100	0.156	1.164	0.257	2.399	3.126	2.370	0.198	1.303	0.196
1538.200	0.168	1.188	0.222	2.416	3.146	2.392	0.198	1.303	0.196
1538.300	0.179	1.244	0.179	2.434	3.169	2.410	0.198	1.302	0.196
1538.400	0.189	1.297	0.146	2.452	3.193	2.425	0.198	1.302	0.196
1538.500	0.197	1.317	0.136	2.472	3.219	2.438	0.198	1.302	0.195
1538.600	0.202	1.323	0.143	2.492	3.246	2.453	0.198	1.302	0.195
1538.700	0.206	1.337	0.149	2.513	3.274	2.468	0.198	1.303	0.194
1538.800	0.210	1.372	0.144	2.534	3.302	2.482	0.198	1.303	0.194
1538.900	0.212	1.419	0.128	2.555	3.332	2.495	0.198	1.304	0.193
1539.000	0.215	1.468	0.101	2.577	3.364	2.505	0.198	1.306	0.193
1539.100	0.218	1.508	0.068	2.598	3.397	2.512	0.198	1.307	0.192
1539.200	0.222	1.520	0.045	2.621	3.430	2.516	0.199	1.309	0.191
1539.300	0.227	1.497	0.038	2.643	3.465	2.520	0.199	1.311	0.189
1539.400	0.232	1.460	0.043	2.667	3.498	2.524	0.199	1.312	0.188
1539.500	0.235	1.432	0.057	2.690	3.532	2.530	0.199	1.313	0.187
1539.600	0.234	1.428	0.072	2.713	3.565	2.537	0.200	1.314	0.187
1539.700	0.229	1.446	0.083	2.736	3.598	2.546	0.200	1.315	0.186
1539.800	0.223	1.470	0.086	2.759	3.631	2.554	0.200	1.316	0.185
1539.900	0.219	1.484	0.083	2.780	3.664	2.563	0.200	1.318	0.184
1540.000	0.219	1.472	0.076	2.802	3.696	2.570	0.200	1.319	0.184
1540.100	0.225	1.437	0.067	2.825	3.728	2.577	0.200	1.320	0.183
1540.200	0.237	1.387	0.058	2.849	3.761	2.583	0.201	1.320	0.182

1540.300	0.248	1.345	0.056	2.873	3.794	2.588	0.201	1.321	0.181
1540.400	0.254	1.340	0.061	2.899	3.828	2.594	0.201	1.321	0.180
1540.500	0.253	1.368	0.067	2.924	3.863	2.601	0.202	1.321	0.179
1540.600	0.247	1.410	0.073	2.949	3.898	2.608	0.202	1.322	0.179
1540.700	0.238	1.458	0.074	2.972	3.932	2.616	0.202	1.323	0.178
1540.800	0.231	1.492	0.074	2.996	3.967	2.623	0.202	1.324	0.177
1540.900	0.228	1.503	0.066	3.018	4.001	2.630	0.203	1.326	0.176
1541.000	0.229	1.489	0.058	3.041	4.035	2.636	0.203	1.327	0.176
1541.100	0.231	1.477	0.057	3.064	4.069	2.641	0.203	1.328	0.175
1541.200	0.231	1.464	0.066	3.087	4.103	2.648	0.203	1.329	0.174
1541.300	0.230	1.467	0.076	3.110	4.137	2.656	0.203	1.330	0.174
1541.400	0.226	1.485	0.081	3.133	4.170	2.664	0.203	1.331	0.173
1541.500	0.215	1.533	0.084	3.154	4.203	2.672	0.204	1.333	0.172
1541.600	0.196	1.593	0.100	3.174	4.235	2.682	0.203	1.334	0.172
1541.700	0.172	1.623	0.148	3.191	4.263	2.697	0.203	1.336	0.172
1541.800	0.141	1.611	0.234	3.205	4.285	2.720	0.203	1.337	0.172
1541.900	0.110	1.527	0.353	3.216	4.302	2.756	0.202	1.338	0.173
1542.000	0.082	1.397	0.488	3.225	4.314	2.804	0.202	1.338	0.175
1542.100	0.059	1.269	0.628	3.230	4.321	2.867	0.201	1.338	0.178
1542.200	0.046	1.177	0.730	3.235	4.326	2.940	0.200	1.337	0.181
1542.300	0.043	1.125	0.774	3.239	4.331	3.018	0.199	1.337	0.185
1542.400	0.052	1.104	0.749	3.245	4.337	3.093	0.198	1.337	0.189
1542.500	0.066	1.119	0.682	3.251	4.345	3.161	0.197	1.336	0.192
1542.600	0.088	1.157	0.571	3.260	4.355	3.218	0.196	1.336	0.194
1542.700	0.113	1.212	0.445	3.271	4.369	3.262	0.196	1.335	0.195
1542.800	0.140	1.260	0.331	3.285	4.386	3.296	0.196	1.335	0.196
1542.900	0.161	1.275	0.266	3.302	4.407	3.322	0.195	1.335	0.197
1543.000	0.181	1.257	0.231	3.320	4.429	3.345	0.195	1.334	0.197
1543.100	0.197	1.243	0.207	3.339	4.454	3.366	0.195	1.334	0.197
1543.200	0.210	1.245	0.185	3.360	4.480	3.385	0.195	1.333	0.197
1543.300	0.217	1.269	0.163	3.382	4.508	3.401	0.196	1.333	0.197
1543.400	0.220	1.306	0.142	3.404	4.536	3.415	0.196	1.333	0.196
1543.500	0.220	1.346	0.118	3.426	4.566	3.427	0.196	1.333	0.196
1543.600	0.220	1.375	0.105	3.448	4.596	3.437	0.196	1.333	0.195
1543.700	0.221	1.386	0.097	3.470	4.627	3.447	0.196	1.333	0.195
1543.800	0.225	1.312	0.098	3.493	4.656	3.457	0.196	1.333	0.194
1543.900	0.231	1.348	0.102	3.516	4.687	3.467	0.196	1.333	0.194
1544.000	0.237	1.323	0.113	3.540	4.719	3.478	0.197	1.333	0.193
1544.100	0.242	1.314	0.124	3.564	4.751	3.491	0.197	1.333	0.193
1544.200	0.246	1.311	0.134	3.588	4.783	3.504	0.197	1.333	0.193
1544.300	0.249	1.316	0.133	3.613	4.816	3.517	0.197	1.333	0.192
1544.400	0.252	1.323	0.122	3.639	4.849	3.530	0.198	1.333	0.192
1544.500	0.255	1.334	0.106	3.664	4.883	3.540	0.198	1.333	0.191
1544.600	0.254	1.351	0.090	3.690	4.918	3.549	0.198	1.333	0.191
1544.700	0.253	1.365	0.076	3.715	4.952	3.557	0.199	1.333	0.190
1544.800	0.249	1.384	0.065	3.740	4.987	3.563	0.199	1.333	0.190
1544.900	0.246	1.401	0.057	3.764	5.021	3.569	0.199	1.334	0.189
1545.000	0.243	1.408	0.053	3.789	5.055	3.574	0.199	1.334	0.188
1545.100	0.245	1.396	0.052	3.813	5.090	3.579	0.200	1.335	0.187
1545.200	0.249	1.369	0.057	3.838	5.124	3.585	0.200	1.335	0.187
1545.300	0.254	1.350	0.067	3.863	5.158	3.592	0.200	1.335	0.186
1545.400	0.257	1.343	0.077	3.889	5.192	3.599	0.200	1.335	0.186
1545.500	0.260	1.357	0.076	3.915	5.228	3.607	0.201	1.335	0.185
1545.600	0.261	1.384	0.069	3.941	5.264	3.614	0.201	1.336	0.184
1545.700	0.261	1.423	0.059	3.967	5.301	3.620	0.201	1.336	0.184

1545.800	0.259	1.455	0.056	3.993	5.339	3.625	0.202	1.337	0.183
1545.900	0.257	1.476	0.056	4.019	5.377	3.631	0.202	1.338	0.182
1546.000	0.254	1.482	0.062	4.044	5.414	3.637	0.202	1.339	0.182
1546.100	0.252	1.480	0.065	4.070	5.452	3.644	0.202	1.340	0.181
1546.200	0.252	1.457	0.065	4.095	5.488	3.650	0.203	1.340	0.181
1546.300	0.253	1.427	0.058	4.120	5.524	3.656	0.203	1.341	0.180
1546.400	0.255	1.399	0.050	4.146	5.560	3.661	0.203	1.341	0.179
1546.500	0.253	1.381	0.045	4.171	5.595	3.666	0.203	1.341	0.179
1546.600	0.247	1.377	0.051	4.196	5.629	3.671	0.204	1.342	0.178
1546.700	0.237	1.386	0.068	4.219	5.662	3.677	0.204	1.342	0.178
1546.800	0.228	1.409	0.086	4.242	5.694	3.686	0.204	1.342	0.177
1546.900	0.218	1.435	0.103	4.264	5.725	3.696	0.204	1.343	0.177
1547.000	0.213	1.467	0.113	4.285	5.757	3.708	0.204	1.343	0.177
1547.100	0.211	1.431	0.115	4.306	5.787	3.719	0.204	1.344	0.176
1547.200	0.214	1.430	0.106	4.328	5.817	3.730	0.204	1.344	0.176
1547.300	0.218	1.420	0.101	4.349	5.848	3.740	0.204	1.345	0.176
1547.400	0.222	1.403	0.101	4.372	5.879	3.750	0.204	1.345	0.175
1547.500	0.224	1.388	0.103	4.394	5.910	3.760	0.204	1.345	0.175
1547.600	0.218	1.413	0.103	4.416	5.941	3.771	0.204	1.345	0.175
1547.700	0.194	1.506	0.111	4.435	5.970	3.782	0.204	1.346	0.174
1547.800	0.157	1.682	0.125	4.451	5.997	3.794	0.204	1.347	0.174
1547.900	0.115	1.932	0.140	4.462	6.019	3.808	0.204	1.349	0.174
1548.000	0.076	2.106	0.159	4.470	6.035	3.824	0.203	1.350	0.174
1548.100	0.045	2.171	0.187	4.475	6.045	3.843	0.202	1.351	0.174
1548.200	0.028	2.271	0.214	4.477	6.051	3.864	0.202	1.352	0.174
1548.300	0.029	1.745	0.238	4.480	6.056	3.888	0.201	1.352	0.174
1548.400	0.041	-	0.258	-	-	-	-	-	-
1548.500	0.062	-	0.284	-	-	-	-	-	-
1548.600	0.093	-	0.295	-	-	-	-	-	-
1548.700	0.128	-	0.289	-	-	-	-	-	-
1548.800	0.162	1.219	0.264	4.496	6.076	3.914	0.201	1.351	0.175
1548.900	0.188	1.326	0.229	4.515	6.101	3.937	0.201	1.351	0.175
1549.000	0.205	1.441	0.185	4.536	6.130	3.956	0.201	1.352	0.175
1549.100	0.213	1.361	0.148	4.557	6.159	3.971	0.201	1.352	0.175
1549.200	0.215	1.408	0.122	4.578	6.190	3.983	0.201	1.352	0.175
1549.300	0.216	1.427	0.109	4.600	6.220	3.994	0.201	1.352	0.174
1549.400	0.216	1.431	0.100	4.622	6.251	4.004	0.201	1.353	0.174
1549.500	0.215	1.436	0.094	4.643	6.282	4.013	0.201	1.353	0.174
1549.600	0.215	1.429	0.092	4.665	6.313	4.023	0.201	1.353	0.173
1549.700	0.215	1.420	0.093	4.686	6.343	4.032	0.201	1.354	0.173
1549.800	0.215	1.402	0.095	4.708	6.374	4.041	0.201	1.354	0.173
1549.900	0.215	1.387	0.099	4.729	6.403	4.051	0.201	1.354	0.172
1550.000	0.214	1.376	0.104	4.751	6.433	4.062	0.201	1.354	0.172
1550.100	0.210	1.380	0.107	4.772	6.462	4.072	0.201	1.354	0.172
1550.200	0.204	1.394	0.107	4.792	6.490	4.083	0.201	1.354	0.172
1550.300	0.196	1.427	0.101	4.812	6.518	4.093	0.201	1.355	0.171
1550.400	0.188	1.464	0.089	4.830	6.546	4.102	0.201	1.355	0.171
1550.500	0.184	1.500	0.071	4.849	6.573	4.109	0.201	1.356	0.171
1550.600	0.183	1.529	0.052	4.867	6.601	4.114	0.201	1.356	0.170
1550.700	0.182	1.538	0.041	4.885	6.629	4.119	0.201	1.357	0.169
1550.800	0.182	1.582	0.036	4.903	6.658	4.122	0.201	1.358	0.169
1550.900	0.183	1.633	0.037	4.922	6.688	4.126	0.201	1.359	0.168
1551.000	0.186	1.663	0.036	4.940	6.719	4.129	0.201	1.360	0.168
1551.100	0.189	1.679	0.038	4.959	6.751	4.133	0.201	1.361	0.167
1551.200	0.192	1.686	0.033	4.978	6.783	4.137	0.201	1.362	0.167

1551.300	0.193	1.691	0.027	4.998	6.816	4.139	0.201	1.364	0.166
1551.400	0.195	1.684	0.021	5.017	6.848	4.141	0.201	1.365	0.166
1551.500	0.194	1.680	0.021	5.037	6.881	4.143	0.201	1.366	0.165
1551.600	0.194	1.669	0.021	5.056	6.914	4.145	0.201	1.367	0.164
1551.700	0.196	1.649	0.018	5.076	6.946	4.147	0.201	1.368	0.164
1551.800	0.203	1.607	0.014	5.096	6.979	4.149	0.201	1.369	0.163
1551.900	0.211	1.548	0.014	5.117	7.011	4.150	0.201	1.370	0.163
1552.000	0.219	1.472	0.023	5.139	7.043	4.152	0.201	1.371	0.162
1552.100	0.223	1.412	0.049	5.161	7.075	4.157	0.201	1.371	0.162
1552.200	0.221	1.366	0.083	5.183	7.105	4.165	0.201	1.371	0.161
1552.300	0.213	1.342	0.116	5.205	7.134	4.177	0.201	1.371	0.161
1552.400	0.198	1.349	0.145	5.224	7.160	4.192	0.201	1.371	0.161
1552.500	0.179	1.370	0.174	5.242	7.185	4.209	0.201	1.371	0.161
1552.600	0.161	1.372	0.212	5.258	7.207	4.230	0.201	1.371	0.161
1552.700	0.146	1.347	0.259	5.273	7.227	4.256	0.200	1.370	0.162
1552.800	0.138	1.274	0.316	5.287	7.244	4.288	0.200	1.370	0.162
1552.900	0.137	1.193	0.367	5.301	7.261	4.324	0.200	1.370	0.163
1553.000	0.144	1.132	0.397	5.315	7.277	4.364	0.200	1.369	0.164
1553.100	0.155	1.105	0.395	5.330	7.294	4.404	0.200	1.368	0.165
1553.200	0.169	1.105	0.373	5.347	7.313	4.441	0.200	1.368	0.166
1553.300	0.183	1.119	0.345	5.366	7.333	4.475	0.199	1.367	0.166
1553.400	0.195	1.146	0.322	5.385	7.356	4.508	0.199	1.366	0.167
1553.500	0.205	1.177	0.301	5.406	7.380	4.538	0.199	1.365	0.167
1553.600	0.212	1.214	0.281	5.427	7.405	4.566	0.200	1.365	0.168
1553.700	0.218	1.252	0.258	5.449	7.433	4.592	0.200	1.364	0.168
1553.800	0.223	1.293	0.230	5.471	7.461	4.615	0.200	1.364	0.168
1553.900	0.228	1.328	0.203	5.494	7.492	4.635	0.200	1.364	0.169
1554.000	0.230	1.354	0.186	5.517	7.523	4.654	0.200	1.364	0.169
1554.100	0.232	1.358	0.182	5.540	7.555	4.672	0.200	1.364	0.169
1554.200	0.234	1.345	0.187	5.563	7.586	4.690	0.200	1.364	0.169
1554.300	0.235	1.311	0.207	5.587	7.617	4.711	0.200	1.363	0.169
1554.400	0.228	1.299	0.239	5.610	7.646	4.735	0.200	1.363	0.169
1554.500	0.220	1.301	0.267	5.632	7.675	4.762	0.200	1.363	0.169
1554.600	0.216	1.300	0.280	5.653	7.703	4.790	0.200	1.363	0.170
1554.700	0.216	1.298	0.281	5.675	7.731	4.818	0.201	1.362	0.170
1554.800	0.219	1.295	0.271	5.697	7.759	4.845	0.201	1.362	0.171
1554.900	0.225	1.289	0.249	5.719	7.788	4.870	0.201	1.362	0.171
1555.000	0.233	1.281	0.225	5.743	7.818	4.892	0.201	1.361	0.171
1555.100	0.236	1.277	0.213	5.766	7.848	4.914	0.201	1.361	0.171
1555.200	0.236	1.279	0.213	5.790	7.879	4.935	0.201	1.361	0.171
1555.300	0.236	1.283	0.212	5.813	7.909	4.956	0.201	1.360	0.171
1555.400	0.238	1.286	0.205	5.837	7.940	4.977	0.201	1.360	0.172
1555.500	0.242	1.291	0.193	5.862	7.971	4.996	0.201	1.360	0.172
1555.600	0.248	1.292	0.173	5.886	8.003	5.013	0.202	1.360	0.172
1555.700	0.251	1.305	0.149	5.911	8.036	5.028	0.202	1.359	0.172
1555.800	0.250	1.329	0.128	5.936	8.069	5.041	0.202	1.359	0.171
1555.900	0.244	1.355	0.117	5.961	8.102	5.053	0.202	1.359	0.171
1556.000	0.233	1.386	0.114	5.984	8.134	5.064	0.202	1.359	0.171
1556.100	0.221	1.410	0.121	6.006	8.165	5.076	0.202	1.359	0.171
1556.200	0.211	1.420	0.133	6.027	8.195	5.089	0.202	1.360	0.171
1556.300	0.205	1.404	0.150	6.048	8.224	5.104	0.202	1.360	0.171
1556.400	0.201	1.382	0.173	6.068	8.252	5.122	0.202	1.360	0.171
1556.500	0.201	1.354	0.200	6.088	8.279	5.142	0.202	1.360	0.171
1556.600	0.202	1.335	0.226	6.108	8.306	5.164	0.202	1.360	0.171
1556.700	0.207	1.237	0.244	6.129	8.332	5.189	0.202	1.359	0.171

1556.800	0.215	1.237	0.249	6.150	8.358	5.214	0.202	1.359	0.172
1556.900	0.223	1.301	0.246	6.173	8.387	5.238	0.202	1.359	0.172
1557.000	0.228	1.305	0.239	6.196	8.417	5.262	0.202	1.359	0.172
1557.100	0.231	1.312	0.231	6.219	8.447	5.285	0.203	1.358	0.172
1557.200	0.234	1.311	0.221	6.242	8.478	5.307	0.203	1.358	0.172
1557.300	0.238	1.309	0.207	6.266	8.509	5.328	0.203	1.358	0.172
1557.400	0.243	1.306	0.190	6.290	8.541	5.347	0.203	1.358	0.172
1557.500	0.247	1.303	0.177	6.315	8.573	5.365	0.203	1.358	0.173
1557.600	0.246	1.315	0.170	6.339	8.605	5.382	0.203	1.357	0.172
1557.700	0.239	1.341	0.172	6.363	8.637	5.399	0.203	1.357	0.172
1557.800	0.226	1.372	0.188	6.386	8.668	5.418	0.203	1.357	0.173
1557.900	0.211	1.402	0.213	6.407	8.698	5.439	0.203	1.358	0.173
1558.000	0.194	1.452	0.234	6.426	8.726	5.463	0.203	1.358	0.173
1558.100	0.169	1.548	0.253	6.443	8.752	5.488	0.203	1.358	0.173
1558.200	0.134	1.694	0.290	6.457	8.775	5.517	0.203	1.359	0.173
1558.300	0.094	1.853	0.355	6.466	8.792	5.552	0.203	1.360	0.174
1558.400	0.053	1.984	0.446	6.471	8.803	5.597	0.202	1.360	0.175
1558.500	0.017	2.038	0.555	6.473	8.806	5.653	0.202	1.360	0.176
1558.600	0.000	1.000	0.664	6.473	8.806	5.719	0.201	1.360	0.178
1558.700	0.000	1.000	0.730	6.473	8.806	5.792	0.200	1.360	0.179
1558.800	0.003	1.000	0.721	6.473	8.807	5.864	0.200	1.360	0.181
1558.900	0.038	1.522	0.642	6.477	8.813	5.928	0.199	1.361	0.182
1559.000	0.082	1.447	0.519	6.485	8.824	5.980	0.199	1.361	0.183
1559.100	0.129	1.418	0.380	6.498	8.843	6.018	0.199	1.361	0.184
1559.200	0.170	1.414	0.257	6.515	8.867	6.044	0.199	1.361	0.184
1559.300	0.201	1.406	0.172	6.535	8.895	6.061	0.199	1.361	0.184
1559.400	0.216	1.412	0.129	6.557	8.926	6.074	0.199	1.361	0.184
1559.500	0.222	1.421	0.110	6.579	8.957	6.085	0.199	1.361	0.184
1559.600	0.222	1.437	0.102	6.601	8.989	6.095	0.199	1.362	0.184
1559.700	0.219	1.455	0.100	6.623	9.021	6.105	0.199	1.362	0.183
1559.800	0.213	1.476	0.101	6.645	9.052	6.115	0.199	1.362	0.183
1559.900	0.208	1.488	0.105	6.665	9.083	6.125	0.199	1.363	0.183
1560.000	0.204	1.482	0.111	6.686	9.114	6.137	0.199	1.363	0.183
1560.100	0.202	1.473	0.117	6.706	9.143	6.148	0.199	1.363	0.182
1560.200	0.203	1.462	0.115	6.726	9.173	6.160	0.199	1.364	0.182
1560.300	0.205	1.462	0.104	6.747	9.203	6.170	0.199	1.364	0.182
1560.400	0.207	1.477	0.085	6.768	9.234	6.179	0.199	1.364	0.182
1560.500	0.206	1.510	0.064	6.788	9.265	6.185	0.199	1.365	0.181
1560.600	0.205	1.533	0.048	6.809	9.296	6.190	0.199	1.365	0.181
1560.700	0.207	1.524	0.039	6.829	9.328	6.194	0.199	1.366	0.181
1560.800	0.211	1.485	0.036	6.851	9.359	6.197	0.199	1.366	0.180
1560.900	0.219	1.437	0.034	6.873	9.391	6.201	0.199	1.366	0.180
1561.000	0.229	1.391	0.034	6.895	9.423	6.204	0.199	1.367	0.179
1561.100	0.237	1.371	0.031	6.919	9.455	6.207	0.199	1.367	0.179
1561.200	0.242	1.380	0.028	6.943	9.488	6.210	0.200	1.367	0.178
1561.300	0.240	1.421	0.026	6.967	9.523	6.213	0.200	1.367	0.178
1561.400	0.234	1.474	0.031	6.991	9.557	6.216	0.200	1.367	0.178
1561.500	0.225	1.534	0.037	7.013	9.592	6.220	0.200	1.368	0.177
1561.600	0.213	1.588	0.048	7.034	9.625	6.224	0.200	1.368	0.177
1561.700	0.198	1.645	0.064	7.054	9.658	6.231	0.200	1.369	0.177
1561.800	0.182	1.694	0.082	7.072	9.689	6.239	0.200	1.370	0.176
1561.900	0.166	1.746	0.095	7.089	9.718	6.249	0.200	1.371	0.176
1562.000	0.150	1.807	0.104	7.104	9.745	6.259	0.200	1.372	0.176
1562.100	0.137	1.844	0.120	7.118	9.770	6.271	0.199	1.373	0.176
1562.200	0.123	1.875	0.148	7.130	9.793	6.286	0.199	1.374	0.176

1562.300	0.110	1.887	0.186	7.141	9.814	6.304	0.199	1.374	0.176
28.300				5.590	7.844	4.760	0.198	1.403	0.168
1563.600	0.116	1.449	0.235	7.152	9.830	6.328	0.199	1.374	0.176
1563.700	0.133	1.418	0.208	7.166	9.849	6.349	0.198	1.374	0.176
1563.800	0.144	1.407	0.204	7.180	9.870	6.369	0.198	1.375	0.176
1563.900	0.150	1.407	0.219	7.195	9.891	6.391	0.198	1.375	0.176
1564.000	0.155	1.400	0.243	7.211	9.912	6.415	0.198	1.375	0.176
1564.100	0.159	1.392	0.268	7.227	9.935	6.442	0.198	1.375	0.176
1564.200	0.164	1.378	0.279	7.243	9.957	6.470	0.198	1.375	0.177
1564.300	0.169	1.357	0.272	7.260	9.980	6.497	0.198	1.375	0.177
1564.400	0.172	1.352	0.251	7.277	10.003	6.522	0.198	1.375	0.177
1564.500	0.172	1.235	0.242	7.294	10.025	6.546	0.198	1.374	0.177
1564.600	0.169	1.330	0.251	7.311	10.047	6.571	0.198	1.374	0.178
1564.700	0.166	1.295	0.284	7.328	10.069	6.600	0.198	1.374	0.178
1564.800	0.162	1.264	0.318	7.344	10.089	6.632	0.197	1.374	0.178
1564.900	0.161	1.257	0.339	7.360	10.109	6.665	0.197	1.374	0.179
1565.000	0.162	1.264	0.335	7.376	10.130	6.699	0.197	1.373	0.179
1565.100	0.168	1.272	0.313	7.393	10.151	6.730	0.197	1.373	0.179
1565.200	0.176	1.312	0.282	7.411	10.174	6.758	0.197	1.373	0.180
1565.300	0.187	1.339	0.254	7.429	10.199	6.784	0.197	1.373	0.180
1565.400	0.200	1.338	0.236	7.449	10.226	6.807	0.197	1.373	0.180
1565.500	0.210	1.329	0.228	7.470	10.254	6.830	0.197	1.373	0.180
1565.600	0.213	1.331	0.227	7.492	10.282	6.853	0.197	1.372	0.180
1565.700	0.211	1.350	0.227	7.513	10.311	6.876	0.197	1.372	0.180
1565.800	0.204	1.369	0.234	7.533	10.339	6.899	0.197	1.372	0.181
1565.900	0.196	1.371	0.256	7.553	10.366	6.925	0.197	1.372	0.181
1566.000	0.186	1.361	0.288	7.571	10.391	6.953	0.197	1.372	0.181
1566.100	0.178	1.337	0.319	7.589	10.415	6.985	0.197	1.372	0.181
1566.200	0.172	1.312	0.345	7.607	10.437	7.020	0.197	1.372	0.182
1566.300	0.162	1.296	0.382	7.623	10.458	7.058	0.197	1.372	0.182
2.800				0.482	0.645	0.754	0.172	1.338	0.269
1599.400	0.159	1.178	0.371	7.639	10.477	7.095	0.197	1.372	0.183
1599.500	0.167	1.215	0.319	7.655	10.497	7.127	0.197	1.371	0.183
1599.600	0.170	1.244	0.285	7.672	10.519	7.156	0.197	1.371	0.183
1599.700	0.171	1.255	0.269	7.689	10.540	7.183	0.197	1.371	0.184
1599.800	0.168	1.260	0.270	7.706	10.561	7.210	0.197	1.370	0.184
1599.900	0.168	1.250	0.278	7.723	10.582	7.237	0.197	1.370	0.184
1600.000	0.171	1.228	0.282	7.740	10.603	7.266	0.196	1.370	0.184
1600.100	0.178	1.209	0.280	7.758	10.625	7.294	0.196	1.370	0.185
1600.200	0.186	1.205	0.265	7.777	10.647	7.320	0.196	1.369	0.185
1600.300	0.194	1.211	0.241	7.796	10.671	7.344	0.196	1.369	0.185
1600.400	0.202	1.223	0.213	7.816	10.695	7.366	0.196	1.368	0.185
1600.500	0.206	1.235	0.202	7.837	10.721	7.386	0.196	1.368	0.185
1600.600	0.206	1.245	0.204	7.857	10.746	7.406	0.196	1.368	0.185
1600.700	0.202	1.257	0.216	7.878	10.772	7.428	0.196	1.367	0.185
1600.800	0.197	1.278	0.224	7.897	10.797	7.450	0.196	1.367	0.185
1600.900	0.192	1.310	0.224	7.916	10.822	7.473	0.196	1.367	0.185
1601.000	0.188	1.354	0.210	7.935	10.848	7.494	0.196	1.367	0.185
1601.100	0.185	1.387	0.197	7.954	10.873	7.513	0.196	1.367	0.186

1601.200	0.183	1.394	0.193	7.972	10.899	7.533	0.196	1.367	0.186
1601.300	0.181	1.367	0.204	7.990	10.924	7.553	0.196	1.367	0.186
1601.400	0.180	1.310	0.232	8.008	10.947	7.576	0.196	1.367	0.186
1601.500	0.179	1.240	0.267	8.026	10.969	7.603	0.196	1.367	0.186
1601.600	0.180	1.175	0.295	8.044	10.991	7.632	0.196	1.366	0.186
1601.700	0.181	1.133	0.312	8.062	11.011	7.664	0.196	1.366	0.186
1601.800	0.179	1.114	0.331	8.080	11.031	7.697	0.196	1.365	0.187
1601.900	0.175	1.106	0.352	8.098	11.050	7.732	0.196	1.365	0.187
1602.000	0.171	1.108	0.368	8.115	11.069	7.769	0.196	1.364	0.188
1602.100	0.165	1.126	0.378	8.131	11.088	7.806	0.196	1.364	0.188
1602.200	0.160	1.146	0.382	8.147	11.106	7.845	0.196	1.363	0.189
1602.300	0.160	1.157	0.371	8.163	11.125	7.882	0.196	1.363	0.189
1602.400	0.163	1.163	0.347	8.179	11.144	7.917	0.196	1.362	0.189
1602.500	0.166	1.164	0.326	8.196	11.163	7.949	0.196	1.362	0.190
1602.600	0.169	1.154	0.319	8.213	11.183	7.981	0.196	1.362	0.190
1602.700	0.172	1.127	0.325	8.230	11.202	8.014	0.195	1.361	0.190
1602.800	0.172	1.109	0.343	8.247	11.221	8.048	0.195	1.361	0.191
1602.900	0.168	1.096	0.370	8.264	11.239	8.085	0.195	1.360	0.191
1603.000	0.166	1.087	0.394	8.281	11.257	8.124	0.195	1.359	0.192
1603.100	0.166	1.083	0.403	8.297	11.275	8.164	0.195	1.359	0.192
1603.200	0.166	1.090	0.405	8.314	11.294	8.205	0.195	1.358	0.193
1603.300	0.165	1.102	0.407	8.331	11.312	8.246	0.195	1.358	0.193
1603.400	0.165	1.113	0.407	8.347	11.330	8.286	0.195	1.357	0.194
1603.500	0.165	1.121	0.403	8.363	11.349	8.327	0.195	1.357	0.194
1603.600	0.164	1.136	0.399	8.380	11.367	8.367	0.195	1.356	0.195
1603.700	0.163	1.151	0.391	8.396	11.386	8.406	0.195	1.356	0.195
1603.800	0.167	1.159	0.373	8.413	11.405	8.443	0.195	1.356	0.195
1603.900	0.174	1.158	0.351	8.430	11.425	8.478	0.195	1.355	0.196
1604.000	0.181	1.159	0.335	8.448	11.446	8.512	0.195	1.355	0.196
1604.100	0.187	1.161	0.323	8.467	11.468	8.544	0.195	1.354	0.196
1604.200	0.193	1.163	0.311	8.486	11.491	8.575	0.195	1.354	0.197
1604.300	0.197	1.168	0.298	8.506	11.514	8.605	0.195	1.354	0.197
1604.400	0.197	1.181	0.281	8.526	11.537	8.633	0.195	1.353	0.197
1604.500	0.191	1.205	0.264	8.545	11.560	8.659	0.195	1.353	0.197
1604.600	0.179	1.240	0.254	8.563	11.582	8.685	0.195	1.353	0.197
1604.700	0.162	1.284	0.256	8.579	11.603	8.710	0.195	1.352	0.198
1604.800	0.145	1.327	0.271	8.593	11.622	8.737	0.194	1.352	0.198
1604.900	0.133	1.339	0.301	8.607	11.640	8.768	0.194	1.352	0.198
1605.000	0.129	1.307	0.335	8.620	11.657	8.801	0.194	1.352	0.198
1605.100	0.136	1.255	0.357	8.633	11.674	8.837	0.194	1.352	0.199
1605.200	0.149	1.213	0.360	8.648	11.692	8.873	0.194	1.352	0.199
1605.300	0.165	1.186	0.348	8.665	11.711	8.908	0.194	1.352	0.199
1605.400	0.177	1.181	0.325	8.682	11.732	8.940	0.194	1.351	0.200
1605.500	0.185	1.191	0.296	8.701	11.754	8.970	0.194	1.351	0.200
1605.600	0.189	1.206	0.272	8.720	11.777	8.997	0.194	1.351	0.200
1605.700	0.189	1.207	0.265	8.739	11.800	9.023	0.194	1.350	0.200
1605.800	0.186	1.209	0.268	8.757	11.822	9.050	0.194	1.350	0.200
1605.900	0.182	1.214	0.279	8.775	11.845	9.078	0.194	1.350	0.200
1606.000	0.175	1.226	0.295	8.793	11.866	9.108	0.194	1.349	0.201
1606.100	0.168	1.241	0.317	8.810	11.887	9.139	0.194	1.349	0.201
1606.200	0.163	1.243	0.337	8.826	11.907	9.173	0.194	1.349	0.201
1606.300	0.162	1.237	0.352	8.842	11.927	9.208	0.193	1.349	0.201
1606.400	0.163	1.225	0.356	8.859	11.947	9.244	0.193	1.349	0.202
1606.500	0.166	1.216	0.353	8.875	11.967	9.279	0.193	1.348	0.202
1606.600	0.168	1.207	0.348	8.892	11.988	9.314	0.193	1.348	0.202

1606.700	0.169	1.202	0.348	8.909	12.008	9.349	0.193	1.348	0.203
1606.800	0.166	1.206	0.357	8.925	12.028	9.385	0.193	1.348	0.203
1606.900	0.163	1.209	0.374	8.942	12.048	9.422	0.193	1.347	0.203
1607.000	0.162	1.211	0.388	8.958	12.067	9.461	0.193	1.347	0.204
1607.100	0.165	1.206	0.393	8.974	12.087	9.500	0.193	1.347	0.204
1607.200	0.172	1.208	0.381	8.992	12.108	9.538	0.193	1.347	0.205
1607.300	0.183	1.214	0.350	9.010	12.130	9.573	0.193	1.346	0.205
1607.400	0.195	1.226	0.309	9.030	12.154	9.604	0.193	1.346	0.205
1607.500	0.204	1.237	0.276	9.050	12.179	9.632	0.193	1.346	0.205
1607.600	0.206	1.253	0.262	9.071	12.205	9.658	0.193	1.346	0.205
1607.700	0.205	1.262	0.265	9.091	12.231	9.684	0.193	1.345	0.206
1607.800	0.201	1.266	0.275	9.111	12.256	9.712	0.193	1.345	0.206
1607.900	0.198	1.257	0.286	9.131	12.281	9.740	0.193	1.345	0.206
1608.000	0.198	1.242	0.293	9.151	12.306	9.770	0.193	1.345	0.206
1608.100	0.201	1.225	0.292	9.171	12.331	9.799	0.193	1.345	0.206
1608.200	0.206	1.208	0.289	9.191	12.355	9.828	0.193	1.344	0.206
1608.300	0.208	1.198	0.291	9.212	12.380	9.857	0.193	1.344	0.207
1608.400	0.206	1.195	0.303	9.233	12.405	9.887	0.193	1.344	0.207
1608.500	0.204	1.194	0.315	9.253	12.429	9.919	0.193	1.343	0.207
1608.600	0.203	1.193	0.323	9.274	12.454	9.951	0.193	1.343	0.207
1608.700	0.202	1.193	0.328	9.294	12.478	9.984	0.193	1.343	0.208
1608.800	0.200	1.194	0.332	9.314	12.502	10.017	0.193	1.342	0.208
1608.900	0.201	1.194	0.329	9.334	12.526	10.050	0.193	1.342	0.208
1609.000	0.202	1.197	0.323	9.354	12.550	10.082	0.193	1.342	0.208
1609.100	0.199	1.215	0.321	9.374	12.574	10.114	0.193	1.341	0.209
1609.200	0.194	1.230	0.330	9.393	12.598	10.147	0.193	1.341	0.209
1609.300	0.193	1.231	0.337	9.413	12.622	10.181	0.193	1.341	0.209
1609.400	0.195	1.221	0.340	9.432	12.645	10.215	0.193	1.341	0.209
1609.500	0.196	1.211	0.346	9.452	12.669	10.250	0.193	1.340	0.210
1609.600	0.192	1.215	0.361	9.471	12.693	10.286	0.193	1.340	0.210
1609.700	0.188	1.218	0.374	9.490	12.715	10.323	0.193	1.340	0.210
1609.800	0.186	1.216	0.380	9.508	12.738	10.361	0.193	1.340	0.211
1609.900	0.185	1.214	0.384	9.527	12.760	10.400	0.193	1.339	0.211
1610.000	0.184	1.210	0.385	9.545	12.783	10.438	0.193	1.339	0.211
1610.100	0.187	1.199	0.376	9.564	12.805	10.476	0.193	1.339	0.212
1610.200	0.193	1.177	0.357	9.583	12.828	10.511	0.193	1.339	0.212
1610.300	0.192	1.158	0.344	9.602	12.850	10.546	0.193	1.338	0.212
1610.400	0.183	1.141	0.343	9.621	12.871	10.580	0.193	1.338	0.212
1610.500	0.163	1.143	0.347	9.637	12.890	10.615	0.193	1.338	0.213
1610.600	0.135	1.167	0.360	9.651	12.905	10.651	0.193	1.337	0.213
1610.700	0.103	1.203	0.388	9.661	12.918	10.690	0.193	1.337	0.213
11.400				2.038	2.459	3.631	0.179	1.207	0.319

Totals for interval : WAARRE FORMATION
Interval top : 1487.000000 METRES
Interval bottom : 1611.000000 METRES

Net pay thickness : 50.100000
Gross thickness : 124.000000
Ratio (net/gross) : 0.404032

		Summation			Averages		
Thickness	Hydrocarbon	PHIE	BVW	VSH	PHIE	SWE_IN	VSH
50.100	-3.257	9.661	12.918	10.690	0.193	1.337	0.213

WELL: BLACKWOOD-1

Totals for well BLACKWOOD-1

Net pay thickness : 50.100000
Gross thickness : 124.000000
Ratio (net/gross) : 0.404032

		Summation			Averages		
Thickness	Hydrocarbon	PHIE	BVW	VSH	PHIE	SWE_IN	VSH
50.100	-3.257	9.661	12.918	10.690	0.193	1.337	0.213

ENCLOSURE 1: WAARRE FORMATION LOG EVALUATION PLOT

PE600655

This is an enclosure indicator page.
The enclosure PE600655 is enclosed within the container PE900834 at this location in this document.

The enclosure PE600655 has the following characteristics:

ITEM_BARCODE	= PE600655
CONTAINER_BARCODE	= PE900834
NAME	= Well Log - Quick Shaley Analysis
BASIN	= OTWAY
PERMIT	= PPL/1
TYPE	= WELL
SUBTYPE	= WELL_LOG
DESCRIPTION	= Well Log - Quick Shaley Analysis, Waarrre Formation -(enclosure from WCR) for Blackwood 1
REMARKS	=
DATE_CREATED	= 28/10/97
DATE_RECEIVED	=
W_NO	= W1152
WELL_NAME	= Blackwood-1
CONTRACTOR	= Cultus Petroluem NL
CLIENT_OP_CO	= Cultus Petroluem NL

(Inserted by DNRE - Vic Govt Mines Dept)

ENCLOSURE 2: HEATHFIELD MEMBER LOG EVALUATION PLOT

PE600656

This is an enclosure indicator page.
The enclosure PE600656 is enclosed within the container PE900834 at this location in this document.

The enclosure PE600656 has the following characteristics:

ITEM_BARCODE	= PE600656
CONTAINER_BARCODE	= PE900834
NAME	= Well Log - Quick Shaley Analysis
BASIN	= OTWAY
PERMIT	= PPL/1
TYPE	= WELL
SUBTYPE	= WELL_LOG
DESCRIPTION	= Well Log - Quick Shaley Analysis, Heathfeild Member - (enclosure from WCR) for Blackwood 1
REMARKS	=
DATE_CREATED	= 28/10/97
DATE_RECEIVED	= 12/11/97
W_NO	= W1152
WELL_NAME	= Blackwood-1
CONTRACTOR	= Cultus Petroluem NL
CLIENT_OP_CO	= Cultus Petroluem NL

(Inserted by DNRE - Vic Govt Mines Dept)

ENCLOSURE 1

COMPOSITE LOG

PE600657

This is an enclosure indicator page.
The enclosure PE600657 is enclosed within the container PE900834 at this location in this document.

The enclosure PE600657 has the following characteristics:

ITEM_BARCODE	= PE600657
CONTAINER_BARCODE	= PE900834
NAME	= Composite Log - Blackwood 1
BASIN	= OTWAY
PERMIT	= PPL/1
TYPE	= WELL
SUBTYPE	= COMPOSITE_LOG
DESCRIPTION	= Composite Log - Blackwood 1 (enclosure from WCR)
REMARKS	=
DATE_CREATED	= 15/05/96
DATE_RECEIVED	= 12/11/97
W_NO	= W1152
WELL_NAME	= Blackwood-1
CONTRACTOR	= Cultus Petroluem NL
CLIENT_OP_CO	= Cultus Petroluem NL

(Inserted by DNRE - Vic Govt Mines Dept)

ENCLOSURE 2

MUDLOG

PE600658

This is an enclosure indicator page.
The enclosure PE600658 is enclosed within the container PE900834 at this location in this document.

The enclosure PE600658 has the following characteristics:

ITEM_BARCODE	= PE600658
CONTAINER_BARCODE	= PE900834
NAME	= Formation Evaluation Log/Mud Log
BASIN	= OTWAY
PERMIT	= PPL/1
TYPE	= WELL
SUBTYPE	= MUD_LOG
DESCRIPTION	= Formation Evaluation Log/Mud Log -(enclosure from WCR) for Blackwood 1
REMARKS	=
DATE_CREATED	= 12/05/96
DATE_RECEIVED	= 12/11/97
W_NO	= W1152
WELL_NAME	= Blackwood-1
CONTRACTOR	= Halliburton
CLIENT_OP_CO	= Cultus Petroluem NL

(Inserted by DNRE - Vic Govt Mines Dept)

APPENDIX 1

DRILLING FLUID SUMMARY

DRILLING FLUID SUMMARY

CULTUS PETROLEUM

WELL : BLACKWOOD # 1

OTWAY BASIN

VICTORIA

Prepared by :Edd Perkins
Andre Skujins

Date : May 1996

CONTENTS

WELL : **BLACKWOOD # 1**
RIG : **O.D. & E. # 30**
SPUD : **26th April 1996**

1. SUMMARY OF OPERATIONS

HOLE SIZE : **12¼"**
MUD TYPE : **Gel Spud Mud - Native Clays**
INTERVAL : **0 m - 692 m**
CASING : **13-3/8" @ 689 m**

The O.D. & E. Rig # 30 spudded this hole on the 26th of April 1996 at 15:30 hours.

The make-up water was trucked in from a pipeline (untreated river water) and it's analysis was :

Chlorides	800 ppm
Total Hardness	400 ppm
pH	6.3
Pf / Mf	0.0 / 0.1

The Spud mud was built on the 25th of April, to ensure time for prehydration of the gel (with a Bentonite content of 21 ppb). This mud was peptised with Caustic Soda and 200 bbls were built to be used in a shortened system. A 20 bbl pill with SAPP was placed on standby, prior to drilling out. Also 180 bbls of Alum treated solution was made - up. The remaining surface volume was filled with water.

As the Mouse and Rat holes were drilled, a depletion of fluid was replaced with gel - water using Lime to flocculate and maintain the desired physical properties.

At 45 m, the system was converted to a Alum based mud with a minimum of yielding properties. With dilutions to keep the mud weight in check, Alum was used to pretreat all water, prior to additions and SAPP to limit the rising Yield Point.

The Marl section was drilled with no problems. Once the Sump had sufficient volume to pump from, this fluid was recycled, to minimise the excess build - up in the sump.

At 512 m, the process was reversed and the Native clays were flocculated to gain Yield but with a minimum of Plastic Viscosity. This was achieved so at T.D. the Yield Point was 27 lbs/100ft² and the Plastic Viscosity was 6 cps with a funnel viscosity of 39 sec/qt.

The wiper trip revealed that the sand section had a thick layer of wall-cake, which made the hole under gauge. A SAPP based 20 bbl sweep was used to soften this barrier, but also it caused down hole mud losses (initially of 35 bbls). Also the sweep made the hole very "sticky", so a gel based high viscosity sweep of 20 bbls was used to plug and 'slicken' the hole bore.

The bit was then able to be pulled out of the hole, but when running back in, it was found that the Marl section had hydrated, with mud returns of very high viscosity and very large pieces of clay-stone were being pumped out of the hole. Due to the losses, the extra additions of water used for thinning, were utilised for volume. Another effect of the lower volume was to shorten the system and the eventual result was that the settled solids were re-introduced into system and the end result was a higher mud weight.

Once the bit was worked back to bottom through the in gauge / tight hole, a high viscosity - CFL (Lignosulphonate) 20 bbl sweep was utilised. The bit was run to bottom with no fill evident and pulled out with no problems.

The $9^5/_8$" casing was run to bottom without any problems and no fill was found at this point. The cement operation followed after circulating the system and was completed successfully, with cement returns to surface.

The surface volume was dumped with 85 bbls being retained for drilling out the cement in the casing.

HOLE SIZE : 8½"
MUD TYPE : KCl PHPA
INTERVAL : 692 m - 1400 m

The make-up of this section's fluid was to maintain the chloride content as low as possible, due to the interference of the K^+ ion by dehydrating the clays being drilled in this area. The action of drying and making the clay crumble [and also the stated reason that the ground water to be drilled through, has a 15,000 ppm chloride reading] had initiated this particular strategy.

Consequently, potassium chloride (KCl), was mixed at 3.5 pound per bbl (or 1 %) which is approximately one half of the upper limit. The initial polyacrylamide was premixed at 0.5 pound per bbl and by using the pre-charge pumps to shear this polymer prior to usage, there was no problems at "mud - up" with screen blinding. Sodium Bicarbonate was incorporated to lower the total hardness and to counter the expected cement contamination.

There was some communication of 12¼" mud into the new system, but due to the new mud's make-up, this did not present a problem. Sodium Sulphite was added at the appropriate time to maximise it's usage, but prior to mud up.

The cement was drilled out with the previous section's mud and the change over to the new system was completed without any problems. From that time the volume was built and the properties refined. By 1000 m, the Yield Point was 10 lbs/100ft² but efforts were directed towards minimising the solids increase and consequent weight gains.

The pit communication appeared to have increased with both premix tanks leaking into the suction line to the extent of 1 bbl per minute. This changed the method in which the premix was added, but also caused a dilemma in that if the leaking tanks were left unused, they could not be emptied, or the mud pumps would draw air & obviously loose efficiency. If the tanks were filled with water, then this would have been taken into the system, so active mud must stay within this area, once the volume of premixes was no longer needed until there was an opportunity to repair the leaks.

Throughout the Paaratte Formation attention was needed to attend the shale shakers, for screen blinding primarily from the sands but also to a degree polyacrylamide additions, as new volume was being added.

A wiper trip was initiated to clean the hole, which found the characteristic polyacrylamide wall-cake through the sand section (i.e. thin tough filter cake on gun barrel hole) and a carbide lag revealed 9% over gauge. At approximately 1400 m, as programmed, the parameters were refined by reducing the fluid loss and raising the Yield Point to above 15 lbs/100ft².

HOLE SIZE : 8½"
MUD TYPE : KCl - PHPA - Polymer
INTERVAL : 1400 m - 2650 m

The Belfast Mudstone was drilled through, without any problems, although there were constant additions throughout this time of polyacrylamide, to counter the depleting influence of the clays drilled up. The clay proved very reactive and showed as a fine "slop" at the shale shakers.

The hardness level continued to present a problem, as to reduce it, meant to add Bicarbonate of Soda and thus eventually raising the carbonate levels. To lower it with higher additions of Caustic Soda would have increased the pH level too easily and this would activate the formation clays (causing possible swelling). The former method was adopted, bearing in mind the type of fluid (polymer based) is far less vulnerable to the effects of carbonates. This particular problem was due to the necessity to retrieve as much Sump fluid as possible and to minimise the total volume of the sump.

As mentioned above, the refining of the properties continued through the initial phase and maintained from then onwards.

Due to the amount of PHPA being added to the system, shale shaker screen blinding proved to be a problem (bearing in mind that the bit had 2 x $^{12}/_{32}$ & 1 x $^{14}/_{32}$ nozzles, thus minimising any shearing action at the bit) and also maintaining mud weight at above 9.0 ppg was a concern, so the shaker screens were down graded. This also allowed the shakers to hold a down-ward tilt; this is relevant, as fluid was able to by-pass the screens and carry sand into the surface system when tilted backwards.

At 1522 m, the main drive shaft on the draw-works snapped and so while this was repaired, the system was circulated (with the bit just off bottom). This at least gave an opportunity to rectify some leaks in the system. Valve rubbers were replaced, where possible, further work was done on the desilter and leaks in the Suction tank were welded up.

Volume was built (due to the amount needed, barytes was used to ensure the programme mud weight parameter was upheld) and chemicals were added for maintenance. It was noted that the PHPA and KCl were being depleted, so this situation was attended to.

The clay content was observed to be decreasing and the weight had lowered slightly. The Sump water continued to be recycled, although treatment was necessary to counter the Calcium and Magnesium (as total hardness). With the potassium chloride content being kept reasonably constant, it was noted (with the re-use of the Sump water, further assisting the situation) that the total chloride count was increasing.

Once the Rig draw-works were repaired, a wiper trip was conducted through tight hole with all the indications that the Belfast Formation had begun to swell. The shakers showed returns with shards of $^{3}/_{8}$" hardened claystone, that did not have the shape of an over-pressured cuttings and only being evident during circulating while pulling out.

The bit revealed that it was missing a few teeth so a wiper trip to clean up the junk in the hole was required and this enabled minor maintenance additions, to ensure the properties were suitable for further tripping. A PDC type bit was run in and this showed a reasonably in-gauge hole as it was tight tripping.

With the cooler mud and a percentage of unsheared new mud in the system, the viscosity remained higher than desired for a period. As penetration continued, with shearing and the system being given a "drink" of treated Sump water (the properties showed that it's content of properties, was close to the Active system - as noted on Report # 11) the rheology was lowered.

Volume was required and this aided the dilution, to effectively lower the solids content. Losses were evident (at 1785 m approximately 73 bbls were lost) and properties were further refined once the volume had been regained.

A wiper trip was initiated at 1890 m (a calcium carbonate pill was used to clear the pipe and the side effect was that it was easily disposed of and it may have plugged off some of the

seepage losses down-hole) with no problems and no fill found on bottom, when drilling resumed.

The emphasis to lower rheology, was maintained until the mud had been sheared for some time and the volumes appeared to be stable. At this point, the shale shaker screens were upgraded to a finer mesh and the yield point brought to above 20 lbs/100ft².

The total hardness of the drilling fluid increased once again, picking up calcium and magnesium from the formation. This was attended to.

The pH was increased from 8.5 to 9.0, as the clay layers were less reactive than previously and the system was easier to control with the higher pH.

Volume replacement was needed throughout this period, which benefited the mud, as extra "fines" were present while using a PDC bit, so the ultra fine solids content rose. Some losses were due to "wet" cuttings and infrequent spills over the shale shakers, which were difficult to estimate. Down-hole losses continued during this bit run.

At 2207 m, a wiper trip using barytes for a slug to clear the pipe, had no problems and drilling resumed with maintenance volume additions only, as the Yield Point was at 22 lbs/100ft².

A trip to change the bit, was conducted at 2383 m with a weighted pill to clear the pipe. On running back into the hole, once the Waarre formation was entered, tight hole was experienced, quite possibly from a build up in the wall-cake. It was also tight in the Eumeralla formation, where the bit was momentarily stuck, near bottom. Drilling resumed with a conventional bit.

The clay content rose, from the wall-cake being wiped off the hole sides and the carbide revealed a 8.6" hole (10 bbls excess, volume) or 2% over-gauge. This would reinforce the opinion of an under-gauged hole, from swelling (possibly in the Belfast, as there has been cavings, of a small but continued amount, since being drilled). Also the losses that have been continuous since drilling the Waarre section, would have built a wall-cake, while drawing fluid from the mud and so forming an under-gauge area.

As the volume was regained, the large sand-trap was dumped of solids. Recycling of sump fluid continued, while there was any to draw on.

Through persistence, the Derrickman was able to get the Desilter operating effectively (14.1 ppg, with a 0.95 litres per minute flow of the solids).

Volume was built to allow for anticipated down-hole losses during logging. CMC LV additions were increased at this time, to ensure good rheology for tripping and logging and to strengthen the polymer base.

After discussing the use of Biocide in the mud to be added prior to Logging, it was not implemented, as the Logging was to be of short duration and the Sump was still smelling "sweet". (The sump degradation is a good indicator of what will happen to the active system, if the pH falls too far.)

This section of hole was drilled to 2650 m and T.D. was declared on the 12th of May 1996. The hole was circulated and a wiper trip was conducted without any problems and found no "fill" on reaching bottom, once again. The bit was pulled out of the hole and Electric Wire Line Logging followed.

Logging took an extended time to be completed, but this was accomplished without hole problems. Plug an Abandonment procedures followed with the biocide being spotted in the Casing as per programme.

The fluid destined for the sump was treated, as mentioned in the Conclusions.

Rig release followed.

2. OBSERVATIONS AND RECOMMENDATIONS

Blackwood # 1 was drilled to a total depth of 2650 m, for a mud cost of $26,806.86 or $10.16 per metre ($3.08 per foot) with a further $1059.75 spent during post T.D. operations.

12¼" Surface Hole

This section of hole was drilled to 692 m for a mud cost of $3,254.93 or $4.70 per metre.

The initial Fresh Water Spud mud was changed once it's purpose was completed and 45 m of new hole was drilled.

The Alum system was well used to drill through the clays of the Marl section and minimal sloughing was evident through this stage.

The above type of mud was then converted to a basic yielding spud mud to reach T.D. with a low Plastic Viscosity and a Yield Point of 27 lbs/100ft². It was noted that once drilling progressed with this fluid, no cavings were observed at the shale shakers afterwards.

The complete 12¼" hole was drilled without problems, but as the wiper trip revealed (the sand section below the Marl section and above the Pember mud-stone) the hole bore was under gauge. This was due to the building of a the viscous mud to protect the hole while the Casing operation took place.

Once this layer of wall-cake was scrubbed off, the hole was still in-gauge and although this may be beneficial, in savings of cement and assist in better bonding, it is suggested that a more turbulent type system be used. This would be beneficial for tripping operations (and therefore Rig costs).

The proposal would be to drill the upper section similar to this hole, but once the Marl section has been drilled through, the complete active system is dumped and a polyacrylamide water fluid replaces it.

By the time the proposed mud has built more desirable properties (with characteristic yielding effects) T.D. of the 12¼" section would have been completed.

This would then present less tight areas and the mud could be readily used on the following 8½" section.

8½" Production Hole

The total 8½" section was drilled for a cost of $23,596.93 or $12.05 per metre ($3.67 per foot).

INTERVAL : 692 m - 1400 m

This section of hole was drilled initially with a potassium chloride (KCl) / polyacrylamide (PHPA) with no additions for Yield Point. As drilling progressed, chemicals were added to improve the properties, so that at 1000 m, the Yield Point was at the desired 10 lbs/100ft² and although efforts were concentrated on minimising the solids increase (and therefore the weight gain) the yield capacity steadily increased.

To gain the desired properties, the emphasis on the usage of the product JK -261 was essential. This polyacrylamide has the added benefits of being able to assist the Yield Point and fluid loss.

Maintaining a 1 ppb PHPA content was the main aim and closely monitor the shale shakers while drilling the Belfast Mudstone, to ensure that sufficient polyacrylamide activity was kept up.

Communication of the surface system proved to be a challenge, but repairs were steadily over-coming the problems. The Solids Control equipment also fitted into that category. By T.D. the Desilter was operating correctly but the Desander had a washed inlet pipe and so reducing its effectiveness.

While penetrating the Belfast formation, the parameters were refined to a minimum weight of 9.2 ppg, the Yield Point was raised to a minimum of 15 lbs/100ft² and the fluid loss to below 10.0 cc's.

INTERVAL : 1400 m - 2650 m

As soon as the Waarre formation was penetrated, losses were evident and volume premixes were required, but this was fortunate as this minimised the weight increases.

The Sump water was recycled where-ever possible and although hardness was being picked up from the formations drilled, no degradation of the fluid was noticed and obviously no bacterial activity.

The benefit of this was to regain some polyacrylamide and potassium chloride (and stop the sump from over-flowing).

The usage of PHPA to inhibit, was insufficient to combat the more active clays. For all intents and purposes, just by adding water, the "crumbling" effect begins (the Belfast section

is an example of this). The susceptibility of this crumbling to KCl has been proven (when the potassium chloride content has been at and above 10% - Bass Strait) but with a 6% K+ content, there have been positive benefits. A suggestion of a minimum of 4% K+ active and 6% maximum, potassium chloride with polyacrylamide of 1 ppb active (excess) would be the most desirable fluid for this area.

As noted the control over the solid's build up was not perfect, so a loss down-hole was not a problem. Of consequence, this did not give an opportunity to use the lost circulation material (LCM) in the earlier interval, when it could have been an advantage to add to the system, because drilling with a down-hole motor ruled out the application of the material.

As drilling progressed the carbide calliper check, showed an in gauge to under gauge hole. The Electric Log revealed wash at just below the shoe and also in the Waarre Formation.

Treatment of the mud for Plug and Abandonment with Biocide as per programme was followed with the treatment of the fluid to be disposed of, in the sump. As this is not an exact science at this time, field and laboratory tests were a guide to the additions of Alum, Drill pol and Lime.

General Mud Program

The Mud Program and Mud Properties as run on this well were well suited to drilling wells in this area. Polymer based muds are probably better suited than gel based systems because, although they generally cost more to set up, show greater stability over time and do not require the same level of maintenance.

Strictly speaking, high levels of inhibition are not absolutely necessary. PHPA in itself is adequate for the levels of inhibition required, and it also aids in maintaining fluid loss and yield point levels. (i.e. Lowers consumption of viscosifying and fluid loss control polymers.)

The level of KCl (or chlorides) to be run can be determined as much by Geological requirements as by any other criteria. i.e. Potassium is not critical in maintaining good hole conditions.

3. INTERVAL COSTS

Product	Cost	Unit Size	12-1/4" Surface Hole 0 - 692 m			8-1/2" Top Hole 692 m - 1400 m			8-1/2" Mudded up Hole 1400 m - 2650 m			Post TD Operations			Total Well Consumption		
			Used	Cost	%Cost	Used	Cost	%Cost	Used	Cost	%Cost	Used	Cost	%Cost	Used	Cost	%Cost
Alum	$ 24.00	25 kg	21	$504.00	15.5%							20	$480.00	45.3%	41	$984.00	3.5%
Barites	$ 6.20	25 kg	21	$130.20	4.0%	20	$124.00	1.9%	231	$1,432.20	8.5%	60	$372.00	35.1%	332	$2,058.40	7.4%
CaCO3	$ 4.52	20 kg							80	$361.60	2.1%				80	$361.60	1.3%
Caustic Soda	$ 37.00	25 kg	1	$37.00	1.1%	4	$148.00	2.2%	9	$333.00	2.0%				14	$518.00	1.9%
CFL (Ligno)	$ 36.00	25 kg	2	$72.00	2.2%										2	$72.00	0.3%
CMC LV	$ 71.70	25 kg							46	$3,298.20	19.5%				46	$3,298.20	11.8%
Drispac	$ 152.28	22.7 kg							4	$609.12	3.6%				4	$609.12	2.2%
Flowzan	$ 423.50	25 kg				1	$423.50	6.4%							1	$423.50	1.5%
Id - Gel	$ 8.13	25 kg	81	$658.53	20.2%	26	$211.38	3.2%							107	$869.91	3.1%
JK - 261	$ 137.25	25 kg	7	$960.75	29.5%	22	$3,019.50	45.5%	53	$7,274.25	43.0%				82	$11,254.50	40.4%
KCL - Ag.	$ 25.70	50 kg				75	$1,927.50	29.0%	75	$1,927.50	11.4%				150	$3,855.00	13.8%
Lime	$ 5.80	25 kg	25	$145.00	4.5%										25	$145.00	0.5%
SAPP	$ 67.95	25 kg	11	$747.45	23.0%										11	$747.45	2.7%
Sod. Bicarb.	$ 16.38	25 kg				22	$360.36	5.4%	42	$687.96	4.1%				64	$1,048.32	3.8%
Sod. Sulphite	$ 23.56	25 kg				18	$424.08	6.4%	38	$895.28	5.3%				56	$1,319.36	4.7%
Soda Ash	$ 15.75	25 kg							6	$94.50	0.6%				6	$94.50	0.3%
Surflo (B54X)	$ 207.75	25 kg										1	$207.75	19.6%	1	$207.75	0.7%
		Totals :		$3,254.93	100.0%		$6,638.32	100.0%		$16,913.61	100.0%		$1,059.75	100.0%		$27,866.61	100.0%
		Cost per metre :		$4.70			$9.38			$13.53						$10.52	

4. MATERIALS RECONCILIATION

Previous Well : **Dunbar East # 1**

Well : **Blackwood # 1**

Transferred to : **Skull Creek # 1**

PRODUCT	UNIT	TOTAL RECEIVED	TOTAL USED	TRANSFER BALANCE
Alum	25 kg	63	41	22
Barite	25 kg	1232	332	900
Bicarb Soda	25 kg	94	64	30
Biocide	25 lt	6	1	5
Calc Carbonate (F)	20 kg	160	80	80
Calcium Chloride	25 kg	31	4	27
Caustic Soda	25 kg	40	14	26
CFL - ligno.	25 kg	40	2	38
CMC - LV	25 kg	58	46	12
Drispac	22.7 kg	33	4	29
Defoamer	20 lt	10		10
Enerseal	40 kg	72		72
Free - pipe	205 lt	2		2
KCi	50 kg	301	143	158
Lime	25 kg	51	25	26
Polythin	25 kg	20		20
PHPA - JK-261	25 kg	86	82	4
SAPP	25 kg	24	11	13
Soda Ash	25 kg	16	6	10
Sodium Sulphite	25 kg	67	54	13
IdGel	25 kg	163	135	28
Wyoming Bentonite	100lb	37		37
Flowzan	25 kg	5	1	4
Drilpol	25 lt	10		10

5. FLUID PROPERTIES SUMMARY

Date	Depth	Temp.	Weight	Vis	PV	YP	Gels 10 sec	Gels 10 min	Filtrate API	Solids Solids	Solids Water	MBT	pH	Pf/Mf	Cl-	Ca++	$SO_3^=$	KCl	PHPA Calc
26/04/96	0		8.50	58	12	31	13	22	27.4	1.3	98.7	23.0	9.5	.15/.26	1,300	180			
26/04/96	0		8.50	52	12	22	10	19	NC	1.3	98.7								
26/04/96	45	23	8.65	44	13	17	12	17	>35.0	2.4	97.6	18.0	9.5	.13/.22	1,150	380			
27/04/96	214	20	8.90	33	7	14	7	12	>35.0	4.3	95.7	16.0	7.0	.0/.08	1,000	620			
27/04/96	457	24	8.80	31	4	8	4	11	33.6	3.5	96.5	19.0	8.0	.12/.44	820	880			
28/04/96	665	32	9.05	39	4	24	4	6	>35.0	5.3	94.7	22.0	9.5	.48/.52	1,000	1620			
28/04/96	692	30	9.10	41	6	29	10	16	>35.0	5.8	94.2	26.0	9.5	.5/.53	1,050	1480			
29/04/96	692		9.50	43	8	14	6	13	>35.0	8.7	91.3	18.0	9.3	.28/.4	900	1040			
29/04/96	692	30	9.40	39	9	17	6	22	>35.0	8.0	92.0	23.0	9.0	.15/.27	900	860			
30/04/96	692		9.45	40	9	16	6	17	>35.0	8.4	91.6	19.0	9.0	.12/.26	850	760			
30/04/96	692		8.50	27	3	4	1	1	19.5	1.0	99.0		8.7	.18/.67	9,800	560		1.6	0.56
1/05/96	695	28	8.55	28	4	4	1	2	21.5	1.1	98.9	2.0	9.0	.24/.72	8,800	620	110	1.3	0.54
1/05/96	940	39	8.90	33	8	8	3	5	19.3	4.3	95.7	8.0	9.3	.38/.84	6,200	380	160	1.1	0.61
2/05/96	1163	38	8.85	35	9	11	3	6	14.2	3.5	96.5	7.0	9.2	.2/.76	6,800	420	140	1.3	0.74
2/05/96	1236	38	8.90	37	10	13	3	6	13.3	4.3	95.7	8.0	9.0	.12/.67	6,300	480	150	1.1	1.10
3/05/96	1413	41	8.85	36	9	13	3	6	14.1	3.5	96.5	7.0	8.8	.28/1.14	6,700	500	110	1.3	1.12
3/05/96	1513	41	9.10	42	13	20	5	12	10.5	5.8	94.2	9.0	9.0	.28/1.22	6,800	380	150	1.1	1.24
4/05/96	1522	40	9.05	50	12	20	7	14	9.4	5.0	95.0	9.0	9.2	.32/1.25	7,100	260	160	1.2	1.18
4/05/96	1522	38	9.00	51	11	21	6	15	8.2	5.0	95.0	7.0	9.0	.31/1.86	7,300	680	160	1.1	1.08
5/05/96	1522	37	9.00	53	13	23	8	15	8.8	4.5	95.5	9.0	9.3	.38/1.92	8,000	360	160	1.4	1.07
5/05/96	1522	33	9.00	51	13	24	6	13	8.4	5.0	95.0	6.0	9.3	.48/2.03	8,200	420	140	1.1	1.11
6/05/96	1522	37	9.00	53	12	25	7	15	8	4.5	95.5	5.0	9.5	.54/2.35	8,300	400	170	1.2	1.16
6/05/96	1563	35	9.10	56	13	33	8	19	7.8	5.8	94.2	7.0	9.7	.7/2.4	9,300	400	150	1.3	1.12
6/05/96	1599	33	9.05	48	12	22	8	13	8	5.5	94.5	5.0	9.3	.42/2.4	8,200	440	140	1.2	0.93
7/05/96	1651		9.10	46	11	17	4	7	8.2	4.9	95.1	5.0	9.3	.58/2.36	7,800	440	110	1.1	0.92
7/05/96	1651	32	9.10	51	13	22	6	13	8	5.8	94.2	8.0	9.0	.26/1.83	8,400	400	130	1.2	0.91
8/05/96	1670	37	9.20	46	12	20	8	15	10.3	6.1	93.9	7.0	9.0	.22/1.94	7,500	420	110	1.1	0.96
8/05/96	1756	34	9.10	44	11	19	8	13	10.5	5.8	94.2	9.0	9.2	.35/2	7,200	620	120	1.1	0.93
8/05/96	1888	41	9.10	42	13	17	5	13	9.3	5.5	94.5	7.0	8.8	.2/1.5	7,400	680	100	1.1	0.95
9/05/96	1985	41	9.10	43	13	16	5	11	9.1	5.3	94.7	6.0	8.5	.15/1.28	8,400	520	150	1.3	0.99
9/05/96	2113	42	9.15	45	12	17	8	12	8.9	6.2	93.8	5.0	8.7	.28/1.2	8,300	720	120	1.2	0.97
9/05/96	2207	43	9.10	45	12	21	9	14	8.6	5.6	94.4	6.0	9.0		8,600	860	150	1.3	0.96

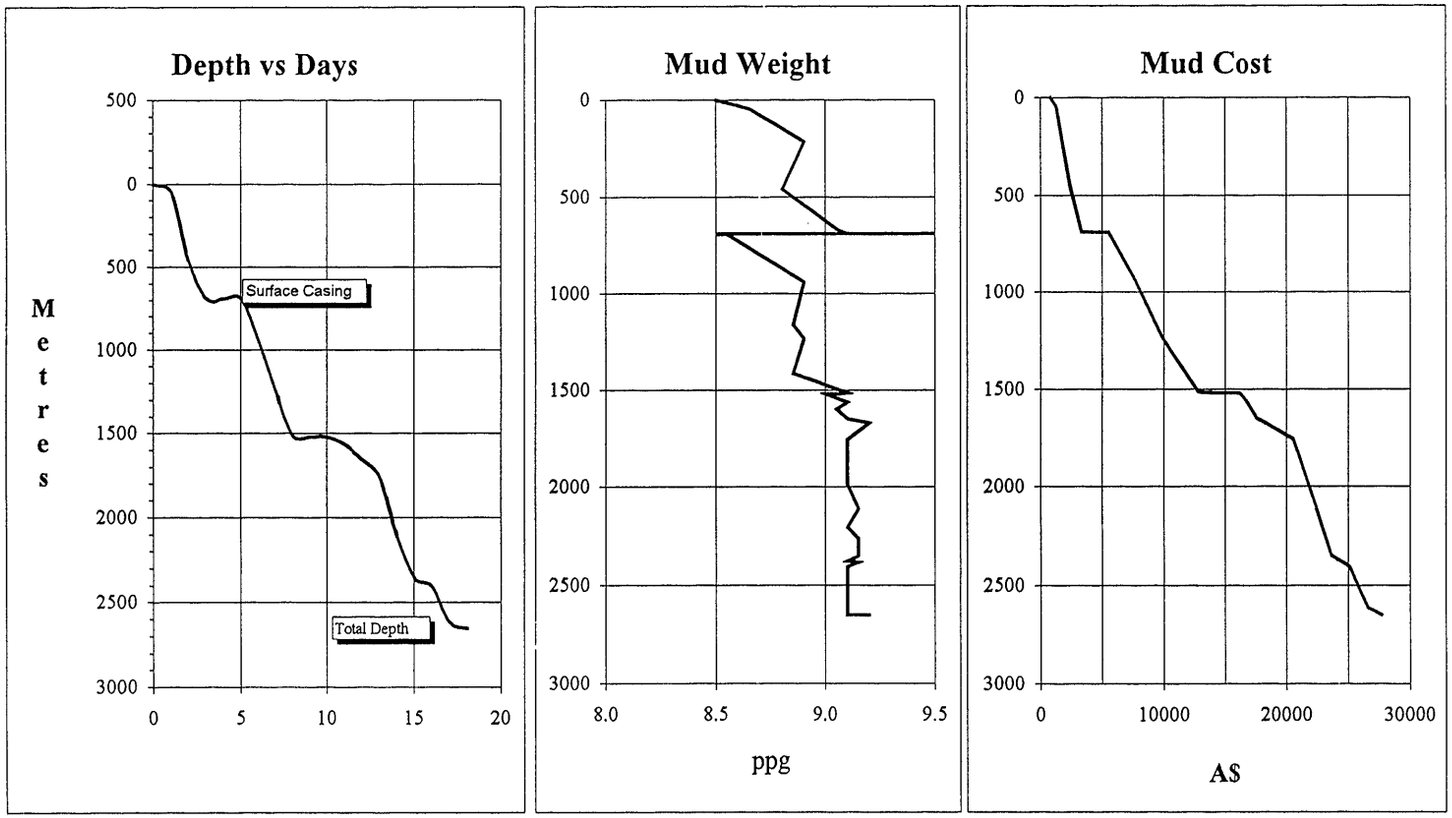
10/05/96	2265	46	9.15	48	13	22	8	14	8.7	6.2	93.8	7.0	8.8	.44/1.22	8,700	560	120	1.3	0.99
10/05/96	2351	47	9.15	45	12	22	9	16	9.3	6.2	93.8	6.0	9.2	.23/1.1	8,500	480	120	1.0	0.97
10/05/96	2377	47	9.10	46	11	22			9		100.0		9.0		8,800	420	150	1.2	0.97
11/05/96	2383		9.15	48	15	18	5	12	8.7	5.6	94.4	8.0	9.3	.42/1.36	8,700	440	140	1.2	1.00
11/05/96	2406	44	9.10	51	13	22	10	15	9.2	5.8	94.2	9.0	8.5	.17/1	9,200	940	160	1.2	0.99
11/05/96	2481	47	9.10	46	13	23	10	14	8		100.0	7.0	9.5	.5/1.23	9,100	560	160	1.3	1.01
12/05/96	2541	48	9.10	45	12	19	8	12	9.6	5.3	94.7	5.0	9.3	.3/1.52	8,300	620	150	1.2	1.04
12/05/96	2615	50	9.10	43	11	20	7	14	9.7	5.8	94.2	6.0	9.2	.23/1.47	8,300	580	140	1.2	1.15
12/05/96	2650	52	9.10	43	11	18	8	16	9.4		100.0	5.0	9.0		8,400	460	140	1.3	1.14
13/05/96	2650		9.15	46	12	20	8	17	9	5.6	94.4	7.0	9.0	.37/1.55	8,500	600	150	1.3	1.14
13/05/96	2650		9.20	47	12	21	9	17	9.2	6.5	93.5	7.0	9.0	.33/1.58	8,300	520	130	1.3	1.12
14/05/96											100.0								

6. Mud Volume Analysis

Date	Hole Size	Interval From	Interval To	Mud Type	Fluid Built & Received: Fresh Premix	Sump Premix	Direct Recirc	Water	Other	Fluid Disposed: De-sander	De-silter	Down-hole	Dumped	Other	Summary: Initial	Received	Disposed	Final
4/25/96	12.25"		692	Spud Mud	200											200		200
4/26/96	12.25"		692	Spud Mud	320					2		59	30	24	200	320	115	405
4/27/96	12.25"		692	Spud Mud	340	1440				51		327	984	22	405	1780	1384	801
4/28/96	12.25"		692	Spud Mud		80		10		51		122	16	56	801	90	245	646
4/29/96	12.25"		692	Spud Mud		50		45		7		29	427	17	646	95	480	261
4/30/96	12.25"		692	Spud Mud											261			261
Sub Total					**860**	**1570**		**55**		**111**		**537**	**1457**	**119**		**2485**	**2224**	
5/1/96	8.5"	692	2650	KCl PHPA	862					38	42	72	21	35	0	862	208	654
5/2/96	8.5"	692	2650	KCl PHPA	52	295				32	31	56	92	28	654	347	239	762
5/3/96	8.5"	692	2650	KCl PHPA	10	165				21		45	15	46	762	175	127	810
5/4/96	8.5"	692	2650	KCl PHPA						8		17	12	28	810		65	745
5/5/96	8.5"	692	2650	KCl PHPA		150						68	18	34	745	150	120	775
5/6/96	8.5"	692	2650	KCl PHPA		330				75		85	76	17	775	330	253	852
5/7/96	8.5"	692	2650	KCl PHPA		85				6		48	8	19	852	85	81	856
5/8/96	8.5"	692	2650	KCl PHPA		355				49	5	152	9	51	856	355	266	945
5/9/96	8.5"	692	2650	KCl PHPA		195				45	5	72	9	34	945	195	165	975
5/10/96	8.5"	692	2650	KCl PHPA		245				37	20	131	18	68	975	245	274	946
5/11/96	8.5"	692	2650	KCl PHPA	60	96		32		17	35	83	75	18	946	188	228	906
5/12/96	8.5"	692	2650	KCl PHPA	50	190				14	7	65	12	55	906	240	153	993
5/13/96	8.5"	692	2650	KCl PHPA						4	1	58	15	30	993		108	885
5/14/96	8.5"	692	2650	KCl PHPA								56		17	885		73	812
					1034	**2106**		**32**		**346**	**146**	**1008**	**380**	**480**		**3172**	**2360**	
Well Total					**1894**	**3676**		**87**		**457**	**146**	**1545**	**1837**	**599**		**5657**	**4584**	

Dilution Factors			
	Interval Length	**Dilution Vol**	**Dilution Factor**
12.25" Surface Hole	692	2285	3.30
8.5" Main Hole	1958	2310	1.18

7. Graphs


Depth vs Days
Metres
500
0
500
1000
1500
2000
2500
3000
Surface Casing
Total Depth
0
5
10
15
20
Mud Weight
0
500
1000
1500
2000
2500
3000
8.0
8.5
9.0
9.5
ppg
Mud Cost
0
500
1000
1500
2000
2500
3000
0
10000
20000
30000
A$

8. Bit Record

Operator : **Cultus**				Well : **Blackwood 1**				Contractor : **ODE # 30**					Supervisors : Bradley - Flink									
Spud Date : 26th April 1996				TD Date 12th May 1996				Surface Csg : 9-5/8" @ 689.4 m					Intermediate Csg :						Production Csg : P&A			
																Annular Vel						
Bit #	Size	Make	Type	Jets			Extended	Depth Out	Depth Drilled	Hours	Cumm Hours	WOB	RPM	GPM	Pump Pressure	Mud Wt	Drill Pipe	Flow	Drill Collars	Flow	Jet Vel	HHPb/ sq"	Impact Force
1	12.25"	Varel	L114	20	20	15	N	692	692	36.5	36.5	25	130	560	1200	9.1	4.5	L	8	L	228	1.2	602
2RR	8.5"	Sii	GT18D	14	12	12	N	1651	959	68	104.5	35	80	300	1100	9.1	4.5	T	6.5	T	259	1.7	366
3RR	8.5"	Sii	DSSH	13	13	10	N	1651	0	0	104.5	0/5	60	310	1100	9.1	4.5	L	6.5	L	295	2.3	432
4	8.5"	Sii	M73P	14	14	14	N	2383	732	57	161.5	10	50	405	2000	9.1	4.5	L	6.5	L	287	2.8	549
5	8.5"	HTC	S20D	12	14	14	N	2650	267	32	193.5	40	50	405	1800	9.1	4.5	L	6.5	L	315	3.4	602

9. Hole Gauge Analysis

Well Name : Blackwood # 1

Hole Gauge by Formation Interpreted from Caliper Log Data.

Total Depth	2650 m	Calc OH Vol	427.7 bbls
Bit Size	8.5"	Actual OH Vol	510.3 bbls
CSG Size	9 5/8"	Volume Excess	82.6 bbls
CSG ID	8.921"	Excess %	19.3%
CSG Shoe	689 m	Average Hole Diam	9.3"
OH Depth	1857 m	CSG Volume	174.9 bbls
		Total Volume	685.3 bbls

FORMATION	FROM m	TO m	INTERVAL m	CUFT	MAX OH DIAM inches	AVG DIAM inches
Dilwyn	689 m	710 m	21 m	53	15.0	12.0
Pember	710 m	786 m	76 m	155	15.5	10.7
Paaratte	786 m	1111 m	325 m	424	12.0	8.5
Skull Creek	1111 m	1281 m	170 m	258	10.5	9.2
Nullawarre	1281 m	1364 m	83 m	113	12.5	8.7
Belfast	1364 m	1499 m	135 m	243	12.5	10.0
Waarre	1499 m	1643 m	144 m	226	15.0	9.4
Eumeralla	1643 m	2537 m	894 m	1246	11.0	8.8
Heathfield	2537 m	2650 m	113 m	145	8.8	8.5

CULTUS PETROLEUM N.L.

Independent Drilling Fluid Services Pty. Ltd.

A.C.N. 009 267 314

Drilling Fluid Report

Report# 19 | Date : 13-May
Spud Date : 26-Apr 1996
Depth : 2,650 | (M.)To : 2,650

WELL NAME and No. : **Blackwood # 1**
CONTRACTOR **O. D. & E.**
Block No. : PPL - 1 | Location : Port Campbell | State : Victoria
RIG No. 30
OPERATOR'S REPRESENTATIVE : Henry FLINK / Bruce RICHARDSON
REPORT FOR Paul COOPER

Drilling Assembly				Casing		Mud Volume Bbls.			Circulation Data		
Bit size 8.5	Type : ~	Jet size ~		16 inch @ 9.6 Metres	Hole : 462	Pits : 297	Pump size : [2*] 6.0" * 8.0 ins.		
DP " 4.5	Type : E	Length 2650		9 5/8 inch @ 689.4 Metres	Drill String Cap. : 124	Total Volume : 812	Make/Model 1: G. D. PZ - 8	% Effic. 0.95	
HWt "	Type : 42 #	Length		~ inch @ ~ Metres	In Storage : 0	Weight : ~	Make/Model 2: G. D. PZ - 8	% Effic. 0.95	
DC "	Length	Other		MUD TYPE : KCL / PHPA Polymer	% O/G: 2.0	Annular Velocity	Bbl/stk 0.067 Stk/min ~	Bbl/M ~	
DC " ~	Length ~				DP size 4.5	(Ft/M) ######	Bbl/stk 0.067 Stk/min ~	GPM : ~	
					DC size	(Ft/M) ######	Bottoms up : #####	PRESSURE :	
					DC size ~	~ (Ft/M) ~	Total Circ. : #####	Type surf/sys. 3	

Mud Properties	Pit		Pit	
SAMPLE From				
TIME Sample Taken	16.30		16.30	
Flowline TEMPERATURE deg. C	N.C.		N.C.	
DEPTH Metres	2,650		2,650	
WEIGHT ppg.	9.20		9.20	
Funnel VISCOSITY (sec/qt.) API @ 25 deg. C	52		52	
PLASTIC VISCOSITY cP @ 41 deg. C	13		13	
YIELD POINT (lb/100ft2)	23		23	
GEL STRENGTH (lb/100ft2) 10 sec. / 10 min.	12	17	12	17
FILTRATE API (cm3 / 30 min.) @	9.6		9.6	
API HTHP Filtrate (cm3 / 30 min.) @ ~ deg. C	~ ~		~	
CAKE Thickness (32nd. in API / HTHP)	1	~	1	~
SOLIDS Content (% by Vol.) Calc. / Retort	6.5	~	6.0	~
LIQUID Content (% by Vol.) Oil/Water	~	93.5	~	94.0
SAND Content (% by Vol.)	Tr		Tr	
METHYLENE BLUE CAPACITY x lb/bbl cm3/cm3	8.0		8.0	
pH Strip 21 deg. C	8.8		8.8	
ALKALINITY Mud (Pm)	~ ~		~	
ALKALINITY Filtrate (Pf/Mf)	0.28/1.27		0.28/1.27	
CHLORIDE (mg/L)	8,500		8,500	
Total HARDNESS (mg/L)	740		740	
SULPHITE (mg/L)	120		120	
K+ (mg/L)	5,300		5,300	
KCL (% by Wt.)	1.09		1.09	
PHPA (Calc. lb/bbl)	0.96		0.96	
PHPA (Excess lb/bbl)	~ ~		~	
RHEOLOGY - 600 / 300 / 6 (readings)	49/36/12		49/36/12	

MUD PROPERTY SPECIFICATIONS

Weight :	9-9.2	Filtrate :	<10	Other : Chlorides max. @	< 15k
Viscosity :	N.C.	Plastic Viscosity :	< 20	Yield Point :	>15

By Authority : yes Operator's written ~ Drilling Contractor
yes Operator's Representative ~ Other

FLUID SUMMARY AND RECOMMENDATIONS

AT THE END OF THE CEMENTING OPERATION, THE SURFACE SYSTEM WAS TREATED, PRIOR TO DUMPING.

THIS ENTAILED THE ADDITION OF ALUMINIUM SULPHATE @ 3.18 KG'S, 0.12 LTR'S OF DRILLPOL AND 0.08 KG'S OF LIME PER BARREL.

THE SPACING AND BLENDING OF THE ADDITIONS WAS ACCOMPLISHED WHILE THE DRILL-STRING WAS BEING LAID OUT.

FURTHER TIME WAS TAKEN (BEFORE EMPTYING THIS FLUID INTO THE SUMP) TO ENSURE SUFFICIENT ADHESION, AS ONE PIT WAS INACCESSABLE TO THIS MIXING [AND SO WAS DUMPED FIRST, IN THE HOPE THAT SOME BLENDING WOULD OCCUR].

THIS TREATMENT WILL NEED A FOLLOW-UP WITH AN APPLICATION OF THE PRODUCT AE - 180, TO FINISH.

OPERATIONS SUMMARY

ON COMPLETION OF THE LOGGING, THE P.& A. OPERATION WAS INSTIGATED.

BIOCIDE TREATED MUD WAS SPOTTED IN THE CASING AS PER PROGRAMME.

MUD ACCOUNTING (BBLS.)

Fluid Built & Received		Fluid Lost or Disposed		Summary	
Premix		Desander	0	Initial Volume	885
w/ fresh water	0	Desilter	0		
" recycled "	0	Downhole	56	Fluid Received	0
Drill Water	0	Dumped	0		
Other	0	Other	17	Fluid Lost	73
				Final Total	812
Total Received	0	Total Lost	73	(Circulating Vol.)	

SOLIDS CONTROL EQUIPMENT

Type	Man.	Hr.	Cones	Hr.	Shaker#	Screen Size	Hr.
Centrifuge	~	0	D'sand 2	0	1	S110/S110/S84	1
Degasser	Drilco	0	D'silter 12	0	2	S110/S84/S84	1

SOLIDS EQUIPMENT EFFICIENCY

	Overflow (ppg.)	Underflow (ppg.)	Output (gal/m)
Desander	~	~	0
Desilter	~	~	0

Product	Inventory	Rec'd.	Used	Balance	Unit $	Cost $
Barytes	900		0	900	6.20	
Aluminium Sulphate	42		42		24.00	1,008.00
Drill pol	10		2	8	75.75	151.50
Lime	24		1	23	5.80	5.80
			0			
			0			
			0			
			0			

SOLIDS ANALYSIS (ppb / %)			BIT / HYDRAULICS DATA		
High Gravity Solids	0.2	0.0	Jet Velocity	####	FT / SEC
Bentonite	3.4	0.4	Impact Force	####	LBS
Drilled Solids	51.1	5.6	HHP / in2	####	
Low Gravity Solids	54.5	6.0	HHP	####	
Average S. G.	2.60	Solids	Bit Press. Loss	####	PSI
Med. "n" #1ck. # 2 ck.	0.445	0.445	Csg. Seat Frac Pres	650	PSI
Med. "K" " "	2.251	####	" Equiv. Mud Wt.	14.03	PPG
Low "n" " "	0.239	0.239	Total nozzle area		SQ.INCH
Low "K" " "	8.132	41.55			

Daily Chemical Cost : $ 1,165
Cumulative Cost : $ 28,790

ENGINEER EDD PERKINS | ADDRESS South Australia | TELEPHONE 08 - 338 3027

CULTUS PETROLEUM N.L.

Independent Drilling Fluid Services Pty. Ltd.

Drilling Fluid Report A.C.N. 009 267 314

Report# 18 | Date : 12-May | Spud Date : 26-Apr 1996 | Depth : 2,650 | (M.)To : 2,650

WELL NAME and No. : **Blackwood # 1** | CONTRACTOR **O. D. & E.**

Block No. : PPL - 1 | Location : Port Campbell | State : Victoria | RIG No. 30

OPERATOR'S REPRESENTATIVE : Henry FLINK / Bruce RICHARDSON | REPORT FOR Paul COOPER

Drilling Assembly				Casing				Mud Volume Bbls.				Circulation Data			
Bit size 8.5	Type : ~	Jet size ~		16 inch @ 9.6	Metres	Hole : 449	Pits : 319	Pump size : [2*] 6.0" * 8.0 ins.	
DP " 4.5	Type : E	Length 2337		9 5/8 inch @ 689.4	Metres	Drill String Cap. : 117	Total Volume : 885	Make/Model 1: G. D. PZ - 8	% Effic. 0.95
HWt " 4.5	Type : 42 #	Length 111.3		~ inch @ ~	Metres	In Storage : 0	Weight : ~	Make/Model 2: G. D. PZ - 8	% Effic. 0.95
DC " 6.5	Length 201.4	Other 20.86		MUD TYPE : KCL / PHPA Polymer		% O/G: 2.0	Annular Velocity	Bbl/stk 0.067 Stk/min ~	Bbl/M ~
DC " ~	Length ~					DP size 4.5	(Ft/M) ######	Bbl/stk 0.067 Stk/min ~	GPM : ~
						DC size 6.5	(Ft/M) ######	Bottoms up : #####	PRESSURE :
						DC size ~ ~	(Ft/M) ~	Total Circ. : #####	Type surf/sys. 3

Mud Properties				
SAMPLE From	Pit		Pit	
TIME Sample Taken	17.00		17.00	
Flowline TEMPERATURE deg. C	N.C.		N.C.	
DEPTH Metres	2,650		2,650	
WEIGHT ppg.	9.20		9.20	
Funnel VISCOSITY (sec/qt.) API @ 33 deg. C	47		47	
PLASTIC VISCOSITY cP @ 50 deg. C	12		12	
YIELD POINT (lb/100ft2)	21		21	
GEL STRENGTH (lb/100ft2) 10 sec. / 10 min.	9	17	9	17
FILTRATE API (cm3 / 30 min.) @	9.2		9.2	
API HTHP Filtrate (cm3 / 30 min.) @ ~ deg. C	~ ~		~	
CAKE Thickness (32nd. in API / HTHP)	1	~	1	~
SOLIDS Content (% by Vol.) Calc. / Retort	6.5	~	6.0	~
LIQUID Content (% by Vol.) Oil/Water	~	93.5	~	94.0
SAND Content (% by Vol.)	Tr		Tr	
METHYLENE BLUE CAPACITY x lb/bbl cm3/cm3	5.0		5.0	
pH Strip 21 deg. C	9.0		9.0	
ALKALINITY Mud (Pm)	~ ~		~	
ALKALINITY Filtrate (Pf/Mf)	0.33/1.58		0.33/1.58	
CHLORIDE (mg/L)	8,300		8,300	
Total HARDNESS (mg/L)	520		520	
CALCIUM (mg/L)	130		130	
K+ (mg/L)	6,100		6,100	
KCL (% by Wt.)	1.25		1.25	
PHPA (Calc. lb/bbl)	1.12		1.12	
PHPA (Excess lb/bbl)	~ ~		~	
RHEOLOGY - 600 / 300 / 6 (readings)	45/33/10		45/33/10	

MUD PROPERTY SPECIFICATIONS

Weight :	9-9.2	Filtrate :	<10	Other :	Chlorides max. @ < 15k
Viscosity :	N.C.	Plastic Viscosity :	< 20	Yield Point :	>15

By Authority : yes Operator's written ~ Drilling Contractor

yes Operator's Representative ~ Other

FLUID SUMMARY AND RECOMMENDATIONS

THE BARYTES USED WAS FOR THE TWO WIPER TRIPS.

THE BIOCIDE IS TO BE USED IN THE DISPLACED FLUID THAT WILL BE LEFT IN THE CASING, FOLLOWING THE NEXT OPERATION.

OPERATIONS SUMMARY

AFTER PULLING THE BIT OUT, LOGGING BEGAN.

MUD ACCOUNTING (BBLS.)

Fluid Built & Received		Fluid Lost or Disposed		Summary	
Premix		Desander	4	Initial Volume	993
w/ fresh water	0	Desilter	1		
" recycled "	0	Downhole	58	Fluid Received	0
Drill Water	0	Dumped	15		
Other	0	Other	30	Fluid Lost	108
				Final Total	885
Total Received	0	Total Lost	108	(Circulating Vol.)	

SOLIDS CONTROL EQUIPMENT

Type	Man.	Hr.		Cones	Hr.	Shaker#	Screen Size	Hr.
Centrifuge	~	0	D'sand	2	2	1	S175/S110/S110	2
Degasser	Drilco	0	D'silter	12	2	2	S175/S110/S110	2

SOLIDS EQUIPMENT EFFICIENCY

	Overflow (ppg.)	Underflow (ppg.)	Output (gal/m)
Desander	9.2	9.6	1.4
Desilter	9.2	13.8	0.3

Product	Inventory	Rec'd.	Used	Balance	Unit $	Cost $
Barytes	960		60	900	6.20	372.00
Biocide	6		1	5	207.75	207.75
Aliminium Sulphate	42		20	22	24.00	480.00
			0			
			0			
			0			
			0			
			0			

SOLIDS ANALYSIS (ppb / %)

			BIT / HYDRAULICS DATA		
High Gravity Solids	0.2	0.0	Jet Velocity		FT./ SEC
Bentonite	-0.6	-0.1	Impact Force		LBS
Drilled Solids	55.2	6.1	HHP / in2		
Low Gravity Solids	54.6	6.0	HHP		
Average S. G.	2.60	Solids	Bit Press. Loss		PSI
Med. "n" #1ck. # 2 ck.	0.447	0.447	Csg. Seat Frac Pres	650	PSI
Med. "K" " "	2.029	####	" Equiv. Mud Wt.	14.03	PPG
Low "n" " "	0.282	0.282	Total nozzle area	0.411	SQ INCH
Low "K" " "	5.680	29.03			

Daily Chemical Cost : $ 1,060 | Cumulative Cost : $ 27,625

ENGINEER EDD PERKINS | ADDRESS South Australia | TELEPHONE 08 - 338 3027

CULTUS PETROLEUM N.L.

Independent Drilling Fluid Services Pty. Ltd.

Drilling Fluid Report

A.C.N. 009 267 314

Report# 17	Date : 12-May
Spud Date : 26-Apr 1996	
Depth : 2,511	(M.)To : 2,650

WELL NAME and No. : **Blackwood # 1**

CONTRACTOR **O. D. & E.**

Block No. : PPL - 1 | Location : Port Campbell | State : Victoria

RIG No. 30

[redacted]ATOR'S REPRESENTATIVE : Henry FLINK / Bruce RICHARDSON

REPORT FOR Paul COOPER

Drilling Assembly				Casing	Mud Volume Bbls.		Circulation Data		
Bit size 8.5	Type : S20D	Jet size 12.14.14		16 inch @ 9.6 Metres	Hole : 449	Pits : 427	Pump size : [2*] 6.0" * 8.0 ins.		
DP " 4.5	Type : E	Length 2337		9 5/8 inch @ 689.4 Metres	Drill String Cap. : 117	Total Volume : 993	Make/Model 1: G. D. PZ - 8	% Effic.	0.95
HWt " 4.5	Type : 42 #	Length 111.3		~ inch @ ~ Metres	In Storage : 0	Weight : ~	Make/Model 2: G. D. PZ - 8	% Effic.	0.95
DC " 6.5	Length 201.4	Other 20.86	MUD TYPE :	KCL / PHPA Polymer	% O/G: 2.0	Annular Velocity	Bbl/stk 0.067 Stk/min 145	Bbl/M	9.64
DC " ~	Length ~				DP size 4.5	191 (Ft/M) Lam	Bbl/stk 0.067 Stk/min ~	GPM :	405
					DC size 6.5	331 (Ft/M) Lam	Bottoms up : 47	PRESSURE :	1,800
					DC size ~	~ (Ft/M) ~	Total Circ. : 103	Type surf/sys.	3

Mud Properties	F/Line	F/L	Pit	
SAMPLE From				
TIME Sample Taken	14.00	19.30	4.00	
Flowline TEMPERATURE deg. C	50	52	N.C.	
DEPTH Metres	2,615	2,650	2,650	
WEIGHT ppg.	9.10	9.10	9.15	
Funnel VISCOSITY (sec/qt.) API @ 47 deg. C	43	43	46	
PLASTIC VISCOSITY cP @ 54 deg. C	11	11	12	
YIELD POINT (lb/100ft2)	20	18	20	
GEL STRENGTH (lb/100ft2) 10 sec. / 10 min.	7	14	8	17
FILTRATE API (cm3 / 30 min.) @	9.7	9.4	9.0	
API HTHP Filtrate (cm3 / 30 min.) @ ~ deg. C	~	~	~	
CAKE Thickness (32nd. in API / HTHP)	1	~	1	~
SOLIDS Content (% by Vol.) Calc. / Retort	5.8	~	5.6	~
LIQUID Content (% by Vol.) Oil/Water	~	94.2	~	94.4
SAND Content (% by Vol.)	Tr	Tr	Tr	
METHYLENE BLUE CAPACITY x lb/bbl cm3/cm3	6.0	5.0	7.0	
pH Strip 19 deg. C	9.2	9.0	9.0	
ALKALINITY Mud (Pm)	~	~	~	
ALKALINITY Filtrate (Pf/Mf)	0.23/1.47		0.37/1.55	
CHLORIDE (mg/L)	8,300	8,400	8,500	
Total HARDNESS (mg/L)	580	460	600	
[redacted]HITE (mg/L)	140	140	150	
K+ (mg/L)	5,800	6,100	6,100	
KCL (% by Wt.)	1.19	1.25	1.25	
PHPA (Calc. lb/bbl)	1.15	1.14	1.14	
PHPA (Excess lb/bbl)	~	~	~	
RHEOLOGY - 600 / 300 / 6 (readings)	42/31/8	40/29/9	44/32/10	
	Gels : 8/16			

MUD PROPERTY SPECIFICATIONS

Weight :	9-9.2	Filtrate :	<10	Other :	Chlorides max. @ < 15k
Viscosity :	N.C.	Plastic Viscosity :	< 20	Yield Point :	>15

By Authority : yes Operator's written ~ Drilling Contractor

yes Operator's Representative ~ Other

FLUID SUMMARY AND RECOMMENDATIONS

THROUGH PERSISTENCE, THE DERRICKMAN HAS THE DESILTER OPERATING EFFECTIVELY.

MAINTENANCE WAS KEPT UP BY ADDITIONS TO A VOLUME PREMIX, WITH THE INTENTION OF HOLDING PLENTY OF SURFACE SYSTEM VOL - UME, WHILE TRIPPING & LOGGING [TO BALANCE THE D/HOLE LOSSES].

HIGHER LEVELS OF CMC - LOW VIS., WERE MIXED IN THIS PERIOD TO ENSURE LOW GEL STRENGTHS (TO MINIMISE SWAB AND SURGING OF THE HOLE, WHILE TRIPPING) AND TO STRENGTHEN THE POLYMER BASE.

THE FLOWLINE TEMPERATURE WAS INCREASING (FROM 121 DEGREES, AT 2,600 METRES, TO 125 DEGREES - FARENHIET, AT 2,650 METRES).

DUE TO A LACK OF DEGRADATION OF THE SUMP FLUID (AN INDICATION OF THE BACTERIA COUNT) NO BIOCIDE WAS ADDED FOR THE LOGS, [ALSO CONSIDERING THE SHORTNESS OF THE LOGGING PROGRAMME].

OPERATIONS SUMMARY

DRILLED 8.5" TO T.D. OF 2,650 METRES, CIRCULATED AND RAN A WIPER TRIP (AFTER PUMPING A WEIGHT SLUG).

NO PROBLEMS DURING THE WIPER TRIP, WITH NO FILL ON BOTTOM. CIRCULATED AND PUMPED A PILL, PRIOR TO PULLING OUT, TO LOG.

**A PRODUCT USAGE ADJUSTMENT (Rpt # 14) 2 Dr. CAUSTIC SODA .

MUD ACCOUNTING (BBLS.)

Fluid Built & Received		Fluid Lost or Disposed		Summary	
Premix		Desander	14	Initial Volume	906
w/ fresh water	50	Desilter	7		
" recycled "	190	Downhole	65	Fluid Received	240
Drill Water	0	Dumped	12		
Other	0	Other	54	Fluid Lost	153
				Final Total	993
Total Received	240	Total Lost	153	(Circulating Vol.)	

SOLIDS CONTROL EQUIPMENT

Type	Man.	Hr.		Cones	Hr.	Shaker#	Screen Size	Hr.
Centrifuge	~	0	D'sand	2	8	1	S175/S110/S110	20
Degasser	Drilco	0	D'silter	12	20	2	S175/S110/S110	20

SOLIDS EQUIPMENT EFFICIENCY

	Overflow (ppg.)	Underflow (ppg.)	Output (gal/m)
Desander	9.2	9.9	1.3
Desilter	9.1	14.1	0.3

Product	Inventory	Rec'd.	Used	Balance	Unit $	Cost $
Barytes	960		0	960	6.20	
KCL - Agri.	150		8	142	25.70	205.60
JK - 261	9		5	4	137.25	686.25
Sodium Sulphite	14		3	11	23.56	70.68
Sod. Bicarbonate	34		4	30	16.38	65.52
CMC - Low Vis.	18		6	12	71.70	430.20
[redacted]tic Soda	31		4	27	21.38	85.52
Soda Ash	10		0	10	15.75	

SOLIDS ANALYSIS (ppb / %)

High Gravity Solids		0.2	0.0	
Bentonite		2.5	0.3	
Drilled Solids		48.6	5.3	
Low Gravity Solids		51.1	5.6	
Average S. G.		2.60	Solids	
Med. "n"	#1ck. # 2 ck.	0.438	0.459	
Med. "K"	" "	2.021	9.333	
Low "n"	" "	0.323	0.301	
Low "K"	" "	4.132	25.02	

BIT / HYDRAULICS DATA

Jet Velocity	316	FT / SEC
Impact Force	606	LBS
HHP / in2	3.4	
HHP	193	
Bit Press. Loss	815	PSI
Csg. Seat Frac Pres	650	PSI
" Equiv. Mud Wt.	14.03	PPG
Total nozzle area	0.411	SQ.INCH

Daily Chemical Cost : $ 1,544

Cumulative Cost : $ 26,565

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CULTUS PETROLEUM N.L.

Independent Drilling Fluid Services Pty. Ltd.

Drilling Fluid Report — A.C.N. 009 267 314

Report# 16	Date : 11-May
Spud Date : 26-Apr 1996	
Depth : 2,383	(M.)To : 2,511

WELL NAME and No. : **Blackwood # 1** | CONTRACTOR **O. D. & E.**

Block No. : PPL - 1 | Location : Port Campbell | State : Victoria | RIG No. 30

OPERATOR'S REPRESENTATIVE : Henry FLINK / Bruce RICHARDSON | REPORT FOR Paul COOPER

Drilling Assembly				Casing	Mud Volume Bbls.		Circulation Data		
Bit size 8.5	Type : S20D	Jet size 12.14.14		16 inch @ 9.6 Metres	Hole : 425	Pits : 370	Pump size : [2*] 6.0" * 8.0 ins.		
DP " 4.5	Type : E	Length 2198		9 5/8 inch @ 689.4 Metres	Drill String Cap. : 111	Total Volume : 906	Make/Model 1: G. D. PZ - 8	% Effic.	0.95
HWt " 4.5	Type : 42 #	Length 111.3		~ inch @ ~ Metres	In Storage : 35	Weight : 8.7	Make/Model 2: G. D. PZ - 8	% Effic.	0.95
DC " 6.5	Length 201.4	Other 20.86		MUD TYPE : KCL / PHPA Polymer	% O/G: 2.0	Annular Velocity	Bbl/stk 0.067 Stk/min 143	Bbl/M	9.51
DC " ~	Length ~				DP size 4.5	188 (Ft/M) Lam	Bbl/stk 0.067 Stk/min ~	GPM :	399
					DC size 6.5	326 (Ft/M) Lam	Bottoms up : 45	PRESSURE :	1,800
					DC size ~	~ (Ft/M) ~	Total Circ. : 95	Type surf/sys.	3

Mud Properties	F/Line	F/L	Pit	
SAMPLE From				
TIME Sample Taken	12.00	20.30	4.00	
Flowline TEMPERATURE deg. C	44	47	48	
DEPTH Metres	2,406	2,481	2,541	
WEIGHT ppg.	9.10	9.10	9.10	
Funnel VISCOSITY (sec/qt.) API @ 41 deg. C	51	46	45	
PLASTIC VISCOSITY cP @ 47 deg. C	13	13	12	
YIELD POINT (lb/100ft2)	22	23	19	
GEL STRENGTH (lb/100ft2) 10 sec. / 10 min.	10	15	8	12
FILTRATE API (cm3 / 30 min.) @	9.2	8.0	9.6	
API HTHP Filtrate (cm3 / 30 min.) @ ~ deg. C	~	~	~	
CAKE Thickness (32nd. in API / HTHP)	1	~	1	~
SOLIDS Content (% by Vol.) Calc. / Retort	5.8	~	5.3	~
LIQUID Content (% by Vol.) Oil/Water	~	94.2	~	94.7
SAND Content (% by Vol.)	Tr	Tr	Tr	
METHYLENE BLUE CAPACITY x lb/bbl cm3/cm3	9.0	7.0	5.0	
pH Strip 22 deg. C	8.5	9.5	9.3	
ALKALINITY Mud (Pm)	~	~	~	
ALKALINITY Filtrate (Pf/Mf)	0.17/1.5	/1.23	0.3/1.52	
CHLORIDE (mg/L)	9,200	9,100	8,300	
Total HARDNESS (mg/L)	940	560	620	
SULPHATE (mg/L)	160	160	150	
K+ (mg/L)	5,800	6,500	5,900	
KCL (% by Wt.)	1.19	1.33	1.21	
PHPA (Calc. lb/bbl)	0.99	1.01	1.04	
PHPA (Excess lb/bbl)	~	~	~	
RHEOLOGY - 600 / 300 / 6 (readings)	48/35/12	49/36/12	43/31/10	
	Gels : 10/14			

MUD PROPERTY SPECIFICATIONS

Weight :	9-9.2	Filtrate :	<10	Other :	Chlorides max. @ < 15k
Viscosity :	N.C.	Plastic Viscosity :	< 20	Yield Point :	>15

By Authority : ~ Operator's written ~ Drilling Contractor

yes Operator's Representative ~ Other

FLUID SUMMARY AND RECOMMENDATIONS

THE CLAY CONTENT INCREASED IN THE MUD DUE TO THE WALL - CAKE BEING REMOVED DURING THE TRIP. THIS WAS COUNTERED WITH EXTRA ADDITIONS OF PHPA AND IT WAS NOTICED THAT THE SECOND CHECK SHOWED A FALL IN THE MBT (CEC). WHILE THE MUD SAT IN THE HOLE, ONCE AGAIN THE HARDNESS PICKED UP (FROM FORMATION INTER-ACTIVITY) THIS WAS TREATED ALSO.

DOWN-HOLE LOSSES WERE EVIDENT DURING THE TRIP. THE CARBIDE CHECK SHOWED A REDUCED AVERAGE HOLE SIZE TO 8.63", THIS CHANGED THE MUD VOLUME COUNT. THE SAND TRAP WAS DUMPED, DUE TO THE EXCESS OF SOLIDS THAT HAD BUILT UP, IN IT.

* 1 DRUM OF CAUSTIC SODA WAS USED ON THE PREVIOUS REPORT.

OPERATIONS SUMMARY

WHILE RUNNING IN, TIGHT HOLE WAS EXPERIENCED.

WHEN BACK ON BOTTOM, VOLUME WAS BUILT AND MAINTENANCE CHEMICALS WERE ADDED.

WATER WAS USED IN THE PREMIX, WHEN THE RECYCLED SUMP FLUID "RAN OUT". WATER ALSO WAS ADDED TO THE MUD TO LOWER THE P.V..

MUD ACCOUNTING (BBLS.)

Fluid Built & Received		Fluid Lost or Disposed		Summary	
Premix		Desander	17	Initial Volume	946
w/ fresh water	60	Desilter	35		
" recycled "	96	Downhole	83	Fluid Received	188
Drill Water	32	Dumped	75		
Other	0	Other	18	Fluid Lost	228
				Final Total	906
Total Received	188	Total Lost	228	(Circulating Vol.)	

SOLIDS CONTROL EQUIPMENT

Type	Man.	Hr.		Cones	Hr.	Shaker#	Screen Size	Hr.
Centrifuge	~	0	D'sand	2	15	1	S175/S110/S110	22
Degasser	Drilco	0	D'silter	12	16.5	2	S175/S110/S110	22

SOLIDS EQUIPMENT EFFICIENCY

	Overflow (ppg.)	Underflow (ppg.)	Output (gal/m)
Desander	9.2	10.0	0.8
Desilter	9.1	10.6	1.5

Product	Inventory	Rec'd.	Used	Balance	Unit $	Cost $
Barytes	960		0	960	6.20	
KCL - Agri.	155		5	150	25.70	128.50
JK - 261	14		5	9	137.25	686.25
Sodium Sulphite	17		3	14	23.56	70.68
Sod Bicarbonate	40		6	34	16.38	98.28
CMC - Low Vis.	22		4	18	71.70	286.80
Caustic Soda	26		2	24	21.38	42.76
Soda Ash	16		6	10	15.75	94.50

SOLIDS ANALYSIS (ppb / %)

High Gravity Solids	0.1	0.0
Bentonite	0.3	0.0
Drilled Solids	47.4	5.2
Low Gravity Solids	47.7	5.2
Average S. G.	2.60	Solids
Med. "n" #1ck. # 2 ck.	0.455	0.472
Med. "K" " "	2.045	8.357
Low "n" " "	0.272	0.294
Low "K" " "	6.416	25.30

BIT / HYDRAULICS DATA

Jet Velocity	278	FT / SEC.
Impact Force	524	LBS.
HHP / in2	2.6	
HHP	147	
Bit Press. Loss	629	PSI
Csg. Seat Frac Pres	650	PSI
" Equiv. Mud Wt.	14.03	PPG.
Total nozzle area	0.460	SQ.INCH
E.C.D.	5.15	PPG

Daily Chemical Cost : $ 1,408 | Cumulative Cost : $ 25,022

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CULTUS PETROLEUM N.L.

Independent Drilling Fluid Services Pty. Ltd.

Drilling Fluid Report A.C.N. 009 267 314

Report#	15	Date :	10-May
Spud Date :	26-Apr 1996		
Depth :	2,210	(M.)To :	2,383

WELL NAME and No. : **Blackwood # 1**

CONTRACTOR **O. D. & E.**

Block No. : PPL - 1 | Location : Port Campbell | State : Victoria

RIG No. 30

OPERATOR'S REPRESENTATIVE : Henry FLINK / Bruce RICHARDSON

REPORT FOR Paul COOPER

Drilling Assembly				Casing	Mud Volume Bbls.			Circulation Data			
Bit size 8.5	Type : M73P	Jet size 6 * 10		16 inch @ 9.6 Metres	Hole : 431	Pits : 410		Pump size : [2*] 6.0" * 8.0 ins.			
DP " 4.5	Type : E	Length 2070		9 5/8 inch @ 689.4 Metres	Drill String Cap. : 105	Total Volume : 946		Make/Model 1: G. D. PZ - 8	% Effic. 0.95		
HWt " 4.5	Type : 42 #	Length 111.3		~ inch @ ~ Metres	In Storage : 100	Weight : 8.7		Make/Model 2: G. D. PZ - 8	% Effic. 0.95		
DC " 6.5	Length 201.4	Other 20.86		MUD TYPE : KCL / PHPA Polymer	% O/G: 9.0	Annular Velocity		Bbl/stk 0.067 Stk/min ~	Bbl/M 9.64		
DC "	Length 0				DP size 4.5	191 (Ft/M) Lam		Bbl/stk 0.067 Stk/min 145	GPM : 405		
					DC size 6.5	331 (Ft/M) Lam		Bottoms up : 45	PRESSURE : 2,000		
					DC size ~	~ (Ft/M) ~		Total Circ. : 98	Type surf/sys. 3		

Mud Properties	F/Line	F/L	Pit	
SAMPLE From				
TIME Sample Taken	12.30	17.30	4.00	
Flowline TEMPERATURE deg. C	47	47	NC	
DEPTH Metres	2,351	2,377	2,383	
WEIGHT ppg.	9.15	9.10	9.15	
Funnel VISCOSITY (sec/qt.) API @ 44 deg. C	45	46	48	
PLASTIC VISCOSITY cP @ 47 deg. C	12	11	15	
YIELD POINT (lb/100ft2)	22	22	18	
GEL STRENGTH (lb/100ft2) 10 sec. / 10 min.	9	16	5	12
FILTRATE API (cm3 / 30 min.) @	9.3	9.0	8.7	
API HTHP Filtrate (cm3 / 30 min.) @ ~ deg. C	~	~	~	
CAKE Thickness (32nd. in API / HTHP)	1	~	1	~
SOLIDS Content (% by Vol.) Calc. / Retort	6.2	~	5.6	~
LIQUID Content (% by Vol.) Oil/Water	~	93.8	~	94.4
SAND Content (% by Vol.)	Tr	Tr	Tr	
METHYLENE BLUE CAPACITY x lb/bbl cm3/cm3	6.0	N.C.	8.0	
pH Strip 22 deg. C	9.2	9.0	9.3	
ALKALINITY Mud (Pm)	~	~	~	
ALKALINITY Filtrate (Pf/Mf)	0.23/1.1		0.42/1.36	
CHLORIDE (mg/L)	8,500	8,800	8,700	
Total HARDNESS (mg/L)	480	420	440	
S[redacted]ITE (mg/L)	120	150	140	
K+ (mg/L)	4,800	5,900	5,800	
KCL (% by Wt.)	0.98	1.22	1.18	
PHPA (Calc. lb/bbl)	0.97	0.97	1.00	
PHPA (Excess lb/bbl)	~	~	~	
RHEOLOGY - 600 / 300 / 6 (readings)	46/34/10	44/33/10	48/33/6	

MUD PROPERTY SPECIFICATIONS

Weight :	9-9.2	Filtrate :	<10	Other :	Chlorides max. @ < 15k
Viscosity :	N.C.	Plastic Viscosity :	< 20	Yield Point :	>15

By Authority : ~ Operator's written ~ Drilling Contractor

yes Operator's Representative ~ Other

FLUID SUMMARY AND RECOMMENDATIONS

VOLUMETRIC ADDITIONS CONTINUED FOR THIS PERIOD, WITH LOSSES ASSISTING IN MINIMISING THE WEIGHT INCREASES, NORMALLY ASSOCIATED WITH A PDC BIT RUN.

SOME LOSSES MARKED AS "OTHER", WERE DUE TO WET CUTTINGS AT THE SHAKERS AND VERY SMALL AMOUNTS OF FLUID WASHING OVER. ALSO THERE WERE LOSSES AT THE SURFACE TO THE CELLAR AND OTHER MINOR SEEPAGE. BUT FOR ALL INTENTS AND PURPOSES, BEARING IN MIND THAT A CLOSE EYE IS KEPT ON THIS AREA, THE MUD MUST BE LOST DOWN-HOLE AND CONSEQUENTLY, MARKED THIS WAY.

A CONCERTED EFFORT TO LOWER THE WEIGHT FOLLOWED THE MORNING CHECK, THAT REVEALED A CLIMBING P.V. AND BY 09.00 HOURS, A WEIGHT OF 9.2 PPG.. THIS WAS DOWN TO 9.1 PPG. BY 9.1 PPG. BY 14.00 HOURS. OTHER PROPERTIES WERE MAINTAINED.

OPERATIONS SUMMARY

DRILLING CONTINUED TO 2,383 METRES, "BOTTOMS - UP" WAS CIRCULATED AND A PILL TO CLEAR THE PIPE (OF BARYTES AND 5 SX. OF KCL).

THE BIT WAS PULLED OUT WITHOUT ANY PROBLEMS AND A CONVEN - TIONAL BIT RUN IN WITH THE D.H. MOTOR.

SODIUM SULPHATE WILL NEED RESTOCKING FOR THE NEXT HOLE.

MUD ACCOUNTING (BBLS.)

Fluid Built & Received		Fluid Lost or Disposed		Summary	
Premix		Desander	37	Initial Volume	975
w/ fresh water	0	Desilter	20		
" recycled "	245	Downhole	131	Fluid Received	245
Drill Water	0	Dumped	18		
Other	0	Other	68	Fluid Lost	274
				Final Total	946
Total Received	245	Total Lost	274	(Circulating Vol.)	

SOLIDS CONTROL EQUIPMENT

Type	Man.	Hr.		Cones	Hr.	Shaker#	Screen Size	Hr.
Centrifuge	~	0	D'sand	2	19	1	S175/S110/S110	19
Degasser	Drilco	0	D'silter	12	13	2	S175/S110/S110	19

SOLIDS EQUIPMENT EFFICIENCY

	Overflow (ppg.)	Underflow (ppg.)	Output (gal/m)
Desander	9.1	10.2	1.4
Desilter	9.1	11.0	1.1

Product	Inventory	Rec'd.	Used	Balance	Unit $	Cost $
Barytes	657	320	17	960	6.20	105.40
KCL - Agri.	165		10	155	25.70	257.00
JK - 261	17		3	14	137.25	411.75
Sodium Sulphite	24		7	17	23.56	164.92
Sod. Bicarbonate		40	0	40	16.38	
CMC - Low Vis.	26		4	22	71.70	286.80
C[redacted]c Soda	26		0	26	21.38	
			0			

SOLIDS ANALYSIS (ppb / %)

High Gravity Solids	0.2	0.0	Jet Velocity	282 FT / SEC
Bentonite	3.8	0.4	Impact Force	542 LBS
Drilled Solids	47.1	5.2	HHP / in2	2.7
Low Gravity Solids	50.9	5.6	HHP	154
Average S. G.	2.60	Solids	Bit Press. Loss	650 PSI
Med. "n" #1ck. # 2 ck.	0.436	0.540	Csg. Seat Frac Pres	650 PSI
Med. "K" " "	2.244	1.136	" Equiv. Mud Wt.	14.03 PPG
Low "n" " "	0.289	0.410	Total nozzle area	0.460 SQ INCH
Low "K" " "	5.621	2.563	E.C.D.	5.92 PPG

Daily Chemical Cost : $ 1,226

Cumulative Cost : $ 23,614

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CULTUS PETROLEUM N.L.

Independent Drilling Fluid Services Pty. Ltd.

Drilling Fluid Report A.C.N. 009 267 314

Report# 14	Date : 9-May
Spud Date : 26-Apr 1996	
Depth : 1,895	(M.)To : 2,210

WELL NAME and No. : **Blackwood # 1** | CONTRACTOR **O. D. & E.**

Block No. : PPL - 1 | Location : Port Campbell | State : Victoria | RIG No. 30

OPERATOR'S REPRESENTATIVE : Alex' BRADLEY / Kevin KELLY | REPORT FOR Paul COOPER

Drilling Assembly				Casing	Mud Volume Bbls.			Circulation Data			
Bit size 8.5	Type : M73P	Jet size 6 * 10		16 inch @ 9.6 Metres	Hole : 484	Pits : 395		Pump size : [2*] 6.0" * 8.0 ins.			
DP " 4.5	Type : E	Length 1897		9 5/8 inch @ 689.4 Metres	Drill String Cap. : 97	Total Volume : 975		Make/Model 1: G. D. PZ - 8	% Effic. 0.95		
HWt " 4.5	Type : 42	Length 111.3		~ inch @ ~ Metres	In Storage : 150	Weight : 8.7		Make/Model 2: G. D. PZ - 8	% Effic. 0.95		
DC " 6.5	Length 201.4	Other 20.86		MUD TYPE : KCL / PHPA Polymer	% O/G: 9.0	Annular Velocity		Bbl/stk 0.067 Stk/min ~	Bbl/M 9.84		
DC " 8	Length 0				DP size 4.5	195 (Ft/M) Lam		Bbl/stk 0.067 Stk/min 148	GPM : 413		
					DC size 6.5	338 (Ft/M) Lam		Bottoms up : 49	PRESSURE : 1,800		
					DC size 8	0 (Ft/M) ~		Total Circ. : 99	Type surf/sys. 3		

Mud Properties	F/Line	F/L	F/Line	
Sample From				
Time Sample Taken	12.30	21.30	4.00	
Flowline Temperature deg. C	42	43	46	
Depth Metres	2,113	2,207	2,265	
Weight ppg.	9.15	9.10	9.15	
Funnel Viscosity (sec/qt.) API @ 39 deg. C	45	45	48	
Plastic Viscosity cP @ 49 deg. C	12	12	13	
Yield Point (lb/100ft2)	17	21	22	
Gel Strength (lb/100ft2) 10 sec. / 10 min.	8	12	8	14
Filtrate API (cm3 / 30 min.) @	8.9	8.6	8.7	
API HTHP Filtrate (cm3 / 30 min.) @ ~ deg. C	~	~	~	
Cake Thickness (32nd. in API / HTHP)	1	~	1	~
Solids Content (% by Vol.) Calc. / Retort	6.2	~	5.6	~
Liquid Content (% by Vol.) Oil/Water	~	93.8	~	94.4
Sand Content (% by Vol.)	Tr	Tr	Tr	
Methylene Blue Capacity X lb/bbl cm3/cm3	5.0	6.0	7.0	
pH Strip 21 deg. C	8.7	9.0	8.8	
Alkalinity Mud (Pm)	~	~	~	
Alkalinity Filtrate (Pf/Mf)	0.28 / 1.2		0.44/1.22	
Chloride (mg/L)	8,300	8,600	8,700	
Total Hardness (mg/L)	720	860	560	
[redacted]ite (mg/L)	120	150	120	
K+ (mg/L)	5,800	6,100	6,200	
KCL (% by Wt.)	1.19	1.25	1.28	
PHPA (Calc. lb/bbl)	0.97	0.96	0.99	
PHPA (Excess lb/bbl)	~	~	~	
Rheology - 600 / 300 / 6 (readings)	41/29/9	45/33/10	48/35/10	
	Gel : 9/15			

MUD PROPERTY SPECIFICATIONS

Weight :	9-9.2	Filtrate :	<10	Other :	Chlorides max. @ < 15k
Viscosity :	N.C.	Plastic Viscosity :	< 20	Yield Point :	>15

By Authority : ~ Operator's written ~ Drilling Contractor

yes Operator's Representative ~ Other

FLUID SUMMARY AND RECOMMENDATIONS

VOLUME AND MAINTENANCE ADDITIONS, WERE USED, THROUGH - OUT THIS PERIOD.
THE SHAKER SCREENS WERE CHANGED FOR FINER MESH, AS LESS NEW MUD WAS BEING CONSUMED AND SO LESS UNSHEARED MUD BLINDING THE SCREENS.
THE CONSTANT DRILLING ASSISTED THIS SITUATION AND RAISED THE FLUID TEMPERATURE (SO RUNNING THROUGH THE SCREENS BETTER).

THE pH OF THE MUD WAS RAISED IN THIS PERIOD, AS IT WAS FELT THERE WAS BETTER CONTROL OVER THE CLAYS (AS THE MUDSTONE BEING DRILLED IS NOT YIELDING, AS IN PREVIOUS SECTIONS).
THE SUMP FLUID WAS CHECKED FOR WEIGHT (8.65 PPG) DUE TO APPEARANCE.

OPERATIONS SUMMARY

AT 2,207 METRES A WIPER TRIP WAS RUN, USING A BARYTES SLUG, NO PROBLEMS WERE ENCOUNTERED.

PICKING UP "HARDNESS" FROM THE FORMATION IS STILL A PROBLEM THE CaCO3 WAS USED FOR A "SLUG" ON THE 1st WIPER TRIP, WITH THE MAIN AIM TO LOOSE IT OVER THE SHAKER SCREENS WHEN CIRCULAT'G.

MUD ACCOUNTING (BBLS.)

Fluid Built & Received		Fluid Lost or Disposed		Summary	
Premix		Desander	45	Initial Volume	945
w/ fresh water	0	Desilter	5		
" recycled "	195	Downhole	72	Fluid Received	195
Drill Water	0	Dumped	9		
Other	0	Other	34	Fluid Lost	165
				Final Total	975
Total Received	195	Total Lost	165	(Circulating Vol.)	

SOLIDS CONTROL EQUIPMENT

Type	Man.	Hr.		Cones	Hr.	Shaker#	Screen Size	Hr.
Centrifuge	~	0	D'sand	2	23	1	S175/S110/S110	24
Degasser	Drilco	0	D'silter	12	1	2	S175/S110/S110	24

SOLIDS EQUIPMENT EFFICIENCY

	Overflow (ppg.)	Underflow (ppg.)	Output (gal/m)
Desander	9.1	10.6	1.4
Desilter	9.1	9.8	3.2

Product	Inventory	Rec'd.	Used	Balance	Unit $	Cost $
Barytes	687		30	657	6.20	186.00
KCL - Agri.	170		5	165	25.70	128.50
JK - 261	22		5	17	137.25	686.25
Sodium Sulphite	28		4	24	23.56	94.24
Sod. Bicarbonate	2		2		16.38	32.76
CMC - Low Vis.	34		8	26	71.70	573.60
[redacted]ic Soda	26		0	26	21.38	
Calcium Carbonate	120		40	80	4.52	180.80

SOLIDS ANALYSIS (ppb / %)

High Gravity Solids	0.2	0.0		
Bentonite	2.5	0.3		
Drilled Solids	48.4	5.3		
Low Gravity Solids	50.9	5.6		
Average S. G.	2.60	Solids		
Med. "n" #1ck. # 2 ck.	0.499	0.455		
Med. "K" " "	1.289	2.045		
Low "n" " "	0.280	0.320		
Low "K" " "	5.070	4.743		

BIT / HYDRAULICS DATA

Jet Velocity	288	FT / SEC
Impact Force	564	LBS
HHP / in2	2.9	
HHP	163	
Bit Press. Loss	677	PSI
Csg. Seat Frac Pres	650	PSI
" Equiv. Mud Wt.	14.03	PPG
Total nozzle area	0.460	SQ INCHS
E.C.D.	5.66	PPG

Daily Chemical Cost : $ 1,882 | Cumulative Cost : $ 22,388

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CULTUS PETROLEUM N.L.

Independent Drilling Fluid Services Pty. Ltd.

A.C.N. 009 267 314

Drilling Fluid Report

Report# 13 | Date : 8-May | Spud Date : 26-Apr 1996 | Depth : 1,651 | (M.)To : 1,895

WELL NAME and No. : **Blackwood # 1** | CONTRACTOR **O. D. & E.**

Block No. : PPL - 1 | Location : Port Campbell | State : Victoria | RIG No. 30

OPERATOR'S REPRESENTATIVE : Alex' BRADLEY / Kevin KELLY | REPORT FOR Paul COOPER

Drilling Assembly				Casing			Mud Volume Bbls.			Circulation Data		
Bit size 8.5	Type : GT18D	Jet size 14.12.12		16 inch @ 9.6	Metres		Hole : 432	Pits : 432		Pump size : [2*] 6.0" * 8.0 ins.		
DP " 4.5	Type : E	Length 1582		9 5/8 inch @ 689.4	Metres		Drill String Cap. : 82	Total Volume : 945		Make/Model 1: G. D. PZ - 8	% Effic.	0.95
HWt " 4.5	Type : 42	Length 111.3		~ inch @ ~	Metres		In Storage : 90	Weight : 8.6		Make/Model 2: G. D. PZ - 8	% Effic.	0.95
DC " 6.5	Length 201.4	Other 20.86		MUD TYPE : KCL / PHPA Polymer			% O/G: 9.4	Annular Velocity		Bbl/stk 0.067 Stk/min ~	Bbl/M	9.84
DC " 8	Length 0						DP size 4.5	195 (Ft/M) Lam		Bbl/stk 0.067 Stk/min 148	GPM :	413
							DC size 6.5	338 (Ft/M) Lam		Bottoms up : 44	PRESSURE :	1,800
							DC size 8	0 (Ft/M) ~		Total Circ. : 96	Type surf/sys.	3

Mud Properties	F/Line	F/L	F/Line	
Sample From				
Time Sample Taken	12.00	21.00	4.00	
Flowline Temperature deg. C	34	41	41	
Depth Metres	1,756	1,888	1,985	
Weight ppg.	9.1	9.1	9.1	
Funnel Viscosity (sec/qt.) API @ 32 deg. C	44	42	43	
Plastic Viscosity cP @ 43 deg. C	11	13	13	
Yield Point (lb/100ft2)	19	17	16	
Gel Strength (lb/100ft2) 10 sec. / 10 min.	8	13	5	11
Filtrate API (cm3 / 30 min.) @	10.5	9.3	9.1	
API HTHP Filtrate (cm3 / 30 min.) @ ~ deg. C	~	~	~	
Cake Thickness (32nd. in API / HTHP)	1	~	1	~
Solids Content (% by Vol.) Calc. / Retort	5.8	~	5.3	~
Liquid Content (% by Vol.) Oil/Water	~	94.2	~	94.7
Sand Content (% by Vol.)	0.25	0.13	0.5	
Methylene Blue Capacity x lb/bbl cm3/cm3	9.0	7.0	6.0	
pH Strip 17 deg. C	9.2	8.8	8.5	
Alkalinity Mud (Pm)	~		~	
Alkalinity Filtrate (Pf/Mf)	0.35/2.	.2/1.5	0.15/1.28	
Chloride (mg/L)	7,200	7,400	8,400	
Total Hardness (mg/L)	620	680	520	
Su[illegible]e (mg/L)	120	100	150	
K+ (mg/L)	5,300	5,500	6,400	
KCL (% by Wt.)	1.09	1.13	1.31	
PHPA (Calc. lb/bbl)	0.93	0.95	0.99	
PHPA (Excess lb/bbl)	~	~	~	
Rheology - 600 / 300 / 6 (readings)	41/30/9	43/30/7	42/29/5	
	Gels : 5/13			

MUD PROPERTY SPECIFICATIONS

Weight :	9-9.2	Filtrate :	<10	Other :	Chlorides max. @ < 15k
Viscosity :	N.C.	Plastic Viscosity :	< 20	Yield Point :	>15

By Authority : ~ Operator's written ~ Drilling Contractor

yes Operator's Representative ~ Other

FLUID SUMMARY AND RECOMMENDATIONS

WHILE DRILLING THE EUMERALLA FORMATION, LOSSES WERE EVIDENT AND VOLUME WAS MADE TO COUNTER THIS. THE NEW VOLUME ALSO ASSISTED IN LOWERING THE MUD WEIGHT. PREMIXED SUMP WATER ALSO HAD CHEMICALS TO REDUCE THE FLUID LOSS, RAISING THE PHPA AND POTASSIUM LEVELS SIMULTANEOUSLY. THIS FORMATION'S SAND SECTION'S, TENDED TO BLIND THE SHAKER SCREENS AND RAISE THE SOLIDS CONTENT.

AT 1,785 METRES APPROXIMATELY, LOSSES ACCOUNTED FOR 73 BBLS., AND VOLUME NEEDED TO COUNTER THIS. THE ACTIVE SYSTEM WAS RAISED AND FULL PREMIX TANKS WERE MADE TO ENSURE THE SUCTION LINES STAYED OUT OF SIGHT. FORTUNATELY, THE ABOVE LOSSES WERE NOT REPEATED AND THE PREMIX WAS BLED INTO THE SYSTEM TO MAINTAIN SUFFICIENT VOLUME.

OPERATIONS SUMMARY

A WIPER TRIP WAS INITIATED AT 1,890 METRES, NO PROBLEMS WERE ENCOUNTERED AND NO FILL WAS FOUND ON BOTTOM, WHEN DRILLING RESUMED.

MUD ACCOUNTING (BBLS.)

Fluid Built & Received		Fluid Lost or Disposed		Summary	
Premix		Desander	49	Initial Volume	856
w/ fresh water	0	Desilter	4		
" recycled "	355	Downhole	152	Fluid Received	355
Drill Water	0	Dumped	9		
Other	0	Other	51	Fluid Lost	266
				Final Total	945
Total Received	355	Total Lost	266	(Circulating Vol.)	

SOLIDS CONTROL EQUIPMENT

Type	Man.	Hr.		Cones	Hr.	Shaker#	Screen Size	Hr.
Centrifuge	~	0	D'sand	2	24	1	S110/S110/S84	23
Degasser	Drilco	0	D'silter	12	1.5	2	S110/S110/S84	23

SOLIDS EQUIPMENT EFFICIENCY

	Overflow (ppg.)	Underflow (ppg.)	Output (gal/m)
Desander	9.2	10.3	1.4
Desilter	9.1	10.5	2.0

Product	Inventory	Rec'd.	Used	Balance	Unit $	Cost $
Barytes	687		0	687	6.20	
KCL - Agri.	190		20	170	25.70	514.00
JK - 261	32		10	22	137.25	1,372.50
Sodium Sulphite	32		4	28	23.56	94.24
Sod. Bicarbonate	4		2	2	16.38	32.76
CMC - Low Vis.	47		13	34	71.70	932.10
C[illegible]c Soda	27		1	26	21.38	21.38
			0			

SOLIDS ANALYSIS (ppb / %)

High Gravity Solids	0.1	0.0	Jet Velocity	288
Bentonite	1.6	0.2	Impact Force	561
Drilled Solids	46.1	5.1	HHP / in2	2.9
Low Gravity Solids	47.7	5.2	HHP	162
Average S. G.	2.60	Solids	Bit Press. Loss	674
Med. "n" #1ck. # 2 ck.	0.450	0.534	Csg. Seat Frac Pres	650
Med. "K" " "	1.809	1.038	" Equiv. Mud Wt	14 03
Low "n" " "	0.287	0.382	Total nozzle area	0.460
Low "K" " "	5.009	2.683	E.C.D.	6.31

Daily Chemical Cost : $ 2,967 | Cumulative Cost : $ 20,506

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CULTUS

Independent Drilling Fluid Services Pty. Ltd.

Drilling Fluid Report

A.C.N. 009 267 314

Report# 12	Date : 7-May
Spud Date : 26-Apr 1996	
Depth : 1,635	(M.)To : 1,651

WELL NAME and No. : **Blackwood # 1**

CONTRACTOR **O. D. & E.**

Block No. : PPL - 1 | Location : Port Campbell | State : Victoria

RIG No. 30

OPERATOR'S REPRESENTATIVE : Alex' BRADLEY / Kevin KELLY

REPORT FOR Paul COOPER

Drilling Assembly				Casing	Mud Volume Bbls.			Circulation Data			
Bit size 8.5	Type : GT18D	Jet size 14.12.12		16 inch @ 9.6 Metres	Hole : 391	Pits : 394		Pump size : [2*] 6.0" * 8.0 ins.			
DP " 4.5	Type : E	Length 1338		9 5/8 inch @ 689.4 Metres	Drill String Cap. : 71	Total Volume : 856		Make/Model 1: G. D. PZ - 8		% Effic.	0.95
HWt " 4.5	Type : 42	Length 111.3		~ inch @ ~ Metres	In Storage : 130	Weight : 8.75		Make/Model 2: G. D. PZ - 8		% Effic.	0.95
DC " 6.5	Length 201.4	Other 20.86		MUD TYPE : KCL / PHPA Polymer	% O/G: 9.0	Annular Velocity		Bbl/stk 0.067	Stk/min 150	Bbl/M	9.98
DC " 8	Length 0				DP size 4.5	197 (Ft/M) Lam		Bbl/stk 0.067	Stk/min ~	GPM :	419
					DC size 6.5	342 (Ft/M) Lam		Bottoms up : 39		PRESSURE :	1,780
					DC size 8	0 (Ft/M) ~		Total Circ. : 86		Type surf/sys.	3

Mud Properties				
Sample From		F/Line		F/Line
Time Sample Taken		23.00		4.00
Flowline Temperature	deg. C	32		37
Depth Metres		1,651		1,670
Weight ppg.		9.1		9.2
Funnel Viscosity (sec/qt.) API @ 30	deg. C	51		46
Plastic Viscosity cP @ 41	deg. C	13		12
Yield Point (lb/100ft2)		22		20
Gel Strength (lb/100ft2) 10 sec. / 10 min.		6	13	8 15
Filtrate API (cm3 / 30 min.) @		8.0		10.3
API HTHP Filtrate (cm3 / 30 min.) @ ~	deg. C	~ ~		~
Cake Thickness (32nd. in API / HTHP)		1	~	1 ~
Solids Content (% by Vol.) Calc. / Retort		5.8	~	6.1 ~
Liquid Content (% by Vol.) Oil/Water		~	94.2	~ 93.9
Sand Content (% by Vol.)		Tr		Tr
Methylene Blue Capacity x lb/bbl	cm3/cm3	8.0		7.0
pH Strip	21 deg. C	9.0		9.0
Alkalinity Mud (Pm)		~		~
Alkalinity Filtrate (Pf/Mf)		0.26/1.83		0.22/1.94
Chloride (mg/L)		8,400		7,500
Total Hardness (mg/L)		400		420
[illegible]ite (mg/L)		130		110
K+ (mg/L)		5,700		5,100
KCL (% by Wt.)		1.17		1.05
PHPA (Calc. lb/bbl)		0.91		0.96
PHPA (Excess lb/bbl)		~ ~		~
Rheology - 600 / 300 / 6 (readings)		48/35/9		44/32/10

MUD PROPERTY SPECIFICATIONS

Weight :	9-9.2	Filtrate :	<10	Other :	Chlorides max. @ < 15k
Viscosity :	N.C.	Plastic Viscosity :	< 20	Yield Point :	>15

By Authority : ~ Operator's written ~ Drilling Contractor

yes Operator's Representative ~ Other

FLUID SUMMARY AND RECOMMENDATIONS

THIS NEXT SECTION TO BE DRILLED NEEDED A LOWER RHEOL - OGY MUD AS THE ACTION OF THE # 4 BIT GENERATES "FINES" THAT ARE DIFFICULT TO COUNTER WITHOUT DILUTION.
VOLUME BUILDING (AND DILUTION) WAS DELAYED WHILE THE TRANSFER LINE WAS CLEARED. AT MORNING REPORT, THIS WAS REPAIRED AND ADDITIONS TO REDUCE THE WEIGHT WERE GOING THROUGH.
MAINTENANCE WAS NEEDED TO ATTEND THE FLUID LOSS AND THE POTASSIUM CONTENT - FOLLOWING UP ON THIS.

OPERATIONS SUMMARY

A WIPER TRIP TO CLEAN UP THE JUNK ENABLED MINOR MAINTEN - ANCE ADDITIONS, TO ENSURE THE PROPERTIES WERE SUITABLE FOR FURTHER TRIPPING.
IN GAUGE HOLE WAS FOUND WITH THE PDC BIT & D.H. MOTOR.

MUD ACCOUNTING (BBLS.)

Fluid Built & Received		Fluid Lost or Disposed		Summary	
Premix		Desander	6	Initial Volume	852
w/ fresh water	0	Desilter	0		
" recycled "	85	Downhole	48	Fluid Received	85
Drill Water	0	Dumped	8		
Other	0	Other	19	Fluid Lost	81
				Final Total	856
Total Received	85	Total Lost	81	(Circulating Vol.)	

SOLIDS CONTROL EQUIPMENT

Type	Man.	Hr.		Cones	Hr.	Shaker#	Screen Size	Hr.
Centrifuge	~	0	D'sand	2	4	1	S110/S110/S84	7
Degasser	Drilco	0	D'silter	12	0	2	S110/S110/S84	7

SOLIDS EQUIPMENT EFFICIENCY

	Overflow (ppg.)	Underflow (ppg.)	Output (gal/m)
Desander	9.1	10.0	4
Desilter	~	~	0

Product	Inventory	Rec'd.	Used	Balance	Unit $	Cost $
Barytes	747		60	687	6.20	372.00
KCL - Agri.	194		4	190	25.70	102.80
JK - 261	34		2	32	137.25	274.50
Sodium Sulphite	35		3	32	23.56	70.68
Sod. Bicarbonate	4		0	4	16.38	
CMC - Low Vis.	47		0	47	71.70	
[illegible]tic Soda	27		0	27	21.38	
			0			

SOLIDS ANALYSIS (ppb / %)

High Gravity Solids		0.1	0.0	
Bentonite		2.0	0.2	
Drilled Solids		53.1	5.8	
Low Gravity Solids		55.1	6.1	
Average S. G.		2.60	Solids	
Med. "n"	#1ck. # 2 ck.	0.455	0.459	
Med. "K"	" "	2.045	1.826	
Low "n"	" "	0.383	0.301	
Low "K"	" "	3.213	4.896	

BIT / HYDRAULICS DATA

Jet Velocity	292
Impact Force	583
HHP / in2	3.0
HHP	171
Bit Press. Loss	700
Csg. Seat Frac Pres	650
" Equiv. Mud Wt.	14.03
Total nozzle area	0.460
E.C.D.	7.25

Daily Chemical Cost : $ 820

Cumulative Cost : $ 17,539

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CULTUS

Independent Drilling Fluid Services Pty. Ltd.

Drilling Fluid Report

A.C.N. 009 267 314

Report# 11 | Date : 6-May

Spud Date : 26-Apr 1996

Depth : 1,522 | (M.)To : 1,635

WELL NAME and No. : **Blackwood # 1**

CONTRACTOR **O. D. & E.**

Block No. : PPL - 1 | Location : Port Campbell | State : Victoria

RIG No. 30

OPERATOR'S REPRESENTATIVE : Alex' BRADLEY / Kevin KELLY

REPORT FOR Paul COOPER

Drilling Assembly				Casing		Mud Volume Bbls.			Circulation Data		
Bit size 8.5	Type : GT18D	Jet size 14.12.12		16 inch @ 9.6 Metres		Hole : 388	Pits : 394		Pump size : [2*] 6.0" * 8.0 ins.		
DP " 4.5	Type : E	Length 1322		9 5/8 inch @ 689.4 Metres		Drill String Cap. : 70	Total Volume : 852		Make/Model 1: G. D. PZ - 8	% Effic.	0.95
HWt " 4.5	Type : 42	Length 111.3		~ inch @ ~ Metres		In Storage : 176	Weight : 8.75		Make/Model 2: G. D. PZ - 8	% Effic.	0.95
DC " 6.5	Length 201.4	Other 17.85		MUD TYPE : KCL / PHPA Polymer		% O/G: 9.0	Annular Velocity		Bbl/stk 0.067 Stk/min 110	Bbl/M	7.32
DC " 8	Length 0					DP size 4.5	145 (Ft/M) Lam		Bbl/stk 0.067 Stk/min ~	GPM :	307
						DC size 6.5	251 (Ft/M) Lam		Bottoms up : 53	PRESSURE :	1,100
						DC size 8	0 (Ft/M) ~		Total Circ. : 116	Type surf/sys.	3

Mud Properties	F/Line	F/L	Pit	
Sample From				
Time Sample Taken	15:30	20:30	0.167	
Flowline Temperature deg. C	35	33	N.C.	
Depth Metres	1,563	1,599	1,651	
Weight ppg.	9.1	9.05	9.1	
Funnel Viscosity (sec/qt.) API @ 32 deg. C	56	48	46	
Plastic Viscosity cP @ 41 deg. C	13	12	11	
Yield Point (lb/100ft2)	33	22	17	
Gel Strength (lb/100ft2) 10 sec. / 10 min.	8	19	4	7
Filtrate API (cm3 / 30 min.) @	7.8	8.0	8.2	
API HTHP Filtrate (cm3 / 30 min.) @ ~ deg. C	~	~	~	
Cake Thickness (32nd. in API / HTHP)	1	~	1	~
Solids Content (% by Vol.) Calc. / Retort	5.8	~	4.9	~
Liquid Content (% by Vol.) Oil/Water	~	94.2	~	95.1
Sand Content (% by Vol.)	0.13	Tr	Tr	
Methylene Blue Capacity x lb/bbl cm3/cm3	7.0	5.0	5.0	
pH Strip 19 deg. C	9.7	9.3	9.3	
Alkalinity Mud (Pm)	~	~	~	
Alkalinity Filtrate (Pf/Mf)	0.7/2.4	.42/2.4	0.58/2.36	
Chloride (mg/L)	9,300	8,200	7,800	
Total Hardness (mg/L)	400	440	440	
[redacted]ite (mg/L)	150	140	110	
K+ (mg/L)	6,100	5,600	5,400	
KCL (% by Wt.)	1.25	1.16	1.12	
PHPA (Calc. lb/bbl)	1.12	0.93	0.92	
PHPA (Excess lb/bbl)	~	~	~	
Rheology - 600 / 300 / 6 (readings)	59/46/13	46/34/9	39/28/7	

MUD PROPERTY SPECIFICATIONS

Weight :	9-9.2	Filtrate :	<10	Other : Chlorides max. @	< 15k
Viscosity :	N.C.	Plastic Viscosity :	< 20	Yield Point :	>15

By Authority : ~ Operator's written ~ Drilling Contractor

yes Operator's Representative ~ Other

FLUID SUMMARY AND RECOMMENDATIONS

WHILE CONDUCTING THE WIPER TRIP - THROUGH TIGHT HOLE - BELFAST FORMATION CHIPS, WERE CIRCULATED OUT, APPEARING AS 3/8" SHARDS, THOUGH NOT OF THE SHAPE INDICATING EXCESSIVE OVER-PRESSURE.

WITH THE COOLER MUD, THE PHPA WAS MORE VISCOUS DURING THIS PERIOD. ADDING TO THIS, TO GAIN VOLUME, THE PREMIX WAS TRANSFERED QUICKLY, SO THE VISCOSITY REMAINED HIGHER THAN DESIRED, FOR LONGER.

THE SUMP WATER (IN THE FINAL SETTLING PIT) WAS FOUND TO HAVE THE FOLLOWING PROPERTIES : Vis. - 33 s/qt. ; Pf / Mf - 0.4 / 1.02 ; pH - 9.8 ; Total Hardness - 440 ppm. ; Chlorides - 5,300 ppm..

AT THIS TIME, THERE WAS LITTLE FLUID REMAINING, BUT IT WAS ACTIVELY BEING RE-USED, WITH A MINIMUM OF TREATMENT.

OPERATIONS SUMMARY

THE BIT DRILLING / SHEARING ACTION (AIDED WITH THE ASSISTANCE OF THE TEMPERATURE INCREASE) IMPROVED THE MUD PROPERTIES. THIS COMBINED WITH A GOOD DRINK OF SUMP WATER, TO REGAIN VOLUME, REDUCED THE WEIGHT GAIN (FROM THE TRIP ETC.). DRILLED TO 1,651 METRES, PUMPED A BARTES SLUG AND PULLED OUT TO CHANGE THE BIT.

MUD ACCOUNTING (BBLS.)

Fluid Built & Received		Fluid Lost or Disposed		Summary	
Premix		Desander	73.97	Initial Volume	775
w/ fresh water	0	Desilter	0		
" recycled "	329	Downhole	85	Fluid Received	329
Drill Water	0	Dumped	76		
Other	0	Other	17	Fluid Lost	252
				Final Total	852
Total Received	329	Total Lost	252	(Circulating Vol.)	

SOLIDS CONTROL EQUIPMENT

Type	Man.	Hr.		Cones	Hr.	Shaker#	Screen Size	Hr.
Centrifuge	~	0	D'sand	2	14	1	S110/S110/S84	14
Degasser	Drilco	0	D'silter	12	0	2	S110/S110/S84	14

SOLIDS EQUIPMENT EFFICIENCY

	Overflow (ppg.)	Underflow (ppg.)	Output (gal/m)
Desander	9.05	11.3	14
Desilter	~	~	0

Desilter suction blocked - attempts to clear it are on going.

Product	Inventory	Rec'd.	Used	Balance	Unit $	Cost $
Barytes	747			747	6.20	
KCL - Agri.	194			194	25.70	
JK - 261	35		1	34	137.25	137.25
Sodium Sulphite	36		1	35	23.56	23.56
Sod. Bicarbonate	10		6	4	16.38	98.28
CMC - Low Viscosity	49		2	47	71.70	143.40
[redacted]stic Soda	27			27	21.38	
Calcium Carbonate	160		40	120	4.52	180.80

SOLIDS ANALYSIS (ppb / %)

High Gravity Solids			0.1	0.0	
Bentonite			0.7	0.1	
Drilled Solids			43.9	4.8	
Low Gravity Solids			44.6	4.9	
Average S. G.			2.60	Solids	
Med. "n"	#1ck.	#2 ck.	0.359	0.478	
Med. "K"	"	"	4.907	1.423	
Low "n"	"	"	0.380	0.423	
Low "K"	"	"	4.305	2.008	

BIT / HYDRAULICS DATA

Jet Velocity	266
Impact Force	382
HHP / in2	1.8
HHP	102
Bit Press. Loss	569
Csg. Seat Frac Pres	650
" Equiv. Mud Wt.	14.03
Total nozzle area	0.371
E.C.D.	4.90

Daily Chemical Cost : $ 583

Cumulative Cost : $ 16,719

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CULTUS

Independent Drilling Fluid Services Pty. Ltd.

Drilling Fluid Report

A.C.N. 009 267 314

Report#	10	Date :	5-May
Spud Date :	26-Apr 1996		
Depth :	1,522	(M.)To :	1,522

WELL NAME and No. :	**Blackwood # 1**	CONTRACTOR	**O. D. & E.**
Block No. : PPL - 1	Location : Port Campbell	State : Victoria	RIG No. 30
OPERATOR'S REPRESENTATIVE :	**Alex' BRADLEY / Kevin KELLY**	REPORT FOR	**Paul COOPER**

Drilling Assembly				Casing		Mud Volume Bbls.			Circulation Data		
Bit size 8.5	Type : GT18D	Jet size 14.12.12		16 inch @ 9.6	Metres	Hole : 369	Pits : 342		Pump size : [2*] 6.0" * 8.0 ins.		
DP " 4.5	Type : E	Length 1209		9 5/8 inch @ 689.4	Metres	Drill String Cap. : 64	Total Volume : 775		Make/Model 1: G. D. PZ-8	% Effic.	0.95
HWt " 4.5	Type : 42	Length 111.3		~ inch @ ~	Metres	In Storage : 80	Weight : 8.4		Make/Model 2: G. D. PZ-8	% Effic.	0.95
DC " 6.5	Length 201.4	Other 17.85		MUD TYPE : KCL / PHPA Polymer		% O/G: 9	Annular Velocity		Bbl/stk 0.067 Stk/min 90	Bbl/M	5.99
DC " 8	Length 0					DP size 4.5	118 (Ft/M) Lam		Bbl/stk 0.067 Stk/min	GPM :	251
						DC size 6.5	205 (Ft/M) Lam		Bottoms up : 62	PRESSURE :	1,050
						DC size 8	0 (Ft/M) ~		Total Circ. : 129	Type surf/sys.	3

Mud Properties	F / Line	F / Line
Sample From		
Time Sample Taken	15:00	04:00
Flowline Temperature deg. C	33	37
Depth Metres	1522	1522
Weight ppg.	9.0	9.0
Funnel Viscosity (sec/qt.) API @ 32 deg. C	51	53
Plastic Viscosity cP @ 41 deg. C	13	12
Yield Point (lb/100ft2)	24	25
Gel Strength (lb/100ft2) 10 sec. / 10 min.	6 / 13	7 / 15
Filtrate API (cm3 / 30 min.) @	8.4	8
API HTHP Filtrate (cm3 / 30 min.) @ ~ deg. C	~	~
Cake Thickness (32nd. in API / HTHP)	1 / ~	1 / ~
Solids Content (% by Vol.) Calc. / Retort	5.0 / ~	4.5 / ~
Liquid Content (% by Vol.) Oil/Water	~ / 95.0	~ / 95.5
Sand Content (% by Vol.)	Tr	Tr
Methylene Blue Capacity X lb/bbl cm3/cm3	6.0	5.0
pH Strip 22 deg. C	9.3	9.5
Alkalinity Mud (Pm)	~	~
Alkalinity Filtrate (Pf/Mf)	0.48/2.03	0.54/2.35
Chloride (mg/L)	8200	8300
Total Hardness (mg/L)	420	400
Sulphate (mg/L)	140	170
K+ (mg/L)	5500	5700
KCL (% by Wt.)	1.12	1.16
PHPA (Calc. lb/bbl)	1.11	1.16
PHPA (Excess lb/bbl)	~	~
Rheology - 600 / 300 / 6 (readings)	50/37/8	49/37/10

MUD PROPERTY SPECIFICATIONS					
Weight :	9-9.2	Filtrate :	<10	Other :	Chlorides max. @ < 15k
Viscosity :	N.C.	Plastic Viscosity :	< 20	Yield Point :	>15

By Authority : ~ Operator's written ~ Drilling Contractor

yes Operator's Representative ~ Other

FLUID SUMMARY AND RECOMMENDATIONS

THE VOLUME PREMIX WAS WEIGHTED WITH BARYTES PRIOR TO TRANSFERING.

DUE TO THE EXPECTED IMMANENT PDC BIT RUN, TO MINIMIZE WEIGHT INCREASES, CALCIUM CARBONATE WILL BE USED FOR THE WIPER TRIP. THIS WOULD BE BENEFICIAL TO COUNTER DOWN-HOLE SEEPAGE, IF CIRCULATED PAST THE SAND ZONES.

MAINTENANCE ADDITIONS ONLY, THOUGH IT HAS BEEN OBSERVED THAT THE CLAY CONTENT IS DROPPING AND THE WEIGHT HAS LOWERED SLIGHTLY.

DUE TO RECYCLING THE SUMP WATER, OTHER THAN THE HARDNESS CONTENT NEEDING CONTINOUS TREATMENT, THE TOTAL CHLORIDES ARE SLOWLY INCREASING [ALTHOUGH THE "K+" CHLORIDES HAVE BEEN KEPT REASONABLY CONSTANT.

OPERATIONS SUMMARY

RIG REPAIRS.

A VOLUME (80 BBL.) PREMIX WAS MADE - UP AND PLACED ON STAND-BY, IN READINESS, FOR WHEN THE RIG IS BACK TO DRILLING.

MUD ACCOUNTING (BBLS.)

Fluid Built & Received		Fluid Lost or Disposed		Summary	
Premix		Desander	0	Initial Volume	745
w/ fresh water	0	Desilter	0		
" recycled "	150	Downhole	68	Fluid Received	150
Drill Water	0	Dumped	18		
Other	0	Other	34	Fluid Lost	120
				Final Total	775
Total Received	18	Total Lost	120	(Circulating Vol.)	

SOLIDS CONTROL EQUIPMENT

Type	Man.	Hr.		Cones	Hr.	Shaker#	Screen Size	Hr.
Centrifuge	~	0	D'sand	2	0	1	S110/S110/S84	24
Degasser	Drilco	0	D'silter	12	0	2	S110/S110/S84	24

SOLIDS EQUIPMENT EFFICIENCY

	Overflow (ppg.)	Underflow (ppg.)	Output (gal/m)
Desander			0
Desilter	~	~	0

Product	Inventory	Rec'd.	Used	Balance	Unit $	Cost $
Barytes	787		40	747	6.2	248.00
KCL - Agri.	200		6	194	25.7	154.20
JK - 261	41		6	35	137.3	823.50
Sodium Sulphite	38		2	36	23.56	47.12
Sod. Bicarbonate	12		2	10	16.38	32.76
CMC - Low Viscosity	50		1	49	71.70	71.70
Caustic Soda	28		1	27	21.38	21.38

SOLIDS ANALYSIS (ppb / %)

High Gravity Solids	0.1	0.0	
Bentonite	1.2	0.1	
Drilled Solids	39.7	4.4	
Low Gravity Solids	40.9	4.5	
Average S. G.	2.60	Solids	
Med. "n" #1ck. #2 ck.	0.434	0.405	
Med. "K" " "	2.468	2.960	
Low "n" " "	0.395	0.362	
Low "K" " "	3.150	3.881	

BIT / HYDRAULICS DATA

Jet Velocity	217
Impact Force	254
HHP / in2	1.0
HHP	56
Bit Press. Loss	379
Csg. Seat Frac Pres	650
" Equiv. Mud Wt.	14.03
Total nozzle area	0.371
E.C.D.	5.04

Daily Chemical Cost : $ 1,399

Cumulative Cost : $ 16,135

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CULTUS

Independent Drilling Fluid Services Pty. Ltd.

A.C.N. 009 267 314

Drilling Fluid Report

Report# 9	Date : 4-May
Spud Date : 26-Apr 1996	
Depth : 1,522	(M.)To : 1,522

WELL NAME and No. : **Blackwood # 1**

CONTRACTOR **O. D. & E.**

Block No. : PPL - 1 | Location : - Port Campbell | State : Victoria

RIG No. 30

OPERATOR'S REPRESENTATIVE : Alex' BRADLEY / Kevin KELLY

REPORT FOR **Paul COOPER**

Drilling Assembly				Casing		Mud Volume Bbls.				Circulation Data			
Bit size 8.5	Type : GT18D	Jet size 14.12.12		16 inch @ 9.6 Metres		Hole : 362	Pits : 328			Pump size : [2*] 6.0 * 8.0" ins.			
DP " 4.5	Type : E	Length 1107		9 5/8 inch @ 689.4 Metres		Drill String Cap. : 55	Total Volume : 745			Make/Model 1: G. D. PZ-8	% Effic. 0.95		
HWt " 4.5	Type : 42	Length 111.3		~ inch @ ~ Metres		In Storage : 95	Weight : 8.6			Make/Model 2: G. D. PZ-8	% Effic. 0.95		
DC " 6.5	Length 303.4	Other 17.85		MUD TYPE : KCL / PHPA Polymer		% O/G: 9	Annular Velocity			Bbl/stk 0.067 Stk/min 90	Bbl/M 5.99		
DC " 8	Length					DP size 4.5	118 (Ft/M) Lam			Bbl/stk 0.067 Stk/min	GPM : 251		
						DC size 6.5	205 (Ft/M) Lam			Bottoms up : 60	PRESSURE : 1,050		
						DC size 8	(Ft/M) ~			Total Circ. : 125	Type surf/sys. 3		

Mud Properties				
Sample From	F / Line		F / Line	
Time Sample Taken	14:30		05:00	
Flowline Temperature deg. C	38		37	
Depth Metres	1522		1522	
Weight ppg.	9		9	
Funnel Viscosity (sec/qt.) API @ 37 deg. C	51		53	
Plastic Viscosity cP @ 41 deg. C	11		13	
Yield Point (lb/100ft2)	21		23	
Gel Strength (lb/100ft2) 10 sec. / 10 min.	6	15	8	15
Filtrate API (cm3 / 30 min.) @	8.2		8.8	
API HTHP Filtrate (cm3 / 30 min.) @ ~ deg. C	~		~	
Cake Thickness (32nd. in API / HTHP)	1	~	1	~
Solids Content (% by Vol.) Calc. / Retort	5.0	~	4.5	~
Liquid Content (% by Vol.) Oil/Water		95.0		95.5
Sand Content (% by Vol.)	Tr		Tr	
Methylene Blue Capacity X lb/bbl cm3/cm3	7.0		9.0	
pH Strip 22 deg. C	9		9.3	
Alkalinity Mud (Pm)	~		~	
Alkalinity Filtrate (Pf/Mf)	0.3/1.86		0.38/1.92	
Chloride (mg/L)	7300		8000	
[redacted] Hardness (mg/L)	680		360	
Sulphite (mg/L)	160		160	
K+ (mg/L)	5600		6600	
KCL (% by Wt.)	1.14		1.35	
PHPA (Calc. lb/bbl)	1.08		1.07	
PHPA (Excess lb/bbl)	~		~	
Rheology - 600 / 300 / 6 (readings)	43/32/10		49/36/10	

MUD PROPERTY SPECIFICATIONS

Weight :	9-9.2	Filtrate :	<10	Other :	Chlorides max. @ < 15k
Viscosity :	N.C.	Plastic Viscosity :	< 20	Yield Point :	>15

By Authority : ~ Operator's written ~ Drilling Contractor

yes Operator's Representative ~ Other

FLUID SUMMARY AND RECOMMENDATIONS

THE OPORTUNITY PRESENTED, ALLOWED TIME FOR SOME REPAIRS TO BE DONE.

THE TWO PREMIX PITS THAT WERE COMMUNICATING WITH THE MAIN SUCTION, WERE EMPTIED AND THE VALVES OVER-HAULED.

THIS THEN, MAYBE THE END OF THE TIDAL LIKE SURGES THAT HAVE BEEN HAPPENNING THROUGH THIS SECTION (BETWEEN THE ACTIVE SYSTEM AND BOTH THE PREMIX PITS) AND WERE INCREASING IN FREQUENCY.

FOLLOWING THIS, A VOLUME PREMIX WAS MADE AND PRIMARY SHEARING TOOK PLACE.

THE PREMIX WAS WEIGHTED TO 9.0 PPG TO ENSURE THAT THERE WAS NO FLUCTUATIONS IN THE ACTIVE MUD & TO KEEP WITHIN THE SPECIFIED PROGRAMME.

OPERATIONS SUMMARY

RIG REPAIRS.

THE SUMP PIT HARDNESS CONTENT HAS DEPLETED BICARB. STOCKS.

THE PREMIX IS BEING BLED INTO THE ACTIVE SYSTEM THROUGH THIS PERIOD (I.E. FINAL REPORT TIME).

FURTHER REPAIRS TOOK PLACE ON THE DESILTER SUCTION & DEGASER PIT PUMP SUCTION J-STYNE.

MUD ACCOUNTING (BBLS.)

Fluid Built & Received		Fluid Lost or Disposed		Summary	
Premix		Desander	8	Initial Volume	810
w/ fresh water		Desilter			
" recycled "		Downhole	17	Fluid Received	
Drill Water		Dumped	12		
Other		Other	28	Fluid Lost	65
				Final Total	745
Total Received		Total Lost	65	(Circulating Vol.)	

SOLIDS CONTROL EQUIPMENT

Type	Man.	Hr.	Cones		Hr.	Shaker#	Screen Size	Hr.
Centrifuge	~		D'sand	2	6	1	S110/S110/S84	24
Degasser	Drilco		D'silter	12		2	S110/S110/S84	24

SOLIDS EQUIPMENT EFFICIENCY

	Overflow (ppg.)	Underflow (ppg.)	Output (gal/m)
Desander	9.1	10.2	0.9
Desilter	~	~	

Product	Inventory	Rec'd.	Used	Balance	Unit $	Cost $
Barytes	867		80	787	6.2	496.00
KCL - Agri.	206		6	200	25.7	154.20
JK - 261	47		6	41	137.3	823.50
Sodium Sulphite	44		6	38	23.56	141.36
Sod. Bicarbonate	22		10	12	16.38	163.80
[redacted] - Low Viscosity	52		2	50	71.70	143.40
Caustic Soda	29		1	28	21.38	21.38

SOLIDS ANALYSIS (ppb / %)

			BIT / HYDRAULICS DATA	
High Gravity Solids	0.1	0.0	Jet Velocity	217
Bentonite	6.5	0.7	Impact Force	254
Drilled Solids	34.6	3.8	HHP / in2	1.0
Low Gravity Solids	41.1	4.5	HHP	56
Average S. G.	2.60	Solids	Bit Press. Loss	379
Med. "n" #1ck #2 ck.	0.426	0.445	Csg. Seat Frac Pres	650
Med. "K" " "	2.246	2.251	" Equiv. Mud Wt.	14.03
Low "n" " "	0.363	0.327	Total nozzle area	0.371
Low "K" " "	3.316	4.696	E.C.D.	5.04

Daily Chemical Cost : $ 1,944

Cumulative Cost : $ 14,737

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CULTUS

Independent Drilling Fluid Services Pty. Ltd.

A.C.N. 009 267 314

Drilling Fluid Report

Report# 8 | Date : 3-May

Spud Date : 26-Apr 1996

Depth : 1,367 (M.)To : 1,522

WELL NAME and No. : **Blackwood # 1**

CONTRACTOR **O. D. & E.**

Block No. : PPL - 1 | Location : Port Campbell | State : Victoria

RIG No. 30

OPERATOR'S REPRESENTATIVE : Alex' BRADLEY / Kevin KELLY

REPORT FOR Dav' BAKER

Drilling Assembly				Casing				Mud Volume Bbls.			
Bit size 8.5	Type : GT18D	Jet size 14.12.12		16	inch @ 9.6	Metres	Hole :	362	Pits :	393
DP " 4.5	Type : E	Length 1107		9 5/8	inch @ 689.4	Metres	Drill String Cap. :	55	Total Volume :	810
HWt " 4.5	Type : 42	Length 111.3		~	inch @ ~	Metres	In Storage :	95	Weight :	8.6
DC " 6.5	Length 303.4	Other 17.85								
DC " 8	Length									

Circulation Data			
Pump size :	[2*] 6.0 * 8.0"	ins.	
Make/Model 1:	G. D. PZ-8	% Effic.	0.95
Make/Model 2:	G. D. PZ-8	% Effic.	0.95
Bbl/stk 0.067	Stk/min 90	Bbl/M	5.99
Bbl/stk 0.067	Stk/min	GPM :	251
Bottoms up :	60	PRESSURE :	900
Total Circ. :	135	Type surf/sys.	3

MUD TYPE : KCL / PHPA

% O/G: 9	Annular Velocity
DP size 4.5	118 (Ft/M) Lam
DC size 6.5	205 (Ft/M) Lam
DC size 8	(Ft/M) ~

Mud Properties				
Sample From		F / Line		F / Line	
Time Sample Taken		13:30		24:00	
Flowline Temperature	deg. C	41		40	
Depth Metres		1513		1522	
Weight ppg.		9.1		9.05	
Funnel Viscosity (sec/qt.) API @ 39	deg. C	42		50	
Plastic Viscosity cP @ 32	deg. C	13		12	
Yield Point (lb/100ft2)		20		20	
Gel Strength (lb/100ft2) 10 sec. / 10 min.		5	12	7	14
Filtrate API (cm3 / 30 min.) @		10.5		9.4	
API HTHP Filtrate (cm3 / 30 min.) @ ~	deg. C	~		~	
Cake Thickness (32nd. in API / HTHP)		1	~	1	~
Solids Content (% by Vol.) Calc. / Retort		5.8	~	5.0	~
Liquid Content (% by Vol.) Oil/Water			94.2		95.0
Sand Content (% by Vol.)		Tr		Tr	
Methylene Blue Capacity X lb/bbl	cm3/cm3	9.0		9.0	
pH Strip	21 deg. C	9		9.2	
Alkalinity Mud (Pm)		~		~	
Alkalinity Filtrate (Pf/Mf)		0.28/1.22		0.32/1.25	
Chloride (mg/L)		6800		7100	
Total Hardness (mg/L)		380		260	
[illegible]hite (mg/L)		150		160	
[illegible](mg/L)		5500		6000	
KCL (% by Wt.)		1.13		1.23	
PHPA (Calc. lb/bbl)		1.24		1.18	
PHPA (Excess lb/bbl)		~		~	
Rheology - 600 / 300 / 6 (readings)		46/33/6		44/32/10	

MUD PROPERTY SPECIFICATIONS					
Weight :	9-9.2	Filtrate :	<10	Other :	Chlorides max. @ < 15k
Viscosity :	N.C.	Plastic Viscosity :	< 20	Yield Point :	>15

By Authority : ~ Operator's written ~ Drilling Contractor

yes Operator's Representative ~ Other

FLUID SUMMARY AND RECOMMENDATIONS

THE BELFAST MUDSTONE WAS DRILLED THROUGH WITHOUT ANY PROBLEMS, ALTHOUGH MORE PHPA WAS TAKEN OUT OF THE SYSTEM, AS NOTED AT THE SHAKERS, WITH THE CLAY CUTTINGS REVEALED AS A "SLOP". THIS WHEN COMPRESSED SHOWED THAT THERE WAS SUFFICIENT PHPA EVIDENT, BUT THERE WAS A CONTINUED EFFORT TO MAINTAIN THE PHPA LEVEL.

VOLUME WAS BUILT WITH SUMP WATER, WHICH WAS TREATED PRIOR TO ADDITION TO THE ACTIVE SYSTEM.

DUE TO WEATHER EXPOSURE, THERE WERE FOUR SACKS OF SOD. SULPHITE USED, THAT A PERCENTAGE WAS DISPOSED OF, AS TOO "ROCKY FOR CONSUMPTION".

AS MENTIONED IN THE PREVIOUS REPORT, THE PROPERTIES WERE REFINED IN THIS PERIOD TO CONFORM WITH THE PROGRAMME.

OPERATIONS SUMMARY

THE RIG DRILLED TO 1,522 METRES AND REPAIRS FOLLOWED. DURING THIS TIME MAINTENANCE ADDITIONS WERE ADDED, WITH A SLIGHT INCREASE OF THE POTASSIUM LEVEL (THAT NEEDED RE - INFORCING).

MUD ACCOUNTING (BBLS.)

Fluid Built & Received		Fluid Lost or Disposed		Summary	
Premix		Desander	21	Initial Volume	762
w/ fresh water	10	Desilter			
" recycled "	165	Downhole	45	Fluid Received	175
Drill Water		Dumped	15		
Other		Other	46	Fluid Lost	127
				Final Total	810
Total Received	175	Total Lost	127	(Circulating Vol.)	

SOLIDS CONTROL EQUIPMENT

Type	Man.	Hr.		Cones	Hr.	Shaker#	Screen Size	Hr.
Centrifuge	~	~	D'sand	2	24	1	S110/S110/S110	24
Degasser	Drilco	~	D'silter	12		2	S175/S110/S110	24

SOLIDS EQUIPMENT EFFICIENCY

	Overflow (ppg.)	Underflow (ppg.)	Output (gal/m)
Desander	9.15	10.8	0.61
Desilter	~	~	

Product	Inventory	Rec'd.	Used	Balance	Unit $	Cost $
Barytes	871		4	867	6.2	24.80
KCL - Agri.	217		11	206	25.7	282.70
JK - 261	57		10	47	137.3	1,372.50
Sodium Sulphite	49		5	44	23.56	117.80
Sod. Bicarbonate	32		10	22	16.38	163.80
CMC - Low Viscosity	58		6	52	71.70	430.20
[illegible]ac	33		4	29	152.3	609.12

SOLIDS ANALYSIS (ppb / %)

High Gravity Solids	0.1	0.0	
Bentonite	5.9	0.7	
Drilled Solids	39.1	4.3	
Low Gravity Solids	45.0	4.9	
Average S. G.	2.60	Solids	
Med. "n" #1ck. #2 ck.	0.479	0.459	
Med. "K" " "	1.663	1.826	
Low "n" " "	0.410	0.330	
Low "K" " "	2.563	4.086	

BIT / HYDRAULICS DATA

Jet Velocity	217
Impact Force	256
HHP / in2	1.0
HHP	56
Bit Press. Loss	381
Csg. Seat Frac Pres	650
" Equiv. Mud Wt.	14.03
Total nozzle area	0.371
E.C.D.	4.47

Daily Chemical Cost : $ 3,001

Cumulative Cost : $ 12,793

ENGINEER EDD PERKINS | ADDRESS South Australia | TELEPHONE 08 - 338 3027

CULTUS

Independent Drilling Fluid Services Pty. Ltd.

Drilling Fluid Report

A.C.N. 009 267 314

Report#	7	Date :	2-May
Spud Date :	26-Apr 1996		
Depth :	1,110	(M.)To :	1,367

WELL NAME and No. : **Blackwood # 1**

CONTRACTOR **O. D. & E.**

Block No. : PPL - 1 | Location : Port Campbell | State : Victoria

RIG No. 30

OPERATOR'S REPRESENTATIVE : Aiex' BRADLEY / Kevin KELLY

REPORT FOR Dav' BAKER

Drilling Assembly				Casing	Mud Volume Bbls.			Circulation Data		
Bit size 8.5	Type : GT18D	Jet size 14.12.12		16 inch @ 9.6 Metres	Hole : 336	Pits : 368		Pump size : [2*] 6.0 * 8.0" ins.		
DP " 4.5	Type : E	Length 952.4		9 5/8 inch @ 689.4 Metres	Drill String Cap. : 55	Total Volume : 762		Make/Model 1: G. D. PZ-8	% Effic.	0.95
HWt " 4.5	Type : 42	Length 111.3		~ inch @ ~ Metres	In Storage : 80	Weight : 8.4		Make/Model 2: G. D. PZ-8	% Effic.	0.95
DC " 6.5	Length 303.4	Other 17.85		MUD TYPE : KCL / PHPA	% O/G: 9	Annular Velocity		Bbl/stk 0.067 Stk/min 80	Bbl/M	10.64
DC " 8	Length				DP size 4.5	211 (Ft/M) Lam		Bbl/stk 0.067 Stk/min 80	GPM :	447
					DC size 6.5	365 (Ft/M) Lam		Bottoms up : 32	PRESSURE :	2050
					DC size 8	(Ft/M) ~		Total Circ. : 72	Type surf/sys.	3

Mud Properties	F / Line	F / Line
Sample From		
Time Sample Taken	16:00	04:00
Flowline Temperature deg. C	38	41
Depth Metres	1236	1413
Weight ppg.	8.9	8.85
Funnel Viscosity (sec/qt.) API @ 35 deg. C	37	36
Plastic Viscosity cP @ 32 deg. C	10	9
Yield Point (lb/100ft2)	13	13
Gel Strength (lb/100ft2) 10 sec. / 10 min.	3 / 6	3 / 6
Filtrate API (cm3 / 30 min.) @	13.3	14.1
API HTHP Filtrate (cm3 / 30 min.) @ ~ deg. C	~	~
Cake Thickness (32nd. in API / HTHP)	1 / ~	2 / ~
Solids Content (% by Vol.) Calc. / Retort	4.3 / ~	3.5 / ~
Liquid Content (% by Vol.) Oil/Water	/ 95.7	/ 96.5
Sand Content (% by Vol.)	0.25	Tr
Methylene Blue Capacity x lb/bbl cm3/cm3	8.0	7.0
pH Strip 21 deg. C	9	8.8
Alkalinity Mud (Pm)	~	~
Alkalinity Filtrate (Pf/Mf)	0.12/0.67	0.28/1.14
Chloride (mg/L)	6300	6700
Total Hardness (mg/L)	480	500
[illegible]te (mg/L)	150	110
K[illegible]g/L)	5500	6500
KCL (% by Wt.)	1.13	1.33
PHPA (Calc. lb/bbl)	1.1	1.12
PHPA (Excess lb/bbl)	~	~
Rheology - 600 / 300 / 6 (readings)	33/23/3	31/22/3

MUD PROPERTY SPECIFICATIONS

Weight :	Min.	Filtrate :		Other : Chlorides max. @	< 15k
Viscosity :	N.C.	Plastic Viscosity :	< 20	Yield Point :	>10

By Authority : ~ Operator's written ~ Drilling Contractor

yes Operator's Representative ~ Other

FLUID SUMMARY AND RECOMMENDATIONS

EFFORTS TO RAISE THE PHPA LEVEL CONTINUE, WITH DRY PHPA BEING ADDED DIRECT AND ALSO IN THE PREMIXED FORM AS VOLUME IS REQUIRED.

IT SHOULD BE NOTED THAT THE SODIUM SULPHATE CONSUMPTION IS LESS, LEADING ONE TO BELEIVE THAT THIS BRAND IS MORE CONCENTRATED.

THE RECYCLING OF SUMP FLUID HAS BEEN EXTENDED IN THIS 24 HOUR PERIOD AND WITH THE 3 SETTLING PONDS, RELATIVELY GOOD FLUID IS BEING RECLAIMED.

DURING THE WIPER TRIP, THE SAND TRAP WAS DUMPED AND CLEANED OUT [BEING TOTALLY FULL OF SAND / SOLIDS].

THE ABOVE MENTIONED EFFORTS ARE TO COUNTER THE EXPECTED PROBLEMS, WHEN PENETRATING THE BELFAST MUDSTONE.

OPERATIONS SUMMARY

THE WIPER TRIP WAS CONDUCTED AT 1,215 METRES, WITH LITTLE DRAG ENCOUNTERED,IN THE PAARATTE FORMATION.

THERE WAS SIGNS OF THE CLAY SECTION STILL BEING "STICKY", INDICATING FURTHER PHPA WOULD BE USEFUL.

AS PER THE PROGRAMME, AT APPROXIMATELY 1,400 METRES, ADDITIONS TO REDUCE THE FLUID LOSS, BEGAN.

MUD ACCOUNTING (BBLS.)

Fluid Built & Received		Fluid Lost or Disposed		Summary	
Premix		Desander	32	Initial Volume	654
w/ fresh water	52	Desilter	30		
" recycled "	295	Downhole	56	Fluid Received	347
Drill Water		Dumped	92		
Other		Other	28	Fluid Lost	239
				Final Total	762
Total Received	347	Total Lost	239	(Circulating Vol.)	

SOLIDS CONTROL EQUIPMENT

Type	Man.	Hr.		Cones	Hr.	Shaker#	Screen Size	Hr.
Centrifuge	~	~	D'sand	2	20	1	S175/S110/S110	20
Degasser	Drilco	~	D'silter	12	10	2	S175/S110/S110	20

SOLIDS EQUIPMENT EFFICIENCY

	Overflow (ppg.)	Underflow (ppg.)	Output (gal/m)
Desander	8.95	9.7	1.13
Desilter	8.9	11.6	2.11

Product	Inventory	Rec'd.	Used	Balance	Unit $	Cost $
Barytes	891		20	871	6.2	124.00
KCL - Agri.	246		20	226	25.7	514.00
JK - 261	66		9	57	137.3	1,235.25
Sodium Sulphite	54		5	49	23.56	117.80
Sod. Bicarbonate		40	8	32	16.38	131.04

SOLIDS ANALYSIS (ppb / %)

			BIT / HYDRAULICS DATA	
High Gravity Solids	0.1	0.0	Jet Velocity	386
Bentonite	5.1	0.6	Impact Force	791
Drilled Solids	26.5	2.9	HHP / in2	5.4
Low Gravity Solids	31.6	3.5	HHP	307
Average S. G.	2.60	Solids	Bit Press. Loss	1177
Med. "n" #1ck. #2 ck.	0.521	0.494	Csg. Seat Frac Pres	650
Med. "K" " "	0.895	1.008	" Equiv. Mud Wt.	14.03
Low "n" " "	0.442	0.433	Total nozzle area	0.371
Low "K" " "	1.458	1.481	E.C.D.	9.50

Daily Chemical Cost : $ 2,122

Cumulative Cost : $ 9,792

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CULTUS

Independent Drilling Fluid Services Pty. Ltd.

Drilling Fluid Report A.C.N. 009 267 314

Report#	6	Date :	1-May
Spud Date :	26-Apr 1996		
Depth :	692	(M.)To :	1,110

WELL NAME and No. : **Blackwood # 1**

CONTRACTOR **O. D. & E.**

Block No. : PPL - 1 | Location : Port Campbell | State : Victoria

RIG No. 30

OPERATOR'S REPRESENTATIVE : Alex' BRADLEY / Kevin KELLY

REPORT FOR Dav' BAKER

Drilling Assembly				Casing		Mud Volume Bbls.				Circulation Data			
Bit size 8.5	Type : GT18D	Jet size 14.12.12		16 inch @ 9.6 Metres		Hole : 294	Pits : 318			Pump size : [2*] 6.0 * 8.0" ins.			
DP " 4.5	Type : E	Length 695.4		9 5/8 inch @ 689.4 Metres		Drill String Cap. : 42	Total Volume : 654			Make/Model 1: G. D. PZ-8		% Effic.	0.95
HWt " 4.5	Type : 42	Length 111.3		~ inch @ ~ Metres		In Storage : 120	Weight : 8.4			Make/Model 2: G. D. PZ-8		% Effic.	0.95
DC " 6.5	Length 303.4	Other 17.85		MUD TYPE : KCL / PHPA		% O/G: 10	Annular Velocity			Bbl/stk 0.067	Stk/min 80	Bbl/M	10.64
DC " 8	Length 0					DP size 4.5	211 (Ft/M) Lam			Bbl/stk 0.067	Stk/min 80	GPM :	447
						DC size 6.5	365 (Ft/M) Lam			Bottoms up : 28		PRESSURE :	1880
						DC size 8	0 (Ft/M) ~			Total Circ. : 61		Type surf/sys.	3

Mud Properties	F / Line		F / Line	
Sample From				
Time Sample Taken	15:00		04:00	
Flowline Temperature deg. C	39		38	
Depth Metres	940		1163	
Weight ppg.	8.9		8.85	
Funnel Viscosity (sec/qt.) API @ 36 deg. C	33		35	
Plastic Viscosity cP @ 29 deg. C	8		9	
Yield Point (lb/100ft2)	8		11	
Gel Strength (lb/100ft2) 10 sec. / 10 min.	3	5	3	6
Filtrate API (cm3 / 30 min.) @	19.3		14.2	
API HTHP Filtrate (cm3 / 30 min.) @ ~ deg. C	0		0	
Cake Thickness (32nd. in API / HTHP)	1	0	1	~
Solids Content (% by Vol.) Calc. / Retort	4.3	0	3.5	0
Liquid Content (% by Vol.) Oil/Water	0	95.7	0	96.5
Sand Content (% by Vol.)	0.5		Tr	
Methylene Blue Capacity x lb/bbl cm3/cm3	8.0		7.0	
pH strip 22 deg. C	9.3		9.2	
Alkalinity Mud (Pm)	~		~	
Alkalinity Filtrate (Pf/Mf)	0.38/0.84		0.2/0.76	
Chloride (mg/L)	6200		6800	
Total Hardness (mg/L)	380		420	
S[redacted]e (mg/L)	160		140	
K+ [redacted]g/L)	5400		6100	
KCL (% by Wt.)	1.10		1.25	
PHPA (Calc. lb/bbl)	0.61		0.74	
PHPA (Excess lb/bbl)	~		~	
Rheology - 600 / 300 / 6 (readings)	24/16/3		29/20/4	

MUD PROPERTY SPECIFICATIONS

Weight :	Min.	Filtrate :	0	Other :	Chlorides max. @ < 15k
Viscosity :	N.C.	Plastic Viscosity :	< 20	Yield Point :	>5

By Authority : ~ Operator's written ~ Drilling Contractor

yes Operator's Representative ~ Other

FLUID SUMMARY AND RECOMMENDATIONS

THE MUD ACCOUNT'G SUMMARY [IN THIS REPORT] DOES NOT SHOW THE MUD USED & DUMPED AFTER THE CEMENT WAS DRILLED OUT (IN THE CASING).
THE AMOUNT WAS 261 BBLS..

VOLUME WAS BUILT AS THE YIELD POINT WAS SLOWLY RAISED. THIS WAS INTENTIONAL, DUE TO THE DIRECT INFLUENCE OF RAISING THE Y.P. IS ALSO PROPORTIONAL TO THE WEIGHT INCREASE - - ESPECIALLY IN THE SAND SECTIONS (AS IS BEING PENETRATED AT THIS TIME) - PROIR TO MIDNIGHT.

DUE TO COMMUNICATIONS BETWEEN THE PITS, THE PREMIX IS NOT BEING ADDED AS EVENLY AS DESIRED, BUT IT IS NOT IMPAIRING THE OPERATION.

OPERATIONS SUMMARY

AFTER THE F.I.T., DRILLING CONTINUED WITH THE 8 1/2" RR BIT, THROUGH THE PAARATTE FORMATION.

THE DESILTER HAS BEEN BEEN OPERATING ERRATICALLY & IS BEING "WORKED ON".

THE PHPA LEVEL IS SLOWLY INCREASING, WHICH IS ASSISTING TO LOWER THE FLUID LOSS & RAISE THE YIELD POINT.

MUD ACCOUNTING (BBLS.)

Fluid Built & Received		Fluid Lost or Disposed		Summary	
Premix		Desander	38	Initial Volume	0
w/ fresh water	862	Desilter	42		
" recycled "	0	Downhole	72	Fluid Received	862
Drill Water	0	Dumped	21		
Other	0	Other	35	Fluid Lost	208
				Final Total	654
Total Received	862	Total Lost	208	(Circulating Vol.)	

SOLIDS CONTROL EQUIPMENT

Type	Man.	Hr.		Cones	Hr.	Shaker#	Screen Size	Hr.
Centrifuge	~	0	D'sand	2	21	1	S175/S110/S110	24
Degasser	Drilco	0	D'silter	12	15	2	S175/S110/S110	24

SOLIDS EQUIPMENT EFFICIENCY

	Overflow (ppg.)	Underflow (ppg.)	Output (gal/m)
Desander	8.95	14.3	1.27
Desilter	8.95	10.2	1.98

Product	Inventory	Rec'd.	Used	Balance	Unit $	Cost $
Barytes	891		0	891	6.2	0 .00
KCL - Agri.	261		15	246	25.7	386 .00
id - Gel	54		26	28	8.13	211 .00
JK - 261	73		7	66	137.3	961 .00
Sodium Sulphite	61		7	54	23.56	165 .00
Sod. Bicarbonate	0		0	0	16.33	0 .00
Flowzan	5		1	4	400.00	400 .00
C[redacted]c Soda	39		4	35	21.38	86 .00
0			0		0	0 .00
0			0		0	0 .00

SOLIDS ANALYSIS (ppb / %)

High Gravity Solids	0.1	0.0		
Bentonite	5.1	0.6		
Drilled Solids	26.4	2.9		
Low Gravity Solids	31.5	3.5		
Average S. G.	2.60	Solids		
Med. "n" #1ck. #2 ck.	0.585	0.536		
Med. "K" " "	0.418	0.708		
Low "n" " "	0.363	0.412		
Low "K" " "	1.658	1.532		

BIT / HYDRAULICS DATA

Jet Velocity	386
Impact Force	791
HHP / in2	5.4
HHP	307
Bit Press. Loss	1177
Csg. Seat Frac Pres	650
" Equiv. Mud Wt.	14.03
Total nozzle area	0.371
E.C.D.	10.47

Daily Chemical Cost : $ 2,208

Cumulative Cost : $ 7,670

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CULTUS

Independent Drilling Fluid Services Pty. Ltd.

Drilling Fluid Report

A.C.N. 009 267 314

Report# 5	Date : 30-Apr
Spud Date : 26-Apr 1996	
Depth : 692	(M.)To : 692

WELL NAME and No. : **Blackwood # 1**

CONTRACTOR **O. D. & E.**

Block No. : PPL - 1 | Location : Port Campbell | State : Victoria

RIG No. 30

OPERATOR'S REPRESENTATIVE : Alex' BRADLEY / Kevin KELLY

REPORT FOR Dav' BAKER

Drilling Assembly				Casing				Mud Volume Bbls.				Circulation Data			
Bit size 8.5	Type : GT18D	Jet size 14.12.12		16 inch @ 9.6	Metres	Hole :	224	Pits :	85	Pump size :	[2*] 6.0 * 8.0"	ins.	
DP " 4.5	Type : E	Length 277.4		9 5/8 inch @ 689.4	Metres	Drill String Cap. :	0	Total Volume :	261	Make/Model 1:	G. D. PZ-8	% Effic.	0.95
HWt " 4.5	Type : 42	Length 111.3		~ inch @ ~	Metres	In Storage :	535	Weight :	8.45	Make/Model 2:	G. D. PZ-8	% Effic.	0.95
DC " 6.5	Length 303.4	Other 17.85		MUD TYPE :	F.W. Native Clay	% O/G:	0	Annular Velocity		Bbl/stk 0.067	Stk/min 80	Bbl/M	10.71
DC " 8	Length 0					DP size 4.5		212 (Ft/M) Lam		Bbl/stk 0.067	Stk/min 81	GPM :	450
						DC size 6.5		367 (Ft/M) Lam		Bottoms up :	16	PRESSURE :	1000
						DC size 8		0 (Ft/M) ~		Total Circ. :	24	Type surf/sys.	3

Mud Properties	Pit		F / Line	
Sample From				
Time Sample Taken	20:00		02:30	
Flowline Temperature deg. C	NC		28	
Depth Metres	692		695	
Weight ppg.	8.5		8.55	
Funnel Viscosity (sec/qt.) API @ 17 deg. C	27		28	
Plastic Viscosity cP @ 16 deg. C	3		4	
Yield Point (lb/100ft2)	4		4	
Gel Strength (lb/100ft2) 10 sec. / 10 min.	1	1	1	2
Filtrate API (cm3 / 30 min.) @	19.5		21.6	
API HTHP Filtrate (cm3 / 30 min.) @ ~ deg. C	0		0	
Cake Thickness (32nd. in API / HTHP)	1	0	1	~
Solids Content (% by Vol.) Calc. / Retort	8.8	0	1.1	0
Liquid Content (% by Vol.) Oil/Water	0	91.2	0	98.9
Sand Content (% by Vol.)	0		Tr	
Methylene Blue Capacity X lb/bbl cm3/cm3	~		2.0	
pH strip 15 deg. C	8.7		9	
Alkalinity Mud (Pm)	~		~	
Alkalinity Filtrate (Pf/Mf)	0.18/0.67		0.24/0.72	
Chloride (mg/L)	9800		8800	
Total Hardness (mg/L)	560		620	
[redacted] (mg/L)	~		110	
K+ [redacted] g/L)	7800		6500	
KCL (% by Wt.)	1.60		1.33	
PHPA (Calc. lb/bbl)	0.56		0.54	
PHPA (Excess lb/bbl)	~		~	
Rheology - 600 / 300 / 6 (readings)	10/7/1		12/8/1	

MUD PROPERTY SPECIFICATIONS

Weight :	Min.	Filtrate :	0	Other :	KCL max. @ 15k
Viscosity :	N.C.	Plastic Viscosity :	<20	Yield Point :	>5

By Authority : ~ Operator's written ~ Drilling Contractor

yes Operator's Representative ~ Other

FLUID SUMMARY AND RECOMMENDATIONS

THE MAIN HOLE KCL / PHPA WAS SHEARED FOR AS LONG AS POSSIBLE.

DUE TO COMMUNICATION, SOME 12 1/4" HOLE MUD DID MIX INTO THE PHPA SYSTEM, BUT WAS OF LITTLE CONSEQUENCE.

THE FIRST REPORTED CHECK, WAS OF THE CONCENTRATED FLUID PRIOR TO DILUTION [WHICH TOOK PLACE ONCE THE SHOE WAS DRILLED OUT].

AT THAT TIME NO SODIUM SULPHITE WAS ADDED, AS IT WOULD HAVE LOST DUE TO THE SHEARING ACTION BEING PERFORMED.

PRIOR TO CHANGING MUD SYSTEMS, THE ABOVE S. SULPHITE WAS ADDED.

OPERATIONS SUMMARY

THE CASING WAS DRILLED OUT WITH THE 12 1/4" SECTION MUD. THE CHANGE OVER TO THE PHPA / KCL FLUID WAS COMPLETED WITH NO PROBLEMS AND WITH THE FINER SHAKER SCREENS BEING ABLE TO COPE.

AS DRILLING PROGRESSED, VOLUME WAS BUILT AND THE PROPERTIES WERE REFINED.

MUD ACCOUNTING (BBLS.)

Fluid Built & Received		Fluid Lost or Disposed		Summary	
Premix		Desander	0	Initial Volume	261
w/ fresh water	0	Desilter	0		
" recycled "	0	Downhole	0	Fluid Received	0
Drill Water	0	Dumped	0		
Other	0	Other	0	Fluid Lost	0
				Final Total	261
Total Received	0	Total Lost	0	(Circulating Vol.)	

SOLIDS CONTROL EQUIPMENT

Type	Man.	Hr.		Cones	Hr.	Shaker#	Screen Size	Hr.
Centrifuge	~	0	D'sand	2	0	1	S175/S110/S110	2
Degasser	Drilco	0	D'silter	12	13	2	S175/S110/S110	2

SOLIDS EQUIPMENT EFFICIENCY

	Overflow (ppg.)	Underflow (ppg.)	Output (gal/m)
Desander	~	~	0
Desilter	8.45	8.5	0

Product	Inventory	Rec'd.	Used	Balance	Unit $	Cost $
Barytes	891		0	891	6.2	0 .00
KCL - Agri.	281		20	261	25.7	514 .00
id - Gel	54		0	54	8.13	0 .00
JK - 261	74		1	73	137.3	137 .00
Sodium Sulphite	67		6	61	23.56	141 .00
Sod. Bicarbonate	14		14	0	16.38	229 .00
0			0		0.00	0 .00
[redacted]			0		0	0 .00
0			0		0	0 .00
0			0		0	0 .00

SOLIDS ANALYSIS (ppb / %)			BIT / HYDRAULICS DATA	
High Gravity Solids	0.0	0.0	Jet Velocity	389
Bentonite	1.4	0.1	Impact Force	773
Drilled Solids	8.4	0.9	HHP / in2	5.3
Low Gravity Solids	9.8	1.1	HHP	302
Average S. G.	2.60	Solids	Bit Press. Loss	1151
Med. "n" #1ck. #2 ck.	0.514	0.585	Csg. Seat Frac Pres	0
Med. "K" " "	0.283	0.209	" Equiv. Mud Wt.	0.00
Low "n" " "	0.423	0.452	Total nozzle area	0.371
Low "K" " "	0.502	0.479	E.C.D.	9.43

Daily Chemical Cost : $ 1,022

Cumulative Cost : $ 5,462

ENGINEER EDD PERKINS | ADDRESS South Australia | TELEPHONE 08 - 338 3027

CULTUS

Independent Drilling Fluid Services Pty. Ltd.

A.C.N. 009 267 314

Drilling Fluid Report

Report# 4 | Date : 29-Apr

Spud Date : 26-Apr 1996

Depth : 692 (M.)To : 692

WELL NAME and No. : **Blackwood # 1**

CONTRACTOR **O. D. & E.**

Lease No. : PPL - 1 | Location : Port Campbell | State : Victoria

RIG No. 30

OPERATOR'S REPRESENTATIVE : **Alex' BRADLEY / Kevin KELLY**

REPORT FOR **Dav' BAKER**

Drilling Assembly				Casing				Mud Volume Bbls.			
Bit size 12.3	Type : L 114	Jet size 20/20/15		16	inch @ 10	Metres	Hole :	176	Pits :	85
DP " 4.5	Type : E	Length 422.4		0	inch @ 0	Metres	Drill String Cap. :	26	Total Volume :	261
HWt " 4.5	Type : 42	Length 111.3		~	inch @ ~	Metres	In Storage :	190 +	Weight :	8.4
DC " 6.5	Length 131.3	Other 16.55		MUD TYPE :		F.W. Native Clay	% O/G:	5	Annular Velocity	
DC " 8	Length 27.05						DP size 4.5	105 (Ft/M) Lam		
							DC size 6.5	127 (Ft/M) Lam		
							DC size 8	159 (Ft/M) Lam		

Circulation Data			
Pump size :	[2*] 6.0 * 8.0"	ins.	
Make/Model 1:	G. D. PZ-8	% Effic.	0.95
Make/Model 2:	G. D. PZ-8	% Effic.	0.95
Bbl/stk 0.067	Stk/min 100	Bbl/M	13.30
Bbl/stk 0.067	Stk/min 100	GPM :	559
Bottoms up :	13	PRESSURE :	1000
Total Circ. :	20	Type surf/sys.	3

MUD PROPERTY SPECIFICATIONS

Weight :	N.C.	Filtrate :	0	Other :	0
Viscosity :	N.C.	Plastic Viscosity :	N.C.	Yield Point :	N.C.

By Authority : ~ Operator's written ~ Drilling Contractor

yes Operator's Representative ~ Other

Mud Properties	F / Line		Pit	
Sample From				
Time Sample Taken	14:30		04:00	
Flowline Temperature deg. C	30		NC	
Depth Metres	692		692	
Weight ppg.	9.4		9.45	
Funnel Viscosity (sec/qt.) API @ 27 deg. C	39		40	
Plastic Viscosity cP @ 22 deg. C	9		9	
Yield Point (lb/100ft2)	17		16	
Gel Strength (lb/100ft2) 10 sec. / 10 min.	6	22	6	17
Filtrate API (cm3 / 30 min.) @	>35.0		>35.0	
API HTHP Filtrate (cm3 / 30 min.) @ ~ deg. C	0		0	
Cake Thickness (32nd. in API / HTHP)	5	0	5	~
Solids Content (% by Vol.) Calc. / Retort	8.0	0	8.4	0
Liquid Content (% by Vol.) Oil/Water	0	92.0	0	91.6
Sand Content (% by Vol.)	0.25		Tr	
Methylene Blue Capacity X lb/bbl cm3/cm3	23.0		19.0	
pH strip 20 deg. C	9		9	
Alkalinity Mud (Pm)	~		~	
Alkalinity Filtrate (Pf/Mf)	0.15/0.27		0.12/0.26	
Chloride (mg/L)	900		850	
Total Hardness (mg/L)	860		760	
Sulphite (mg/L)	~		~	
K+ (mg/L)	~		~	
KCL (% by Wt.)	~		~	
PHPA (Calc. lb/bbl)	~		~	
PHPA (Excess lb/bbl)	~		~	
Rheology - 600 / 300 / 6 (readings)	35/26/14		34/25/11	

FLUID SUMMARY AND RECOMMENDATIONS

THE WEIGHT GAIN WAS DERIVED FROM SHORTENING THE SYSTEM WHEN THE SURFACE VOLUME WAS LOW. THIS IN TURN, ADGITATED A SETTLING PIT AND THEN DILUTION WAS NEEDED TO COUNTER THIS.

ON COMPLETION OF THE BELOW MENTIONED ACTIVITIES : AND THE PITS WERE CLEANED, 85 BBLS. OF MUD WAS ALIGNED TO THE MUD PUMPS FOR DRILLING OUT THE CEMENT.

THE REMAINING VOLUME WAS UTILISED TO BUILD THE KCL (1%) / PHPA (0.5 PPB.) AND SHEARING WAS INITIATED, USING 2 CHARGE PUMPS.

THE ABOVE FLUID BEING MADE FOR THE MAIN 8 1/2" SECTION IS BEING TREATED WITH S. BICARBONATE TO LOWER THE HARDNESS AND TO COUNTER THE CEMENT CONTAMINATION.

OPERATIONS SUMMARY

ON THE WIPER TRIP, WHEN THE BIT WAS RUN BACK TO BOTTOM, NO FILL WAS FOUND.

THERE WAS NO PROBLEMS RUNNING THE CASING TO BOTTOM (WITH NO FILL AGAIN, BEING ENCOUNTERED).

THE CEMENT OPERATION WAS COMPLETED WITH RETURNS TO SURFACE; AT THIS TIME THE PITS WERE CLEANED & NEW MUD MADE.

MUD ACCOUNTING (BBLS.)

Fluid Built & Received		Fluid Lost or Disposed		Summary	
Premix		Desander	7	Initial Volume	646
w/ fresh water	0	Desilter	0		
" recycled "	50	Downhole	29	Fluid Received	95
Drill Water	45	Dumped	427		
Other	0	Other	17	Fluid Lost	480
				Final Total	261
Total Received	95	Total Lost	480	(Circulating Vol.)	

SOLIDS CONTROL EQUIPMENT

Type	Man.	Hr.		Cones	Hr.	Shaker#	Screen Size	Hr.
Centrifuge	~	0	D'sand	2	3	1	S110/S110/S110	7
Degasser	Drilco	0	D'silter	12	0	2	S110/S110/S110	7

SOLIDS EQUIPMENT EFFICIENCY

	Overflow (ppg.)	Underflow (ppg.)	Output (gal/m)
Desander	9.45	12.3	1.59
Desilter	~	~	0

Product	Inventory	Rec'd.	Used	Balance	Unit $	Cost $
Barytes	891		0	891	6.2	0 .00
KCL - Agri.	301		20	281	25.7	514 .00
id - Gel	54		0	54	8.13	0 .00
JK - 261	19	60	5	74	137.3	686 .00
Sodium Sulphite	67		0	67	23.56	0 .00
0			0		0.00	0 .00
ment operation			0		0.00	0 .00
CaCl2	27		4	23	0	0 .00
0			0		0	0 .00
0			0		0	0 .00

SOLIDS ANALYSIS (ppb / %)

High Gravity Solids	0.0	0.0	Jet Velocity	228
Bentonite	15.1	1.7	Impact Force	623
Drilled Solids	60.9	6.7	HHP / in2	1.2
Low Gravity Solids	76.0	8.4	HHP	143
Average S. G.	2.60	Solids	Bit Press. Loss	438
Med. "n" #1ck #2 ck.	0.429	0.443	Csg. Seat Frac Pres	0
Med. "K" " "	1.796	1.575	" Equiv. Mud Wt.	0.00
Low "n" " "	0.318	0.310	Total nozzle area	0.786
Low "K" " "	3.569	3.619	E.C.D.	9.47

BIT / HYDRAULICS DATA

Daily Chemical Cost : $ 1,200

Cumulative Cost : $ 4,440

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CULTUS

Independent Drilling Fluid Services Pty. Ltd.

A.C.N. 009 267 314

Drilling Fluid Report

Report# 3 | Date : 28-Apr

Spud Date : 26-Apr 1996

Depth : 594 | (M.)To : 692

WELL NAME and No. : **Blackwood # 1**

CONTRACTOR **O. D. & E.**

Block No. : PPL - 1 | Location : Port Campbell | State : Victoria

RIG No. 18

OPERATOR'S REPRESENTATIVE : Alex' BRADLEY / Kevin KELLY

REPORT FOR Dav' BAKER

Drilling Assembly				Casing				Mud Volume Bbls.				Circulation Data			
Bit size 12.3	Type : L 114	Jet size 20/20/15		16	inch @ 10	Metres		Hole : 295	Pits : 325			Pump size : [2"] 6.0 * 8.0"		ins.	
DP " 4.5	Type : E	Length 422.4		0	inch @ 0	Metres		% Hole Excess : 5	Total Volume : 646			Make/Model 1: G. D. PZ-8		% Effic.	0.95
HWt " 4.5	Type : 42	Length 111.3		~	inch @ ~	Metres		In Storage : 20	Weight : 8.3			Make/Model 2: G. D. PZ-8		% Effic.	0.95
DC " 6.5	Length 131.3	Other 16.55		MUD TYPE :		F.W. Spud		DScap: 26	Annular Velocity			Bbl/stk 0.067	Stk/min 100	Bbl/M	13.30
DC " 8	Length 27.05							DP size 4.5	105 (Ft/M) Lam			Bbl/stk 0.067	Stk/min 100	GPM :	559
								DC size 6.5	127 (Ft/M) Lam			Bottoms up : 22		PRESSURE :	1000
								DC size 8	159 (Ft/M) Lam			Total Circ. : 49		Type surf/sys.	3

Mud Properties	F / Line		Pit	
Sample From				
Time Sample Taken	11:30		04:00	
Flowline Temperature deg. C	30		NC	
Depth Metres	692		692	
Weight ppg.	9.1		9.5	
Funnel Viscosity (sec/qt.) API @ 27 deg. C	41		43	
Plastic Viscosity cP @ 23 deg. C	6		8	
Yield Point (lb/100ft2)	29		14	
Gel Strength (lb/100ft2) 10 sec. / 10 min.	10	16	6	13
Filtrate API (cm3 / 30 min.) @	>35.0		>35.0	
API HTHP Filtrate (cm3 / 30 min.) @ ~ deg. C	0		0	
Cake Thickness (32nd. in API / HTHP)	6	0	5	~
Solids Content (% by Vol.) Calc. / Retort	5.8	0	8.7	0
Liquid Content (% by Vol.) Oil/Water	0	94.2	0	91.3
Sand Content (% by Vol.)	0.5		Tr	
Methylene Blue Capacity x lb/bbl cm3/cm3	26		18	
pH strip 22 deg. C	9.5		9.3	
Alkalinity Mud (Pm)	~		~	
Alkalinity Filtrate (Pf/Mf)	0.5/0.53		0.28/0.4	
Chloride (mg/L)	1050		900	
Calcium Hardness (mg/L)	1480		1040	
Chlorite (mg/L)	~		~	
K+ (mg/L)	~		~	
KCL (% by Wt.)	~		~	
PHPA (Calc. lb/bbl)	~		~	
PHPA (Excess lb/bbl)	~		~	
Rheology - 600 / 300 / 6 (readings)	41/35/12		30/22/9	

MUD PROPERTY SPECIFICATIONS

Weight :	<9.0	Filtrate :	0	Other :	0
Viscosity :	N.C.	Plastic Viscosity :	Min.	Yield Point :	<15

By Authority : yes Operator's written ~ Drilling Contractor

yes Operator's Representative ~ Other

FLUID SUMMARY AND RECOMMENDATIONS

THE NATIVE CLAY SYSTEM WITH INBUILT YIELDING PROPERTIES, WAS USED TO PROTECT THE HOLE WHILE CASING WAS RUN. THIS ALSO BUILT UP A THICK WALL-CAKE IN THE SAND SECTION, BELOW THE MARL AND ABOVE THE PEMBER MUDSTONE. A SAPP SWEEP WAS USED TO SOFTEN AND POSSIBLY REMOVE THE WALL-CAKE OBSTRUCTION, BUT THIS MADE THE FILTERCAKE "STICKY". AT THIS TIME DOWN-HOLE LOSSES WERE OBSERVED (35 BBLS.). A GEL HIGH VISCOSITY SWEEP WAS USED AND THIS ADDITION OF SEMI - INACTIVE CLAYS,ASSISTED TO SEAL & MAKE THE WALLS FIRMER. BARYTES WAS USED TO CLEAR THE PIPE ON THE TRIP. WHILE RUNNING IN, TIGHT HOLE WAS OBSERVED SO A HIGH VISCOSITY SWEEP, MADE W/ GEL AND 5.5 PPB. CFL (LIGNO) FOR THINNING PER - POSES AND TO ENSURE A POSITIVE ION EFFECT ON THE WALL-CAKE.

OPERATIONS SUMMARY

THE ABOVE MENTIONED (20 BBL) SWEEP WAS PUMPED WHILE ON BOTTOM. THIS PILL WAS DUEL ACTING, SO TO CLEAN THE SOFTER FILTER-CAKE OVER THE SAND SECTION (STRENGTHENING IT) AND ALSO ADDING STRENGTH TO THE MARL PROBLEMATIC SECTION [WHICH HAS BEGUN TO SWELL AND SLOUGH].

DILUTIONS INCREASED TO COUNTER WEIGHT GAINS.

MUD ACCOUNTING (BBLS.)

Fluid Built & Received		Fluid Lost or Disposed		Summary	
Premix		Desander	51	Initial Volume	801
w/ fresh water	0	Desilter	0		
" recycled "	80	Downhole	122	Fluid Received	90
Drill Water	10	Dumped	16		
Other	0	Other	56	Fluid Lost	245
				Final Total	646
Total Received	90	Total Lost	245	(Circulating Vol.)	

SOLIDS CONTROL EQUIPMENT

Type	Man.	Hr.		Cones	Hr.	Shaker#	Screen Size	Hr.
Centrifuge	~	0	D'sand	2	18	1	S110/S110/S110	21
Degasser	Drilco	0	D'silter	12	0	2	S110/S110/S110	21

SOLIDS EQUIPMENT EFFICIENCY

	Overflow (ppg.)	Underflow (ppg.)	Output (gal/m)
Desander	9.05	11.2	1.98
Desilter	~	~	0

Product	Inventory	Rec'd.	Used	Balance	Unit $	Cost $
Barytes	912		21	912	6.2	130 .00
0			0		0	0 .00
id - Gel	87		5	82	8.13	41 .00
CFL (Ligno)	39		2	37	36	72 .00
SAPP	14		2	12	67.95	136 .00
Note that 4 sx. Lime were broken & w/off.			0		0.00	0 .00
	43		19	24	5.80	110 .00
	261		3	19	137.3	412 .00
Usage by Haliburton			0		0	0 .00
id - Gel	82		28	54	0	0 .00

SOLIDS ANALYSIS (ppb / %)

High Gravity Solids		0.0	0.0	
Bentonite		13.3	1.5	
Drilled Solids		66.1	7.3	
Low Gravity Solids		79.4	8.7	
Average S. G.		2.60	Solids	
Med. "n"	#1ck. #2 ck.	0.228	0.447	
Med. "K"	" "	8.438	1.353	
Low "n"	" "	0.272	0.282	
Low "K"	" "	6.416	3.787	

BIT / HYDRAULICS DATA

Jet Velocity	228
Impact Force	626
HHP / in2	1.2
HHP	143
Bit Press. Loss	440
Csg. Seat Frac Pres	0
" Equiv. Mud Wt.	0.00
Total nozzle area	0.786
ECD	

Daily Chemical Cost : $ 901

Cumulative Cost : $ 3,239

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CULTUS

Independent Drilling Fluid Services Pty. Ltd.

A.C.N. 009 267 314

Drilling Fluid Report

Report# 2 | Date : 27-Apr

Spud Date : 26-Apr 1996

Depth : 120 (M.)To : 594

WELL NAME and No. : **Blackwood # 1**

CONTRACTOR **O. D. & E.**

Block No. : PPL - 1 | Location : Port Campbell | State : Victoria

RIG No. 18

[redacted]RATOR'S REPRESENTATIVE : Alex' BRADLEY

REPORT FOR Dav' BAKER

Drilling Assembly					Casing				Mud Volume Bbls.				Circulation Data		
Bit size	12.3	Type :	L 114	Jet size 20/20/15	16	inch @	10	Metres	Hole :	365	Pits :	410	Pump size :	[2*] 6.0 * 8.0"	ins.
DP "	4.5	Type :	E	Length 324.4	0	inch @	0	Metres	% Hole Excess :	30	Total Volume :	801	Make/Model 1:	G. D. PZ-8	% Effic. 0.95
HWt "	4.5	Type :	42	Length 111.3	~	inch @	~	Metres	In Storage :	105	Weight :	8.3	Make/Model 2:	G. D. PZ-8	% Effic. 0.95
DC "	6.5	Length	131.3	Other 16.55	MUD TYPE :		F.W. Spud						Bbl/stk 0.067	Stk/min 106	Bbl/M 14.10
DC "	8	Length	27.05										Bbl/stk 0.067	Stk/min 106	GPM : 592

DScap: 26	Annular Velocity	Bottoms up : 26	PRESSURE : 1200
DP size 4.5	112 (Ft/M) Lam	Total Circ. : 56	Type surf/sys. 3
DC size 6.5	135 (Ft/M) Lam		
DC size 8	168 (Ft/M) Lam		

Mud Properties		F / Line		F / Line	
Sample From					
Time Sample Taken		19:30		04:00	
Flowline Temperature	deg. C	24		32	
Depth	Metres	457		665	
Weight	ppg.	8.8		9.05	
Funnel Viscosity (sec/qt.) API @	21 deg. C	31		39	
Plastic Viscosity cP @	22 deg. C	4		4	
Yield Point (lb/100ft2)		8		24	
Gel Strength (lb/100ft2) 10 sec. / 10 min.		4	11	4	6
Filtrate API (cm3 / 30 min.) @		33.6		>35.0	
API HTHP Filtrate (cm3 / 30 min.) @	~ deg. C	0		0	
Cake Thickness (32nd. in API / HTHP)		4	0	7	~
Solids Content (% by Vol.)	Calc. / Retort	3.5	0	5.3	0
Liquid Content (% by Vol.)	Oil/Water	0	96.5	0	94.7
Sand Content (% by Vol.)		2.5		0.5	
Methylene Blue Capacity	X lb/bbl cm3/cm3	19		22	
pH	strip 22 deg. C	8		9.5	
Alkalinity Mud (Pm)		~		0	
Alkalinity Filtrate (Pf/Mf)		0.12/0.44		0.48/0.52	
Chloride (mg/L)		820		1000	
Total Hardness (mg/L)		880		1620	
[redacted]ite (mg/L)		~		~	
K[redacted] (mg/L)		~		~	
KCL (% by Wt.)		~		~	
PHPA (Calc. lb/bbl)		~		~	
PHPA (Excess lb/bbl)		~		~	
Rheology - 600 / 300 / 6 (readings)		16/12/6		32/28/4	

MUD PROPERTY SPECIFICATIONS

Weight :	<9.0	Filtrate :	0	Other :	0
Viscosity :	N.C.	Plastic Viscosity :	Min.	Yield Point :	<15

By Authority : yes Operator's written ~ Drilling Contractor

yes Operator's Representative ~ Other

FLUID SUMMARY AND RECOMMENDATIONS

FOR THE MAJORITY OF THIS PERIOD, A FRESH WATER POSITIVE ION SYSTEM WAS USED.
THE SOLIDS IN THE SETTLING PITS WERE DUMPED AS THEY BUILT UP, THIS FLUID (ONCE SUCTION WAS ATTAINABLE) WAS RECYCLED, AS THE SOLIDS SETTLED OUT READILY.
ADDITIONS OF ALUMINIUM SULPHATE AND SAPP WERE INCORPORATED TO ASSIST THE INHIBITION OFTHE MARL SECTION.
THIS PROVED TO BE SUCCESSFUL.
AT 512 METRES, THE ABOVE PROCESS WAS REVERSED AND THE PHPA THAT HAD BEEN USED FOR SWEEPS, WAS SLOWLY BLED INTO THE SYSTEM AND THE pH WAS INCREASED, TO RAISE THE YIELD POINT AND VISCOSITY, IN PREPARATION FOR RUNNING THE CASING.

OPERATIONS SUMMARY

THE 12 1/4" HOLE WAS DRILLED TO 665 METRES, WITH [redacted]VEYS.

TO ASSIST IN RAISING THE VISCOSITY, LIME WAS USED TO ACTIVATE THE NATIVE CLAYS.
THE DUMPING PROCESS WAS NEEDED TO MINIMISE THE WEIGHT INCREASES AND TO DECREASE THE VOLUMETRIC CLAY CONTENT.

MUD ACCOUNTING (BBLS.)

Fluid Built & Received		Fluid Lost or Disposed		Summary	
Premix		Desander	51	Initial Volume	405
w/ fresh water	340	Desilter	0		
" recycled "	1440	Downhole	327	Fluid Received	1780
Drill Water	0	Dumped	984		
Other	0	Other	22	Fluid Lost	1384
				Final Total	801
Total Received	1780	Total Lost	1384	(Circulating Vol.)	

SOLIDS CONTROL EQUIPMENT

Type	Man.	Hr.		Cones	Hr.	Shaker#	Screen Size	Hr.
Centrifuge	~	0	D'sand	2	24	1	S110/S110/S110	24
Degasser	Drilco	0	D'silter	12	0	2	S110/S110/S110	24

SOLIDS EQUIPMENT EFFICIENCY

	Overflow (ppg.)	Underflow (ppg.)	Output (gal/m)
Desander	8.8	12.1	1.48
Desilter	~	~	0

Product	Inventory	Rec'd.	Used	Balance	Unit $	Cost $
Barytes	912		0	912	0	0 .00
0			0		0	0 .00
0			0		0	0 .00
0			0		0	0 .00
SAPP	20		6	14	67.95	408 .00
Aluminium Sulphate	15		15	0	24.00	360 .00
Li[redacted]	47		4	43	5.80	23 .00
J[redacted]61	24		2	22	137.3	275 .00
0			0		0	0 .00
0			0		0	0 .00

SOLIDS ANALYSIS (ppb / %)

High Gravity Solids	0.0	0.0	
Bentonite	10.0	1.1	
Drilled Solids	38.6	4.2	
Low Gravity Solids	48.6	5.3	
Average S. G.	2.60	Solids	
Med. "n" #1ck. #2 ck.	0.415	0.193	
Med. "K" " "	0.903	8.428	
Low "n" " "	0.239	0.423	
Low "K" " "	2.711	2.008	

BIT / HYDRAULICS DATA

Jet Velocity	242
Impact Force	670
HHP / in2	1.4
HHP	163
Bit Press. Loss	471
Csg. Seat Frac Pres	0
" Equiv. Mud Wt.	0.00
Total nozzle area	0.786

Daily Chemical Cost : $ 1,065

Cumulative Cost : $ 2,339

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CULTUS

Independent Drilling Fluid Services Pty. Ltd.
A.C.N. 009 267 314

Drilling Fluid Report

Report# 1 | Date : 26-Apr
Spud Date : 26-Apr 1996
Depth : 0 (M.)To : 120

WELL NAME and No. : **Blackwood # 1**
CONTRACTOR **O. D. & E.**
Block No. : PPL - 1 | Location : Port Campbell | State : South Australia
RIG No. 18
[redacted]RATOR'S REPRESENTATIVE : Alex' BRADLEY
REPORT FOR Dav' BAKER

Drilling Assembly				Casing				Mud Volume Bbls.			
Bit size 12.3	Type : L 114	Jet size 20/20/15		16	inch @ 10	Metres		Hole : 38	Pits : 367		
DP " 4.5	Type : E	Length 16.55		0	inch @ 0	Metres		% Hole Excess : 30	Total Volume : 405		
HWt " 4.5	Type : 42	Length 0		~	inch @ ~	Metres		In Storage : 240	Weight : 8.3		
DC " 6.5	Length 76.4	Other 16.55		MUD TYPE :	F.W. Spud			DScap: 3	Annular Velocity		
DC " 8	Length 27.05							DP size 4.5	113 (Ft/M) Lam		
								DC size 6.5	136 (Ft/M) Turb.		
								DC size 8	171 (Ft/M) Turb.		

Circulation Data			
Pump size :	[2*] 6.0 * 8.0"	ins.	
Make/Model 1:	G. D. PZ-8	% Effic.	0.97
Make/Model 2:	G. D. PZ-8	% Effic.	0.97
Bbl/stk 0.068	Stk/min 105	Bbl/M	14.26
Bbl/stk 0.068	Stk/min 105	GPM :	599
Bottoms up :	3	PRESSURE :	900
Total Circ. :	28	Type surf/sys.	3

Mud Properties		F / Line		F / Line	
Sample From		F / Line		F / Line	
Time Sample Taken		1900		04:00	
Flowline Temperature	deg. C	23		20	
Depth	Metres	45		214	
Weight	ppg.	8.65		8.9	
Funnel Viscosity (sec/qt.) API @	21 deg. C	44		33	
Plastic Viscosity cP @	18 deg. C	13		7	
Yield Point (lb/100ft2)		17		14	
Gel Strength (lb/100ft2) 10 sec. / 10 min.		12	17	7	12
Filtrate API (cm3 / 30 min.) @		>35.0		>35.0	
API HTHP Filtrate (cm3 / 30 min.) @	~ deg. C	0		0	
Cake Thickness (32nd. in API / HTHP)		5	0	~	~
Solids Content (% by Vol.)	Calc. / Retort	2.4	0	4.3	0
Liquid Content (% by Vol.)	Oil/Water	0	97.6	0	95.7
Sand Content (% by Vol.)		0.5		Tr	
Methylene Blue Capacity	x lb/bbl cm3/cm3	18		16	
pH	strip 20 deg. C	9.5		7	
Alkalinity Mud (Pm)		~		0	
Alkalinity Filtrate (Pf/Mf)		0.13/0.22		0.0/0.08	
Chloride (mg/L)		1150		1000	
[redacted] Hardness (mg/L)		380		620	
[redacted]ite (mg/L)		~		~	
K+ (mg/L)		~		~	
KCL (% by Wt.)		~		~	
PHPA (Calc. lb/bbl)		~		~	
PHPA (Excess lb/bbl)		~		~	
Rheology - 600 / 300 / 6 (readings)		43/30/13		28/21/9	

MUD PROPERTY SPECIFICATIONS

Weight :	<9.0	Filtrate :	0	Other :	0
Viscosity :	N.C.	Plastic Viscosity :	Min.	Yield Point :	<15

By Authority : yes Operator's written ~ Drilling Contractor
yes Operator's Representative ~ Other

FLUID SUMMARY AND RECOMMENDATIONS

AS THE MOUSE AND RAT HOLES WERE DRILLED, A DEPLETION OF FLUID WAS REPLACED WITH GEL WATER, USING LIME TO FLOC - CULATE AND MAINTAIN THE VISCOSITY.

ONCE THE SECOND STABILIZER HAD BEEN RUN (AND 45 METRES WERE DRILLED) THE SYSTEM WAS CONVERTED TO WATER [AS PER OPERATOR'S INSTRUCTIONS]. ALUMINIUM SULPHATE WAS ADDED TO ASSIST THE DEFLOCCULATING EFFECT AND THE END PREMIX PIT WAS USED TO MAKE VOLUME FOR THE PHPA SWEEP.

AT THIS TIME THE COMPLETE SURFACE VOLUME WAS IN USE [WITH NUMBERS' 1 TO 4 PITS AS ACTIVE, PREMIX 1 AS WATER STANDBY, PREMIX 2, AS ABOVE EXPLAINED AND THE PILL PIT WITH SAPP. AS THE SETTLING PIT BECAME "SOLIDS HEAVY", THIS WAS DUMPED.

OPERATIONS SUMMARY

SPUD WAS 15:30 HOURS AND AT THIS TIME, THE 12 1/4" BIT DRILLED OUT THE CONDUCTOR PIPE.

DRILLED TO 214 METRES WITH SURVEYS & NO DOWN-HOLE PROBLEMS.

MUD ACCOUNTING (BBLS.)

Fluid Built & Received		Fluid Lost or Disposed		Summary	
Premix		Desander	2	Initial Volume	200
w/ fresh water	320	Desilter	0		
" recycled "	0	Downhole	59	Fluid Received	320
Drill Water	0	Dumped	30		
Other	0	Other	24	Fluid Lost	115
				Final Total	405
Total Received	320	Total Lost	115	(Circulating Vol.)	

SOLIDS CONTROL EQUIPMENT

Type	Man.	Hr.		Cones	Hr.	Shaker#	Screen Size	Hr.
Centrifuge	~	0	D'sand	2	6.5	1	S110/S110/S110	12
Degasser	Drilco	0	D'silter	12	0	2	S110/S110/S110	12

SOLIDS EQUIPMENT EFFICIENCY

	Overflow (ppg.)	Underflow (ppg.)	Output (gal/m)
Desander	8.7	13.2	0.19
Desilter	~	~	0

Product	Inventory	Rec'd.	Used	Balance	Unit $	Cost $
Barytes	912		0	912	0	0 .00
0			0		0	0 .00
0			0		0	0 .00
0			0		0	0 .00
SAPP	22		2	20	67.95	136 .00
Aluminium Sulphate	19		4	15	24.00	96 .00
[redacted]	48		1	47	5.80	6 .00
J[redacted]261	26		2	24	137.3	275 .00
0			0		0	0 .00
0			0		0	0 .00

SOLIDS ANALYSIS (ppb / %)

High Gravity Solids		0.0	0.0	Jet Velocity	244
Bentonite		20.9	2.3	Impact Force	674
Drilled Solids		1.2	0.1	HHP / in2	1.4
Low Gravity Solids		22.0	2.4	HHP	166
Average S. G.		2.57	Solids	Bit Press. Loss	474
Med. "n"	#1ck #2 ck.	0.519	0.415	Csg. Seat Frac Pres	0
Med. "K"	" "	1.179	1.581	" Equiv. Mud Wt.	0.00
Low "n"	" "	0.199	0.239	Total nozzle area	0.786
Low "K"	" "	8.674	4.743		

BIT / HYDRAULICS DATA

Daily Chemical Cost : $ 512
Cumulative Cost : $ 1,273

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CULTUS

Independent Drilling Fluid Services Pty. Ltd.
A.C.N. 009 267 314

Drilling Fluid Report

Report# 0 | Date : 25-Apr
Spud Date : 26-Apr 1996
Depth : 0 (M.)To : 0

WELL NAME and No. : **Blackwood # 1**
Block No. : PPL - 1 | Location : Port Campbell | State : South Australia
OPERATOR'S REPRESENTATIVE : Alex' BRADLEY

CONTRACTOR **O. D. & E.**
RIG No. 18
REPORT FOR Dav' BAKER

Drilling Assembly				Casing				Mud Volume Bbls.				Circulation Data			
Bit size 12.3	Type : L 114	Jet size 20/20/15		0 inch @ 0	Metres	Hole : 0	Pits : 200	Pump size : [2*] 6.0 * 8.0"	ins.		
DP " 4.5	Type : E	Length 0		0 inch @ 0	Metres	% Hole Excess : 0	Total Volume : 200	Make/Model 1: G. D. PZ-8	% Effic. 0.97		
HWt " 4.5	Type : 42	Length 0		~ inch @ ~	Metres	In Storage : 300	Weight : 8.3	Make/Model 2: G. D. PZ-8	% Effic. 0.97		
DC " 6.5	Length 0	Other 0		MUD TYPE : F.W. Spud				Annular Velocity		Bbl/stk 0.068 Stk/min 0	Bbl/M 0.00
DC " 8	Length 0							DP size 4.5 0 (Ft/M) Lam		Bbl/stk 0.068 Stk/min 0	GPM : 0
								DC size 6.5 0 (Ft/M) Lam		Bottoms up : 0	PRESSURE : 0
								DC size 8 0 (Ft/M) Lam		Total Circ. : 0	Type surf/sys. 3

Mud Properties	Pit	Pit
Sample From		
Time Sample Taken	00:30	04:00
Flowline Temperature deg. C	NC	NC
Depth Metres	0	0
Weight ppg.	8.5	8.5
Funnel Viscosity (sec/qt.) API @ 12 deg. C	58	52
Plastic Viscosity cP @ ~ deg. C	12	12
Yield Point (lb/100ft2)	31	22
Gel Strength (lb/100ft2) 10 sec. / 10 min.	13 / 22	10 / 19
Filtrate API (cm3 / 30 min.) @	27.4	NC
API HTHP Filtrate (cm3 / 30 min.) @ ~ deg. C	0	0
Cake Thickness (32nd. in API / HTHP)	4 / 0	~ / ~
Solids Content (% by Vol.) Calc. / Retort	1.3 / 0	1.3 / 0
Liquid Content (% by Vol.) Oil/Water	0 / 98.7	0 / 98.7
Sand Content (% by Vol.)	Tr	Tr
Methylene Blue Capacity X lb/bbl cm3/cm3	23	~
pH strip 15 deg. C	9.5	~
Alkalinity Mud (Pm)	~	~
Alkalinity Filtrate (Pf/Mf)	0.15/0.26	~
Chloride (mg/L)	1300	~
Total Hardness (mg/L)	180	~
Calcium (mg/L)	~	~
LIME (mg/L)	~	~
KCL (% by Wt.)	~	~
PHPA (Calc. lb/bbl)	~	~
PHPA (Excess lb/bbl)	~	~

MUD PROPERTY SPECIFICATIONS

Weight :	Min.	Filtrate :	0	Other :	0
Viscosity :	35-40	Plastic Viscosity :	Min.	Yield Point :	>15

By Authority : yes Operator's written ~ Drilling Contractor
yes Operator's Representative ~ Other

FLUID SUMMARY AND RECOMMENDATIONS

BUILT 200 BARRELS OF Id GEL SPUD MUD USING CAUSTIC SODA TO PEPTISE THE GEL (WITH A BENTONITE CONTENT OF 21 PPB.). THIS WAS TRANSFERED TO THE DESANDER AND INTERMEDIATE PITS, SO TO BE ABLE TO UTILISE THE SOLIDS CONTROL EQUIPMENT AS SOON AS PRACTICAL. THE SMALLER SAND TRAP WILL BE USED INITIALLY, WITH THE LARGE TRAP INCORPORATED WHEN VOLUME IS BUILT.

THE PILL PIT IS ON STAND - BY WITH 20 BARRELS OF SAPP TREATED FLUID, TO COMBAT ANY SUSPECTED MUD RINGS (PREFERABLY BEFORE THEY HAPPEN).

THE SUCTION PIT, WHICH IS OFF - LINE, HAS BEEN PRE-TREATED WITH ALUM, TO AID IN THE DEFLOCCULATING AND SETTLING ACTIONS.

OPERATIONS SUMMARY

THE DRILL WATER HAS BEEN RETRIEVED FROM THE MAIN PIPE LINE FROM A LOCAL RIVER.

THE ANALYSIS IS : CHLORIDES : 800 ppm
pH : 6.3
HARDNESS : 400 ppm
pf / Mf : 0.0 / 0.1

MUD ACCOUNTING (BBLS.)

Fluid Built & Received		Fluid Lost or Disposed		Summary	
Premix		Desander	0	Initial Volume	0
w/ fresh water	200	Desilter	0		
" recycled "	0	Downhole	0	Fluid Received	200
Drill Water	0	Dumped	0		
Other	0	Other	0	Fluid Lost	0
				Final Total	200
Total Received	200	Total Lost	0	(Circulating Vol.)	

SOLIDS CONTROL EQUIPMENT

Type	Man.	Hr.		Cones	Hr.	Shaker#	Screen Size	Hr.
Centrifuge	~	0	D'sand	2	0	1	S110/S110/S110	0
Degasser	Drilco	0	D'silter	12	0	2	S110/S110/S110	0

SOLIDS EQUIPMENT EFFICIENCY

	Overflow (ppg.)	Underflow (ppg.)	Output (gal/m)
Desander	~	~	0
Desilter	~	~	0

Product	Inventory	Rec'd.	Used	Balance	Unit $	Cost $
			0		0	0 .00
0			0		0	0 .00
Id Gel	162		76	86	8.13	618 .00
Caustic Soda	40		1	39	21.38	21 .00
SAPP	21		1	20	67.95	68 .00
Aluminium Sulphate	21		2	19	24.00	48 .00
Lime	24		1	23	5.80	6 .00
0			0		0	0 .00
0			0		0	0 .00
0			0		0	0 .00

SOLIDS ANALYSIS (ppb / %)

					BIT / HYDRAULICS DATA	
High Gravity Solids			0.0	0.0	Jet Velocity	0
Bentonite			28.8	3.2	Impact Force	0
Drilled Solids			0.0	0.0	HHP / in2	0.0
Low Gravity Solids			12.3	1.3	HHP	0
Average S. G.			2.50	Solids	Bit Press. Loss	0
Med. "n"	#1ck.	#2 ck.	0.355	0.436	Csg. Seat Frac Pres	0
Med. "K"	"	"	4.703	2.244	" Equiv. Mud Wt.	####
Low "n"	"	"	0.260	0.266	Total nozzle area	0.786
Low "K"	"	"	8.510	6.483		

Daily Chemical Cost : $ 761
Cumulative Cost : $ 761

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Blackwood # 1 Totco Deviation Surveys

Depth *mKB*	Deviation *degree*	Horizontal Shift *m*
32	0.8	0.45
193	0.5	1.85
350	0.8	4.04
500	0.5	5.35
681	0.5	6.93
973	0.3	8.46
1268	1.0	13.61
1582	1.3	20.74
1883	0.8	24.94
2194	0.5	27.65
2492	0.5	30.25
Maximum Radius of Deviation		30.25