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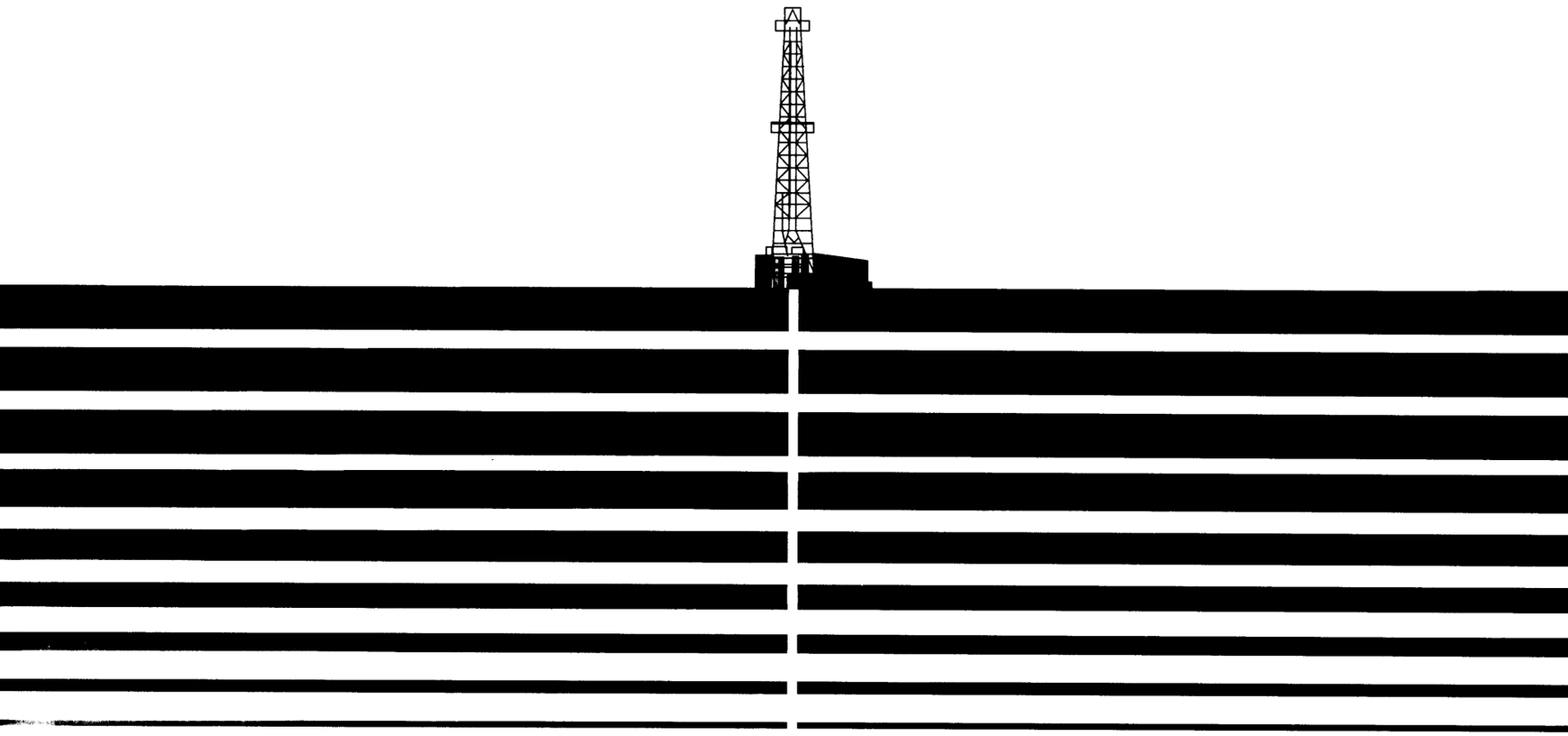
CROFT 1

Well Completion Report



Santos

PEP 154, OTWAY BASIN
VICTORIA

A.B.N. 80 007 550 923

SANTOS

COMPILED FOR

SANTOS LTD

(A.C.N. 000 670 575)

Petroleum Development

CROFT 1

WELL COMPLETION REPORT

Prepared By:
D. ZURCHER
June, 2001

CROFT 1 WCR

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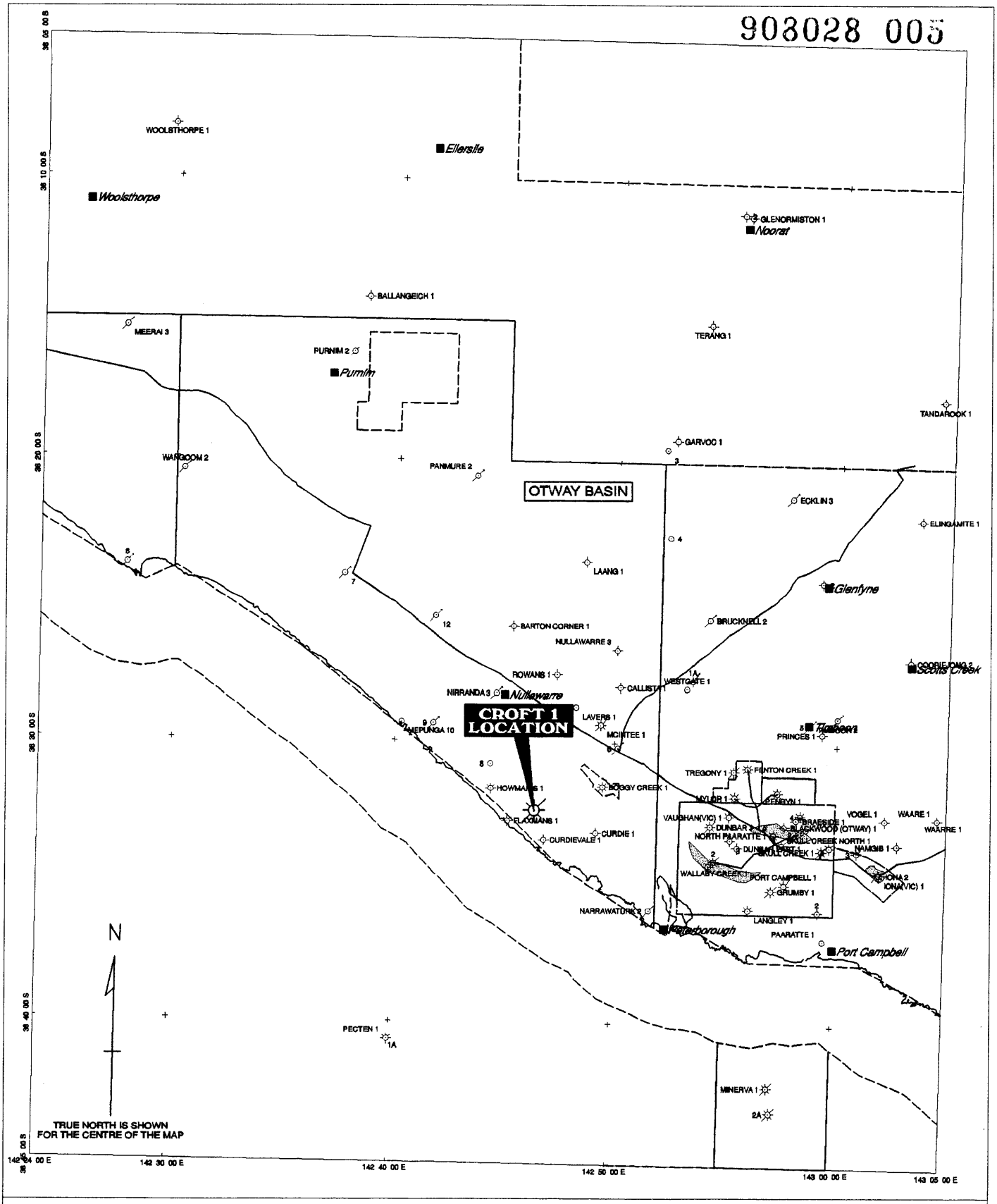
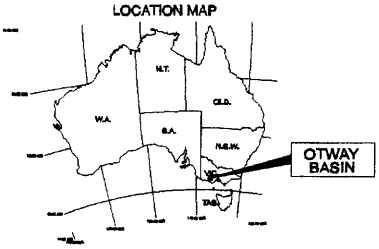
LOCATION MAP



LOCATION MAP



LEGEND

- Dry hole
- Dry hole with gas show(s)
- Dry hole with oil show(s)
- Dry Hole with oil & gas show(s)
- Gas well
- Gas well with oil show(s)
- Oil well
- Oil and gas well
- Gas Pipeline
- Oil Pipeline

EXPLORATION & DEVELOPMENT

Santos
South Australia Business Unit

CROFT 1 LOCATION MAP

0 2 4 6 8 10
KILOMETRES
UTM ANS CM141

Author: Jo-Anne Hart
Drafted:
Original Scale: 1:250000
Contact Number:
Datum:
Date: May 9, 2001
Revised Date:
File Number:
ENCL

SANTOS LTD A.C.N. 007 550 923

FIGURE 1

WELL CARD

WELL HISTORY

REVISION 1 (11/11/96)

WELL: CROFT 1	**WELL CATEGORY:** EXP **WELL INTENT:** GAS	**SPUD:** 30/03/01 @ 15:00hrs **TD REACHED:** 11/04/01
LAT: 38° 32' 19.98" S **LONG:** 142° 46' 28.51" E **(GDA94)**		**RIG RELEASED:** 20/04/01 @ 20:00hrs **CMPLT:**
SEISMIC STATION: INLINE 2133, CDP 10084, CURDIEVALE 3D		**STATUS:** C&S GAS WELL
ELEVATION GND: 55.5 m **RT:** 60.2m (Final)		**REMARKS:**
BLOCK/LICENCE: PEP 154		
TD 2534m (Logr Ext) 2529m (Drlr)		
PBTD m (Logr) m (Drlr)		
TYPE STRUCTURE: TILTED FAULT BLOCK		
TYPE COMPLETION: 3 ½" MONOBORE		
ZONE(S): WAARRE SANDSTONE		

CASING SIZE	SHOE DEPTH	TYPE
7-5/8"	471m	26.4 lb/ft
3½"	2408m	9.3 lb/ft

AGE	FORMATION OR ZONE TOPS	DEPTH (m)		THICKNESS TVD (m)	HIGH (H) LOW (L)
		LOGGERS	TVD SS		
MIOCENE	GELLIBRAND MARL	145.5	-85	362	34H
LATE OLIGOCENE - E. MIOCENE	CLIFTON FM	508	-447	9	9L
LATE EOCENE – EARLY OLIGOCENE	NARRAWATURK FM	517	-456	74	6L
LATE EOCENE	MEPUNGA FM	591	-530	61	29L
PALAEOCENE - EOCENE	DILWYN FM	652	-591	288	50L
PALAEOCENE – EARLY EOCENE	PEMBER FM	940	-879	70	67L
LATE PALAEOCENE	PEBBLE POINT FM	1010	-949	78	9L
LATE MAASTRICHTIAN-EARLY PALAEOCENE	MASSACRE SHALE	1088	-1027	29	N/P
LATE CAMPANIAN-MAASTRICHTIAN	TIMBOON SST	1117.5	-1056	110	N/P
SENONIAN	PAARATTE FM	1227.5	-1166	328	123L
CAMPANIAN	SKULL CREEK FM	1555.5	-1494	186	11H
LATE SANTONIAN	NULLAWARRE	1742	-1680	15	N/P
CONIACIAN-SANTONIAN	BELFAST MUDSTONE	1757	-1695	251	26H
TURONIAN	FLAXMANS FM	2008.5	-1947	16	5L
TURONIAN	WAARRE FM C	2024.5	-1963	35	38H
TURONIAN	WAARRE FM B	2059.5	-1999	16	N/P
TURONIAN	WAARRE FM A	2075.5	-2013	42	N/P
LATE ALBIAN	EUMERALLA FM	2118	-2056	416+	10H
	TD	2534	-2474		

PRELIMINARY LOG INTERPRETATION (Interval Averages)

INTERVAL (m)	Ø %	Sw %	INTERVAL (m)	Ø %	Sw %
WAARRE C					
2024.5-2059.5	16.1	14.7			
WAARRE A					
2081-2084.5	14.9	45			

PERFORATIONS (4 shots/ft)

FORMATION	INTERVAL

CORES

FORM	NO.	INTERVAL	CUT	REC
NIL				

LOG	SUITE/ RUN	INTERVAL	BHT/TIME/ REMARKS	LOG	SUITE/ RUN	INTERVAL	BHT/TIME/ REMARKS
GR	1/1	2526m-surface	89°C / 7hrs	RFS-GR	3/1	2027.4m-2373.5m	100°C / 46hrs
LCS	1/1	2526m-471m	89°C / 7hrs	SCG-GR	4/1	2516.5m-1985m	Shot 48, 46 rec
DLS	1/1	2526m-471m	89°C / 7hrs				
MRS	1/1	2526m-471m	89°C / 7hrs				
GR	2/1	2526m-1950m	100°C / 17.50hrs				
PDS	2/1	2526m-1950m	100°C / 17.50hrs				
CNS	2/1	2526m-1950m	100°C / 17.50hrs				

FORMATION TESTS

NO.	INTERVAL (m)	FORMATION	FLOW (mins)	SHUT IN (mins)	BOTTOM GAUGE IP/FP (psia)	SIP	MAX SURF PRESS (psia)	FLUID TO SURF (mins)	TC/ BC	REMARKS
1	2287-2336		Unable to obtain packer seat – test cancelled							

SUMMARY:

Croft 1 was an Otway Basin gas exploration well located in the PEP 154 licence, approximately 12 km north west of the town of Peterborough, 4.9 km south west of the Boggy Creek CO_2 field and 11.6 km west of the producing Wallaby Creek gas field.

The PEP 154 Licence is held 90% Santos (operator) and 10% Beach Petroleum N.L. The Croft Structure is a tilted-fault block closure defined by the Curdievale 3D seismic.

Croft 1 is situated in Southern Victoria, in the onshore portion of the Otway Basin (Port Campbell Embayment). The well is located in the PEP 154 licence (90% Santos, 10% Beach Petroleum), and sited at CDP 10084, Inline 2133, on the Curdievale 3D Seismic Survey

The Croft prospect is a tilted –fault block structural closure defined by 3D seismic. The Croft structure is situated within the Port Campbell Embayment and the productive Waarre Formation play fairway.

The primary objective of Croft 1 was the Waarre Formation and the predicted geological section was penetrated. Formations tops were intersected in a range between 123m low (Paaratte Formation) and 38m high (Waarre Formation).

During drilling excellent gas shows of up to 3460/90 units were detected in the upper portion the Waarre Formation (reservoir). Gas levels decreased in the lower Waarre and increased again in the Eumeralla Formation to a maximum of 3200/30 units.

One suite of wireline logging was carried out by Reeves at total depth, and consisted of the following: Run 1: LCS-DLS-MRS-GR, Run 2: PDS-CNS-GR, Run 3: RFS, Run 4: SCG.

Log analysis and formation pressure data indicate a net gas pay of 33.8m (net sand of 34.7m), average porosity of 16.1% with an average water saturation of 14.7% in the Waarre C Sandstone. Sandstone was not present in the Waarre B interval. The Waarre A has an interpreted net gas pay of 2.7m (net sand of 3m), with an average porosity of 14.9% and average water saturation of 45%.

A DST was conducted over the internal 2287 – 2336 m (Eumeralla Formation) but was unable to obtain a packer seat and the test was cancelled.

Croft 1 reached a total depth of 2529m (D), 2534m (L. extr.), and has been cased with 3.5" production tubing.

Croft 1 is a new field gas discovery and has been suspended as a future gas producer.

AUTHOR: D. Zurcher | **DATE**: June 2001

1. GENERAL DATA

Well Name:	Croft 1
Well Classification:	Exploration (Wildcat)
Interest Holders:	Santos Ltd (90%) Beach Petroleum (10%)
Participating Interests:	Santos Ltd (90%) Beach Petroleum (10%)
Operator	Santos
Block/Licence	PEP 154, Onshore Otway Basin, Victoria
Surface Location (GDA94)	Latitude: 38° 32' 19.98" South Longitude: 142° 46' 28.51" East
Surveyed Elevation	Ground Level: 55.5m Rotary Table: 60.2m
Seismic Survey	Curdievale 3D
Seismic Location	CDP 10084, LINE 2133
Total Depth	Driller: 2529m Logger: 2534m
Completion	249 joints of 3.5" 9.3 ppft J55 new NK3SB tubing, set at 2408mRT
Status	Completed Gas Well.

2. DRILLING DATA

Date Drilling Commenced	1500 hours, 30th March 2001
Date Drilling Completed	2300 hours, 11th April 2001
Date Rig Released	2000 hours, 20th April 2001
Contractor	Oil Drilling & Exploration Pty Ltd (OD&E)
Rig	OD&E 30
Rig Specifications	Refer to Appendix XII

3. DRILLING SUMMARY

(a) Drilling Summary (All Depths Driller's KB)

Croft 1 was spudded at 1500 hours on the 30th March 2001. Tables I and II summarise the casing, cementing and mud systems used in this well. A more comprehensive summary is appended to this report (Appendix XI: (Drilling - Final Well Report).

TABLE I: CASING, HOLE, AND CEMENT DETAILS

BIT SIZE	DEPTH	CSG SIZE	CSG DEPTH	JNTS	CSG TYPE	CEMENT
9.875"	476m	7-5/8"	470.9m	32	26.4ppf L80 BTC	172sx, 86.9 bbls Class 'G' Plus 92sx, 19.4 bbls 'G' tail
6.75"	2529m	3-1/2"	2408m	249	9.3ppf J55 new NK3SB	488sx, 248 bbls Class 'G' Plus 329sx, 71 bbls Class 'G' tail

TABLE II: SUMMARY OF MUD SYSTEMS

MUD TYPE	INTERVAL (m)
Spud Mud (Gel/Water)	Surface – 476
KCL/PHPA/Polymer	476 - 2529

(b) Lost Time

Lost time at Croft 1 – Please refer to Appendix XI (Drilling - Final Well Report,: Time Breakdown Data).

(c) Water Supply

No water analysis was done.

(d) Mudlogging

Mudlogging services were provided by Geoservices Ltd. Samples were collected, washed, and described at 15m intervals from the surface to 1095m, and at 3 m intervals from 1095m to total depth at 2529m. All samples were checked for oil shows using ultraviolet fluorescence. Gas levels were monitored from the surface casing shoe to TD using a total gas detector and other parameters monitored include rate of penetration, weight on hook and mud pit levels.

(e) Testing

A DST was attempted in the Eumerella Formation (2287-2336m), however a packer seat was not attained and as a result the test was cancelled.

(f) Coring

No full cores were cut in Croft 1.

(g) Wireline Logging

One suite of wireline logs was run in Croft 1, as detailed below:

TABLE III: ELECTRIC LOG SUMMARY

LOG	SUITE/ RUN	INTERVAL (m)	BHT/TIME/ REMARKS	LOG	SUITE/ RUN	INTERVAL (m)	BHT/TIME/ REMARKS
GR	1/1	2526m-surface	89°C / 7hrs	GR-RFS	3/1	2027.4m-2373.5m	100°C / 46hrs
LCS	1/1	2526m-471m	89°C / 7hrs				41 tests
DLS	1/1	2526m-471m	89°C / 7hrs	SCG-GR4	4/1	2516.5m-1985m	Shot 48, 46 rec
MRS	1/1	2526m-471m	89°C / 7hrs				
GR	2/1	2526m-1950m	100°C / 17.50hrs				
PDS	2/1	2526m-1950m	100°C / 17.50hrs				
CNS	2/1	2526m-1950m	100°C / 17.50hrs				

*Logging Contractor - REEVES

(h) Geothermal Gradient

A measured static bottom hole temperature of 108°C at 2534m is calculated. This gives a geothermal gradient of 2.88°C/100m. An ambient temperature of 20°C was employed. Data used for calculations is as follows:

89.0°C at 2526m after 7.0 hours from Logging Suite 1, Run 1.
100.0°C at 2526.0m after 17.5 hours from Logging Suite 1, Run 2.

(i) Hole Deviation

The Croft 1 well is essentially a vertical hole although minor deviation was required to reach optimum subsurface position. Directional surveys indicate a maximum deviation from vertical of 5.0°, inclination 188°T at 461mMDRT.

(j) Velocity Survey

No velocity survey was run in Croft 1.

(k) Completion Summary

Croft 1 was cased and suspended. Refer to Appendix XI (Drilling - Final Well Report) for further details.

GEOLOGY

1. PRE-DRILLING SUMMARY (after Well Proposal)

Croft 1 is proposed as an Otway Basin gas exploration well to be located in the PEP 154 licence, approximately 12 km north west of the town of Peterborough, 4.9 km south west of the Boggy Creek CO_2 field and 11.6 km west of the producing Wallaby Creek gas field. The Croft Structure is situated within the Port Campbell Embayment and the productive Waarre Sandstone play fairway.

The PEP 154 Licence is held 90% Santos (operator) and 10% Beach Petroleum N.L. The Croft Structure is a tilted-fault block closure defined by the Curdievale 3D seismic. The well is expected to intersect a Waarre Sandstone reservoir with mean average net pay of 35 m.

Croft 1 had a mean prognosed success case of 4.4 BCF sales gas (9.7 BCF OGIP) and a Pc (probability of commercial success) of 41%, resulting in expected mean reserves of 1.80 BCF sales gas.

2. DRILLING RATIONALE (after Well Proposal)

GEOLOGICAL RISK ASSESSMENT

Play Analysis

The Croft Prospect is mapped as a tilted-fault block closure with the primary reservoir being the Waarre Sandstone; both vertical and cross-fault seal are provided by a thick Belfast Mudstone. Structures are charged from mature source beds located within the underlying Eumeralla and / or Crayfish Group, with migration directly into the reservoir or via fault conduits. The play has proven successful in the nearby Mylor, Fenton Creek, North Paaratte, Wallaby Creek and Iona gas fields as well as the Boggy Creek $C0_2$ field. Croft as with each of these fields exhibits a strong amplitude anomaly at the Waarre Sandstone horizon, interpreted as being indicative of well-developed, gas saturated reservoir.

Trap

Interpretation and mapping of the Croft prospect was based on the Curdievale 3D survey, which was recorded in early 2000. The Curdievale 3D data quality is good over the Croft structure.

Several migrated volumes including migrated stacks with and without spectral whitening and both near and far offset migrated stacks were generated and used for interpretation. Due to better horizon continuity and amplitude preservation the migrated stack volume without spectral whitening was used for horizon interpretation. Far and near offset volumes were used for amplitude extraction and AVO analysis.

A coherency cube (similarity volume) was also generated and used in conjunction with other volumes for fault interpretation.

Main mapping was carried out at near top Waarre Sandstone, which is the primary target reservoir. The Waarre sand package has a distinctive seismic characteristic and therefore a high degree of consistency was maintained on mapping this unit. It should be noted however, due to uncertainty in phase and polarity of the Curdievale volume and lateral variations within the Waarre, alternative options for the top Waarre event were investigated.

Well ties were performed for Boggy Creek 1, Callista 1 and Curdie 1. The Curdie 1 ties however may not be a valid tie for the Waarre, as the well appears to have penetrated a fault plane at this level.

A phase analysis trial was conducted using Boggy Creek 1 and Callista 1 but the results obtained are considered inconclusive. Boggy Creek 1 showed data to be between –75 and 60 degrees from zero phase whilst Callista 1 showed between 30 and 135 degrees.

As a consequence of the uncertainties associated with the seismic pick for the top Waarre sand over the Croft structure, alternative options were considered as possibly reflecting the near top Waarre. The integrity of the closure area was examined using these alternative picks. The final mapping however was carried out using the preferred pick which ties with Callista 1 and forms a consistent pick throughout the Curdievale data volume (but is one leg high at Boggy Creek 1 welltie).

The top Belfast Mudstone was interpreted on a selected grid in order to adequately evaluate its seal efficiency over the Croft structure. A time-interval map Belfast to Waarre was generated to investigate the seal thickness.

The Croft structure is a relatively simple tilted fault block structure located between Curdie 1 and Flaxman 1. A strong amplitude event is prominent within the Waarre sand unit over the Croft prospect. Similar events over all gas fields within Port Campbell region suggest that the amplitude anomaly is likely related to the presence of gas in these structures. Furthermore, near and far offset volumes were also used to evaluate the amplitude anomaly over the Croft structure.

A possible illuminated 'flat spot' may also be observed over the Croft prospect which further supports the presence of gas.

The location for the proposed Croft 1 well was selected on inline 2132, CDP 10081. This location is at a near crestal position, and about 50 metres away from the main fault at the Waarre sand level.

Depth conversion for the prognosis was performed using Curdie 1 velocities.

Reservoir

The Waarre Sandstone reservoir was deposited as the initial post-rift sequence at the commencement of the Turonian time under non-marine to marginal marine conditions. The section is sub-divided into three sub-units – Waarre A, B & C. The lower A unit represents a basal transgressive systems tract (TST) characterised by flooding of an incised valley with sediments deposited under marginal marine / estuarine conditions. The basal portion of Unit A is represented by either sand (as in Curdie 1) or shale (Boggy Creek 1 and Callista 1). This section is overlain by the widespread predominantly argillaceous Unit B, which was deposited under estuarine conditions. Unit C followed and is characterised by initial estuarine / deltaic conditions succeeded by high energy sands as the transgression pushed the sediments up the valley system.

The Waarre Sandstone thickens to the south in the Port Campbell Embayment. The proximity to the Boggy Creek Co_2 Field where good reservoir is encountered provides high confidence that similar good reservoir will be found in Croft 1. Nearby water wet Curdie 1 has an average porosity of 12% and a maximum porosity of 17% from logs. This reduced porosity could be a result of the Waarre sands not having early hydrocarbon emplacement, and thus being subject to increased diagenesis from the nearby fault and greater depth of burial. The strong amplitude anomaly associated with the Croft prospect is likely to be an indication of good porosity.

A review of the local wells shows some variability in Waarre sand quality. In Boggy Creek 1 a maximum core permeability of 10.1 Darcies and average core permeabilities of 4.5 Darcies were measured. Drill stem tests confirmed the potential of the reservoir with test rates of 4.5 MMCFD. Howmains 1 represents an interfluve environment with only minor Waarre sand development. No log

porosity estimate can be generated for Flaxmans 1, due to the poor Waarre coverage of the sonic log and its spurious nature.

Seal

All Otway Basin successes In the Port Campbell Embayment area have been from high side, tilted fault and horst blocks. The ultimate top seal to Waarre reservoirs is the marine Belfast Mudstone. While a potential waste or " thief" zone exists between the Waarre sands and the Belfast seal, the Flaxmans Formation, deposited under transitional marine conditions is most likely to act as a seal.

A review of the cross-fault seal in proposed Croft 1 suggests that leakage will not occur as the bounding fault displacement (~140ms) is considerably less than the thickness of the Belfast Mudstone (+300ms).

Charge

Hydrocarbons are produced in the Port Campbell Embayment with the Eumeralla Formation and/or the Crayfish Group being the source beds. Analyses of the condensates and oils from the area suggest a non-marine origin with both algal and higher land plant components (Type III Kerogen). Maturation studies indicate that the top of the hydrocarbon window lies at about 2500m (SS). Thus mature Eumeralla source units which underlie the local gas fields are most likely to charge directly into the overlying structures through source-reservoir juxtaposition or via fault conduits. This model is proposed for Croft 1, which is positioned in a similar setting to the near by, existing gas fields.

With many of the structures being present prior to the Belfast deposition, the timing of generation and migration does not appear to be a major issue.

CO2 Issues

The distribution of CO_2 within the Port Campbell area appears to be related to the introduction of a restricted CO_2 volume at a number of locations and its subsequent migration. The CO_2 is considered to be from a mantle source and is likely to have occurred in conjunction with the emplacement of an igneous body during the Miocene.

A review of the high-resolution aeromagnetic data has been undertaken in an effort to understand the distribution of deep-seated faulting, believed to be the conduit for CO_2 migration and the emplacement of igneous bodies. The preliminary results of the study indicate the presence of an intrusive marginal to the coast and proximal to a major NNE-SSW lineament. This lineament appears to be coincident with major faulting identified on the seismic and is seen as a likely conduit for the Langley and Grumby CO_2. While an intrusive is not identified at nearby Boggy Creek, a similar trending lineament is mapped through the Boggy Creek well location.

3. RESULTS OF DRILLING

(a) Stratigraphy

The following table lists the formations intersected in Croft 1, together with sub-sea elevations and thicknesses.

TABLE IV: STRATIGRAPHY IN THE CROFT 1 WELL

AGE	FORMATIONS	DEPTH (m)	TVD (MRT)	THICK. (m)	ELEV. (m)
MIOCENE	GELLIBRAND MARL NIRRANDA GRP	145.5	145.4	362	-85
L OLIGOCENE - E. MIOCENE	CLIFTON FM	508	507.7	9	-447
L EOCENE – E OLIGOCENE	NARRAWATURK MARL	517	516.6	74	-456
LATE EOCENE	MEPUNGA FM	591	590.6	61	-530
PALAEOCENE - EOCENE	DILWYN FM WANGERRIP GRP	652	551.5	288	-591
PALAEOCENE – E EOCENE	PEMBER FM	940	939.3	70	-879
LATE PALAEOCENE	PEBBLE PT FM	1010	1009.3	78	-949
L MAASTRICHTIAN-E PALAEOCENE	MASSACRE SHERBROOK GRP	1088	1087.2	29	-1027
L CAMPANIAN-MAASTRICHTIAN	TIMBOON SAND	1117.5	1116.7	110	-1056
SENONIAN	PAARATTE FM	1227.5	1226.6	328	-1166
CAMPANIAN	SKULL CK MUDSTONE	1555.5	1554.3	186	-1494
LATE SANTONIAN	NULLAWARRE	1742	1740.7	15	-1680
CONIACIAN-SANTONIAN	BELFAST MUDSTONE	1757	1755.7	251	-1695
TURONIAN	FLAXMANS FM	2008.5	2007.0	16	-1947
TURONIAN	WAARRE FM UNIT C	2024.5	2023.0	35	-1963
TURONIAN	UNIT B	2059.5	2058.0	16	-1999
TURONIAN	UNIT A	2075.5	2073.9	42	-2013
LATE ALBIAN	EUMERALLA FM	2118	2116.4	416+	-2056
	TD	2534	2532.4	-	-2474

Samples were collected, washed, and described at 15m intervals from the surface to 1095mMD, and at 3 m intervals from 1095m to total depth at 2529mMD.

A brief summary of the formations penetrated in Croft 1, their ages and interpreted environments of deposition follows:- (For more detailed lithological descriptions refer to Appendix I). For specific relationships between the units, refer to the stratigraphic column in Appendix VIII)

Total depth for Croft 1 was reached at 2529m (D), 2534m (L), in the Early Cretaceous **Eumeralla Formation,** of the **Otway Group**. The well intersected 416m of the Eumeralla, the top coming in at 2118m (maximum recorded thickness in the Otway Basin is 2743m, in the Fergusons Hill-1 well). The formation consists of interbedded argillaceous sandstone and silty claystone. The sandstones are translucent to off-white, and commonly light-dark grey. Quartz grains are dominantly medium-sized with rare coarse-very coarse grains. They are angular to subangular, poorly to moderately sorted, better sorted toward the base, contain weak to moderate silica cement, and have a common to abundant white argillaceous matrix. In part the sandstone is matrix supported, increasing with depth. Characteristically, the Eumeralla contains a high percentage of volcanic rock fragments (38-53%--Abele *et al*, 1995). There is trace carbonaceous flakes grading to coal in part, and the sandstone varies from friable to occasionally moderately hard, but only exhibits a poor porosity. No oil fluorescence was observed. The claystone comprises approximately 30% of the section drilled and is light olive grey and dark grey brown. It is moderately to very silty in parts, has rare coaly detritus, and is locally micro-micaceous. The claystone is soft to firm and amorphous to sub blocky.

The Eumeralla was deposited in a low-energy fluviatile environment, probably in a major braided stream system where there was an abundant supply of sand-sized volcanic detritus. The landscape also included occasional high energy streams, lakes and channel tracts. The source of the volcanic material is unknown, but due to results from age dating, it appears that volcanism was contemporaneous with

sedimentation (Foster and Hodgson, 1995). In the eastern portion of the Otway Basin the Eumeralla has been dated to be Aptian to Albian.

The Late Cretaceous **Sherbrook Group** unconformably overlies the Early Cretaceous Eumeralla in the Otway Basin. The **Waarre Formation** makes up the oldest formation of the group and is dated to be Turonian in age (Partridge, 1997). The formation was divided up into 4 units by Buffin (1989), however the youngest, 'Unit D', is generally called the Flaxmans Formation, after Flaxmans-1, by Bain (1961). The Waarre was intersected at 2024.5m (-1966m SS), and is 93m thick. The Waarre C contains good 'clean' sand with 33.8m of net pay identified (see Appendix IV for Log Analysis). The Waarre B interval is a thin shale facies (2059.5-2075.5m). The Waarre A interval (2075.5-2118m) contains a number of separate sand packages with 2.7m of net pay. The sandstone is off-white to light pale grey, very fine to very coarse, but dominantly medium. The grains are subangular to subrounded, moderately sorted, contains a weak to moderate silica cement. There is trace to common white argillaceous matrix throughout. The sandstone is loose to friable, and occasionally moderately hard, has a poor to fair visible porosity, and no fluorescence. The claystone is medium to dark grey and pale brown grey, moderately silty, has common glauconite, with a trace of pyrite and carbonaceous material. It is soft to dispersive, occasionally firm and sub-blocky. The sandstone packages are from 1 to 20m thick and are generally blocky in shape, although the Waarre B sand package exhibits a slight fining upward signature. The basal Waarre is interpreted to be shallow marine to marginal marine. After the transgression in the lower part of the Waarre, the formation became more regressive, depositing the best reservoir sands in the lower coastal and delta areas.

The Waarre Formation was transgressed by another flooding event (conformably overlain) by the **Flaxmans Formation.** In the Croft well it was intersected at 2008.5m (-1947m SS), and is 16m thick. It consists of a marginally coarsening upward package of approximately equal amounts of siltstone and claystone, with some sandstone at its base. The claystone is medium to dark brown grey and olive brown, moderately silty, has common glauconite, with a trace of very fine siltstone laminae in part, and slightly calcareous. The siltstone is light grey to olive grey, very argillaceous, and amorphous to subblocky. The sandstone is light grey, dominantly medium and occasionally very coarse grained. It is moderately to poorly sorted, subangular to subrounded, has a weak siliceous cement and minor argillaceous matrix. The sand contains abundant glauconite pellets, occasional pyrite, is loose and exhibits fair porosity. The Flaxmans is dated as being Turonian (Partridge, 1997) in age, and is defined as the initial sediments of the major marine transgression to the overlying Belfast Mudstone. Both the Flaxmans and Belfast are considered part of the regional seal and side seal for the Waarre Formation.

The **Belfast Mudstone** conformably overlies the Flaxmans Formation. It was penetrated at 1757m (-1695m SS), and is 251m thick. This formation is dominantly claystone at this location, with siltstone content increasing from midway through to its base, and minor sandstone close to its top. The sandstone is pale grey, dominantly medium and occasionally coarse, with a weak siliceous cement and minor argillaceous matrix. It is dominantly loose, and exhibits fair porosity. The claystone is medium to dark brown and olive brown, moderately silty, has common glauconite, with a trace of very fine siltstone laminae in part. It is dominantly firm, occasionally soft and sub-blocky. The Belfast has been dated as Turonian to Campanian (Abele *et al.*, 1995), but Partridge (1997) considered it to be only Coniacian to Santonian. It was deposited below storm wave base in low-energy marine conditions, in a pro-delta environment.

The **Nullawarre Greensand** conformably overlies the Belfast with a top intersected at 1742m (-1680m SS), and is 15m thick. It is predominantly made up of a pale to medium green, in part orange, medium to coarse, trace very coarse-grained sandstone. The sandstone is subangular to subrounded, moderately to well sorted, with weak calcareous and siliceous cements (including occasional quartz overgrowths), rare off white argillaceous matrix, and common glauconite. The sandstone is loose and exhibits fair porosity. No shows were registered.

The Nullawarre is regarded as being Late Santonian in age and is marine deposit formed above storm wave base. It may be a sheet sand which accumulated on the upper part of the shelf (Abele *et al*, 1995).

In this locality, the **Skull Creek Mudstone,** (often considered part of the Paaratte Formation), conformably overlies the Nullawarre Greensand. The top of the mudstone was encountered at 1555.5m (-1494m SS), and is 186m thick. It comprises a pale to medium brownish-grey and pale grey, moderately to very silty claystone, and approximately 30m of 80-90% sandstone at the base. The claystone has common dispersed very fine quartz, trace:- black coaly detritus, micro-mica, and glauconite. It is soft to firm and slightly subfissile. The sandstone is pale grey, pale orange, occasionally iron oxide stained, medium to coarse, occasionally fine, moderately to poorly sorted, with rare white argillaceous matrix, and poor to fair porosity. A pro-delta environment of deposition is interpreted for the Skull Creek and an age of Campanian has been attributed to it.

The top of the youngest formation of the Sherbrook Group, the **Paaratte Formation,** was intersected at 1227.5m (-1166m SS). The formation is 328m thick and is made up of thin (1-5m) to fairly thick (10-35m), sandstone packages, which are interbedded with claystone (1-3m thick), minor siltstone, and coal. The sandstone is pale grey and pale grey-brown, becoming off-white toward the base. Quartz grains are predominantly coarse, ranging from medium to pebbly, are angular to subrounded, and very poorly sorted, though improve to moderate at the base. There is weak pyrite and silica cement (including quartz overgrowths) throughout the section. A trace of dark greyish brown argillaceous matrix occurs in the upper portion of this formation. Minor carbonaceous material is present, some of which is partly pyritised. The sandstone is dominantly loose and exhibits poor to fair porosity, improving slightly toward the top. No fluorescence was noted. The minor thinly interbedded claystone is medium to dark grey to medium brownish-grey, moderately to very silty, in part finely arenaceous, commonly calcareous, with trace to common pyrite, minor glauconite, increasingly fossiliferous with depth, trace carbonaceous specks, soft to firm, in part very dispersive and sub-blocky. Coal in the Paaratte Formation is black, subvitreous, brittle, and exhibited conchoidal fractures.

The Paaratte Formation was deposited in a deltaic environment, in this case, presumably delta plain, and has been dated to be Senonian in age in the Otway Basin.

In Croft 1, the **Timboon Sandstone** (new formation – A. Partridge, 1999) was intersected at 1117.5m (-1056m SS), and is 110m thick. The sandstone is off white with grains being clear to translucent, fine to medium, and sub-angular to sub-rounded. It is held together by a weak siliceous cement, and exhibits fair to poor porosity. The sandstone Multiple unconformities are interpreted to occur at the base, middle, and top of this Late Campanian to Maastrichtian age sandstone. The Timboon Sandstone is interpreted to be a marginal facies equivalent to the overlying Massacre Shale.

The **Massacre Shale** (new formation – A. Partridge, 1999) unconformably overlies the Timboon Sand. It is 33m thick with its top at 1088m (-1027m SS), and ranges in composition from mudstone through silty mudstone to argillaceous fine-grained sandstone. The shale is pale to medium grey, grey brown, and occasionally arenaceous. It contains trace lithics and carbonaceous material, is soft to firm and generally sub-blocky. This shale was deposited in a distal marine neritic environment of uncertain water depth and is of Maastrichtian to Palaeocene in age.

Unconformably overlying the Massacre Shale is the oldest unit in the **Wangerrip Group**, the **Pebble Point Formation**. At Croft 1, the Pebble Point is 78m thick, from 1010m (-949m SS) to 1088m, and consists of interbedded sandstone and claystone. Claystone content averages 20% and decreases, grading to siltstone with depth. It is pale to medium brown and pale grey, moderately to very silty, with common dispersed very fine to mainly grit-sized iron oxide stained quartz grains, trace:- glauconite, minor iron oxide pellets, and fossil fragments. It is soft, sticky and sub-blocky. The sandstone is off

white, pale grey, very fine to grit, dominantly medium to coarse, angular to subrounded, poorly sorted with minor siliceous cement. There are common orange iron oxide stained quartz grains, carbonaceous laminations, and pyrite. The sand is dominantly loose with some moderately hard aggregates, and no visible but good inferred porosity and no fluorescence.

The environment of deposition for the Pebble Point is interpreted to be shallow water, near-shore, restricted marine with periodic influxes of coarse detrital material. Various megafossils and microfossils have been identified in the formation that indicate a Palaeocene age (Abele *et al*, 1995).

Conformably overlying the Pebble Point is the **Pember Mudstone**, between 940m (-879m SS) and 1010m, thus is 70m thick. This claystone is medium, occasionally brown grey, is moderately to very silty with abundant dispersed very fine to fine quartz grains in part, common glauconite especially at the top. There is trace:- black carbonaceous flecks, micro-mica, pyrite and it is soft, sticky and sub-blocky. Minor sandstone is present toward the top and the base of this formation. The sandstone is off white, very coarse to medium grained, poorly sorted, with weak siliceous cement. It is loose and exhibits fair inferred porosity.

The Pember Mudstone was deposited in a marine environment where there was restricted circulation and low energy conditions, probably below or close to storm wave base. It has been given an age of Late Palaeocene to Early Eocene (Abele *et al*, 1995) as a result of enclosed palynomorphs.

The **Dilwyn Formation** conformably overlies the Pember Mudstone at this location, and is 288m thick. It was encountered between 652m (-591m SS) and 940m. The section consists predominantly of sandstone with approximately 40% interbedded silty claystone. The sandstone is a off white, very fine to trace grit, though mainly medium-sized, angular to subrounded, poorly sorted with very weak silica and calcareous cements. It contains minor medium brown argillaceous and silty matrix, black carbonaceous detritus and trace to common pyrite. The sand is friable to unconsolidated with porosity ranging from fair to good, is interbedded, and in part grades to a medium brown claystone. It is moderately to very silty with abundant, in part, dispersed very fine to grit-sized, quartz sand grains, stained brown, and in part grading to argillaceous sandstone. The claystone is slightly calcareous in part, common fossil fragments, trace to common pyrite and is very soft, very dispersive and sub-blocky.

Both macrofossils and microfossils from the Dilwyn have been dated to be Palaeocene - Eocene. The environment of deposition is interpreted to be shallow marine, with the cleaner sandy portions representing shore-face deposits of a coastal barrier system and the interbedded section possibly back beach lagoonal sediments, with some breaching occurring. Another interpretation is that the Dilwyn could have formed in a lower delta plain area with the sands, distributary channels and mouth bars, and the clays, the inter-distributary bay fills (Abele *et al.*, 1995).

The Dilwyn Formation is the youngest unit of the **Wangerrip Group**, and is disconformably overlain by the **Mepunga Formation**, the oldest formation of the **Nirranda Group**. In the Croft well the Mepunga was intersected at 591m (-530m SS) and is 61m thick. The massive sandstone is pale brownish orange and very fine to medium in part, commonly coarse to grit-sized, angular to subrounded (dominantly subangular), moderately sorted, becoming poorer with depth, with in part, weak calcareous and siliceous cement generally decreasing with depth, minor medium brown argillaceous and silty matrix, and abundant brown-stained quartz grains, decreasing to common with depth. There is trace fossil fragments and coarse muscovite flakes, and the sand is generally loose, and has a very poor, to in part, very good visible porosity.

The trace claystone is grey, dark brown, slightly to very silty in part, with abundant dispersed very fine to grit-sized brown-stained quartz grains in places. It is slightly calcareous in part, with a trace of glauconite, trace to common pyrite and is very soft, very dispersive and sub-blocky.

According to dating of forams, molluscs and palynomorphs discovered within the Mepunga, an age of Late Eocene has been given. The sandstones have been interpreted as being deposited in beach and near-shore locations as barrier islands, whereas the claystones regarded as estuarine and some as deep-lagoonal in origin (Abele *et al,* 1995).

The **Narrawaturk Marl** overlies the Mepunga Formation with a conformable contact. The marl was encountered at 517m (-456m SS), and is 74m thick. The formation is made up of a grey brown to dark grey, and medium green grey marl. It contains abundant fossil fragments, including fenestrate bryozoa, forams, shell fragments, echinoid spines and sponge spicules. It has a trace pyrite, trace to common very fine, clear quartz grains, common glauconite and is very soft, sticky and sub-blocky.

The fossil fragments have been dated to be Late Eocene to Early Oligocene. The marl was deposited in an open marine environment, mostly below storm wave base.

The Narrawaturk represents the youngest formation of the Nirranda Group, and overlying it with a regional disconformity is the **Clifton Formation**, the oldest unit of the **Heytesbury Group.** The Clifton is a 9m thick formation of calcarenite, found from 508m (-447m SS) to 517m in the Croft well. This limestone is white to orange and dark brown, very iron oxide rich with abundant iron oxide pellets and common iron oxide replaced fossil fragments (decreasing with depth). It contains common to abundant very coarse, rounded, brown, iron oxide-stained quartz grains, common fine clear quartz grains, abundant fossil fragments, trace glauconite increasing to abundant with depth, all set in a cryptocrystalline to calcarenitic matrix. The limestone is firm with an inferred poor porosity.

Fossils found within the calcarenite have been dated to be Late Eocene – Early Oligocene, and it is thought to represent a shallow marine unit, a carbonate sand, deposited above fair weather base under fairly energetic conditions (Abele *et al*, 1995).

The Clifton Formation grades vertically, and in places laterally into the **Gellibrand Marl.** The Gellibrand Marl was intersected at 145.5m (-85m SS) and is 362m thick. This marl is medium olive grey with common to abundant fossil fragments including bryozoa, forams, shell fragments, echinoid spines and sponge spicules. There is a trace of pyrite, appearing as fossil replacement in places, trace of very fine grained glauconite, and it is very soft, sticky and non fissile.

The Miocene Gellibrand Marl was deposited in low-energy, continental shelf environment, with a minimum water depth of 60m, due to the presence of glauconite (Abele *et al*, 1995).

The Port Campbell Limestone was the first formation penetrated. For further details concerning the formations encountered in Croft 1, refer to **Appendix I** of this report.

(b) Stratigraphic Prognosis (after Well Proposal)

The majority of the geological section penetrated was within tolerance to prognosis. Prognosed tops ranged from a maximum of 123m low to prognosis to 38m high. The primary objective, the Waarre Formation, was 38m low. The top of the Eumeralla Formation tends to be difficult to pick on seismic in this region.

Actual versus predicted formation tops and thicknesses for Croft 1 are tabled below (all depths quoted are Logger's Depths):

TABLE V: ACTUAL VERSUS PREDICTED DEPTHS AND THICKNESSES Croft 1

FORMATION	PROG SS DEPTH (m)	ACTUAL SS DEPTH (m)	DEPTH DIFF (m)	PROG THICK (m)	ACTUAL THICK (m)	THICK DIFF (m)
Gellibrand Marl	-122	-85	37H	320	362	+42
Clifton Fm	-442	-447	5L	12	9	-3
Narrawaturk Marl	-454	-456	2L	51	74	+23
Mepunga Fm	-505	-530	25L	40	61	+21
Dilwyn Fm	-545	-591	46L	270	288	+18
Pember Mdst	-815	-879	64L	128	70	-58
Pebble Point Fm	-943	-949	6L	-	78	-
Massacre Shale	N/P	-1027	-	-	29	-
Timboon Sandstone	N/P	-1056	-	-	110	-
Paaratte Fm	-1047	-1166	119L	461	328	-133
Skull Creek Mdst	-1508	-1494	14H	-	186	-
Nullawarre Greensand	N/P	-1680	-	-	15	-
Belfast Mdst	-1725	-1695	30H	220	251	+31
Flaxmans Fm	-1945	-1947	2L	59	16	-43
Waarre Fm	-2004	-1963	35H	65	93	+28
Eumeralla Fm	-2069	-2056	13H	35+	416+	-
TD	-2104	-2474				

(c) Hydrocarbon Summary

Total gas was recorded from the surface to total depth (2529m RT) using a FID total gas detector run by Geoservices Ltd. One unit of gas is equal to 200ppm methane equivalent. Chromatographic analysis was determined using a FID chromatograph and these values are quoted as percentages (C1-C4). Ditch cuttings were washed, described and checked for fluorescence using ultraviolet light.

Surface to Paaratte Formation (spud to 1330m)

No gas was detected through the Port Campbell Limestone, Gellibrand Marl, Clifton Formation, Narrawaturk Marl, Mepunga Formation, Dilwyn Formation, Pember Mudstone, Pebble Point Formation, Massacre Shale, Timboon Sandstone, and the upper Paaratte Formation. No hydrocarbon fluorescence in the drill cuttings was recorded within these formations.

Paaratte Formation – Skull Creek Formation (1330-1555.5m)

Total gas recorded within the lower section of the Paaratte Formation was less than 1 unit and often nil. The gas analysed was predominantly 100% C1, with minor amounts of C2 in the mid portion of the Paaratte Formation. No hydrocarbon fluorescence was noted.

Skull Creek Formation – Flaxmans Formation (1555.5-2008.5m)

Total gas rose steadily throughout the Skull Creek Formation – Flaxmans Formation interval, from 1 units to a maximum of 100 units at the base. The gas ratios for the high readings in the lower portion of this interval are: C1=90%, C2=8%, and C3=2%. No hydrocarbon fluorescence was recorded within these formations.

Flaxmans Formation (2008.5-2024.5m)

Gas levels continue to rise through this formation to ~500 units with a background of ~80 units. Gas breakdown is: C1=90%, C2=7%, C3=3%, and C4=Tr. No hydrocarbon fluorescence was recorded for this interval.

Waarre Formation (2024.5-2118m)

Waarre Unit C (2024.5-2059.5m)
The primary objective of the Croft 1 well was the Waarre Unit C. The Waarre Unit C yielded significant values in the upper sands associated with excellent reservoir qualities. At the wellsite, during the drilling it was assessed as being gas saturated, and that it would likely flow gas at economic recovery rates. This unit contains a broad gas peak with readings up to 3460 units, and with components being: C1=88%, C2=7%, C3=3%, C4=1%,. and C5=1%. No oil fluorescence was documented at the wellsite.

Log analysis and formation pressure data indicate a gross sand column of 34.7m with 33.8m of net pay. Average porosity calculated in this interval was 16.1% with an average water saturation of 14.7%. Mudlog gas peaks, log evaluation, combined with RFS tests indicate that the Waarre Unit C has good potential at this location.

Waarre Unit B (2059.5-2075.5m)
Gas readings drop back to background levels of 70 units in this unit. Gas breakdowns are: C1=89%, C2=8%, C3=3%, and C4=Tr. No hydrocarbon fluorescence was recorded for this interval. Log analysis indicates that there is no sand development present in this interval.

Waarre Unit A (2075.5-2118m)
Gas readings increase slightly in the Waarre Unit A, with a maximum total gas of 1440 units and background gas of ~150 units, C1=90%, C2=6%, C3=4%, C4=Tr, and C5=Tr. No hydrocarbon fluorescence was recorded for this interval. Log analysis and formation pressure data indicate a gross sand column of 3.0m with 2.7m net pay. Average porosity calculated in this interval is 14.9% with an average water saturation of 45%.

Eumeralla Formation (2118-2534m TD)

The middle portion of the Eumeralla Formation interval drilled (~2230-2325m) produced gas readings to a maximum of 3200 units, and maintained a background level of around 30 units to total. No fluorescence was documented in this formation. Typical breakdown: C1=92%, C2=5%, C3=2%, C4=1%, and C5=Tr. No hydrocarbon fluorescence was recorded for this interval.

The Croft 1 well has been classed as a new field gas discovery and has been suspended as a future gas producer.

4. SUMMARY

Croft 1 was drilled as a Wildcat (WCNF) gas exploration well within PEP 154, at CDP 10084, Inline 2133, located on the Curdievale 3D Seismic Survey. The Croft Structure is situated within the Port Campbell Embayment (southern Victoria) and the productive Waarre Formation play fairway.
The Croft Prospect is a tilted-fault block structural closure defined by 3D seismic. The penetrated a thick Waarre Formation reservoir section.

The primary objective of Croft 1 was the Late Cretaceous Waarre Formation of the Sherbrook Group, and the secondary contingent objective the older Early Cretaceous Eumeralla Formation of the Otway Group.

Drilling of Croft 1 was terminated 416m into the Eumeralla Formation. Formation tops were generally intersected close to prognosis. The Paaratte Formation was furthest from prognosed depth at 123m low, and the top of the primary objective, the Waarre, was 38m high (at –1966m SS).

Wireline logging at total depth of 2534m consisted of the following: Run 1: LCS-DLS-MRS-GR, Run 2: PDS-CNS-GR, Run 3: RFS, Run 4: SCG.

Log analysis and formation pressure data from the Waarre C Sandstone indicate a net pay 33.8m, average porosity of 16.1%, with an average water saturation of 14.7%. The Waarre 'A' contains 2.7m net pay, average of 14.9%, with an average water saturation of 45%.

Croft 1 has established the presence of hydrocarbons reservoired in the Waarre Formation at this location within PEP 154. Croft 1 has been cased and suspended as a future gas producer.

5. REFERENCES

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APPENDIX I: LITHOLOGICAL DESCRIPTIONS

APPENDIX I (a): CUTTINGS

LITHOLOGICAL DESCRIPTIONS

Ditch cuttings were collected, washed, described, and checked for fluorescence at 15m intervals from the surface to 1095m, and at 3 m intervals from 1095m to total depth at 2529mRT (drlr).

HEYTESBURY GROUP
Gellibrand Marl (Miocene)
362m thick

145-508m MARL: light grey - medium grey, pale to medium greenish/grey, commonly silty and also argillaceous, very calcareous, common to abundant fossil fragments, echinoid spines, gastropods, fenestrate bryozoans, forams, rare pyrite in parts, rare carbonaceous specks, soft-dispersive, sticky, competency and firmness increases with depth, predominantly sub blocky, occasionally blocky.

Clifton Formation (Late Oligocene – Early Miocene)
9m thick

508-517m LIMESTONE: Light brown to predominantly orange tan, very fine to fine calcarenite in parts, predominantly crystalline, hard to brittle, subblocky to blocky.
MARL: Dominantly medium to dark grey, dark blue grey in part, trace off white, very argillaceous and very calcareous, minor fossiliferous, minor coral spicules and forams, dominantly firm and subblocky, minor soft and dispersive.

NIRRANDA GROUP
Narrawaturk Fm (Late Eocene to Early Oligocene)
74m thick

517-591m CLAYSTONE: medium to predominantly dark brown, silty in part, very calcareous, trace fossil fragments, trace carbonaceous specks in parts, rare pyrite nodules, very soft to dispersive, amorphous.: medium to predominantly dark brown, silty in part, very calcareous, trace fossil fragments, trace carbonaceous specks in parts, rare pyrite nodules, very soft to dispersive, amorphous.

Mepunga Formation (Late Eocene)
61m thick

591-652m SANDSTONE: White to light brown, very fine – fine grained, moderate sorting, subrounded to angular, calcareous cement. Occasional lithic clasts, poor inferred porosity. No fluorescence.
CLAYSTONE: Medium to dark brown, predominantly medium brown, trace fossiliferous material, nodular pyrite, calcareous, soft, blocky to subblocky.

WANGERRIP GROUP
Dilwyn Formation (Palaeocene - Eocene)
288m thick

652-940m SANDSTONE: Medium to dark brown occasionally light brown, fine-medium grained, moderate sorting, rounded to subrounded, calcareous cement. Glauconite and pyrite framboids present. Poor inferred porosity. No fluorescence.
CLAYSTONE: Medium to dark brown, light grey (?marl). Occasionally silty. Pyritic, glauconitic and occasional carbonaceous fragments.
SILTSTONE: Grey to grey brown. Pyritic, calcareous, blocky, rare carbonaceous material.

Pember Mudstone (Palaeocene - Early Eocene)
70m thick

940-1010m CLAYSTONE: (70%) Dark grey-brown grey, pyritic, calcareous, carbonaceous specs. Amorphous.
SILTSTONE: (10%) Dark grey, pyritic, calcareous, blocky to subblocky, calcareous, micro-micaceous, carbonaceous fragments.
SANDSTONE: (20%) Yellow orange, very fine to fine grained, moderate sorting, subrounded, calcareous cement, trace glauconite, unconsolidated. Poor inferred visible porosity. No fluorescence.

Pebble Point Formation (Late Palaeocene)
78m thick

1010-1088m SANDSTONE: (90%) Yellow orange, fine grained, well sorted, subrounded, calcareous cement, trace glauconite, sponge spicules, echinoid spines, lithic clasts, unconsolidated. Poor inferred visible porosity. No fluorescence.
CLAYSTONE: (10%) Dark grey-brown grey, pyritic, slightly calcareous. Amorphous.

SHERBROOK GROUP
Massacre Shale (Late Campanian to Maastrichtian)
29m thick

1088-1117.5m CLAYSTONE: (20%) medium to predominantly dark grey, silty in part, calcareous, trace fossil fragments, carbonaceous in parts, rare pyrite, very soft to dispersive, amorphous.
SILTSTONE: (30%) medium dark grey, arenaceous, blocky, calcareous, pyritic and carbonaceous specks.
SANDSTONE: (50%) brown (iron staining), fine to medium grained, poorly sorted, subrounded, weak calcareous cement, quartz overgrowths, good inferred porosity, no fluorescence.

Timboon Sandstone (Late Campanian to Maastrichtian)
110m thick

1117.5-1227.5m SANDSTONE: (90%) brown to orange brown, with intervals of white to clear, predominantly medium to course grained, occasionally very course grained. Moderate sorting, rounded to subangular, calcareous cement, argillaceous, pyritic, rare lithic clasts, predominantly unconsolidated. Fair inferred visible porosity. No fluorescence.

SILTSTONE: (10%) grey, calcareous, pyritic, carbonaceous, to very carbonaceous, soft to medium hard, blocky.

Paaratte Formation (Senonian)
328m thick
1227.5-1555.5m

1227.5-1347m SANDSTONE: (60%) white to yellow brown, with subordinate brown to orange brown, fine to medium grained, moderate sorting, rounded to subangular, calcareous to very calcareous, lithic clasts, pyritic, rare gastropods, trace glauconite, unconsolidated, fair inferred porosity. No fluorescence.
SILTSTONE: (40%) dark brown, dark grey, argillaceous, carbonaceous specs, amorphous.

1347-1380m SANDSTONE: (80%) white to yellow brown, with subordinate brown to orange brown, fine to medium grained, moderate sorting, rounded to subangular, calcareous to very calcareous, lithic clasts, pyritic, rare gastropods, trace glauconite, unconsolidated, fair inferred porosity. No fluorescence.
SILTSTONE: (20%) dark brown, dark grey, argillaceous, carbonaceous specs, amorphous.

1380-1434m SILTSTONE: (80%) medium to dark grey, argillaceous, carbonaceous, occasionally very glauconitic soft to medium hard, subblocky.
SANDSTONE: (20%) light to medium grey, brown to yellow, medium to course grained, poorly sorted, rounded to subangular, calcareous, lithic clasts, nodular pyrite, argillaceous matrix, trace glauconite, unconsolidated, fair inferred porosity. No fluorescence.

1434-1555.5m SANDSTONE: (80%) white to light grey, medium to very course grained, poorly sorted, rounded to subangular, calcareous, pyritic, argillaceous matrix, unconsolidated, poor inferred porosity. No fluorescence.
SILTSTONE: (20%) medium to dark grey, argillaceous, carbonaceous, soft to medium hard, subblocky.

Skull Creek Mudstone (Campanian)
186m thick
1555.5-1742m

1555.5-1670m SANDSTONE: (20%) light grey, very fine to fine grained, poorly sorted, rounded to subangular, calcareous, pyritic, argillaceous matrix, unconsolidated, poor inferred porosity. No fluorescence.
SILTSTONE: (80%) Dark grey to grey brown, arenaceous, carbonaceous specks, argillaceous, calcareous, carbonaceous, soft to medium hard, subblocky to blocky.

1670-1704m SILTSTONE: (90%) light grey, dark grey, occasionally brown, common carbonaceous flakes, arenaceous, very fine sand, very calcareous, soft to dispersive, argillaceous grading to claystone, subblocky.
SANDSTONE: (10%) clear, frosted, translucent, fine to coarse, predominantly medium, moderately sorted, subangular to subrounded, no visible cement, loose, fair inferred porosity.

1704-1742m SANDSTONE: (70%) white to light grey, translucent, fine grained, well sorted, subrounded to rounded, no visible cement, pyrite, glauconite, loose, fair to good inferred porosity,
SILTSTONE: (30%) light grey, occasionally brown, trace to common carbonaceous flakes, arenaceous in part very calcareous, pyritic, foraminifera, ostracods, very soft – dispersive, argillaceous, subblocky.

Nullawarre Greensand (Late Santonian)
15m thick

1742-1757m SANDSTONE: translucent to frosted, occasionally very light grey and mottled green, very fine to fine grained, well sorted, subrounded to angular, weak calcareous cement, off white to light brown argillaceous matrix in part, common glauconite, occasional fossil fragments, rare nodular pyrite, predominantly loose with occasional moderately hard aggregates, poor visible porosity, poor to fair inferred porosity, no fluorescence.

Belfast Mudstone (Coniacian to Santonian)
251m thick
1757-2008.5m

1757-1827m SILTSTONE: (30%-90%) dark grey, occasionally dark brown, trace carbonaceous flakes, arenaceous, in part very calcareous, pyritic, fragmented shelly debri, foraminifera, very soft to firm, argillaceous, subblocky.
SANDSTONE: (10%-70%) clear to translucent, light yellow to light green, fine, trac very coarse, well sorted, sub angular to sub rounded, weak siliceous cement, rare off white argillaceous matrix, glauconite, fair inferred porosity, no fluorescence.

1827-2008.5 SILTSTONE: (40%) dark grey, occasionally dark brown, trace carbonaceous flakes, arenaceous, in part very calcareous, pyritic, fragmented shelly debri, foraminifera, very soft to firm, argillaceous, subblocky.
CLAYSTONE: (50%) medium to dark brown grey, olive brown, very argillaceous, silty in part, glauconite, trace calcareous in part, abundant green/black glauconite pellets, firm, minor soft, sub blocky.
LIMESTONE: (10%) white-grey, calcilutite, argillaceous, microcrystalline, glauconite pellets, brittle.

Flaxmans Formation (Turonian)
16m thick

2008.5-2024.5m SILTSTONE: (10%) dark grey, trace carbonaceous flakes, arenaceous, in part very calcareous, pyritic, foraminifera, very soft to firm, argillaceous, subblocky.
CLAYSTONE: (70%) medium to dark brown grey, olive brown, very argillaceous, silty in part, glauconite, trace calcareous in part, abundant green/black glauconite pellets, firm, minor soft, sub blocky.
SANDSTONE: (20%) clear to translucent, very fine-fine grained, good sorting, rounded, calcareous, firm, fair inferred porosity, no fluorescence.

Waarre Formation (Turonian)
93m thick
2024.5-2118m

2024.5-2059.5m WAARRE UNIT C
SANDSTONE: (10%) buff - brown, rare clear to translucent, fine to medium grained, good sorting, rounded, calcareous, glauconite, firm, fair visible porosity, good inferred porosity, no fluorescence
SANDSTONE: (70%) off white, clear to translucent, fine to very course grained, poor sorting, angular, strongly calcareous, rare glauconite, lithic fragments firm to loose, good visible porosity, good inferred porosity, no fluorescence
CLAYSTONE: (20%) medium to dark grey, rare light grey, very argillaceous, silty in part, glauconite, trace calcareous in part, firm, sub blocky.

2059.5-2075.5m WAARRE UNIT B
CLAYSTONE: (90-100%) medium to dark grey, rare light grey, very argillaceous, silty in part, grading to siltstone, glauconite, trace calcareous in part, firm, sub blocky.
COAL: (TRACE-10%) black, subvitreous, friable, subblocky, uneven fracture, lignitic.

2075.5-2118m WAARRE UNIT A
SANDSTONE (10%) buff - brown, occasionally clear to translucent, fine to medium grained, good sorting, rounded, calcareous, ?glauconite, firm, fair visible porosity, good inferred porosity, no fluorescence
SANDSTONE (70%) off white, clear to translucent, fine to very course grained, poor sorting, angular, strongly calcareous, rare ?glauconite, lithic fragments firm to loose, good visible porosity, good inferred porosity, no fluorescence.
CLAYSTONE (20%) medium to dark grey, rare light grey, very argillaceous, silty in part, glauconite nodules, trace calcareous in part, firm, sub blocky.
COAL (TRACE-10%) black, subvitreous, friable, subblocky, uneven fracture, lignitic.

Eumeralla Formation (Late Albian)
(416+m)
2118-2534m TD

2118-2205m SANDSTONE: (30%-70%) off white, pale grey-white, rare dark grey, very fine to fine grained, well sorted, well to moderately sorted, weak silica cement, slightly calcareous, argillaceous, lithic fragments. Presence of volcanics, multi-coloured. Friable to loose, poor visible porosity, poor inferred porosity, no fluorescence.
SILTSTONE: (20%-80%) medium to dark grey, carbonaceous laminae, argillaceous, pyritic, very calcareous, soft to firm, subblocky.

2205-2226m CLAYSTONE: (100%) light grey, with brown to grey also present. argillaceous, very calcareous, firm, subblocky.

2226-2290m SANDSTONE (30%-70%) off white, pale grey-white, rare dark grey, very fine to fine grained, well sorted, well to moderately sorted, weak silica cement, slightly calcareous, argillaceous, lithic fragments. Presence of volcanics, multi-coloured. Friable to loose, poor visible porosity, poor inferred porosity, no fluorescence.
SILTSTONE: (20%-80%) medium to dark grey, carbonaceous laminae, argillaceous, pyritic, very calcareous, soft to firm, subblocky.

2290-2534m SANDSTONE (30%-70%) off white, pale grey-white, rare dark grey, very fine to fine grained, grading to medium grained, rare course grained. moderate sorting, weak silica cement, slightly calcareous, argillaceous, lithic fragments. Friable, fair to good visible porosity, fair to good inferred porosity, no fluorescence.
SILTSTONE: (30%-70%) medium to dark grey, carbonaceous laminae, argillaceous, pyritic, slightly calcareous, soft to firm, subblocky.

APPENDIX I (b): SIDE WALL CORES

SANTOS LIMITED

SIDEWALL CORE DESCRIPTION

WELL: CROFT 1 **DATE:** 18TH APRIL **PAGE:** 1 OF 1

GUN NO.: 1 AND 2 **SHOTS FIRED:** 48 **SHOTS BOUGHT:** 46

GEOLOGIST: J. GOODALL

CORE NO.	DEPTH	REC.	PALYN. EVAL.	LITH.	COLOUR	GRAIN SIZE	HYDR. INDIC. (Y/N)	SUPPLEMENTARY INFORMATION
1	2516.5	RECOVERED	P	SST	LIGHT GY	FINE	N	
2	2479	RECOVERED	P	SLTST	LIGHT GY		N	
3	2411.5	RECOVERED	P	SLTST	LIGHT GY		N	
4	2383.5	RECOVERED	P	SLTST	LIGHT GY		N	
5	2337	RECOVERED	P	SLTST	LIGHT GY		N	
6	2321	RECOVERED	X	SST	LIGHT GY	FINE	N	LOWER EUMERALLA GAS SAND
7	2318.5	RECOVERED	P	SST	LIGHT GY	FINE	N	
8	2310.5	RECOVERED	X	SST	LIGHT GY	FINE	N	LOWER EUMERALLA GAS SAND
9	2298.5	RECOVERED	X	CLYST	GY		N	LOWER EUMERALLA GAS SAND
10	2284.5	RECOVERED	P	SLTST	LIGHT GY		N	
11	2270.5	RECOVERED	P	SLTST	LIGHT GY		N	
12	2258.5	RECOVERED	P	SLTST	LIGHT GY		N	
13	2252.5	RECOVERED	X	CLYST	GY-BN		N	UPPER EUMERALLA GAS SAND
14	2244	RECOVERED	X	SST	GY-BL GY	VF-F	N	UPPER EUMERALLA GAS SAND
15	2237	RECOVERED	P	SST	GY-BL GY	FINE	N	
16	2223	RECOVERED	P	CLYST	LIGHT GY		N	
17	2216	RECOVERED	P	CLYST	LIGHT GY		N	
18	2208.5	RECOVERED	P	CLYST	LIGHT GY		N	
19	2193	RECOVERED	P	SST	GY-BL GY	F-MED	N	
20	2183.5	RECOVERED	P	SST	GY-BL GY	F-MED	N	
21	2173	RECOVERED	P	CLYST	GY-BN		N	
22	2168	RECOVERED	P	CLYST	GY-BN		N	
23	2159	RECOVERED	P	SST	GY-BN	F-MED	N	
24	2152	RECOVERED	P	SST	GY-BL GY	F-MED	N	
25	2143.5	RECOVERED	P	SST	GY-BL GY	F-MED	N	
26	2134	RECOVERED	P	SST	GY-BL GY	F-MED	N	
27	2125.5	RECOVERED	P	SST	GY	FINE	N	
28	2120.5	RECOVERED	P	CLYST	BN		N	
29	2110.5	RECOVERED	P	CLYST	BN-GY		N	
30	2095.5	RECOVERED	P	CLYST	DK GY		N	
31	2089.5	RECOVERED	P	CLYST	BN-GY		N	
32	2083.5	RECOVERED	X	SST	GY	F-MED	N	WAARRE A
33	2079	RECOVERED	P	SST	GY	F-MED	N	
34	2074	RECOVERED	P	CLYST	GY-BN		N	
35	2069	RECOVERED	P	CLYST	GY-BN		N	
36	2065	RECOVERED	P	CLYST	GY-BN		N	
37	2062.5	RECOVERED	P	SST	GY	FINE	N	
38	2055	RECOVERED	P	SST	GY	FINE	N	
39	2046.5	RECOVERED	P	CLYST	BN		N	
40	2041.5	RECOVERED	X	SST	GY	FINE	N	WAARRE C
41	2035	RECOVERED	P	CLYST	BN-GY		N	
42	2027	EMPTY	X				N	WAARRE C
43	2023	RECOVERED	P	CLYST	BN-GY		N	
44	2018	RECOVERED	P	SLTST	BN-GY		N	
45	2015	RECOVERED	P	CLYST	BN		N	
46	2004.5	LOST	P				N	
47	1994	RECOVERED	P	CLYST	DK GY		N	
48	1985	RECOVERED	P	CLYST	GY		N	

COMMENTS: DEPTHS PICKED FROM ON DEPTH LOG.

OTHER ANALYSIS
2 SAMPLES IN WAARRE C
1 SAMPLE IN WAARRE A
3 IN LOWER EUMERALLA GAS SAND
2 IN UPPER EUMERALLA GAS SAND
X= OTHER ANALYSIS (SANDSTONE SAMPLES)

PALYNOLOGY
40 FOR PALYNOLOGY
P= PALYNOLOGICAL ANALYSIS

APPENDIX II: HYDROCARBON SHOW REPORTS

No oil shows were seen in Croft 1

APPENDIX III: WIRELINE LOGGING REPORTS

APPENDIX III (a): LOGGING ORDER FORM

Santos

A.C.N. 007 550 923

REVISION 1.0
(DATE: 22/11/96)

LOGGING ORDER

COMPANY:	SANTOS LTD & BEACH PETROLEUM N.L.				
WELL:	CROFT # 1	**FIELD:**	WILDCAT		
RIG:	OD & E 30	**STATE:**	VIC		
LOCATION:	INLINE 2134, CDP 10084 CURDIEVALE 3D	**BLOCK:**	PEP 154		
LATITUDE:	38 32 25.32S	**LONGITUDE:**	142 46 23.65E		
ELEVATIONS:	**GL:** 51.5M	**RT:**	56.2M	**DF:**	4.7
9 7/8" HOLE:	480m	**7 5/8" CSG:**	471m	**WT:**	26.4/B/FT
6 ¾"HOLE:	2529m TD	**3 1/2" CSG:**	2408	**WT:**	
TD (Drlr.):	2529m TD	**TD (Logr.):**	2142m		
MUD SYSTEM:	KCl /PHPA/Polymer	**CIRCULATION STOPPED:**	21:00	**HRS ON**	12-April

WT: 9.5 **VISC:** 45 **PV/YP:** 10/7 **PH:** 9.0 **FLUID LOSS:** 7 **CHL:** 19000

GEOLOGIST: JEFF GOODALL

INFORMATION GIVEN ABOVE IS TO BE USED ON LOG HEADING SHEETS.

HOLE CONDITIONS: (TIGHT SPOTS, DEVIATION, COALS, BARITE IN MUD, ETC)
NO TIGHT SPOTS NOTED.
KCl%

INTERNAL DIAMETER OF 7 5/8" CASING IS 6.969"

DRILL STEM TESTS/CORED INTERVALS:
NO DRILL STEM TESTS OR FULL HOLE CORES ARE PLANNED FOR THIS WELL

COMMENTS: (TO BE INCLUDED IN REMARKS SECTION ON HEADER SHEET)
KCL ?%
INTERNAL DIAMETER OF 7 5/8" CASING IS 6.969"
ADD COMMENT ON WHETHER ENVIRONMENT CORRECTIONS HAVE BEEN APPLIED.

LOGS:
PROGRAM CONFIRMED WITH OPERATIONS GEOLOGIST AT ?? HOURS ON 10/04/2001
PROGRAM VARIES FROM PRE-SPUD NOTES: **YES:** ☐ **NO:** ☒ X

LOG	INTERVAL	REPEAT SECTION
RUN 1 – COMBO GR-DLS-MRS-LCS	GR - TD TO SURFACE	ACQUIRE RUNNING IN HOLE
	DLS / LCS – TD TO SURFACE CASING SHOE ARRAY SONIC TD TO 1980M MSFL - TD TO SURFACE CASING SHOE	ACQUIRE RUNNING IN HOLE
RUN 2		
PDS (RHOB)	TD TO 1980M	ACQUIRE RUNNING IN HOLE
CNS (NPHI)	TD TO 1980M	ACQUIRE RUNNING IN HOLE
RUN 3		
ACOUSTIC SCANNER	TD TO 1980M	
RUN 4		
40 RFS (with 1 Sample)	TBA POST RUNS 1 & 2	TIE IN EVERY 50M
RUN 5		
RFS (1 Sample)	TBA POST RUNS 1 & 2	
RUN 6		
DIPMETER	TD TO 1980M	
RUN 7		
SCG (SIDEWALL CORE GUN). 2 FULL GUNS (48)	SWC POINTS TO BE PICKED, PALYNOLOGY AND GEOLOGY TEAM	CORRELATE DEPTH

REMARKS:
(ALL OPERATIONS ARE TO CONFORM TO CURRENT REEVES AND SANTOS OPERATING PROCEDURES)

1. TENSION CURVE - TO BE DISPLAYED ON LOG FROM T.D. TO CASING SHOE.
2. ALL CALIBRATIONS IN CASING MUST BE VERSUS DEPTH. (IF HOLE CONDITIONS PERMIT).
3. SONIC WAVEFORMS TO BE RECORDED OVER ENTIRE WAARRE SANDSTONE SECTION.
4. ALL ZONES OF SONIC CYCLE SKIPPING OR POOR QUALITY DATA TO BE REPEATED AND NOTED IN REMARKS SECTION.
5. REPEAT SECTION NOT TO BE RUN IN 6 3/4" HOLES, COMPARE DOWN LOG FOR REPEAT ANALYSIS.
6. REPEAT SECTION TO BE LOGGED PRIOR TO MAIN LOG OVER INTERVAL OF INTEREST. (IF HOLE CONDITIONS ALLOW). CONFIRM REPEAT SECTION INTERVAL WITH OPERATIONS GEOLOGIST.
7. ALL THERMOMETER READINGS TO BE RECORDED ON LOG
8. ALL SCALES AND PRESENTATIONS TO CONFIRM TO STANDARDS UNLESS OTHERWISE ADVISED.
9. THE FIELD/EDIT TAPE MUST BE A MERGED COPY OF ALL LOGS RUN. SEPARATE TAPES ARE ONLY ACCEPTABLE AS AN INTERIM MEASURE.
10. ANY CHANGE FROM STANDARD PROCEDURES/SCALES TO BE NOTED IN REMARKS SECTION.
11. RM, RMF, RMC AND BHT MUST BE ANNOTATED ON FAXED LOGS. FAXED LOGS SHOULD ALSO INDICATE IF ON-DEPTH OR NOT.LOG DATA IS TO BE TRANSMITTED AS SOON AS POSSIBLE AFTER ACQUISITION.
12. IF ANY DELAYS ARE LIKELY OR IF DATA TRANSMISSION WILL ADVERSELY EFFECT THE OPERATION THEN THE OPERATIONS GEOLOGIST MUST BE IMMEDIATELY INFORMED.
13. THE OPERATIONS GEOLOGIST MUST BE INFORMED IMMEDIATELY OF ANY TOOL OR HOLE PROBLEMS, LOST TIME OR ANY OTHER EVENT WHICH MAY AFFECT THE LOGGING OPERATIONS.

APPENDIX III (b): FIELD ELECTRIC LOG REPORT

SANTOS LIMITED
FIELD ELECTRIC LOG REPORT

WELL:	CROFT 1	**GEOLOGIST:**	JEFF GOODALL
LOGGING ENGINEER:	M.BARNES		
RUN NO.:	1 TO 7	**DATE LOGGED:**	12-18/4/01
DRILLERS DEPTH:	2529M	**LOGGERS DEPTH:**	2527M
ARRIVED ON SITE:	06:30 12/4/01		
ACTUAL LOG TIME:	37.25 HRS	**LOST TIME LOGGER:**	0 HRS
TOTAL TIME:	37.25 HRS	**LOST TIME OTHER:**	44 HRS

TYPE OF LOG	GR-DLS-MRS-LCS	GR-PDS-CNS	GR-RFS	GR-SCG
TIME CIRC. STOPPED	HRS	HRS	HRS	HRS
TIME TOOL RIG UP	0.75HR	0.5HR	0.5HR	0.5HR
TIME TOOL RIH	0.30HR to start downlog	0.30HR to start downlog	7.0HR	1HR
TIME TOOL RIG DOWN	0.25HR	0.75HR	2.0HR	0.5HR
TOTAL TIME	11HRS	5.25HR	16HRS	5HRS

TYPE OF LOG	FROM	TO	REPEAT SECTION	TIME SINCE LAST CIRCULATION	BHT
RUN 1					
GR	2529M	SURFACE	DOWNLOG	7.0HRS	89°C
LCS	2529M	471M	DOWNLOG	7.0HRS	89°C
DLS	2529M	471M	DOWNLOG	7.0HRS	89°C
MRS	2529M	471M	DOWNLOG	7.0HRS	89°C
RUN 2					
GR	2529M	1980M	DOWNLOG	17:50HRS	89°C
PDS	2529M	1980M	-	17:50HRS	89°C
CNS	2529M	1980M	DOWNLOG	17:50HRS	89°C
RUN 3					
GR-RFS	2370.5M	2027M	-		89°C
RUN 4	(ABANDONED)				
GR-RFS (1 SAMPLE)					
RUN 5	(DID NOT REACH TARGET INTERVAL)				
DIPMETER					
RUN 6	(DID NOT REACH TARGET INTERVAL)				
ACOUSTIC SCANNER					
RUN 7 (PACKER FAILED)	2336M	2287M			
DST					
RUN 8	2516.5M	1985M	-	-	-
SCG-GR					

MUD SYSTEM: KCL/PHPA/POLYMER WEIGHT: 9.6 PPG

HOLE CONDITIONS:
THE HOLE CONDITIONS WERE VERY POOR IN THE LOWER BELFAST MUDSTONE AND THE FLAXMANS FORMATION. ALSO HOLE CONDITIONS DETERIORATED IN THE GELLIBRAND MARL INTERVAL. THIS CAUSED SEVERE PROBLEMS WITH THE LOGGING RUNS.

REMARKS / RECOMMENDATIONS
2 attempts at Run-1 (combo), first attempt failed because tool could not pass ledge at 1925.5m (12th April, total time first attempt 4.5hrs)
2 attempts at Run-3 (RFS), first run could not pass bridge at 1981m (13th April, total time first attempt 12hrs)
1 failed attempt to run AST (Run 6), tool could not pass bridge at 1996m (15th April, total time 5hrs)
2 failed attempts to run Dipmeter (Run 5), tool could not pass bridge at 796m (15th April, total time 4hrs) and 1926m (16th April, total time 4 hrs).
Run 4 (second RFS) cancelled due to hole conditions
DST run, failure of packer, no seal after 3 attempts. (17th April). log correlation run, (3hrs)

THE HOLE CONDITIONS WERE VERY POOR AT THE FLAXMANS/BELFAST MUDSTONE CONTACT AND IN THE GELLIBRAND MARL. THESE HOLE PROBLEMS WERE RESPONSIBLE FOR THE MULTIPLE ATTEMPTS AT LOGGING RUNS. REEVES DID A GOOD LOGGING JOB.

WELLSITE LOG QUALITY CONTROL CHECKS

LOG ORDER FORM	Y	MUD SAMPLE RESISTIVITY	Y	TOOL NO. / CODE CHECK	Y
OFFSET WELL DATA	Y	CABLE DATA CARD	Y	LOG SEQUENCE CONFIRM.	Y

LOG TYPE	LCS	GR	CAL	DLS	MLL	PDS	CNS	RFS	REMARKS
CASING CHECK	Y		Y						
SCALE CHECK	Y		Y	Y	Y	Y	Y	Y	
DEPTH Casing Total	Y	Y	Y	Y		Y			
CALIBRATIONS OK	Y	Y	Y	Y	Y	Y	Y	Y	
REPEATABILITY	Y	Y	Y	Y	Y	Y	Y	Y	
LOGGING SPEED	Y	Y	Y	Y	Y	Y	Y	Y	
OFFSET WELL Repeatability	Y	Y	Y	Y	Y	Y	Y	Y	
NOISY / MISSING DATA	N	N	N	N	N	N	N	N	
CURVES/LOGS Depth Matched	Y	Y	Y	Y	Y	Y			
Rm MEASUREMENT				Y	Y				
LLS / LLD / CHECK				Y	Y				
PERF / RHOB CHECK						Y	Y		
LOG HEADER / TAIL	Y	Y	Y	Y	Y	Y	Y	Y	
PRINT/FILM QUALITY	Y	Y	Y	Y	Y	Y	Y	Y	

COMMENTS:

GOOD LOGGING JOB. TOOLS WORKED WELL. HOLE CONDITIONS POOR.

ENGINEERS COMMENTS (If this report has not been discussed with the Engineeer state reason)

CROFT 1

LOG ANALYSIS

CROFT 1 - LOG ANALYSIS

Croft 1 wireline logs were analysed over the Waarre Sandstone (2024.5-2120.5m) interval. Gas pay was identified in the Waarre A & C Sandstones. Croft 1 was cased as a potential gas producer.

A 9-7/8" surface hole was drilled to 476 metres and 7-5/8" casing set at 470.9 meters. A 6-3/4" hole was then drilled with KCl/PHPA/polymer mud to 2529 metres (D). Wireline logging was carried out by Reeves as described below. Forty one Repeat Formation Sampler (RFS) pressure points were attempted (19 valid, 10 curtailed, 12 no seal).

Unless otherwise specified, all depths mentioned below are wireline measured depth referenced to the drill floor.

Pay Summary

Waarre C	Gas Pay **33.8m**, Ave Porosity 16.1%, Ave S_w 14.7%
Waarre A	Gas Pay **2.7m**, Ave Porosity 14.9 %, Ave S_w 45%

Note: Net gas pay assumes a 5% porosity cut-off and a 65% water saturation cut-off

Logs Acquired

Run 1	GR	2522.5-Surface	
	CSS (Compensated Sonic Sonde)	2513-471m	(Waveform Sonic from 2520-1955m)
	DLS (Dual Laterolog Sonde)	2521-471m	
	MRS (Micro Resistivity Sonde)	2525.5-471m	
Run 2	PDS (Compensated Density Sonde)	2524-1982m	
	CNS (Compensated Neutron Sonde)	2520-1982m	
Run 3	SCG (Side wall cores)	2513.5-1985m	(2x24 shot gun)
Run 4	RFS	2373.5-2027.4m	

Mud Parameters

Mud Type	KCl/PHPA
Mud Density	9.6ppg
KCl	3.2%
Rm	0.245 ohmm @ 63.9°F
Rmf	0.221 ohmm @ 60.8°F
Rmc	0.332 ohmm @ 69.8°F
MRT	100°C from Run 4 at 2373.5m

Remarks

- The laterolog and sonic was run with 1 inch stand-offs.

Log Processing

- Regional salinity data in water sands was used to derive the R_w used for this analysis.
- A BHT of 100.8°C was used for the analysis (Gradient of 30°C/km).

Interpretation Procedures and Parameters

An interpretation over the Waarre Sandstone interval was conducted using a combination of gas corrected density-neutron cross-plot porosity (PHIX) and sonic porosity (SPHI) from sonic. A gamma-ray derived volume of shale was calculated with water saturations computed using a pseudo-Archie Equation (Parameters used for the interpretation are detailed in Table 1).

- The GR from Run 1 was corrected for environmental effects such as mud-weight, KCl and borehole size using measurements made from the MRS caliper.

- Borehole corrections for the Dual Laterolog SLL and DLL curves using 1.5" stand-offs were applied (Table 1). These are ratios illustrated in the Reeves charts Lat-1 and Lat-2 respectively.

- The borehole corrected deep resistivity curve (DLL_BC) was further corrected for shoulder effects (DLLc).

- The invasion corrected R_T was derived using the following tornado chart emulation relationship:

  $R_T = (1.59*DLL_C - 0.59*SLL\_BC)$
  where:
  DLL_C = Deep resistivity response borehole and shoulder bed corrected.
  SLL_BC = Shallow resistivity response borehole corrected.

- Density porosity was calculated over the Waarre Sandstone:

  $DPHI = (2.65 - DEN) / (1.65)$
  where;
  DEN= Bulk Density in g/cc.

- Cross-plot porosity was determined:

  PHIX= (DPHI+NPRL_ss)/2
  where;
  NPRL_ss= Environmentally corrected neutron porosity in sandstone units.

- A Hunt-Raymer sonic porosity curve was calculated:

  SPHI = (DTC2 – 55.5/DTC2)*0.58
  Where;
  DTC2 = 3-4ft Compensated Sonic (µs/ft).

- PHIT was primarily produced from the minimum value of DPHI and PHIX with some editing to SPHI and porosity interpreted from the MLL.

- A shale corrected porosity (PHIE to be used in the pseudo-Archie equation) was calculated as follows:

if Vsh < VshSt..... PHIE = PHIT

elseif VshSt < Vsh < VshCO... PHIE = a proportional percentile correction from PHIT to (PHIT – (Vsh * PHIsh))

elseif Vsh > VshCO ..... PHIE = PHIT - (Vsh * PHIsh)

where:

VshSt =	The start of the sliding scale Vsh correction.
VshCO =	Shale volume cut-off.
Vsh =	Shale volume.
PHIT =	Combination of density/neutron and sonic porosity.
PHIsh =	Apparent shale porosity.

- Limited SCAL data from Mylor indicate that the cementation exponent "m" for the Waarre sandstones has a range between 1.67 and 1.84 and varies with porosity. Given this range, it was appropriate to use a variable cementation exponent "m" for the use in calculating S_w. The derivation of "m" was porosity based and results in "m" decreasing as porosity increases. The variable "m" relationship is given as;

*MEXP = (-0.2413 * Log10 PHIE) +2.4657*

- Limited SCAL data from Mylor indicate that the saturation exponent "n" for the Waarre sandstones has a range between 1.52 and 1.78 and varies with porosity and shaliness. A pseudo saturation exponent "n" has been used in the Archie equation. This is to take into account the impact of micro-porosity inherent in shaly sandstones. It is postulated that shale intergranular micro-porosity increases the surface area (conductivity) of the rock, and therefore "n" needs to be adjusted to compensate for the extra conductivity in shaly sandstones.

Clean sand "n" =1.85 Shaly sand "n" = 1.50

Shaly sand is defined where the shale volume is greater than a cut-off of 40%. Saturation exponent is gradational between the two end-points above.

- Water saturations were calculated using a pseudo-Archie equation.

$$SW = \sqrt[n]{\frac{aRw}{\phi^m Rt}}$$

where:

R_w =	Resistivity of formation water at formation temperature.
RT =	True resistivity, i.e. resistivity of the non-invaded reservoir (i.e. LLD corrected for borehole, invasion and resistive shoulder beds).
PHIT=	Input as shale corrected PHIE (derived above).
a =	Porosity coefficient (default = 1).
m =	Cementation factor or exponent from the variable "m" relationship.
n =	Saturation exponent from the "n" relationship derived above.

Conclusions

1. Croft 1 log analysis identified a total of 36.5 metres of pay in the Waarre Sandstone.

2. The Waarre C sandstone contains 33.8 metres of pay. This interval has an average porosity of 16.1% and an average water saturation of 14.7%.

3. Sandstone development was not observed in the Waarre B.

4. The Waarre A sandstone contains 2.7 metres of pay. This interval has an average porosity of 14.9% and an average water saturation of 45%.

5. Formation pressure points in these sandstones indicated a reservoir pressure of around 2860 psi.

6. Conventional pay, porosity and water saturations for Croft 1 are tabulated in Table 2.

7. Low bulk density and high sonic transit time would indicate gas-bearing sands down to 2084m. Below this depth are shales and shaly sands interpreted as water bearing.

8. Croft 1 was cased as a future gas producer.

Attached is the well evaluation summary (WES) plot for Croft 1 (01.069)
wes/wessa/croft_01.069_waarre.wes

TABLE 1
Log Analysis Parameters

PARAMETERS	WAARRE C SANDSTONE	WAARRE A SANDSTONE
R_w (ohmm) @ 25°C	0.3	0.3
a	1	1
m	Variable	Variable
n	Variable	Variable
Borehole cor RD	0.85	0.85
Borehole cor RS	0.9	0.9
RD Shoulder Corr.	1.1	1.1
GR matrix (API)	30	30
GR shale (API)	120	150
VSHST	0	0
VSHCO	0.4	0.6
PHISH	0.13	0.2

TABLE 2
Conventional Pay Summary

FORMATION SAND	SAND INTERVAL	NET PAY (m)	NET SAND (m)	AVG Porosity (wt%)	AVG Sw (wt %)
WAARRE C	2024.5 -2059.5	33.8	34.7	16.1	14.7
WAARRE A	2081 -2084.5	2.7	3	14.9	45

	NET PAY (ft)	Avg Porosity (wt%)	Avg S_W (wt%)
Waarre Sandstone	**36.5**	**16**	**17**

Net Pay identified where PHIE>5% & S_w<65%, Net Sand identified where PHIE>5%

PE605249

This is an enclosure indicator page.
The enclosure PE605249 is enclosed within the container PE908028 at this location in this document.

The enclosure PE605249 has the following characteristics:

ITEM_BARCODE	PE605249
CONTAINER_BARCODE	PE908028
NAME	Croft-1 Well Evaluation Summary Log
BASIN	OTWAY
ONSHORE?	Y
DATA_TYPE	WELL
DATA_SUB_TYPE	WELL_LOG
DESCRIPTION	Croft-1 Well Evaluation Summary Log, Scale 1:200, by Santos [BOL] Pty Ltd, W1315, PEP154. Enclosure of Appendix IV Log Evaluation / Analysis contained in "Well Completion Report" [PE908028].
REMARKS	
DATE_WRITTEN	
DATE_PROCESSED	31-MAY-2001
DATE_RECEIVED	19-OCT-2001
RECEIVED_FROM	Santos Ltd
WELL_NAME	Croft-1
CONTRACTOR	
AUTHOR	
ORIGINATOR	Santos Ltd
TOP_DEPTH	
BOTTOM_DEPTH	
ROW_CREATED_BY	DN07_SW

(Inserted by DNRE - Vic Govt Mines Dept)

APPENDIX V: PRESSURE SURVEY

SANTOS LIMITED

PRESSURE SURVEY

WELL: CROFT 1 K.B.: 56.2M TOOL AND GAUGE TYPE: HP QUARTZ/STRAIN PAGE: 1

WITNESS: J.GOODALL TIME SINCE LAST CIRC.: 14/04/01 4.30PM PROBE / PACKER TYPE: NORMAL DATE: 15/04/01

TEST	FORMATION UNIT SANDS	DEPTH K.B.	DEPTH S.S.	EXPECT. FORM PRESS.	EXPECT. TEMP.	FILE NO.	TEST RESULTS					INTERPRETATION			COMMENTS (FLUID TYPE)
							HYDR. BEFORE	FORM. PRESS	HYDR. AFTER	TEMP.	DRAW D. MOBILITY	TYPE D/D	TYPE BUILDUP	DEPLET -S/C	
		M	M	PSIG	°F/P°C		PSI	PSI	PSI	°F/°C	MD/CP				
1	WAARRE C	2027.4	1970.8		80 C		3342.8	2857.52	3342.8	84.94	N/A	N	GOOD	N	
2	WAARRE C	2028.5	1972.3		80 C		3344.2	2859.0	3344.5	84.94	N/A	N	GOOD	N	
3	WAARRE C	2031	1974.8		80 C		3348.4	2859.1	3348.8	84.94	N/A	N	SLOW	N	
4	WAARRE C	2038	1981.8		80 C		3359.6	2859.3	3359.9	85.4	N/A	N	GOOD	N	GAS SAMPLE
5	WAARRE C	2043	1986.8		80 C		3366.4	2859.4	3367.4	85.4	N/A	N	GOOD	N	
6	WAARRE C	2047.7	1991.5		80 C		3375.0	2719.0	3375.8	85.92	N/A	N	GOOD	N	
7	WAARRE C	2051	1994.8		80 C		3381.2	2861.3	3381	86.08	N/A	N	GOOD	N	
8	WAARRE C	2052.5	1996.3		81 C		3383.3	2861.9	3383.5	86.4	N/A	N	GOOD	N	
9	WAARRE C	2056.5	2000.3		81 C		3390.1	2861.9	3390.3	86.4	N/A	N	GOOD	N	
10	WAARRE C	2058.9	2002.7		81 C		3394.0	2863.3	3394.2	86.4	N/A	N	GOOD	N	
11	WAARRE A	2077	2020.8		81 C		3423.0	2568.0	3424.4	86.4	N/A	N	SLOW	N	

ANTICIPATED GEOTHERMAL GRADIENT: _____

ANTICIPATED WATER GRADIENT: _____

MUD WEIGHT / GRADIENT: MUD WEIGHT 9.7

DRAWDOWN NORMAL : PRESSURE DOES NOT DROP TO ZERO
LIMITED : PRESSURE DROPS TO ZERO

BUILD UP TYPES : IMMEDIATE - RAPID - GOOD - SLOW

SANTOS LIMITED

PRESSURE SURVEY

WELL: CROFT 1 K.B.: 56.2M TOOL AND GAUGE TYPE: HP QUARTZ/STRAIN PAGE: 2

WITNESS: J.GOODALL TIME SINCE LAST CIRC.: 14/04/01 4.30 PROBE / PACKER TYPE: NORMAL DATE: 15/04/01

TEST	FORMATION UNIT SANDS	DEPTH K.B.	DEPTH S.S.	EXPECT. FORM PRESS.	EXPECT. TEMP.	FILE NO.	TEST RESULTS					INTERPRETATION			COMMENTS (FLUID TYPE)
							HYDR. BEFORE	FORM. PRESS	HYDR. AFTER	TEMP.	DRAW D. MOBILITY	TYPE D/D	TYPE BUILDUP	DEPLET -S/C	
		FT/M	FT/M	PSIG	°F/P°C		PSI	PSI	PSI	°F/°C	MD/CP				
12	WAARRE A	2082	2025.8		81 C		3431.6	2868.4	3432.6	86.9	N/A	N	GOOD	N	
13	WAARRE A	2083	2026.8		81 C		3433.7	2868.8	3434.1	87.4	N/A	N	GOOD	N	
14	WAARRE A	2086	2029.8		81 C		3438.9	2869.8	3439.3	87.4	N/A	N	GOOD	N	
15	WAARRE A	2090.5	2034.3		81 C		3446.6	2875.03	3447.1	87.4	N/A	N	GOOD	N	
16	WAARRE A	2100	2043.8		81 C		3461.9	2919.4	3462.6	87.4	N/A	N	GOOD	N	
17	WAARRE A	2106.5	2050.3		81 C		3472.4	2929.1	3473.4	87.4	N/A	N	GOOD	N	
18	WAARRE A	2109	2052.8		81 C		3476.8	2927.2	3477.5	88.36	N/A	N	GOOD	N	
19	WAARRE A	2112	2055.8		82 C		3482.1	2927.0	3482.4	88.36	N/A	N	GOOD	N	
20	WAARRE A	2113	2056.8		82 C		3483.8	2928.4	3484.3	88.36	N/A	N	GOOD	N	
21	EUME.U GAS	2230.5	2174.3		85 C		3676.03	1531.98	3678.1	92.27	N/A	N	SLOW	N	
22	EUME.U GAS	2234.5	2178.3		85 C		3683.2	1675.5	3686.4	92.76	N/A	N	SLOW	N	

ANTICIPATED GEOTHERMAL GRADIENT:

ANTICIPATED WATER GRADIENT:

MUD WEIGHT / GRADIENT: MUD WEIGHT 9.7

DRAWDOWN NORMAL : PRESSURE DOES NOT DROP TO ZERO
LIMITED : PRESSURE DROPS TO ZERO

BUILD UP TYPES : IMMEDIATE - RAPID - GOOD - SLOW

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SANTOS LIMITED

PRESSURE SURVEY

WELL: CROFT 1 K.B.: 56.2M TOOL AND GAUGE TYPE: HP QUARTZ/STRAIN PAGE: 3

WITNESS: J.GOODALL TIME SINCE LAST CIRC.: 14/04/01 4.30 PM PROBE / PACKER TYPE: NORMAL DATE: 15/04/01

TEST	FORMATION UNIT SANDS	DEPTH K.B.	DEPTH S.S.	EXPECT. FORM PRESS.	EXPECT. TEMP.	FILE NO.	TEST RESULTS					INTERPRETATION			COMMENTS (FLUID TYPE)
							HYDR. BEFORE	FORM. PRESS	HYDR. AFTER	TEMP.	DRAW D. MOBILITY	TYPE D/D	TYPE BUILDUP	DEPLET -S/C	
		FT/M	FT/M	PSIG	°F/P°C		PSI	PSI	PSI	°F/°C	MD/CP				
23	EUME.U GAS	2244.5	2188.3		85		3699.3	3722	3699.4	93.25					NO SEAL
24	EUME.U GAS	2246	2189.8		85		3701.1	3701.2	3701.4	93.25					NO SEAL
25	EUME.U GAS	2251.5	2195.3		85		3711.1	3711.0	3711.0	93.5					NO SEAL
26	EUME.L GAS	2296	2239.8		86		3282.3	1656.6	3784.3	93.5	N/A	N	SLOW	N	
27	EUME.L GAS	2299	2242.8		86		3788.2	3789	3788	94.2					NO SEAL
28	EUME.L GAS	2304	2247.8		86		3796.5	1730.9	3797.8	94.2	N/A	N	SLOW	N	
29	EUME.L GAS	2310	2253.8		87		3807.2	3806.5	3807.1	94.3					NO SEAL
30	EUME.L GAS	2320.5	2264.3		87		3824.2	1736.3	3825.8	94.71	N/A	N	SLOW	N	
31	EUME.L GAS	2331.8	2275.6		87		3844.3	1786.3	3844.0	95.2	N/A	N	SLOW	N	
32	EUM WATER	2346	2289.8		87		3864.4	1764.6	3867.5	96.18	N/A	N	SLOW	N	
33	EUM WATER	2368.3	2312.1		88		3901	3900.6	3900.6	96.0					NO SEAL

ANTICIPATED GEOTHERMAL GRADIENT:

ANTICIPATED WATER GRADIENT:

MUD WEIGHT / GRADIENT: MUD WEIGHT 9.7

DRAWDOWN NORMAL : PRESSURE DOES NOT DROP TO ZERO
LIMITED : PRESSURE DROPS TO ZERO

BUILD UP TYPES : IMMEDIATE - RAPID - GOOD - SLOW

SANTOS LIMITED

PRESSURE SURVEY

WELL: CROFT 1 K.B.: 56.2M TOOL AND GAUGE TYPE: HP QUARTZ/STRAIN PAGE: 4

WITNESS: J.GOODALL TIME SINCE LAST CIRC.: 14/04/01 PROBE / PACKER TYPE: NORMAL DATE: 15/04/01

TEST	FORMATION UNIT SANDS	DEPTH K.B.	DEPTH S.S.	EXPECT. FORM PRESS.	EXPECT. TEMP.	FILE NO.	TEST RESULTS					INTERPRETATION			COMMENTS (FLUID TYPE)
							HYDR. BEFORE	FORM. PRESS	HYDR. AFTER	TEMP.	DRAW D. MOBILITY	TYPE D/D	TYPE BUILDUP	DEPLET -S/C	
		FT/M	FT/M	PSIG	°F/P°C		PSI	PSI	PSI	°F/°C	MD/CP				
34	EUM WATER	2370.5	2314.3		88		3905.7	3906.2	3906.2	97.16					NO SEAL
35	EUM WATER	2394	2337.8		88		3935.5	1798.9	3941	97.16					NO SEAL
36	EUM WATER	2419	2362.8		88		3969.6	4020.8	3975.4	97.16					NO SEAL (?OVERPRESSURED)
25A	EUME U.GAS	2252.5	2196.3		85		3712.2	3690	3712.1	93.25					NO SEAL
34A	EUME U.GAS	2373.5	2317.3		88		3906.4	1930	3909.5	96.18	N/A	N	SLOW	N	
34B	EUME U.GAS	2370.7	2314.5		88		3906.2	3885.4	3905.4	97.2					NO SEAL
21A	EUME U.GAS	2230	2173.8		85		3676.8	2415.8	3676.9	92.27					PARTIAL SEAL
33A	EUME U.GAS	2369	2312.8		88		3898.4	3898.8	3899.2	97.2					NO SEAL

ANTICIPATED GEOTHERMAL GRADIENT:

ANTICIPATED WATER GRADIENT:

MUD WEIGHT / GRADIENT: MUD WEIGHT 9.7

DRAWDOWN NORMAL : PRESSURE DOES NOT DROP TO ZERO
LIMITED : PRESSURE DROPS TO ZERO

BUILD UP TYPES : IMMEDIATE - RAPID - GOOD - SLOW

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APPENDIX VI: DRILL STEM TEST DATA

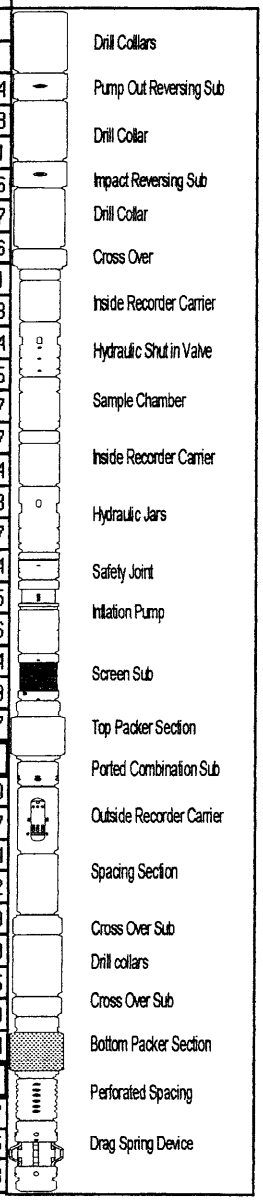
BAKER HUGHES

Baker Oil Tools

TEST TOOL & PIPE RECORD

Well Name & No.	Croft # 1			
Date	17/04/01			
Ticket No.	5845			
Interval Tested	From:	2287	To:	2332
Total Depth.	2529	Total Interval		45
Test No.	One			

DESCRIPTION	I.D. No.	I.D.	O.D	Length	Depth
Stick Up					-5.24
Drill Pipe #2 to #72	*71 std*			2051.22	2045.98
Marker Joint 6ft Pony DC				1.83	2047.81
Drill Pipe #1+S	*1 std+ S*			38.75	2086.56
Santos **NoGo** Sub	*210*			0.61	2087.17
Hevi-wate Drill Pipe	*x5*			45.39	2132.56
Drill Collars #7 to #19	*x13*			121.65	2254.21
Pump Out Reversing Sub	*581*	2 1/3	4 3/4	0.43	2254.63
Drill Collars #6	*x1*			9.31	2263.94
Impact Reversing Sub	*854*	2 7/8	6	0.31	2264.25
Drill Collars #5	*x1*			9.32	2273.57
Cross Over Sub	*567*	2 9/16	4 4/5	0.30	2273.87
Recovery Recorder Carrier	*917*		4 7/8	1.37	2275.24
Hydraulic Shut in Valve	*304*		4 7/8	1.49	2276.73
Positive Control Sampler	*405*		5	1.04	2277.77
Inside Recorder Carrier	*921*		4 7/8	1.37	2279.14
Hydraulic Jars	*206*		5	2.01	2281.15
Safety Joint	*938*	2 7/16	4 3/4	0.60	2281.76
Downhole Inflation Pump	*103*		5	2.38	2284.14
Screen Sub Assembly	*506*		5	1.16	2285.29
Top Packer Stick Up	*726*		5 5/8	1.71	2287
Top Packer Seal Depth					*2287*
Top Packer Stick Down				0.90	2287.90
Port Sub	*662*		5	0.27	2288.17
Combination Sub	*667*		5	0.17	2288.34
Outside Recorder Carrier	*905*		5	2.68	2291.02
X/O 3 1/2FH Box 4 IF Pin	*552*	2 5/16	4 3/4	0.37	2291.39
Drill Collars #1 to #4	*x4*			37.40	2328.79
X/O 4 IF Box 3 1/2 FH pin	*560*	2 1/3	4 3/4	0.37	2329.15
Spacing (8ft)	*88*			2.44	2331.59
Bottom Packer Stick Up	*825*		5 5/8	0.55	2332.14
Bottom Packer Seal Depth					*2332.14*
Bottom Packer Stick Down				1.83	2333.97
Perforated Spacing	*941*	2 9/32	4 3/4	0.61	2332.75
Belly Spring	*15*	2 1/16	5	2.06	2336.03



Pipe Tally	Length	Description	Depth
NoGo	0.61		
Drill Pipe	2089.97	Marker Joint	2047.81
Pup Joint	1.83	P.O.S.	2254.63
Hevi-wate Pipe	45.39	D.B.S.	2264.25
Drill Collars Above Interval	140.28	Rec. Recorder	2275.24
Tools above Interval	14.16	Inside Recorder	2279.14
STRING ABOVE INTERVAL	2292.24	Panex Recorder	2291.02
Top of Interval	2287.00	Outside Recorder	2291.02
Top Single Above Table	5.24		

Service Engineer	Oil Co. Rep.	Geologist
Chris Riggs	Alistair Chomley	Jeff Goodall

BAKER HUGHES

Drill Stem Test Field Report

Customer	**Santos Ltd**
Address	**91 King William St, 5000**
Well Name & Number	**Croft # 1**
Location	**38.54°S 142.773°E**
Test Number	**One**
Formation Tested	**Eumerella**
Interval Tested	**2291 to 2336 mtrs**
Test Type	**Inflate Straddle DST**
Test Date	**17/04/01**

General Information

Company Rep	Alistair Chomley	**Unit Number**	10
Geologist	Jeff Goodall	**Field**	Otway basin
Service Engineer	Chris Riggs	**Area**	Pep 154
Contractor	ODE # 30	**Ground Elevation**	57.1 mtrs
Ticket Number	5845	**Rotary Table**	61.8 mtrs

Mud & Hole Data

Mud Type	KCL Polymer	**Calliper Log Run**	Yes
Weight	9.6 lb/gl	**Type Of Calliper**	Reeves Single Axis
Water Loss	7	**Top Packer**	7.25"
Viscosity	45	**Bottom Packer**	7.5"
Filter Cake	1	**Drag Spring**	7.5"
Main Hole Size	6.75"	**Hole Conditioned**	Yes

Drill Pipe Size & Wt	3.5" @ 15.5 lb/ft
Drill Collars	4.75" @ 47 lb/ft
Drill Collars Run	19
Water Cushion	764 mtrs
Bottom Hole Choke	1 inch
Surface Choke Size	0.25" and 0.5 "
Element Size	5 3/8 inch
Element Length	66 inches

BAKER HUGHES

Drill Stem Test Field Report

Test Times

Pre-Flow		Initial Shut-In	
Final Flow		Final Shut-In	

Gas Measurements

Time	Surface Choke	Readings	Comments

BAKER HUGHES

Drill Stem Test Field Report

Pre-Flow / Blow Description

Final Flow / Blow Description

Sequence Of Events

Date:Time	
12/4/01	**Description of Events:**
0700	Truck mobilised from Moomba to Wellsite
13/4/01	
1530	Depart Adelaide for Wellsite, arrive Mt.Gambier @ 2230 & overnight there
14/4/01	
0730	Depart Mt.Gambier for Wellsite
1230	Arrive Wellsite & Standby
17/4/01	
1030	Hold pre-job Safety Meeting
1035	Commence making up tools
1050	Pick up drill collars for Interval spaceout
1110	Continue making up tools
1230	Finish Making up tools & RIH
1340	Install ***no-go*** sub
1400	Install 1.83 mtr pup joint as marker joint & RIH
1550	Finish installing Water Cushion to 19 std & D of drill pipe(2448') & continue RIH
1830	Finish RIH
	Rig up and conduct Reeves correlation. A 1.2mtr down-hole depth correction was required.
2200	Finish correlation, rig down Reeves,
	Rig up surface equipment and establish string weights,
	115klbs up, 93klbs static and 90klbs down
2230	Pressure Test
2255	Slips in & rotate at 40 rpm to inflate packers, hold Safety meeting.
2326	Pull slips & pick up 10k over (125k)
2328	Come down & set 15k on tools to open
2334	Mud drops, pick up with 10k over
2336	Slips in & rotate @ 40 rpm
2346	Pick up & pull slips, pick up to 20 k over (135k)
2348	Tool indications of open with 7k bleed off, further 5k bleedoff & slip downhole 1mtr
2352	Pick up to test seat, no overpull
2355	Slips in, 1mtr uphole & rotate @ 45rpm
2358	Apply an extra winchline to control drill pipe , lift rotate speed to 65 rpm
18/4/01	
0011	Pull slips to test seat , appears good at 10 k over
0014	Pull further 10k to 135k, still good
0016	Come down with 15k to open @ 75k
0022	No indication of open, Pick up no overpull
0031	Drop bar
0034	Mud gone
0043	Water to surface, 396 strokes
0115	Break down Surface Equipment & Kelly up for conventional circulation
0130	Finish laying out Surface Equipment & POOH
0710	Break out tools
0930	Finish & compile reports

BAKER HUGHES

Drill Stem Test Field Report

Pressure / Temperature Recorder Data

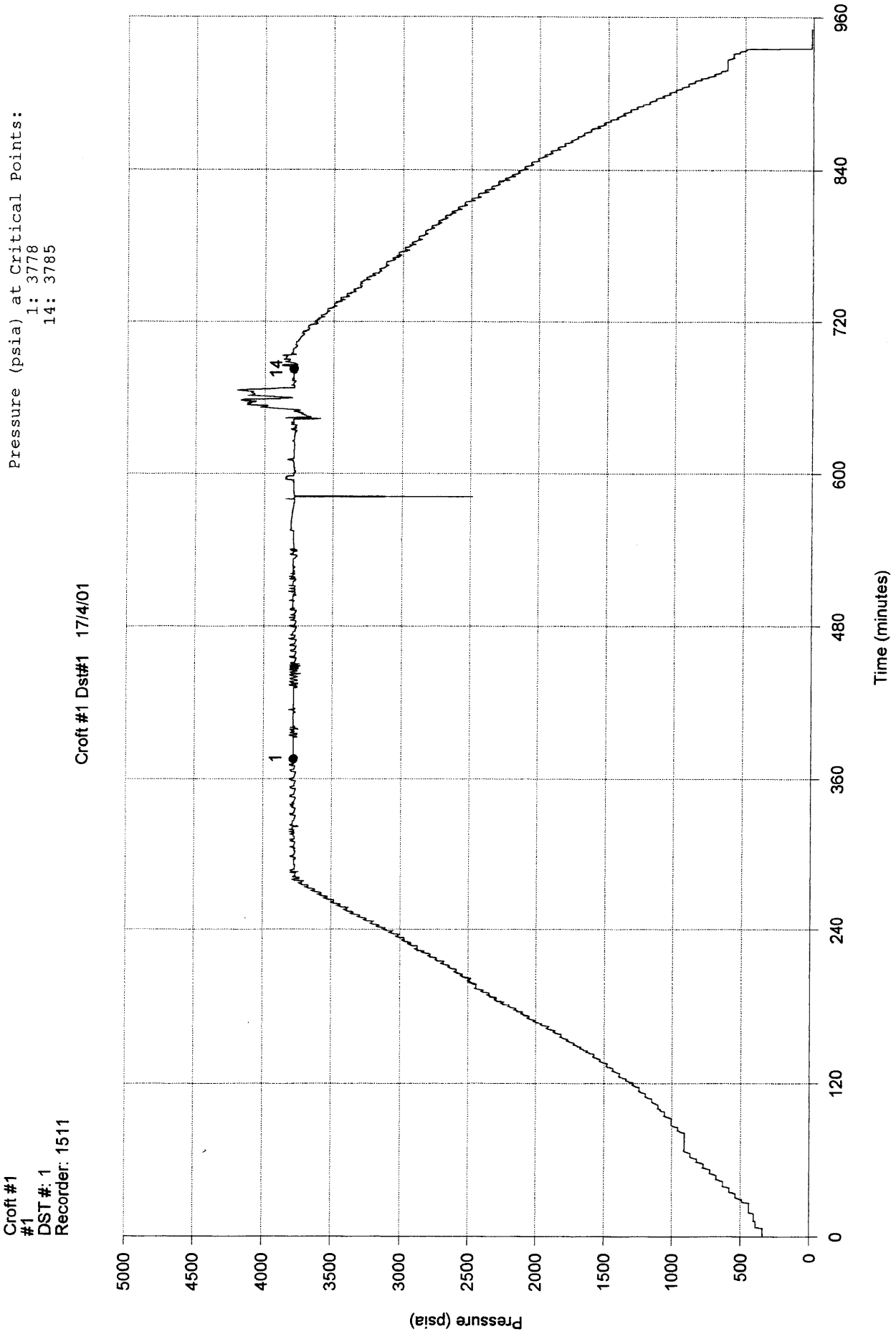
	Panex	Kuster	Kuster	Kuster
Recorder Number	1511	24546	12395	7680
Clock Number	Battery	27245	13988	11517
Capacity	10000 psi	6125psi	5950psi	6325psi
Depth (mtrs)	2291.02	2291.02	2279.14	2275.24
Position	Interval	Interval	Inside	Recovery
Initial Hydrostatic	3777	3879	3850	1043
Pre-Flow Initial				
Pre-Flow End				
Initial Shut-In				
Final Flow Initial				
Final Flow End				
Final Shut-In				
Final Hydrostatic	3777	3879	3850	3777
Temperature	199			

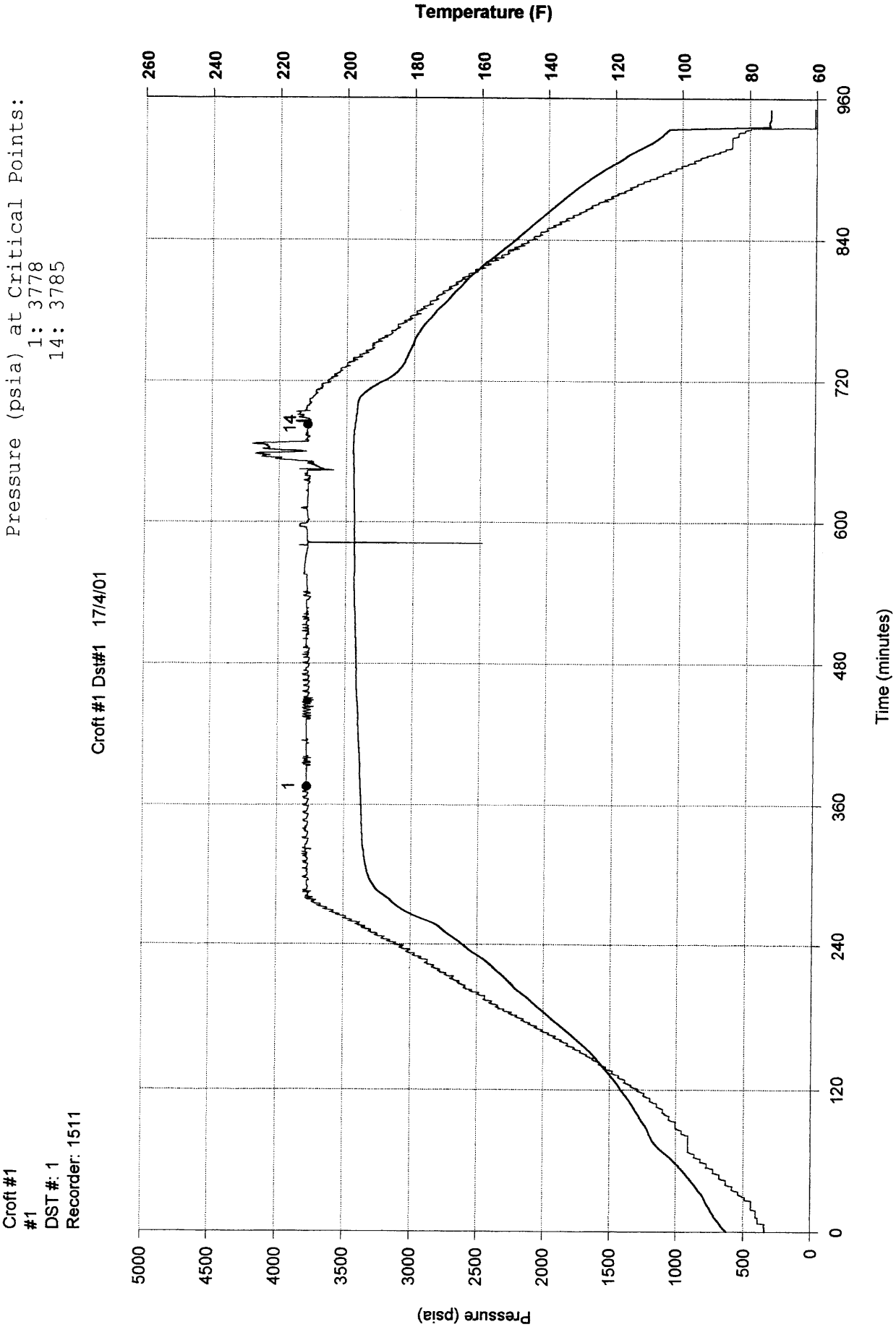
Recovery Data

Test Reversed Out:	Yes
Total Fluid Recovered	
Fluid Recovered Consisted Of :	Water cushion & mud
Sample Chamber Contained	

Remarks

Packer setting depths calculated using Driller's tally and confirmed using Reeves GR-CCL. A correction of 1.2mtr down-hole was required to position packers over desired test interval.
Top & Bottom packer rubbers were both recovered.
Both Impact pins were recovered.


Croft #1
#1
DST #: 1
Recorder: 1511
Croft #1 Dst#1 17/4/01
Pressure (psia) at Critical Points:
1: 3778
14: 3785
Pressure (psia)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Time (minutes)
0
120
240
360
480
600
720
840
960
1
14


Temperature (F)
260
240
220
200
180
160
140
120
100
80
60
Pressure (psia)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Time (minutes)
960
840
720
600
480
360
240
120
0
Croft #1 Dst#1 17/4/01
1
14
Pressure (psia) at Critical Points:
1: 3778
14: 3785
Croft #1
#1
DST #: 1
Recorder: 1511

BAKER HUGHES

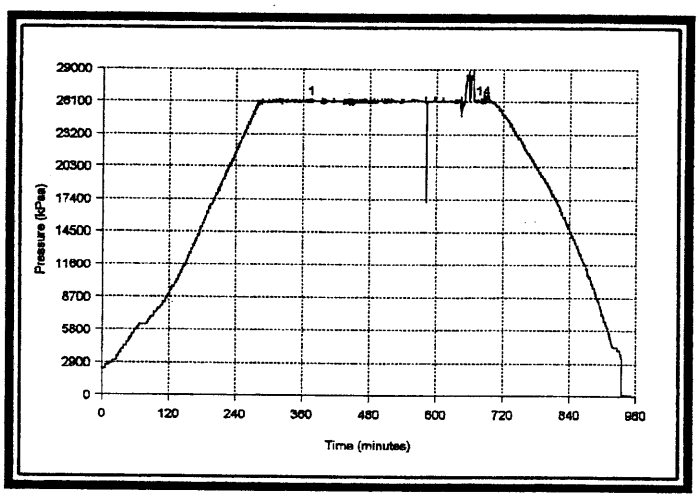
Baker Oil Tools

Croft # 1
00/ 38.540 / 142.773 /00
DST# 1

Formation: Eumerella

Interval - from: 2,287.00 **to:** 2,332.00 meters

Recorder# 1511 at 2,291.02 meters



Max Btm Hole Temperature @ FSI: 199.0 C

		Pressure (kPaa)	*Time* (min)	*Extrapolated Pressure* (kPaa)
1	Initial Hydrostatic	26046		
14	Final Hydrostatic	26099		

Test Date: 17/4/01

Test Type : Inflate Straddle

Blow Description:

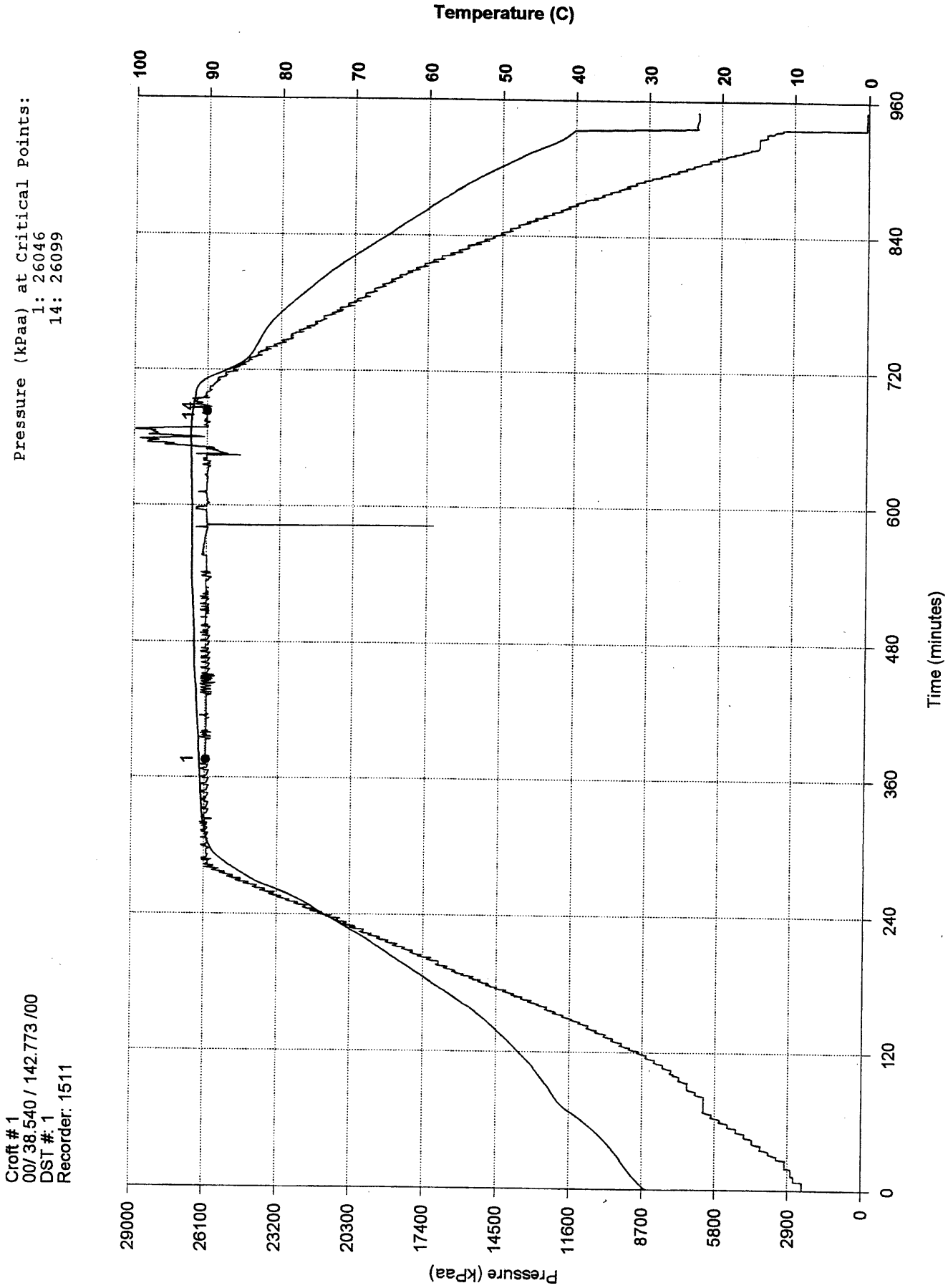
PREFLOW: N/A

FINAL FLOW: N/A

LIQUID RECOVERY: The total liquid recovery consisted of water cushion and mud.

Remarks:

An unsuccessful test was conducted.
All the pressures reported from the downhole recorders are kpaa.
The packer setting depths were calculated using the Driller's tally and confirmed using Reeves GR-CCL with a correction of 1.2mtrs downhole required to position packers over desired test interval.
The top and bottom packer rubbers were both retrieved.
Both impact pins were recovered.


Temperature (C)
100
90
80
70
60
50
40
30
20
10
0
960
840
720
600
480
360
240
120
0
Time (minutes)
Pressure (kPaa)
29000
26100
23200
20300
17400
14500
11600
8700
5800
2900
0
14
1
Pressure (kPaa) at Critical Points:
1: 26046
14: 26099
Croft # 1
00/ 38.540 / 142.773 /00
DST #: 1
Recorder: 1511

Croft # 1
00/ 38.540 / 142.773 /00
DST# 1

General Information:

Operator: Santos Ltd
c/o: Exploration and Production
91 King William Street
Adelaide S.A. 5000

Tester: C. Riggs
Ticket#: 5845

KB Elevation: 61.80 meters
Ground Elevat'n: 57.10 meters
Total Depth: 2,529.00 meters
Cushion: Water 763.78 meters

Mud Data:

Weight: 1379 kg/m3
Type: KC1 PHPA Polymer
Viscosity: 40 s/l
Water Loss: 7.0 cc/s
Filter Cake: 0.8 mm

Hole Data:

Drilled Hole Size: 171 mm
Calipered Hole Size: 171 mm
Conditioned prior to this test? Y

Recorder Summary:

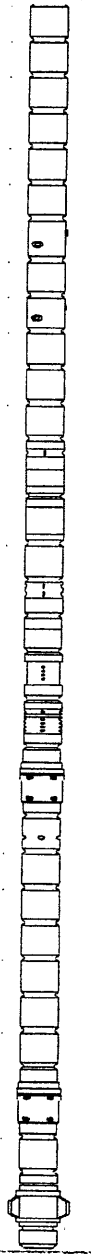
Recorder#	*Type*	*Position*	*Capacity*	*Units*	*Depth*	*Comments*
7680	K-3	Inside	41369	kPaa	2,275.24	
12395	K-3	Outside	41369	kPaa	2,279.14	
1511	2570	Outside	68948	kPaa	2,291.02	
24546	K-3	Outside	42230	kPaa	2,291.02	

Distributions:

Reports Sent To: N. Smith

Croft # 1
00/ 38.540 / 142.773 /00
DST# 1

Tool Sequence:

Diagram	Description	Length
	Drill Pipe	2,051.22 m
	Pup Joint	1.83 m
	Drill Pipe	38.75 m
	Blank Off Sub	0.61 m
	Hevi Waite Drill Pipe	45.39 m
	Drill Collar	121.65 m
	Pump Out Sub	0.43 m
	Drill Collar	9.31 m
	Impact Reversing Sub	0.31 m
	Drill Collar	9.32 m
	Cross Over Sub	0.30 m
	Recorder Carrier	1.37 m
	Hydraulic Tool	1.49 m
	Bottom Hole Sampler	1.04 m
	Recorder Carrier	1.37 m
	Hydraulic Jars	2.01 m
	Safety Joint	0.60 m
	Inflate Pump	2.38 m
	Screen	1.16 m
	Packer Stick Up	1.71 m
	Packer Stick Down	0.90 m
	Port Sub	0.27 m
	Combination Sub	0.17 m
	Recorder Carrier	2.68 m
	Cross Over Sub	0.37 m
	Drill Collar	37.40 m
	Cross Over Sub	0.37 m
	Spacing	2.44 m
	Packer Stick Up	0.55 m
	Packer Stick Down	1.83 m
	Spacing	0.61 m
	Belly Spring	2.06 m

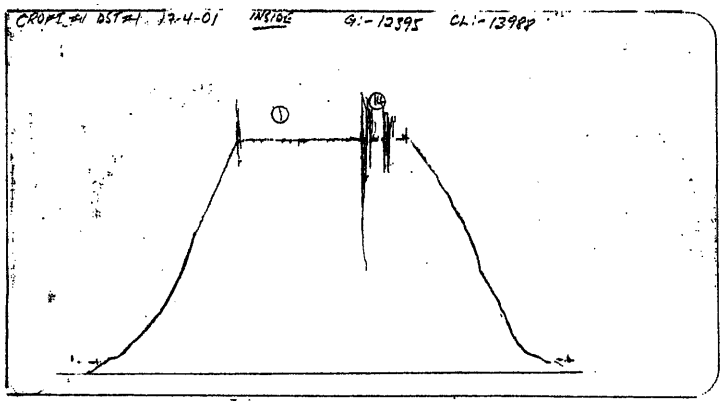
Tool String Length:	2,341.89 m
	185.67 m
	2,092.41 m
Collar Pipe Total:	2,278.08 m
Stick Up:	5.24 m
Tool Above:	14.16 m
Interval Tested:	45.00 m
Bottom Hole Choke Size:	25.40 mm

Croft # 1
00/ 38.540 / 142.773 /00
DST# 1

Recorder# 12395

Depth: 2,279.14 m
Location: Outside

Recorder Type: K-3
Capacity: 41,369 kPaa

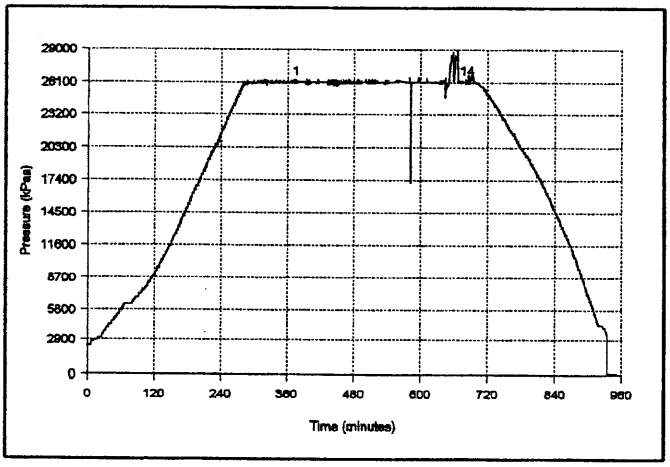


		Pressure (kPaa)	Time (min)
1	Initial Hydrostatic	26597	
14	Final Hydrostatic	26671	

Recorder# 1511

Depth: 2,291.02 m
Temperature: 199.0 C
Location: Outside

Recorder Type: 2570
Capacity: 68,948 kPaa



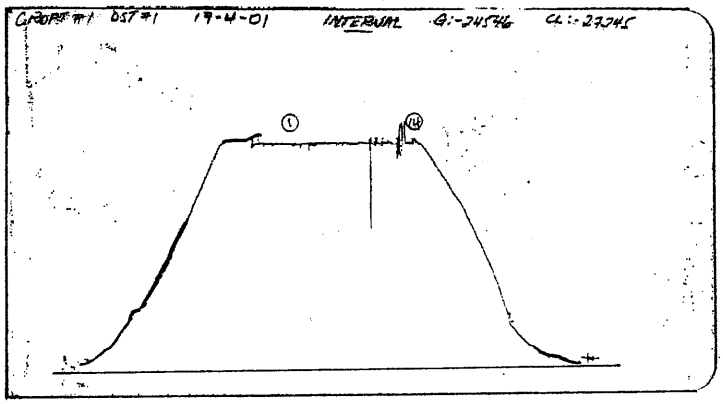
		Pressure (kPaa)	Time (min)
1	Initial Hydrostatic	26046	
14	Final Hydrostatic	26099	

Croft # 1
00/ 38.540 / 142.773 /00
DST# 1

Recorder# 24546

Depth: 2,291.02 m
Location: Outside

Recorder Type: K-3
Capacity: 42,230 kPaa

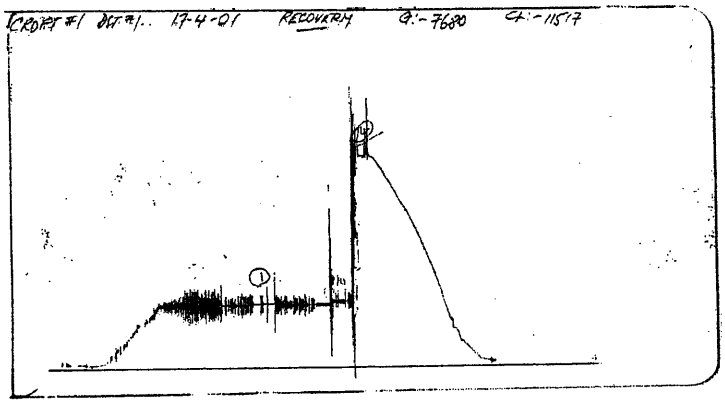


		Pressure (kPaa)	Time (min)
1	Initial Hydrostatic	26881	
14	Final Hydrostatic	26867	

Recorder# 7680

Depth: 2,275.24 m
Location: Inside

Recorder Type: K-3
Capacity: 41,369 kPaa



		Pressure (kPaa)	Time (min)
1	Initial Hydrostatic	7468	
14	Final Hydrostatic	26149	

BAKER HUGHES

Drill Stem Test Field Report

Customer	**Santos Ltd**
Address	**91 King William St, 5000**
Well Name & Number	**Croft # 1**
Location	**38.54°S 142.773°E**
Test Number	**One**
Formation Tested	**Eumerella**
Interval Tested	~~**2291**~~ **to** ~~**2336**~~ **mtrs** 2287 m to 2332 m
Test Type	**Inflate Straddle DST**
Test Date	**17/04/01**

General Information

Company Rep	Alistair Chomley	**Unit Number**	10
Geologist	Jeff Goodall	**Field**	Otway basin
Service Engineer	Chris Riggs	**Area**	Pep 154
Contractor	ODE # 30	**Ground Elevation**	57.1 mtrs
Ticket Number	5845	**Rotary Table**	61.8 mtrs

Mud & Hole Data

Mud Type	KCL Polymer	**Calliper Log Run**	Yes
Weight	9.6 lb/gl	**Type Of Calliper**	Reeves Single Axis
Water Loss	7	**Top Packer**	7.25"
Viscosity	45	**Bottom Packer**	7.5"
Filter Cake	1	**Drag Spring**	7.5"
Main Hole Size	6.75"	**Hole Conditioned**	Yes

Drill Pipe Size & Wt	3.5" @ 15.5 lb/ft
Drill Collars	4.75" @ 47 lb/ft
Drill Collars Run	19
Water Cushion	764 mtrs
Bottom Hole Choke	1 inch
Surface Choke Size	0.25" and 0.5 "
Element Size	5 3/8 inch
Element Length	66 inches

BAKER HUGHES

Drill Stem Test Field Report

Pre-Flow / Blow Description

Final Flow / Blow Description

Sequence Of Events

Date:Time	
12/4/01	**Description of Events:**
0700	Truck mobilised from Moomba to Wellsite
13/4/01	
1530	Depart Adelaide for Wellsite, arrive Mt.Gambier @ 2230 & overnight there
14/4/01	
0730	Depart Mt.Gambier for Wellsite
1230	Arrive Wellsite & Standby
17/4/01	
1030	Hold pre-job Safety Meeting
1035	Commence making up tools
1050	Pick up drill collars for Interval spaceout
1110	Continue making up tools
1230	Finish Making up tools & RIH
1340	Install ***no-go*** sub
1400	Install 1.83 mtr pup joint as marker joint & RIH
1550	Finish installing Water Cushion to 19 std & D of drill pipe(2448') & continue RIH
1830	Finish RIH
	Rig up and conduct Reeves correlation. A 1.2mtr down-hole depth correction was required.
2200	Finish correlation, rig down Reeves,
	Rig up surface equipment and establish string weights,
	115klbs up, 93klbs static and 90klbs down
2230	Pressure Test
2255	Slips in & rotate at 40 rpm to inflate packers, hold Safety meeting.
2326	Pull slips & pick up 10k over (125k)
2328	Come down & set 15k on tools to open
2334	Mud drops, pick up with 10k over
2336	Slips in & rotate @ 40 rpm
2346	Pick up & pull slips, pick up to 20 k over (135k)
2348	Tool indications of open with 7k bleed off, further 5k bleedoff & slip downhole 1mtr
2352	Pick up to test seat, no overpull
2355	Slips in, 1mtr uphole & rotate @ 45rpm
2358	Apply an extra winchline to control drill pipe , lift rotate speed to 65 rpm
18/4/01	
0011	Pull slips to test seat , appears good at 10 k over
0014	Pull further 10k to 135k, still good
0016	Come down with 15k to open @ 75k
0022	No indication of open, Pick up no overpull
0031	Drop bar
0034	Mud gone
0043	Water to surface, 396 strokes
0115	Break down Surface Equipment & Kelly up for conventional circulation
0130	Finish laying out Surface Equipment & POOH
0710	Break out tools
0930	Finish & compile reports

BAKER HUGHES

Drill Stem Test Field Report

Pressure / Temperature Recorder Data

	Panex	Kuster	Kuster	Kuster
Recorder Number	1511	24546	12395	7680
Clock Number	Battery	27245	13988	11517
Capacity	10000 psi	6125psi	5950psi	6325psi
Depth (mtrs)	2291.02	2291.02	2279.14	2275.24
Position	Interval	Interval	Inside	Recovery
Initial Hydrostatic	3777.6	~~3879~~ ↑	~~3850~~ ↑	~~1043~~ ↑
Pre-Flow Initial		3898.7	3857.6	1083.1
Pre-Flow End				
Initial Shut-In				
Final Flow Initial				
Final Flow End				
Final Shut-In	3785.3	3896.7	3868.3	3792.6
Final Hydrostatic	~~↓3777~~	~~↓3879~~	~~3850~~	~~↓3777~~
Temperature	199			

Recovery Data

Test Reversed Out:	Yes
Total Fluid Recovered	
Fluid Recovered Consisted Of :	Water cushion & mud
Sample Chamber Contained	

Remarks

Packer setting depths calculated using Driller's tally and confirmed using Reeves GR-CCL. A correction of 1.2mtr down-hole was required to position packers over desired test interval.
Top & Bottom packer rubbers were both recovered.
Both Impact pins were recovered.

BAKER HUGHES

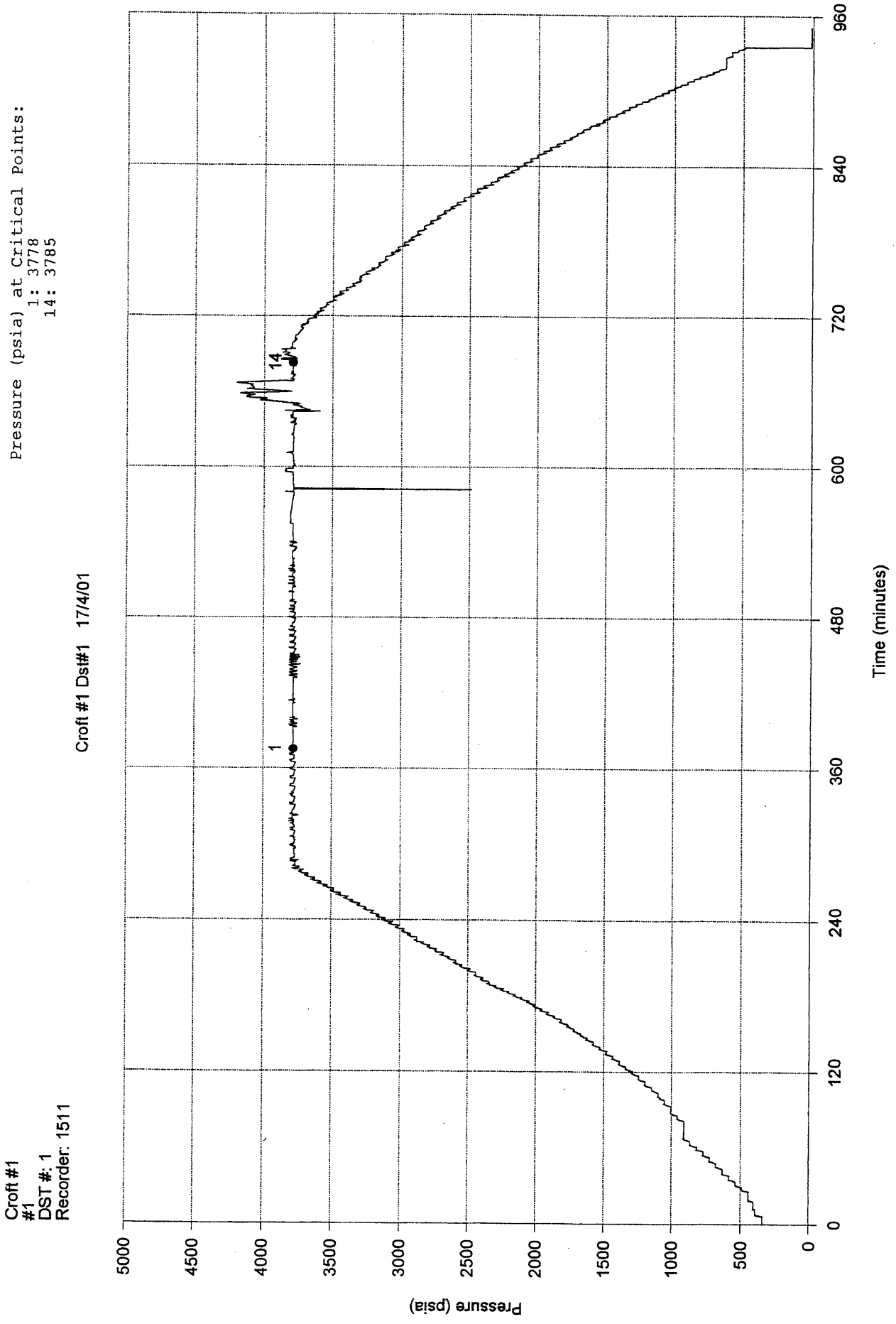
Drill Stem Test Field Report

Test Times

Pre-Flow		Initial Shut-In	
Final Flow		Final Shut-In	

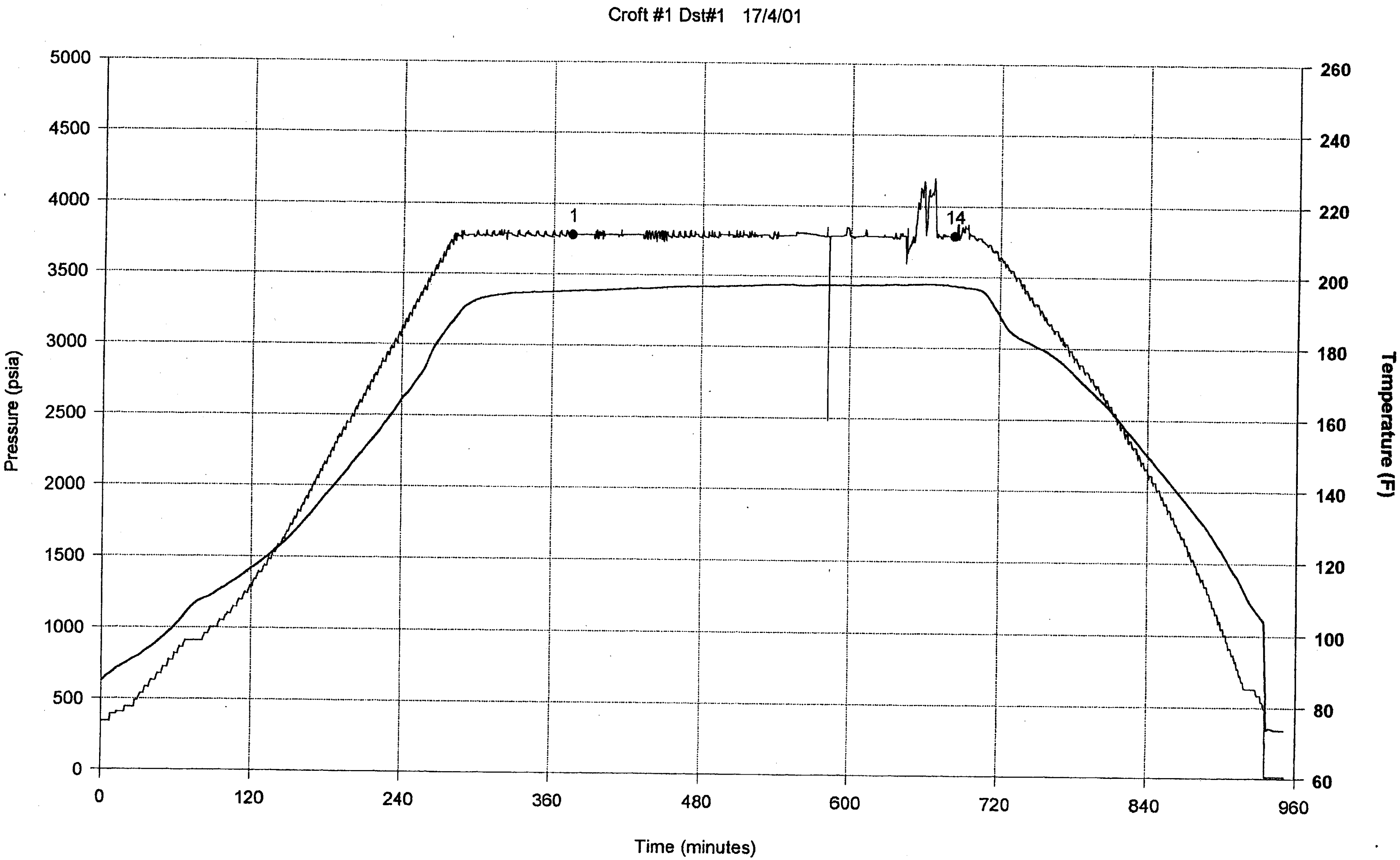
Gas Measurements

Time	Surface Choke	Readings	Comments


Croft #1
#1
DST #: 1
Recorder: 1511
Croft #1 Dst#1 17/4/01
Pressure (psia) at Critical Points:
1: 3778
14: 3785
1
14
Pressure (psia)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Time (minutes)
0
120
240
360
480
600
720
840
960

Croft #1
#1
DST #: 1
Recorder: 1511

```
Pressure (psia) at Critical Points:
           1: 3778
          14: 3785
```



908028 075

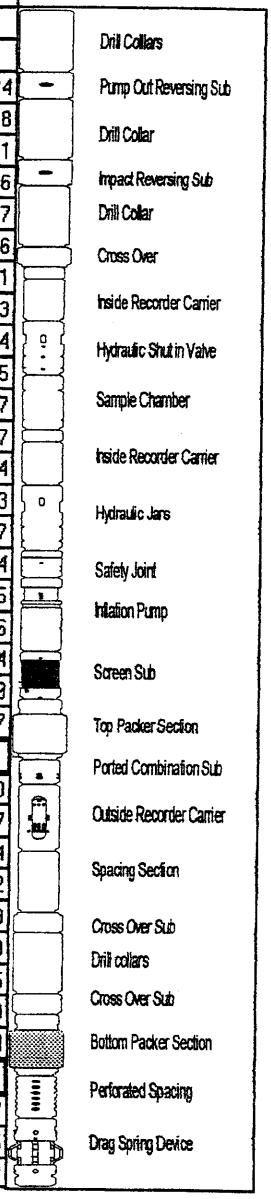
BAKER HUGHES

Baker Oil Tools

TEST TOOL & PIPE RECORD

Well Name & No.	Croft # 1			
Date	17/04/01			
Ticket No.	5845			
Interval Tested	From:	2287	To:	2332
Total Depth.	2529	Total Interval		45
Test No.	One			

DESCRIPTION	I.D. No.	I.D.	O.D	Length	Depth
Stick Up					-5.24
Drill Pipe #2 to #72	*71 std*			- 2051.22	2045.98
Marker Joint 6ft Pony DC				- 1.83	2047.81
Drill Pipe #1+S	*1 std+ S*			- 38.75	2086.56
Santos NoGo Sub	*210*			- 0.61	2087.17
Hevi-wate Drill Pipe	*x5*			- 45.39	2132.56
Drill Collars #7 to #19	*x13*			- 121.65	2254.21
Pump Out Reversing Sub	*581*	2 1/3	4 3/4	0.43	2254.63
Drill Collars #6	*x1*			- 9.31	2263.94
Impact Reversing Sub	*854*	2 7/8	6	0.31	2264.25
Drill Collars #5	*x1*			- 9.32	2273.57
Cross Over Sub	*567*	2 9/16	4 4/5	0.30	2273.87
Recovery Recorder Carrier	*917*		4 7/8	1.37	- 2275.24
Hydraulic Shut in Valve	*304*		4 7/8	1.49	2276.73
Positive Control Sampler	*405*		5	1.04	2277.77
Inside Recorder Carrier	*921*		4 7/8	1.37	2279.14
Hydraulic Jars	*206*		5	2.01	2281.15
Safety Joint	*938*	2 7/16	4 3/4	0.60	2281.76
Downhole Inflation Pump	*103*		5	2.38	2284.14
Screen Sub Assembly	*506*		5	1.16	2285.29
Top Packer Stick Up	*726*		5 5/8	1.71	2287
Top Packer Seal Depth					***2287***
Top Packer Stick Down				0.90	2287.90
Port Sub	*662*		5	0.27	2288.17
Combination Sub	*667*		5	0.17	2288.34
Outside Recorder Carrier	*905*		5	2.68	2291.02
X/O 3 1/2FH Box 4 IF Pin	*552*	2 5/16	4 3/4	0.37	2291.39
Drill Collars #1 to #4	*x4*			37.40	2328.79
X/O 4 IF Box 3 1/2 FH pin	*560*	2 1/3	4 3/4	0.37	2329.15
Spacing (8ft)	*88*			2.44	2331.59
Bottom Packer Stick Up	*825*		5 5/8	0.55	2332.14
Bottom Packer Seal Depth					***2332.14***
Bottom Packer Stick Down				1.83	2333.97
Perforated Spacing	*941*	2 9/32	4 3/4	0.61	2332.75
Belly Spring	*15*	2 1/16	5	2.06	2336.03



Pipe Tally		Length	Description	Depth
NoGo	✓	0.61		
Drill Pipe	✓	2089.97	Marker Joint	2047.81
Pup Joint	✓	1.83	P.O.S.	2254.63
Hevi-wate Pipe	✓	45.39	D.B.S.	2264.25
Drill Collars Above Interval	✓	140.28	Rec. Recorder	2275.24
Tools above Interval	14.17	14.16	Inside Recorder	2279.14
STRING ABOVE INTERVAL		2292.24	Panex Recorder	2291.02
Top of Interval		2287.00	Outside Recorder	2291.02
Top Single Above Table		5.24		

Service Engineer
Chris Riggs

Oil Co. Rep.
Alistair Chomley

Geologist
Jeff Goodall

APPENDIX VII: HYDROCARBON ANALYSIS

Amdel Limited
A.C.N. 008 127 802

Petroleum Services
PO Box 338
Torrensville Plaza SA 5031

Telephone: (08) 8416 5240
Fax: (08) 8234 2933

8 May 2001

Santos Limited
GPO Box 2319
ADELAIDE SA 5001

Attention: Mike Guliano

REPORT LQ10391

CLIENT REFERENCE: Request

WELL NAME/RE: Croft-1

MATERIAL: RFT

WORK REQUIRED: Gas & liquid composition

AUTHOR'S NAME: Diane Cass

Please direct technical enquiries regarding this work, to the signatory below, under whose supervision the work was carried out. This report relates specifically to the sample or samples submitted for testing.

Brian L Watson
Manager
Petroleum Services

Bw.jh

G:\Secretary\petroleum\10391.doc

AMDEL PETROLEUM SERVICES
Method GL-02-03
Client: SANTOS Ltd

Report # LQ10391

Sample: CROFT-1
RFT
Opening Pressure 11,200 kPag

COMPOSITIONAL ANALYSIS OF RECOMBINED SEPARATOR FLUID

Component	Flashed Stock Tank Liquid Mol %	Flashed Stock Tank Gas Mol %	Recomb. Sep. Liquid Mol %
Nitrogen	-------	3.71	3.68
Carbon Dioxide	-------	2.38	2.36
Methane	-------	86.24	85.64
Ethane	0.00	4.77	4.74
Propane	0.12	1.71	1.70
I-Butane	0.39	0.32	0.32
N-Butane	1.06	0.41	0.41
I-Pentane	2.10	0.11	0.12
N-Pentane	2.50	0.09	0.11
Hexanes	15.80	0.15	0.26
Heptanes	27.21	0.07	0.26
Octanes plus	50.81	0.04	0.39
TOTAL	100.00	100.00	100.00
RATIOS			
Molar ratio	0.0069	0.9931	1.0000
Mass Ratio	0.0411	0.9589	1.0000
Gas Liquid Ratio	1.00 bbl @ SC	125743.3 SCF	-------
STREAM PROPERTIES			
Molecular Weight	116.5	18.9	19.6
Density obs(g/cc)	0.7664 @ 15°C	-------	-------
API-Gas Density	53.06 API @60°F	0.653 (air=1)	-------
GHV (BTU/scf)	-------	1046	-------
OCTANE PLUS PROPERTIES			
Mol %	50.81	0.04	0.39
Molecular Weight	141.1	114.2	138.4
Density (g/cc)	0.8184 @ 15°C	-------	-------
API @ 60°F	41.33	-------	-------

LABORATORY FLASH SEPARATION DETAILS

Separation Temperature	20	°C
Flash Gas Volume	1469.00	litres
Stabilised Liquid Volume	65	ml
Liquid Density	0.7620	g/ml

Approved Signatory Diane Cass

Accreditation No: 2013 07-May-01

AMDEL PETROLEUM SERVICES
Method GL-02-03
Client: SANTOS Ltd Report # LQ10391

Sample: CROFT-1
RFT
Opening Pressure 11,200 kPag

COMPOSITIONAL ANALYSIS OF RECOMBINED SEPARATOR FLUID

Component	Flashed Stock Tank Liquid Mol %	Flashed Stock Tank Gas Mol %	Recomb. Sep. Liquid Mol %
Nitrogen	-------	3.71	3.68
Carbon Dioxide	-------	2.38	2.36
Methane	-------	86.24	85.64
Ethane	0.00	4.77	4.74
Propane	0.12	1.71	1.70
I-Butane	0.39	0.32	0.32
N-Butane	1.06	0.41	0.41
I-Pentane	2.10	0.11	0.12
N-Pentane	2.50	0.09	0.11
Hexanes	15.80	0.15	0.26
Heptanes	27.21	0.07	0.26
Octanes plus	50.81	0.04	0.39
TOTAL	100.00	100.00	100.00

RATIOS

Molar ratio	0.0069	0.9931	1.0000
Mass Ratio	0.0411	0.9589	1.0000
Gas Liquid Ratio	1.00 bbl @ SC	125743.3 SCF	-------

STREAM PROPERTIES

Molecular Weight	116.5	18.9	19.6
Density obs(g/cc)	0.7664 @ 15°C	-------	-------
API-Gas Density	53.06 API @60°F	0.653 (air=1)	-------
GHV (BTU/scf)	-------	1046	-------

OCTANE PLUS PROPERTIES

Mol %	50.81	0.04	0.39
Molecular Weight	141.1	114.2	138.4
Density (g/cc)	0.8184 @ 15°C	-------	-------
API @ 60°F	41.33	-------	-------

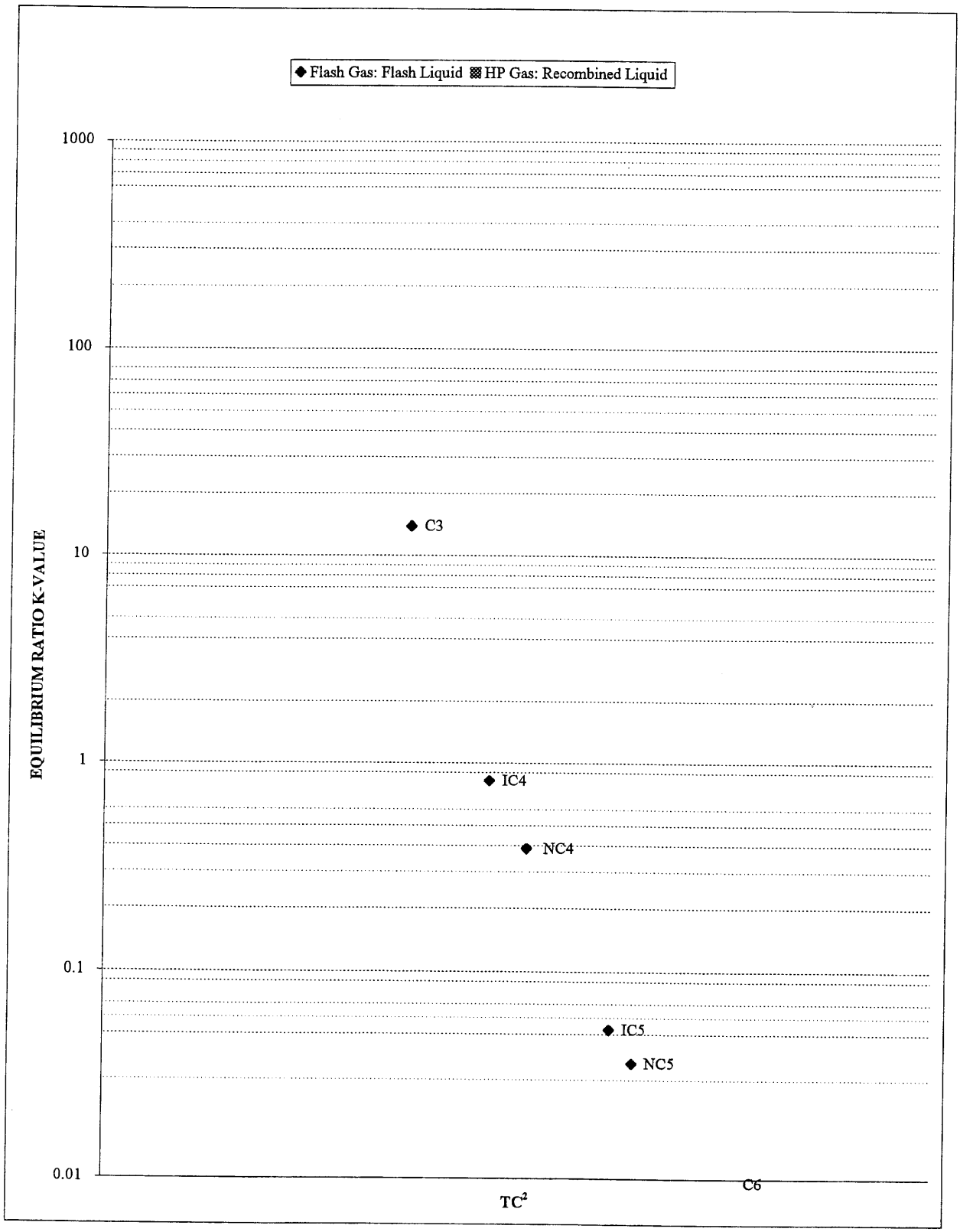
LABORATORY FLASH SEPARATION DETAILS

Separation Temperature	20	°C
Flash Gas Volume	1469.00	litres
Stabilised Liquid Volume	65	ml
Liquid Density	0.7620	g/ml

AMDEL PETROLEUM SERVICES
Method GL-02-03
Client: SANTOS Ltd

Report # LQ10391

Sample: CROFT-1
RFT
Opening Pressure 11,200 kPag



AMDEL PETROLEUM SERVICES
Method GL-02-03

Appendix A
Page A1

Client: SANTOS Ltd

Report # LQ10391

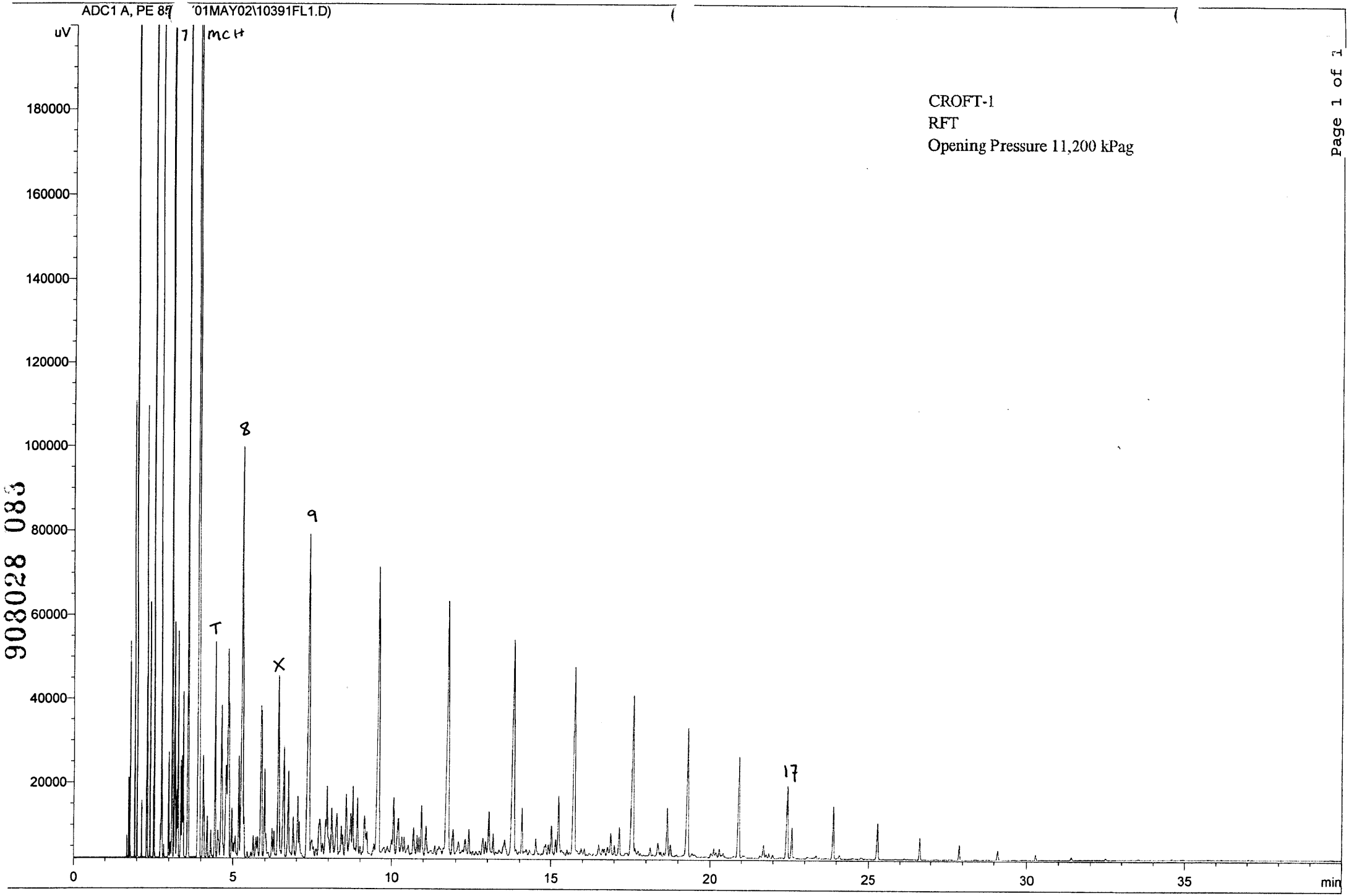
Sample: CROFT-1
RFT
Opening Pressure 11,200 kPag

Full Well Stream

Separator Gas	0.000	MMSCF	
Stock Tank Oil Rate	0.000	BBLS	
			Av Mol Wt
Flash Gas Moles		61.065	18.92
Flash Liquid Moles		0.425	116.46
Recombination Moles		61.490	
Molar Shrinkage Factor		0.007	
Full Well Stream	0	Moles Liquid	#DIV/0!
Molar ratio	0	Moles Gas	#DIV/0!

	Flash Gas Mol%	Flash Liquid Mol%	Recomb. Liquid Mol%	HP Gas Mol%	Full Well Stream Mol%
Nitrogen	3.71	-------	3.68	0.00	#DIV/0!
Carbon Dioxide	2.38	-------	2.36	0.00	#DIV/0!
Methane	86.24	-------	85.65	0.00	#DIV/0!
Ethane	4.77	0.00	4.74	0.00	#DIV/0!
Propane	1.71	0.12	1.70	0.00	#DIV/0!
I-Butane	0.32	0.39	0.32	0.00	#DIV/0!
N-Butane	0.41	1.06	0.41	0.00	#DIV/0!
I-Pentane	0.11	2.10	0.12	0.00	#DIV/0!
N-Pentane	0.09	2.50	0.11	0.00	#DIV/0!
Hexanes	0.15	15.80	0.26	0.00	#DIV/0!
Heptanes	0.07	27.21	0.26	0.00	#DIV/0!
Octanes plus	0.04	50.81	0.39	0.00	#DIV/0!
	100.00	100.00	100.00	0.00	#DIV/0!
Av.Mol.Weight	18.92	116.46	19.60	0.00	#DIV/0!

K Factors	Flash Gas/ Flash Liquid Ratio	HP Gas/ Recombined Liquid Ratio
C1	-------	0.00
C2	-------	0.00
C3	13.77	0.00
IC4	0.81	0.00
NC4	0.39	0.00
IC5	0.05	0.00
NC5	0.04	0.00
C6	0.01	0.00
C7	0.00	0.00


ADC1 A, PE 8? '01MAY02\10391FL1.D)
uV
7
mcH
180000
160000
140000
120000
100000
8
80000
9
60000
T
X
40000
20000
17
0
5
10
15
20
25
30
35
min
CROFT-1
RFT
Opening Pressure 11,200 kPag
Page 1 of 1
9038028 083

GAS ANALYSIS OF RFS SAMPLE

CROFT - 1, 15APR01

UNDILUTED (ppm)

injection	1	2	3			Average	True Value	notes
C1	53864	53855	53844			53854	53854	peaks truncated
C2	14583	14581	14583			14582	14582	true values offscale
C3	7915	7748	7487			7717	**7717**	
iC4	2804	2771	2695			2757	**2757**	
nC4	3217	2951	2749			2972	**2972**	
iC5	857	762	702			774	**774**	
nC5	574	472	396			481	**481**	

DILUTED (ppm, 5% of sampled concentration)

injection	1	2	3	4	5	Average	True Value	notes
C1	40984	39493	43080	40630	50794	42996	**859924**	
C2	1877	1853	1996	1875	2295	1979	**39584**	
C3	596	566	610	560	694	605	12104	see undiluted values
iC4	78	79	81	74	94	81	1624	for most accurate
nC4	61	54	61	47	66	58	1156	representation
iC5	n/r	n/r	n/r	n/r	n/r	n/a	n/a	
nC5	n/r	n/r	n/r	n/r	n/r	n/a	n/a	

FINAL VALUES

	ppm	ratio
C1	**859924**	94.06
C2	**39584**	4.33
C3	**7717**	0.84
iC4	**2757**	0.30
nC4	**2972**	0.33
iC5	**774**	0.08
nC5	**481**	0.05

CO2: 2.18%

APPENDIX VIII: PALYNOLOGICAL ANALYSIS

SANTOS PALYNOLOGY SECTION
EXPLORATION SERVICES DEPARTMENT

Palynology Report No. 2001/08

Author: J.GOODALL
Approved by: G.WOOD

PALYNOLOGICAL REPORT NO. 2001/08
PALYNOSTRATIGRAPHICAL ANALYSIS

CROFT-1 WELL

Santos Ltd
A.C.N. 007 550 923

Circulation: Geology Operations, Team Leader, EIC, Palynology Files

Introduction

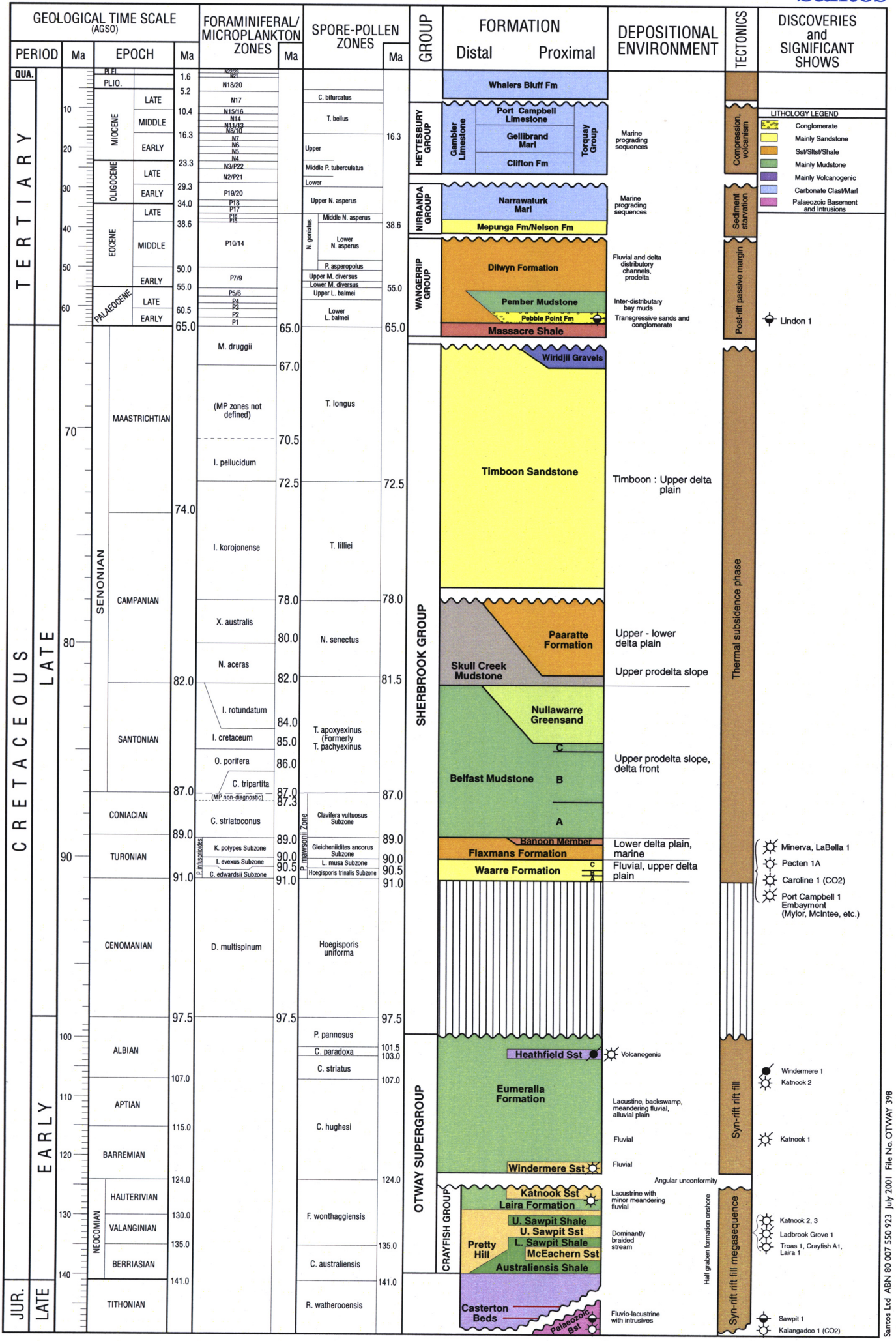
Twenty nine sidewall core samples and from Croft-1, located in the Otway Basin, PEP 154 were examined palynologically so as to assess their palynostratigraphic position. Total hydrocarbon yield, oil proneness and maturity analysis has not been performed.

Summaries of the results of this study are presented on Table 1. The palynostratigraphic results are presented in more detail on Table 2. The known relationships of the palynological zones to the lithostratigraphy are shown on Chart 1. Range charts of the palynomorphs identified in this study are presented in Appendix 1.

J.Goodall

OTWAY BASIN STRATIGRAPHIC COLUMN

Santos



Santos Ltd ABN 80 007 550 923 July 2001 File No. OTWAY 398

Santos

PALYNOLOGICAL SYNTHESIS

Report No. 2001/08

Study: Croft No. 1

Table 1

Author: J.Goodall

SAMPLE	DEPTH	LITHOLOGY	ROCK UNIT	AGE	PALYNOSTRATIGRAPHIC UNIT	MATURITY SC: Spore Colour Vre: Vitrinite Reflectance Equivalent	TOTAL H.C. YIELD				OIL PRONENESS				MATURITY				
							not a source rock	marginal	adequate	rich	very limited	limited	moderate	high	immature	early mature	peak generation	late mature	post oil window
SWC 48	1985M	Claystone	Belfast Mudstone	Santonian	*I. cretaceum*														
SWC 47	1994M	Claystone	Belfast Mudstone	Santonian	*I. cretaceum*														
SWC 45	2015M	Claystone	Flaxman Fm	Turonian	*K.polypes*														
SWC 43	2023M	Claystone	Flaxman Fm	Turonian	*K.polypes*														
SWC 41	2035M	Claystone	Waarre Fm 'C'	Turonian	Undifferentiated														
SWC 39	2046.5M	Sandstone	Waarre Fm 'C'	Turonian	*Heterosphaeridium* Acme														
SWC 38	2055M	Sandstone	Waarre Fm 'C'	Turonian	*Heterosphaeridium* Acme														
SWC 36	2065M	Claystone	Waarre Fm 'B'	Turonian	*C. edwardsii* Acme														
SWC 35	2069M	Claystone	Waarre Fm 'B'	Turonian	*C. edwardsii* Acme														
SWC 34	2074M	Claystone	Waarre Fm 'B'	Turonian	*C. edwardsii* Acme														
SWC 31	2089.5M	Siltstone	Waarre Fm 'A'	Turonian	*C. edwardsii* Acme														
SWC 30	2095.5M	Siltstone	Waarre Fm 'A'	Turonian	*?C. edwardsii* Acme														

SAMPLE	DEPTH (feet)	LITHOLOGY	ROCK UNIT	AGE	PALYNOSTRATIGRAPHIC UNIT	MATURITY SC: Spore Colour Vre: Vitrinite Reflectance Equivalent	TOTAL H.C. YIELD				OIL PRONENESS				MATURITY				
							not a source rock	marginal	adequate	rich	very limited	limited	moderate	high	immature	early mature	peak generation	late mature	post oil window
SWC 29	2110.5M	Claystone	Waarre Fm 'A'	Turonian	*C. edwardsii* Acme														
SWC 28	2120.5M	Claystone	Eumeralla Fm	Albian	Undifferentiated														
SWC 27	2125.5M	Claystone	Eumeralla Fm	Albian	Undifferentiated														
SWC 22	2168M	Claystone	Eumeralla Fm	Albian	*P.pannosus*														
SWC 21	2173M	Claystone	Eumeralla Fm	Albian	*?P.pannosus*														
SWC 18	2208.5M	Claystone	Eumeralla Fm	Albian	Undifferentiated														
SWC 17	2216M	Claystone	Eumeralla Fm	Albian	Undifferentiated														
SWC 15	2237M	Claystone	Eumeralla Fm	Albian	Undifferentiated														
SWC 13	2252.5M	Sandstone	Eumeralla Fm	Albian	Undifferentiated														
SWC 12	2258.5M	Siltstone	Eumeralla Fm	Albian	*P. pannosus*														
SWC 11	2270.5M	Siltstone	Eumeralla Fm	Albian	*P.pannosus*														
SWC 10	2284.5M	Siltstone	Eumeralla Fm	Albian	Undifferentiated														
SWC 9	2298.5M	Sandstone	Eumeralla Fm	Albian	*P. pannosus*														
SWC 7	2318.5M	Sandstone	Eumeralla Fm	Albian	Undifferentiated														

Santos

PALYNOLOGICAL SYNTHESIS

Report No. 2001/08

Study: Croft No. 1

Table 1

Author: J. Goodall

SAMPLE	DEPTH (feet)	LITHOLOGY	ROCK UNIT	AGE	PALYNOSTRATIGRAPHIC UNIT	MATURITY SC: Spore Colour Vre: Vitrinite Reflectance Equivalent	TOTAL H.C. YIELD				OIL PRONENESS				MATURITY				
							not a source rock	marginal	adequate	rich	very limited	limited	moderate	high	immature	early mature	peak generation	late mature	post oil window
SWC 4	2383.5M	Siltstone	Eumeralla Fm	Albian	Undifferentiated														
SWC 3	2411.5M	Siltstone	Eumeralla Fm	Albian	*P. pannosus*														
SWC 2	2479M	Siltstone	Eumeralla Fm	Albian	Undifferentiated														

Distribution: Geology Operations, Team Leader, EIC, Palynology Files

PALYNOSTRATIGRAPHICAL DATA

Table 2

SAMPLE	DEPTH (M)	PALYNOSTRATIGRAPHICAL UNIT (Age)	INFERRED STRATIGRAPHICAL UNIT	REWORKED ELEMENTS		PRESERVATION	YIELD	DIVERSITY	REMARKS
				%	AGE				
SWC 48	1985M	*I.CRETACEUM*	BELFAST MUDSTONE			FAIR - GOOD	MOD	MOD	The presence of *I. cretaceum*, with *G.hymenophora, O.porifera, P.infusorioides* and *O.cribropoda* indicates an age no older than the *I. Cretaceum* palynozone. The spores and pollen are dominated by bisaccate pollen, *G.senonicus, Proteacidites,* Osmundaceous spores and *Dilwynites pusillus*. Other taxa recorded include A.*cruciformis, P.mawsonii, C.triplex* and *Cupressacites* spp.
SWC 47	1994M	*I.CRETACEUM*	BELFAST MUDSTONE			FAIR	HIGH	LOW	Presence of *I. Cretaceum* with *G,hymenophora* indicates the *I.cretaceum* palynozone. Other dinocyst taxa recorded include *O.porifera, O.operculata* and *O.cribropoda* The highest occurrence of common *H.heterocanthum* is noted at this depth. The spore / pollen assemblage is similar to the SWC at 1994m
SWC 45	2015M	*K.POLYPES*	FLAXMANS FORMATION			FAIR - GOOD	V. LOW	LOW	The occurrence of *V.griphus* in association with common *H.heterocanthum* and *Spiniferites* spp indicates the *K.polypes* palynozone. The pollen and spore assemblage is represented by *Cicatricosisporites* spp, *Cupressacites* spp, *D.granulatus, D.pusillus, A.spinulosus, P.mawsonii, C.triplex* and *L.ovatus*. The algae are represented by *A. cruciformis, Nummus* spp and *Botryococcus*.
SWC 43	2023M	*K.POLYPES*	FLAXMANS FORMATION			FAIR	EX LOW	MOD	Moderately rich assemblage with common *K.polypes* and *H.heterocanthum*. Pollen and spores represented by *H.trinalis* (?RW), *C.minor* and *V.admirabilis*.

SAMPLE	DEPTH (M)	PALYNOSTRATIGRAPHICAL UNIT (Age)	INFERRED STRATIGRAPHICAL UNIT	REWORKED ELEMENTS %	REWORKED ELEMENTS AGE	PRESERVATION	YIELD	DIVERSITY	REMARKS
SWC 41	2035M	UNDIFFERENTIATED	WAARRE FM 'C'			POOR	EXT LOW	LOW	A very low palynomorph abundance / diversity, with a single specimen of *Isabelidinium* spp and rare *H.heterocanthum* recorded. The spores and pollen are dominated by the saccates and *C.minor*. with rare *Dilwynites* spp. The presence of *Nothofagus* spp is considered to represent contamination.
SWC 39	2046.5 M	*HETEROSPHAERIDIUM* ACME ZONE	WAARRE FM 'C'			POOR	HIGH	MOD	Very low palynomorph abundance, with only rare pollen / spores and dinocysts. The dinocysts are dominated by *H.heterocanthum*, with rarer *Spiniferites* spp, *O.operculata*, *O.complex* and *Canningia rotundatum*. The spores and pollen are dominated by *Dilwynites pusillus*, but are again of low diversity. Mud contamination is suspected.
SWC 38	2055M	*HETEROSPHAERIDIUM* ACME ZONE	WAARRE FM 'C'			POOR	MOD	MOD - LOW	The basal abundance of *H. heterocanthum* in association with *Circulodinium* spp, *C.edwardsii* and *P.cretaceum* indicates the *H.heterocanthum* acme zone. The significant presence of *H.trinalis* indicates the *H.trinalis* pollen zone.
SWC 36	2065M	*CRIBROPERIDINIUM EDWARDSII* ACME ZONE	WAARRE 'B'			POOR	LOW / MOD	MOD - LOW	Predominance of *C. edwardsii*, *O.complex*, *Spiniferites* spp and *Circulodinium* spp indicates the *C.edwardsii* acme zone. Other significant dinocyst taxa recorded include, *K.polypes* and a questionable specimen of *I.evexus*. The presence of *H.trinalis* indicates the *H.trinalis* pollen zone.

PALYNOSTRATIGRAPHICAL DATA

Table 2

SAMPLE	DEPTH (M)	PALYNOSTRATIGRAPHICAL UNIT (Age)	INFERRED STRATIGRAPHICAL UNIT	REWORKED ELEMENTS		PRESERVATION	YIELD	DIVERSITY	REMARKS
				%	AGE				
SWC 35	2069M	*CRIBROPERIDINIUM EDWARDSII* ACME ZONE	WAARRE 'B'			FAIR	V LOW	MOD	Dinocysts dominated by *C.edwardsii, Spiniferites* spp, *Circulodinium* spp and *O.complex*, with rarer *P.cretaceum, C.oceanica* and *E.robustum*. The spores and pollen represented by common *Dilwynites* and rare *H.trinalis*, indicating the *H.trinalis* pollen zone.
SWC 34	2074M	*CRIBROPERIDINIUM EDWARDSII ACME ZONE*	WAARRE 'B'			FAIR	LOW / MOD	MOD	Dinocysts dominated by *C.edwardsi,i O. complex* and *Spiniferites* spp, with rarer *P.cretaceum* and *C. vannophorum*. The spores and pollen are represented by common *Dilwynites* and rare *H.trinalis*, indicating the *H.trinalis* pollen zone.
SWC 31	2089.5 M	*CRIBROPERIDINIUM EDWARDSII* ACME ZONE	WAARRE 'A'			FAIR	MOD	FAIR	The dinocysts are represented by *Spiniferites* spp, *Circulodinium* spp, *O. operculata, P.cretaceum* and *K.polypes*. The spores and pollen are represented by common *Dilwynites* and rare *H.trinalis*, indicating the *H.trinalis* pollen zone.
SWC 30	2095.5 M	*?CRIBROPERIDINIUM EDWARDSII* ACME ZONE	WAARRE 'A'			FAIR	HIGH	LOW	The dinocyst abundance is extremely low, with only *P.cretaceum* recorded. The spores and pollen dominate being represented by *G.senonicus,* Osmundaceous spores, *Cicatricosisporites* spp and *C.minor*.
SWC 29	2110.5 M	*CRIBROPERIDINIUM EDWARDSII* ACME ZONE	WAARRE 'A'			FAIR	LOW	MOD	A very high dinocyst abundance is recorded, with common *Circulodinium* spp, *C. edwardsii, O.operculata, O. pulcherrimum* and *P.cretaceum*. This distinctive association is very typical of the basal *C. edwardsii* acme Zone. The presence of *H.trinalis* indicates this pollen zone.

SAMPLE	DEPTH (M)	PALYNOSTRATIGRAPHICAL UNIT (Age)	INFERRED STRATIGRAPHICAL UNIT	REWORKED ELEMENTS		PRESERVATION	YIELD	DIVERSITY	REMARKS
				%	AGE				
SWC 28	2120.5 M	UNDIFFERENTIATED	EUMERELLA FM			POOR	V. LOW	V. LOW	A very lean sample, effectively barren of palynomorphs, with only a single specimen of *Osmundacidites* spp.
SWC 27	2125.5 M	UNDIFFERENTIATED	EUMERELLA FM			POOR	V. LOW	V. LOW	A very lean sample, with only rare bisaccate pollen, *C.minor* and *G.senonicus*. Mud contaminants are also noted.
SWC 22	2168M	*P.PANNOSUS*	EUMERELLA FM			POOR	V. LOW	LOW	A sparse spore / pollen assemblage is recorded, with the significant presence of *P.pannosus* and absence of younger markers. The assemblage is dominated by *Cicatricosisporites* spp, *C.torosa*, *C.minor* and saccate pollen.
SWC 21	2173M	*?P.PANNOSUS*	EUMERELLA FM			FAIR	V. LOW	MOD	A very distinctive assemblage is recorded, which is dominated by bisaccate pollen, *C.minor* and *Cicatricosisporites* spp. A transitional *Hoegisporis / Araucaria* pollen type is also noted commonly. Evidence of mud contamination is suggested by the presence of dinocysts typical of the Belfast Mudstone. The sample can be assigned to the *P.pannosus* zone only by its inferred stratigraphic position.
SWC 18	2208.5 M	UNDIFFERENTIATED	EUMERELLA FM			POOR	EXT LOW	MOD	The sample was virtually barren of palynomorphs, with only long ranging taxa recorded. Evidence for mud contaminants is also noted.
SWC 17	2216M	UNDIFFERENTIATED	EUMERELLA FM			POOR	EXT LOW	MOD	No age significant palynomorphs were recorded, with the sample being virtually barren.

PALYNOSTRATIGRAPHICAL DATA

Table 2

SAMPLE	DEPTH (M)	PALYNOSTRATIGRAPHICAL UNIT (Age)	INFERRED STRATIGRAPHICAL UNIT	REWORKED ELEMENTS		PRESERVATION	YIELD	DIVERSITY	REMARKS
				%	AGE				
SWC 15	2237M	UNDIFFERENTIATED	EUMERELLA FM			POOR	EXT LOW	MOD	The sample was barren of palynomorphs.
SWC 13	2252.5 M	UNDIFFERENTIATED	EUMERELLA FM			POOR	V. LOW	MOD	No age significant palynomorphs were recorded, with the sample being virtually barren.
SWC 12	2258.5 M	*P.PANNOSUS*	EUMERELLA FM			POOR	EXT. LOW	LOW	A restricted assemblage, with a predominance of *C.minor* and *Retitriletes* spp. Other taxa recorded include *P.pannosus, M.antarticus, C.paradoxa* and *C.striatus*. Brackish water indicators include *Nummus* spp.
SWC 11	2270.5 M	*P.PANNOSUS*	EUMERELLA FM			POOR	EXT. LOW	V. LOW	A very similar assemblage to that recorded above, with common *C.minor*, but absence of abundant *Retitriletes* spp. Other taxa recorded include *P.pannosus, A.spinulosus, Cicatricosisporites* spp and *M.antarticus*. Brackish water indicators include *Nummus* spp., *Moutgatia* spp, *Botryococcus* spp and *S.carbonis*
SWC 10	2284.5 M	UNDIFFERENTIATED	EUMERELLA FM			POOR	EXT. LOW	LOW	A low diversity assemblage, with a predominance of bisaccate pollen, *O. wellmanii* and *C.minor*. Brackish water indicators include *Sigmopollis carbonis* and *Batiacasphaera 'bensonii'*.
SWC 9	2298.5 M	*P.PANNOSUS*	EUMERELLA FM			POOR	EXT. LOW	LOW	A very lean sample, with only rare palynomorphs, including Bisaccate pollen and *C.minor*. Mud contamination is evident.

PALYNOSTRATIGRAPHICAL DATA

Table 2

SAMPLE	DEPTH (M)	PALYNOSTRATIGRAPHICAL UNIT (Age)	INFERRED STRATIGRAPHICAL UNIT	REWORKED ELEMENTS		PRESERVATION	YIELD	DIVERSITY	REMARKS
				%	AGE				
SWC 7	2318.5 M	UNDIFFERENTIATED	EUMERELLA FM			POOR	EXT. LOW	LOW	The sample was virtually barren of palynomorphs.
SWC 4	2383.5 M	UNDIFFERENTIATED	EUMERELLA FM			POOR	EXT. LOW	LOW	The assemblage is dominated by *Cicatricosisporites* spp, *C.minor*, *C.torosa*, *M.antarticus* and Osmundaceous spores. Rarer elements include *H.trinalis* and *A.cruciformis*. Mud contamination is evident.
SWC 3	2411.5 M	*P.PANNOSUS*	EUMERELLA FM			POOR	EXT. LOW	LOW	The occurrence of common *Cicatricosisporites* spp, *Retitriletes* spp, Osmundaceous spores and rare *P.pannosus* indicates an age no older than the *P.pannosus* pollen zone.
SWC 2	2479M	UNDIFFERENTIATED	EUMERELLA FM			POOR	EXT. LOW	LOW	A generally low diversisty assemblage, represented by a predominance of *Cicatricosisporites* spp., *C.minor* and *Steriesporites* spp. No age significant taxa have been recorded.

PE908029

This is an enclosure indicator page.
The enclosure PE908029 is enclosed within the container PE908028 at this location in this document.

The enclosure PE908029 has the following characteristics:

ITEM_BARCODE	PE908029
CONTAINER_BARCODE	PE908028
NAME	Croft-1 Palynology Range Chart
BASIN	OTWAY
ONSHORE?	Y
DATA_TYPE	WELL
DATA_SUB_TYPE	BIOSTRAT
DESCRIPTION	Croft-1 Palynology Range Chart, Scale 1:1500, W1315, PEP154. Enclosure of Appendix VIII Palynological Analysis contained within "Well Completion Report" [PE908028].
REMARKS	
DATE_WRITTEN	
DATE_PROCESSED	16-OCT-2001
DATE_RECEIVED	19-OCT-2001
RECEIVED_FROM	Santos Ltd
WELL_NAME	Croft-1
CONTRACTOR	
AUTHOR	
ORIGINATOR	Santos Ltd
TOP_DEPTH	1985
BOTTOM_DEPTH	2500
ROW_CREATED_BY	DN07_SW

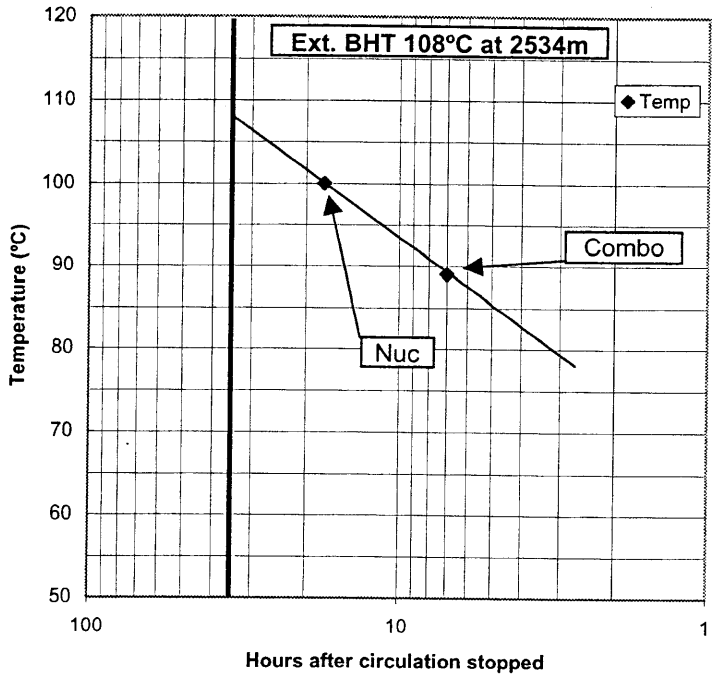
(Inserted by DNRE - Vic Govt Mines Dept)

APPENDIX IX: GEOTHERMAL GRADIENT

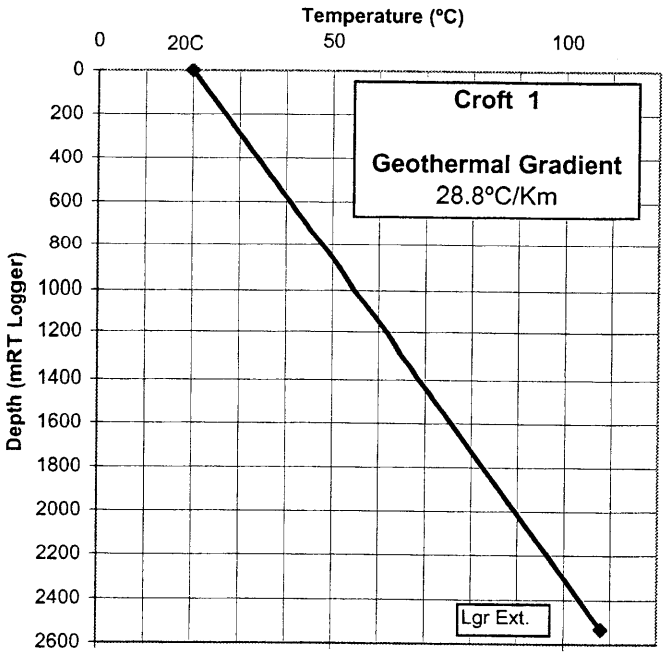
Assumed surface temperature = 20°C
Calculated BHT @ 2534m = 108°C
Geothermal gradient = 28.8°C/km

Well Name: Croft 1 **Santos**

Extrapolation to Determine Static BHT



Geothermal Gradient **Santos**



APPENDIX X: WELL LOCATION SURVEY

VICTORIA

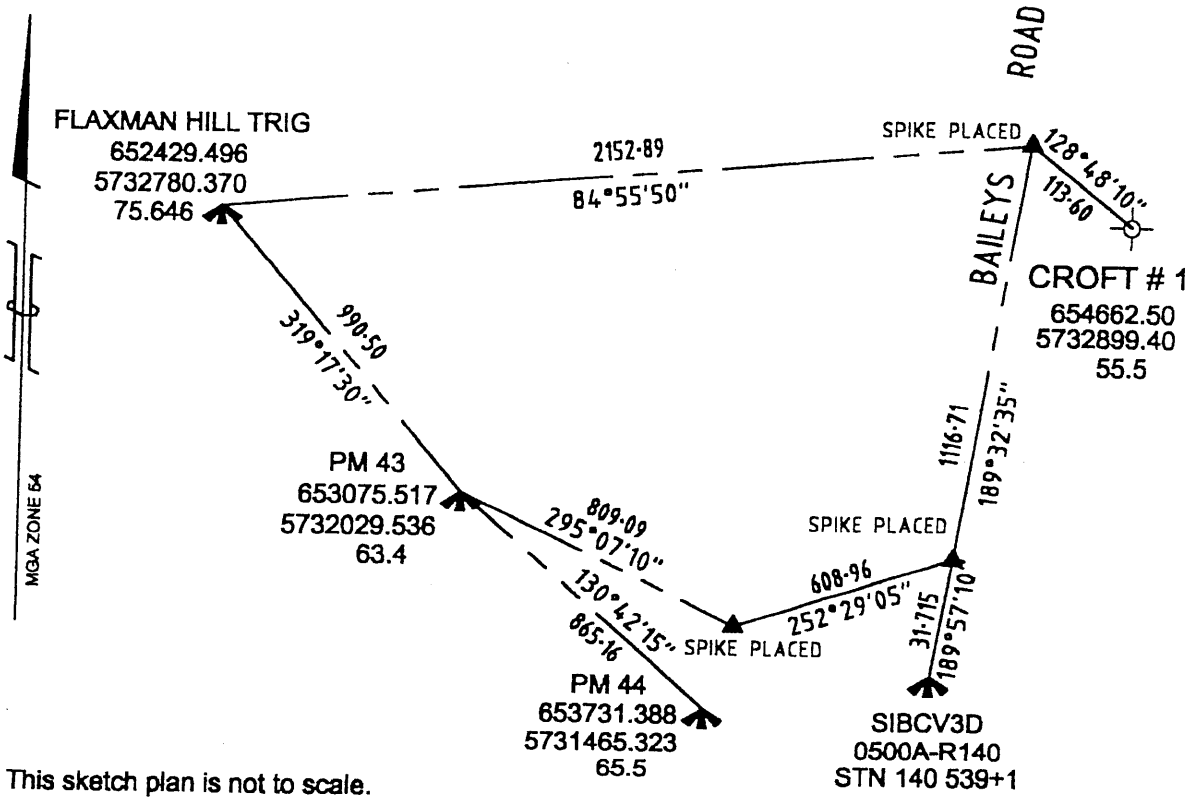
GAS WELL LOCATION

REFERENCE MARKS SKETCH PLAN

EXPLORATION LICENCE PEP 154

Well Name	CROFT # 1
Map	
Spheroid	GDA94
Latitude	S 38°32'19.98"
Longitude	E 142°46'28.51"
Convergence	1°06'21"
Scale Factor	0.99988559

MGA 94	ZONE 54
Measurement units	(metres)
Easting	654 662.50
Northing	5732 899.40
Elevation	55.5 (AHD)



NOTES : This sketch plan is not to scale.
Distances shown are computed grid distances.
Bearings shown are computed grid bearings.

DATUM : The origin of coordinates was Land Victoria's Survey Mark Enquiry Service (SMES) AGD66 (AMG Zone 54) then transformed to GDA94 (MGA Zone 54) using GDAit software.
Height datum is to AHD originating from SMES.

Estimated Horizontal error is less than +/- 0.2 metre.
Estimated Vertical error is less than +/- 0.2 metre.
Date of Survey : 20 / 11 / 2000

Paul Crowe Surveyor
ABN 59521601183
"Ambleside" 192 Koroit Street
Warrnambool 3280
Ph. (03) 5561 1500

REF 969

Date 16 / 7 / 2001

LICENSED SURVEYOR

APPENDIX XI: DRILLING - FINAL WELL REPORT

Santos Ltd

FINAL WELL REPORT

CROFT #1

Drilling Supervisor(s)	: A. Chomley
Drilling Engineer(s)	: G. Coker
Report Author	: T. Robertson / G. Coker
Report Supervisor	: M. Bill
Date of Issue	:8th August 2001

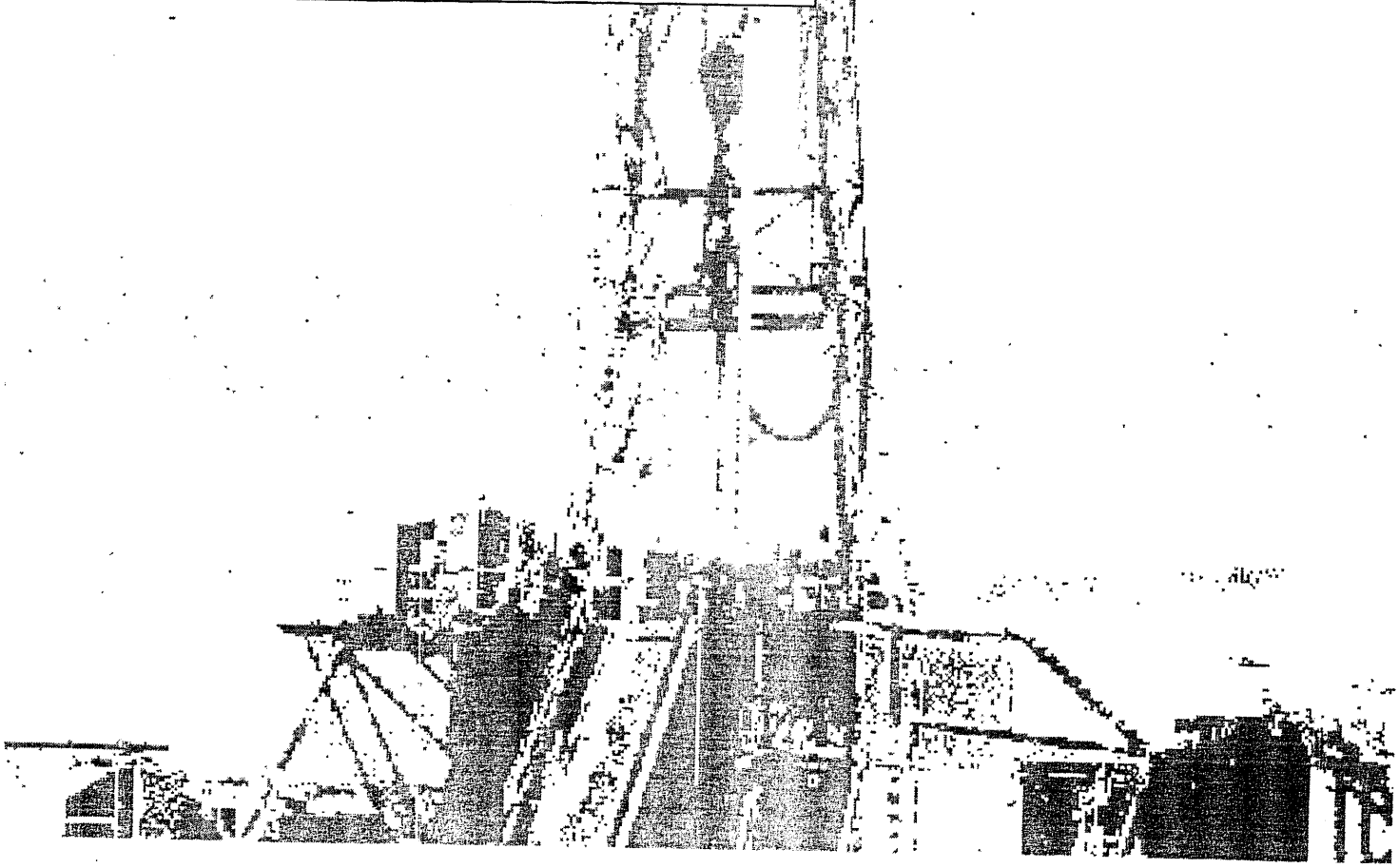


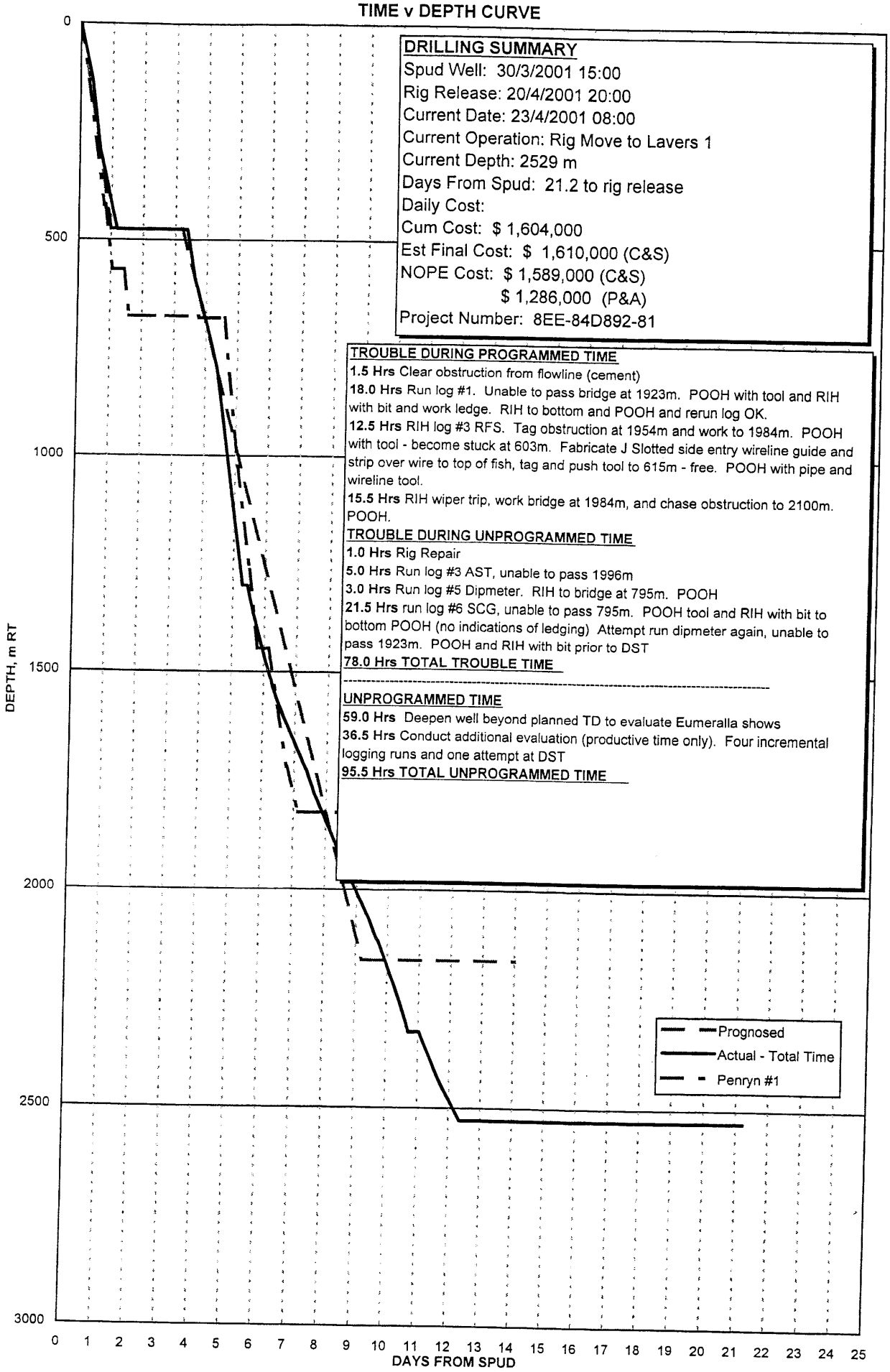
Table of Contents

Section 1.0

Well Summary

- Time vs Depth Curve
- Activity Annotations Report

CROFT #1
TIME v DEPTH CURVE



DRILLING SUMMARY

Spud Well: 30/3/2001 15:00
Rig Release: 20/4/2001 20:00
Current Date: 23/4/2001 08:00
Current Operation: Rig Move to Lavers 1
Current Depth: 2529 m
Days From Spud: 21.2 to rig release
Daily Cost:
Cum Cost: $ 1,604,000
Est Final Cost: $ 1,610,000 (C&S)
NOPE Cost: $ 1,589,000 (C&S)
$ 1,286,000 (P&A)
Project Number: 8EE-84D892-81

TROUBLE DURING PROGRAMMED TIME

1.5 Hrs Clear obstruction from flowline (cement)
18.0 Hrs Run log #1. Unable to pass bridge at 1923m. POOH with tool and RIH with bit and work ledge. RIH to bottom and POOH and rerun log OK.
12.5 Hrs RIH log #3 RFS. Tag obstruction at 1954m and work to 1984m. POOH with tool - become stuck at 603m. Fabricate J Slotted side entry wireline guide and strip over wire to top of fish, tag and push tool to 615m - free. POOH with pipe and wireline tool.
15.5 Hrs RIH wiper trip, work bridge at 1984m, and chase obstruction to 2100m. POOH.

TROUBLE DURING UNPROGRAMMED TIME

1.0 Hrs Rig Repair
5.0 Hrs Run log #3 AST, unable to pass 1996m
3.0 Hrs Run log #5 Dipmeter. RIH to bridge at 795m. POOH
21.5 Hrs run log #6 SCG, unable to pass 795m. POOH tool and RIH with bit to bottom POOH (no indications of ledging) Attempt run dipmeter again, unable to pass 1923m. POOH and RIH with bit prior to DST
78.0 Hrs TOTAL TROUBLE TIME

UNPROGRAMMED TIME

59.0 Hrs Deepen well beyond planned TD to evaluate Eumeralla shows
36.5 Hrs Conduct additional evaluation (productive time only). Four incremental logging runs and one attempt at DST
95.5 Hrs TOTAL UNPROGRAMMED TIME

CROFT #1

Drilling Co.: OD&E **Rig:** OD&E #30

RT above GL: 4 m	Lat : 38 deg 32 min 25.32 sec	Spud Date: 30/03/2001	Release Date: 20/04/2001
GL above MSL : 52 m	Long : 142 deg 46 min 23.65 sec	Spud Time: 15:00:00	Release Time: 20:00:00

ACTIVITY ANNOTATIONS

DATE : 29 March, 2001 **REPORT NUMBER :2**

Comment	Solution
Rig Down 75% Rig Move 50 % Rig Up 25% Camp 0% NB. Time lost due to crane break down.	

DATE : 29 March, 2001 **REPORT NUMBER :3**

Comment	Solution
Rig Down 100% Rig Move 100% Rig Up 65% Camp 0%	

DATE : 30 March, 2001 **REPORT NUMBER :4**

Comment	Solution
Rig Down 100% Rig Move 100% Rig Up 85% Camp 100% 1. Crews being tested and certified for fork truck operation.	

DATE : 01 April, 2001 **REPORT NUMBER :7**

Comment	Solution
**All crew members have been instructed and certified for Fork Truck operation.	

DATE : 02 April, 2001 **REPORT NUMBER :8**

Comment	Solution
1.The lack of any real BOP handling system and requirement to remove catwalk and V-Door to access is rig time costly. (16 Hrs to N/U BOPs) 2. Requested change out of Survey wire due to condition of same.	

DATE : 09 April, 2001 **REPORT NUMBER :14**

Comment	Solution
Gas peaks in Waarre Formation to 3464 units.	

RT above GL: 4 m	Lat : 38 deg 32 min 25.32 sec	Spud Date: 30/03/2001	Release Date: 20/04/2001
GL above MSL : 52 m	Long : 142 deg 46 min 23.65 sec	Spud Time: 15:00:00	Release Time: 20:00:00

ACTIVITY ANNOTATIONS

DATE : 13 April, 2001 **REPORT NUMBER : 19**

Comment	Solution
The fabricated "J" Slot Wire Guide was utilised due to the short open hole section and clearance available in casing. It is a simpler, less time consuming and safer operation than the conventional "Cut & Thread" alternative. In this case it resulted in nil damage to wire or tool.	

Section 2.0

Well History

- IDS Well History Report

CROFT #1

Drilling Co.: OD&E **Rig:** OD&E #30

RT above GL: 4 m Lat : 38 deg 32 min 25.32 sec Spud Date: 30/03/2001 Release Date: 20/04/2001
GL above MSL : 52 m Long : 142 deg 46 min 23.65 sec Spud Time: 15:00:00 Release Time: 20:00:00

Well History

#	DATE	DEPTH	WELL HISTORY (24 Hr Summary)
1	26/03/2001	0	Rig release at 07:00 Hrs 26th March, rig down rig, lay down Derrick, wait on daylight.
2	27/03/2001	0	Rig down and move rig from Dunbar to Croft #1.
3	28/03/2001	0	Wait on Dylight, Rig Move and Rig Up Rig, Wait on daylight.
4	29/03/2001	0	Wait on daylight, prepare and raise derrick, move camp, rig up, M/U kelly, Wait on Crews.
5	30/03/2001	130	Final R/U over Croft #1, Pre-Spud meeting and Spud Croft #1 @ 15:00 Hrs, Jet, Drill & Survey 9 7/8" hole from 15m - 130m.
6	31/03/2001	476	Jet, Drill & Survey from 130m to section TD 476m, circ, wiper trip, circ.
7	01/04/2001	476	POOH and L/O DCs, Rig Up and Run 7 5/8" casing, circulate and cement casing, WOC, Install "A" Section, N/U BOPs.
8	02/04/2001	476	N/U & Test BOPs, Slip & Cut, M/U Bit & BHA and RIH, Drill float and shoe track, drill 6 3/4" hole from 476 - 480m.
9	03/04/2001	798	LOT, Drill & Survey 6 3/4" hole from 476m - 798m.
10	04/04/2001	1,300	Drill & Survey 6 3/4" hole from 798m - 1300m, wiper trip to shoe.
11	05/04/2001	1,555	RIH Wiper trip, Drill & Survey 6 3/4" hole from 1300m to 1555m.
12	06/04/2001	1,726	Drill & Survey 6 3/4" hole from 1555m to 1726m.
13	07/04/2001	1,904	Drill & Survey 6 3/4" hole from 1726m - 1904m.
14	08/04/2001	2,063	Drill & Survey 6 3/4" hole from 1904m to 2063m.
15	09/04/2001	2,253	Drill from 2063m to 2253m. (TD extended from programmed)
16	10/04/2001	2,388	Drill 6 3/4" hole from 2253m - 2328m, circ, survey, wiper trip out, Slip drill line, wiper trip in, drill 6 3/4" hole from 2328m - 2388m.
17	11/04/2001	2,529	Drill 6 3/4" hole from 2388m to 2529m, Circulate.
18	12/04/2001	2,529	POOH, Logging Run #1 (Unable to pass 1923m) RIH wiper trip (Work obstruction area), circ, POOH wiper trip.
19	13/04/2001	2,529	POOH wiper, Reeves Log Run #1, Ruin #2, Run #3 unable to pass bridge at 1984m. POOH Reeves, tool stuck at 603m, M/U and strip over wire to 180m.
20	14/04/2001	2,529	Strip over Reeves Wire and push tool free, POOH wire guide, Reeves POOH and R/D, Wiper trip (Work Belfast formation), circ, POOH wiper (Slick), Reeves logging.
21	15/04/2001	2,529	Reeves Logging Run #3 - Accoustic Scanner (No Pass 1995m) Run #4 - RFS in Waarre & Eumerella formations (36 stations), Run #5 - Dipmeter, Run #6 - SCG.
22	16/04/2001	2,529	Reeves logging (No pass 795m), RIH wiper, circ, POOH wiper, Reeves Logging (No Pass 1923m), R/D Reeves, Wiper trip prior to DST #1.
23	17/04/2001	2,529	POOH Wiper trip, M/U DST #1 tools with 45m interval and RIH, attempt DST -NoGo.
24	18/04/2001	2,529	Reverse circ. DST, POOH and L/O, Reeves Logging 48 SWCs and R/D, RIH Wiper Trip, Circ.
25	19/04/2001	2,529	POOH L/D Pipe, Rig Up to and Run 3 1/2" Casing.
26	20/04/2001	2,529	Run & Cement casing, WOC, Set Slips, N/D BOPs, Install Adaptor flange / Wellhead. Rig Release at 20:00 Hrs 20th April 2001.

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CROFT #1

Drilling Co.: OD&E **Rig: OD&E #30**

RT above GL: 4 m Lat : 38 deg 32 min 25.32 sec Spud Date: 30/03/2001 Release Date: 20/04/2001
GL above MSL : 52 m Long : 142 deg 46 min 23.65 sec Spud Time: 15:00:00 Release Time: 20:00:00

ACTIVITY REPORT

Date : 26/03/2001 **Progress : 0** **Depth @ 24:00 hrs :0**

Depth	Phase	Class	Operation	Hrs	Activity
0	PS	P	RIG DOWN (THE RIG)	6.00	Rig down rig floor and equipment. Prepare to lower derrick. Rig down mud pits and pumps.
0	PS	P	RIG DOWN (THE RIG)	5.50	Lower derrick and bundle lines. Lay down monkey board. Unspool drilling line. Rig down air, water and electrical. Load out mud chemicals to Croft #1.
0	PS	P	WAIT ON	5.50	Wait on Daylight.

Date : 27/03/2001 **Progress : 0** **Depth @ 24:00 hrs :0**

Depth	Phase	Class	Operation	Hrs	Activity
0	PS	P	WAIT ON	6.50	Wait on Daylight.
0	PS	P	RIG DOWN (THE RIG)	12.00	Safety Meeting, RigDown- Stairs, Poorboy Degasser, Gen & SCR shacks, Lower doghouse, Unpin A-Legs and split derrick. LOAD OUT & SPOT- Matting, pits, sub, pumps,Gen & SCR shacks, Mech shack, junk box.
0	PS	P	WAIT ON	5.50	Wait on Daylight.

Date : 28/03/2001 **Progress : 0** **Depth @ 24:00 hrs :0**

Depth	Phase	Class	Operation	Hrs	Activity
0	PS	P	WAIT ON	7.00	Wait on Daylight.
0	PS	P	RIG UP (THE RIG)	11.50	Safety Meeting, Complete load out from Dunbar, Spot all rig equipment, Pin derrick sections, String blocks, power up rig. Load in Surface casing.
0	PS	P	WAIT ON	5.50	Wait on Daylight.

Date : 29/03/2001 **Progress : 0** **Depth @ 24:00 hrs :0**

Depth	Phase	Class	Operation	Hrs	Activity
0	PS	P	WAIT ON	6.50	Wait on Daylight.
0	PS	P	RIG UP (THE RIG)	4.50	Safety Meeting, Prepare to raise derrick. Rig Down-Move & Rig up camp. Geoservices Rig Up.
0	PS	P	RIG UP (THE RIG)	10.00	Raise Derrick and rig up lines. Install cat walk and V-Door. Dowell Rig Up Unit and bulky. Load in chemicals Spud list. Prepare BHA. Rig up rig, pits and pumps. Mix Spud Mud, P/U Kelly.
0	PS	P	WAIT ON	3.00	Wait On Crews.

Date : 30/03/2001 **Progress : 130** **Depth @ 24:00 hrs :130**

Depth	Phase	Class	Operation	Hrs	Activity
0	PS	P	RIG UP (THE RIG)	15.00	Torq Kelly, Install kelly spinner, Run Geolograph & Survey Lines. Service Mud Pumps, M/U 12 1/4" Bit and drill/set Rat hole & mouse Hole sock. Prepare BHA and final R/U and House keeping and safety issues. Press. test lines 2000psi.
130	SH	P	CONTROL DRILL - DEV	9.00	Hold Pre-Spud meeting and Hazard identification tour. Spud Croft #1 and Drill & Jet & Survey from 15m to 130m.

Date : 31/03/2001 **Progress : 97** **Depth @ 24:00 hrs :476**

Depth	Phase	Class	Operation	Hrs	Activity
379	SH	P	CONTROL DRILL - DEV	9.50	Drill, Jet & Survey from 130m to 379m.
379	SH	TP	CIRCULATE & CONDITION	1.50	Clear obstruction from flow line that resulted in clay build up and blockage. Flush same.
476	SH	P	CONTROL DRILL - DEV	8.50	Drill, Jet & Survey from 379m to section TD 476m.
476	SH	P	CIRCULATE & CONDITION	0.50	Circulate hole clean.
476	SH	P	SURVEY	0.50	Survey at 458m 5 deg Inc 188 deg Az

CROFT #1

Drilling Co.: OD&E

Rig: OD&E #30

RT above GL: 4 m
GL above MSL : 52 m

Lat : 38 deg 32 min 25.32 sec
Long : 142 deg 46 min 23.65 sec

Spud Date: 30/03/2001
Spud Time: 15:00:00

Release Date: 20/04/2001
Release Time: 20:00:00

ACTIVITY REPORT

Date : 31/03/2001 — **Progress : 97** — **Depth @ 24:00 hrs :476**

Depth	Phase	Class	Operation	Hrs	Activity
476	SC	P	WIPER TRIP	2.50	POOH for wiper trip from 476m to surface. Double work DCs and Inspect bit. RIH to 476m. Hole slick.
476	SC	P	CIRCULATE & CONDITION	1.00	Circulate hole clean.

Date : 01/04/2001 — **Progress : 0** — **Depth @ 24:00 hrs :476**

Depth	Phase	Class	Operation	Hrs	Activity
476	SC	P	TRIP-OUT	4.50	Pump pill and POOH from 476m, double work DCs to condition hole. L/O 6 1/2" DCs and BHA.
476	SC	P	RIG RUN TO CASING	2.00	Rig up to run 7 5/8" Surface Casing.
476	SC	P	RUN CASING	4.00	Hold pre job safety meeting, Make Up Float & Shoe track, test floats -OK, Run 7 5/8" Surface casing.
476	SC	P	CIRCULATE CASING	1.00	Make up circulating swage and circulate casing. Rig pump 40 bbls water pre-flush. Hold pre-cementing safety meeting.
476	SC	P	HEAD-UP FOR CMT OPS	0.50	Make up Cement head and Dowell test lines.
476	SC	P	CEMENT CASING	0.50	Drop bottom plug, Dowell mix and pump 87 bbls Lead cement at 11.5 ppg & 19 bbls Tail cement at 15.6 ppg. Drop top plug and displace 10 bbls water. Rig displace cement with mud and bump plug to 1000 psi. (13 bbls cement returns)
476	SC	P	CEMENT CASING	0.50	Dowell pressure test casing to 3000 psi / 10 min -OK. Bleed back 0.5 bbls - Floats holding. Conduct top up.
476	SC	P	WAIT ON CEMENT	4.00	WOC - Prepare for BOP nipple up. Pressure test choke manifold. Dump & Clean mud pits, Mix KCl / PHPA Mud system.
476	SC	P	WELL-HEAD	2.00	Stage slack off casing, back out land joint and lay out surface riser. Clean threads and install "A" Section Bradenhead and torq - Orientate same.
476	SC	P	N/U & TEST BOP's	5.00	Nipple up BOPs.

Date : 02/04/2001 — **Progress : 4** — **Depth @ 24:00 hrs :480**

Depth	Phase	Class	Operation	Hrs	Activity
476	SC	P	N/U & TEST BOP's	10.00	Nipple up BOPs, Choke manifold and lines. Function test BOPs.
476	SC	P	N/U & TEST BOP's	4.00	M/U Test joint assembly and Test BOPs, casing, lines and kelly valves as per Santos Specs - OK.
476	SC	P	N/U & TEST BOP's	1.50	R/U Modified Bell Nipple, run on new wire to Survey Unit as per Santos request.
476	SC	P	WELL-HEAD	1.00	Run Wear Bushing and L/O test joint assembly.
476	SC	P	SLIP/CUT DRILL LINE	1.00	Slip & Cut drilling line (Excessive line wear)
476	SC	P	TRIP-IN	3.50	M/U 6 3/4" Bit #2 and BHA and RIH to 254m.
476	SC	P	LAY DOWN PIPE	1.00	RIH stands drill pipe, R/U and L/O excess singles.
476	SC	P	TRIP-IN	0.50	RIH from 254m to 435m and wash to tag TOC @ 445m.
476	SC	P	DRILL FLOAT / SHOE TRAC	1.25	Drill cement from 445m, float @ 447m, cement and shoe @ 472m and shoe track to 476m.
480	PH	P	DRILLING AHEAD	0.25	Drill 6 3/4" hole from 476m to 480m.

Date : 03/04/2001 — **Progress : 318** — **Depth @ 24:00 hrs :798**

Depth	Phase	Class	Operation	Hrs	Activity
480	PH	P	LOT / FIT	1.50	Circulate to balanced mud system and conduct LOT to 16. 2 EMW
588	PH	P	DRILLING AHEAD	4.00	Drill ahead 6 3/4" hole from 480m. (Pump 40 bbl water spacer and displace to KCl/PHPA mud system). Drill to 588m.
588	PH	P	SURVEY	0.50	Circulate & Survey @ 578m - 4.5 deg Inc 183 deg Az
634	PH	P	CONTROL DRILL - DEV	4.50	Drill 6 3/4" hole from 588m to 634m. (Control drill for deviation)
334	PH	P	SURVEY	0.50	Circulate & Survey @ 625m - 3 deg Inc 190 deg Az
693	PH	P	CONTROL DRILL - DEV	4.00	Drill 6 3/4" hole from 634m to 693m. (Control drill for deviation)
693	PH	P	SURVEY	0.50	Circulate & Survey @ 684m - 1.5 deg Inc 206 deg Az

CROFT #1

Drilling Co.: OD&E **Rig: OD&E #30**

RT above GL: 4 m Lat : 38 deg 32 min 25.32 sec Spud Date: 30/03/2001 Release Date: 20/04/2001
GL above MSL : 52 m Long : 142 deg 46 min 23.65 sec Spud Time: 15:00:00 Release Time: 20:00:00

ACTIVITY REPORT

Date : 03/04/2001 **Progress : 318** **Depth @ 24:00 hrs :798**

Depth	Phase	Class	Operation	Hrs	Activity
750	PH	P	CONTROL DRILL - DEV	3.00	Drill 6 3/4" hole from 693m to 750m. (Control drill for deviation)
750	PH	P	RIG SERVICE	0.50	Service Rig.
750	PH	P	SURVEY	0.50	Circulate & Survey @ 741m - 1.1 deg Inc 222 deg Az
798	PH	P	CONTROL DRILL - DEV	4.00	Drill 6 3/4" hole from 750m to 798m (Control drill for deviation)
798	PH	P	SURVEY	0.50	Circulate & Survey @ 789m - 0.25 deg Inc 227 deg Az

Date : 04/04/2001 **Progress : 424** **Depth @ 24:00 hrs :1,300**

Depth	Phase	Class	Operation	Hrs	Activity
876	PH	P	DRILLING AHEAD	2.50	Drill 6 3/4" hole from 798m to 876m.
876	PH	P	SURVEY	0.50	Circulate & Survey @ 867m - 3/8 .375 deg Inc 117 deg Az
972	PH	P	DRILLING AHEAD	4.50	Drill 6 3/4" hole from 876m to 972m.
972	PH	P	SURVEY	0.50	Circulate & Survey @ 963m - 0.1 deg Inc 162 deg Az
1,087	PH	P	DRILLING AHEAD	3.50	Drill 6 3/4" hole from 972m to 1087m.
1,087	PH	P	SURVEY	0.50	Circulate & Survey @ 1078m - 0.3 deg Inc 112 deg Az
1,194	PH	P	DRILLING AHEAD	3.50	Drill 6 3/4" hole from 1087m to 1194m.
1,194	PH	P	SURVEY	0.50	Circulate & Survey @ 1185m - 1.0 deg Inc 162 deg Az
1,290	PH	P	DRILLING AHEAD	5.00	Drill 6 3/4" hole from 1194m to 1290m.
1,290	PH	P	SURVEY	0.50	Circulate & Survey @ 1281m - 1.1 deg Inc 212 deg Az
1,300	PH	P	DRILLING AHEAD	0.50	Drill 6 3/4" hole from 1290m to 1300m.
1,300	PH	P	CIRCULATE & CONDITION	0.50	Circulate hole clean, flow check -Static. Pump pill.
1,300	PH	P	WIPER TRIP	1.50	POOH for wiper trip from 1300m to shoe at 472m. (Hole slick)

Date : 05/04/2001 **Progress : 255** **Depth @ 24:00 hrs :1,555**

Depth	Phase	Class	Operation	Hrs	Activity
1,300	PH	P	WIPER TRIP	1.50	RIH wiper trip from shoe at 472m to 1300m. (Hole slick and nil fill)
1,406	PH	P	DRILLING AHEAD	8.00	Drill 6 3/4" hole from 1300m to 1406m.
1,406	PH	P	SURVEY	0.50	Circulate & Survey @ 1397m - 0.9 deg Inc 230 deg Az
1,484	PH	P	DRILLING AHEAD	7.00	Drill 6 3/4" hole from 1406m to 1484m. (Several stringers drilled at <1 m/hr)
1,484	PH	P	RIG SERVICE	0.50	Service Rig.
1,513	PH	P	DRILLING AHEAD	2.50	Drill 6 3/4" hole from 1484m to 1513m. (Several stringers drilled at <1 m/hr)
1,513	PH	P	SURVEY	0.50	Circulate & Survey @ 1504m - 1.0 deg Inc 230 deg Az
1,555	PH	P	DRILLING AHEAD	3.50	Drill 6 3/4" hole from 1513m to 1555m.

Date : 06/04/2001 **Progress : 106** **Depth @ 24:00 hrs :1,726**

Depth	Phase	Class	Operation	Hrs	Activity
1,620	PH	P	DRILLING AHEAD	8.00	Drill 6 3/4" hole from 1555m to 1620m.
1,620	PH	P	SURVEY	0.50	Circulate & Survey @ 1611m - 2.25 deg Inc 237 deg Az
1,667	PH	P	DRILLING AHEAD	7.00	Drill 6 3/4" hole from 1620m to 1667m.
1,667	PH	P	SURVEY	0.50	Circulate & Survey @ 1658m - 1 deg Inc 266 deg Az
1,726	PH	P	DRILLING AHEAD	7.50	Drill 6 3/4" hole from 1667m to 1726m.
1,726	PH	P	SURVEY	0.50	Circulate & Survey @ 1716m - 0.9 deg Inc 299 deg Az

Date : 07/04/2001 **Progress : 111** **Depth @ 24:00 hrs :1,904**

Depth	Phase	Class	Operation	Hrs	Activity
1,793	PH	P	DRILLING AHEAD	7.50	Drill 6 3/4" hole from 1726m to 1793m.
1,793	PH	P	SURVEY	0.50	Circulate & Survey @ 1784m - 2.3 deg Inc 242 deg Az
1,851	PH	P	DRILLING AHEAD	7.50	Drill 6 3/4" hole from 1793m to 1851m.
1,851	PH	P	RIG SERVICE	0.50	Service Rig
1,851	PH	P	SURVEY	0.50	Circulate & Survey @ 1842m - 2.8 deg Inc 239 deg Az

CROFT #1

Drilling Co.: OD&E

Rig: OD&E #30

RT above GL: 4 m
GL above MSL : 52 m

Lat : 38 deg 32 min 25.32 sec
Long : 142 deg 46 min 23.65 sec

Spud Date: 30/03/2001
Spud Time: 15:00:00

Release Date: 20/04/2001
Release Time: 20:00:00

ACTIVITY REPORT

Date : 07/04/2001 — **Progress : 111** — **Depth @ 24:00 hrs :1,904**

Depth	Phase	Class	Operation	Hrs	Activity
1,889	PH	P	DRILLING AHEAD	4.50	Drill 6 3/4" hole from 1851m to 1889m.
1,889	PH	P	SURVEY	0.50	Circulate & Survey @ 1880m - 2.25 deg Inc 245 deg Az
1,904	PH	P	DRILLING AHEAD	2.50	Drill 6 3/4" hole from 1889m to 1904m.

Date : 08/04/2001 — **Progress : 108** — **Depth @ 24:00 hrs :2,063**

Depth	Phase	Class	Operation	Hrs	Activity
1,955	PH	P	DRILLING AHEAD	7.00	Drill 6 3/4" hole from 1904m to 1955m.
1,955	PH	P	SURVEY	0.50	Circulate & Survey @ 1946m - 1.1 deg Inc 212 deg Az
2,003	PH	P	DRILLING AHEAD	7.00	Drill 6 3/4" hole from 1955m to 2003m.
2,003	PH	P	SURVEY	0.50	Circulate & Survey @ 1994m - 2.0 deg Inc 227 deg Az
2,063	PH	P	DRILLING AHEAD	9.00	Drill 6 3/4" hole from 2003m to 2063m. (Flow check drill breaks and gas peaks to 3450 units)

Date : 09/04/2001 — **Progress : 136** — **Depth @ 24:00 hrs :2,253**

Depth	Phase	Class	Operation	Hrs	Activity
2,117	PH	P	DRILLING AHEAD	8.00	Drill 6 3/4" hole from 2063m to 2117m. (Flow check Hi Gas peaks & Drill breaks)
2,117	PH	P	RIG SERVICE	0.50	Service Rig
2,156	PH	P	DRILLING AHEAD	5.50	Drill 6 3/4" hole from 2117m to provisional TD 2156m.
2,156	PH	U	CIRCULATE & CONDITION	0.50	Circulate, - TD of well extended.
2,253	PH	U	DRILLING AHEAD	9.50	Drill 6 3/4" hole from provisional TD 2156m to 2253m.

Date : 10/04/2001 — **Progress : 60** — **Depth @ 24:00 hrs :2,388**

Depth	Phase	Class	Operation	Hrs	Activity
2,328	PH	U	DRILLING AHEAD	7.50	Drill 6 3/4" hole from 2253m to 2328m. (Gas of 40% from 2294 - 2297m)
2,328	PH	U	CIRCULATE & CONDITION	1.00	Circulate hole clean, flow check - static. Pump pill.
2,328	PH	U	SURVEY	0.50	Survey at 2310m - 6.25 deg Inc 197 deg Az.
2,328	PH	P	WIPER TRIP	2.50	POOH for wiper trip from 2328m to shoe at 471m.
2,328	PH	P	SLIP/CUT DRILL LINE	0.50	Slip drilling line.
2,328	PH	P	WIPER TRIP	3.50	RIH wiper trip from shoe at 471m to 2316m. (Tight spot at 1990m) Wash from 2316m to 2328m (3m fill)
2,388	PH	U	DRILLING AHEAD	8.50	Drill 6 3/4" hole from 2328m to 2388m.

Date : 11/04/2001 — **Progress : 86** — **Depth @ 24:00 hrs :2,529**

Depth	Phase	Class	Operation	Hrs	Activity
2,443	PH	U	DRILLING AHEAD	8.00	Drill 6 3/4" hole from 2388m to 2443m.
2,443	PH	U	RIG SERVICE	0.50	Service Rig.
2,529	PH	U	DRILLING AHEAD	14.50	Drill 6 3/4" hole from 2443m to 2529m. (Weight indicator failure at 2520m -investigate same)
2,529	PH	TU	RIG REPAIR	1.00	Circulate hole clean.- Investigate Weight Indicator failure)

Date : 12/04/2001 — **Progress : 0** — **Depth @ 24:00 hrs :2,529**

Depth	Phase	Class	Operation	Hrs	Activity
2,529	PH	U	SURVEY	1.00	survey at 2511m - 7 deg Inc 214 deg Az.
2,529	EP	P	TRIP-OUT	5.50	Flow check, Pump pill and POOH with alternate weight indicator from 2529m to shoe at 471m. (Hole slick). Flow check static. Continue POOH and break bit.
2,529	EP	TP	LOGGING	4.50	Hold pre-job safety meeting, R/U Reeves logging and Run #1 Tools and RIH. Casing test tools and RIH to bridge at 1923m. Attempt to work thru -NoGo. POOH and R/D Reeves.

CROFT #1

Drilling Co.: OD&E

Rig: OD&E #30

RT above GL: 4 m
GL above MSL : 52 m

Lat : 38 deg 32 min 25.32 sec
Long : 142 deg 46 min 23.65 sec

Spud Date: 30/03/2001
Spud Time: 15:00:00

Release Date: 20/04/2001
Release Time: 20:00:00

ACTIVITY REPORT

Date : 12/04/2001 — **Progress : 0** — **Depth @ 24:00 hrs :2,529**

Depth	Phase	Class	Operation	Hrs	Activity
2,529	EP	TP	WIPER TRIP	1.50	L/O Monel DC and worn stb, M/U Bit #RR3 and BHA and RIH to shoe at 471m.
2,529	EP	TP	SLIP/CUT DRILL LINE	0.50	Slip drilling line.
2,529	EP	TP	WIPER TRIP	5.00	RIH from 471m to 1923m, work and ream stringer ledge, cont RIH pushing obstruction to 2500m.
2,529	EP	TP	WIPER TRIP	1.00	Wash & Ream from 2500m to TD 2529m.
2,529	EP	TP	CIRCULATE & CONDITION	1.00	Circulate hole clean and low gas count. Flow check and pump pill.
2,529	EP	TP	WIPER TRIP	4.00	POOH wiper trip from 2529m and rack BHA.

Date : 13/04/2001 — **Progress : 0** — **Depth @ 24:00 hrs :2,529**

Depth	Phase	Class	Operation	Hrs	Activity
2,529	EP	TP	WIPER TRIP	0.50	Cont. POOH wiper trip and rack BHA.
2,529	EP	P	LOGGING	11.50	Hold pre-job safety meeting, R/U Reeves logging and Run #1 Tools GR- DLS- MRS- LCS and RIH. Casing test tools and RIH to TD 2529m and log.
2,529	EP	P	LOGGING	5.00	Reeves M/U Run #2 PDS- CNS and RIH to TD. Log to 1950m, apparent failure of caliper giving fluctuating readings. POOH and L/O tools.
2,529	EP	TP	LOGGING	5.00	Reeves M/U Log tools Run #3 RFS and RIH. Tag obstruction at 1954m and work to 1984m. Full bridge off. Attempt to clear thru -NoGo. POOH for wiper trip, tool stuck at 603m. Attempt to work free -NoGo.
2,529	EP	TP	LOGGING	2.00	Hold safety meeting, rearrange Reeves Top Sheave, Fabricate "J" slotted side entry wire guide and RIH stripping over Reeves Wire to 180m.

Date : 14/04/2001 — **Progress : 0** — **Depth @ 24:00 hrs :2,529**

Depth	Phase	Class	Operation	Hrs	Activity
2,529	EP	TP	LOGGING	2.00	Hold safety meeting with new crew and RIH stripping over Reeves Wire from 180m to tag top of tool at 594m and push until tool free at 615m. Reeves RIH to 635m.
2,529	EP	TP	LOGGING	2.00	Work pipe from 615m to 625m, POOH from 625m to 435m with Reeves tailing behind on each stand pulled. Reeves POOH to inside shoe at 465m. POOH pipe from 435m to surface. "T" bar wire, unthread from "J" slot guide.
2,529	EP	TP	LOGGING	1.50	Reeves function test tool -OK, POOH from 465m, L/O RFS tools and R/D. ***Nil Tool or wire damage.
2,529	EP	TP	WIPER TRIP	9.50	M/U Bit and BHA and RIH for wiper trip. Work any indications of hang up, work bridge at 1984m and chase obstruction to 2100m.(Triple work all stands in Belfast formation) Cont RIH and ream from 2509m to 2529m.
2,529	EP	TP	CIRCULATE & CONDITION	1.50	Circulate hole clean and condition mud. Spot 5 x 3 bbl LCM sweeps. Flow check -Static. Pump pill and rack kelly.
2,529	EP	TP	WIPER TRIP	4.50	POOH Wiper trip from 2529m. (Hole slick but double work stands- shoe to 570m). Rack BHA.
2,529	EP	TU	WIPER TRIP	0.50	R/U Reeves and hold pre-job safety meeting.
2,529	EP	TU	LOGGING	2.50	Reeves M/U Log Run #3 AST and RIH.

Date : 15/04/2001 — **Progress : 0** — **Depth @ 24:00 hrs :2,529**

Depth	Phase	Class	Operation	Hrs	Activity
2,529	EP	TU	LOGGING	2.00	Reeves RIH Log Run #3 AST to unpassable hole at 1996m. (Belfast formation) POOH.
2,529	EP	P	LOGGING	18.00	Reeves M/U Log run #4 RFS and RIH. Work through hang-ups in Belfast formation from 1950m to 2005m and Cont. RIH. Correlate from 2070m to 2020m. Conduct Pressure tests in Waarre/Eumerella stations. (Programmed 36 stations). POOH.

CROFT #1

Drilling Co.: OD&E **Rig: OD&E #30**

RT above GL: 4 m Lat : 38 deg 32 min 25.32 sec Spud Date: 30/03/2001 Release Date: 20/04/2001
GL above MSL : 52 m Long : 142 deg 46 min 23.65 sec Spud Time: 15:00:00 Release Time: 20:00:00

ACTIVITY REPORT

Date : 15/04/2001 **Progress : 0** **Depth @ 24:00 hrs :2,529**

Depth	Phase	Class	Operation	Hrs	Activity
2,529	EP	TU	LOGGING	3.00	Reeves M/U Run #5 - DIPMETER and RIH to bridge at 795m. Attempt to work through -NoGo. POOH.
2,529	EP	TU	LOGGING	1.00	Reeves M/U Log Run #6 - SCG Side Wall Cores and RIH.

Date : 16/04/2001 **Progress : 0** **Depth @ 24:00 hrs :2,529**

Depth	Phase	Class	Operation	Hrs	Activity
2,529	EP	TU	LOGGING	1.50	Reeves RIH Log Run #6 - SCG Side Wall Cores to bridge at 795m, attempt to work through -NoGo. POOH and R/D Reeves and clear rig floor.
2,529	EP	TU	WIPER TRIP	1.50	M/U Bit and RIH wiper trip to shoe at 471m.
2,529	EP	TU	SLIP/CUT DRILL LINE	1.00	Slip & Cut Drilling Line.
2,529	EP	TU	WIPER TRIP	5.00	Cont. RIH wiper trip from shoe at 471m. (Nil indications at 795m) and cont RIH washing last single to TD 2529m.
2,529	EP	TU	CIRCULATE & CONDITION	1.00	Circulate hole clean and low gas.
2,529	EP	TU	WIPER TRIP	4.50	Flow check, pump pill and POOH wiper trip from 2529m. Rack BHA.
2,529	EP	TU	LOGGING	6.00	Reeves R/U and M/U tools - Dipmeter and RIH to bridge at 1923m. Attempt to work through -NoGo. POOH and L/O tools. Abort Side Wall Core run.
2,529	EP	U	WIPER TRIP	3.50	M/U Bit #3RR4 and RIH wiper trip to 1800m.

Date : 17/04/2001 **Progress : 0** **Depth @ 24:00 hrs :2,529**

Depth	Phase	Class	Operation	Hrs	Activity
2,529	EP	U	WIPER TRIP	4.00	Cont. RIH Wiper trip from 1800m to obstruction at 1920m and work clean. Work each stand twice from 1920m to top of fill at 2520m.
2,529	EP	U	CIRCULATE & CONDITION	1.00	Circulate hole clean and low gas. Condition mud and build volume. Flow check - static. Pump pill.
2,529	EP	U	WIPER TRIP	5.00	POOH wiper trip from 2520m, rack BHA as per DST requirements, break bit and L/O stbs. Clear rig floor.
2,529	EP	U	DST	8.50	Safety meeting and M/U Tools DST #1 for interval 2287m - 2332m (Drillers Depth) and RIH filling for 746m water cushion. Cont. RIH to 2336m.
2,529	EP	U	DST	3.50	R/U Reeves and RIH. Correlate string on depth with a 1. 2m down correction. POOH and R/D.
2,529	EP	U	DST	2.00	R/U Baker Oiltools pressure head, lines and manifold. Pressure test. Inflate packers, hold safety meeting. Test seat and attempt to open tool - Slippage. Reinflate and test seat- NoGo.

Date : 18/04/2001 **Progress : 0** **Depth @ 24:00 hrs :2,529**

Depth	Phase	Class	Operation	Hrs	Activity
2,529	EP	U	DST	1.50	Attempt to reinflate packers, test seat - free string movement. Drop bar and reverse circulate string to 9.6ppg mud. Nil indications of contamination. R/D Baker Oiltools head and manifold.
2,529	EP	U	DST	8.00	Flow check - Static. Pump pill and POOH with DST tools from 2336m and L/O and inspect tools. Full recovery.
2,529	EP	U	LOGGING	7.00	R/U Reeves, hold Radio Silence / Explosives safety meeting, M/U Tools Run #8 Side Wall Cores and RIH to 2508m. taking 48 samples to 1985m (Eumerella - Waarre Formation) POOH and Rig Down.
2,529	EP	P	WIPER TRIP	1.50	M/U Bit # 3RR5 and BHA. RIH to shoe at 471m.
2,529	EP	P	SLIP/CUT DRILL LINE	0.50	Slip Drilling Line.
2,529	EP	P	WIPER TRIP	3.50	Continue to RIH from shoe at 471m to 2510m.
2,529	EP	P	CIRCULATE & CONDITION	1.00	Circulate hole clean and low gas count.
2,529	PC	P	LAY DOWN PIPE	1.00	Pump pill and POOH laying down pipe from 2510m.

CROFT #1

Drilling Co.: OD&E **Rig: OD&E #30**

RT above GL: 4 m
GL above MSL : 52 m

Lat : 38 deg 32 min 25.32 sec
Long : 142 deg 46 min 23.65 sec

Spud Date: 30/03/2001
Spud Time: 15:00:00

Release Date: 20/04/2001
Release Time: 20:00:00

ACTIVITY REPORT

Date : 19/04/2001 **Progress : 0** **Depth @ 24:00 hrs :2,529**

Depth	Phase	Class	Operation	Hrs	Activity
2,529	PC	P	LAY DOWN PIPE	5.00	Cont. POOH laying down pipe to shoe at 471m.
2,529	PC	P	LAY DOWN PIPE	1.00	P/U Kelly and soft break connections.
2,529	PC	P	LAY DOWN PIPE	4.00	Cont. POOH laying down pipe from shoe at 471m. Break bit and L/O stbs. Clear rig floor.
2,529	PC	P	WELL-HEAD	0.50	Retreive Wear Bushing and L/O assembly.
2,529	PC	P	RIG RUN TO CASING	2.00	Rig Up PCS and equipment to run 3 1/2" Production Casing. Hold Pre-Job safety meeting.
2,529	PC	P	RUN CASING	11.50	M/U Shoe Track, test floats -Ok and RIH 3 1/2" Production Casing.

Date : 20/04/2001 **Progress : 0** **Depth @ 24:00 hrs :2,529**

Depth	Phase	Class	Operation	Hrs	Activity
2,529	PC	P	RUN CASING	2.00	Continue to RIH 3 1/2" Production Casing to 2408m. (Differentially sticking)
2,529	PC	P	CIRCULATE CASING	1.50	Circulate casing treating 100bbls mud with biocide and caustic to Ph 10.
2,529	PC	P	HEAD-UP FOR CMT OPS	0.50	M/U Cementhead and test lines 4000 psi -OK.
2,529	PC	P	CEMENT CASING	1.50	Dowel drop Bottom Plug, Mix and Pump 248 bbls Lead Cmt @ 11.5ppg and 70 bbls Tail Cmt @ 15.8 ppg. Flush lines. Drop Top Plug and pump 10 bbls water.
2,529	PC	P	CEMENT CASING	0.50	Rig displace Cmt with 59 bbls 2% KCL and bump plug to 2000 psi. Dowell pressure to 3000 psi / 10 min -OK. Bleed back 1/2 bbls, Floats holding.
2,529	PC	P	WAIT ON CEMENT	4.00	WOC and flush BOPs and Choke manifold. Dump & clean mud pits.
2,529	PC	P	N/U & TEST BOP's	3.00	N/D Choke / Kill Lines and BOP flange and raise BOPs. Rough cut landing joint and lay out same. Set down BOPs.
2,529	PC	P	N/U & TEST BOP's	5.00	Lay out Kelly, remove cat walk & V-Door, N/D and Lay down BOPs.
2,529	PC	P	WELL-HEAD	1.75	Final cut, dress and bevel casing stump, N/U adaptor flange and Well-head.
2,529	PC	P	WELL-HEAD	0.25	RIG RELEASE CROFT #1 @ 20:00 Hrs FRIDAY 20th APRIL 2001.

Section 3.0

Drilling Data

- Mud Record
- BHA Summary
- Bit Summary by Formation
- FIT/LOT Report

Drilling Co.: OD&E | Rig: OD&E #30 | Mud Co: Baroid

RT above GL . + m | Lat : 38 deg 32 min 25.32 sec | Spud Date: 30/03/2001 | Release Date: 20/04/2001 | **Total Cost:** $ 38,357

GL above MSL : 52 m | Long : 142 deg 46 min 23.65 sec | Spud Time: 15:00 | Release Time: 20:00

MUD RECAP

R#	DATE	TYPE	DEPTH	TMP F	MW ppg	VIS secs /qt	PV cps	YP lbs/ 100ft2	Gel10s lbs/ 100ft2	Gel10m lbs/ 100ft2	F.L. API (cm3/ 30min)	F.L. hthp (cm3/ 30min)	Sols %	Sand %	MBT %	PH	Cl ppm	HARD /Ca ppm	KCl %	DAILY $
5	30/03/2001	GEL SPUD MUD	99	66	8.9	41	10	8	7	15	16.0		4.5	.25	20.0	9.5	800	40	0	1,400
6	31/03/2001	GEL SPUD MUD	476	80	8.8	40	4	20	15	17	32.0		3.8	tr	10.0	8.5	3,000	80	0	8
7	01/04/2001	GEL SPUD MUD	476	0	9.0	45	7	23	19	22	30.0		4.9	tr	10.0	8.5	2,500	80	0	254
8	02/04/2001	GEL SPUD MUD	476	0	9.0	45	7	23	19	22	30.0		4.9	tr	10.0	8.5	2,500	80	0	2,456
9	03/04/2001	KCL/PHPA/POLYMER	769	94	8.6	33	4	2	0	1	15.0		.1	tr	0.0	9.0	18,000	360	4	947
10	04/04/2001	KCL/PHPA/POLYMER	1,252	104	9.0	35	5	4	0	1	8.5		3.9	.4	0.5	9.0	19,500	360	4	4,184
11	05/04/2001	KCL/PHPA/POLYMER	1,494	110	9.0	34	5	8	1	2	7.6		3.9	.5	0.5	9.0	20,000	400	4	4,487
12	06/04/2001	KCL/PHPA/POLYMER	1,719	116	9.0	35	6	6	1	2	8.8		3.9	.25	2.5	9.0	20,000	320	4	2,522
13	07/04/2001	KCL/PHPA/POLYMER	1,889	114	9.2	35	7	6	1	2	8.0		5.8	.25	2.0	9.0	21,000	240	4	4,450
14	08/04/2001	KCL/PHPA/POLYMER	2,047	122	9.3	36	7	6	1	2	7.5		6.4	.25	2.5	9.0	19,000	280	4	1,212
15	09/04/2001	KCL/PHPA/POLYMER	2,228	116	9.3	35	9	8	1	2	7.0		6.4	.25	2.5	9.5	19,500	160	4	2,693
16	10/04/2001	KCL/PHPA/POLYMER	2,367	112	9.5	36	9	9	1	2	7.0		9	.5	2.5	9.0	18,500	280	4	1,904
17	11/04/2001	KCL/PHPA/POLYMER	2,514	128	9.5	38	10	8	1	2	7.0		9	.5	2.5	9.0	19,000	320	4	3,387
18	12/04/2001	KCL/PHPA/POLYMER	2,514	128	9.5	38	10	8	1	2	7.0		9	.5	2.5	9.0	19,000	320	4	2,950
19	13/04/2001	KCL/PHPA/POLYMER	2,514	128	9.5	38	10	8	1	2	7.0		9	.5	2.5	9.0	19,000	320	4	169
20	14/04/2001	KCL/PHPA/POLYMER	2,529	92	9.6	43	10	11	3	4	7.4		9	.5	3.0	9.0	17,000	240	3	801
21	15/04/2001	KCL/PHPA/POLYMER	2,529	92	9.6	43	10	11	3	4	7.4		9	.5	3.0	9.0	17,000	240	3	0
22	16/04/2001	KCL/PHPA/POLYMER	2,529	92	9.7	43	10	11	3	4	7.4		9	.5	3.0	9.0	17,000	240	3	2,110
23	17/04/2001	KCL/PHPA/POLYMER	2,529	0	9.6	45	10	7	2	3	7.0		8	TR	2.0	9.0	19,000	360	4	169
24	18/04/2001	KCL/PHPA/POLYMER	2,529	0	9.6	45	10	7	2	3	7.0		8	TR	2.0	9.0	19,000	360	4	169
25	19/04/2001	KCL/PHPA/POLYMER	2,529	0	9.6	45	10	7	2	3	7.0		8	TR	2.0	9.0	19,000	360	4	169
26	20/04/2001	KCL/PHPA/POLYMER	2,529	0	9.6	45	10	7	2	3	7.0		8	TR	2.0	9.0	19,000	360	4	1,916

903028 120

CROFT #1

Drilling Co.: OD&E **Rig:** OD&E #30

RT above GL 4 m
GL above MSL 52 m

Lat : 38 deg 32 min 25.32 sec
Long : 142 deg 46 min 23.65 sec

Spud Date: 30/03/2001
Spud Time: 15:00

Release Date: 20/04/2001
Release Time: 20:00

BHA SUMMARY

#	Length (m)	Weight (k-lbs)	Weight blw/Jars (k-lbs)	String Weight (k-lbs)	Pick-Up Weight (k-lbs)	Slack-Off Weight (k-lbs)	Torque Max (ft-lbs)	Torque on bottom (ft-lbs)	Torque off bottom (ft-lbs)	BHA DESCRIPTION
1	163	35		51	52	50	4,300	4,000	2,500	BIT, BIT SUB, X/O, 9 7/8 STB, X/O, UBHO, MDC, X/O, 11 x DCs, X/O, 5 x HWDP=163.43m
2	255	31	26	125	145	113	7,500	7,000	4,200	BIT, BIT SUB, MDC, STB, DC, STB, 16xDCs, JAR, 3xDCs, 5xHWDP = 254.92m
3	246	30	25	125	145	115	7,500	7,000	4,200	BIT, BIT SUB, STB, DC, STB, 16xDCs, JAR, 3xDCs, 5xHWDP = 245.77m
4	249	35								DST Tools with 45m interval = 249.47m

903028 121

CROFT #1

Drilling Co.: OD&E

Rig : OD&E #30

RT above GL : 4 mtrs
GL above MSL : 52 mtrs

Lat : 38 deg 32 min 25.32 sec
Long : 142 deg 46 min 23.65 sec

Spud Date: 30/03/2001
Spud Time: 15:00:00

Release Date: 20/04/2001
Release Time: 20:00:00

BIT RECORD

DATE	BIT#	SIZE "	IADC	SER	MFR	TYPE	JETS	D.IN mtrs	D.OUT mtrs	MTRG	HRS IADC	SPP psi	FLW gpm	WOB k-lbs	RPM	MW ppg	TFA sq.in	VEL mps	HHP /sq"	ROP m/hr	I	O1	D	L	B	G	O2	R
31/03/2001	RR1	9.88	117	LY9255	SMITH	FGSS+2C	2x0,1x22	0	476	476	20.8	2018	470	8.6	110	8.8	0.371	132	0.00	22.9	2	2	WT	A	E	I	NO	TD
11/04/2001	2	6.75		S1C0272	OTHER	SPL419	4x11	476	2,529	2,053	181.1	1675	292	6.4	110	9.1	0.371	75	2.44	11.3	2	4	WT	A	X	I	WO	TD
12/04/2001	3RR	6.75	437	D85YU	HUGHES	STR09D	3x24	2,529	2,529	0	0.0	2700	325	0.0	70	9.5	1.326	24	0.28		1	2	WT	A	E	I	JD	LOG

903028 123 **Santos**

LEAK OFF TEST / FORMATION INTEGRITY TEST

WELL: CROFT #1 **RIG:** ODE #30 **DATE:** 03-Apr-01

CASING SIZE: 7 5/8 (inch) SANTOS SUPERVISOR: ALISTAIR CHOMLEY

A. MUD DENSITY IN USE:	8.6	(ppg)
B. HOLE DEPTH:	480	(m)
C. SHOE DEPTH:	471	(m)
D. FIT PRESSURE (GRAPH):	~~610~~ 660	(psi)
E. EQUIVALENT DENSITY: PRESSURE. (D) (psi) / SHOE DEPTH (C) m x 3.2808 x 0.052 + MUD DENSITY IN USE (A) (ppg)	16.2	(ppg) (EMW)
F. STABILIZED PRESSURE RECORDED:	500	(psi)
G. VOLUME PUMPED:	0.35	(bbl)
H. VOLUME REGAINED:	0.2	(bbl)

MAX. PRESSURE AT PUMP UNIT CALCULATION

DESIRED EMW=	15.5
MUD WT. IN USE	8.6
SHOE DEPTH (m)	471

*** UNIT PRESSURE FOR DESIRED EMW: **554**

CASING PRESS CHART

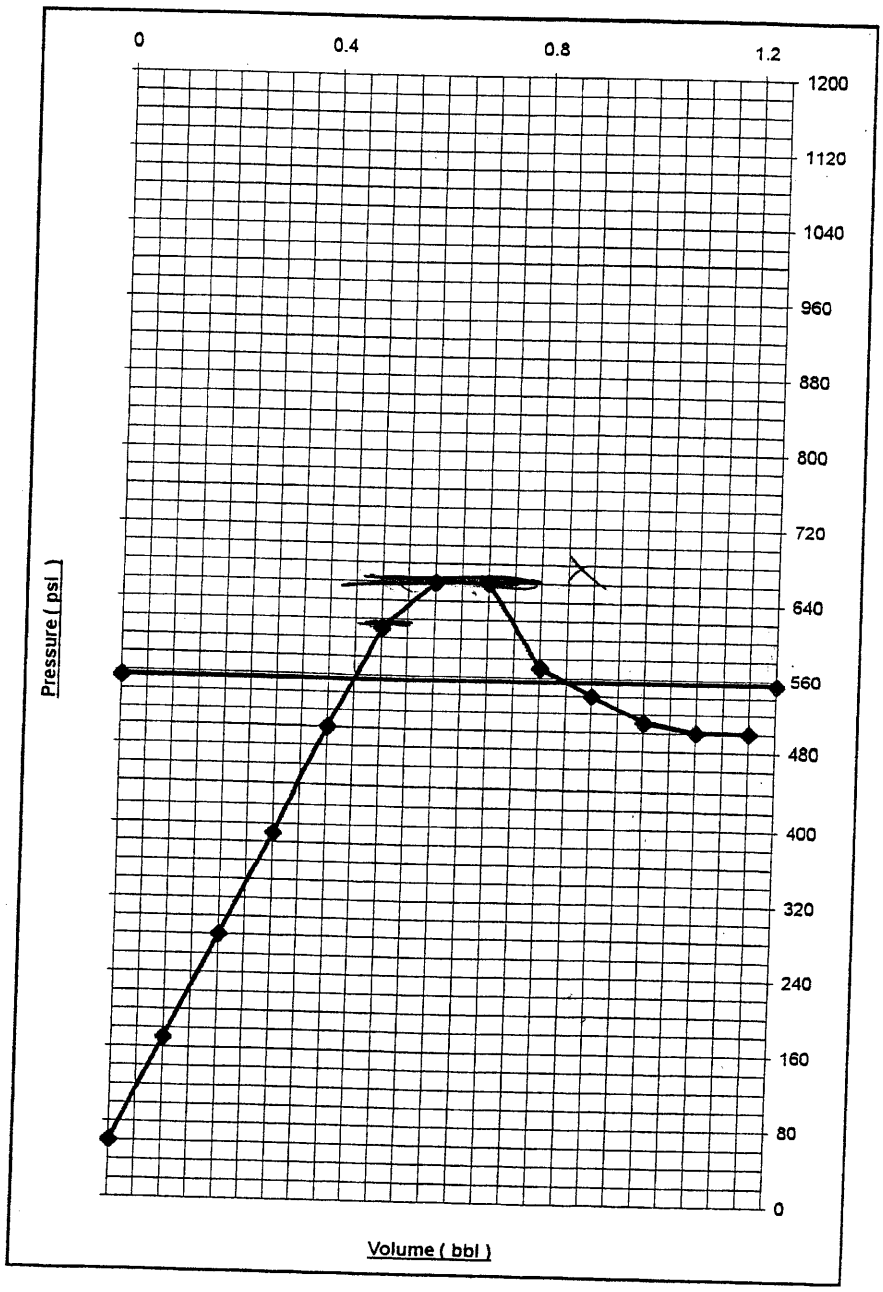
Volume (BBLS)	Pressure (psi)
0.1	
0.2	
0.3	
0.4	
0.5	
0.6	
0.7	
0.8	
0.9	
1	
1.1	
1.2	
1.3	
1.4	
1.5	
1.6	
1.7	
1.8	

OPEN HOLE LOT PRESS

Volume (BBLS)	Pressure (psi)	
0	60	
0.1	170	
0.2	280	
0.3	390	
0.4	500	
0.5	610	
0.6	660	I.S.I.P
0.7	660	1 min
0.8	570	2min
0.9	540	3 min
1	510	4 min
1.1	500	5 min
1.2	500	6 min
1.3		
1.4		
1.5		
1.6		
1.7		
1.8		

MAX PRESS

Volume (BBLS)	Pressure (psi)
0	554
1.25	554



Section 4.0

Casing and Cementing

- **Casing and Cementing Reports**
- **Wellhead Installation Report or**
- **Plug and Abandonment Report**

Santos

Santos Ltd

A.C.N. 007 550 923

CASING AND CEMENTING REPORT

Well Name: CROFT #1

FORM DQMS F-220 Rev.2

Casing type: X Surface casing | Intermediate Casing | Production Casing | Completion tubing

Originated by: ALISTAIR CHOMLEY **Checked by:** GEOFF COKER **Date:** 01-Apr-01

Hole Size: 9-7/8" **T.D.:** 476m MD **Date:** 01-Apr **Contractor:** Schlumberger

PRE-FLUSH 40 bbls. @ 8.4 ppg. **SPACER** 10 bbls@ 8.34 ppg.

Additives:

Water Source: CROFT #1 Water Bore Water Source: CROFT #1 Water Bore

CEMENT Mixwater: 80.5 bbls

LEAD SLURRY:	172	sacks Class	G	
Slurry Yield:	2.84	cu.ft./sack		
Mixwater Req't:	17.442	gal./sack		
Actual Slurry Pumped:	86.9	bbls @	11.5	ppg
Planned TOC:	0	m RT @	55	% o/g hole
Actual est. TOC:	0	m RT @		% o/g hole
TAIL SLURRY:	92	sacks Class	G	
Slurry Yield:	1.19	cu.ft./sack		
Mixwater Req't:	5.299	gal./sack		
Actual Slurry Pumped:	19.4	bbls @	15.6	ppg
Planned top tail:	379.6	m RT @	20	% o/g hole
Actual est. top tail:		m RT @		% o/g hole

ADDITIVES

Product	% or gps	Product	% or gps
D 020	4% BWOC		
S001 CaCl	1.5% BWOC		
D047	.01 gal/sx		
D145A	.05 gal/sx		
S001 CaCl	0.50%		
D047	.01 gal/sx		

DISPLACEMENT Fluid: 10bbl Water 59.8bbl Mud @ 9 ppg

Theoretical Displ.: 69.3 bbl. Bumped plug with 500 psi

Actual Displ. 69.8 bbl @ 5.5 bpm Pressure Tested to: 3000 psi

Displaced via RIG PUMP Bleed back: 0.5 bbls

ACTIVITY	Date	Time
Start Running csg.	1-Apr-01	6:30
Casing on Bottom	1-Apr-01	10:25
Start Circulation	1-Apr-01	10:30
Start Pressure Test	1-Apr-01	11:40
Pump Preflush	1-Apr-01	11:15
Start Mixing	1-Apr-01	11:50
Finish Mixing	1-Apr-01	12:25
Start Displacing	1-Apr-01	12:35
Stop Displ./Bump	1-Apr-01	12:35
Press. test	1-Apr-01	12:40

Returns to Surface: 160 bbls mud 13 bbls cmt.

Reciprocate / Rotate Casing: Reciprocate till plug bump.

Top Up Job run: Yes / No Yes 10 sx class G

Plug Set Make / Type: Weatherford Model-303 (FS), Model-402NP (FC)

Centraliser Placement, type/depth: Weatherford 468m, 458m, 442m, 415m, 17m.

Remarks:

No. JOINTS	SIZE OD	WT lb/ft	GRADE	THREAD	METER	FROM	TO
Stick Up at RT				(Enter as negative number-do not include stretch,RT = 0)	-0.87	-0.87	0.00
Rotary table to top of Bradenhead				(Enter for surface casing only)	4.70	0.00	4.70
Bradenhead : WG-22-L, 7-5/8"BTC x 9-5/8"BTC x 11"5K				(Enter for surface casing only)	0.72	4.70	5.42
Rotary table to top of cut jt				(Enter for int. or production casing only)			
1 Cut Jt							
38 Jts	7-5/8"	26.4	L80	BTC	441.40	5.42	446.82
Jts					0.00	446.82	446.82
marker					0.00	446.82	446.82
Jts					0.00	446.82	446.82
marker					0.00	446.82	446.82
Jts					0.00	446.82	446.82
Float Collar	W'ford Model-402NP			BTC	0.40	446.82	447.22
2 Jts	7-5/8"	26.4	L80	BTC	23.25	447.22	470.47
Float Shoe	W'ford Model-303			BTC	0.44	470.47	470.91

Total Jts Run	40
Jts On Location	42
Jts not run	2

Theoretical Bouyed wt of casing(klb):	32	Bradenhead Height above GL	0.00
Actual wt of casing (last joint run-block wt, klb)	30	Casing wt just prior to landing csg/	22
Landing WT (after cementing and pressure bleed off)	25	setting slips	(indicator wt - blocks = wt)

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Santos

Santos Ltd

A.C.N. 007 550 923

CASING & CEMENTING REPORT

Well Name: CROFT #1

FORM DQMS F-220

Casing type: ☐ Surface casing ☐ Intermediate Casing ☒ Production Casing ☐ Completion tubing

Originated by:	Alistair Chomley	**Checked by:**	Geoff Coker	**Date:**	20-Apr-2001
Hole Size:	6 3/4"	**T.D.:**	2529 mMD	**Date:**	20/04/2001
Contractor:	Schlumberger				

PRE-FLUSH 40 bbls. @ 8.5 ppg. **SPACER** 10 bbls@ 8.4 ppg.

Additives: Aldacide = 0.5 dr
S.A.P.P. = 8 lb/bbl

CEMENT

LEAD SLURRY:	488	sx class	G	
Slurry Yield:	2.85	cu.ft./sack		
Mixwater Req't:	17.518	gal./sack		
Actual Slurry Pumped:	248	bbls @	11.5	ppg

ADDITIVES	Product	%	Amount
	D066 Silica Flour	BWOC	lbs
	D020 Bentonite	5.00 BWOC	2294 lbs
	D167 UniFLAC	BWOC	lbs
	S001 Calc.Chloride	BWOC	lbs
	D110 Retarder	0.04 gal/sk	19.5 gal
	D047 Antifoam	0.01 gal/sk	4.9 gal

TAIL SLURRY:	329	sx class	G	
Slurry Yield:	1.15	cu.ft./sack		
Mixwater Req't:	5.074	gal./sack		
Actual Slurry Pumped:	71	bbls @	15.8	ppg

D066 Silica Flour	BWOC		lbs
D167 UniFLAC	BWOC		lbs
D080 Dispersant	0.05	gal/sk	16.5 gal
D153 Antisettling	BWOC		lbs
D110 Retarder	0.03	gal/sk	9.9 gal
D047 Antifoam	0.01	gal/sk	3.3 gal

DISPLACEMENT

Fluid: 2% KCL @ 8.6 ppg

Theoretical Displ.:	68.4	bbl.		Bumped plug with	2000 psi
Actual Displ.	68.5	bbl @	5 bpm	Pressure Tested to:	3000 psi
Displaced via	Rig / ~~Truck~~ Pump			Bleed back:	0.5 bbls

ACTIVITY	Time
Start Running csg.	12:30
Casing on Bottom	02:00
Start Circulation	02:05
Start Pressure Test	03:50
Pump Preflush	03:20
Start Mixing	04:03
Finish Mixing	05:15
Start Displacing	05:20
Stop Displ./Bump	05:42
Start Press. test	05:45

Returns to Surface: 197 bbls mud ____ bbls cmt.
Reciprocate / ~~Rotate~~ Casing: Reciprocate until string stuck with 50 bbls cement in annulus
Top Up Job run: Yes / No No sx class
Plug Set Make / Type: Davis-Lynch : Bottom + Ball + Top
Centraliser Placement, type/depth: Float & Shoe, 1 each 4th to 2166m, 1 each 3rd to 1971m, 1 at shoe 460m.

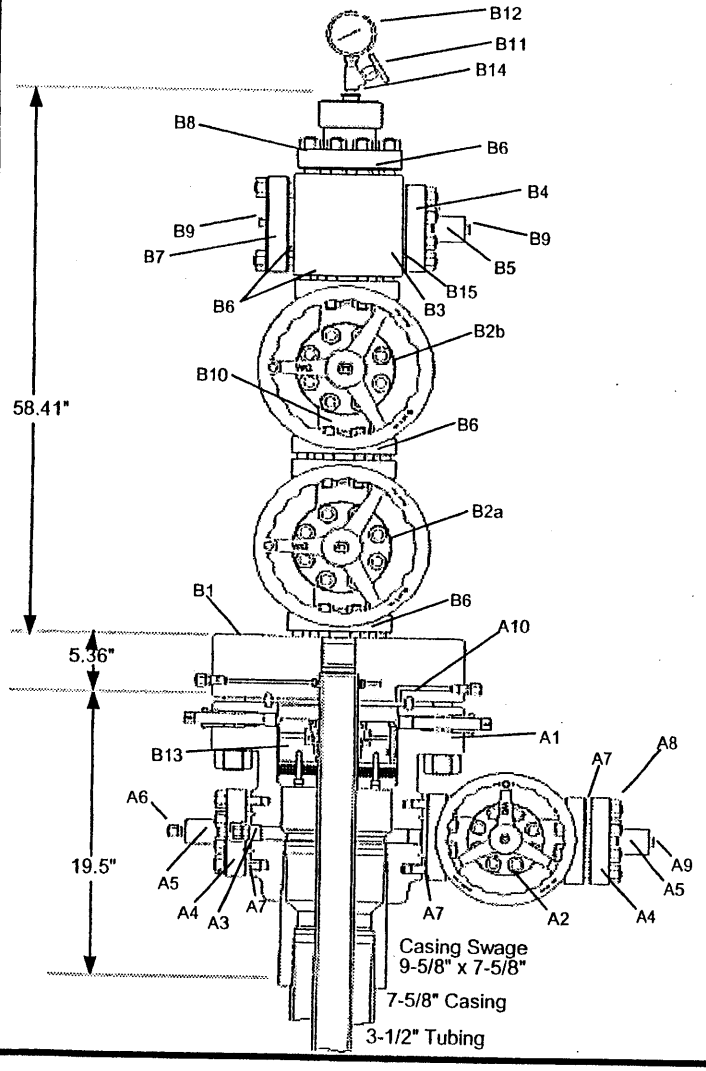
Remarks: **String became differentially stuck several times on second last joint run, and several times during preparation to circulate and M/U cement head.**

No. JOINTS	SIZE OD	WT lb/ft	GRADE	THREAD	MTS	FROM	TO
Stick Up (Enter as negative number)					-0.82	-0.82	
Rotary table to top of Bradenhead					4.70		4.70
~~Bradenhead~~ / ~~Tubing Hanger or~~ Slip and Seal				WG-22 11" x 3-1/2"		4.70	4.70
						4.70	4.70
						4.70	4.70
						4.70	4.70
						4.70	4.70
						4.70	4.70
Part Land Jt.	3.5	9.3	J55	New NK3SB	4.10	4.70	8.80
207 Jts	3.5	9.3	J55	New NK3SB	1991.34	8.80	2000.14
1 marker	3.5	9.3	J55	New NK3SB	3.01	2000.14	2003.15
41 Jts	3.5	9.3	J55	New NK3SB	394.46	2003.15	2397.61
Float Collar	3.5		P110	New NK3SB, Davis-Lynch	0.36	2397.61	2397.
1 Joint	3.5	9.3	J55	New NK3SB	9.62	2397.97	2407.59
Float Shoe	3.5		P110	New NK3SB, Davis-Lynch	0.41	2407.59	2408.00

Theoretical Bouyed wt of casing(klb):	63.000 klbs	Bradenhead Height above GL	m
Actual wt of casing (last joint run-block wt, klb)	65.000 klbs	Casing wt just prior to landing casing	115.000 klbs
Landing WT (after cementing and pressure bleed off)	65.000 klbs	setting slips (overpull)	50.000 klbs

FORM DQMS F-130	WELLHEAD INSTALLATION REPORT 2 STRING MONOBORE (7-5/8" SURFACE CASING)	Santos

Well : CROFT #1
Supervisor : Alistair Chomley
Date : 22-Apr-2001



COMPONENT	DESCRIPTION	No USED
A1. Casing Head	11" 5k x 7-5/8" 5k c/w BTC Box (WG-22-L, PSL-1, PR-2, AA, U)	1
A2. Gate Valve	2-1/16" 5k Model 2200 (Type 'FE', PSL-1, PR-1, BB, U)	1
A3. Plug	1-1/2" line pipe c/w 1-1/4" hex	1
A4. Companion Flange	2-1/16" 5k x 2" line pipe, (AA, U)	2
A5. Bull Plug	2" line pipe tapped c/w 1/2" NPT, XX-H	2
A6. Test Fitting	1/2" NPT	1
A7. Ring Gasket	RX-24 Stainless Steel	3
A8. Studs	7/8" x 6-1/4" long c/w nuts	8
A9. Pipe Plug	1/2" NPT male	1
A10. Ring Gasket	RX-54 Stainless Steel	1
B13. Slip & Seal Assy	11" x 3-1/2" (WG-22, PSL-1, PR-2, AA, U)	1
B1. Adaptor Flange	11" x 3-1/8" 5k, 3.5" P seal, 3" H BPV (WG-A4-P, PSL-1, CC, U)	1
B2a. Gate Valve	3-1/8" 5k Model 2200 (6A, PSL-2, PR-1, CC, PU, 410/NITRO)	1
B2b. Gate Valve	3-1/8" 5k Model 2200 (6A, PSL-1, PR-2, BB, U, AS/NITRO)	1
B3. Flow Cross	3-1/8" x 3-1/8" x 3-1/8" x 2-1/16" 5k (PSL-1, PR-2, CC, U)	1
B4. Companion Flange	2-1/16" 5k x 2" line pipe, (AA, U)	1
B5. Bull Plug	2" line pipe tapped c/w 1/2" NPT, XX-H	1
B6. Ring Gasket	RX-35 Stainless Steel	5
B7. Blind Flange	3-1/8" 5k tapped 1/2" NPT (CC, U)	1
B8. Tree Cap	3-1/8" 5k c/w Bowen union, 3.5" lift thread, tapped 1" NPT	1
B9. Pipe Plug	1/2" NPT male	1
B10. Studs	7-1/4" x 1-1/8" w/ nuts	8
B11. Needle Valve	1/2" NPT 5k Stainless Steel	0
B12. Pressure Gauge	1/2" NPT 0-5000psi	0
B14. Reducer	1" male x 1/2" female NPT Reducer	1
B15. Ring Gasket	RX-24 Stainless Steel	1
Notes:	3-1/2" Tubing stub cut off 3" above top flange on bradenhead.	
	1/2" NPT male Pipe plug fitted in lieu of Items B11 & B12 at this time.	

Section 5.0

Time Breakdown Data

- Overview
- Trouble Time Breakdown

CROFT #1

Drilling Co.: OD&E **Rig:** OD&E #30

RT above GL: 4 m
GL above MSL : 52 m

Lat : 38 deg 32 min 25.32 sec
Long : 142 deg 46 min 23.65 sec

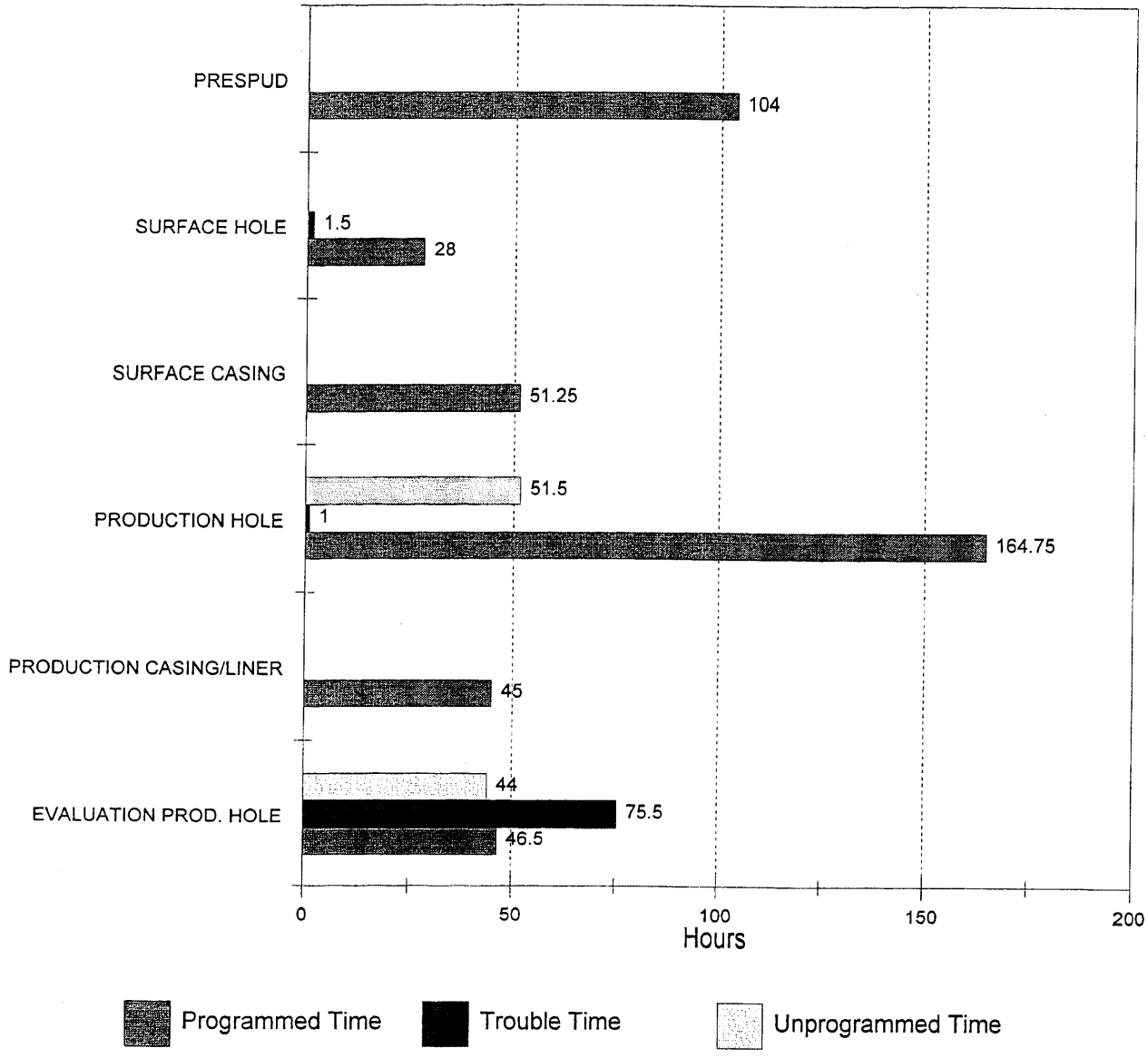
Spud Date: 30/03/2001
Spud Time: 15:00:00

Release Date: 20/04/2001
Release Time: 20:00:00

Time Breakdown by Phase
CROFT #1

TOTAL HRS ON WELL :	**613.00**
TOTAL PROGRAMMED HRS :	**439.50**
TOTAL TROUBLE HRS :	**78.00**
TOTAL UNPROGRAMMED HRS :	**95.50**

Programmed, Trouble and Unprogrammed hours per Phase



CODE	PHASE	PROG	TROUB	UNPROG
PS	PRESPUD	104.00		
SH	SURFACE HOLE	28.00	1.50	
SC	SURFACE CASING	51.25		
PH	PRODUCTION HOLE	164.75	1.00	51.50
PC	PRODUCTION CASING/LINER	45.00		
EP	EVALUATION PROD. HOLE	46.50	75.50	44.00

Well : CROFT #1 **Drilling Co : OD&E** **Rig : OD&E #30**

RT above GL: 4 m
GL above MSL : 52 m
Lat : 38 deg 32 min 25.32 sec
Long : 142 deg 46 min 23.65 sec
Spud Date: 30/03/2001
Spud Time: 15:00:00
Release Date: 20/04/2001
Release Time: 20:00:00

TIME BREAKDOWN DATABASE - single well overview

Spud date :	**30/03/2001**
TD Depth :	**2,529.0**
Final Depth :	**2,529.0**
Total Time (hrs) - Spud/Release :	**509.00**
Total Time (hrs) - Rig Move :	**0.00**
Total NPT (hrs) :	**78.00**

Time-Breakdown : Times by Class and Operation

Class	Hrs
PROGRAMMED EVENT	335.5
UNPROGRAMMED EVENT	95.5
TROUBLE - DURING PROGRAM	47.5
TROUBLE - DURING UNPROG	30.5

Operation	Hrs
DRILLING AHEAD	173.8
LOGGING	74.5
WIPER TRIP	66.5
CONTROL DRILL - DEV	42.5
TOT. CSG/CMT	36.3
N/U & TEST BOP's	28.5
DST	23.5
TOT. TRIPPING	14.0
LAY DOWN PIPE	12.0
SURVEY	12.0
CIRCULATE & CONDITION MUD	10.5
WELL-HEAD	5.5
SLIP/CUT DRILL LINE	3.5
RIG SERVICE	2.5
LOT / FIT	1.5
HEAD-UP FOR CMT OPS	1.0
RIG REPAIR	1.0

TIME BREAKDOWN DATABASE - single well overview

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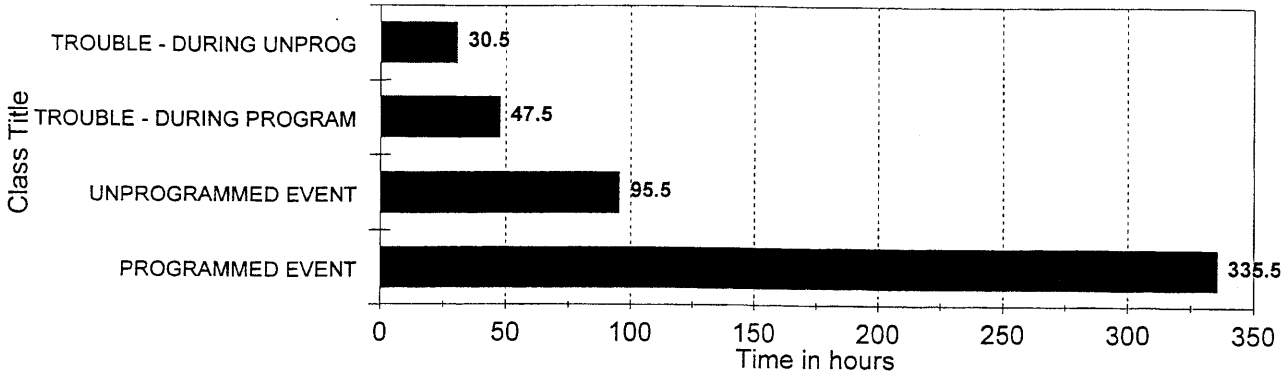
WELL : CROFT #1

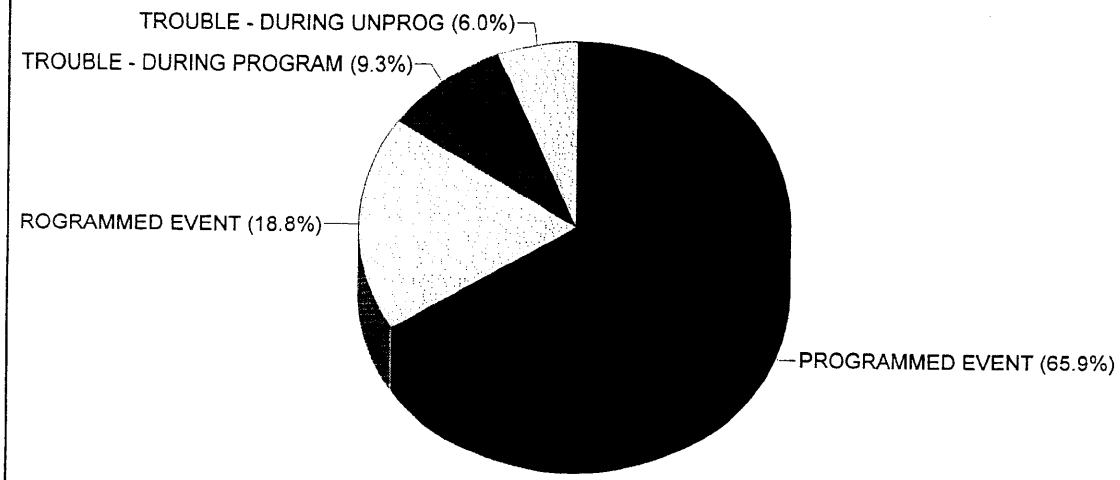
Pacesetter : none selected

Time Breakdown by Class Codes



Time Analysis by Class Codes

Class	Hrs
PROGRAMMED EVENT	335.5
UNPROGRAMMED EVENT	95.5
TROUBLE - DURING PROG	47.5
TROUBLE - DURING UNPR	30.5

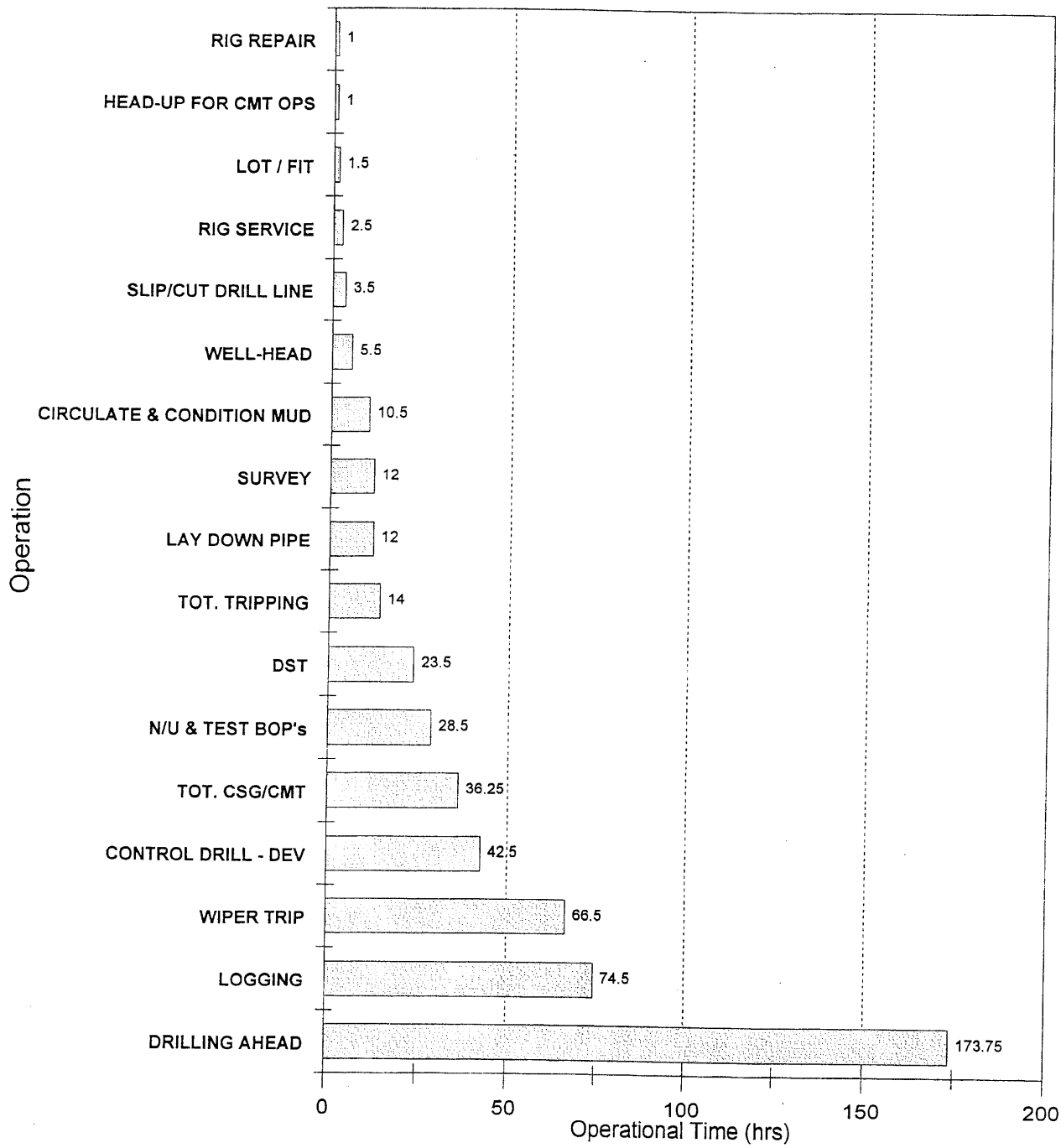


TIME BREAKDOWN DATABASE - single well overview

WELL : CROFT #1

Pacesetter : none selected

Time Breakdown by Operational Code



TIME BREAKDOWN DATABASE - single well overview

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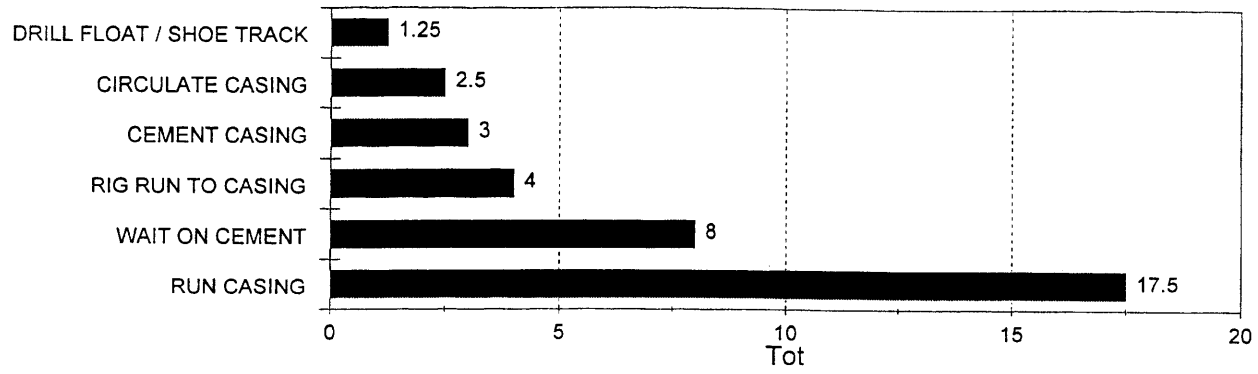
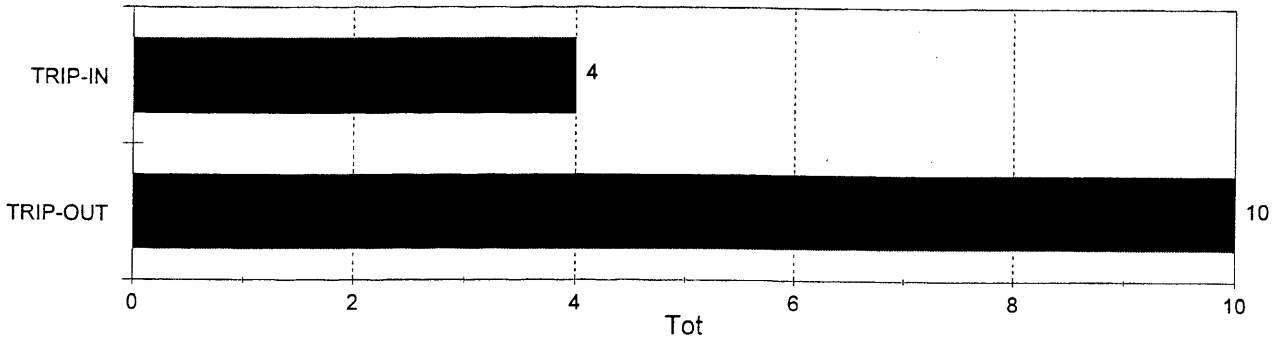
WELL : CROFT #1

Pacesetter : none selected

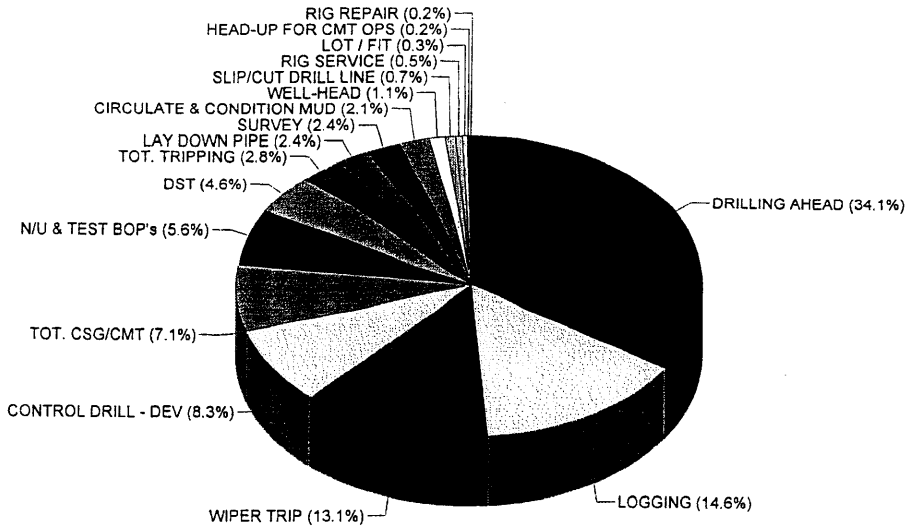
Breakdown of Total Csg & Cmtng Time



Breakdown of Total Tripping Time



Time Analysis by Operational Codes

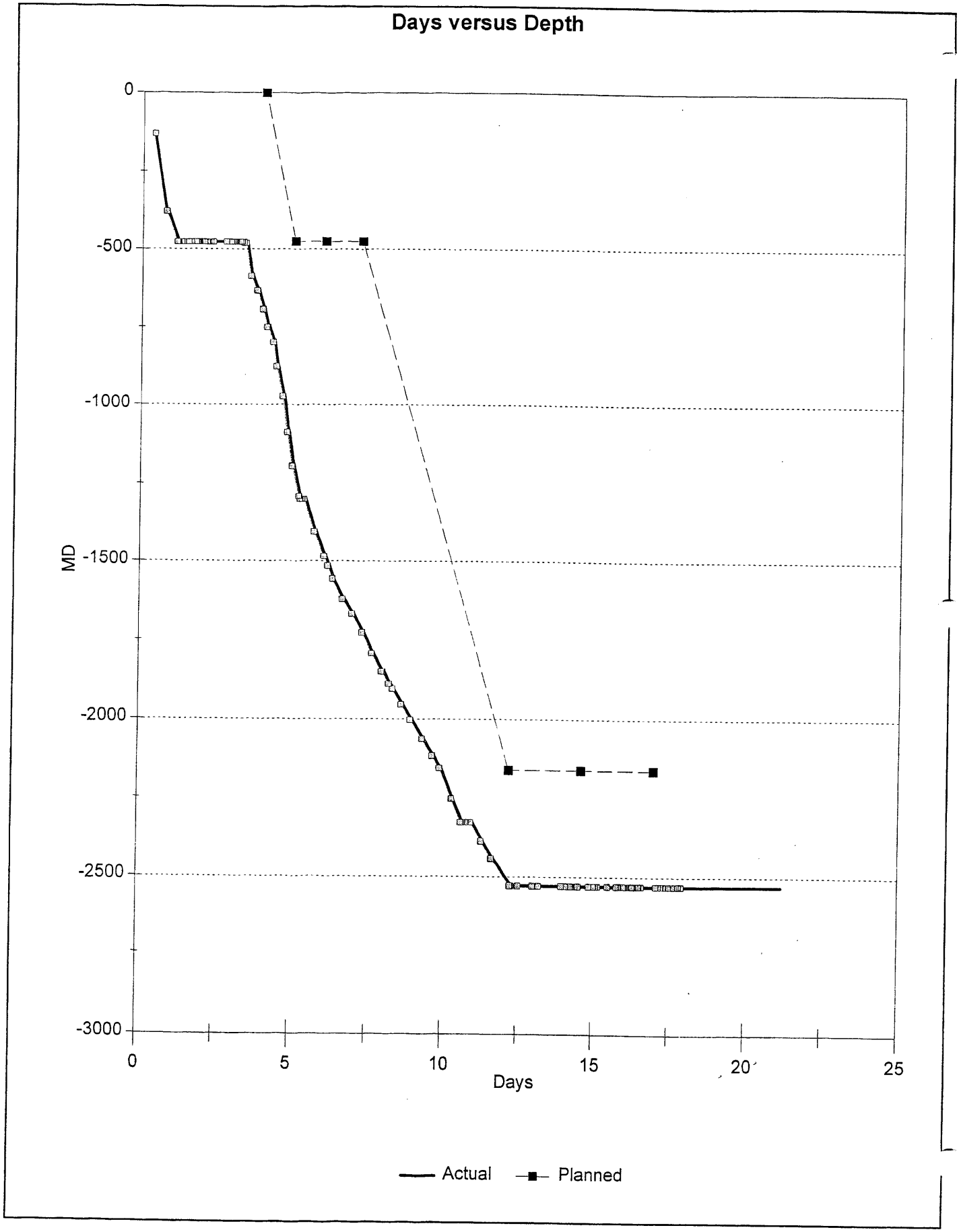


Operation	hrs
DRILLING AHEAD	173.8
LOGGING	74.5
WIPER TRIP	66.5
CONTROL DRILL - DE	42.5
TOT. CSG/CMT	36.3
N/U & TEST BOP's	28.5
DST	23.5
TOT. TRIPPING	14.0
LAY DOWN PIPE	12.0
SURVEY	12.0
CIRCULATE & CONDIT	10.5
WELL-HEAD	5.5
SLIP/CUT DRILL LINE	3.5
RIG SERVICE	2.5
LOT / FIT	1.5
HEAD-UP FOR CMT O	1.0
RIG REPAIR	1.0

TIME BREAKDOWN DATABASE - single well overview

WELL : CROFT #1

Pacesetter : none selected



CROFT #1

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Drilling Co.: OD&E **Rig :** OD&E #30

RT above GL: 4 m | Lat : 38 deg 32 min 25.32 sec | Spud Date: 30/03/2001 | Release Date: 20/04/2001
GL above MSL: 52 m | Long : 142 deg 46 min 23.65 sec | Spud Time: 15:00:00 | Release Time: 20:00:00

TIME BREAKDOWN DATABASE Non-Productive Time Analysis (NPT)

(Pre-Spud time excluded)

Total Time on Well (hrs)	**509.0**	**(days**	**21.21**	**Spud Date :**	**30/03/2001**
Total Trouble Time (hrs)	**78.0**	**(days**	**3.25**	**Total Depth :**	**2,529**
Trouble Time (%)	**15.32**	**)**		**Final Depth :**	**2,529**

Total NPT Hours per Phase

PHASE	HOURS
SURFACE HOLE	1.5
PRODUCTION HOLE	1.0
EVALUATION PROD. HOLE	46.0
EVALUATION PROD. HOLE	29.5

NPT during programmed time

DATE	PHS	OPERATION	NPT hrs	DEPTH m	DESCRIPTION OF PROGRAMMED TROUBLE TIME
31/03/2001	SH	CIRCULATE & CONDITION MUD	1.5	379	Clear obstruction from flow line that resulted in clay build up and blockage. Flush same.
12/04/2001	EP	LOGGING	4.5	2,529	Hold pre-job safety meeting, R/U Reeves logging and Run #1 Tools and RIH. Casing test tools and RIH to bridge at 1923m. Attempt to work thru -NoGo. POOH and R/D Reeves.
12/04/2001	EP	WIPER TRIP	1.5	2,529	L/O Monel DC and worn stb, M/U Bit #RR3 and BHA and RIH to shoe at 471m.
12/04/2001	EP	SLIP/CUT DRILL LINE	0.5	2,529	Slip drilling line.
12/04/2001	EP	WIPER TRIP	5.0	2,529	RIH from 471m to 1923m, work and ream stringer ledge, cont RIH pushing obstruction to 2500m.
12/04/2001	EP	WIPER TRIP	1.0	2,529	Wash & Ream from 2500m to TD 2529m.
12/04/2001	EP	CIRCULATE & CONDITION MUD	1.0	2,529	Circulate hole clean and low gas count. Flow check and pump pill.
12/04/2001	EP	WIPER TRIP	4.0	2,529	POOH wiper trip from 2529m and rack BHA.
13/04/2001	EP	WIPER TRIP	0.5	2,529	Cont. POOH wiper trip and rack BHA.
13/04/2001	EP	LOGGING	5.0	2,529	Reeves M/U Log tools Run #3 RFS and RIH. Tag obstruction at 1954m and work to 1984m. Full bridge off. Attempt to clear thru - NoGo. POOH for wiper trip, tool stuck at 603m. Attempt to work free -NoGo.
13/04/2001	EP	LOGGING	2.0	2,529	Hold safety meeting, rearrange Reeves Top Sheave, Fabricate "J" slotted side entry wire guide and RIH stripping over Reeves Wire to 180m.
14/04/2001	EP	LOGGING	2.0	2,529	Hold safety meeting with new crew and RIH stripping over Reeves Wire from 180m to tag top of tool at 594m and push until tool free at 615m. Reeves RIH to 635m.
14/04/2001	EP	LOGGING	2.0	2,529	Work pipe from 615m to 625m, POOH from 625m to 435m with Reeves tailing behind on each stand pulled. Reeves POOH to inside shoe at 465m. POOH pipe from 435m to surface. "T" bar wire, unthread from "J" slot guide.
14/04/2001	EP	LOGGING	1.5	2,529	Reeves function test tool -OK, POOH from 465m, L/O RFS tools and R/D. ***Nil Tool or wire damage.
14/04/2001	EP	WIPER TRIP	9.5	2,529	M/U Bit and BHA and RIH for wiper trip. Work any indications of hang up, work bridge at 1984m and chase obstruction to 2100m.(Triple work all stands in Belfast formation) Cont RIH and ream from 2509m to 2529m.
14/04/2001	EP	CIRCULATE & CONDITION MUD	1.5	2,529	Circulate hole clean and condition mud. Spot 5 x 3 bbl LCM sweeps. Flow check -Static. Pump pill and rack kelly.
14/04/2001	EP	WIPER TRIP	4.5	2,529	POOH Wiper trip from 2529m. (Hole slick but double work stands-shoe to 570m). Rack BHA.

NPT during unprogrammed time

DATE	PHS	OPERATION	NPT hrs	DEPTH m	DESCRIPTION OF UNPROGRAMMED TROUBLE TIME
11/04/2001	PH	RIG REPAIR	1.0	2,529	Circulate hole clean.- Investigate Weight Indicator failure)
14/04/2001	EP	WIPER TRIP	0.5	2,529	R/U Reeves and hold pre-job safety meeting.
14/04/2001	EP	LOGGING	2.5	2,529	Reeves M/U Log Run #3 AST and RIH.
15/04/2001	EP	LOGGING	2.0	2,529	Reeves RIH Log Run #3 AST to unpassable hole at 1996m. (Belfast formation) POOH.
15/04/2001	EP	LOGGING	3.0	2,529	Reeves M/U Run #5 - DIPMETER and RIH to bridge at 795m. Attempt to work through -NoGo. POOH.
15/04/2001	EP	LOGGING	1.0	2,529	Reeves M/U Log Run #6 - SCG Side Wall Cores and RIH.
16/04/2001	EP	LOGGING	1.5	2,529	Reeves RIH Log Run #6 - SCG Side Wall Cores to bridge at 795m, attempt to work through -NoGo. POOH and R/D Reeves and clear rig floor.
16/04/2001	EP	WIPER TRIP	1.5	2,529	M/U Bit and RIH wiper trip to shoe at 471m.
16/04/2001	EP	SLIP/CUT DRILL LINE	1.0	2,529	Slip & Cut Drilling Line.
16/04/2001	EP	WIPER TRIP	5.0	2,529	Cont. RIH wiper trip from shoe at 471m. (Nil indications at 795m) and cont RIH washing last single to TD 2529m.
16/04/2001	EP	CIRCULATE & CONDITION MUD	1.0	2,529	Circulate hole clean and low gas.

[redacted]

RT above GL: 4 m Lat : 38 deg 32 min 25.32 sec Spud Date: 30/03/2001 Release Date: 20/04/2001
GL above MSL: 52 m Long : 142 deg 46 min 23.65 sec Spud Time: 15:00:00 Release Time: 20:00:00

TIME BREAKDOWN DATABASE Non-Productive Time Analysis (NPT)

(Pre-Spud time excluded)

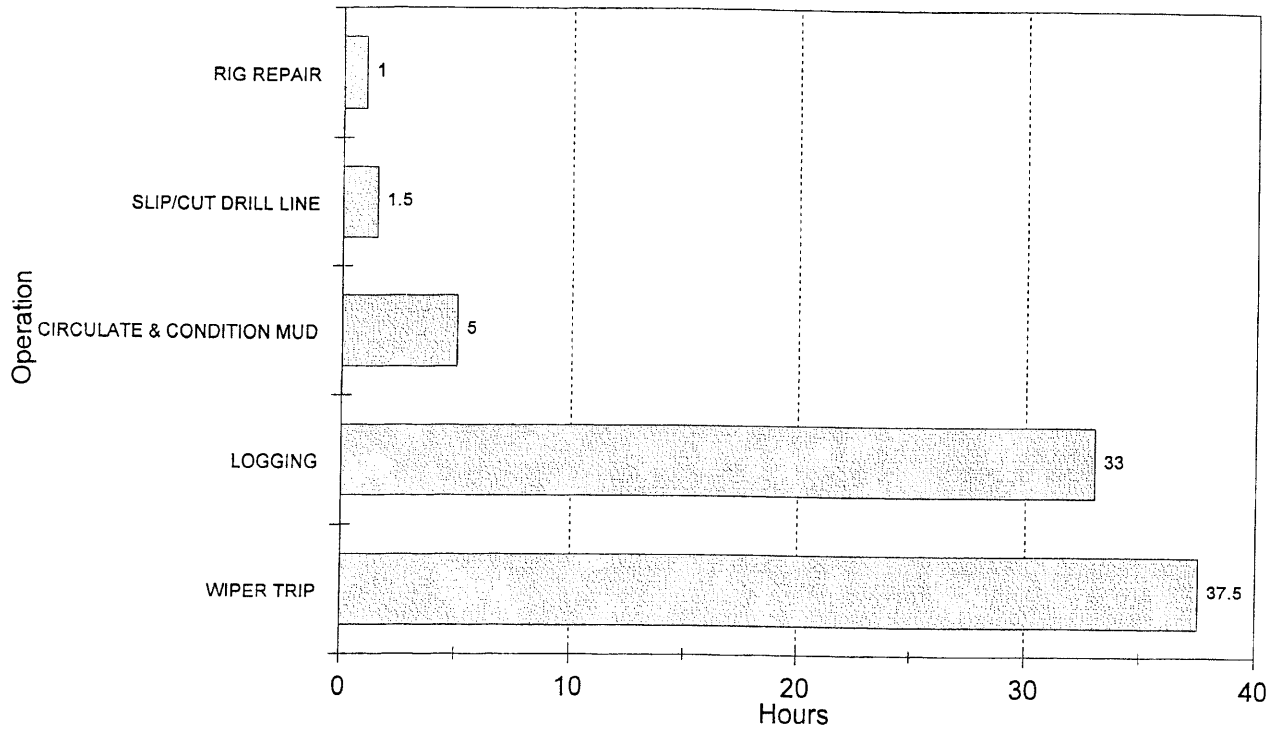
DATE	PHS	OPERATION	NPT hrs	DEPTH m	DESCRIPTION OF UNPROGRAMMED TROUBLE TIME
16/04/2001	EP	WIPER TRIP	4.5	2,529	Flow check, pump pill and POOH wiper trip from 2529m. Rack BHA.
16/04/2001	EP	LOGGING	6.0	2,529	Reeves R/U and M/U tools - Dipmeter and RIH to bridge at 1923m. Attempt to work through -NoGo. POOH and L/O tools. Abort Side Wall Core run.

RT above GL: 4 m
GL above MSL: 52 m
Lat : 38 deg 32 min 25.32 sec
Long : 142 deg 46 min 23.65 sec
Spud Date: 30/03/2001
Spud Time: 15:00:00
Release Date: 20/04/2001
Release Time: 20:00:00

TIME BREAKDOWN DATABASE Non-Productive Time Analysis (NPT)

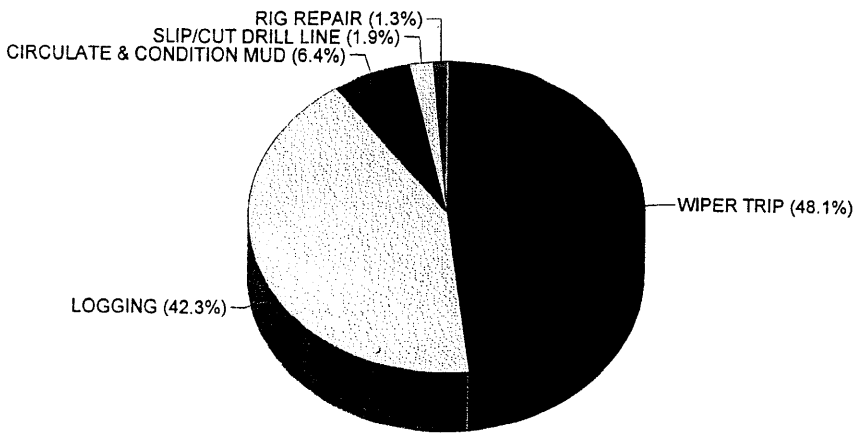
(Pre-Spud time excluded)

Trouble Drilling by Operational Code



Trouble Drilling by Operational Code

OPERATION	HRS
WIPER TRIP	37.5
LOGGING	33.0
CIRCULATE & CONDITION MUD	5.0
SLIP/CUT DRILL LINE	1.5
RIG REPAIR	1.0



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TIME BREAKDOWN DATABASE - Unprogrammed Time Analysis

WELL :	CROFT #1
Drilling Co :	OD&E
Rig :	OD&E #30
Spud Date :	09/04/2001
Total Unprogrammed Time on Well	126.00
Total Unprogrammed Trouble Time	30.50
% Unprogrammed Trouble Time	24.21

Unprogrammed time (Productive)

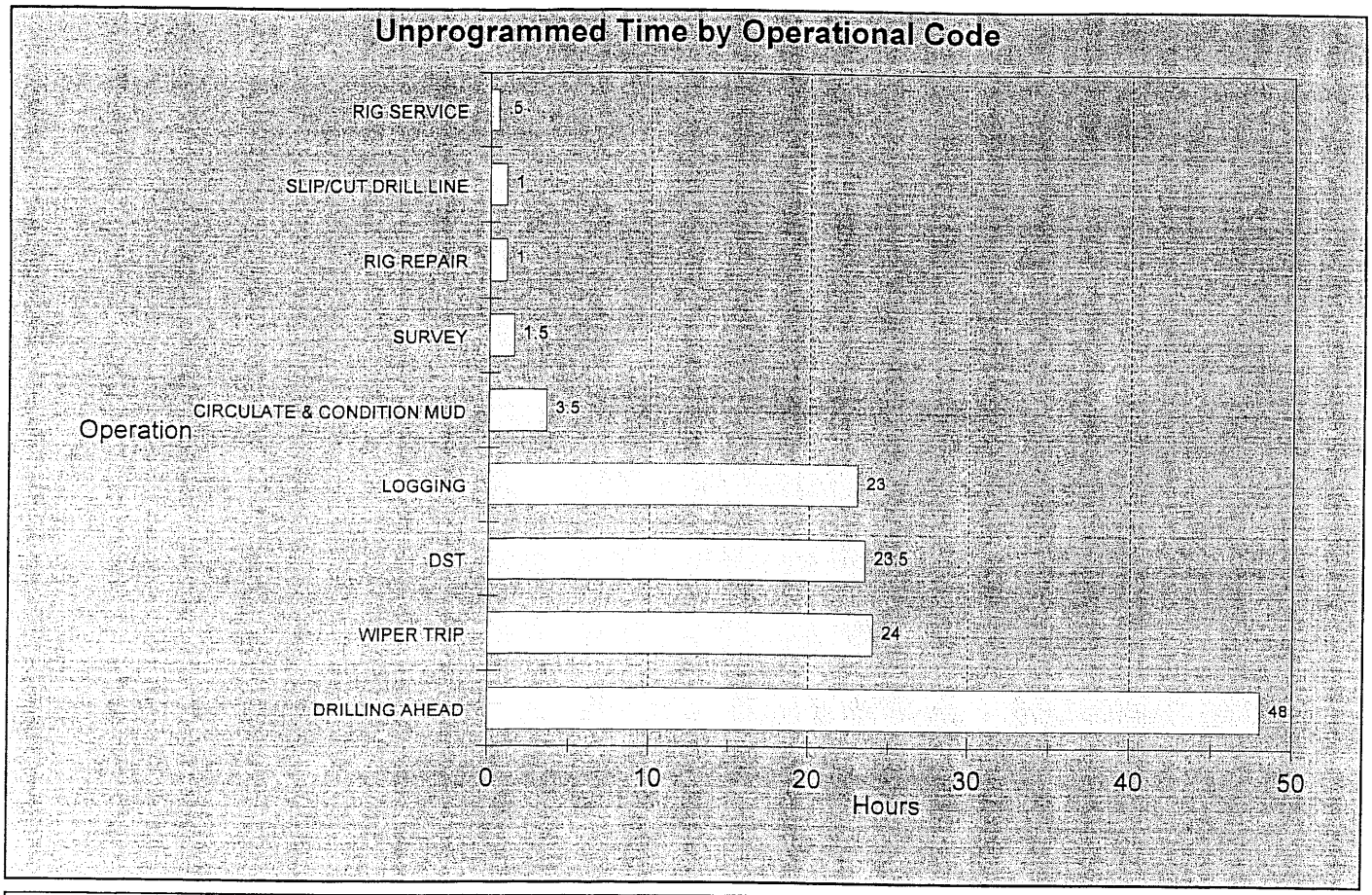
PHASE	OPERATION	NPT Hrs	DEPTH	DESCRIPTION OF UNPROGRAMMED PRODUCTIVE TIME
PH	CIRCULATE & CONDITION MU	0.50	2,156.0	Circulate, - TD of well extended.
PH	DRILLING AHEAD	9.50	2,253.0	Drill 6 3/4" hole from provisional TD 2156m to 2253m.
PH	DRILLING AHEAD	7.50	2,328.0	Drill 6 3/4" hole from 2253m to 2328m. (Gas of 40% from 2294 - 2297m)
PH	CIRCULATE & CONDITION MU	1.00	2,328.0	Circulate hole clean, flow check - static. Pump pill.
PH	SURVEY	0.50	2,328.0	Survey at 2310m - 6.25 deg Inc 197 deg Az.
PH	DRILLING AHEAD	8.50	2,388.0	Drill 6 3/4" hole from 2328m to 2388m.
PH	DRILLING AHEAD	8.00	2,443.0	Drill 6 3/4" hole from 2388m to 2443m.
PH	RIG SERVICE	0.50	2,443.0	Service Rig.
PH	DRILLING AHEAD	14.50	2,529.0	Drill 6 3/4" hole from 2443m to 2529m. (Weight indicator failure at 2520m - investigate same)
PH	SURVEY	1.00	2,529.0	survey at 2511m - 7 deg Inc 214 deg Az.
EP	WIPER TRIP	3.50	2,529.0	M/U Bit #3RR4 and RIH wiper trip to 1800m.
EP	WIPER TRIP	4.00	2,529.0	Cont. RIH Wiper trip from 1800m to obstruction at 1920m and work clean. Work each stand twice from 1920m to top of fill at 2520m.
EP	CIRCULATE & CONDITION MU	1.00	2,529.0	Circulate hole clean and low gas. Condition mud and build volume. Flow check - static. Pump pill.
EP	WIPER TRIP	5.00	2,529.0	POOH wiper trip from 2520m, rack BHA as per DST requirements, break bit and L/O stbs. Clear rig floor.
EP	DST	8.50	2,529.0	Safety meeting and M/U Tools DST #1 for interval 2287m - 2332m (Drillers Depth) and RIH filling for 746m water cushion. Cont. RIH to 2336m.
EP	DST	3.50	2,529.0	R/U Reeves and RIH. Correlate string on depth with a 1.2m down correction. POOH and R/D.
EP	DST	2.00	2,529.0	R/U Baker Oiltools pressure head, lines and manifold. Pressure test. Inflate packers, hold safety meeting. Test seat and attempt to open tool - Slippage. Reinflate and test seat- NoGo.
EP	DST	1.50	2,529.0	Attempt to reinflate packers, test seat - free string movement. Drop bar and reverse circulate string to 9.6ppg mud. Nil indications of contamination. R/D Baker Oiltools head and manifold.
EP	DST	8.00	2,529.0	Flow check - Static. Pump pill and POOH with DST tools from 2336m and L/O and inspect tools. Full recovery.
EP	LOGGING	7.00	2,529.0	R/U Reeves, hold Radio Silence / Explosives safety meeting, M/U Tools Run #8 Side Wall Cores and RIH to 2508m. taking 48 samples to 1985m (Eumerella - Waarre Formation) POOH and Rig Down.

Unprogrammed time (NPT)

PHASE	OPERATION	NPT hrs	DEPTH	DESCRIPTION OF UNPROGRAMMED TROUBLE TIME
PH	RIG REPAIR	1.00	2,529.00	Circulate hole clean.- Investigate Weight Indicator failure)
EP	WIPER TRIP	0.50	2,529.00	R/U Reeves and hold pre-job safety meeting.
EP	LOGGING	2.50	2,529.00	Reeves M/U Log Run #3 AST and RIH.
EP	LOGGING	2.00	2,529.00	Reeves RIH Log Run #3 AST to unpassable hole at 1996m. (Belfast formation) POOH.
EP	LOGGING	3.00	2,529.00	Reeves M/U Run #5 - DIPMETER and RIH to bridge at 795m. Attempt to work through -NoGo. POOH.
EP	LOGGING	1.00	2,529.00	Reeves M/U Log Run #6 - SCG Side Wall Cores and RIH.
EP	LOGGING	1.50	2,529.00	Reeves RIH Log Run #6 - SCG Side Wall Cores to bridge at 795m, attempt to work through -NoGo. POOH and R/D Reeves and clear rig floor.
EP	WIPER TRIP	1.50	2,529.00	M/U Bit and RIH wiper trip to shoe at 471m.
EP	SLIP/CUT DRILL LINE	1.00	2,529.00	Slip & Cut Drilling Line.
EP	WIPER TRIP	5.00	2,529.00	Cont. RIH wiper trip from shoe at 471m. (Nil indications at 795m) and cont RIH washing last single to TD 2529m.
EP	CIRCULATE & CONDITION MU	1.00	2,529.00	Circulate hole clean and low gas.
EP	WIPER TRIP	4.50	2,529.00	Flow check, pump pill and POOH wiper trip from 2529m. Rack BHA.
EP	LOGGING	6.00	2,529.00	Reeves R/U and M/U tools - Dipmeter and RIH to bridge at 1923m. Attempt to work through -NoGo. POOH and L/O tools. Abort Side Wall Core run.

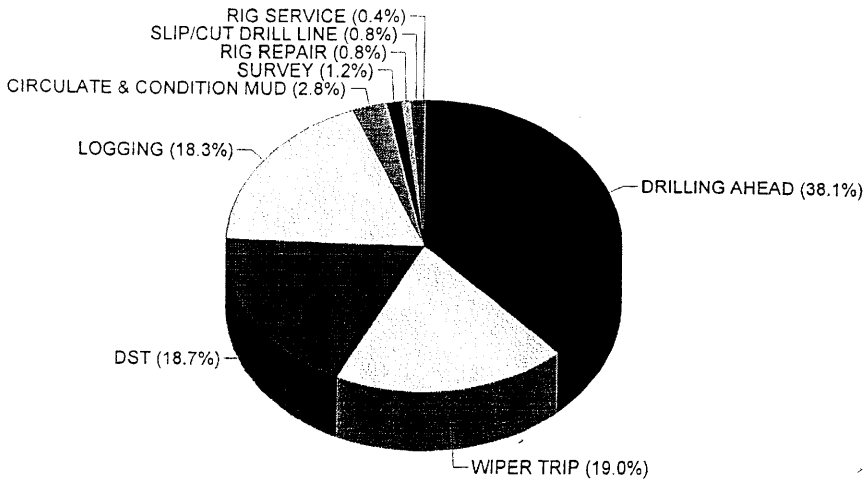
WELL : CROFT #1

903028 13J



Unprogrammed Time by Operational Code

OPERATION	HRS
DRILLING AHEAD	48.00
WIPER TRIP	24.00
DST	23.50
LOGGING	23.00
CIRCULATE & CONDITION MUD	3.50
SURVEY	1.50
RIG REPAIR	1.00
SLIP/CUT DRILL LINE	1.00
RIG SERVICE	0.50



Section 6.0

Survey Data
- IDS Survey Report

CROFT #1

Drilling Co.: OD&E **Rig:** OD&E #30

RT above GL: 4 m Lat : 38 deg 32 min 25.32 sec Spud Date: 30/03/2001 Release Date: 20/04/2001
GL above MSL : 52 m Long : 142 deg 46 min 23.65 sec Spud Time: 15:00:00 Release Time: 20:00:00
Magnetic Declination (degs): 12.00
Projection:

DEVIATION SURVEY

MD (m)	TVD (m)	INCL (deg)	AZIMUTH (deg)	CORRECT. AZ (deg)	DOGLEG (deg/30m)	'V' SECT (m)	N/S (m)	E/W (m)	CLOSURE (m)
52	52	0.75	58	70	0.4	0	0	0	0
88	88	0.75	110	122	0.6	0	0	1	1
126	126	1.25	132	144	0.5	-0	-0	1	1
201	201	1.50	155	167	0.2	-2	-2	2	3
288	288	2.50	167	179	0.4	-5	-5	2	5
388	388	3.50	171	183	0.3	-10	-10	2	10
425	425	4.50	176	188	0.9	-13	-13	2	13
454	454	5.00	176	188	0.5	-15	-15	1	15
578	577	4.50	173	185	0.1	-25	-25	0	25
625	624	3.00	178	190	1.0	-28	-28	-0	28
684	683	1.50	194	206	0.8	-31	-31	-1	31
741	740	1.10	210	222	0.3	-32	-32	-1	32
789	788	0.25	215	227	0.5	-32	-32	-2	32
867	866	0.38	105	117	0.2	-32	-32	-2	32
963	962	0.10	150	162	0.1	-33	-33	-1	33
1,078	1,077	0.30	100	112	0.1	-33	-33	-1	33
1,185	1,184	1.00	150	162	0.2	-34	-34	-0	34
1,281	1,280	1.10	200	212	0.3	-35	-35	-1	35
1,396	1,395	0.90	218	230	0.1	-37	-37	-2	37
1,504	1,503	1.10	224	236	0.1	-38	-38	-4	38
1,611	1,610	2.25	225	237	0.3	-40	-40	-6	40
1,658	1,657	1.00	264	276	1.0	-40	-40	-7	41
1,716	1,715	0.90	287	299	0.2	-40	-40	-8	41
1,784	1,783	2.30	230	242	0.9	-40	-40	-10	41
1,842	1,841	2.80	227	239	0.3	-42	-42	-12	43
1,880	1,879	2.25	233	245	0.5	-43	-42	-14	44
1,946	1,945	1.10	200	212	0.7	-44	-43	-15	46
1,994	1,993	2.00	215	227	0.6	-45	-44	-16	47
2,310	2,308	6.25	185	197	0.4	-65	-65	-25	69
2,511	2,508	7.00	214	226	0.5	-84	-84	-37	91

CROFT #1

Drilling Co.: OD&E **Rig:** OD&E #30

RT above GL: 4 m Lat : 38 deg 32 min 25.32 sec Spud Date: 30/03/2001 Release Date: 20/04/2001
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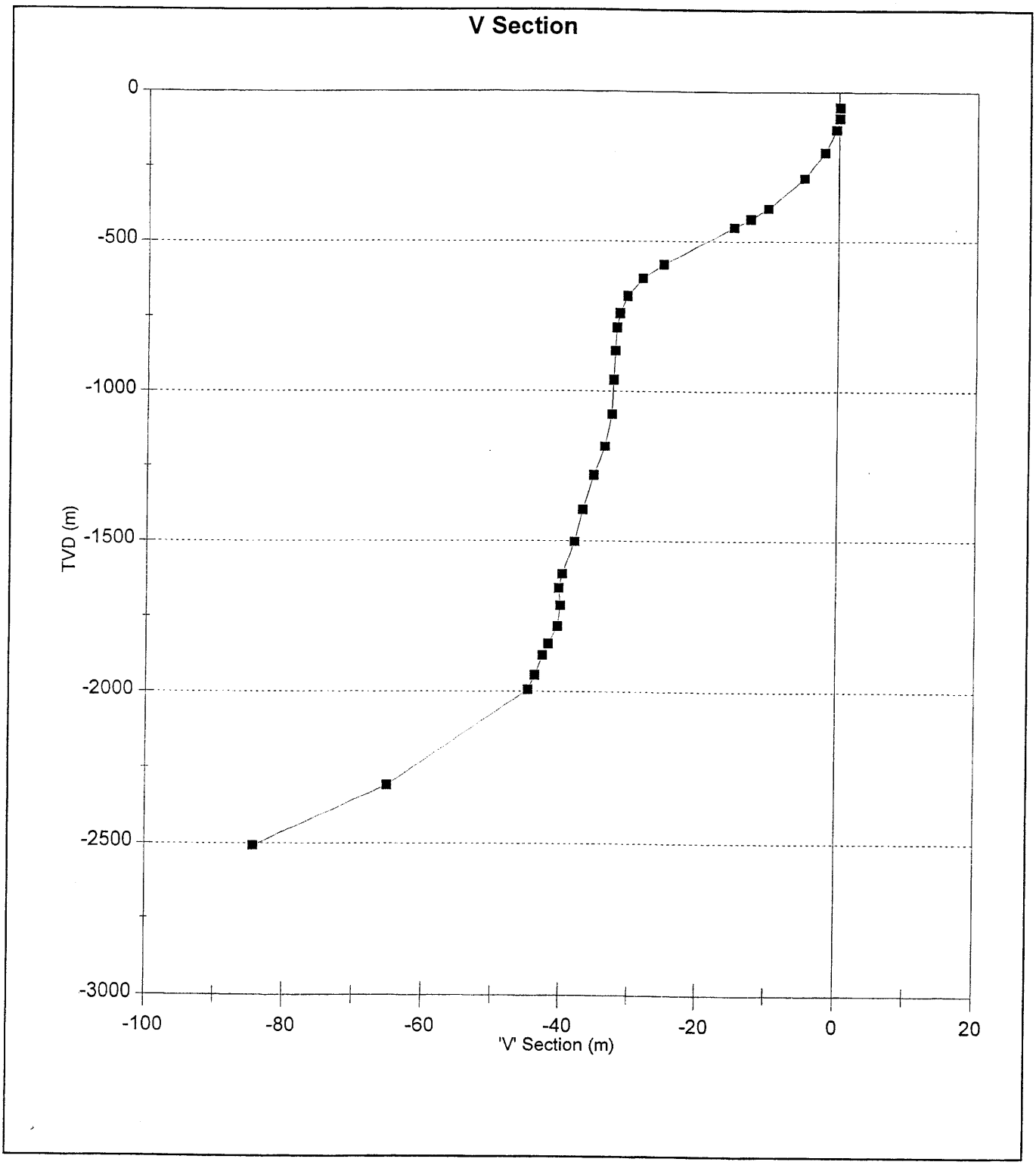
DEVIATION SURVEY



Section 7.0

Well Cost Information

- Well Phase Cost Summary

This is Page Number **908028_144X**

This is an enclosure indicator page.

The page that follows this page is an uncatalogued fold-out with page number:

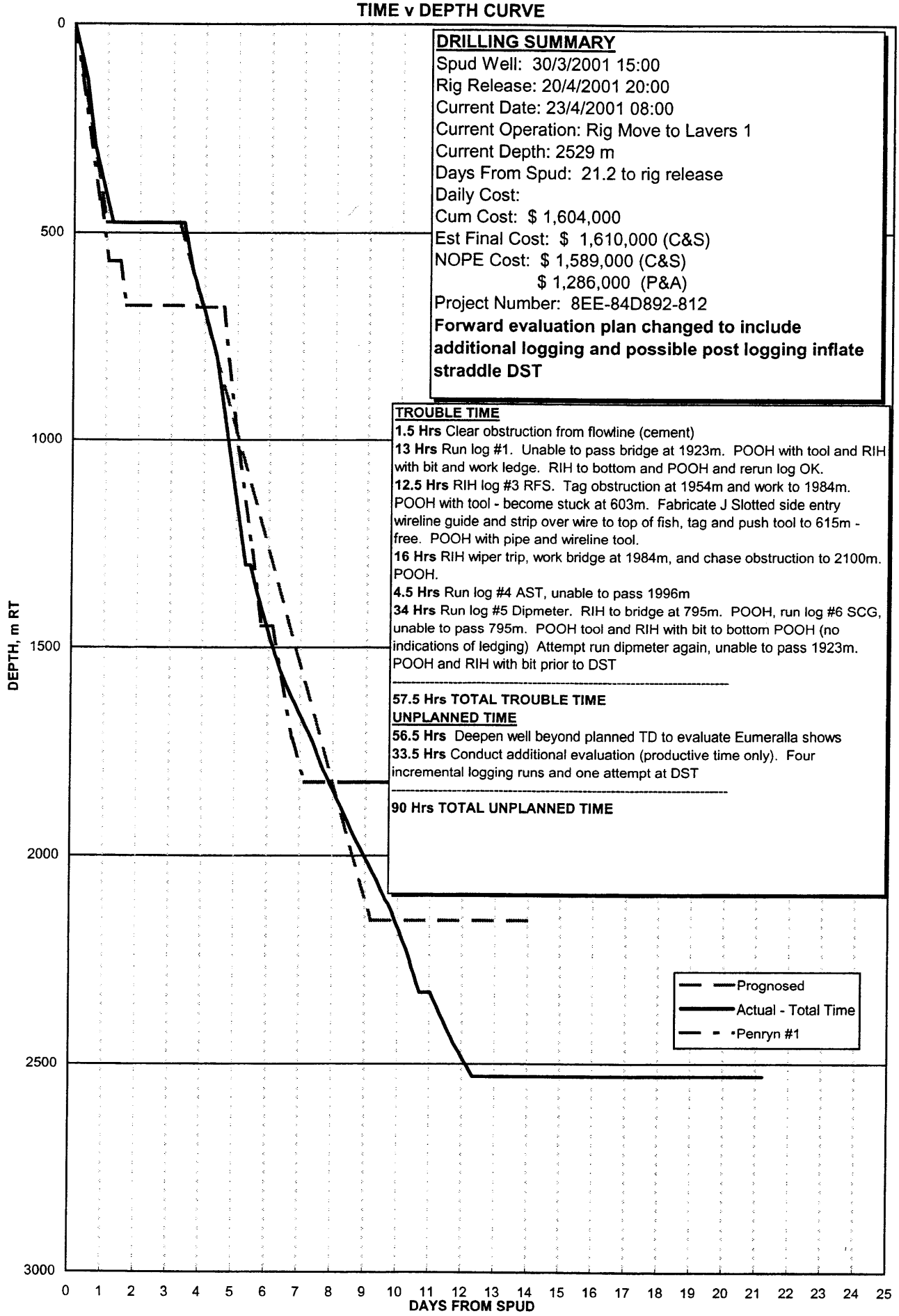
908028_144Y

and is enclosed within the document PE908028 at this page.

903028 144Y

WELL:	Croft 1	DAILY DRILLING COST TRACKING SHEET												
TYPE:	Gas Exploration Monobore	Total Cum Costs	$0	$479,650	$515,156	$649,688			$980,700	$1,377,734	$1,604,316	$501,050		
RIG:	OD&E 30	Phase Variance	-$15,036	$101,721	$13,205	$4,826			$21,049	-$265,942	$105,330	$43,856		
	Start Date/Time of Phase		26/03/2001 07:00	26/03/2001 07:00	30/03/2001 15:00	31/03/2001 20:30	00/01/1900 00:00	00/01/1900 00:00	02/04/2001 23:45	12/04/2001 00:00	18/04/2001 16:30	30/03/2001 15:00	00/01/1900 00:00	00/01/1900 00:00
	End of Phase Date/Time		20/04/2001 20:00	30/03/2001 15:00	31/03/2001 20:30	02/04/2001 23:45	00/01/1900 00:00	00/01/1900 00:00	12/04/2001 00:00	18/04/2001 16:30	20/04/2001 20:00	12/04/2001 00:00	00/01/1900 00:00	00/01/1900 00:00
	Actual Time for Each Phase (days)		613:00 hrs	104:00 hrs	29:30 hrs	51:15 hrs			216:15 hrs	160:30 hrs	51:30 hrs	297:00 hrs		
	End of Phase Depth		2,529 ft		476 ft		0 ft		2,529 ft	2,529 ft				
Account #	DESCRIPTION	NOPE ($A)	C&S TOTAL ($A)	PreSpud ($A)	Top hole ($A)	Surface Casing ($A)	Intermediate Hole ($A)	Intermediate Casing ($A)	Prod Hole ($A)	2,529 ft Total Evaluation ($A)	Prod.Casing ($A)	Spud to TD drilling ONLY	P&A ($A)	Completion ($A)
	IN-HOUSE & LABOUR COSTS		Day 25.54	Day 4.33	Day 5.56	Day 7.70			Day 9.01	Day 6.69	Day 25.54	Day 12.38		
TOTAL: 001	001 For SA only:	$62,000	$62,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
812-224 / 001	Drilling Time costs-Office & Field	$50,000	$30,000	$30,000	$0	$0.00			$0	$0.00	$0.00	$0	$0	$0
880 / 001	Operations Geology-Time Costs	$12,000	$5,000	$5,000	$0	$0.00			$0	$0.00	$0.00	$0	$0	$0
218 / 001	Petroleum Development-Time Costs	$0	$12,000	$12,000	$0	$0.00			$0	$0.00	$0.00	$0	$0	$0
225 / 001	Exploration-Time Costs	$0	$15,000	$15,000	$0	$0.00			$0	$0.00	$0.00	$0	$0	$0
226 / 001	Drafting-Time Costs	$0	$0	$0	$0	$0.00			$0	$0.00	$0.00	$0	$0	$0
242 / 001	Jackson Field Services-Time Costs	$0	$0	$0	$0	$0.00			$0	$0.00	$0.00	$0	$0	$0
620	Overheads	$52,000	$25,000	$25,000	$0	$0.00			$0	$0.00	$0.00	$0	$0	$0
012	Australian travel and Accommodation	$5,000	$5,000	$5,000	$0	$0.00			$0	$0.00	$0.00	$0	$0	$0
072	Data Reproduction	$500	$500	$500	$0	$0.00			$0	$0.00	$0.00	$0	$0	$0
183	Insurance	$2,000	$0	$0	$0	$0.00			$0	$0.00	$0.00	$0	$0	$0
556	Camp Accomodation	$2,000	$2,000	$2,000	$0	$0.00			$0	$0.00	$0.00	$0	$0	$0
554	Alloc\Recovery-Field Support	$10,000	$2,000	$2,000	$0	$0.00			$0	$0.00	$0.00	$0	$0	$0
558	Flights Allocation (to/from) Field	$5,000	$5,000	$5,000	$0	$0.00			$0	$0.00	$0.00	$0	$0	$0
		$138,500	$101,500	$101,500	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	DRILLING COSTS													
301	Rig Rate	$260,400	$394,475	$0	$22,862	$39,719			$167,594	$124,388	$39,913	$230,175	$0	$0
301	Rig Extras (Drilling Tools)	$0	$0	$0	$0	$0			$0	$0	$0	$0	$0	$0
303	Mob/Demob	$108,000	$64,800	$64,800	$0	$0			$0	$0	$0	$0	$0	$0
304	Rig Move	$112,000	$128,750	$128,750	$0	$0			$0	$0	$0	$0	$0	$0
381	Misc Drilling Contractor Charges	$21,800	$33,940	$21,517	$430	$747			$3,154	$7,341	$751	$4,331	$0	$0
390	Wet Weather Standby	$0	$0	$0	$0	$0			$0	$0	$0	$0	$0	$0
		$502,200	$621,965	$215,067	$23,293	$40,466	$0	$0	$170,747	$131,728	$40,664	$234,506	$0	$0
	LOGISTICS													
329	Water Source & Supply/Haulage	$16,956	$5,450	$5,000	$0	$0			$300	$150	$0	$300	$0	$0
331	Access & Lease Preparation	$111,200	$70,989	$70,989	$0	$0			$0	$0	$0	$0	$0	$0
332	Lease Clean Up	$18,889	$19,000	$19,000	$0	$0			$0	$0	$0	$0	$0	$0
391	Lease Maintenance	$0	$0	$0	$0	$0			$0	$0	$0	$0	$0	$0
502/501	Air Charter Flights	$0	$0	$0	$0	$0			$0	$0	$0	$0	$0	$0
600	Transport	$16,790	$17,000	$17,000	$0	$0			$0	$0	$0	$0	$0	$0
	Communications	$3,600	$2,554	$433	$123	$214			$901	$669	$215	$1,238	$0	$0
2[illegible]20	Supply Support Allocation	$0	$0	$0	$0	$0			$0	$0	$0	$0	$0	$0
557	Road Maintenance	$0	$0	$0	$0	$0			$0	$0	$0	$0	$0	$0
		$167,435	$114,993	$112,422	$123	$214	$0	$0	$1,201	$819	$215	$1,538	$0	$0
	MATERIALS													
306	Drill Bits	98648	$42,708	$0	$0	$0			$42,708	$0	$0	$42,708	$0	$0
307	Drilling Fluids - Materials	20325	$38,357	$0	$1,408	$254			$28,244	$6,366	$2,385	$29,906	$0	$0
309	Cement - Materials	102186	$61,491	$0	$0	$18,581			$0	$0	$42,310	$18,581	$0	$0
340	Casing & Tubing	136330	$98,786	$0	$0	$42,694			$0	$0	$56,092	$42,694	$0	$0
342	Casing Equipment	7191	$7,978	$0	$0	$2,346			$0	$0	$5,632	$2,346	$0	$0
349	Downhole Production Equipment	0	$0	$0	$0	$0			$0	$0	$0	$0	$0	$0
350	Wellhead Equipment	64746	$52,516	$0	$0	$10,181			$0	$0	$42,335	$10,181	$0	$0
424	Fuel	0	$0	$0	$0	$0			$0	$0	$0	$0	$0	$0
471	Misc Equipment / Materials	5000	$0	$0	$0	$0			$0	$0	$0	$0	$0	$0
		$434,426	$301,836	$0	$1,408	$74,056	$0	$0	$70,952	$6,366	$149,054	$146,416	$0	$0
	CONTRACT SERVICES													
310	Cement - Services	$1,650	$0	$0	$0	$0			$0	$0	$0	$0	$0	$0
311	Coring - Services, Rentals & Materials	$0	$0	$0	$0	$0			$0	$0	$0	$0	$0	$0
312	Core Analysis	$0	$0	$0	$0	$0			$0	$0	$0	$0	$0	$0
313	Electric Logging & Ancillaries costs	$60,000	$150,000	$0	$0	$0			$0	$150,000	$0	$0	$0	$0
315	Mud Logging	$29,700	$42,144	$7,150	$2,028	$3,523			$14,867	$11,034	$3,541	$20,419	$0	$0
316	DSTs - Services	$0	$50,000	$0	$0	$0			$0	$50,000	$0	$0	$0	$0
318	Sample Analysis (DSTs)	$0	$0	$0	$0	$0			$0	$0	$0	$0	$0	$0
326	Fishing	$0	$0	$0	$0	$0			$0	$0	$0	$0	$0	$0
333	Tubular Goods Inspection & Repair	$10,000	$0	$0	$0	$0			$0	$0	$0	$0	$0	$0
335	Equipment Lost In Hole	$0	$0	$0	$0	$0			$0	$0	$0	$0	$0	$0
338	Casing/Tubing Running	$18,065	$18,000	$0	$0	$0			$0	$0	$18,000	$0	$0	$0
357	Drilling Fluids - Services	$13,500	$19,156	$3,250	$922	$1,602			$6,758	$5,016	$1,609	$9,281	$0	$0
370	Directional / MWD	$115,725	$94,480	$14,228	$4,035	$8,248			$38,971	$21,955	$7,045	$51,254	$0	$0
382	Air Underbalanced Drilling Incrementals	$0	$0	$0	$0	$0			$0	$0	$0	$0	$0	$0
386	Drilling Tool Rental and servicing	$34,480	$32,327	$13,718	$1,055	$1,832			$8,143	$5,738	$1,841	$11,030	$0	$0
206	Geological/Geophysical - Field	$2,499	$0	$0	$0	$0			$0	$0	$0	$0	$0	$0
006	Contract Rig Supervision - Field	$24,300	$37,481	$8,850	$1,659	$2,883			$12,164	$9,028	$2,697	$16,706	$0	$0
006	Office Based Professional Services	$0	$0	$0	$0	$0			$0	$0	$0	$0	$0	$0
212	Adhoc Contract Services - Field	$33,200	$15,325	$2,600	$737	$1,281			$5,406	$4,013	$1,238	$7,425	$0	$0
260	Rental Equipment (Santos)	$3,600	$5,108	$867	$246	$427			$1,802	$1,338	$429	$2,475	$0	$0
340	Fixed Costs Allocation	$0	$0	$0	$0	$0			$0	$0	$0	$0	$0	$0
	TOTAL	$346,719	$464,022	$50,661	$10,683	$19,796	$0	$0	$88,112	$258,121	$36,649	$118,590	$0	$0
	IN-HOUSE LABOUR	$138,500	$101,500	$101,500	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	DRILLING COSTS	$502,200	$621,965	$215,067	$23,293	$40,466	$0	$0	$170,747	$131,728	$40,664	$234,506	$0	$0
	LOGISTICS	$167,435	$114,993	$112,422	$123	$214	$0	$0	$1,201	$819	$215	$1,538	$0	$0
	MATERIALS	$434,426	$301,836	$0	$1,408	$74,056	$0	$0	$70,952	$6,366	$149,054	$146,416	$0	$0
	CONTRACT SERVICES	$346,719	$464,022	$50,661	$10,683	$19,796	$0	$0	$88,112	$258,121	$36,649	$118,590	$0	$0
	TOTAL COSTS	$1,589,280	$1,604,316	$479,650	$35,506	$134,532	$0	$0	$331,012	$397,034	$226,582	$501,050	$0	$0
	TOTAL WELL COST TO DATE			$479,650	$515,156	$649,688	$649,688	$649,688	$980,700	$1,377,734	$1,604,316	$501,050		
	NOPE COST PER PHASE	$1,589,280	$1,589,280	$581,371	$48,712	$139,358	$4,771	$0	$352,061	$131,091	$331,911	$544,906	$29,106	$0
	DIFFERENCE (Actual - estimate)		-$15,036	$101,721	$13,205	$4,826			$21,049	-$265,942	$105,330	$43,856		

CROFT #1
TIME v DEPTH CURVE



Santos

Santos Ltd

A.C.N. 007 550 923

CASING & CEMENTING REPORT

Well Name: CROFT #1

FORM DQMS F-220

Casing type: ☐ Surface casing ☐ Intermediate Casing ☒ Production Casing ☐ Completion tubing

Originated by: Alistair Chomley | **Checked by:** Geoff Coker | **Date:** 20-Apr-2001

Hole Size: 6 3/4" | **T.D.:** 2529 mMD | **Date:** 20/04/2001 | **Contractor:** Schlumberger

PRE-FLUSH 40 bbls. @ 8.5 ppg. | **SPACER** 10 bbls@ 8.4 ppg.

Additives: **Aldacide = 0.5 dr**
S.A.P.P. = 8 lb/bbl

CEMENT

LEAD SLURRY:	488	sx class	G
Slurry Yield:	2.85	cu.ft./sack	
Mixwater Req't:	17.518	gal./sack	
Actual Slurry Pumped:	248	bbls @	11.5 ppg

ADDITIVES

Product	%	Amount
D066 Silica Flour	BWOC	lbs
D020 Bentonite	5.00 BWOC	2294 lbs
D167 UniFLAC	BWOC	lbs
S001 Calc.Chloride	BWOC	lbs
D110 Retarder	0.04 gal/sk	19.5 gal
D047 Antifoam	0.01 gal/sk	4.9 gal

TAIL SLURRY:	329	sx class	G
Slurry Yield:	1.15	cu.ft./sack	
Mixwater Req't:	5.074	gal./sack	
Actual Slurry Pumped:	71	bbls @	15.8 ppg

Product	%	Amount
D066 Silica Flour	BWOC	lbs
D167 UniFLAC	BWOC	lbs
D080 Dispersant	0.05 gal/sk	16.5 gal
D153 Antisettling	BWOC	lbs
D110 Retarder	0.03 gal/sk	9.9 gal
D047 Antifoam	0.01 gal/sk	3.3 gal

DISPLACEMENT Fluid: **2% KCL** @ 8.6 ppg

Theoretical Displ.: 68.4 bbl. | Bumped plug with 2000 psi

Actual Displ. 68.5 bbl @ 5 bpm | Pressure Tested to: 3000 psi

Displaced via Rig / ~~Truck~~ Pump | Bleed back: 0.5 bbls

ACTIVITY	Time
Start Running csg.	12:30
Casing on Bottom	02:00
Start Circulation	02:05
Start Pressure Test	03:50
Pump Preflush	03:20
Start Mixing	04:03
Finish Mixing	05:15
Start Displacing	05:20
Stop Displ./Bump	05:42
Start Press. test	05:45

Returns to Surface: 197 bbls mud ____ bbls cmt.

Reciprocate / ~~Rotate~~ Casing: Reciprocate until string stuck with 50 bbls cement in annulus

Top Up Job run: Yes / No No sx class ____

Plug Set Make / Type: Davis-Lynch : Bottom + Ball + Top

Centraliser Placement, type/depth: Float & Shoe, 1 each 4th to 2166m, 1 each 3rd to 1971m, 1 at shoe 460m.

Remarks: **String became differentially stuck several times on second last joint run, and several times during preparation to circulate and M/U cement head.**

No. JOINTS	SIZE OD	WT lb/ft	GRADE	THREAD	MTS	FROM	TO
Stick Up (Enter as negative number)					-0.82	-0.82	
Rotary table to top of Bradenhead					4.70		4.70
~~Bradenhead~~ / ~~Tubing Hanger or~~ Slip and Seal				WG-22 11" x 3-1/2"		4.70	4.70
						4.70	4.70
						4.70	4.70
						4.70	4.70
						4.70	4.70
						4.70	4.70
Part Land Jt.	3.5	9.3	J55	New NK3SB	4.10	4.70	8.80
207 Jts	3.5	9.3	J55	New NK3SB	1991.34	8.80	2000.14
1 marker	3.5	9.3	J55	New NK3SB	3.01	2000.14	2003.15
41 Jts	3.5	9.3	J55	New NK3SB	394.46	2003.15	2397.61
Float Collar	3.5		P110	New NK3SB, Davis-Lynch	0.36	2397.61	2397.97
1 Joint	3.5	9.3	J55	New NK3SB	9.62	2397.97	2407.59
Float Shoe	3.5		P110	New NK3SB, Davis-Lynch	0.41	2407.59	2408.00

Theoretical Bouyed wt of casing(klb):	63.000 klbs	Bradenhead Height above GL	m
Actual wt of casing (last joint run-block wt, klb)	65.000 klbs	Casing wt just prior to landing casing	115.000 klbs
Landing WT (after cementing and pressure bleed off)	65.000 klbs	setting slips (overpull)	50.000 klbs

908028 147

Santos

Santos Ltd

A.C.N. 007 550 923

CASING AND CEMENTING REPORT

Well Name: CROFT #1

FORM DQMS F-220

Rev.2

Casing type: X Surface casing | Intermediate Casing | Production Casing | Completion tubing

Originated by: ALISTAIR CHOMLEY **Checked by:** GEOFF COKER **Date:** 01-Apr-01

Hole Size: 9-7/8" **T.D.:** 476m MD **Date:** 01-Apr **Contractor:** Schlumberger

PRE-FLUSH 40 bbls. @ 8.4 ppg.

Additives:

Water Source: CROFT #1 Water Bore

SPACER 10 bbls@ 8.34 ppg.

Water Source: CROFT #1 Water Bore

CEMENT Mixwater: 80.5 bbls

LEAD SLURRY:	172	sacks Class	G	
Slurry Yield:	2.84	cu.ft./sack		
Mixwater Req't:	17.442	gal./sack		
Actual Slurry Pumped:	86.9	bbls @	11.5	ppg
Planned TOC:	0	m RT @	55	% o/g hole
Actual est. TOC:	0	m RT @		% o/g hole
TAIL SLURRY:	92	sacks Class	G	
Slurry Yield:	1.19	cu.ft./sack		
Mixwater Req't:	5.299	gal./sack		
Actual Slurry Pumped:	19.4	bbls @	15.6	ppg
Planned top tail:	379.6	m RT @	20	% o/g hole
Actual est. top tail:		m RT @		% o/g hole

ADDITIVES

Product	% or gps	Product	% or gps
D 020	4% BWOC		
S001 CaCl	1.5% BWOC		
D047	.01 gal/sx		
D145A	.05 gal/sx		
S001 CaCl	0.50%		
D047	.01 gal/sx		

DISPLACEMENT Fluid: 10bbl Water 59.8bbl Mud @ 9 ppg

Theoretical Displ.:	69.3	bbl.		
Actual Displ.	69.8	bbl @	5.5	bpm
Displaced via	RIG PUMP			

Bumped plug with 500 psi

Pressure Tested to: 3000 psi

Bleed back: 0.5 bbls

ACTIVITY	Date	Time
Start Running csg.	1-Apr-01	6:30
Casing on Bottom	1-Apr-01	10:25
Start Circulation	1-Apr-01	10:30
Start Pressure Test	1-Apr-01	11:40
Pump Preflush	1-Apr-01	11:15
Start Mixing	1-Apr-01	11:50
Finish Mixing	1-Apr-01	12:25
Start Displacing	1-Apr-01	12:35
Stop Displ./Bump	1-Apr-01	12:35
Press. test	1-Apr-01	12:40

Returns to Surface: 160 bbls mud 13 bbls cmt.

Reciprocate / Rotate Casing: Reciprocate till plug bump.

Top Up Job run: Yes / No Yes 10 sx class G

Plug Set Make / Type: Weatherford Model-303 (FS), Model-402NP (FC)

Centraliser Placement, type/depth: Weatherford 468m, 458m, 442m, 415m, 17m.

Remarks:

No. JOINTS	SIZE OD	WT lb/ft	GRADE	THREAD	METER	FROM	TO
Stick Up at RT				(Enter as negative number-do not include stretch,RT = 0)	-0.87	-0.87	0.00
Rotary table to top of Bradenhead				(Enter for surface casing only)	4.70	0.00	4.70
Bradenhead : WG-22-L, 7-5/8"BTC x 9-5/8"BTC x 11"5K				(Enter for surface casing only)	0.72	4.70	5.42
Rotary table to top of cut jt				(Enter for int. or production casing only)			
1 Cut Jt							
38 Jts	7-5/8"	26.4	L80	BTC	441.40	5.42	446.82
Jts					0.00	446.82	446.82
marker					0.00	446.82	446.82
Jts					0.00	446.82	446.82
marker					0.00	446.82	446.82
Jts					0.00	446.82	446.82
Float Collar	W'ford Model-402NP			BTC	0.40	446.82	447.22
2 Jts	7-5/8"	26.4	L80	BTC	23.25	447.22	470.47
Float Shoe	W'ford Model-303			BTC	0.44	470.47	470.91

Total Jts Run	40
Total Jts On Location	42
Jts not run	2

Theoretical Bouyed wt of casing(klb):	32	Bradenhead Height above GL	0.00
Actual wt of casing (last joint run-block wt, klb)	30	Casing wt just prior to landing csg/	22
Landing WT (after cementing and pressure bleed off)	25	setting slips	(indicator wt - blocks = wt)

APPENDIX XII: RIG SPECIFICATIONS

Rig Inventory for ODE RIG # 30

DRAWWORKS	:	Ideco Hydrair H-725-D double drum with V-80 Parmac hydromatic brake, Martin Decker satellite automatic drilling control. Max. single line pull - 50,000 lbs. Main drum grooved for 1-1/8" drilling line.
SUBSTRUCTURE	:	One piece substructure 14' high x 13'6" wide x 50' long with 12' BOP clearance. Setback area loading: 250,000 lbs Casing area loading: 275,000 lbs
ENGINES	:	Four (4) Caterpillar Model 3412 PCTA diesel engines.
BRAKE	:	V-80 Parmac hydromatic brake,
MAST	:	Dreco Model #: M12713-510 Floor Mounted Cantilever Mast designed in accordance with API Specification 4E Drilling & Well Servicing Structures. Hook load Gross Nominal Capacity - 510,000 lbs with:- 10 lines strung - 365,000 lbs 8 lines strung - 340,000 lbs Clear working height of 127'. Base width of 13'6". Adjustable racking board with capacity for i) 108 stands of 4.½" drill pipe, ii) 10 stands of 6.½" drill collars, iii) 3 stands of 8" drill collars Designed to withstand an API windload of 84 mph with pipe racked and 100 mph with no pipe racked.
CATHEADS	:	One (1) Foster Model 37 make-up spinning cathead mounted on drillers side. One (1) Foster Model 24 break-out cathead mounted off drillers side.
TRAVELLING BLOCK/HOOK	:	One (1) 667 Crosby McKissick 250 ton combination block hook Web Wilson. 250 ton Hydra hook Unit 5 - 36" sheaves.
WINCHES	:	One (1) Ingersol Rand HU-40 with 5/8" wireline. Capacity 2,000 lb. One (1) ANSI B30.7 with 3/8'wire capacity 4000lbs @ 70 fpm
SWIVEL	:	One (1) Oilwell PC-300 ton swivel
RIG LIGHTING	:	Explosive proof fluorescent. As per approved State Specifications.
KELLY DRIVE	:	One (1) 27 HDP Varco kelly drive bushing.

MUD PUMPS	:	Two (2) Gardner Denver mud pumps Model PZH-8 each driven by 750 HP EMD D-79 motors. 8" stroke with liner size 6" through to 5". 6" liner maximum pressure 2387 psi 5.1/2" liner maximum pressure 2841 psi 5" liner maximum pressure 3437 psi 6" liner maximum volume 412 gpm 5.1/2" liner maximum volume 345 gpm 5" liner maximum volume 280 gpm
MIXING PUMP	:	Two (2) Mission Magnum 5" x 6" x 14" centrifugal pump complete with 50 HP, 600 Volt, 60 Hz, 3 phase explosion proof electric motors.
MUD AGITATORS	:	Five (5) Geolograph/Pioneer 40TD - 15" 'Pitbull' mud agitators with 15 HP, 60 Volt, 60 HZ, 3 phase electric motors.
LINEAR MOTION SHALE SHAKERS	:	Two (2) DFE SCR-01 Linear motion shale shakers.
DEGASSER	:	48" Dia Poor Boy Degasser
DESILTER	:	One (1)DFE - Harrisburg style 12 cone desilter 12 x 5" cones. Approximate output of 960 gpm. Driven by Mission Magnum 5" x 6" x 11" centrifugal pump complete with 50 hp 600 volt 60 Hz 3 phase explosion proof motor.
GENERATORS	:	Four (4) Brown Boveri 600 volt, 600 Kw, 750 kva , 3 phase, 60 HZ AC generators. Powered by four (4) Cat 3412 PCTA diesel engines.
BOP's & ACCUMULATOR	:	One (1) Wagner Model 20-160 3 BND 160 gallon accumulator consisting of: Sixteen (16) 11 gallon bladder type bottles One (1) 20 HP electric driven triplex pump 600 volts, 60 HZ, 3 phase motor and controls. One (1) Wagner Model A 60 auxiliary air pump 4.5 gals/minute.

BOP's & ACCUMULATOR (Cont'd)	:	One (1) Wagner Model UM2SCB5S mounted hydraulic control panel with five (5) 1" stainless steel fitted selector valves and two (2) stripping controls and pressure reducing valves. Three (3) 4" hydraulic readout gauges:- one for annular pressure- one for accumulator pressure one for manifold pressure. One (1) Stewart & Stevenson 5 station remote drillers control with air cable umbilical with three pressure gauges, increase and decrease control for annular pressure. One (1) Shaffer 13.5/8" x 3,000 psi spherical annular BOP, One (1) Shaffer 13.5/8" x 5,000 psi LWS studded, double gate autolock B.O.P.
KELLY COCK (UPPER)	:	Two (2) Upper Kelly Cock 7.3/4"OD with 6.5/8" API connections (1 x M&M, 1 x Hydril).
KELLY COCK (LOWER)	:	Three (3) M&M Lower Kelly Cocks 6.½" OD with 4" IF connections
DRILL PIPE SAFETY VALVE	:	One (1) Hydril 6.½" stabbing valve (4" IF). One (1) Gray inside BOP with 4.3/4" OD and 2.1/4" ID with 3.1/2" IF connections c/w releasing tool and thread protectors.
AIR COMPRESSORS AND RECEIVERS	:	Two (2) LeRoi Dresser Model 660A air compressor packages c/w 10 HP motors rated at 600 Volts, 60 HZ, 3 phase. Receivers each 120 gallon capacity and fitted with relief valves.
POWER TONGS	:	One (1) Farr 13.5/8" - 5.½" hydraulic casing tongs c/w hydraulic power pack and hoses and torque gauge assembly. One (1) Foster hydraulic kelly spinner with 6.5/8" LH connection.
TORQUE WRENCH	:	Yutani c/w drive sockets 1 1/8" through to 2 3/8"
SPOOLS	:	One (1) set double studded adaptor flanges to mate 13.5/8" 5,000 psi. API BOP flange to following wellhead flange 13.5/8" x 3,000 series, 11" x 3,000 series, 11" x 5,000 series 7.1/16" x 3,000 series, 7.1/16" x 5,000 series 4 1/16" 5000 x 3 1/16" 5000 3 1/16" 5000 x 2 1/16" 5000

SPOOLS (Cont'd)	:	1 double studded adaptor flange 4 1/16"5K x 3 1/16"5K 1 double studded adaptor flange 3 1/16" 5K x 2 1/16" 5K 1 only 14" - BOP mud cross (drilling spool) 13.5/8" 5,000 x 13.5/8" 5,000 BX160. with 2 x 3 1/16" 5K outlets. 1 only BOP spacer spool 13 5/8" 3,000 x 13 5/8" 3,000 1 only BOP spacer .spool 11" 3,000 x 13.5/8" 5,000 .
ROTARY TABLE	:	One (1) Oilwell A 20.½" rotary table torque tube driven from drawworks complete with Varco MASTER bushings and Insert Bowls.
MUD TANKS	:	SHAKER Active No 1. 277 BBL Desilter 73 BBL Sand Trap 50 BBL Trip Tank 29 BBL Total 429 BBL SUCTION Active No 2 174 BBL Pre-Mix 146 BBL Pill Tank 63 BBL Total 383 BBL
TRIP TANK	:	Trip Tank 29 BBL One (1) Mission Magnum 2" x 3" centrifugal pump complete with 20 HP, 600 Volts, 60 HZ, 3 phase explosion proof motors
KILL LINE VALVE	:	2 x 3 1/8" Cameron FL 5K gate valves
CHOKE LINE VALVES	:	1 x 4 1/16 Cameron FC 5K hydraulic operated gate valve 1 x 4 1/16 5K manual gate valve
CHOKE MANIFOLD	:	One (1) McEvoy choke and kill manifold 3" 5,000 psi with hydraulic Swaco "super" choke.
DRILL PIPE	:	240 joints (2270 m) - 3.½" 13.30lb/ft drill pipe Grade 'G' 105 with 3 1/2" IF conn
PUP JOINTS	:	One (1) - 10'(3.65 m)3.½" OD Grade 'G' with 3.½" IF conn
HEVI-WATE DRILL PIPE	:	6 joints of 3.½" H.W.D.P. with 3.½" IF conn
DRILL COLLARS	:	12 x 6.½" OD drill collars (113 m) with 4" IF conn 24 x 4 ¾" O.D. drill collars (227 m) with 3.½"IF conn 1 x 4.3/4" OD Pony Drill Collar
KELLIES	:	Two (2) Square Kelly drive 4.¼" x 40' complete with Scabbard and 55 ft x 3 ½" kelly hose

FISHING TOOLS	:	One (1) only 8.1/8" Bowen series 150 FS overshot One (1) 5.3/4" SH Bowen 150 Overshot c/w grapples and packoffs to fish contractors downhole equipment. One (1) only Reverse circulating junk basket 4" IF box One (1) only 6.½" OD Griffith Fishing Jars One (1) only 4 ¾" O.D. Bowen Type "Z" Fishing Jar One (1) only Bumper Sub 6.½" OD 4" IF pin & box. One (1) 5" R.C.J.B. One (1) 5" Junk Sub with 4.3/4" OD x 1.1/2" ID.
WIRELINE SURVEY UNIT	:	Gearmatic hydraulic drive Model 5 c/w .092" line
SUBSTITUTES	:	Two (2)Bit Sub - 7.5/8" reg x 6.5/8" reg double box. Two (2) Bit Subs - 6.5/8" reg double box. Two (2) Bit Sub - 6.5/8" reg box. x 4½" IF box Two (2) Bit Subs - 4.½" reg x 4" IF double box. Two (2) 4.3/4" bit subs (36" long) with 3.1/2" IF box x 3.1/2" reg box bored for float. One (1) Float Sub 6.5/8" reg box (FC) x 6.5/8" reg pin Two (2) XO Sub - 4" IF box x 4.½" IF pin. Two (2) XO Sub - 4½" IF box x 4." IF pin. One (1) XO Sub - 4.½" reg x 4" IF double pin. Two (2) XO Sub - 6.5/8" reg pin x 4" IF box. One (1) Junk Sub - 6.5/8" reg pin x 6.5/8" reg box One (1) Junk Sub - 4.½" reg box x 4.½" reg pin. One (1) XO Sub - 4.½" IF box x 4" IF box. Two (2) Kelly Saver Subs c/w rubber 4" IF pin & box. Two (2) Kelly Saver Subs 4" IF pin & box One (1) Kelly Saver Subs 4½" IF pin & box. Two (2)4 IF box x 3.1/2" IF pin Saver Subs. One (1) Circulating Subs - 4" IF x 2" 1502 hammer union. One (1) Circulating Subs - 4" IF x 2" 602 hammer union. Eleven (11) Lifting Subs - 18□ Taper 4.½" pick up neck and 4" IF pin. Eight (8) Lift Subs with 3.1/2" OD D.P. neck and 3.1/2" IF pin connections.
HANDLING TOOLS	:	2 only 4.½" BJ 250 ton 18 degree taper D/P elevators. 1 only 3.½" BJ 200 ton 18 degree taper D/P elevators. 1 only 3.1/2" BJ type MGG 18° centre latch Elevators. 1 only 4.½" Varco SDXL D/P slips. 1 only 4.½" Varco SDML D/P slips 2 only 8" - 6.½" DCS-R drill collar slips. 1 only 3.1/2" Varco SDML Slips 1 only 4.3/4" Varco DCS-S Drill Collar Slips

CASING RUNNING TOOLS	:	1 only 13.3/8" Webb Wilson 150 ton side door elevator. 1 only 13.3/8" single joint P.U. elevators. 1 only 9.5/8" Webb Wilson 150 ton side door elevators. 1 only 9.5/8 single joint P.U. elevator. 1 only 7" BJ 150 ton side door elevators. 1 only 7" single joint P.U. elevators. 1 only 5.½" BJ 200 ton S11 1 only 2.7/8" BJ 100 ton tubing elevator. 1 only 2.3/8" BJ 100 ton tubing elevator. (all P.U. elevators c/w slings & swivel) 1 only 13.3/8" Varco CMS-XL casing slips 1 only 9.5/8" Varco CMS-XL casing slips. 1 only 7" Varco CMS-XL casing slips. 1 only 3.1/2" Varco SDML tubing slips.
CASING / TUBING DRIFTS	:	9 5/8, 7", 5 ½",3 ½"
THREAD PROTECTORS	:	9 5/8, 7".
KELLY SPINNER	:	One (1) Foster hydraulic kelly spinner with 6.5/8" LH connection.
PIPE SPINNER	:	One (1) International 850H hydraulic pipe spinner
WELDING EQUIPMENT	:	1 - Miller 400 amp welding machine. 1 - oxy acetylene set.
DOGHOUSE	:	1 Doghouse 5m x 2.4m x 2.3m
GENERATOR HOUSE	:	Ross Hill SCR
UTILITY HOUSE	:	1 Utility and Mechanics House
CATWALKS	:	2 catwalks total 18.6m long x 1.6m wide x1.08m high
PIPE RACKS	:	8 - 9m tumble racks.
DAY FUEL TANK	:	1 only 19,000 ltrs
WATER/FUEL TANK	:	WATER 1 only 320 bbls. 1 only brake cooling tank 80 bbl FUEL 1 only 27,500 litres
OIL STORAGE	:	drums
DRILLING RATE RECORDER	:	1 only 6 pen Pioneer Geolograph drill sentry recorder to record: weight (D) penetration (feet) pump pressure (0-6,000 psi) electric rotary torque rotary speed (rpm) pump spm (with selector switch)

DEVIATION RECORDER	:	1 set Totco 'Double Shot' deviation instrument 0□-8□.
INSTRUMENTS & INDICATORS	:	1 only Martin Decker Sealtite. 1 only Martin Decker Deadline type. 1 only drillers console including the following equipment. Martin Decker Weight Indicator type'D' Electric rotary torque gauge. MD Totco Mud Watch Instrumentation c/w display and alarms. Rotary rpm gauge
MUD TESTING	:	1 set Baroid mud testing laboratory (standard kit
RATHOLE DRILLER	:	One (1) fabricated rotary table chain driven.
MUD SAVER	:	Okeh unit
CELLAR PUMP	:	Cellar jet from No 1 pump
WATER PUMP	:	Three (3) Mission Magnum 2" x 3" centrifugal pumps c/w 20 HP, 600 Volts, 60 HZ, 3 phase explosion proof motors
FIRE EXTINGUISHERS	:	Dry Chemical Rig 22 Camp 20 CO2 Rig 3 Camp 0 Foam Rig 1 Camp 1
PIPE BINS	:	5 units
CUP TESTER	:	Two (2) Grey Cup Tester c/w test cups for 9.5/8" & 13.3/8".
DRILLING LINE	:	5,000' 1.1/8" - E.I.P.S

TRANSPORT EQUIPMENT AND MOTOR VEHICLES

One (1) International 530 Forklift
One (1) Tray Top Utility
One (1) Crew Bus

CAMP EQUIPMENT

Four (4) x 8-Man Bunkhouses (12 man emergency)
One (1) x Recreation/Canteen unit
One (1) x Ablution/Laundry/Freezer unit
One (1) x Kitchen/Cooler/Diner unit
One (1) x Toolpushers unit
One (1) x Meeting / Smoko unit
One (1) x Combined Water/Fuel Tank unit
Two (2) x CAT 3304PC generator sets each 106 kVa, 86 KW, 50 HZ.

NOTE: At Contractor's discretion any of the foregoing items may be replaced by equipment of equivalent or greater capacity.

ENCLOSURE I: 1 : 200 COMPOSITE LOG

PE605250

This is an enclosure indicator page.
The enclosure PE605250 is enclosed within the container PE908028 at this location in this document.

The enclosure PE605250 has the following characteristics:

ITEM_BARCODE	PE605250
CONTAINER_BARCODE	PE908028
NAME	Encl.1 Croft-1 Composite Well Log
BASIN	OTWAY
ONSHORE?	Y
DATA_TYPE	WELL
DATA_SUB_TYPE	COMPOSITE_LOG
DESCRIPTION	Encl.1 Croft-1 Composite Well Log, Scale 1:200, by Santos [BOL] Pty Ltd, W1315, PEP154. Enclosure 1 contained within "Well Completion Report" [PE908028].
REMARKS	
DATE_WRITTEN	
DATE_PROCESSED	31-JUL-2001
DATE_RECEIVED	19-OCT-2001
RECEIVED_FROM	Santos Ltd
WELL_NAME	Croft-1
CONTRACTOR	
AUTHOR	
ORIGINATOR	Santos Ltd
TOP_DEPTH	
BOTTOM_DEPTH	
ROW_CREATED_BY	DN07_SW

(Inserted by DNRE - Vic Govt Mines Dept)

ENCLOSURE II: 1 : 500 MUDLOG

PE605251

This is an enclosure indicator page.
The enclosure PE605251 is enclosed within the container PE908028 at this location in this document.

The enclosure PE605251 has the following characteristics:

ITEM_BARCODE	= PE605251
CONTAINER_BARCODE	= PE908028
NAME	= Encl.2 Croft-1 Mud Log
BASIN	= OTWAY
ONSHORE?	= Y
DATA_TYPE	= WELL
DATA_SUB_TYPE	= MUD_LOG
DESCRIPTION	= Encl.2Croft-1 Mud Log, Scale 1:100, by Santos [BOL] Pty Ltd, W1315, PEP154. Enclosure 2 contained within "Well Completion Report" [PE908028].
REMARKS	=
DATE_WRITTEN	=
DATE_PROCESSED	=
DATE_RECEIVED	= 19-OCT-2001
RECEIVED_FROM	= Santos Ltd
WELL_NAME	= Croft-1
CONTRACTOR	= Santos Ltd
AUTHOR	=
ORIGINATOR	= Santos Ltd
TOP_DEPTH	= 0
BOTTOM_DEPTH	= 2529
ROW_CREATED_BY	= DN07_SW

(Inserted by DNRE - Vic Govt Mines Dept)

ENCLOSURE III: STRUCTURE MAPS

[redacted]

This is Page Number **908028_162X**

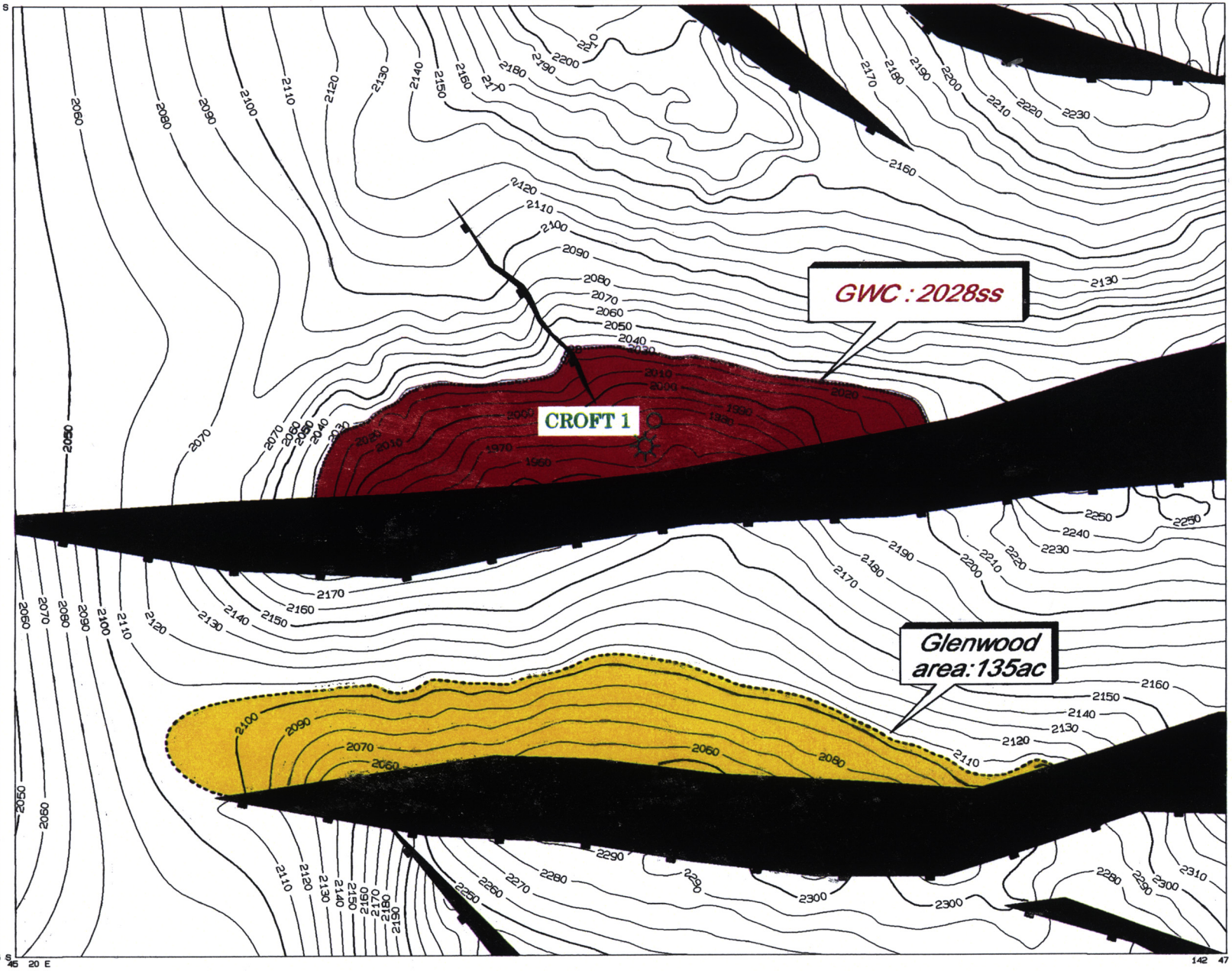
This is an enclosure indicator page.

The page that follows this page is an uncatalogued fold-out with page number:

908028_162Y

and is enclosed within the document PE908028 at this page.

CROFT



1: 15000

0 0.50

KILOMETRES

UNIVERSAL TRANSVERSE MERCATOR PROJECTION
G.R.S. 1980 SPHEROID
CENTRAL MERIDIAN 141 00 00 E
MAPSHEET DATUM: "GDA94"

GDA

Santos

DEPTH

Top Waarre Sand

April 2001

M.Majedi

Horizon : cv_wwc_pk_petm

(based on avg. vel.of 2631m/s at the croft_1)

Date : July 4, 2001	*Author : M.Majedi*	*MVCL*
Contour Interval : 5	*Verified:*	
Datum : G.R.S. 1980	*File No. :*	