SANTOS – BEACH

COMPILED FOR

SANTOS LIMITED

ABN 80 007 550 923

NAYLOR SOUTH 1

WELL COMPLETION REPORT

Prepared by:
A.HUDDLESTON
June 2002

NAYLOR SOUTH 1 WCR

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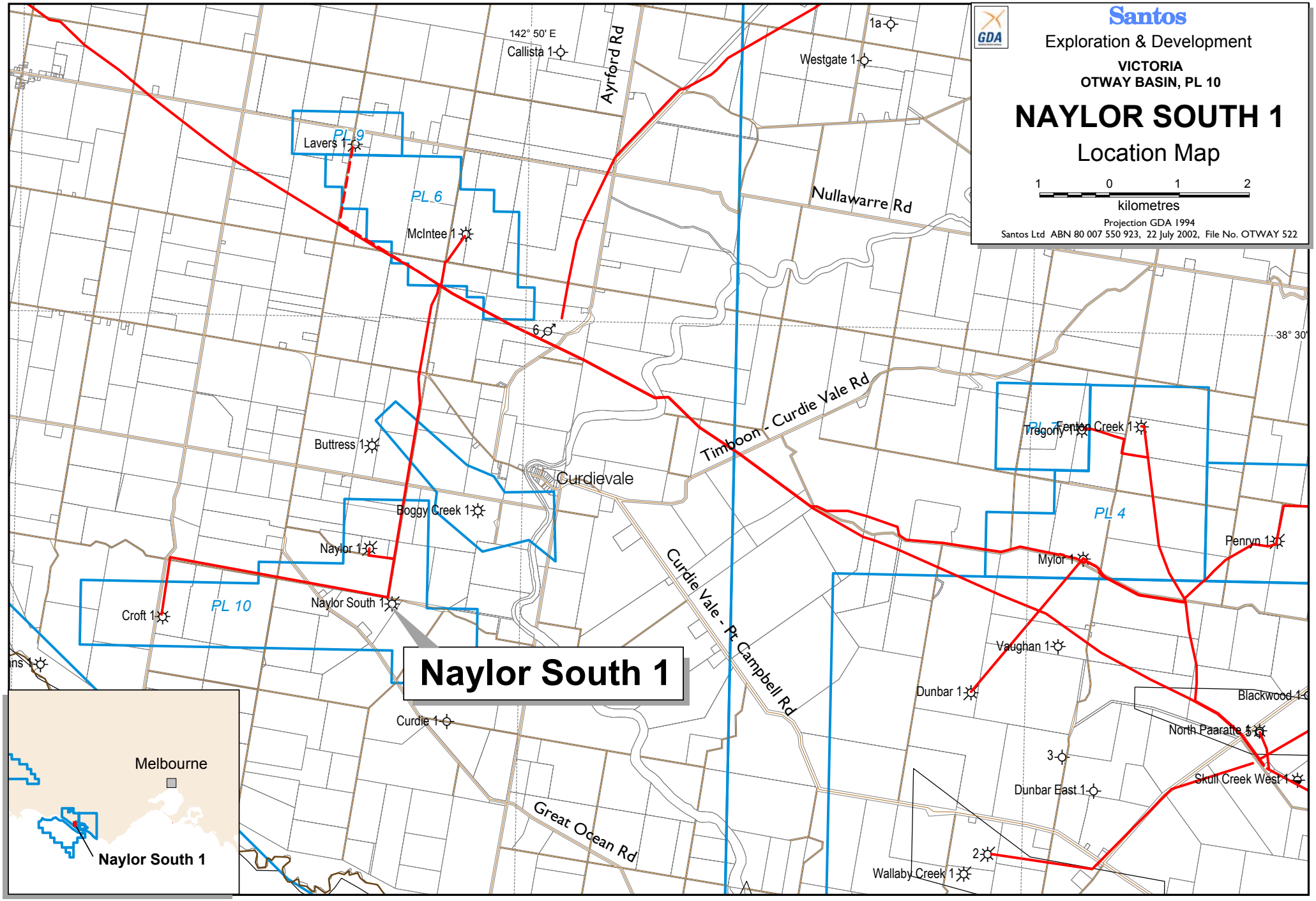
LOCATION MAP


Santos
Exploration & Development
VICTORIA
OTWAY BASIN, PL 10
NAYLOR SOUTH 1
Location Map
1 0 1 2
kilometres
Projection GDA 1994
Santos Ltd ABN 80 007 550 923, 22 July 2002, File No. OTWAY 522
142° 50' E
38° 30'
Callista 1
Ayrford Rd
Westgate 1
1a
Lavers 1
PL 9
PL 6
McIntee 1
Nullawarre Rd
6
Timboon - Curdie Vale Rd
Buttress 1
Curdievale
Boggy Creek 1
Naylor 1
Naylor South 1
Croft 1
PL 10
Curdie Vale - Pt Campbell Rd
Curdie 1
Great Ocean Rd
Tregony 1
Fenton Creek 1
PL 4
Mylor 1
Penryn 1
Vaughan 1
Dunbar 1
Blackwood 1
North Paaratte 1
3
Dunbar East 1
Skull Creek West 1
2
Wallaby Creek 1
Melbourne
Naylor South 1

WELL DATA CARD

WELL HISTORY

1. GENERAL DATA

Well Name:	Naylor South 1
Well Classification:	Gas Exploration
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	Latitude: 38° 32' 12.86" South Longitude: 142° 48' 44.39" East
Surveyed Elevation	Ground Level: 48.55m Rotary Table: 53.24m
Seismic Survey	CURDIEVALE 3D
Seismic Location	CDP 10133, LINE 2580
Total Depth	Driller: 243.0m Logger Ext: 2243.0m
Completion	6 joints of 88.9mm 9.3 ppf L80 New NK 3SB and 162 joints of 88.9mm 9.3 ppf J55 New NK3SB Tubing, set at 1623m.
Status	Plug & Abandoned.

2. DRILLING DATA

Date Drilling Commenced	0730 hours, 15th December 2001
Date Drilling Completed	0430 hours, 26th December 2001
Date Rig Released	0430 hours, 30th December 2001
Contractor	Oil Drilling & Exploration Pty Ltd (OD&E)
Rig	OD&E 30
Rig Specifications	Refer to Appendix XIV

3. DRILLING SUMMARY

(a) Drilling Summary:

Naylor South 1 was spudded at 0730 hours on the 15th December 2001. A 250.825mm surface hole was drilled to 438m (Drlr). A 193.675mm surface casing was run and cemented from surface to 434m (Drlr). It was drilled as a deviated well, due to surface constraints. A Leak-Off Test was conducted to 17.2 ppg EMW at 360m (Drlr). A 171.45mm main hole was then drilled to a Total Depth of 2243m (Drlr) which was reached at 0430 hours, on the 26th December 2001. Deviational constraints insured that the well had to be steered on to target from 1087m to 1283m using directional assembly. Naylor South 1 was plugged and abandoned post logging with four plugs: Plug #1 at 2141m – 2049m (Drlr), Plug #2 at 1297m-1207m, Plug #3 at 464m-374m and Plug # 4 at 30m-surface. The rig was released at 0430 hours on 30th December 2001. A more comprehensive drilling summary can be found in Appendix XIII, in the Drilling - Final Well Report.

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 XIII: (Drilling - Final Well Report).

TABLE I: CASING, HOLE, AND CEMENT DETAILS

BIT SIZE	DEPTH	CSG SIZE	CSG DEPTH	JNTS	CSG TYPE	CEMENT
250.825 mm	438m	193.675 mm	434m (D&L)	37	26.4 lb/ft L-80	Lead: 68 bbls of Slurry (113 sacks Class G cement) @ 11.0 ppg + 4% bwoc of D020 + 1.5% bwoc of S001 CaCl2 + 0.01 gal (sax of D144). Tail: 19 bbls of slurry (90 sacks Class G) @ 15.6 ppg + 0.5 gal/sx of D145A + 0.01 gal/sax of D144.
171.45 mm	2243 (D) 2243 (L)					

TABLE II: SUMMARY OF MUD SYSTEMS

MUD TYPE	INTERVAL (m)
Spud Mud (Gel/Water)	Surface – 438m
KCL/Polymer	438m – 2243m

(b) Lost Time:

Lost time at Naylor South 1 – Please refer to Appendix XIII (Drilling - Final Well Report: Time Breakdown Data).

(c) Water Supply:

Naylor South flowing bore containing:
Cl: 15,000mg/l,
Hardness(Ca++): <320 mg/l
PH:8.5
Pf/Mf: 0.05/0.3

Mains water was also used as make up water containing:
Cl: 600 mg/l
Hardness(Ca++): <40 mg/l
PH: 8.5
Pf/Mf: 0.05/0.1

(d) Mudlogging:

Mudlogging services were provided by Geoservices Ltd. Samples were collected, washed, and described at 10m intervals from the surface to 1000m, 3m intervals from 1000m to 2243m (T.D.), except for the following intervals where the samples were collected at 6m intervals:

1002 – 1020m
1023 – 1029m
1056 – 1062m
1080 – 1089m
1110 – 1116m
1122 – 1128m
1140 – 1152m
1161 – 1167m

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:

No DST's were conducted in Naylor South 1.

(f) Coring:

No cores were cut in Naylor South 1.

(g) Electric Logging:

Reeves completed two wireline logging runs. A sonic and resistivity run (GR-DLL-SLL-CSS-MLL-SP-CAL) and a density logging run (GR-PDS-CNS-CAL). Two logging runs (Pressure Survey and Sidewell Cores) were cancelled due to lack of hydrocarbon show sin the Primary Objective.

One suite of wireline logs was run in Naylor South 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	2234-surface	81°C/36:00hrs	GR	1/2	2229 - surface	86°C/42:00hrs
CSS (comp-ensated sonic)	1/1	2224 - 434	81°C/36:00hrs	CAL	1/2	2234 - 434	86°C/42:00hrs
CSS (wave-Form sonic)	1/1	2224 - 1950	81°C/36:00hrs	PDS	1/2	2234 - 434	86°C/42:00hrs
DLL	1/1	2233 - 434	81°C/36:00hrs	CNS	1/2	2231 - 434	86°C/42:00hrs
SLL	1/1	2233 - 434	81°C/36:00hrs				
MLL	1/1	2237 - 434	81°C/36:00hrs				
SP	1/1	2216 – 434	81°C/36:00hrs				
CAL	1/1	2237 - 434	81°C/36:00hrs				

*Logger Contractor - REEVES

(h) Geothermal Gradient:

An estimated static bottom hole temperature of 80.3°C at 1694m, and a geothermal gradient of 2.64°C/100m was calculated from down hole temperatures recorded during logging runs 1 and 2.

(i) Hole Deviation

The Naylor South 1 well is a deviated hole. Directional surveys indicate a maximum deviation from vertical of 23.1° inclination 167.52°T at 1783m

(j) Velocity Survey:

No velocity survey was run in Naylor South 1.

(k) Completion Summary:

Naylor South 1 was plugged and abandoned on the 30/12/01.

GEOLOGY

5. REFERENCES (Cont.)

Partridge, A., 1997 New Upper Cretaceous Palynology of the Sherbrook Group Otway Basin. Biostrata Pty. Ltd. In PESA News, April/May, p.9.

SANTOS Ltd., 2001 Naylor 1 Raw Data Report. SANTOS Ltd. (Unpublished), prepared by Operations Geology.

SANTOS Ltd., 2001 Naylor 1 Well Completion Report. SANTOS Ltd. (Unpublished), prepared by Operations Geology.

SANTOS Ltd., 2002 Naylor South 1 Raw Data Report. SANTOS Ltd. (Unpublished), prepared by Operations Geology.

APPENDIX I: LITHOLOGICAL DESCRIPTIONS

APPENDIX I (a): CUTTINGS

LITHOLOGICAL DESCRIPTIONS

APPENDIX I (b): SIDE WALL CORES

No side wall cores were taken at Naylor South 1.

APPENDIX II: HYDROCARBON SHOW REPORTS

There were no hydrocarbon shows on Naylor South 1

APPENDIX III: WIRELINE LOGGING REPORTS

APPENDIX III (a): LOGGING ORDER FORM

Santos
A.B.N. 80007 550 923

LOGGING ORDER FORM

COMPANY:	Santos		
WELL:	NAYLOR SOUTH 1	**FIELD:**	OTWAY
RIG:	OD&E 30	**STATE:**	VICTORIA
LOCATION:	OTWAY, VICTORIA	**BLOCK:**	PEP 154
LATITUDE:	38 32' 12.86" S (GDA 94)	**LONGITUDE:**	142 48' 44.39" E (GDA 94)
ELEVATION:	**GL:** 48.30	**RT:**	53.00 **DF:** 4.70
9 7/8" HOLE:	438 m	**7 5/8" CSG:**	434 (D) **WT:** 26 lb/ft, L-80, BT&C
6 3/4" HOLE:	2244	**3 1/2" CSG:**	**WT:**
TD (Drilr.)	2244	**TD (Logr.):**	2238.00
MUD SYSTEM:	2% KCl / Polymer	**CIRC. STOPPED:**	05:30 AM 26/December/2001
WT: 9.4	**VISC:** 40 **PV/YP:** 12/12 **PH:** 9	**FLUID LOSS:**	5.6 **CHL:** 10,500
GEOLOGIST:	T. PRATER		

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

HOLE CONDITIONS: (TIGHT SPOTS, DEVIATION, COALS, BARITE IN MUD, ETC..)

Maximum Hole Deviation: 22.8deg @ 1828m
Maximum Dog Leg Severity: 7.2deg @ 1677m
Barite: 1.2%
KCl: 17.5ppb, 6%

No expected over-pressure or depletion. Expected fm press: 2800psi
Expected BHT: 95degC
TIGHT HOLE: 1900 - 2000m

DRILL STEM TESTS/CORED INTERVALS:

NO FORMATION TESTS

COMMENTS

LOGS:

PROGRAM CONFIRMED WITH OPERATIONS GEOLOGIST AT **4.30pm** **HOURS ON** **26/12/2001**

PROGRAM VARIES FROM PRE-SPUD NOTES: **YES:** **X** **NO:**

LOG	INTERVAL (m)	REMARKS/REPEAT SECTION
RUN # 1		
GR	2244 to Surface	DOWNLOG
DLS	2244 to 434	Semblance Processing TD TO 1950
MRS	2244 to 800	UPLOG
LCS	2244 to 434	DOWNLOG
CAL	2244 to 434	UPLOG
RUN # 2		
GR		
PDS	2244 to 2050	UPLOG
CNS	2244 to 2050	UPLOG
RUN # 3	CANCELLED	
GR	20 PRESET POINTS	TO BE PICKED FROM RUN # 1
RFS		
RUN # 4	CANCELLED	
SCG	ONE GUN 20 SAMPLES	
Transmitted Ascii data to include: dt24, dth, dtr, dtt, so11, so12, so13, so14 sonic curves.		

REMARKS:

(ALL OPERATIONS ARE TO CONFORM TO CURRENT 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 FROM TD TO 30m ABOVE CONIACIAN (WAARRE FORMATION.

4 ALL ZONES OF SONIC CYCLE SKIPPING OR POOR QUALITY DATA TO BE REPEATED AND NOTED IN REMARKS SECTION. (EXCEPT ABOVE NARRAWATURK MARL. IF HOLE CONDITION IS POOR).

5 REPEAT SECTION NOT TO BE RUN IN 6" 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.

12 LOG DATA IS TO BE TRANSMITTED AS SOON AS POSSIBLE AFTER ACQUISITION. 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): ELECTRIC LOG TIME SUMMARY

Geology Operations **Santos** (A.B.N. 80007 550 923)

ELECTRIC LOGGING TIME SUMMARY

LOGGING UNIT:	1030	LEFT BASE:	AM (19/12)	WELL NAME:	NAYLOR SOUTH 1
START DATE:	27-Dec-01	ARRIVED AT THE WELLSITE:	09:30 (20/12)	TRIP NUMBER:	SUITE 1, RUN 1 & 2
END DATE:	XX/12/2001	INITIAL RIG UP:	10:00 (27/12)	WSG:	T. PRATER
DEPTH DRILLER:	2244 MD	FINAL RIG DOWN:	02:15 (28/12)	LOGGING ENGINEER:	A.DIGIACOMO
DEPTH LOGGER:	2238 MD	RETURN TO BASE:		PAGE / DATE:	PAGE 1 26/12/2001

26-Dec	RIG UP / DOWN	TOOL CHECK	RIH / POOH	LOGGING	DATA TX	LOST TIME LOGGER	I. O.	WIPER TRIP	LOST TIME OTHERS	OTHERS	COMMENTS / REMARKS
12:00	0:15										RIG UP FOR RUN 1
	0:15										
:30			0:15								RUN IN HOLE
			0:15								CSG CHECK, CAL CHECK
13:00			0:15								CALIPER WON'T OPEN, POOH TO CHECK
			0:15			0:15					CHECK AT SURFACE - CLEAN
:30			0:15			0:15					RUN IN HOLE AND CHECK - OK
				0:15							START DOWNLOG
14:00				0:15							
				0:15							
:30				0:15							
				0:15							
15:00				0:15							VERY TIGHT HOLE AT 1800m
				0:15							
:30				0:15							AT TD, BEGIN WAVEFORM MAIN UPLOG
				0:15							
16:00				0:15							
				0:15							
:30				0:15							
				0:15							
17:00				0:15							FINISHED WFT - BACK TO TD
				0:15							UPLOG RUN #1
:30				0:15							
				0:15							
18:00				0:15							
				0:15							
:30				0:15							
				0:15							
19:00				0:15							
				0:15							
:30				0:15							
				0:15							
20:00				0:15							
				0:15							TOOL TO SURFACE
:30	0:15										RIG DOWN RIG 1
	0:15										
21:00	0:15										
	0:15								0:15		LOST TIME WAITING ON DRILLER TO CLEAR FLOOR
:30	0:15										RIG UP FOR RUN 2
	0:15										
22:00			0:15								
			0:15						0:15		LOST TIME: CAN'T GET PAST CSG
:30			0:15						0:15		
				0:15							DOWNLOG
23:00				0:15							
				0:15							BEGIN UPLOG FOR RUN # 2
:30				0:15							
				0:15							

WSG (SIGN)	ENGINEER (SIGN)

TOTALS

1:30	0:00	1:15	6:45	0:00	0:30	0:00	0:00	0:15	0:00
0:30	0:00	0:45	1:15	0:00	0:00	0:00	0:00	0:30	0:00
0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00

TOOLS RUN: GR-DLL-SLL-MLL-LCS-CAL

TOOLS RUN: GR-PDS-CNS

TOOLS RUN:

LOGGING UNIT:	1030	WELL NAME:	NAYLOR SOUTH 1	PAGE:	2

27-Dec	RIG UP / DOWN	TOOL CHECK	RIH / POOH	LOGGING	DATA TX	LOST TIME LOGGER	I. O.	WIPER TRIP	LOST TIME OTHERS	OTHERS	COMMENTS / REMARKS
0:00				0:15							
				0:15							
:30				0:15							
				0:15							
1:00				0:15							
				0:15							
:30				0:15							ON SURFACE
	0:15										RIG DOWN RUN # 2
2:00	0:15										
	0:15										
:30											
3:00											
:30											
4:00											
:30											
5:00											
:30											
6:00											
:30											
7:00											
:30											
8:00											
:30											
9:00											
:30											
10:00											
:30											
11:00											
:30											

WSG (SIGN)	ENGINEER (SIGN)

TOTALS

0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	TOOLS RUN: GR-DLL-SLL-MLL-LCS-CAL
2:30	0:45	0:00	0:00	1:45	0:00	0:00	0:00	0:00	0:00	0:00	TOOLS RUN: GR-PDS-CNS
0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	TOOLS RUN:

GRAND TOTALS

9:30	1:30	0:00	1:15	6:45	0:00	0:30	0:00	0:00	0:15	0:00	TOOLS RUN: GR-DLL-SLL-MLL-LCS-CAL
5:00	1:15	0:00	0:45	3:00	0:00	0:00	0:00	0:00	0:30	0:00	TOOLS RUN: GR-PDS-CNS
0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	TOOLS RUN:

OVERALL JOB TOTAL

14:30	2:45	0:00	2:00	9:45	0:00	0:30	0:00	0:00	0:45	0:00

SERVICE QUALITY SUMMARY

CLIENT WSG					ENGINEER					
1	2	3	4	5	1	2	3	4	5	
					✓					SAFETY
					✓					PROMPTNESS
					✓					TOOL & SURFACE SYSTEM PERFORMANCE
					✓					ATTITUDE & CO-OPERATION
					✓					WELLSITE PRODUCTS / LOG QUALITY
					✓					COMMUNICATIONS / TX PERFORMANCE
										OTHER (PLEASE SPECIFY)

1 Excellent, 2 - 3 Normal, 4 - 5 Very Poor

APPENDIX III (C): FIELD ELECTRIC LOG REPORT

SANTOS LIMITED

FIELD ELECTRIC LOG REPORT

WELL:	**NAYLOR SOUTH 1**
LOGGING ENGINEER:	**A.DIGIACOMO**
RUN No.:	**1,2**
DRILLERS DEPTH:	**2244.00**
ARRIVED ON SITE:	**09:30 (20/12)**
ACTUAL LOGGING TIME:	**9:45**
TOTAL TIME:	**14:30**

GEOLOGIST:	**T. PRATER**
	SUITE 1, RUN 1 & 2
DATE LOGGED:	**27-Dec-01**
LOGGERS DEPTH:	**2238.00**
CIRCULATION STOPPED:	**05:30 26/Dec/01**
LOST TIME LOGGERS:	**0:30**
LOST TIME OTHERS:	**0:45**

TYPE OF LOG	**GR-DLL-SLL-MLL-LCS-CAL**	**GR-FMT**
TIME CIRC. STOPPED:	**05:30 27/Dec/01**	**05:30 27/Dec/01**
TIME TOOL RIG UP:	**12:00 27/Dec/01**	**21:30 27/Dec/01**
TIME TOOL RIH:	**12:30 27/Dec/01**	**22:00 26/Dec/01**
TIME TOOL RIG DOWN:	**21:30 27/Dec/01**	**02:15 27/Dec/01**
TOTAL TIME:	**9:30**	**4:45**

TYPE OF LOG	**FROM (m)**	**TO (m)**	**REPEAT SECTION**	**TIME SINCE LAST CIRCULATION**	**BHT**
RUN # 1					
GR	2238	SURFACE		10 hrs	81 deg C
DLS	2238	434			
MRS	2238	434			
LCS	2238	434			
CAL	2238	434			
RUN # 2					
GR	2238	434		18 hrs	86 deg C
PDS	2238	434			
CNS	2238	434			

SUITE/ RUN	**BHT**	**DEPTH**	**TIME**	**SUITE/ RUN**	**BHT**	**DEPTH**	**TIME**	**SUITE/ RUN**	**BHT**	**DEPTH**	**TIME**	**SUITE/ RUN**	**BHT**	**DEPTH**	**TIME**
1 / 1	81	2231	36	**1 / 2**	86	2238	42	**1 / 3**				**1 / 4**			

MUD SYSTEM:	**TYPE**	**WT.**	**VISC.**	**WL**	**PH**	**Cl**	**PV/YP**	**RMF**	**RM**	**RMC**
	2% KCl / Polymer	9.4	40	5.6	9	10,500	12/12	0.172 ohmm @ 65.8 F	0.1985 ohmm @ 65.34 F	0.338 ohmm @ 64.05 F

HOLE CONDITIONS:

Maximum Hole Deviation: 22.8deg @ 1828m

Maximum Dog Leg Severity: 7.2 deg @ 1677m

Barite: 1.2%

KCl: 17.5ppb, 6%

Expected BHT: 95 degC

Tight High: 1900 - 2000m

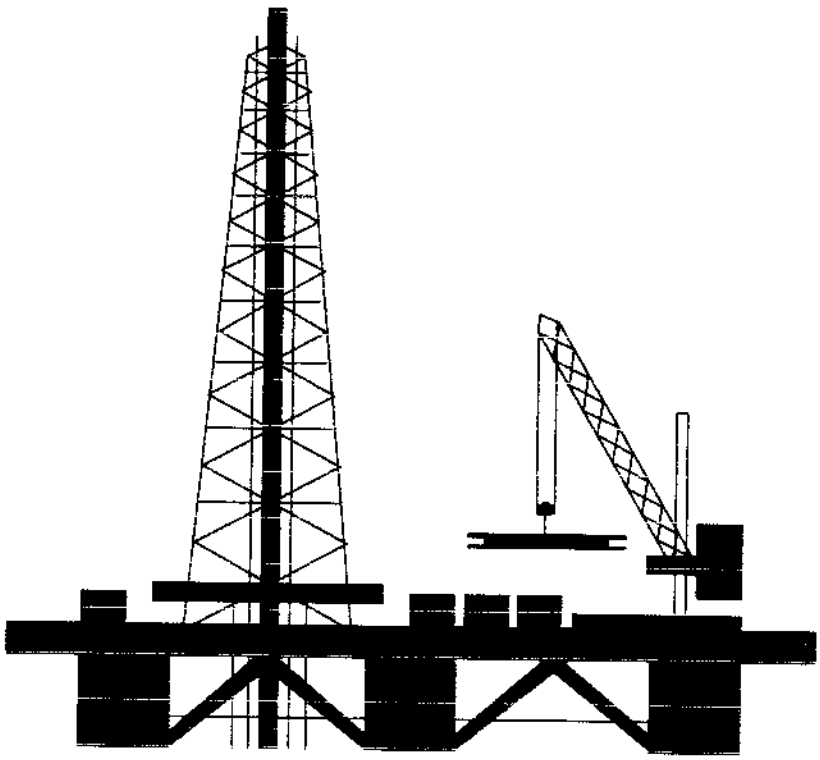
LOG ORDER FORM	✓	MUD SAMPLE RESISTIVITY	✓	TOOL No. / CODE CHECK	✓
OFFSET WELL DATA	✓	CABLE DATA CARD	✓	LOG SEQUENCE CONFIRM	✓

LOG TYPE	GR	DLS	MRS	LCS	CAL	GR	PDS	CNS				REMARKS
CASING CHECK	✓	✓	✓	✓	✓	✓	✓	✓				
SCALE CHECK	✓	✓	✓	✓	✓	✓	✓	✓				
DEPTH Casing Total			✓									
CALIBRATIONS OK	✓	✓	✓	✓	✓	✓	✓	✓				
REPEATABILTY	✓	✓	✓	✓	✓	✓	✓	✓				
LOGGING SPEED	✓	✓	✓	✓	✓	✓	✓	✓				
OFFSET WELL REPEATABILITY	✓	✓	✓	✓	✓	✓	✓	✓				
NOISY MISSING DATA												
CURVES / LOGS DEPTH MATCHED	✓	✓	✓	✓	✓	✓	✓	✓				
Rm MEASURMENTS	✓	✓	✓	✓	✓	✓	✓	✓				
RS / RD CHECK		✓										
?PERF / ZCOR CHECK												
LOG HEADER / TAIL	✓	✓	✓	✓	✓	✓	✓	✓				
PRINT FILM QUALITY	✓	✓	✓	✓	✓	✓	✓	✓				

Notes:

APPENDIX IV: DIRECTIONAL DRILLING END OF WELL

SANTOS LTD.



DIRECTIONAL DRILLING END OF WELL REPORT

WELL : NAYLOR SOUTH #1

sperry-sun
DRILLING SERVICES

SANTOS LTD.

WELL : NAYLOR SOUTH #1

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Customer : **Santos Ltd.**

Well : **Naylor South #1**

Job Objectives:

To achieve a small target (25m radius) 90m at 165° azimuth @ 2050m TVD. It was hoped by jetting to 3 degrees in the top hole and holding angle and direction to TD, the objective could be achieved. In the event that this was unsuccessful, a correction run into the target as late as possible is planned.

Summary of Results:

Jetting in the top hole proved unsuccessful, however even if it was its highly unlikely that such a small target over a long distance could have been achieved without a correction run at any event.
A correction run begun at 1650m lined the well to the target without any problems, at which point the target was close enough that the well could be rotated to TD.

Discussion:

BHA #	Bit #	Motor Run #	Hole Size (in)	MD In (m)	MD Out (m)	TVD In (m)	TVD Out (m)	Inc In (deg)	Inc Out (deg)	Azi In (deg)	Azi Out (deg)	Drlg hrs	Circ hrs
1	1		9.875	13	438	12	438	0.2	1.3	145	8	29	7
2	2		6.750	438	1650	438	1649	1.3	3.3	8	261	55	2
3	3	1	6.750	1650	1819	1649	1811	3.3	22.1	261	167	27	2
4	?		6.750	1819		1811	0	22.1	0.0	167	0	0	0

Table 1 - BHA Summary

Motor Run #	Manufacturer	Type	Lobe	OD (in)	Gauge (in)	Bend (deg)	Adj	DLS (Ori) (°/30m)	ROP (Ori) (m/hr)	ROP (Rot) (m/hr)
1	SSDS	SperryDrill	4/5	4.700	6.500	1.15	Y		4	8

Table 2 - Motor Run Summary

Bit Run Summary:

Bit 1 A 16" Hughes GT-1 Sn A33JD used in the top hole jetting assembly performed well drilling at 60m/hr in the soft top hole.Came out with little wear and tear.

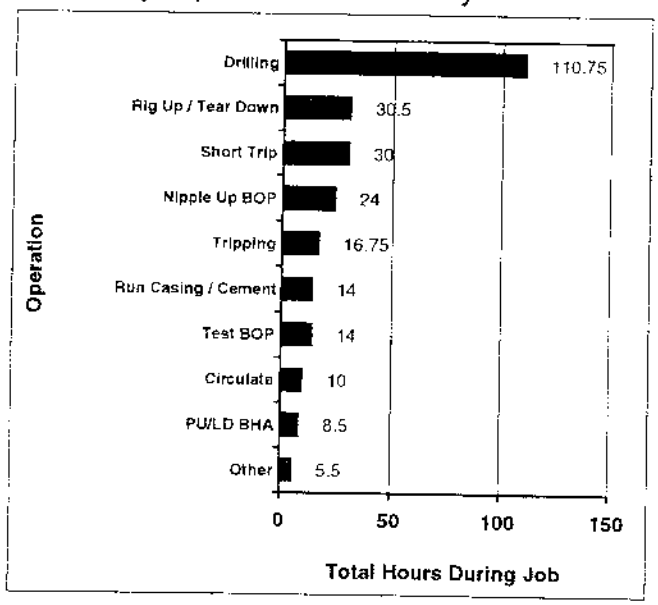
Bit 2
6-3/4" Hughes PDC
Drilled 1200m of 6 3/4" hole to 1650m where the assembly was pulled for a correction run. The ROP was good 40+ /hr for most of the run however slowed over the last 100m. The bit was quite knocked about with chipped and worn teeth and starting to ring out.

Bit 3
6-3/4" Smith XR32TDGPS
Used with a steerable assembly. A hard formation insert bit, not the first choice but the only tricone bit with suitable nozzles, however it slid well with a steady toolface and achieved good dogleg rates . At the end of the correction run rotary ROP had become very slow and the bit was pulled. It was quite worn and there was a lot of erosion.

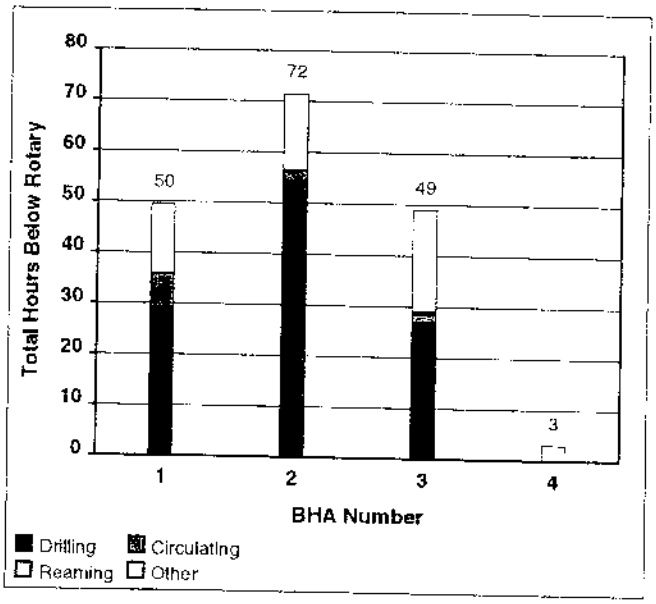
Bit #	Manufacturer	Style	OD (in)	Gge Len (in)	Nozzles (/32's)	TFA (in²)	Dull Grades I O D L B G O R	Ftge (m)	Drlg hrs	ROP (m/hr)
1	Hughes	GT-1	9.875	3.000	1x22	0.371	1-2-WT-A-E-I-NO-TD	426	29.25	15
2	Hughes		6.750		2x11, 2x9	0.310	5-2-WT-SH-X-I-RO-BHA	1212	54.50	22
3	Smith	XR32TDGPS	6.750		3x12	0.331	5-5-WT-A-E-I-ER-ROP	169	27.00	6
?	Hughes		6.750		2x11, 2x9	0.310			0.00	

Table 3 - Bit Run Summary

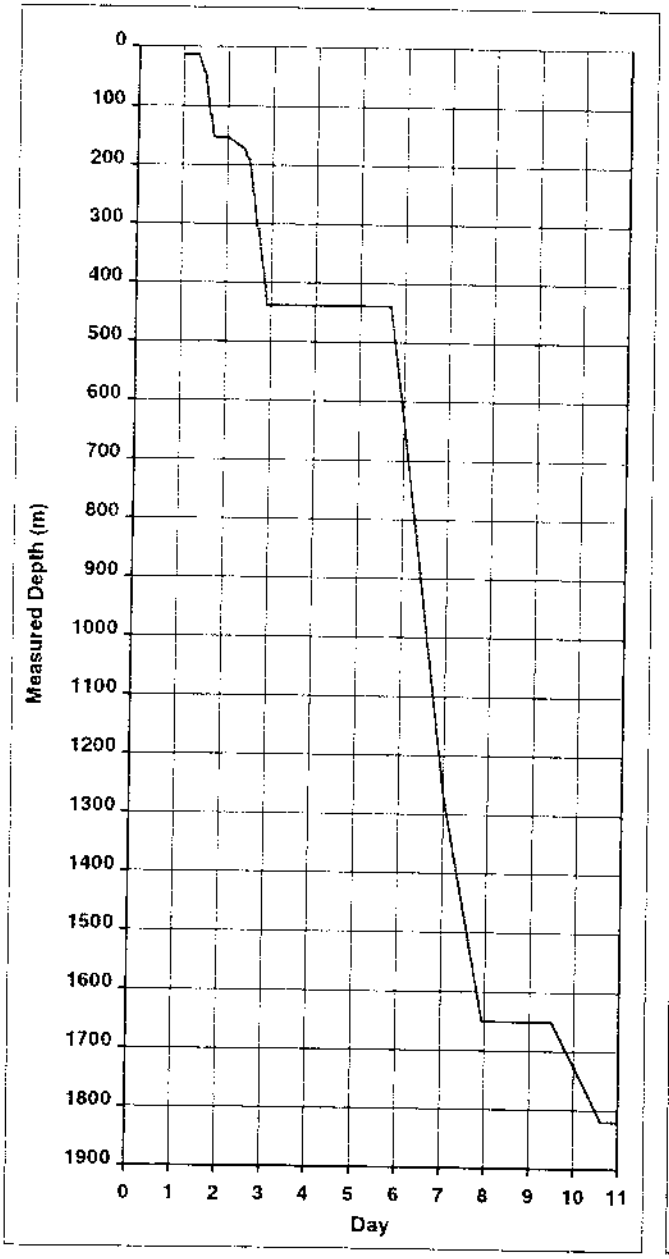
Hours by Operation Summary



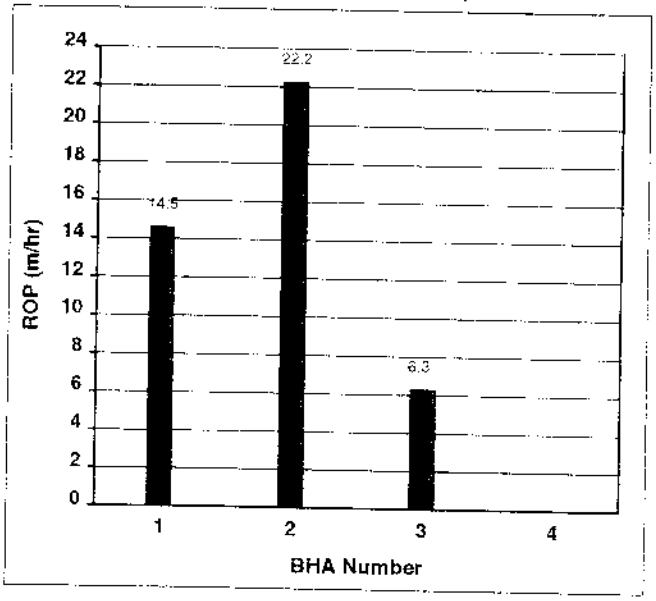
Hours per BHA Breakdown



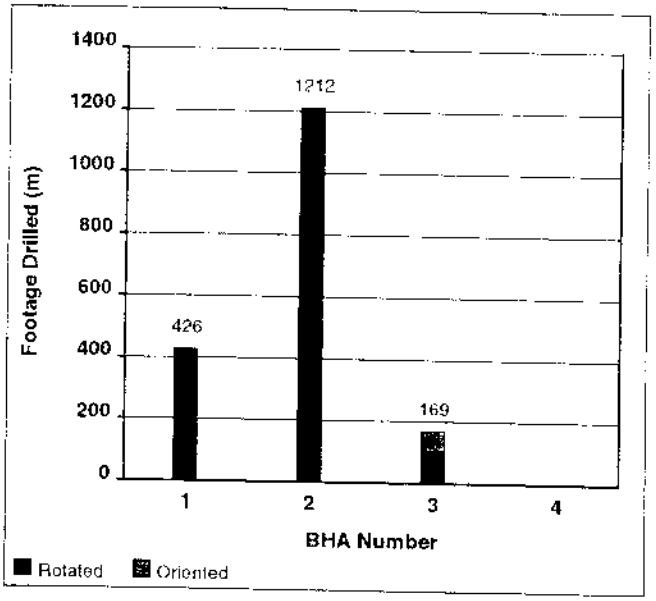
Days vs. Depth



Average Rate of Penetration per BHA



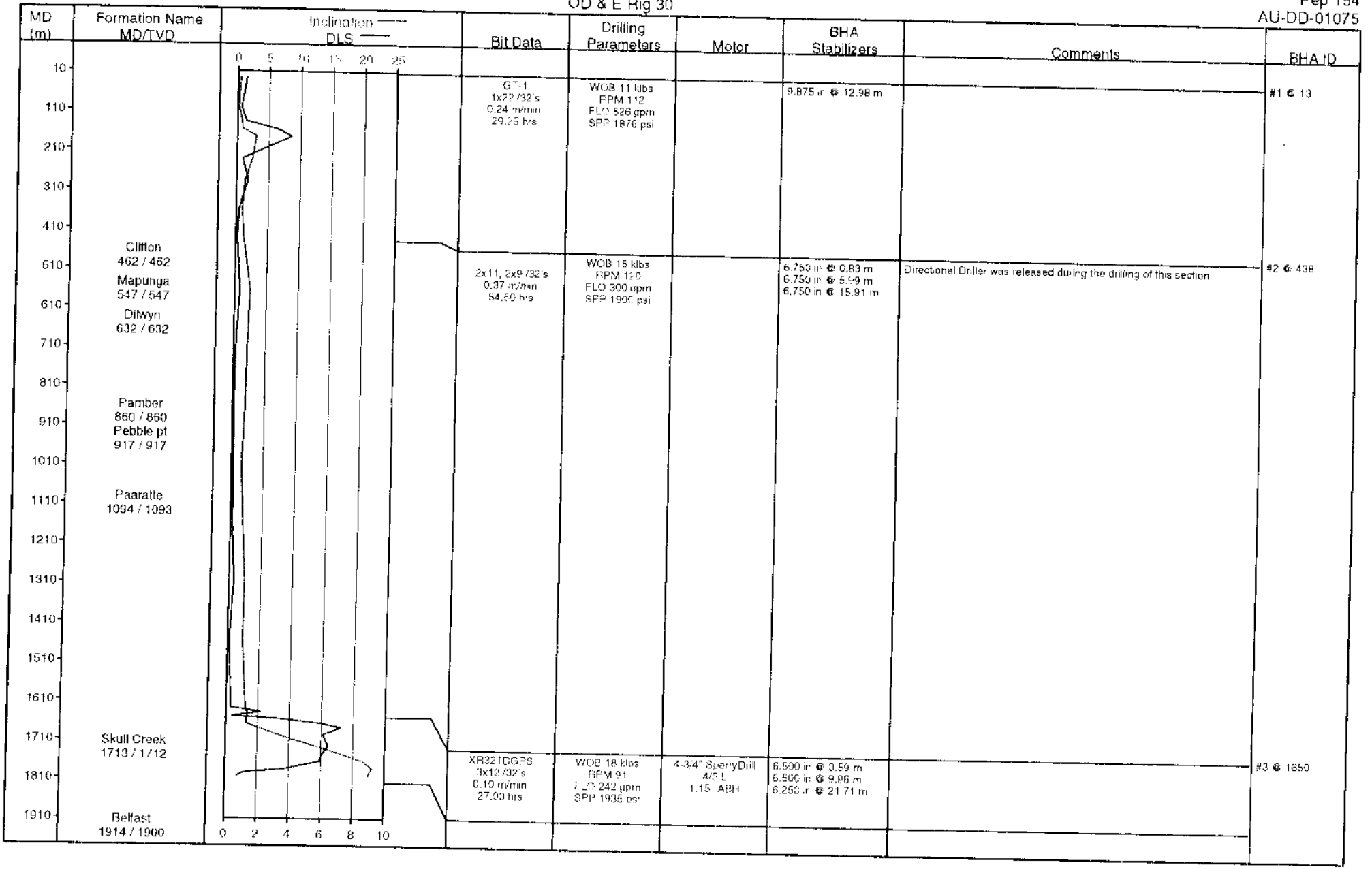
Footage per BHA



Sperry-Sun Drilling Services

Santos Ltd.
Naylor South #1
OD & E Rig 30

Otway Basin
Pep 154
AU-DD-01075



Santos Ltd.
Naylor South
Naylor South #1 : Survey Data

Sperry-Sun

Survey Report

8 May, 2002

Surface Coordinates: 5733054.64 N, 657956.77 E (38° 32' 12.3832" S, 142° 48' 44.3590" E)
Grid Coordinate System: UTM Zone 54S on Australian Datum 1984, Meters

Kelly Bushing: 53.00m above Mean Sea Level

Survey Ref: svy4959

HALLIBURTON

Survey Report for Naylor South #1 : Survey Data

Measured Depth (m)	Incl.	Azim.	Vertical Depth (m)	Northings (m)	Eastings (m)	Vertical Section (m)	Dogleg Rate (°/30m)
0.00	0.000	0.000	0.00	0.00 N	0.00 E	0.00	
25.48	0.500	145.000	25.48	0.09 S	0.06 E	0.07	0.59
99.08	0.250	248.000	99.08	0.41 S	0.10 E	0.37	0.25
135.94	0.750	182.000	135.94	0.69 S	0.02 E	0.66	0.56
155.13	0.850	357.000	155.13	0.67 S	0.00 E	0.65	2.50
174.00	3.000	2.000	173.98	0.04 S	0.01 E	0.03	3.43
231.55	2.500	352.000	231.47	2.71 N	0.11 W	-2.59	0.36
286.85	1.350	12.000	286.74	4.54 N	0.14 W	-4.35	0.71
357.75	1.000	357.000	357.62	5.98 N	0.00 E	-5.78	0.20
425.17	1.250	2.000	425.03	7.30 N	0.00 E	-7.05	0.12
568.00	2.500	38.000	567.78	11.31 N	1.97 E	-11.44	0.35
712.00	2.130	53.000	711.67	15.40 N	6.04 E	-16.43	0.15
857.00	2.000	37.000	856.57	19.04 N	9.71 E	-20.90	0.12
1010.00	1.630	23.000	1009.50	23.18 N	12.17 E	-25.53	0.11
1163.00	2.000	0.000	1162.42	27.85 N	13.02 E	-30.26	0.16
1308.00	2.500	325.000	1307.32	32.97 N	11.21 E	-34.74	0.30
1453.00	2.370	311.000	1452.19	37.53 N	7.13 E	-38.10	0.13
1627.00	3.000	279.000	1626.01	40.60 N	0.08 W	-39.21	0.28
1638.11	3.320	265.670	1637.10	40.62 N	0.69 W	-39.07	2.16
1647.88	3.340	263.300	1646.85	40.57 N	1.26 W	-38.87	0.43
1655.12	3.200	251.730	1654.08	40.48 N	1.66 W	-38.69	2.79
1667.38	3.260	206.910	1666.32	40.06 N	2.14 W	-38.16	6.03
1677.06	4.810	181.810	1675.98	39.41 N	2.28 W	-37.49	7.17
1696.56	8.230	163.360	1695.35	37.25 N	1.90 W	-35.51	6.11
1725.76	14.350	156.170	1723.98	31.94 N	0.16 E	-30.90	6.44
1744.82	18.150	158.300	1742.27	27.02 N	2.21 E	-26.67	6.05
1764.21	21.620	162.650	1760.50	20.80 N	4.40 E	-21.23	5.83
1782.92	23.050	167.520	1777.81	13.93 N	6.21 E	-15.06	3.75
1792.18	22.680	167.370	1786.34	10.42 N	7.00 E	-11.87	1.21
1801.55	22.460	167.200	1795.00	6.91 N	7.79 E	-8.68	0.73

All data is in Metres unless otherwise stated. Directions and coordinates are relative to Grid North.
Vertical depths are relative to RT. Northings and Eastings are relative to Well.

The Dogleg Severity is in Degrees per 30 metres.
Vertical Section is from Well and calculated along an Azimuth of 194.927° (Grid).

Coordinate System is UTM Zone 54S on Australian Datum 1984, Meters.
Grid Convergence at Surface is -1.129°. Magnetic Convergence at Surface is -11.963° (08-Jan-02)

Based upon Minimum Curvature type calculations, at a Measured Depth of 1801.55m.,
The Bottom Hole Displacement is 10.41m., in the Direction of 48.417° (Grid).

Formation tops are provisional and should be used as a guide.

Survey Report for Naylor South #1 : Survey Data

Formation Tops

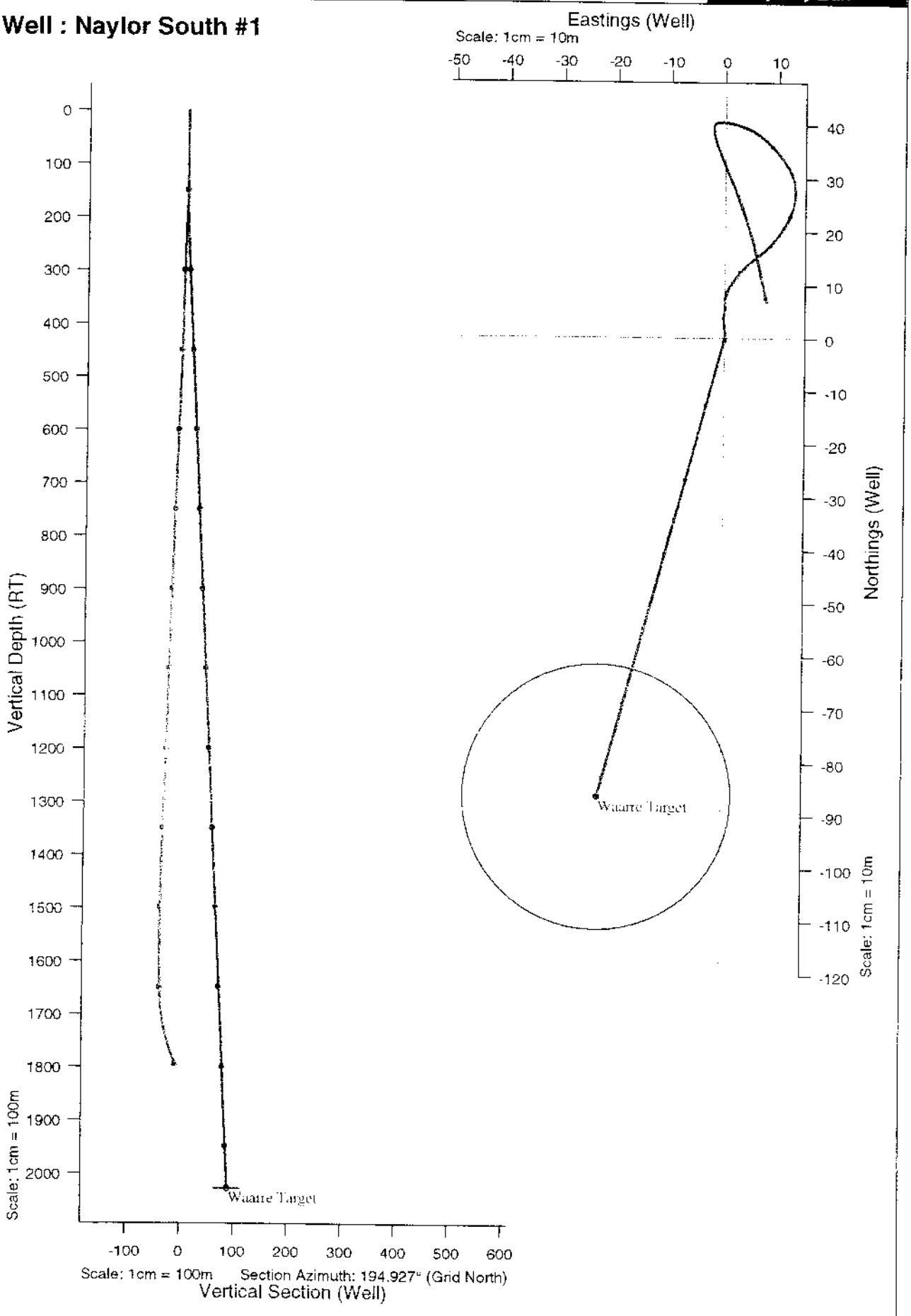
Measured Depth (m)	Vertical Depth (m)	Sub-Sea Depth (m)	Northings (m)	Eastings (m)	Dip Deg.	Dip Dir. Deg.	Formation Name
462.00	461.85	408.85	8.16 N	0.15 E	0.000	0.000	Clifton
547.00	546.80	493.80	10.61 N	1.44 E	0.000	0.000	Mepunga
632.00	631.73	578.73	13.34 N	3.73 E	0.000	0.000	Dilwyn
860.00	859.57	806.57	19.12 N	9.78 E	0.000	0.000	Pamber
917.00	916.54	863.54	20.69 N	10.86 E	0.000	0.000	Pebble Point
1094.00	1093.46	1040.46	25.58 N	12.85 E	0.000	0.000	Paaratte
1713.00	1711.54	1658.54	34.58 N	0.95 W	0.000	0.000	Skull Creek

HALLIBURTON

Santos Ltd.

DrillQuest
Sperry-Sun

Well : Naylor South #1



sperry-sun
DRILLING SERVICES
Survey and Drilling Parameters

Customer : Santos Ltd.
Well : Naylor South #1
Rig : OD & E Rig 30

Location : Otway Basin
Lease : Pep 154
Job # : AU-DD-01075

North Ref : Grid Declination : ° VS Dir : 194.93° (from Wellhead)

WELLBORE SURVEY										DRILLING PARAMETERS									
Measured Depth (m)	Incl Angle (deg)	Azi Dir (deg)	Vertical Depth (m)	Vertical Section (m)	Coordinates N/S (m)	Coordinates E/W (m)	DLS (°/30m)	Build Rate (°/30m)	Turn Rate (°/30m)	WOB (klbs)	RPM	Flow Rate (gpm)	Stand Pipe (psi)	Orientation From (m)	Orientation To (m)	Tool Face (deg)	ROP (m/hr)	BHA No. (#)	Comment
0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00										Theon
25.48	0.50	145.00	25.5	0.1	-0.1	0.1	0.59	0.59	0.00	10	100	500	1600				50	1	
99.08	0.25	248.00	99.1	0.4	-0.4	0.1	0.25	-0.10	0.00	12	100	500	1650				62	1	
135.94	0.75	182.00	135.9	0.7	-0.7	0.0	0.56	0.41	0.00	12	100	500	1650				62	1	
155.13	0.85	357.00	155.1	0.6	-0.7	0.0	2.50	0.16	0.00	30		600	2200	153	155	165R	1	1	
174.00	3.00	2.00	174.0	0.0	0.0	0.0	3.43	3.42	0.00	10	120	550	2000	155	157	165R	60	1	
														164	168	165R		1	
231.55	2.50	352.00	231.5	-2.6	2.7	-0.1	0.36	-0.26	-5.21	10	120	550	2000				60	1	
286.85	1.35	12.00	286.7	-4.4	4.5	-0.1	0.71	-0.62	10.85	10	120	550	2000				60	1	
357.75	1.00	357.00	357.6	-5.8	6.0	0.0	0.20	-0.15	0.00	10	120	550	2000				60	1	
425.17	1.25	2.00	425.0	-7.1	7.3	0.0	0.12	0.11	0.00	10	120	550	2000				60	1	
568.00	2.50	38.00	567.8	-11.4	11.3	2.0	0.35	0.26	7.56	15	120	300	1900				40	2	
712.00	2.13	53.00	711.7	-16.4	15.4	6.0	0.15	-0.08	3.13	15	120	300	1900				40	2	
857.00	2.00	37.00	856.6	-20.9	19.0	9.7	0.12	-0.03	-3.31	15	120	300	1900				40	2	
1010.00	1.63	23.00	1009.5	-25.5	23.2	12.2	0.11	-0.07	-2.75	15	120	300	1900				40	2	
1163.00	2.00	0.00	1162.4	-30.3	27.8	13.0	0.16	0.07	-4.51	15	120	300	1900				40	2	
1308.00	2.50	325.00	1307.3	-34.7	33.0	11.2	0.30	0.10	-7.24	15	120	300	1900				40	2	
1453.00	2.37	311.00	1452.2	-38.1	37.5	7.1	0.13	-0.03	-2.90	15	120	300	1900				40	2	
1627.00	3.00	279.00	1626.0	-39.2	40.6	-0.1	0.28	0.11	-5.52	15	120	300	1900				40	2	
1638.11	3.32	265.67	1637.1	-39.1	40.6	-0.7	2.16	0.86	-35.99	15	120	300	1900				40	2	
1648.88	3.34	263.30	1647.9	-38.9	40.6	-1.3	0.39	0.06	-6.60	15	120	300	1900				40	2	
1655.12	3.20	251.73	1654.1	-38.7	40.5	-1.7	3.24	-0.67	-55.62	18		240	1850	1655	1655	165m	12	3	
1667.38	3.26	206.91	1666.3	-38.2	40.1	-2.1	6.03	0.15	-109.67	15	80	240	1900	1655	1665	165m	30	3	
1677.00	4.81	181.81	1675.9	-37.5	39.4	-2.3	7.22	4.83	-78.27	15	80	240	1900				30	3	
1696.56	8.23	163.36	1695.4	-35.5	37.3	-1.9	6.09	5.25	-28.30	18		240	1850	1684	1697	165m	12	3	
1725.76	14.35	156.17	1724.0	-30.9	31.9	0.2	6.44	6.29	-7.39	20		240	2100	1697	1704	165m	10	3	
														1714	1726	20R		3	
1744.82	18.15	158.30	1742.3	-26.7	27.0	2.2	6.05	5.98	3.35	20		240	2100	1726	1733	20R	10	3	
														1743	1745	25R		3	

Sperry-Sun DRILLING SERVICES

Survey and Drilling Parameters

Customer : Santos Ltd.
Well : Naylor South #1
Rig : OD & E Rig 30

Location : Otway Basin
Lease : Pep 154
Job # : AU-DD-01075

North Ref : Grid Declination : ° VS Dir : 194.93° (from Wellhead)

WELLBORE SURVEY										DRILLING PARAMETERS									
Measured Depth (m)	Incl Angle (deg)	Azi Dir (deg)	Vertical Depth (m)	Vertical Section (m)	Coordinates N/S (m)	Coordinates E/W (m)	DLS (°/30m)	Build Rate (°/30m)	Turn Rate (°/30m)	WOB (klbs)	RPM	Flow Rate (gpm)	Stand Pipe (psi)	Orientation From (m)	Orientation To (m)	Tool Face (deg)	ROP (m/hr)	BHA No. (#)	Comment
1764.00	21.62	162.65	1760.3	-21.3	20.9	4.4	5.90	5.43	6.80	20		240	2100	1745	1752	25R	10	3	
														1762	1764	80R		3	
1782.92	23.05	167.50	1777.8	-15.1	13.9	6.2	3.70	2.27	7.69	20	100	240	1900	1764	1771	80R	10	3	
1792.18	22.68	167.37	1786.3	-11.9	10.4	7.0	1.21	-1.20	-0.42	20	100	240	1900				10	3	
1801.55	22.46	167.20	1795.0	-8.7	6.9	7.8	0.73	-0.70	-0.54	20	100	240	1900				10	3	

sperry-sun
DRILLING SERVICES

BHA Report

Customer : Santos Ltd.
Well : Naylor South #1
Location : Otway Basin
Lease : Pep 154
Rig : OD & E Rig 30
Job # : AU-DD-01075

BHA# 1

BHA# 1 : Date In 15/12/200 MD In (m) : 13 TVD In (m) : 12 Date Out 17/12/200 MD Out (m): 438 TVD Out (m): 438

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
1	9.875	Hughes	GT-1	A33JD	1x22	0.371	1-2-WT-A -E-I-NO-TD

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (psi)	Cum Circ Hrs

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	PDC Hughes GT-1	A33JD	9.875	4.000	9.875	218.19	P 6-5/8" Reg	0.26	
2	Bit Sub		8.000	2.813		150.12	B 6-5/8" Reg	0.95	
3	Cross Over Sub		6.500	2.813		91.91	B 4" IF	0.84	
4	Cross Over Sub		6.500	2.813		91.91	B 4-1/2" IF	0.48	
5	Non-Mag 1x Drill collar	91129	6.500	2.813		92.00	B 4-1/2" IF	9.23	
6	Cross Over Sub		6.500	2.813		91.91	B 4" IF	0.47	
7	Carbide Insert Stabiliser	GU163	6.500	2.813	9.875	91.91	B 4" IF	1.80	12.98
8	10x Drill collar		6.500	2.813		92.00	B 4" IF	91.88	
9	Cross Over Sub		4.750	2.250		46.84	B 3-1/2" IF	0.65	
10	4x HWDP		3.500	2.063		25.30	B 3-1/2" IF	36.21	
								142.77	

Parameter	Min	Max	Ave
WOB (klbs) :	10	30	11
RPM (rpm) :	60	120	112
Flow (gpm) :	45	600	526
SPP (psi) :	1600	2200	1876

Activity	Hrs
Drilling :	29.25
Reaming :	0.00
Circ-Other :	6.50
Total :	35.75

BHA Weight	(lb)
in Air (Total) :	35361
in Mud (Total) :	
in Air (Bel Jars) :	0
in Mud (Bel Jars :	

Drill String	OD(in)	Len (m)
DP(S)-NC38(IF)-13.30#	3.500	295

PERFORMANCE

	In	Out
Inclination (deg)	0.25	1.33
Azimuth (deg)	145.00	7.71

	Distance(m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :	8.00	0			
Rotated :	417.50	15			
Total :	425.50	15	0.08	0.00	0.11

COMMENTS

Customer : Santos Ltd.
Well : Naylor South #1
Location : Otway Basin
Lease : Pep 154
Rig : OD & E Rig 30
Job # : AU-DD-01075

BHA# 1

OBJECTIVES:

Begin jetting at approximately 150m, building to 3 degrees at around 165° azimuth as required to achieve the target at 2050mTVD. MSS will be run on slick line to monitor progress. A UBHO sub was not used at company's request; instead a line was scribed from the jetting nozzle and carried 150m up the BHA and drill pipe.

RESULTS:

At about 150m the scribe line was oriented to approximately 165° azimuth and jetting commenced. 3m per single was jetted for 3 singles by which time 3 degrees had been built but in almost the opposite direction to which was required. It is not known why this happened, perhaps despite great care taken the scribe line became misaligned over 150m of scribing, or maybe the formation trended in this direction. At this point it was decided to rotate ahead to section TD and try to drop off as much angle as possible.

RECOMMENDATIONS:

If jetting use a UBHO sub, to ensure that you travel in the desired direction.

sperry-sun
DRILLING SERVICES

BHA Report

Customer : Santos Ltd.
Well : Naylor South #1
Location : Otway Basin
Lease : Pep 154
Rig : OD & E Rig 30
Job # : AU-DD-01075

BHA# 2

BHA# 2 : Date In 19/12/200 MD In (m) : 438 TVD In (m) : 438 Date Out 22/12/200 MD Out (m): 1650 TVD Out (m): 1649

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
2	6.750	Hughes		1904177	2x11, 2x9	0.310	5-2-WT-SH-X-I-RO-BHA

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (psi)	Cum Circ Hrs

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	PDC	1904177	6.750	3.500	6.750	89.17	P 3-1/2" Reg	0.28	
2	Integral Blade Stabiliser		4.750	2.250	6.750	46.84	B 3-1/2" IF	1.10	0.83
3	Pony collar		4.750	2.250		47.00	B 3-1/2" IF	3.90	
4	Integral Blade Stabiliser		4.750	2.250	6.750	46.84	B 3-1/2" IF	1.41	5.99
5	1x Non-Mag Drill collar	1616	4.750	2.250		47.00	B 3-1/2" IF	8.34	
6	Integral Blade Stabiliser		4.750	2.250	6.750	46.84	B 3-1/2" IF	1.75	15.91
7	16x Spiral Drill collar		4.750	2.250		47.00	B 3-1/2" IF	140.80	
8	Drilling Jar	23921	4.750	2.250		46.84	B 3-1/2" IF	9.19	
9	3x Drill collar		4.750	2.250		47.00	B 3-1/2" IF	28.24	
10	4x HWDP		3.500	2.063		25.30	B 3-1/2" IF	36.21	
								231.22	

Parameter		Min	Max	Ave
WOB (klbs)	:	15	15	15
RPM (rpm)	:	120	120	120
Flow (gpm)	:	300	300	300
SPP (psi)	:	1900	1900	1900

Activity	Hrs
Drilling :	54.50
Reaming :	0.00
Circ-Other :	2.00
Total :	56.50

BHA Weight	(lb)
in Air (Total) :	33108
in Mud (Total) :	
in Air (Bel Jars) :	24335
in Mud (Bel Jars :	

Drill String	OD(in)	Len(m)
DP(S)-NC38(IF)-13.30#	3.500	1419

PERFORMANCE

	In	Out
Inclination (deg)	1.33	3.31
Azimuth (deg)	7.71	261.30

	Distance (m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :	0.00	0			
Rotated :	1212.00	22			
Total :	1212.00	22	0.05	-2.63	0.10

COMMENTS

Directional Driller was released during the drilling of this section

OBJECTIVES:

To rotate ahead to a point where a correction run to achieve the target requires building to less than 30 degrees, and requires less than 8°/30m doglegs.

RESULTS:

Rotated ahead to 1650m at which point the well was at 3 degrees at 265° azimuth.

sperry-sun
DRILLING SERVICES

BHA Report

Customer : Santos Ltd.
Well : Naylor South #1
Location : Otway Basin
Lease : Pep 154
Rig : OD & E Rig 30
Job # : AU-DD-01075

BHA# 3

BHA# 3 : Date In 22/12/200 MD In (m) : 1650 TVD In (m) : 1649 Date Out 24/12/200 MD Out (m): 1819 TVD Out (m): 1811

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
3	6.750	Smith	XR32TDGPS	MH4631	3x12	0.331	5-5-WT-A -E-I-ER-ROP

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (psi)	Cum Circ Hrs
1	4.750	SSDS	SperryDrill	475355	1.15°		128	29.00

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	Tricone Smith XR32TD	MH4631	6.750	3.000	6.750	97.86	P 3-1/2" Reg	0.19	
2	4-3/4" SperryDrill Lobe 4/5 - 6.3 stg	475355	4.750	2.794	6.500	39.50	B 3-1/2" IF	8.13	0.59
3	Float Sub	A397	4.625	2.125		45.17	B 3-1/2" IF	0.76	
4	Integral Blade Stabilizer	0207000168	4.750	2.250	6.500	46.84	B 3-1/2" IF	1.75	9.96
5	Non-Mag Px P Cross Over Sub	3081	4.500	2.250		40.65	P 3-1/2" IF	0.64	
6	DWD SlimHole - HOC	00045	4.750	2.810		39.26	B 3-1/2" IF	9.54	
7	Integral Blade Stabilizer	5040	4.625	2.125	6.250	45.17	B 3-1/2" IF	1.41	21.71
8	16x Spiral Drill collar		4.750	2.250		47.00	B 3-1/2" IF	150.11	
9	Drilling Jar	23921	4.750	2.250		46.84	B 3-1/2" IF	9.19	
10	3x Drill collar		4.750	2.250		47.00	B 3-1/2" IF	28.24	
11	4x HWDP		3.500	2.063		25.30	B 3-1/2" IF	36.21	
								246.17	

Parameter		Min	Max	Ave
WOB (klbs)	:	15	20	18
RPM (rpm)	:	80	120	91
Flow (gpm)	:	240	300	242
SPP (psi)	:	1850	2100	1935

Activity	Hrs
Drilling :	27.00
Reaming :	0.50
Circ-Other :	1.50
Total :	29.00

BHA Weight	(lb)
in Air (Total) :	34939
in Mud (Total)	30039
in Air (Bel Jars) :	26166
in Mud (Bel Jars :	22497

Drill String	OD(in)	Len (m)
DP(S)-NC38(IF)-13.30#	3.500	1573

PERFORMANCE

	In	Out
Inclination (deg)	3.31	22.05
Azimuth (deg)	261.30	166.87

	Distance(m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :	67.00	4			
Rotated :	102.00	8			
Total :	169.00	6	3.33	-16.76	4.00

COMMENTS

OBJECTIVES:

A correction run to achieve the target. Need to build to 22 degrees at 6°/30m then hold to TD.

RESULTS:

The required angle and direction was achieved by sliding two singles and rotating one. Sliding was generally reasonable, becoming a little tedious towards the end. After rotating ahead 40m the ROP became very slow, and the assembly was pulled for a bit.

sperry-sun
DRILLING SERVICES

BHA Report

Customer : Santos Ltd.
Well : Naylor South #1
Location : Otway Basin
Lease : Pep 154
Rig : OD & E Rig 30
Job # : AU-DD-01075

BHA# 4

BHA# 4 : Date In 24/12/200 MD In (m) : 1819 TVD In (m) : 1811 Date Cur 13/12/200 MD Cur (m): TVD Cur (m): 0

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
	6.750	Hughes		1904177	2x11, 2x9	0.310	

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (psi)	Cum Circ Hrs

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	PDC	1904177	6.750	3.500	6.750	89.17	P 3-1/2" Reg	0.28	
2	Integral Blade Stabiliser		4.750	2.250	6.563	46.84	B 3-1/2" IF	1.10	0.83
3	Float Sub	A536	4.750	2.250		46.84	B 3-1/2" IF	1.10	
4	Float Sub	A397	4.750	2.250		46.84	B 3-1/2" IF	0.76	
5	Integral Blade Stabiliser		4.750	2.250	6.625	46.84	B 3-1/2" IF	1.41	3.95
6	1x Non-Mag Drill collar	1616	4.750	2.250		47.00	B 3-1/2" IF	8.34	
7	Integral Blade Stabiliser		4.750	2.250	6.625	46.84	B 3-1/2" IF	1.75	13.87
8	16x Spiral Drill collar		4.750	2.250		47.00	B 3-1/2" IF	140.80	
9	Drilling Jar	23921	4.750	2.250		46.84	B 3-1/2" IF	9.19	
10	3x Drill collar		4.750	2.250		47.00	B 3-1/2" IF	28.24	
11	4x HWDP		3.500	2.063		25.30	B 3-1/2" IF	36.21	
								229.18	

Parameter	Min	Max	Ave
WOB (klbs) :			
RPM (rpm) :			
Flow (gpm) :			
SPP (psi) :			

Activity	Hrs
Drilling :	0.00
Reaming :	0.00
Circ-Other :	0.00
Total :	0.00

BHA Weight	(lb)
in Air (Total) :	32792
in Mud (Total) :	
in Air (Bel Jars) :	24020
in Mud (Bel Jars :	

Drill String	OD(in)	Len(m)
DP(S)-NC38(IF)-13.30#	3.500	

PERFORMANCE

	In	Out
Inclination (deg)	22.05	0.00
Azimuth (deg)	166.87	0.00

	Distance(m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :					
Rotated :					
Total :					

COMMENTS

OBJECTIVES:

As the well was lined up to the target and there was little chance of missing the target over a relativly short distance, it was decided to use a slightly dropping rotary assembly to TD.

RESULTS:

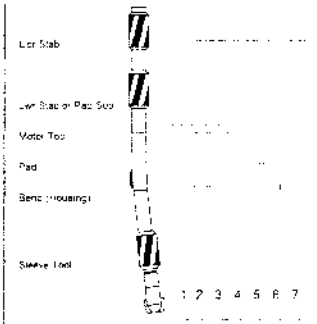
Rotated to TD intersecting the target 19m from centre.

MOTOR PERFORMANCE REPORT

M-AU-DD-01075-3

Motor Serial #	475355	Job # :	AU-DD-01075		
Directional Driller(s) :	A .Pritchett	Customer :	Santos Ltd.		
Location	Pep 154	Rig :	OD & E Rig 30		
Well :	Naylor South #1	Bit Run # :	3	BHA # : 3	Motor Run # : 1
Depth In/Out :	1650 / 1819 m	Date In/Out :	22/12/2001 / 24/12/2001		Hole Size : 6.750 in
Application Details :	Correction Run				

MOTOR CONFIGURATION



	From Bit (m)	Component		Type	Diam In/Out (in)
1	0.59	Sleeve Stab/Pad	Yes	Stab: 5 / 0°	6.500 6.500
2	1.51	Bent Housing	Yes	Adjustable: 1.15° bend	
3		Housing Tool Used	No		
4	6.32	Stator Elastomer	HSN	Stator: Oversized	
5		Bent Sub / 2nd Bent Hsg	No		
6	9.96	Lower String Stab	Yes	Stab: 3 / 180°	6.500 6.500
7	21.71	Upper String Stab	Yes	Stab: 3 / 180°	6.250 6.250

Additional Features :						Arr	Ret
Flex Collar : No	Short Brg Pack : Yes	Rtr Noz / Size : /32's		Pick Up Sub :		Yes	Yes
Brg Cfg (Off/On) :	Lobe Cfg : 4/5	BHA OD/ID : 4.625 / 2.125 in		Bit Box Protr :		Yes	Yes

MOTOR RUN DATA

Max Dogleg While Rotating :	°/30m	RPM :		Motor Stalled :	No	Prev Job/Well Hrs :	0.00
Max Dogleg Overpulled In :	°/30m	Force :	lbf	Float Valve :	No	Drilling Hrs :	27.00
Max Dogleg Pushed Through :	°/30m	Force :	lbf	DP Filter :	No	Circ Hrs :	1.50
Hole Azimuth Start / End :	261.30° / 166.87°	Inc Start / End :	3.31° / 22.05°			Reaming Hrs :	0.50
Interval Oriented / Rot. :	67 / 102 m	Directional Perf Ori / Rot :	/ °/30m			Total Hrs This Run :	29.00
Jarring Occured : No						New Cumulative Hrs :	29.00

	Diff Press (psi)	Str RPM	Rotn Torque (ft-lbs)	Drag Up/Dn (klbs)	WOB (klbs)	ROP Oriented (m/hr)	ROP Rotated (m/hr)
Avg :	128	91		/	18	4	8
Max :	200	120		/	20	12	40

PRE-RUN TESTS

Motor Tested Pre-Run :	No	with :	
Dump Sub Operating :	N/A	Brg Play :	mm
Flow 1 :	gpm	Pressure 1 :	psi
Flow 2 :	gpm	Pressure 2 :	psi
Driveshaft Rotation Observed :	No		
Bearing Leakage Observed :	No		

POST-RUN TESTS

Motor Tested Post-Run :	No	with :	
Dump Sub Operating :	N/A	Brg Play :	mm
Flow 1 :	gpm	Pressure 1 :	psi
Flow 2 :	gpm	Pressure 2 :	psi
Driveshaft Rotation Observed :	No		
Bearing Leakage Observed :	No		
Driveshaft Rotated to Drain Mud :	No		
Fluid Flushed :	No	Fluid Used :	

MUD DATA

Base :	Additives :	Mud Wt :	ppg	SPP Start/End :	1850 / 1900	psi	
% Oil/Water :	% Solids :	% Sand :	PV :	cp	YP :	lb/100ft²	pH :
DH Temp Avg/Max :	/	FlowRate Avg/Max :	242 / 300 gpm	Chloride Content :	ppm		
Principle Formation Name(s) :	Paaratte, Skull Creek			Lithology :			

BIT DATA

Make :	Smith	Type :	XR32TDGPS	Serial # :	MH4631	Dull Grade	1	2	3	4	5	6	7	8
Pre Existing Hours From Other Wells:														
Prev Drilling Hrs :	0.00	Prev Reaming Hrs :	0.00	No of Runs This Bit :	1	In								NEW
Jet Sizes /32's	3x12	TFA :	0.331 in²	Gage Length :	in	Out	5	5	WT	A	E	I	ER	ROP

PERFORMANCE COMMENTS

Problem Perceived :	No	Problem Date :		Service Interrupt :	No	Service Interrupt Hrs :	
Performance Motor :	Yes	Tandem Motor :	No	LIH :	No	PPR Ref # :	

Customer Representative's Signature (optional) : ..... Date: .....

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DRILLING SERVICES

Daily Drilling Report

Customer : Santos Ltd.
Well : Naylor South #1
Location : Otway Basin
Lease : Pep 154
Rig : OD & E Rig 30
Job # : AU-DD-01075

CURRENT STATUS Report # 1 14/12/2001

Total Depth	(m)	:	13	Casing Depth	(m)	:	0.00	Operator Reps : Duncan New
Drilled last 24 hrs	(m)	:	0	Casing Diameter	(in)	:	0.000	SSDS Reps : A .Pritchett (1)
Hole Size	(in)	:		Casing ID	(in)	:		

LAST SURVEY

Depth (m)	Inclination	Azimuth	TVD (m)	Displ (m)	Direction
0.00	0.00	0.00	0.00	0.00	N00.00E

LAST FORMATION TOP

Formation Name	MD Top (m)	TVD Top (m)

BHA SUMMARY

MUD DATA

Type	Weight (ppg)	FV (sec)	PV (cp)	YP (lbf/100ft²)	Gels	Fluid Loss	pH	Solids (%)	Sand (%)	Oil (%)

TIME BREAKDOWN

From	To	Hours	TMD (m)	BHA #	Activity
00:00	00:00	24.00	12.50		Rig Up

COMMENTS

A.Pritchett arrives on site

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DRILLING SERVICES

Daily Drilling Report

Customer : Santos Ltd.
Well : Naylor South #1
Location : Otway Basin
Lease : Pep 154
Rig : OD & E Rig 30
Job # : AU-DD-01075

CURRENT STATUS Report # 2 15/12/2001

Total Depth	(m)	:	154	Casing Depth	(m)	:	0.00	Operator Reps : Duncan New
Drilled last 24 hrs	(m)	:	141	Casing Diameter	(in)	:	0.000	SSDS Reps : A .Pritchett (2)
Hole Size	(in)	:	9.875	Casing ID	(in)	:		

LAST SURVEY

Depth (m)	Inclination	Azimuth	TVD (m)	Displ (m)	Direction
135.94	0.75	182.00	135.94	0.69	S01.35E

LAST FORMATION TOP

Formation Name	MD Top (m)	TVD Top (m)

BHA SUMMARY

BHA 1: 142.77 m; Bit #1 (9.75 hrs), Sub, Sub, Sub, DC, Sub, Stab, 10x DC, Sub, 4x HWDP

MUD DATA

Type	Weight (ppg)	FV (sec)	PV (cp)	YP (lbf/100ft²)	Gels	Fluid Loss	pH	Solids (%)	Sand (%)	Oil (%)

TIME BREAKDOWN

From	To	Hours	TMD (m)	BHA #	Activity
00:00	06:30	6.50	12.50		Rig Up
06:30	07:30	1.00	12.50		Make up 9-7/8" BHA
07:30	07:45	0.25	12.50	1	Trip In
07:45	11:00	3.25	43.30	1	Continue to make up BHA while drilling
11:00	11:30	0.50	43.30	1	Circulate and MSS Deviation Survey
11:30	14:30	3.00	116.00	1	Drill 9-7/8" hole from 43.3m to 116m
14:30	15:00	0.50	116.00	1	Circulate and MSS Deviation Survey
15:00	16:30	1.50	153.00	1	Drill 9-7/8" hole from 116m to 153m
16:30	17:00	0.50	153.00	1	Circulate and MSS Deviation Survey
17:00	18:00	1.00	153.60	1	Drilling / Jetting 9-7/8" hole from 153 to 153.6m
18:00	23:00	5.00	153.60	1	Circulate / jet with one pump (300 gpm) while repairing other pump
23:00	00:00	1.00	154.00	1	Drilling / Jetting 9-7/8" hole to 154m

COMMENTS

sperry-sun
DRILLING SERVICES

Daily Drilling Report

Customer : Santos Ltd.
Well : Naylor South #1
Location : Otway Basin
Lease : Pep 154
Rig : OD & E Rig 30
Job # : AU-DD-01075

CURRENT STATUS Report # 3 16/12/2001

Total Depth	(m)	:	438	Casing Depth	(m)	:	0.00	Operator Reps : Duncan New
Drilled last 24 hrs	(m)	:	284	Casing Diameter	(in)	:	0.000	SSDS Reps : A .Pritchett (3)
Hole Size	(in)	:	9.875	Casing ID	(in)	:		

LAST SURVEY

Depth (m)	Inclination	Azimuth	TVD (m)	Displ (m)	Direction
425.17	1.25	2.00	425.03	7.30	N00.03W

LAST FORMATION TOP

Formation Name	MD Top (m)	TVD Top (m)

BHA SUMMARY

BHA 1: 142.77 m; Bit #1 (29.25 hrs), Sub, Sub, Sub, DC, Sub, Stab, 10x DC, Sub, 4x HWDP

MUD DATA

Type	Weight (ppg)	FV (sec)	PV (cp)	YP (lbf/100ft²)	Gels	Fluid Loss	pH	Solids (%)	Sand (%)	Oil (%)

TIME BREAKDOWN

From	To	Hours	TMD (m)	BHA #	Activity
00:00	09:00	9.00	173.00	1	Drilling / Jetting 9-7/8" hole from 154m to 173m
09:00	11:00	2.00	191.00	1	Drill 9-7/8" hole from 173m to 191m
11:00	11:30	0.50	191.00	1	Deviation Survey
11:30	14:00	2.50	250.00	1	Drill 9-7/8" hole from 191m to 250m
14:00	14:30	0.50	250.00	1	Deviation Survey
14:30	16:00	1.50	308.00	1	Drill 9-7/8" hole from 250m to 308m
16:00	16:30	0.50	308.00	1	Service Rig
16:30	17:00	0.50	308.00	1	Deviation Survey
17:00	19:30	2.50	376.00	1	Drill 9-7/8" hole from 308m to 376m
19:30	20:00	0.50	376.00	1	Deviation Survey
20:00	22:00	2.00	438.00	1	Drill 9-7/8" hole from 376m to 438m - Section TD
22:00	23:30	1.50	438.00	1	Circulate hole clean
23:30	00:00	0.50	438.00	1	Deviation Survey

COMMENTS

sperry-sun
DRILLING SERVICES

Daily Drilling Report

Customer : Santos Ltd.
Well : Naylor South #1
Location : Otway Basin
Lease : Pep 154
Rig : OD & E Rig 30
Job # : AU-DD-01075

CURRENT STATUS Report # 4 17/12/2001

Total Depth	(m)	:	438	Casing Depth	(m)	:	0.00	Operator Reps : Duncan New
Drilled last 24 hrs	(m)	:	0	Casing Diameter	(in)	:	0.000	SSDS Reps : A .Pritchett (4)
Hole Size	(in)	:	9.875	Casing ID	(in)	:		

LAST SURVEY

Depth (m)	Inclination	Azimuth	TVD (m)	Displ (m)	Direction
425.17	1.25	2.00	425.03	7.30	N00.03W

LAST FORMATION TOP

Formation Name	MD Top (m)	TVD Top (m)

BHA SUMMARY

BHA 1: 142.77 m; Bit #1 (29.25 hrs), Sub, Sub, Sub, DC, Sub, Stab, 10x DC, Sub, 4x HWDP

MUD DATA

Type	Weight (ppg)	FV (sec)	PV (cp)	YP (lbf/100ft²)	Gels	Fluid Loss	pH	Solids (%)	Sand (%)	Oil (%)

TIME BREAKDOWN

From	To	Hours	TMD (m)	BHA #	Activity
00:00	07:00	7.00	438.00	1	Wiper trip to surface and back to TD
07:00	09:00	2.00	438.00	1	Trip Out (at Surface)
09:00	10:00	1.00	438.00	1	PU/LD BHA
10:00	00:00	14.00	438.00		Run Casing / Cement

COMMENTS

sperry-sun
DRILLING SERVICES

Daily Drilling Report

Customer : Santos Ltd.
Well : Naylor South #1
Location : Otway Basin
Lease : Pep 154
Rig : OD & E Rig 30
Job # : AU-DD-01075

CURRENT STATUS Report # 5 18/12/2001

Total Depth	(m)	: 438	Casing Depth	(m)	: 0.00	Operator Reps	: Duncan New
Drilled last 24 hrs	(m)	: 0	Casing Diameter	(in)	: 0.000	SSDS Reps	: A .Pritchett (5)
Hole Size	(in)	:	Casing ID	(in)	:		

LAST SURVEY

Depth (m)	Inclination	Azimuth	TVD (m)	Displ (m)	Direction
425.17	1.25	2.00	425.03	7.30	N00.03W

LAST FORMATION TOP

Formation Name	MD Top (m)	TVD Top (m)

BHA SUMMARY

MUD DATA

Type	Weight (ppg)	FV (sec)	PV (cp)	YP (lbf/100ft²)	Gels	Fluid Loss	pH	Solids (%)	Sand (%)	Oil (%)
					/					

TIME BREAKDOWN

From	To	Hours	TMD (m)	BHA #	Activity
00:00	00:00	24.00	438.00		Nipple Up BOP

COMMENTS

A.Pritchett released from rig

sperry-sun
DRILLING SERVICES

Daily Drilling Report

Customer : Santos Ltd.
Well : Naylor South #1
Location : Otway Basin
Lease : Pep 154
Rig : OD & E Rig 30
Job # : AU-DD-01075

CURRENT STATUS Report # 6 19/12/2001

Total Depth	(m)	:	628	Casing Depth	(m)	:	0.00	Operator Reps : Duncan New
Drilled last 24 hrs	(m)	:	190	Casing Diameter	(in)	:	0.000	SSDS Reps :
Hole Size	(in)	:	6.750	Casing ID	(in)	:		

LAST SURVEY

Depth (m)	Inclination	Azimuth	TVD (m)	Displ (m)	Direction
568.00	2.50	38.00	567.78	11.48	N09.87E

LAST FORMATION TOP

Formation Name	MD Top (m)	TVD Top (m)
Mapunga	547.00	546.80

BHA SUMMARY

BHA 2: 231.22 m; Bit #2 (8. hrs), Stab, Pony, Stab, 1x DC, Stab, 16x DC, Jar, 3x DC, 4x HWDP

MUD DATA

Type	Weight (ppg)	FV (sec)	PV (cp)	YP (lbf/100ft²)	Gels	Fluid Loss	pH	Solids (%)	Sand (%)	Oil (%)
					/					

TIME BREAKDOWN

From	To	Hours	TMD (m)	BHA #	Activity
00:00	14:00	14.00	438.00		Test BOP
14:00	15:00	1.00	438.00		Pick up 6-3/4" Rotary BHA
15:00	16:00	1.00	438.00	2	Trip In
16:00	00:00	8.00	628.00	2	Drill / Survey 6-3/4" hole from 348m to 628m

COMMENTS

sperry-sun
DRILLING SERVICES

Daily Drilling Report

Customer : Santos Ltd.
Well : Naylor South #1
Location : Otway Basin
Lease : Pep 154
Rig : OD & E Rig 30
Job # : AU-DD-01075

CURRENT STATUS Report # 7 20/12/2001

Total Depth	(m)	:	1267	Casing Depth	(m)	:	0.00	Operator Reps : Duncan New
Drilled last 24 hrs	(m)	:	639	Casing Diameter	(in)	:	0.000	SSDS Reps :
Hole Size	(in)	:	6.750	Casing ID	(in)	:		

LAST SURVEY

Depth (m)	Inclination	Azimuth	TVD (m)	Displ (m)	Direction
1163.00	2.00	0.00	1162.42	30.74	N25.06E

LAST FORMATION TOP

Formation Name	MD Top (m)	TVD Top (m)
Paaratte	1094.00	1093.46

BHA SUMMARY

BHA 2; 231.22 m; Bit #2 (32. hrs), Stab, Pony, Stab, 1x DC, Stab, 16x DC, Jar, 3x DC, 4x HWDP

MUD DATA

Type	Weight (ppg)	FV (sec)	PV (cp)	YP (lbf/100ft²)	Gels	Fluid Loss	pH	Solids (%)	Sand (%)	Oil (%)

TIME BREAKDOWN

From	To	Hours	TMD (m)	BHA #	Activity
00:00	00:00	24.00	1267.00	2	Drill / Survey 6-3/4" hole from 628m to 1267m

COMMENTS

sperry-sun
DRILLING SERVICES

Daily Drilling Report

Customer : Santos Ltd.
Well : Naylor South #1
Location : Otway Basin
Lease : Pep 154
Rig : OD & E Rig 30
Job # : AU-DD-01075

CURRENT STATUS Report # 8 21/12/2001

Total Depth	(m)	:	1650	Casing Depth	(m)	:	0.00	Operator Reps : Duncan New
Drilled last 24 hrs	(m)	:	383	Casing Diameter	(in)	:	0.000	SSDS Reps : A .Pritchett (6)
Hole Size	(in)	:	6.750	Casing ID	(in)	:		

LAST SURVEY

Depth (m)	Inclination	Azimuth	TVD (m)	Displ (m)	Direction
1648.88	3.34	263.30	1647.85	40.58	N01.85W

LAST FORMATION TOP

Formation Name	MD Top (m)	TVD Top (m)
Paaratte	1094.00	1093.46

BHA SUMMARY

BHA 2. 231.22 m; Bit #2 (54.5 hrs), Stab, Pony, Stab, 1x DC, Stab, 16x DC, Jar, 3x DC, 4x HWDP

MUD DATA

Type	Weight (ppg)	FV (sec)	PV (cp)	YP (lbf/100ft²)	Gels	Fluid Loss	pH	Solids (%)	Sand (%)	Oil (%)

TIME BREAKDOWN

From	To	Hours	TMD (m)	BHA #	Activity
00:00	22:30	22.50	1650.00	2	Drill / Survey 6-3/4" hole from 1267m to 1650m
22:30	23:00	0.50	1650.00	2	Circulate hole clean
23:00	23:30	0.50	1650.00	2	Deviation Survey
23:30	00:00	0.50	1650.00	2	Circulate - pump Hi - Vis pill

COMMENTS

A.Pritchett and C. Landon arrive at rig

sperry-sun
DRILLING SERVICES

Daily Drilling Report

Customer : Santos Ltd.
Well : Naylor South #1
Location : Otway Basin
Lease : Pep 154
Rig : OD & E Rig 30
Job # : AU-DD-01075

CURRENT STATUS Report # 9 22/12/2001

Total Depth	(m)	: 1650	Casing Depth	(m)	: 0.00	Operator Reps	:	Duncan New
Drilled last 24 hrs	(m)	: 0	Casing Diameter	(in)	: 0.000	SSDS Reps	:	A .Pritchett (7)
Hole Size	(in)	: 6.750	Casing ID	(in)	:			

LAST SURVEY

Depth (m)	Inclination	Azimuth	TVD (m)	Displ (m)	Direction
1648.88	3.34	263.30	1647.85	40.58	N01.85W

LAST FORMATION TOP

Formation Name	MD Top (m)	TVD Top (m)
Paaratte	1094.00	1093.46

BHA SUMMARY

BHA 2: 231.22 m; Bit #2 (54.5 hrs), Stab, Pony, Stab, 1x DC, Stab, 16x DC, Jar, 3x DC, 4x HWDP
BHA 3: 246.17 m; Bit #3 (0.5 hrs), PDM #1 (0.5 hrs), Sub, Stab, Sub, MWD, Stab, 16x DC, Jar, 3x DC, 4x HWDP

MUD DATA

Type	Weight (ppg)	FV (sec)	PV (cp)	YP (lbf/100ft²)	Gels	Fluid Loss	pH	Solids (%)	Sand (%)	Oil (%)

TIME BREAKDOWN

From	To	Hours	TMD (m)	BHA #	Activity
00:00	05:30	5.50	1650.00	2	Wiper trip to shoe - Hole tight all the way out.
05:30	09:30	4.00	1650.00	2	Run back to bottom - hole ok
09:30	10:30	1.00	1650.00	2	Circulate hole clean
10:30	14:30	4.00	1650.00	2	Trip Out (at Surface) for a correction run
14:30	16:00	1.50	1650.00	2	Lay out 6-3/4" rotary BHA
16:00	18:00	2.00	1650.00	2	Make up 6-3/4" steerable assembly - Test motor and MWD
18:00	21:30	3.50	1650.00	3	Trip In to 1633m
21:30	22:00	0.50	1650.00	3	Pick up kelly to wash to bottom - No go , pressure trapped in string
22:00	00:00	2.00	1650.00	3	POOH to find blockage

COMMENTS

sperry-sun
DRILLING SERVICES

Daily Drilling Report

Customer : Santos Ltd.
Well : Naylor South #1
Location : Otway Basin
Lease : Pep 154
Rig : OD & E Rig 30
Job # : AU-DD-01075

CURRENT STATUS Report # 10 23/12/2001

Total Depth	(m)	:	1725	Casing Depth	(m)	:	0.00	Operator Reps : Duncan New
Drilled last 24 hrs	(m)	:	75	Casing Diameter	(in)	:	0.000	SSDS Reps : A .Pritchett (8)
Hole Size	(in)	:	6.750	Casing ID	(in)	:		

LAST SURVEY

Depth (m)	Inclination	Azimuth	TVD (m)	Displ (m)	Direction
1696.56	8.23	163.36	1695.35	37.31	N02.92W

LAST FORMATION TOP

Formation Name	MD Top (m)	TVD Top (m)
Skull Creek	1713.00	1711.54

BHA SUMMARY

BHA 3: 246.17 m; Bit #3 (12.5 hrs), PDM #1 (13. hrs), Sub, Stab, Sub, MWD, Stab, 16x DC, Jar, 3x DC, 4x HWDP

MUD DATA

Type	Weight (ppg)	FV (sec)	PV (cp)	YP (lbf/100ft²)	Gels	Fluid Loss	pH	Solids (%)	Sand (%)	Oil (%)

TIME BREAKDOWN

From	To	Hours	TMD (m)	BHA #	Activity
00:00	04:00	4.00	1650.00	3	POOH to BHA fing 6 feet of pipe scale above MWD
04:00	06:00	2.00	1650.00	3	Rack back motor & MWD - RIH drill collars and circulate out scale. - POOH
06:00	07:00	1.00	1650.00	3	Pick up and test motor and MWD
07:00	11:30	4.50	1650.00	3	Trip in drifting drill pipe
11:30	12:00	0.50	1650.00	3	Pick up kelly and wash to bottom.
12:00	00:00	12.00	1725.00	3	Drilling - Slide/Rotate 6-3/4" hole to 1725m

COMMENTS

sperry-sun
DRILLING SERVICES

Daily Drilling Report

Customer : Santos Ltd.
Well : Naylor South #1
Location : Otway Basin
Lease : Pep 154
Rig : OD & E Rig 30
Job # : AU-DD-01075

CURRENT STATUS Report # 11 24/12/2001

Total Depth	(m)	:	1819	Casing Depth	(m)	:	0.00	Operator Reps : Duncan New
Drilled last 24 hrs	(m)	:	94	Casing Diameter	(in)	:	0.000	SSDS Reps : A .Pritchett (9)
Hole Size	(in)	:	6.750	Casing ID	(in)	:		

LAST SURVEY

Depth (m)	Inclination	Azimuth	TVD (m)	Displ (m)	Direction
1801.55	22.46	167.20	1794.99	10.41	N48.43E

LAST FORMATION TOP

Formation Name	MD Top (m)	TVD Top (m)
Skull Creek	1713.00	1711.54

BHA SUMMARY

BHA 3: 246.17 m; Bit #3 (27.5 hrs), PDM #1 (29. hrs), Sub, Stab, Sub, MWD, Stab, 16x DC, Jar, 3x DC, 4x HWDP
BHA 4: 229.18 m; Bit # (54.5 hrs), Stab, Sub, Sub, Stab, 1x DC, Stab, 16x DC, Jar, 3x DC, 4x HWDP

MUD DATA

Type	Weight (ppg)	FV (sec)	PV (cp)	YP (lbf/100ft²)	Gels	Fluid Loss	pH	Solids (%)	Sand (%)	Oil (%)

TIME BREAKDOWN

From	To	Hours	TMD (m)	BHA #	Activity
00:00	15:00	15.00	1819.00	3	Drilling - Slide/Rotate 6-3/4" hole to 1819m
15:00	16:00	1.00	1819.00	3	Circulate hole clean
16:00	19:00	3.00	1819.00	3	Trip Out (at Surface) for Bit and pick up rotary assembly
19:00	21:00	2.00	1819.00	3	Lay out Motor and MWD - pick up rotary assembly
21:00	00:00	3.00	1819.00	4	Trip In

COMMENTS

Directional driller released from rigsite.

APPENDIX V: LOG ANALYSIS

SLL_BC = Shallow resistivity response borehole corrected.

- Density porosity was calculated over the Waarre Sandstones:

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

- A Hunt-Raymer sonic porosity curve was calculated:

SPHI = (DTC2 – 55.5/DTC2)*0.625

where:
DTC2 = 3-4ft Compensated Sonic (μs/ft).

- PHIE was primarily produced from the minimum value of DPHI and NPRL 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 = DPHI

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

elseif Vsh > VshCO …… PHIE = DPHI - (Vsh * PHIsh)

where: VshSt = The start of the sliding scale Vsh correction.
VshCO = Shale volume cut-off.
Vsh = Shale volume.
DPHI = 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 shaleness. 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.

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

APPENDIX VI: PRESSURE SURVEY

No pressure surveys were taken for Naylor South 1

APPENDIX VII: DRILL STEM TEST DATA

No drill stem tests were conducted for Naylor South 1

APPENDIX VIII: HYDROCARBON ANALYSIS

No Hydrocarbon Analysis was done for Naylor South 1

APPENDIX IX: WATER ANALYSIS

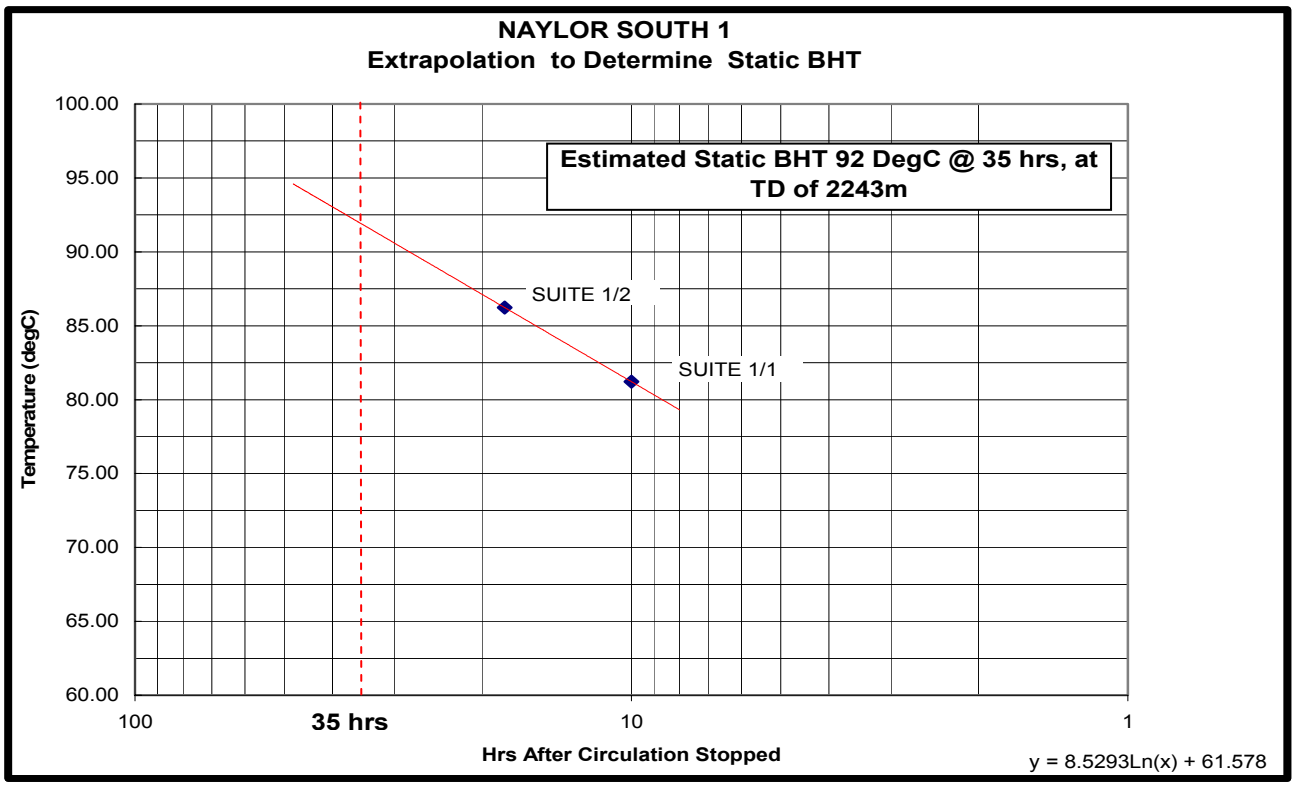
No Water Analysis was conducted on Naylor South 1

APPENDIX X: PALYNOLOGICAL ANALYSIS

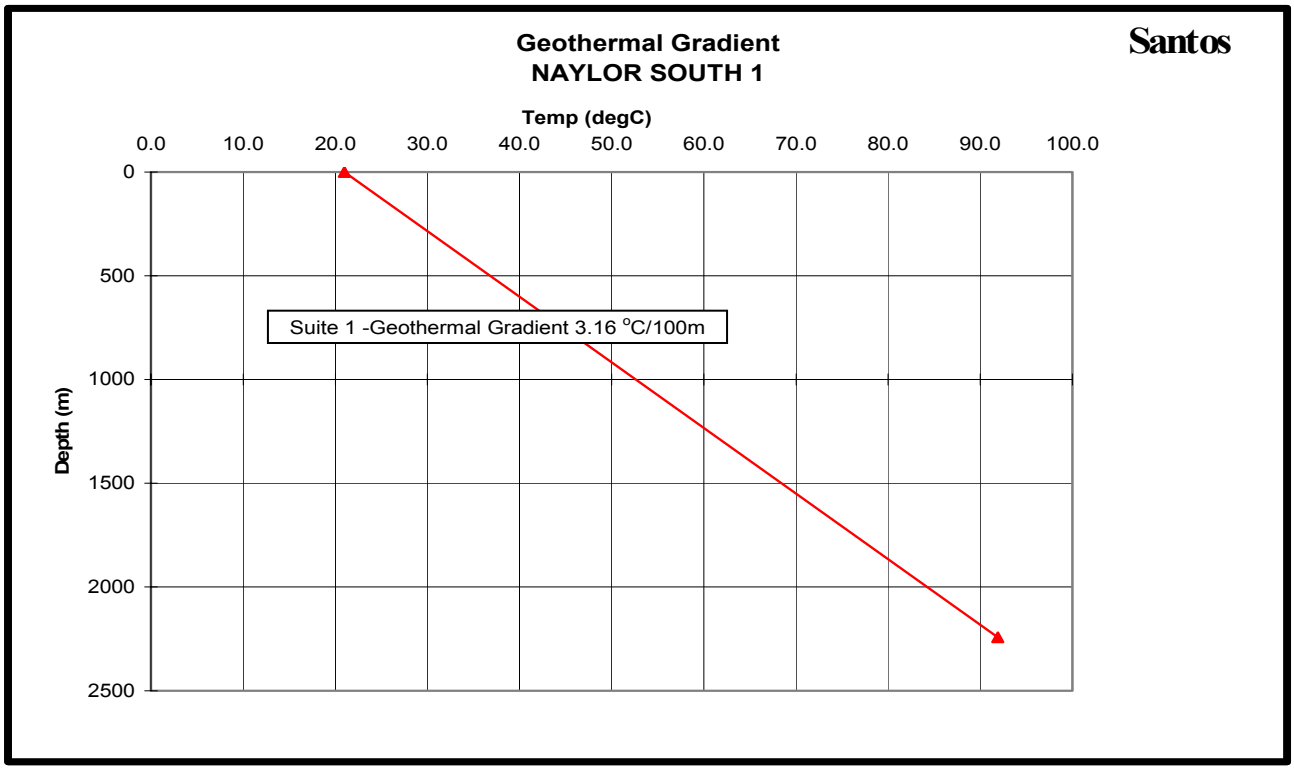
No Palynological Analysis was done for Naylor South 1

APPENDIX XI: GEOTHERMAL GRADIENT

	Max Recorded Temp (degC)	Depth Recorded (m)	Time Since Circulation. (hrs)	Total Depth (m)	Estimated BHT (degC)
Run 1	81	2237	10	2243	81.22
Run 2	86	2237	18	2243	86.23
Run 3					



STATIC BHT @ 35 hrs	91.9	°C	@	2243	m
SURFACE TEMP.	21	°C	@	0	m
Geothermal Gradient for Suite 1		3.16	°C/100 m		



APPENDIX XII: DEVIATION DATA

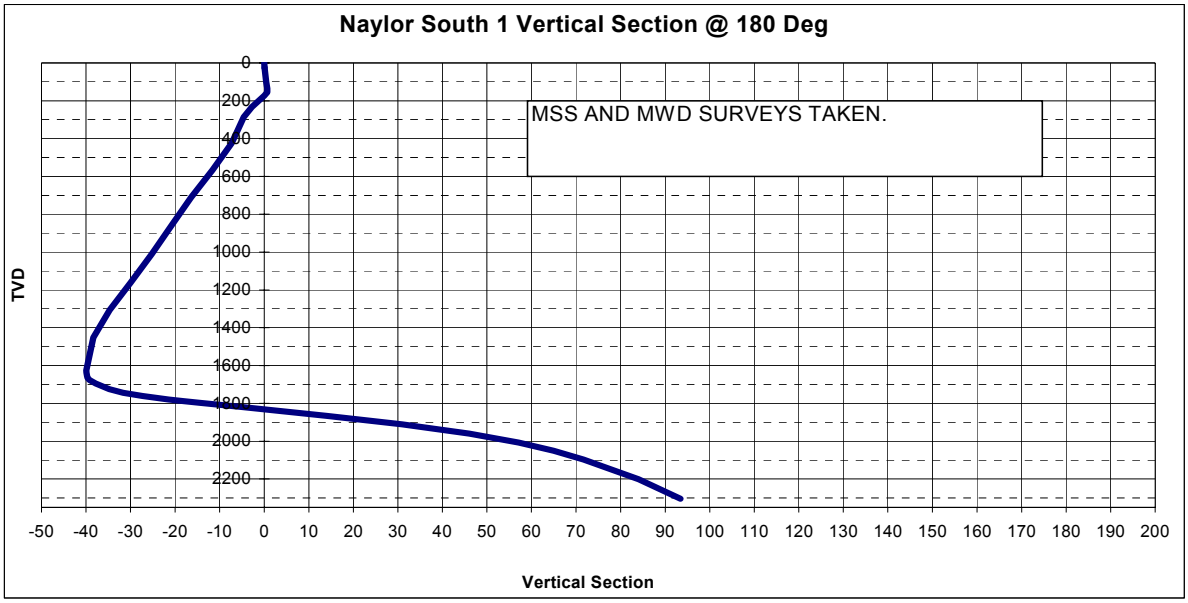
NAYLOR SOUTH 1

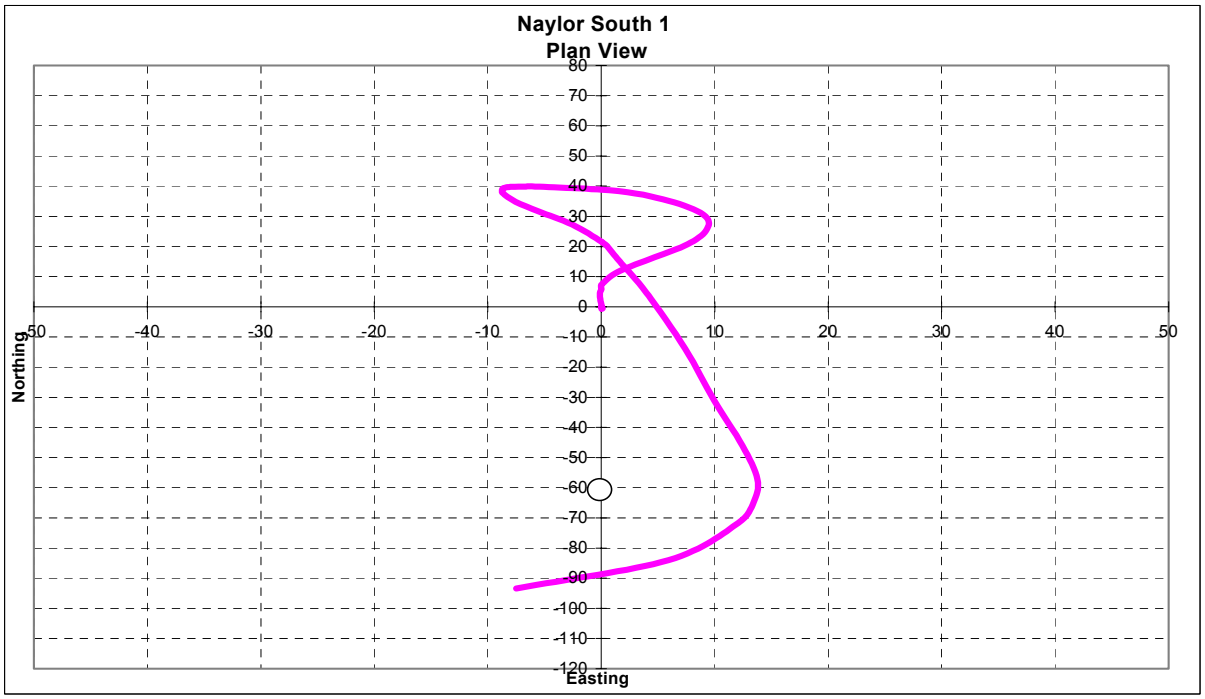
DEVIATION DATA

DEPTH M	INCLIN DEG	Azimuth DEG	TVD M	TVD S/S M	Northing north	Easting east	Q DEG	Vert Sect	Vert Plane	Displ	Direction True
0.00	0.00	0.00	0.00	-53.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25.00	0.50	142.00	25.00	-28.00	-0.09	0.07	0.01	0.09	-0.09	0.11	0.00
100.00	0.25	245.00	100.00	47.00	-0.41	0.12	0.01	0.41	-0.41	0.43	163.75
136.00	0.75	182.00	136.00	83.00	-0.68	0.04	0.01	0.68	-0.68	0.68	176.56
155.00	0.85	357.00	155.00	102.00	-0.67	0.03	0.03	0.67	0.67	0.67	177.49
174.00	3.00	2.00	173.98	120.98	-0.03	0.04	0.04	0.03	-0.03	0.05	125.04
232.00	2.50	352.00	231.92	178.92	2.74	-0.08	0.01	-2.74	-2.74	2.74	358.25
287.00	1.35	12.00	286.89	233.89	4.56	-0.12	0.02	-4.56	4.56	4.57	358.54
358.00	1.00	357.00	357.87	304.87	6.00	0.03	0.01	-6.00	-6.00	6.00	0.24
425.00	1.25	2.00	424.86	371.86	7.31	0.02	0.00	-7.31	7.31	7.31	0.16
568.00	2.50	27.00	567.78	514.78	11.65	1.49	0.03	-11.65	11.65	11.75	7.29
712.00	2.13	42.00	711.67	658.67	16.44	4.71	0.01	-16.44	16.44	17.10	15.98
857.00	2.00	26.00	856.57	803.57	20.72	7.62	0.01	-20.72	20.72	22.07	20.19
1010.00	1.63	12.00	1009.50	956.50	25.24	9.24	0.01	-25.24	25.24	26.88	20.11
1163.00	2.00	349.00	1162.42	1109.42	29.99	9.19	0.01	-29.99	-29.99	31.37	17.03
1308.00	2.50	314.00	1307.32	1254.32	34.67	6.43	0.03	-34.67	-34.67	35.27	10.50
1453.00	2.37	300.00	1452.19	1399.19	38.37	1.56	0.01	-38.37	-38.37	38.40	2.32
1627.00	3.00	267.00	1626.00	1573.00	39.93	-6.11	0.03	-39.93	-39.93	40.40	351.30
1638.00	3.32	265.67	1636.99	1583.99	39.89	-6.71	0.01	-39.89	-39.89	40.45	350.45
1647.00	3.34	263.30	1656.57	1603.57	39.78	-7.85	0.00	-39.78	-39.78	40.55	348.84
1657.62	3.20	242.00	1665.94	1612.94	39.63	-8.35	0.02	-39.63	39.63	40.50	348.10
1667.00	3.26	196.00	1675.92	1622.92	39.22	-8.67	0.04	-39.22	39.22	40.17	347.53
1677.00	4.81	171.00	1695.88	1642.88	37.85	-8.70	0.04	-37.85	37.85	38.84	347.06
1697.00	8.23	152.00	1724.69	1671.69	34.81	-7.53	0.07	-34.81	34.81	35.62	347.79
1726.00	14.35	145.00	1743.31	1690.31	31.68	-5.54	0.11	-31.68	31.68	32.16	350.08
1745.00	18.15	147.00	1761.55	1708.55	27.27	-2.58	0.07	-27.27	27.27	27.39	354.60
1764.00	21.60	162.65	1779.43	1726.43	21.44	0.08	0.11	-21.44	21.44	21.44	0.21
1783.00	23.10	167.52	1787.75	1734.75	18.14	0.95	0.04	-18.14	18.14	18.16	3.01
1792.00	22.70	167.37	1796.96	1743.96	14.34	1.80	0.01	-14.34	14.34	14.45	7.15
1802.00	22.50	167.20	1820.97	1767.97	4.59	4.00	0.00	-4.59	4.59	6.09	41.04
1828.00	22.80	172.00	1866.19	1813.19	-13.95	7.40	0.03	13.95	-13.95	15.79	152.07
1877.00	19.20	171.00	1911.00	1858.00	-30.96	9.93	0.06	30.96	-30.96	32.52	162.23
1925.00	15.00	170.00	1960.69	1907.69	-46.04	12.43	0.07	46.04	-46.04	47.69	164.89
1977.00	12.00	177.00	2007.36	1954.36	-57.15	13.77	0.06	57.15	-57.15	58.78	166.45
2025.00	9.00	190.00	2049.64	1996.64	-64.93	13.42	0.07	64.93	-64.93	66.30	168.32
2068.00	7.50	193.00	2097.14	2044.14	-71.68	12.07	0.03	71.68	-71.68	72.69	170.44
2116.00	8.00	219.00	2201.21	2148.21	-84.04	5.93	0.06	84.04	-84.04	84.24	175.97
2221.00	10.50	247.00	2304.89	2251.89	-93.46	-7.49	0.09	93.46	-93.46	93.76	184.58

Deviation plots
trajectory

Naylor South 1 Deviation plots





APPENDIX XIII: WELL LOCATION SURVEY

VICTORIA

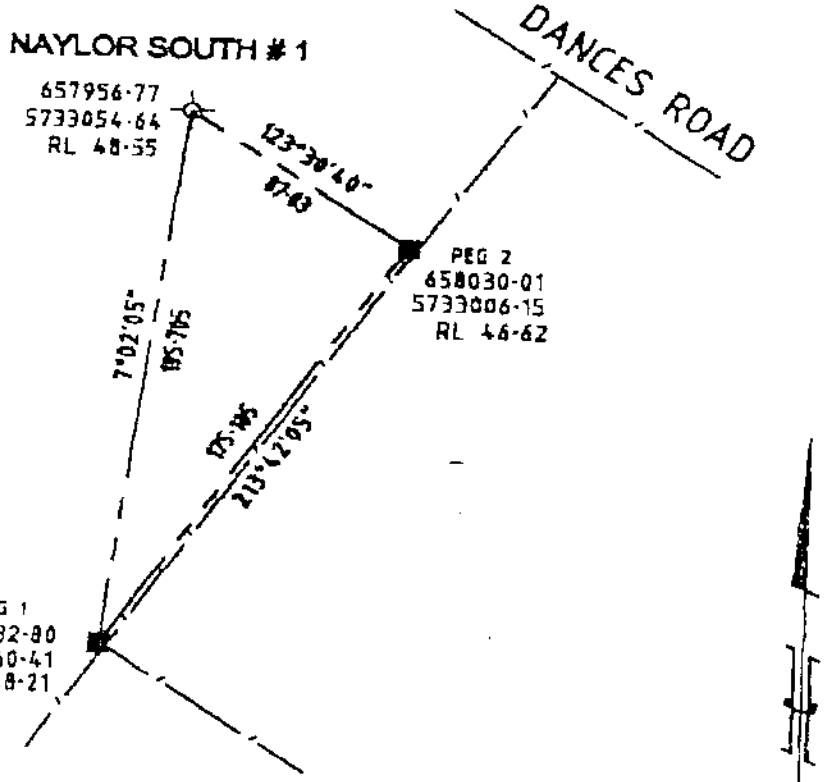
GAS WELL LOCATION

REFERENCE MARKS SKETCH PLAN

EXPLORATION LICENCE PEP 154

Well Name	NAYLOR SOUTH # 1
Map	
Spheroid	GDA94
Latitude	S 38°32'12·86"
Longitude	E 142°48'44·39"
Convergence	1°07'46"
Scale Factor	0·99990726

MGA 94	ZONE 54
Measurement units	(metres)
Easting	657 956·77
Northing	5 733 054·64
Elevation	48·55 (AHD)



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

DATUM : GDA94 vide Peg 1 and Peg 2.
Datum coordinates determined by Fyfe Surveyors 22 / 10 / 2001.
Height datum is to AHD vide Peg 1 and Peg 2.

Estimated Horizontal error is less than +/- 0.05 metre.
Estimated Vertical error is less than +/- 0.05 metre.
Date of Survey : 5 / 12 / 2001

Paul Crowe Surveyor
ABN 59521601188
"Ambleside" 192 Koroit Street
Warrnambool 3280
Ph. (03) 5561 1500

REF 1050

Date 6 / 12 / 2001

Trevor McDowell

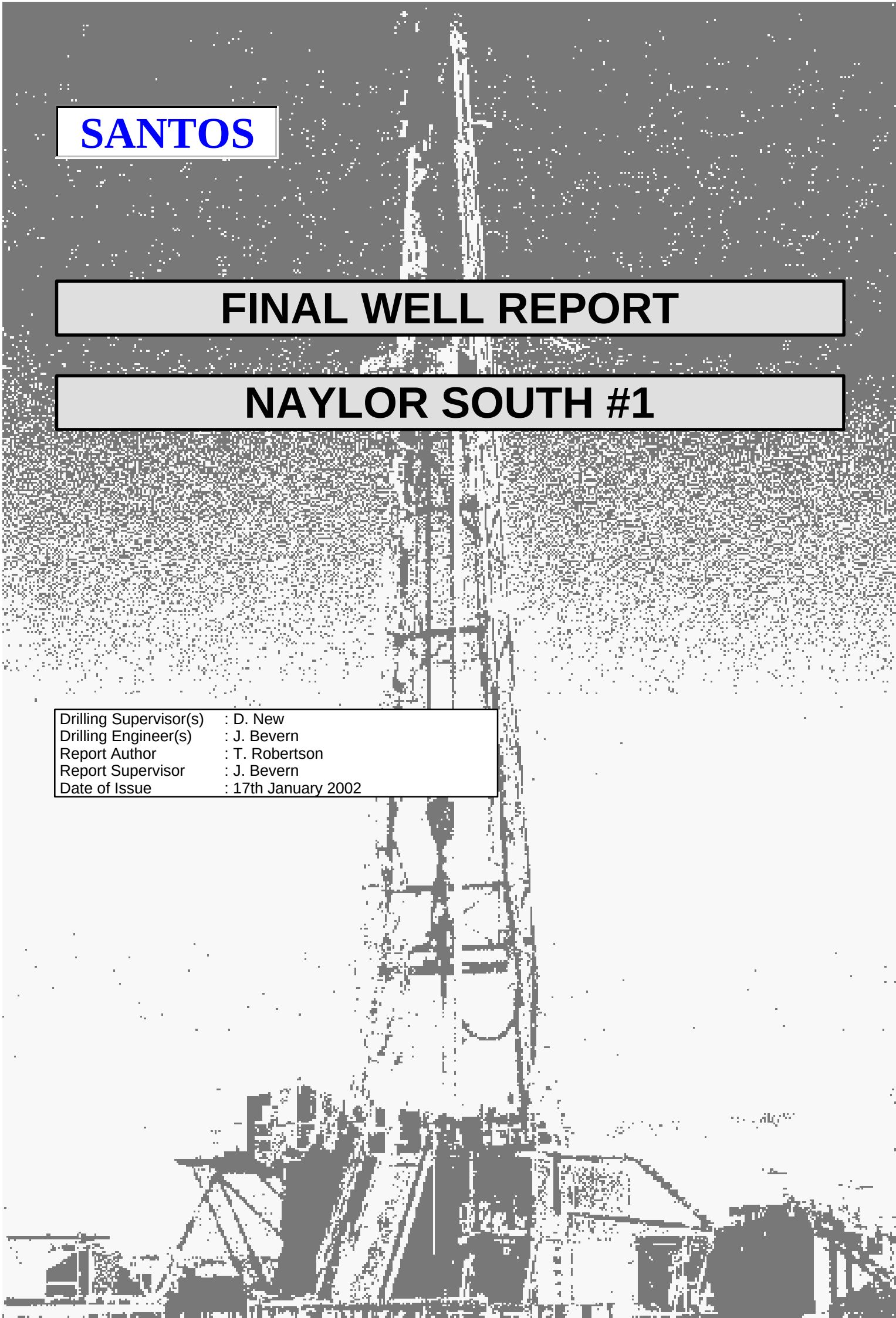
TREVOR McDOWELL
LICENSED SURVEYOR

APPENDIX XIV: DRILLING - FINAL WELL REPORT

SANTOS

FINAL WELL REPORT

NAYLOR SOUTH #1



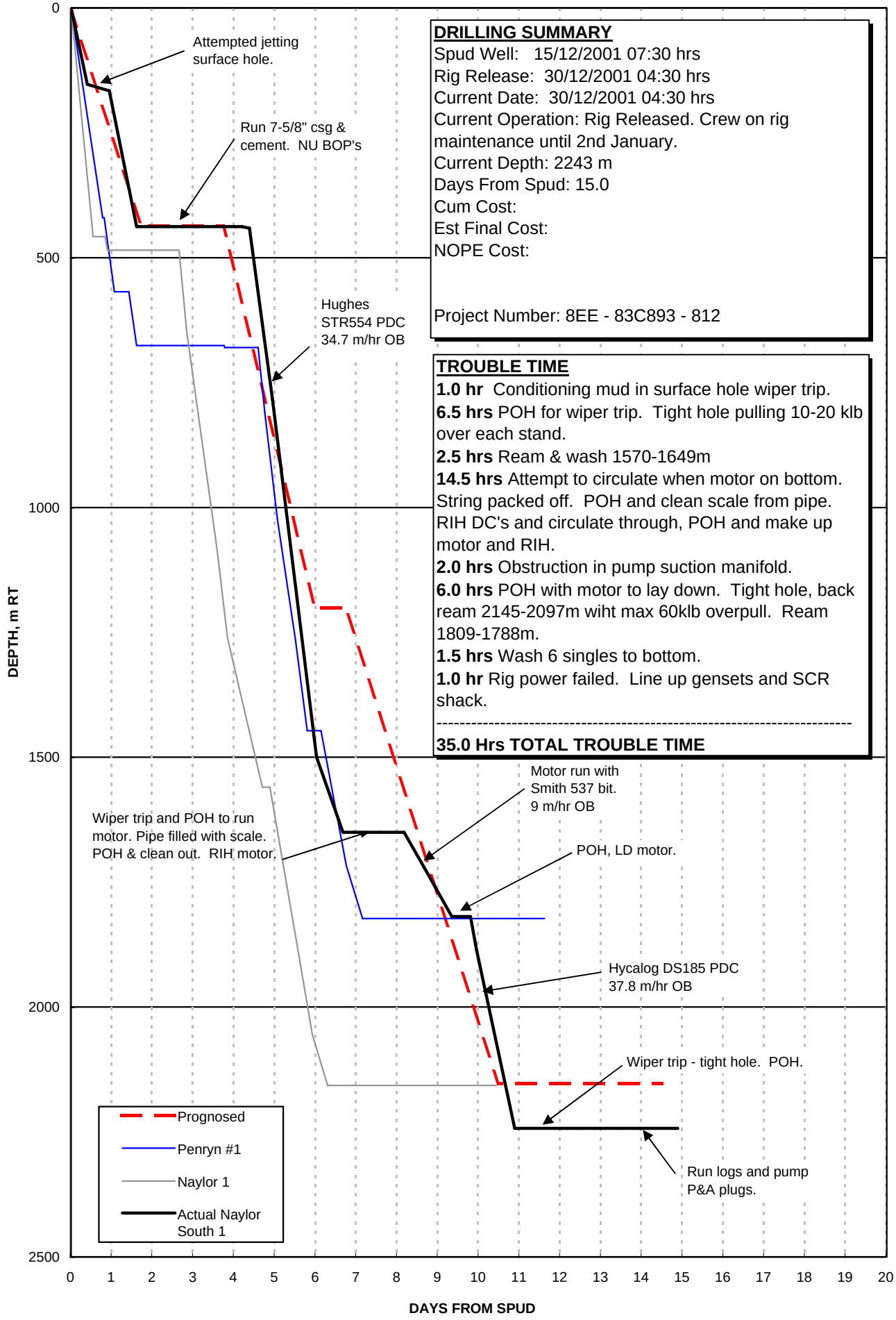
Drilling Supervisor(s)	: D. New
Drilling Engineer(s)	: J. Bevern
Report Author	: T. Robertson
Report Supervisor	: J. Bevern
Date of Issue	: 17th January 2002

Table of Contents

Section 1 – Well Summary

Time vs Depth Curve

NAYLOR SOUTH 1
TIME v DEPTH CURVE



Section 2 – Well History

Well History Report

NAYLOR SOUTH #1

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

RT above GL: 4 m	Lat : 38 deg 32 min 12.86 sec	Spud Date: 15/12/2001	Release Date: 30/12/2001
GL above MSL : 48 m	Long : 142 deg 48 min 44.39 sec	Spud Time: 7:30:00	Release Time: 4:30:00

Well History

#	DATE	DEPTH	WELL HISTORY (24 Hr Summary)
1	10/12/2001	0	Wait on daylight. Move rig equipment from Warrnambool to Nylor South #1. Wait on daylight.
2	11/12/2001	0	Continue moving equipment and rigging up.
3	12/12/2001	0	Continue rigging up. Hold pre spud safety meeting. Continue rigging up.
4	13/12/2001	0	Continue rigging up.
5	14/12/2001	0	Finish rigging up. Prepare to drill rat hole and mouse hole.
6	15/12/2001	154	Drill rat hole and mouse hole. Fish bit breaker from conductor. Spud well and drill to 153m. Jet from 153m to 154m.
7	16/12/2001	438	Jet to 173m. Drill with surveys to 438m. POOH for wiper trip.
8	17/12/2001	438	Finish wiper trip. POOH and lay down DC's. Run and cement 7 5/8" casing. WOC.
9	18/12/2001	438	WOC. Install bradenhead. Nipple up and test BOP's.
10	19/12/2001	628	Finish pressure testing BOP's. Make up new BHA and RIH. Drill shoe track and 3m new hole. LOT. Drill ahead with surveys to 628m.
11	20/12/2001	1,263	Drill with surveys from 628m to 1262m.
12	21/12/2001	1,650	Drill with surveys to 1649.9m. POOH for wiper trip.
13	22/12/2001	1,650	POOH through tight hole. RIH and rea/wash to bottom. CBU and POOH. Make up motor and MWD and RIH. Attempt to circulate - no go string packed off. POOH.
14	23/12/2001	1,725	POOH and clear pipe scale from MWD tools. RIH with BHA and circulate clean. Make up motor and MWD and RIH. Drill ahead building angle to 18.1° and change direction to 158.3°.
15	24/12/2001	1,819	Directionally drill to 1819m. POOH and lay out motor and MWD. Make up new BHA and RIH.
16	25/12/2001	2,186	RIH with new bit. Break in bit and drill ahead to 2186m taking surveys every 50m.
17	26/12/2001	2,243	Drill to 2243m - TD. CBU and POOH. Lay out stabilisers and NMDC. RIH.
18	27/12/2001	2,243	RIH to 2160m. Wash to bottom. Circulate hole clean. POOH. Run wireline logs.
19	28/12/2001	2,243	Finish running wireline logs. Make up cement stinger and RIH. Set abandonment plugs 1, 2 and 3.
20	29/12/2001	2,243	Set plug #3. Lay out excess pipe. RIHand tag shoe plug. POOH lay down pipe and collars. Nipple down BOP's.
21	30/12/2001	2,243	Nipple down BOP. Cut off bradenhead. Set plug #4 from 0-30m. Release rig at 04:30 hrs.

Section 3 – Drilling Data

Bit Record

FIT/LOT Report

BIT RECAP

NAYLOR SOUTH #1

From : **15/12/2001**
To : **27/12/2001**

DATE	BIT#	SIZE	SER#	MF	IADC	TYPE	JETS	OUT	FTGE	HRS IADC	SPP psi	FLW gpm	WOB lbs	RPM	VEL fps	HHP	ROP f/hr	I	O1	D	L	B	G	O2	R
15/12/2001	1	9.88	A33JB	HU	116	GT-1	1x22		154	15.0	2250	550	5.0	90	144.5	7.517	49.7								
16/12/2001	1	9.88	A33JB	HU	116	GT-1	1x22	438	284	19.0	2100	502	10.0	120	131.9	0.000	21.5								
17/12/2001	1	9.88	A33JB	HU	116	GT-1	1x22	438	0	0.0	2100	502	10.0	120	131.9	0.000		1	2	WT	A	2	I	NO	TD
19/12/2001	2	6.75	1904177	HU		STR554A3X	2x11, 2x9		190	9.0	1000	311	5.0	130	97.9	0.000	39.6								
20/12/2001	2	6.75	1904177	HU		STR554A3X	2x11, 2x9		634	21.5	1500	311	5.0	110	97.9	4.175	45.9								
21/12/2001	2	6.75	1904177	HU		STR554A3X	2x11, 2x9		388	21.0	2000	311	11.0	80	97.9	0.000	23.8								
22/12/2001	2	6.75	1904177	HU		STR554A3X	2x11, 2x9	1,650	0	0.0	2000	311	11.0	80	97.9	0.000		6	2	WT	S	X	I	RO	BHA
23/12/2001	3	6.75	MH4631	SM	537	X32DGPS	3x12		75	12.0	2000	239	12.0	80	70.4	0.000	9.6								
24/12/2001	3	6.75	MH4631	SM	537	X32DGPS	3x12	1,819	94	15.0	2000	239	15.0	80	70.4	0.000	9.0	5	5	WT	A	E	I	ER	PR
25/12/2001	4	6.75	24429	HY		DS185	4x12		367	13.5	2100	287	15.0	80	63.4	0.000	49.6								
26/12/2001	4	6.75	24429	HY		DS185	4x12	2,243	57	4.5	2100	287	15.0	80	63.4	0.000	15.0	2	5	WT	S	X	I	LN	TD
26/12/2001	2RR	6.75	1904177	HU		STR554A3X	2x32, 2x9	2,243	0	0.0					0.0	0.000		6	2	WT	S	X	I	RO	BHA
27/12/2001	2RR	6.75	1904177	HU		STR554A3X	2x32, 2x9	2,243	0	0.0	1500	287			16.5	0.116		6	2	WT	S	X	I	RO	BHA

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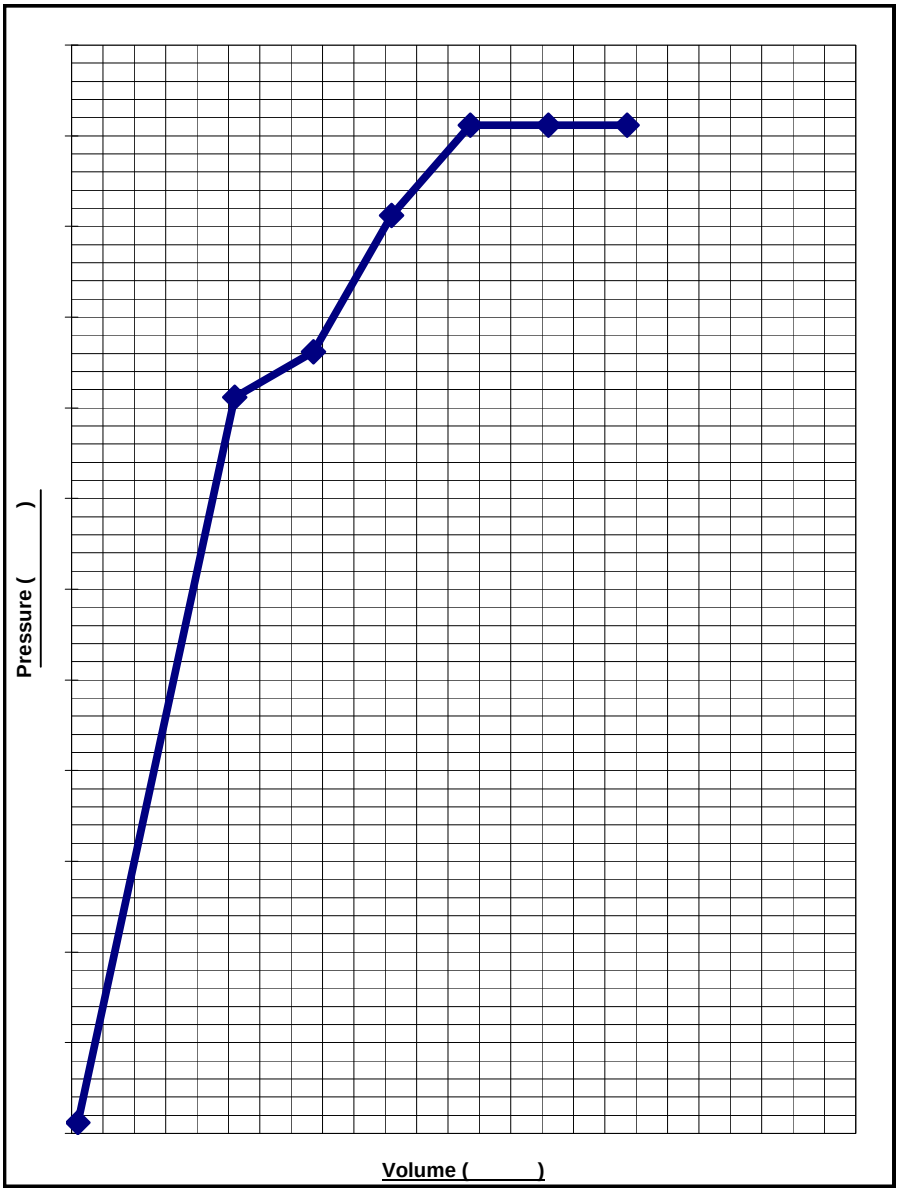
LEAK OFF TEST / FORMATION INTEGRITY TEST

WELL:	Naylor South #1	RIG:	30	DATE:	19/12/2001

CASING SIZE: 7 5/8 (inch) SANTOS SUPERVISOR: Duncan New

A. MUD DENSITY IN USE:		8.5	(ppg)
B. HOLE DEPTH:		1446	(ft)
C. SHOE DEPTH:		1423	(ft)
D. F.F.P. PRESSURE (GRAPH):		550	(psi)
E. EQUIVALENT DENSITY:			
PRESSURE. (D) (psi) / SHOE DEPTH (C) (ft) x 0.052	+ MUD DENSITY IN USE (A) (ppg)	**15.9**	**(ppg) (EMW)**
F. STABILIZED PRESSURE RECORDED:		450	(psi)
G. VOLUME PUMPED:		100	(gallons)
H. VOLUME REGAINED:		85	(gallons)

Volume ( )	Pressure ( )
0	0
0.5	400
0.75	425
1	500
1.25	550
1.5	550
1.75	550



Section 4 – Casing and Cementing

Casing and Cementing Report/s

Wellhead Installation Report/Plug and Abandonment Report

Santos

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CASING AND CEMENTING REPORT

Well Name: Naylor South #1

FORM DQMS F-220

Casing type: [X] Surface casing [ ] Intermediate Casing [ ] **Production Casing** [ ] Completion tubing

Originated by: D. New Date: 17-Dec-01 **Checked by:** JNB **Date:** 18/12/2001

Hole Size: 9 7/8" **T.D.:** 438m **Rig:** ODE Rig 30 **Date:** **Cemented by:** Howco

PRE-FLUSH 0 bbls. @ **SPACER** 40 bbls@ 8.4 ppg

Additives: Mains water

CEMENT

LEAD SLURRY:	113	sacks class	"G"
Slurry Yield:	3.38	cu.ft./sack	
Mixwater Req't:	21.43	gal./sack	
Actual Slurry Pumped:	68.0	bbls @	11.0 ppg
	381 cu ft		

(Job was planned for top of lead slurry to surface using 50% excess)

TAIL SLURRY:	90	sacks class	"G"
Slurry Yield:	1.19	cu.ft./sack	
Mixwater Req't:	5.24	gal./sack	
Actual Slurry Pumped:	19.0	bbls @	15.6 ppg
	107 cu ft		

(Job was planned for top of tail slurry at 340m using 30% excess).

ADDITIVES

	%	Amount
D020 Bentonite	4	424 lbs
S001 Accelerator	1.5	239 lbs
D144 Antifoam	0.01 ga/sx	1 gal
D145A Dispersant	0.05 gal/sx	4 gal
D144 Antifoam	0.01 gal/sx	1 gal

DISPLACEMENT Fluid: Mud 9 ppg

Theoretical Displ.:	63.5 bbl.	Bumped plug with	900 psi
Actual Displ.	63.1 bbl @ 5 BPM	Pressure Tested to:	2500 psi
Displaced via	RIG / ~~CEMENTING UNIT~~	Bleed back:	0.5 bbl

ACTIVITY	Time
Start Running csg. **17/12**	12:00
Casing on Bottom	16:30
Start Circulation	16:40
Pump Preflush (Rig)	17:48
Start Pressure Test	17:52
Start Mixing	18:04
Finish Mixing	18:25
Start Displacing	18:30
~~Stop Displ~~./Bump	18:50
Press. test	19:05

Returns to Surface: 120 bbls mud 10 bbls Cement

Reciprocated/Rotated Casing: No - casing chained down.

Top Up Job run: Yes / ~~No~~ 47 sx class G

Plug Set make/type: Weatherford non rotating.

Centraliser type/depth: Weatherford Bow Spring at 428m, 416m, 398m, 386m, 363m and 17m.

Remarks: Very good cement job. Densities even for both lead and tail.

Good returns throughout job.

Bradenhead set 0.23m BELOW current groundlevel but will be 0.07m ABOVE final ground level after lease is cleaned up.

No. JOINTS	SIZE OD	WT lb/ft	GRADE	THREAD	M	FROM	TO
Stick up					-0.89	-0.89	0.00
Rotary table to top of bradenhead					4.93	0.00	4.93
Bradenhead. Woods 5k 11" x 9 5/8" with 7 5/8" X/O					0.58	4.93	5.51
35	7 5/8"	26.4	L80	BTC	404.62	5.51	410.13
Float collar	7 5/8"	26.4	L80	BTC	0.41	410.13	410.54
2	7 5/8"	26.4	L80	BTC	23.21	410.54	433.75
Float shoe	7 5/8"	26.4	L80	BTC	0.45	433.75	434.20

Theoretical Bouyed wt of casing(klb):	36 klb	Bradenhead Height above GL	0.07m above final GL.
Actual wt of casing (last joint run-block wt, klb)	37 klb	Marker jts Left	0.00
Hanging wt (after cementing and pressure bleed off)	40 klb	Total Jts on Loc	40
Casing wt just prior to setting slips	N/A	Total No. Run	37
(Indicator wt - Blocks = Csg wt)		No. Left	3

APPENDIX XV: RIG SPECIFICATIONS

RIG INVENTORY FOR 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 1:200m COMPOSITE LOG

ENCLOSURE II 1:500m MUDLOG

ENCLOSURE III STRUCTURE MAPS (Pre-Drilling)

ENCLOSURE IV WELL EVALUATION SUMMARY PLOT