



**HALLIBURTON**  
**Sperry Drilling Services**

**End of Well Report**  
**for**  
**Santos Ltd**

**Casino-4DW1 & DW2**

**Rig:** Ocean Patriot  
**Field:** Casino  
**Country:** Australia  
**Job No:** AU-FE -0003530356  
& AU-FE -0003735541  
  
**Date:** 21<sup>st</sup> May 2005

## Table of Contents

1. General Information
2. Operational Overview
3. Summary of MWD Runs
4. Bitrun Summary
5. Directional Survey Data
6. Service Interrupt Report

## General Information

Company:	Santos Ltd		
Rig:	Ocean Patriot		
Well:	Casino-4 DW1 and DW2		
Field:	Casino		
Country:	Australia		
API Number:			
Sperry-Sun Job Number:	AU-FE-3530356 and 3735541		
Job start date:	21-May-05		
Job end date:	04-Jun-05		
North reference:	Grid		
Declination:	10.942	deg	
Dip angle:	-69.993	deg	
Total magnetic field:	60916	nT	
Date of magnetic data:	08-May-05		
Wellhead coordinates N:	38 deg. 47 min 13.030 sec South		
Wellhead coordinates E:	142 deg. 41 min 54.490 sec East		
Vertical section direction:	289.9	deg	
MWD Engineers:	A.Rule	J.Nicolson	
	M.Saunders	B.Cooper	
Company Representatives:	C.Wise		
	R.King		
Company Geologist:	R. Subramanian		
Lease Name:	Vic P-44		
Unit Number:	197		
State:	Victoria		
County:			

## Operational Overview

Sperry Drilling Services, a division of Halliburton, was contracted by Santos Ltd to provide Surveying and Logging While Drilling (LWD) services on the wells, Casino-4DW1 and Casino-4DW2, located in the Bass Strait, offshore Victoria.

The development well was kicked off from the pilot hole Casino-4.

### Casino-4DW1 12 1/4" Hole Section

The hole section was drilled with a rotary steerable assembly and a logging while drilling (LWD) tool was used to provide realtime and recorded drilling and formation evaluation data. The tool incorporated a positive pulser, Geo-Pilot Rotary Steerable Tool, Directional Module (DM), Dual Gamma Ray (DGR), Electromagnetic Wave Resistivity (EWR) and a Pressure While Drilling (PWD) tool to enable communications with the Geopilot.

The well was drilled to 1662.0 mMDRT using the Geo-Pilot rotary steerable tool but the required hole angle could not be built. The rotary steerable assembly was changed out for a mud motor with a 1.5° bend. The new BHA was unable to go down the casing and the well was plugged back and a new sidetrack drilled.

### Casino-4DW2 12 1/4" Hole Section

The hole section was kicked off with two mud motor runs and then a Geo-Pilot rotary steerable assembly was used to build hole angle to 78° at the top of the reservoir. The hole was logged with the same LWD tool as DW1 with the addition of Gamma Ray at Bit (GABI) to provide realtime and recorded drilling and formation evaluation data. This section was drilled to 1998.0 mMDRT.

### Casino-4DW2 8 1/2" Hole Section

The section was drilled in one bit run using a Geo-Pilot rotary steerable assembly to build hole angle and steer through the reservoir. The hole was logged with a LWD tool that incorporated a positive pulser, DGR, EWR, PWD, DM, Stabilised Litho-Density (SLD) and Compensated Neutron Porosity (CNP).

The well was drilled to a total depth of 2404.0 mMDRT.

## Summary of MMDruns


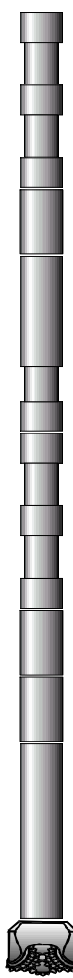
[illegible]

1677.00

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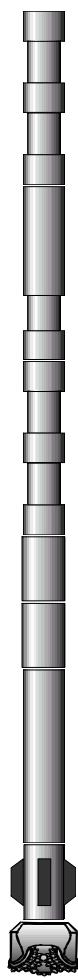
## Bitrun Summary

Run Time Data		Drilling Data		Mud Data				
MWD Run :	0500	Start Depth :	1308.00 m	Mud Type :	KCl/Polymer			
Rig Bit No:	7	End Depth :	1662.00 m	Weight / Visc :	1.29 sg /	58.00	spqt	
Hole Size :	311.00 mm	Footage :	354.00 m	Chlorides :	47000 ppm			
Run Start :	20-May-05 19:36	Avg. Flow Rate :	965 gpm	PV / YP :	22.00 cp /	38.00	lhf2	
Run End :	23-May-05 00:33	Avg. RPM :	147 rpm	Solids/Sand :	13 % /	0.01 %		
BRT Hrs :	52.94	Avg. WOB :	16.40 klb	%Oil / O:W:	N/A % /	N/A		
Circ. Hrs :	30.30	Avg. ROP :	17.28 m/hr	pH/Fluid Loss:	9.20 pH /	3.80	mptm	
Oper. Hrs :	52.94	Avg. SPP :	3036 psig	Max. Temp. :	67.00 degC			
MWD Schematics		BHA Schematics						
<div><div>(7)</div><div></div><div>7. Mk8 Pulser 1200 system SN: 8270</div><div>6. DM SN: 10581139 19.90 m From Bit</div><div>5. HCIM SN: 110349</div><div>4. PWD SN: 104432 15.98 m From Bit</div><div>3. EWR-P4 SN: 123048 13.47 m From Bit</div><div>2. DGR SN: 084171 11.14 m From Bit</div><div>1. GeoPilot SN: GP1225TL062 5.71 m From Bit</div></div>		<div><div>(8)</div><div></div><div>Component</div><div>Length (m)</div><div>O.D. (mm)</div><div>I.D. (mm)</div><div>(7)</div><div>(6)</div><div>(5)</div><div>(4)</div><div>(3)</div><div>(2)</div><div>(1)</div><div>08. HWDP45.59127.00079.400</div><div>07. Cross Over Sub1.02190.50073.025</div><div>06. Drilling Jars9.67206.37576.200</div><div>05. HWDP84.30127.00077.756</div><div>04. Cross Over Sub1.09203.20071.438</div><div>03. Float Sub1.05203.20076.200</div><div>02. MWD23.67206.82975.473</div><div>01. Security DBS FS2663 (PDC)0.64311.00076.200</div></div>						
Comments				MWD Performance				
Kicked off with Geopilot at 1308.0 mMDRT. Unable to build angle with the Geo-Pilot. Pulled out to pick up a motor.				Tool OD / Type :	203.00 mm /	P4M		
				MWD Real-time%:	99.00 %			
				MWD Recorded%:	100.00 %			
				Min. Inc. :	5.69 deg /	1318.55 m		
				Max. Inc. :	39.79 deg /	1605.77 m		
				Final Az. :	313.00 deg			
				Max Op. Press. :	2983 psig			

## Bitrun Summary

Run Time Data		Drilling Data		Mud Data				
MWD Run :	0600	Start Depth :	1662.00 m	Mud Type :	KCl/Polymer			
Rig Bit No:	8	End Depth :	1662.00 m	Weight / Visc :	1.29 sg /	65.00	spqt	
Hole Size :	311.00 mm	Footage :	0.00 m	Chlorides :	48000 ppm			
Run Start :	23-May-05 05:00	Avg. Flow Rate :	N/A gpm	PV / YP :	19.00 cp /	37.00	lhf2	
Run End :	23-May-05 08:35	Avg. RPM :	N/A rpm	Solids/Sand :	13 % /	0.1	%	
BRT Hrs :	3.58	Avg. WOB :	N/A klb	%Oil / O:W:	N/A % /	N/A		
Circ. Hrs :	0.00	Avg. ROP :	N/A m/hr	pH/Fluid Loss:	9.00 pH /	3.20	mpfm	
Oper. Hrs :	3.58	Avg. SPP :	N/A psig	Max. Temp. :	N/A degC			
MWD Schematics		BHA Schematics						
<div><div>(7)</div><div>(6)</div><div>(5)</div><div>(4)</div><div>(3)</div><div>(2)</div><div>(1)</div></div> <div>7. Mk8 Pulser 1200 system SN: 8270</div> <div>6. DM SN: 10581139 24.24 m From Bit</div> <div>5. HCIM SN: 163155</div> <div>4. PWD SN: 161846 19.06 m From Bit</div> <div>3. EWR-P4 SN: 45162 16.54 m From Bit</div> <div>2. DGR SN: 151078 14.20 m From Bit</div> <div>1. DDS SN: 151078 0.00 m From Bit</div>		Component		Length	O.D.	I.D.		
				(m)	(mm)	(mm)		
		(10)						
		(9)						
		(8)						
		(7)						
		(6)		10. HWDP	45.59	127.000	76.200	
		(5)		09. Drilling Jars	9.87	165.100	73.025	
		(4)		08. HWDP	83.17	127.000	79.375	
		(3)		07. Cross Over Sub	1.09	165.100	71.438	
(2)		06. MWD	14.32	203.200	81.679			
(1)		05. Cross Over Sub	1.22	203.200	100.013			
		04. Integral Blade Stabilizer	1.90	203.200	76.200			
		03. Float Sub	1.05	215.900	76.200			
		02. 9-5/8" SperryDrill Lobe 3/4	8.56	244.602	76.200			
		01. Smith MA89PX (PDC)	0.38	311.000	25.400			
Comments				MWD Performance				
Picked up a mud motor and RIH. Unable to go down casing. POOH and racked in derrick. Picked up cement stinger and plugged back.				Tool OD / Type :	203.00 mm /	P4M		
				MWD Real-time%:	N/A	%		
				MWD Recorded%:	N/A	%		
				Min. Inc. :	N/A deg /	N/A	m	
				Max. Inc. :	N/A deg /	N/A	m	
				Final Az. :	N/A deg			
				Max Op. Press. :	1813 psig			

## Bitrun Summary

Run Time Data		Drilling Data		Mud Data				
MWD Run :	0700	Start Depth :	1200.00 m	Mud Type :	KCl/Polymer			
Rig Bit No:	10	End Depth :	1265.00 m	Weight / Visc :	1.27 sg / 60.00 spqt			
Hole Size :	311.00 mm	Footage :	65.00 m	Chlorides :	47000 ppm			
Run Start :	24-May-05 15:01	Avg. Flow Rate :	826 gpm	PV / YP :	16.00 cp / 35.00 lhf2			
Run End :	25-May-05 16:35	Avg. RPM :	76 rpm	Solids/Sand :	12 % / 0.1 %			
BRT Hrs :	25.55	Avg. WOB :	4.10 klb	%Oil / O:W:	N/A % / N/A			
Circ. Hrs :	7.37	Avg. ROP :	17.40 m/hr	pH/Fluid Loss:	10.50 pH / 3.40 mptm			
Oper. Hrs :	25.55	Avg. SPP :	2276 psig	Max. Temp. :	22.00 degC			
MWD Schematics		BHA Schematics						
<div><div>(7)</div><div></div><div>(6)</div><div>7. Mk8 Pulser 1200 System SN: 8270</div><div>(5)</div><div>6. DM SN: 581139 20.13 m From Bit</div><div>(4)</div><div>5. HCIM SN: 163155</div><div>(3)</div><div>4. PWD SN: 161846 16.17 m From Bit</div><div>(2)</div><div>3. EWR-P4 SN: 45162 13.65 m From Bit</div><div>(1)</div><div>2. DGR SN: 151078 11.31 m From Bit</div><div>1. GeoPilot SN: GP1225TL062 6.23 m From Bit</div></div>		<div><div>(8)</div><div></div><div>(7)</div><div>(6)</div><div>(5)</div><div>(4)</div><div>(3)</div><div>(2)</div><div>(1)</div><div>08. HWDP46.07127.00079.400</div><div>07. Drilling Jars9.87203.20076.200</div><div>06. HWDP82.69127.00077.788</div><div>05. Cross Over Sub1.09203.20076.200</div><div>04. Float Sub1.05203.20076.200</div><div>03. MWD23.74206.82975.473</div><div>02. Integral Blade Stabilizer0.46203.20076.200</div><div>01. TCI MXCS030.34311.00076.200</div></div>						
Comments				MWD Performance				
MWD tool failed pre-run confidence test. Picked up backup tool. RIH, unable to kick off from 1200.0 mMDRT. POOH at 1265.0 mMDRT to set another plug.				Tool OD / Type :	203.00 mm / P4M			
				MWD Real-time%:	98.50 %			
				MWD Recorded%:	100.00 %			
				Min. Inc. :	4.40 deg / 1230.61 m			
				Max. Inc. :	4.44 deg / 1202.14 m			
				Final Az. :	205.11 deg			
				Max Op. Press. :	2320 psig			



## Bitrun Summary

Run Time Data		Drilling Data		Mud Data			
MWD Run :	0800	Start Depth :	1146.00 m	Mud Type : KCl/Polymer			
Rig Bit No:	12	End Depth :	1157.00 m	Weight / Visc : 1.27 sg / 68.00 spqt			
Hole Size :	311.00 mm	Footage :	11.00 m	Chlorides : 46000 ppm			
Run Start :	26-May-05 12:47	Avg. Flow Rate :	866 gpm	PV / YP : 18.00 cp / 42.00 lhf2			
Run End :	27-May-05 10:26	Avg. RPM :	167 rpm	Solids/Sand : 12 % / 0.01 %			
BRT Hrs :	21.65	Avg. WOB :	6.00 klb	%Oil / O:W: N/A % / N/A			
Circ. Hrs :	13.27	Avg. ROP :	1.10 m/hr	pH/Fluid Loss: 11.00 pH / 4.40 mptm			
Oper. Hrs :	21.65	Avg. SPP :	2681 psig	Max. Temp. : 57.00 degC			
MWD Schematics		BHA Schematics					
<div><div><div>(6)</div><div></div></div><div><div>(5)</div><div></div></div><div><div>(4)</div><div>6. Mk8 Pulser 1200 System SN: 8270 0.00 m From Bit</div></div><div><div>(3)</div><div>5. DM SN: 581139 20.91 m From Bit</div></div><div><div>(2)</div><div>4. HCIM SN: 163155</div></div><div><div>(1)</div><div>3. PWD SN: 161846 16.95 m From Bit</div></div><div><div></div><div>2. EWR-P4 SN: 45162 14.43 m From Bit</div></div><div><div></div><div>1. DGR SN: 151078 12.09 m From Bit</div></div></div>		<div><div><div>(10)</div><div></div></div><div><div>(9)</div><div></div></div><div><div>(8)</div><div></div></div><div><div>(7)</div><div></div></div><div><div>(6)</div><div>10. HWDP 46.12 127.000 79.400</div></div><div><div>(5)</div><div>09. Drilling Jars 9.87 203.200 76.200</div></div><div><div>(4)</div><div>08. HWDP 138.37 127.000 79.400</div></div><div><div>(3)</div><div>07. Cross Over Sub 1.09 203.200 70.000</div></div><div><div>(2)</div><div>06. Drill Collar 26.59 203.200 76.200</div></div><div><div>(1)</div><div>05. MWD 17.31 203.200 76.396</div></div><div><div></div><div>04. Cross Over Sub 1.22 203.200 70.000</div></div><div><div></div><div>03. Float Sub 1.05 203.200 70.000</div></div><div><div></div><div>02. 9-5/8" SperryDrill Lobe 3/4 8.56 244.602 70.000</div></div><div><div></div><div>01. HYCALOG DS43GTS (PDC) 0.17 311.000 76.200</div></div></div>					
Comments				MWD Performance			
Kicked off 1146.0 mMDRT. POOH at 1157.0 mMDRT to change the bit.				Tool OD / Type : 203.00 mm / P4M			
				MWD Real-time%: 99.25 %			
				MWD Recorded%: 100.00 %			
				Min. Inc. : 3.91 deg / 1133.97 m			
				Max. Inc. : 3.91 deg / 1133.97 m			
				Final Az. : 191.68 deg			
				Max Op. Press. : 2086 psig			

## Bitrun Summary

Run Time Data		Drilling Data		Mud Data				
MWD Run :	0900	Start Depth :	1157.00 m	Mud Type :	KCl/Polymer			
Rig Bit No:	13	End Depth :	1274.00 m	Weight / Visc :	1.27 sg / 60.00 spqt			
Hole Size :	311.00 mm	Footage :	117.00 m	Chlorides :	46000 ppm			
Run Start :	27-May-05 11:09	Avg. Flow Rate :	843 gpm	PV / YP :	16.00 cp / 37.00 lhf2			
Run End :	28-May-05 15:49	Avg. RPM :	72 rpm	Solids/Sand :	13 % / 0.1 %			
BRT Hrs :	28.67	Avg. WOB :	19.20 klb	%Oil / O:W:	N/A % / N/A			
Circ. Hrs :	15.58	Avg. ROP :	8.80 m/hr	pH/Fluid Loss:	10.80 pH / 4.20 mptm			
Oper. Hrs :	28.67	Avg. SPP :	2625 psig	Max. Temp. :	58.00 degC			
MWD Schematics		BHA Schematics						
<div><div><div>(6)</div><div></div></div><div><div>(5)</div><div></div></div><div><div>(4)</div><div>6. Mk8 Pulser 1200 System SN: 8270 0.00 m From Bit</div></div><div><div>(3)</div><div>5. DM SN: 581139 22.98 m From Bit</div></div><div><div>(2)</div><div>4. HCIM SN: 163155</div></div><div><div>(1)</div><div>3. PWD SN: 161846 19.02 m From Bit</div></div><div><div></div><div>2. EWR-P4 SN: 45162 16.50 m From Bit</div></div><div><div></div><div>1. DGR SN: 151078 14.16 m From Bit</div></div></div>		<div><div><div>(11)</div><div></div></div><div><div>(10)</div><div></div></div><div><div>(9)</div><div></div></div><div><div>(8)</div><div></div></div><div><div>(7)</div><div>11. HWDP</div></div><div><div>(6)</div><div>10. Drilling Jars</div></div><div><div>(5)</div><div>09. HWDP</div></div><div><div>(4)</div><div>08. Cross Over Sub</div></div><div><div>(3)</div><div>07. Drill Collar</div></div><div><div>(2)</div><div>06. MWD</div></div><div><div>(1)</div><div>05. Cross Over Sub</div></div><div><div></div><div>04. Integral Blade Stabilizer</div></div><div><div></div><div>03. Float Sub</div></div><div><div></div><div>02. 9-5/8" SperryDrill Lobe 3/4</div></div><div><div></div><div>01. Security DBS XL12D (Tricone)</div></div></div>		Length (m)	O.D. (mm)	I.D. (mm)		
		46.12	127.000	79.400				
		9.87	203.200	76.200				
		138.37	127.000	79.400				
		1.09	203.200	70.000				
		26.59	203.200	76.200				
		14.31	203.200	76.396				
		1.22	203.200	70.000				
		1.90	203.200	70.000				
		1.05	203.200	70.000				
		8.56	244.602	70.000				
		0.34	311.000	50.800				
Comments				MWD Performance				
Completed kick-off program with mud motor. Pulled out at 1274.0 mMDRT to pick up the Geopilot.				Tool OD / Type :	203.00 mm / P4M			
				MWD Real-time%:	98.25 %			
				MWD Recorded%:	100.00 %			
				Min. Inc. :	5.08 deg / 1166.38 m			
				Max. Inc. :	10.24 deg / 1250.01 m			
				Final Az. :	1250.01 deg			
				Max Op. Press. :	2353 psig			

## Bitrun Summary

Run Time Data		Drilling Data		Mud Data																																			
MWD Run :	1000	Start Depth :	1274.00 m	Mud Type :	KCl/Polymer																																		
Rig Bit No:	14	End Depth :	1998.00 m	Weight / Visc :	1.28 sg /	69.00	spqt																																
Hole Size :	311.00 mm	Footage :	724.00 m	Chlorides :	46000 ppm																																		
Run Start :	28-May-05 18:30	Avg. Flow Rate :	960 gpm	PV / YP :	20.00 cp /	43.00	lhf2																																
Run End :	31-May-05 23:02	Avg. RPM :	140 rpm	Solids/Sand :	14 % /	0.1 %																																	
BRT Hrs :	76.54	Avg. WOB :	24.00 klb	%Oil / O:W:	N/A % /	N/A																																	
Circ. Hrs :	52.30	Avg. ROP :	24.96 m/hr	pH/Fluid Loss:	8.50 pH /	4.60	mptm																																
Oper. Hrs :	76.54	Avg. SPP :	3230 psig	Max. Temp. :	76.00 degC																																		
MWD Schematics		BHA Schematics																																					
<div><div>(7)</div><div></div><div>(6)</div><div>7. Mk8 Pulser 1200 System SN: 8270 0.00 m From Bit</div><div>(5)</div><div>6. DM SN: 581139 19.97 m From Bit</div><div>(4)</div><div>5. HCIM SN: 163155</div><div>(3)</div><div>4. PWD SN: 161846 16.01 m From Bit</div><div>(2)</div><div>3. EWR-P4 SN: 45162 13.49 m From Bit</div><div>(1)</div><div>2. DGR SN: 151078 11.15 m From Bit</div><div>1. GeoPilot SN: GP1225TL062 5.71 m From Bit</div></div>		<div><div>(7)</div><div></div><div>(6)</div><div>(5)</div><div>(4)</div><div>(3)</div><div>(2)</div><div>(1)</div><div><table><thead><tr><th>Component</th><th>Length (m)</th><th>O.D. (mm)</th><th>I.D. (mm)</th></tr></thead><tbody><tr><td>07. HWDP</td><td>138.06</td><td>127.000</td><td>79.400</td></tr><tr><td>06. Drill Collar</td><td>27.81</td><td>171.450</td><td>76.200</td></tr><tr><td>05. Cross Over Sub</td><td>1.09</td><td>203.200</td><td>76.200</td></tr><tr><td>04. Drilling Jars</td><td>9.67</td><td>203.200</td><td>76.200</td></tr><tr><td>03. Drill Collar</td><td>88.33</td><td>203.200</td><td>76.200</td></tr><tr><td>02. MWD</td><td>23.63</td><td>207.433</td><td>76.364</td></tr><tr><td>01. Security DBS FS2663 (PDC)</td><td>0.64</td><td>311.000</td><td>50.800</td></tr></tbody></table></div></div>						Component	Length (m)	O.D. (mm)	I.D. (mm)	07. HWDP	138.06	127.000	79.400	06. Drill Collar	27.81	171.450	76.200	05. Cross Over Sub	1.09	203.200	76.200	04. Drilling Jars	9.67	203.200	76.200	03. Drill Collar	88.33	203.200	76.200	02. MWD	23.63	207.433	76.364	01. Security DBS FS2663 (PDC)	0.64	311.000	50.800
Component	Length (m)	O.D. (mm)	I.D. (mm)																																				
07. HWDP	138.06	127.000	79.400																																				
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Comments				MWD Performance																																			
Steered with Geopilot to section TD at 1998.0 mMDRT.				Tool OD / Type :	203.00 mm /	P4M																																	
				MWD Real-time%:	98.00 %																																		
				MWD Recorded%:	67.00 %																																		
				Min. Inc. :	10.53 deg /	1287.27 m																																	
				Max. Inc. :	76.28 deg /	1975.04 m																																	
				Final Az. :	287.89 deg																																		
				Max Op. Press. :	3195 psig																																		

## Bitrun Summary

Run Time Data		Drilling Data		Mud Data			
MWD Run :	1100	Start Depth :	1998.00 m	Mud Type :	Flo Pro		
Rig Bit No:	15	End Depth :	2404.00 m	Weight / Visc :	1.27 sg /	57.00	spqt
Hole Size :	216.00 mm	Footage :	406.00 m	Chlorides :	120000 ppm		
Run Start :	02-Jun-05 09:17	Avg. Flow Rate :	745 gpm	PV / YP :	17.00 cp /	41.00	lhf2
Run End :	04-Jun-05 15:29	Avg. RPM :	92 rpm	Solids/Sand :	15 % /	0.25 %	
BRT Hrs :	54.20	Avg. WOB :	16.50 klb	%Oil / O:W:	N/A % /	N/A	
Circ. Hrs :	35.80	Avg. ROP :	18.10 m/hr	pH/Fluid Loss:	9.70 pH /	3.80	mptm
Oper. Hrs :	54.20	Avg. SPP :	3220 psig	Max. Temp. :	78.00 degC		
MWD Schematics		BHA Schematics					
<div><div><div>(9)</div><div>(8)</div><div>(7)</div><div>(6)</div><div>(5)</div><div>(4)</div><div>(3)</div><div>(2)</div><div>(1)</div></div><div><div>9. Mk8 Pulser 650 System SN: 8047 0.00 m From Bit</div><div>8. CNP SN: 74044 24.52 m From Bit</div><div>7. SLD SN: 121808 21.05 m From Bit</div><div>6. HCIM SN: 093281</div><div>5. PWD SN: 159816 16.31 m From Bit</div><div>4. EWR-P4 SN: 138389 13.78 m From Bit</div><div>3. DGR SN: 126021 11.44 m From Bit</div><div>2. DM SN: 149865 8.97 m From Bit</div><div>1. GeoPilot SN: GP0850TL084 4.66 m From Bit</div></div></div>		<div><div><div>(6)</div><div>(5)</div><div>(4)</div><div>(3)</div><div>(2)</div><div>(1)</div></div><div><div>Component</div><div>Length (m)</div><div>O.D. (mm)</div><div>I.D. (mm)</div></div><div><div>06. HWDP</div><div>46.12</div><div>127.000</div><div>79.400</div></div><div><div>05. Drilling Jars</div><div>9.24</div><div>171.450</div><div>76.200</div></div><div><div>04. HWDP</div><div>55.28</div><div>139.700</div><div>76.200</div></div><div><div>03. Float Sub</div><div>0.79</div><div>165.100</div><div>76.200</div></div><div><div>02. MWD</div><div>28.67</div><div>174.228</div><div>75.152</div></div><div><div>01. Security DBS FMF3553 (PDC)</div><div>0.42</div><div>216.000</div><div>50.800</div></div></div>					
Comments				MWD Performance			
Built hole angle with Geopilot and drilled horizontal hole along reservoir to 2404.0 mMDRT.				Tool OD / Type :	171.00 mm /	P4M	
				MWD Real-time%:	95.60 %		
				MWD Recorded%:	100.00 %		
				Min. Inc. :	76.66 deg /	2020.94 m	
				Max. Inc. :	87.78 deg /	2193.21 m	
				Final Az. :	287.71 deg		
				Max Op. Press. :	3176 psig		

## Directional Survey Data

Measured Depth (metres)	Inclination (degrees)	Direction (degrees)	Vertical Depth (metres)	Latitude (metres)	Departure (metres)	Vertical Section (metres)	Dogleg (deg/30m)
1146.00	4.50	204.71	1145.63	2.70 S	1.75 E	-2.56	TIE-IN
1166.38	5.08	197.94	1165.94	4.28 S	1.14 E	-2.53	1.19
1196.52	6.90	204.40	1195.91	7.20 S	0.02 W	-2.43	1.93
1225.28	9.13	213.00	1224.39	10.69 S	1.98 W	-1.78	2.63
1250.01	10.24	216.17	1248.77	14.11 S	4.34 W	-0.72	1.49
1257.46	10.16	218.79	1256.10	15.16 S	5.15 W	-0.32	1.90
1287.27	10.53	234.54	1285.43	18.79 S	9.01 W	2.08	2.86
1314.96	11.47	254.15	1312.62	21.01 S	13.72 W	5.75	4.16
1342.92	12.82	274.39	1339.97	21.53 S	19.49 W	11.00	4.76
1371.81	14.63	289.92	1368.04	20.04 S	26.12 W	17.74	4.25
1403.35	16.96	298.16	1398.39	16.51 S	33.93 W	26.28	3.07
1430.21	19.64	303.85	1423.89	12.15 S	41.13 W	34.54	3.59
1460.58	23.39	309.06	1452.15	5.50 S	50.05 W	45.19	4.15
1487.44	26.26	311.42	1476.52	1.79 N	58.65 W	55.76	3.39
1515.92	30.69	310.65	1501.55	10.70 N	68.90 W	68.42	4.68
1544.45	35.01	308.80	1525.51	20.57 N	80.80 W	82.98	4.66
1574.02	39.48	307.90	1549.05	31.67 N	94.84 W	99.95	4.57
1601.66	43.46	306.39	1569.75	42.71 N	109.43 W	117.43	4.45
1630.50	47.12	305.12	1590.04	54.68 N	126.06 W	137.15	3.92
1659.47	51.07	302.67	1609.01	66.87 N	144.24 W	158.39	4.52
1688.15	54.91	300.23	1626.27	78.81 N	163.78 W	180.82	4.50
1716.83	59.06	298.06	1641.90	90.51 N	184.78 W	204.55	4.74
1745.43	62.89	296.17	1655.77	101.90 N	207.04 W	229.36	4.38
1775.14	65.13	291.82	1668.79	112.74 N	231.43 W	255.99	4.55
1803.18	66.82	288.55	1680.21	121.57 N	255.46 W	281.59	3.67
1832.10	67.00	288.55	1691.55	130.04 N	280.69 W	308.19	0.19
1861.05	70.00	287.81	1702.16	138.44 N	306.27 W	335.11	3.19
1889.71	70.27	288.54	1711.90	146.85 N	331.88 W	362.05	0.77
1918.35	71.02	288.14	1721.39	155.35 N	357.53 W	389.06	0.88
1946.76	73.24	288.85	1730.11	163.93 N	383.17 W	416.09	2.45
1975.04	76.28	287.89	1737.54	172.52 N	409.07 W	443.36	3.37
2020.94	76.66	287.87	1748.28	186.22 N	451.54 W	487.96	0.25
2049.61	78.96	288.67	1754.34	195.01 N	478.14 W	515.97	2.54
2078.36	82.52	288.53	1758.96	204.06 N	505.03 W	544.33	3.72
2107.04	86.73	289.13	1761.65	213.27 N	532.05 W	572.88	4.45
2135.83	87.47	289.13	1763.10	222.70 N	559.22 W	601.63	0.77
2164.51	87.78	290.18	1764.29	232.33 N	586.20 W	630.28	1.14
2193.21	87.78	290.62	1765.40	242.33 N	613.08 W	658.96	0.46
2221.71	87.29	289.70	1766.63	252.14 N	639.81 W	687.43	1.10
2250.28	85.93	289.24	1768.32	261.65 N	666.70 W	715.95	1.51

## Directional Survey Data

Measured Depth (metres)	Inclination (degrees)	Direction (degrees)	Vertical Depth (metres)	Latitude (metres)	Departure (metres)	Vertical Section (metres)	Dogleg (deg/30m)
2279.03	86.30	289.25	1770.27	271.10 N	693.78 W	744.63	0.39
2307.85	85.37	288.38	1772.36	280.37 N	720.99 W	773.37	1.32
2336.65	82.20	287.82	1775.48	289.27 N	748.20 W	801.98	3.35
2365.23	80.01	287.52	1779.90	297.84 N	775.10 W	830.20	2.32
2394.21	79.83	287.71	1784.97	306.47 N	802.30 W	858.71	0.27
2404.00	79.83	287.71	1786.70	309.40 N	811.48 W	868.34	0.00

## Directional Survey Data

CALCULATION BASED ON Minimum Curvature METHOD

SURVEY COORDINATES RELATIVE TO WELL SYSTEM REFERENCE POINT

TVD VALUES GIVEN RELATIVE TO DRILLING MEASUREMENT POINT

VERTICAL SECTION RELATIVE TO WELL HEAD

VERTICAL SECTION IS COMPUTED ALONG A DIRECTION OF 289.90 DEGREES (GRID)

A TOTAL CORRECTION OF 12.01 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.

HORIZONTAL DISPLACEMENT(CLOSURE) AT 2404.00 METRES

IS 868.46 METRES ALONG 290.87 DEGREES (GRID)

RT to LAT = 22.0 m.

Surveys are corrected for BHA sag.

Final Survey Projected to TD.

## Service Interrupt Report

MWD run number :	0700	Time/Date of Failure :	28-May-05 02:24
Rig Bit Number :		Depth at time of Failure :	0.00 m
MWD Run start time/date :	24-May-05 15:01	Lost Rig Hours :	3.00
MWD Run end time/date :	25-May-05 16:35		

## Rig Activity

Changing out BHA.

## Description of Failure

Tool failed confidence test. Subsequent attempts to communicate with the tool failed.

## Action Taken

Changed out RLL and RIH. Changed out the HCIM insert on failed tool after it was laid out but got the same problem.

## Operation Impact

Lost 3 hours of rig time.

## Reason for Failure

Unknown.

## Service Interrupt Report

MWD run number :	1100	Time/Date of Failure :	04-Jun-05 16:00
Rig Bit Number :	15	Depth at time of Failure :	0.00 m
MWD Run start time/date :	02-Jun-05 09:17	Lost Rig Hours :	0.00
MWD Run end time/date :	04-Jun-05 15:29		

### Rig Activity

Running production liner.

### Description of Failure

Unable to process SLD+ data after successfully reading tool.

### Action Taken

Repeated tool read but with same outcome. The data was later processed in the office.

### Operation Impact

Delivery of recorded SLD data delayed by three days.

### Reason for Failure

Surface computer error.

