

# HALLIBURTON

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**Sperry Drilling**

## **LWD End of Well Report**

**For**

**Origin Energy Resources Ltd**

## **Trefoil-2**

<b>Rig:</b>	<b>Kan Tan IV</b>
<b>Field:</b>	<b>Trefoil</b>
<b>Country:</b>	<b>Australia</b>
<b>Job No:</b>	<b>AU-FE-0006714148</b>
<b>Date:</b>	<b>03-OCT-09</b>

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## General Information

Company:	Origin Energy Resources Ltd
Rig:	Kan Tan IV
Well:	Trefoil-2
Field:	Trefoil
Lease Name:	T/18P
State:	Tasmania
County:	
Country:	Australia
API Number:	
Sperry Job Number:	AU-FE-0006714148
Job start date:	03-Oct-09
Job end date:	05-Oct-09
North reference:	Grid
Declination:	12.497 deg
Dip angle:	-70.484 deg
Total magnetic field:	61022 nT
Date of magnetic data:	06 October, 2009
Wellhead coordinates N:	39 deg. 53 min 7.93 sec South
Wellhead coordinates E:	145 deg. 22 min 14.62 sec East
Vertical section direction:	0.00 deg
Unit Number:	SSH-40
MWD Engineers:	J. Lau, A. Nijhof, M. Dillon, T. Osborne, M. Ward
Company Representatives:	J. McGarrity, B. Houston
Company Geologist:	D. Archer, L. Hansen

## Operational Overview

Sperry Drilling was contracted by Origin Energy Resources Ltd to provide Logging While Drilling (LWD) services for the drilling of Trefoil-2. The well was drilled in permit T/18P by the Maersk MODU Kan Tan IV.

### 17 1/2" (445mm) Hole Section:

This section was drilled in one bit run using a conventional rotary assembly.

A Pressure Case Gamma (PCG) was utilised for formation evaluation. Additionally a Pressure Case Directional (PCDC) was run for wellbore surveying.

The section was drilled from 155.0 mMDRT to section TD at 935.0 mMDRT. Pulled out of hole to run 340mm casing.

### 12 1/4" (311mm) Hole Section:

This section was drilled in two bit runs using a SperryDrill Motor assembly. LWD tools comprised of the following :

Drilling String Dynamics (DDSR-DGR) for drilling optimisation, Dual Gamma Ray (DGR) and Electromagnetic Wave Resistivity (EWR-P4) for formation evaluation. Additionally a Pressure Case Directional (PCDC) was utilised for wellbore surveying.

The first run was drilled from 935.0 to 2271.0 mMDRT.

The second run was drilled from 2271.0 mMDRT to section TD at 2520.0 mMDRT. Pulled out of hole to run 244mm casing.

### 8 1/2" (216mm) Hole Section:

This section was drilled in four bit runs using a conventional rotary assembly. LWD tools comprised of the following :

Drilling String Dynamics (DDS) for drilling optimisation, Dual Gamma Ray (DGR), Electromagnetic Wave Resistivity (EWR-P4), Compensated Thermal Neutron (CTN), Azimuthal Litho-Density (ALD) and Bi-Modal Acoustic (BAT) for formation evaluation. Acoustic Caliper (ACAL) was run in recorded mode to determine hole size. Additionally a Pressure Case Directional (PCDC) was utilised for wellbore surveying.

The first run was drilled from 2520.0 to 2633.0 mMDRT and pulled out of hole for LWD failure.

The second run was drilled from 2633.0 mMDRT to the first coring point at 2983.0 mMDRT.

The third run logged the core section from 2983.0 to 3013.0 mMDRT and continued drilling to the second coring point at 3145.0 mMDRT.

The fourth run logged the core section from 3145.0 to 3175.0 mMDRT and continued drilling to well TD at 3235.0 mMDRT.

## Summary of MWD runs

[illegible]

## Bitrun Summary

## RUN TIME DATA

MWD Run	: 100	Run Start	: 08-Oct-09 09:00	BRT Hrs	: 64.50 hr	Circ. Hrs	: 34.85 hr
Rig Bit No	: 2	Run End	: 11-Oct-09 01:30	Hole Size	: 445.00 mm	Oper. Hrs	: 64.50 hr

## DRILLING DATA

Start Depth	: 155.00 m	Footage	: 780.00 m	Avg RPM	: 90 rpm	Avg ROP	: 30.34 m/hr
End Depth	: 935.00 m	Avg Flow Rate	: 1157.00 gpm	Avg WOB	: 8.0 klb	Avg SPP	: 2185 psig
Drilling Hours	: 25.710 hr						

## MUD DATA

Mud Type	: Sea Water						
Weight	: 8.76 ppg	Viscosity	: 0.00 spqt	PV	: 0 cP	YP	: 0.00 lhf2
Chlorides	: 0.00 ppm	Max Temp.	: 21.10 degC	% Solids	: 0.00 %	% Sand	: 0.00 %
pH	: 0.00 pH	Fluid Loss	: 0 mptm	% Oil	: 0.00 %	O:W	: 0:100

## MWD PERFORMANCE

Tool OD	: 9.50 in	Type	: D/GWD	Min. Inc.	: 0.00 deg	Min. Inc. Depth	: 95.000 m
Final Az.	: 183.94 deg	Max Op. Press.	: 1398 psig	Max Inc.	: 1.03 deg	Max Inc. Depth	: 896.770 m
MWD Real-time %	: 99 %	MWD Recorded %	: 100 %				

	Length (m)	Dist From Bit (m)		Length (m)	Dist From Bit (m)
5" X 3" HWDP #49.3 - NC50(IF) 5.00 in OD / 3.00 in ID	113.22	244.52			
X-Over Sub 6.75 in OD / 3.00 in ID	1.09	131.30	HOC 9.50 in OD / 4.13 in ID		0.00
8 1/4" X 2.8125" - 160.6# Drill Collar 8.25 in OD / 2.81 in ID	75.33	130.21	* Positive Pulser - SN : 10608131	9.77	7.76
			* PCM Sonde - SN : 11226946		
			* PCDC Sonde - SN : 300348		
			* PCG Sonde - SN : PCGR624		5.62
Jar 8.00 in OD / 3.00 in ID	9.68	54.88			
8 1/4" X 2.8125" - 160.6# Drill Collar 8.25 in OD / 2.81 in ID	18.63	45.20			
X-Over Sub 8.25 in OD / 3.00 in ID	1.13	26.57			
Stabilizer 9.50 in OD / 3.00 in ID	2.05	25.44			
		23.39			
Spiral Drill Collar 9.50 in OD / 3.00 in ID	9.45				
Stabilizer 9.50 in OD / 3.00 in ID	2.51	13.94			
		11.43			
MWD	9.77				
Bit Sub 9.50 in OD / 3.00 in ID	1.22	1.66			
Tricone 9.50 in OD / 3.00 in ID	0.44	0.44			

## COMMENTS

Drill 445mm hole from 155.0 mMDRT to section TD at 935.0 mMDRT. POOH to run 340mm casing. All recorded data recovered on surface.

## Bitrun Summary

## RUN TIME DATA

MWD Run	: 200	Run Start	: 15-Oct-09 05:02	BRT Hrs	: 117.11 hr	Circ. Hrs	: 71.57 hr
Rig Bit No	: 3	Run End	: 20-Oct-09 02:09	Hole Size	: 311.00 mm	Oper. Hrs	: 117.11 hr

## DRILLING DATA

Start Depth	: 935.00 m	Footage	: 1336.00 m	Avg RPM	: 107 rpm	Avg ROP	: 34.08 m/hr
End Depth	: 2271.00 m	Avg Flow Rate	: 1000.00 gpm	Avg WOB	: 11.3 klb	Avg SPP	: 2485 psig
Drilling Hours	: 39.200 hr						

## MUD DATA

Mud Type	: KCL/Polymer						
Weight	: 9.10 ppg	Viscosity	: 50.00 spqt	PV	: 15 cP	YP	: 27.00 lhf2
Chlorides	: 38000.00 ppm	Max Temp.	: 65.30 degC	% Solids	: 2.90 %	% Sand	: 0.25 %
pH	: 9.00 pH	Fluid Loss	: 4 mptm	% Oil	: 0.00 %	O:W	: 0:100

## MWD PERFORMANCE

Tool OD	: 8.00 in	Type	: P4M	Min. Inc.	: 0.48 deg	Min. Inc. Depth	: 1963.220 m
Final Az.	: 82.85 deg	Max Op. Press.	: 3527 psig	Max Inc.	: 1.44 deg	Max Inc. Depth	: 1500.560 m
MWD Real-time %	: 100 %	MWD Recorded %	: 100 %				

	Length (m)	Dist From Bit (m)		Length (m)	Dist From Bit (m)
15 x 5" Heavy Weight Drill Pipe 5.00 in OD / 3.00 in ID	141.54	252.71			
Cross-over Sub 6.75 in OD / 2.81 in ID	1.09	111.17	8" HOC w/ Pulser & Directional 8.06 in OD / 2.38 in ID * Positive Pulser - SN : 10608131 * PCM Sonde - SN : 11226946 * PCDC Sonde - SN : 300348	4.80	0.00
2 x 8-1/4" Spiral Drill Collar 8.25 in OD / 2.88 in ID	18.63	110.08			19.76
8" Drilling Jar 8.00 in OD / 3.00 in ID	9.68	91.45	8" HF HCIM Collar 8.00 in OD / 2.38 in ID * HCIM Insert - SN : 245814	1.65	18.66
6 x 8-1/4" Spiral Drill Collar 8.25 in OD / 2.88 in ID	56.43	81.77			
12-1/8" Integral Blade Stabilizer 8.06 in OD / 2.81 in ID	1.88	25.34	8" HF EWR-P4 Collar 8.00 in OD / 2.38 in ID * EWR-P4 Insert - SN : 11131559	3.71	14.81
MWD	12.08	23.46			
12-1/8" Integral Blade Stabilizer 8.00 in OD / 2.81 in ID	1.86	11.38	8" HF DGR Collar 8.00 in OD / 2.38 in ID * DDS Insert * DGR Insert - SN : 11158407	1.92	12.34
9-5/8" Sperry Drill Lobe 6/7 - 5.0 stg w/ Float 9.63 in OD / 6.14 in ID	9.22	9.52			
12-1/4" Reed RSR616M-A21 PDC Bit 12.25 in OD / 3.00 in ID	0.30	0.30			

## COMMENTS

Drill 311mm hole from 935.0 to 2271.0 mMDRT. POOH due to pressure drop. All recorded data recovered on surface.

## Bitrun Summary

## RUN TIME DATA

MWD Run	: 300	Run Start	: 20-Oct-09 11:03	BRT Hrs	: 46.51 hr	Circ. Hrs	: 23.73 hr
Rig Bit No	: 4	Run End	: 22-Oct-09 09:34	Hole Size	: 311.00 mm	Oper. Hrs	: 46.51 hr

## DRILLING DATA

Start Depth	: 2271.00 m	Footage	: 249.00 m	Avg RPM	: 108 rpm	Avg ROP	: 18.12 m/hr
End Depth	: 2520.00 m	Avg Flow Rate	: 949.00 gpm	Avg WOB	: 12.1 klb	Avg SPP	: 2879 psig
Drilling Hours	: 13.690 hr						

## MUD DATA

Mud Type	: KCL/Polymer						
Weight	: 9.40 ppg	Viscosity	: 56.00 spqt	PV	: 16 cP	YP	: 32.00 lhf2
Chlorides	: 44000.00 ppm	Max Temp.	: 86.70 degC	% Solids	: 4.00 %	% Sand	: 0.25 %
pH	: 9.00 pH	Fluid Loss	: 4 mptm	% Oil	: 0.00 %	O:W	: 0:100

## MWD PERFORMANCE

Tool OD	: 8.00 in	Type	: P4M	Min. Inc.	: 0.84 deg	Min. Inc. Depth	: 2281.350 m
Final Az.	: 89.94 deg	Max Op. Press.	: 4061 psig	Max Inc.	: 1.08 deg	Max Inc. Depth	: 2426.570 m
MWD Real-time %	: 97 %	MWD Recorded %	: 100 %				

	Length (m)	Dist From Bit (m)		Length (m)	Dist From Bit (m)
15 x 5" Heavy Weight Drill Pipe 5.00 in OD / 3.00 in ID	141.54	252.71			
Cross-over Sub 6.75 in OD / 2.81 in ID	1.09	111.17	8" HOC w/ Pulser & Directional 8.06 in OD / 2.38 in ID * Positive Pulser - SN : 11160935 * PCM Sonde - SN : 10921470 * PCDC Sonde - SN : 300454	4.80	0.00
2 x 8-1/4" Spiral Drill Collar 8.25 in OD / 2.88 in ID	18.63	110.08			19.76
8" Drilling Jar 8.00 in OD / 3.00 in ID	9.68	91.45	8" HF HCIM Collar 8.00 in OD / 2.38 in ID * HCIM Insert - SN : 245814	1.65	18.66
6 x 8-1/4" Spiral Drill Collar 8.25 in OD / 2.88 in ID	56.43	81.77			
12-1/8" Integral Blade Stabilizer 8.06 in OD / 2.81 in ID	1.88	25.34	8" HF EWR-P4 Collar 8.00 in OD / 2.38 in ID * EWR-P4 Insert - SN : 11131559	3.71	14.81
MWD	12.08	23.46			
12-1/8" Integral Blade Stabilizer 8.00 in OD / 2.81 in ID	1.86	11.38	8" HF DGR Collar 8.00 in OD / 2.38 in ID * DDS Insert * DGR Insert - SN : 11158407	1.92	12.34
9-5/8" Sperry Drill Lobe 6/7 - 5.0 stg w/ Float 9.63 in OD / 6.14 in ID	9.22	9.52			
12-1/4" Reed RSR616M-A21 PDC Bit 12.25 in OD / 3.00 in ID	0.30	0.30			

## COMMENTS

Drill 311mm hole from 2271.0 mMDRT to section TD at 2520.0 mMDRT. POOH to run 244mm casing All recorded data recovered on surface.



## Bitrun Summary

## RUN TIME DATA

MWD Run	: 400	Run Start	: 08-Nov-09 01:55	BRT Hrs	: 34.44 hr	Circ. Hrs	: 15.82 hr
Rig Bit No	: 6	Run End	: 09-Nov-09 12:21	Hole Size	: 216.00 mm	Oper. Hrs	: 34.44 hr

## DRILLING DATA

Start Depth	: 2519.00 m	Footage	: 114.00 m	Avg RPM	: 110 rpm	Avg ROP	: 17.55 m/hr
End Depth	: 2633.00 m	Avg Flow Rate	: 725.00 gpm	Avg WOB	: 6.7 klb	Avg SPP	: 2516 psig
Drilling Hours	: 6.440 hr						

## MUD DATA

Mud Type	: Polymer						
Weight	: 9.30 ppg	Viscosity	: 48.00 spqt	PV	: 12 cP	YP	: 27.00 lhf2
Chlorides	: 42500.00 ppm	Max Temp.	: 96.00 degC	% Solids	: 3.20 %	% Sand	: 0.25 %
pH	: 9.00 pH	Fluid Loss	: 4 mptm	% Oil	: 0.00 %	O:W	: 0:100

## MWD PERFORMANCE

Tool OD	: 6.75 in	Type	: P4M	Min. Inc.	: 1.00 deg	Min. Inc. Depth	: 2524.750 m
Final Az.	: 90.35 deg	Max Op. Press.	: 4223 psig	Max Inc.	: 1.30 deg	Max Inc. Depth	: 2588.200 m
MWD Real-time %	: 100 %	MWD Recorded %	: 100 %				

	Length (m)	Dist From Bit (m)		Length (m)	Dist From Bit (m)
15 x 5" HWDP 6.63 in OD / 3.00 in ID	141.13	287.57	6 3/4" ACAL 6.75 in OD / 1.92 in ID SN : PA90223655B-6 * ACAL Insert - SN : 138159	1.83	30.20
3 x 6 4/3" Drill Collar 6.75 in OD / 2.88 in ID	28.21	146.44	6 3/4" HOC 6.75 in OD / 1.92 in ID SN : 203846 * Positive Pulser - SN : 11160907 * PCM Sonde - SN : 159	3.05	0.00
Jar 6.75 in OD / 2.75 in ID	9.91	118.23	6 3/4" BAT 6.75 in OD / 1.92 in ID SN : PA90227156O-6 * BAT Insert - SN : 11378930	6.72	23.36
8 x 6 3/4" Drill Collar 6.75 in OD / 2.88 in ID	74.97	108.32	6 3/4" Nuke Collar 6.75 in OD / 1.92 in ID SN : PA90219755N2L2-6 * CTN Insert - SN : 161970 * ALD Insert - SN : 96441	8.45	18.83
Stabilizer 6.50 in OD / 2.81 in ID	1.70	33.35	6 3/4" PM Sub 6.75 in OD / 1.92 in ID SN : 203846 * PCDC Sonde - SN : 351	2.79	10.02
MWD	29.87	31.65	6 3/4" RLL 6.75 in OD / 1.92 in ID SN : PA90222557H1RGV2-6 * HCIM Insert - SN : 222936 * EWR-P4 Insert - SN : 175801 * DGR Insert - SN : 218750 * DDSr-DGR - SN : 218750	7.03	5.16
Stabilizer w/ ported float 6.63 in OD / 3.24 in ID	1.50	1.78			2.81
Mi616VPX PDC 8.00 in OD / 2.25 in ID	0.28	0.28			0.00

## COMMENTS

Drill 216 mm hole from 2520.0 to 2633.0 mMDRT. POOH for PCM failure. ALD failed during run. All remaining recorded data recovered on surface.

## Bitrun Summary

## RUN TIME DATA

MWD Run	: 500	Run Start	: 09-Nov-09 22:43	BRT Hrs	: 57.84 hr	Circ. Hrs	: 33.71 hr
Rig Bit No	: 7	Run End	: 12-Nov-09 08:34	Hole Size	: 216.00 mm	Oper. Hrs	: 57.84 hr

## DRILLING DATA

Start Depth	: 2633.00 m	Footage	: 350.00 m	Avg RPM	: 121 rpm	Avg ROP	: 15.40 m/hr
End Depth	: 2983.00 m	Avg Flow Rate	: 702.00 gpm	Avg WOB	: 13.2 klb	Avg SPP	: 2564 psig
Drilling Hours	: 22.730 hr						

## MUD DATA

Mud Type	: Polymer						
Weight	: 9.30 ppg	Viscosity	: 46.00 spqt	PV	: 14 cP	YP	: 25.00 lhf2
Chlorides	: 40000.00 ppm	Max Temp.	: 101.00 degC	% Solids	: 3.30 %	% Sand	: 0.25 %
pH	: 9.00 pH	Fluid Loss	: 4 mptm	% Oil	: 0.00 %	O:W	: 0:100

## MWD PERFORMANCE

Tool OD	: 6.75 in	Type	: P4M	Min. Inc.	: 1.43 deg	Min. Inc. Depth	: 2646.630 m
Final Az.	: 85.15 deg	Max Op. Press.	: 4784 psig	Max Inc.	: 2.93 deg	Max Inc. Depth	: 2963.220 m
MWD Real-time %	: 100 %	MWD Recorded %	: 100 %				

	Length (m)	Dist From Bit (m)		Length (m)	Dist From Bit (m)
15 x 5" HWDP 6.63 in OD / 3.00 in ID	141.13	288.37	6 3/4" ACAL 6.75 in OD / 1.92 in ID SN : PA902223063B-6 * ACAL Insert - SN : 123087	1.81	31.02
3 x 6 4/3" Drill Collar 6.75 in OD / 2.88 in ID	28.21	147.24	6 3/4" HOC 6.75 in OD / 1.92 in ID SN : 302842 * Positive Pulser - SN : 10796450 * PCM Sonde - SN : 557	3.03	0.00
Jar 6.75 in OD / 2.75 in ID	9.91	119.03	6 3/4" BAT 6.75 in OD / 1.92 in ID SN : PA90227155O-6 * BAT Insert - SN : 11378929	6.76	24.20
8 x 6 3/4" Drill Collar 6.75 in OD / 2.88 in ID	74.97	109.12	6 3/4" Nuke Collar 6.75 in OD / 1.92 in ID SN : PA90222683N2L2-6 * CTN Insert - SN : 231177 * ALD Insert - SN : 10507525	9.20	19.64
Stabilizer 6.50 in OD / 2.81 in ID	1.70	34.15	6 3/4" PM Sub 6.75 in OD / 1.92 in ID SN : 1025744 * PCDC Sonde - SN : 348	2.81	10.07
MWD	30.67	32.45	6 3/4" RLL 6.75 in OD / 1.92 in ID SN : PA90222505H1RG-6 * HCIM Insert - SN : 232754 * EWR-P4 Insert - SN : 270277 * DGR Insert - SN : 176027 * DDSr-DGR - SN : 176027	7.07	5.17
Stabilizer w/ ported float 6.63 in OD / 3.24 in ID	1.50	1.78			2.83
Mi616BPX PDC 8.00 in OD / 2.25 in ID	0.28	0.28			0.00

## COMMENTS

Drill 216 mm hole from 2633.0 mMDRT to coring point at 2983.0 mMDRT. All recorded data recovered on surface.

## Bitrun Summary

## RUN TIME DATA

MWD Run	: 600	Run Start	: 13-Nov-09 18:59	BRT Hrs	: 41.08 hr	Circ. Hrs	: 18.19 hr
Rig Bit No	: 9	Run End	: 15-Nov-09 12:03	Hole Size	: 216.00 mm	Oper. Hrs	: 41.08 hr

## DRILLING DATA

Start Depth	: 2983.00 m	Footage	: 162.00 m	Avg RPM	: 82 rpm	Avg ROP	: 12.82 m/hr
End Depth	: 3145.00 m	Avg Flow Rate	: 725.00 gpm	Avg WOB	: 16.5 klb	Avg SPP	: 2888 psig
Drilling Hours	: 12.640 hr						

## MUD DATA

Mud Type	: Polymer						
Weight	: 9.40 ppg	Viscosity	: 50.00 spqt	PV	: 12 cP	YP	: 29.00 lbf/2
Chlorides	: 40000.00 ppm	Max Temp.	: 109.30 degC	% Solids	: 3.50 %	% Sand	: 0.25 %
pH	: 9.00 pH	Fluid Loss	: 5 mptm	% Oil	: 0.00 %	O:W	: 0:100

## MWD PERFORMANCE

Tool OD	: 6.75 in	Type	: P4M	Min. Inc.	: 2.88 deg	Min. Inc. Depth	: 2992.320 m
Final Az.	: 81.59 deg	Max Op. Press.	: 5073 psig	Max Inc.	: 3.75 deg	Max Inc. Depth	: 3130.210 m
MWD Real-time %	: 100 %	MWD Recorded %	: 100 %				

	Length (m)	Dist From Bit (m)		Length (m)	Dist From Bit (m)
15 x 5" HWDP 6.63 in OD / 3.00 in ID	141.13	288.37	6 3/4" ACAL 6.75 in OD / 1.92 in ID SN : PA902223063B-6 * ACAL Insert - SN : 123087	1.81	31.02
3 x 6 4/3" Drill Collar 6.75 in OD / 2.88 in ID	28.21	147.24	6 3/4" HOC 6.75 in OD / 1.92 in ID SN : 302842 * Positive Pulser - SN : 10796450 * PCM Sonde - SN : 557	3.03	0.00
Jar 6.75 in OD / 2.75 in ID	9.91	119.03	6 3/4" BAT 6.75 in OD / 1.92 in ID SN : PA90227155O-6 * BAT Insert - SN : 11378929	6.76	24.20
8 x 6 3/4" Drill Collar 6.75 in OD / 2.88 in ID	74.97	109.12	6 3/4" Nuke Collar 6.75 in OD / 1.92 in ID SN : PA90222683N2L2-6 * CTN Insert - SN : 231177 * ALD Insert - SN : 10507525	9.20	19.64
Stabilizer 6.50 in OD / 2.81 in ID	1.70	34.15	6 3/4" PM Sub 6.75 in OD / 1.92 in ID SN : 1025744 * PCDC Sonde - SN : 348	2.81	10.07
MWD	30.67	32.45	6 3/4" RLL 6.75 in OD / 1.92 in ID SN : PA90222505H1RG-6 * HCIM Insert - SN : 232754 * EWR-P4 Insert - SN : 270277 * DGR Insert - SN : 176027 * DDSr-DGR - SN : 176027	7.07	5.17
Stabilizer w/ ported float 6.63 in OD / 3.24 in ID	1.50	1.78			2.83
Mi616VPX PDC 8.00 in OD / 2.25 in ID	0.28	0.28			0.00

## COMMENTS

Wipe 216 mm coring interval from 2983.0 to 3013.0 mMDRT. Drill 216 mm hole from 3013.0 mMDRT to coring point at 3145.0 mMDRT. All recorded data recovered on surface.

## Bitrun Summary

## RUN TIME DATA

MWD Run	: 700	Run Start	: 16-Nov-09 21:11	BRT Hrs	: 41.30 hr	Circ. Hrs	: 11.48 hr
Rig Bit No	: 11	Run End	: 18-Nov-09 14:30	Hole Size	: 216.00 mm	Oper. Hrs	: 41.30 hr

## DRILLING DATA

Start Depth	: 3145.00 m	Footage	: 90.00 m	Avg RPM	: 91 rpm	Avg ROP	: 0.00 m/hr
End Depth	: 3235.00 m	Avg Flow Rate	: 681.00 gpm	Avg WOB	: 13.8 klb	Avg SPP	: 2771 psig
Drilling Hours	: 7.450 hr						

## MUD DATA

Mud Type	: Polymer						
Weight	: 9.40 ppg	Viscosity	: 56.00 spqt	PV	: 14 cP	YP	: 29.00 lbf/2
Chlorides	: 38000.00 ppm	Max Temp.	: 112.90 degC	% Solids	: 3.60 %	% Sand	: 0.25 %
pH	: 9.00 pH	Fluid Loss	: 5 mptm	% Oil	: 0.00 %	O:W	: 0:100

## MWD PERFORMANCE

Tool OD	: 6.75 in	Type	: P4M	Min. Inc.	: 3.79 deg	Min. Inc. Depth	: 3167.650 m
Final Az.	: 83.41 deg	Max Op. Press.	: 5188 psig	Max Inc.	: 4.33 deg	Max Inc. Depth	: 3223.600 m
MWD Real-time %	: 100 %	MWD Recorded %	: 100 %				

	Length (m)	Dist From Bit (m)		Length (m)	Dist From Bit (m)
15 x 5" HWDP 6.63 in OD / 3.00 in ID	141.13	288.37	6 3/4" ACAL 6.75 in OD / 1.92 in ID SN : PA902223063B-6 * ACAL Insert - SN : 123087	1.81	31.02
3 x 6 4/3" Drill Collar 6.75 in OD / 2.88 in ID	28.21	147.24	6 3/4" HOC 6.75 in OD / 1.92 in ID SN : 302842 * Positive Pulser - SN : 10796450 * PCM Sonde - SN : 557	3.03	0.00
Jar 6.75 in OD / 2.75 in ID	9.91	119.03	6 3/4" BAT 6.75 in OD / 1.92 in ID SN : PA90227155O-6 * BAT Insert - SN : 11378929	6.76	24.20
8 x 6 3/4" Drill Collar 6.75 in OD / 2.88 in ID	74.97	109.12	6 3/4" Nuke Collar 6.75 in OD / 1.92 in ID SN : PA90222683N2L2-6 * CTN Insert - SN : 231177 * ALD Insert - SN : 10507525	9.20	19.64
Stabilizer 6.50 in OD / 2.81 in ID	1.70	34.15	6 3/4" PM Sub 6.75 in OD / 1.92 in ID SN : 1025744 * PCDC Sonde - SN : 348	2.81	10.07
MWD	30.67	32.45	6 3/4" RLL 6.75 in OD / 1.92 in ID SN : PA90222505H1RG-6 * HCIM Insert - SN : 232754 * EWR-P4 Insert - SN : 270277 * DGR Insert - SN : 176027 * DDSr-DGR - SN : 176027	7.07	5.17
Stabilizer w/ ported float 6.63 in OD / 3.24 in ID	1.50	1.78			2.83
Mi616VPX PDC 8.00 in OD / 2.25 in ID	0.28	0.28			0.00

## COMMENTS

Wipe 216 mm coring interval from 3145.0 to 3175.0 mMDRT. Drill 216 mm hole from 3175.0 mMDRT to well TD at 3235.0 mMDRT. All recorded data recovered on surface.

## Directional Survey Data

UTM Zone 55S, GDA 1994  
 All depths are taken from driller's pipe tally unless otherwise noted  
 RT-MSL = 26.0m  
 Final Survey Projected to TD.

Tie-in

0.000 0.00 0.00 0.000 0.000 N 0.000 E \*\*\*

Measured Depth (m)	Inclination (deg)	Direction (deg)	Vertical Depth (m)	Latitude (m)	Departure (m)	Vertical Section (m)	Dogleg (°/30m)
95.000	0.00	0.00	95.000	0.000 N	0.000 E	0.000	0.00
204.920	0.58	282.17	204.920	0.120 N	0.540 W	-0.520	0.16
289.500	0.55	277.88	289.490	0.260 N	1.360 W	-1.280	0.02
376.490	0.32	238.01	376.480	0.190 N	1.980 W	-1.760	0.13
435.080	0.35	232.40	435.070	0.000 N	2.260 W	-1.890	0.02
521.950	0.72	199.02	521.940	0.680 S	2.650 W	-1.830	0.16
547.830	0.73	193.58	547.810	1.000 S	2.740 W	-1.740	0.08
579.000	0.69	195.91	578.980	1.370 S	2.840 W	-1.610	0.05
665.440	0.36	203.20	665.420	2.120 S	3.090 W	-1.410	0.12
782.280	0.67	192.10	782.250	3.120 S	3.380 W	-1.090	0.08
812.120	0.66	196.82	812.090	3.460 S	3.470 W	-0.980	0.06
868.190	0.30	224.95	868.160	3.870 S	3.660 W	-0.920	0.22
896.770	1.03	195.99	896.740	4.170 S	3.790 W	-0.850	0.82
925.970	0.71	183.94	925.930	4.610 S	3.870 W	-0.680	0.38
952.440	0.80	188.49	952.400	4.950 S	3.910 W	-0.530	0.12
981.350	0.74	192.99	981.310	5.330 S	3.980 W	-0.370	0.09
1010.200	0.83	198.72	1010.160	5.710 S	4.090 W	-0.260	0.12
1067.210	0.87	190.96	1067.160	6.530 S	4.310 W	0.020	0.06
1095.870	0.84	194.49	1095.820	6.950 S	4.400 W	0.170	0.06
1153.510	1.11	191.81	1153.450	7.900 S	4.620 W	0.510	0.14
1182.360	1.27	187.06	1182.290	8.490 S	4.720 W	0.760	0.20
1211.300	0.97	182.63	1211.230	9.060 S	4.770 W	1.030	0.32
1240.320	1.00	184.76	1240.240	9.550 S	4.800 W	1.270	0.05
1269.440	0.96	179.68	1269.360	10.050 S	4.820 W	1.530	0.10
1298.710	1.13	178.12	1298.620	10.580 S	4.810 W	1.840	0.18
1327.950	1.27	184.82	1327.860	11.200 S	4.830 W	2.160	0.20
1357.120	1.31	184.97	1357.020	11.850 S	4.880 W	2.470	0.04
1385.950	1.43	187.08	1385.840	12.530 S	4.950 W	2.790	0.14
1414.800	1.33	186.15	1414.680	13.220 S	5.030 W	3.110	0.11
1443.260	1.42	189.23	1443.140	13.900 S	5.130 W	3.400	0.12
1471.760	1.41	188.55	1471.630	14.600 S	5.240 W	3.700	0.02
1500.560	1.44	186.77	1500.420	15.310 S	5.330 W	4.010	0.06
1529.740	1.02	177.87	1529.590	15.930 S	5.360 W	4.320	0.47
1559.000	1.11	183.32	1558.850	16.470 S	5.370 W	4.620	0.14
1588.150	1.05	181.86	1587.990	17.020 S	5.400 W	4.900	0.07
1617.270	1.14	175.03	1617.110	17.580 S	5.380 W	5.220	0.16
1646.320	1.17	184.16	1646.150	18.160 S	5.380 W	5.550	0.19
1675.150	1.31	182.99	1674.970	18.780 S	5.410 W	5.860	0.15
1703.610	1.02	183.90	1703.430	19.360 S	5.450 W	6.150	0.31
1731.980	1.12	176.27	1731.790	19.890 S	5.450 W	6.440	0.18
1760.710	1.20	179.48	1760.520	20.470 S	5.430 W	6.780	0.11

## Directional Survey Data

Measured Depth (m)	Inclination (deg)	Direction (deg)	Vertical Depth (m)	Latitude (m)	Departure (m)	Vertical Section (m)	Dogleg (°/30m)
1790.080	1.13	181.99	1789.880	21.070 S	5.430 W	7.100	0.09
1819.450	1.17	182.73	1819.240	21.660 S	5.460 W	7.410	0.04
1848.520	1.17	190.32	1848.310	22.250 S	5.530 W	7.680	0.16
1877.800	1.13	190.92	1877.580	22.820 S	5.630 W	7.910	0.04
1906.650	1.23	192.98	1906.430	23.400 S	5.760 W	8.120	0.11
1934.670	1.08	194.42	1934.440	23.950 S	5.890 W	8.320	0.16
1963.220	0.48	64.50	1962.990	24.160 S	5.850 W	8.470	1.51
1992.330	0.56	59.70	1992.100	24.040 S	5.620 W	8.590	0.09
2021.460	0.59	61.98	2021.230	23.900 S	5.360 W	8.730	0.04
2050.740	0.64	78.76	2050.500	23.790 S	5.070 W	8.910	0.19
2080.190	0.61	81.26	2079.950	23.740 S	4.750 W	9.150	0.04
2102.200	0.68	80.27	2101.960	23.700 S	4.510 W	9.330	0.10
2138.040	0.69	75.36	2137.800	23.610 S	4.090 W	9.630	0.05
2195.190	0.63	82.85	2194.940	23.480 S	3.440 W	10.090	0.06
2253.190	0.62	89.29	2252.940	23.440 S	2.810 W	10.600	0.04
2281.350	0.84	88.95	2281.100	23.430 S	2.460 W	10.890	0.23
2310.290	0.91	90.74	2310.040	23.430 S	2.010 W	11.260	0.08
2339.670	0.80	84.68	2339.410	23.410 S	1.580 W	11.620	0.15
2398.220	0.81	98.78	2397.960	23.440 S	0.760 W	12.310	0.10
2426.570	1.08	93.16	2426.300	23.480 S	0.300 W	12.720	0.30
2454.950	0.96	91.77	2454.680	23.510 S	0.210 E	13.160	0.13
2484.550	1.06	89.94	2484.270	23.510 S	0.730 E	13.590	0.11
2524.750	1.00	97.22	2524.470	23.560 S	1.450 E	14.220	0.11
2557.550	1.13	91.00	2557.260	23.600 S	2.060 E	14.750	0.16
2588.200	1.30	90.35	2587.900	23.610 S	2.710 E	15.290	0.17
2646.630	1.43	86.39	2646.320	23.560 S	4.100 E	16.430	0.08
2674.000	1.51	91.33	2673.680	23.550 S	4.800 E	17.010	0.16
2702.980	1.62	88.34	2702.650	23.550 S	5.590 E	17.670	0.14
2732.910	1.69	88.47	2732.570	23.520 S	6.450 E	18.370	0.07
2762.560	1.85	89.89	2762.200	23.510 S	7.370 E	19.130	0.17
2791.490	1.82	85.29	2791.120	23.470 S	8.300 E	19.880	0.16
2819.890	1.94	85.21	2819.500	23.400 S	9.220 E	20.610	0.13
2847.720	2.06	83.71	2847.310	23.300 S	10.190 E	21.360	0.14
2876.190	2.24	81.90	2875.760	23.170 S	11.250 E	22.170	0.20
2905.640	2.46	85.79	2905.190	23.040 S	12.450 E	23.100	0.28
2935.670	2.58	82.74	2935.190	22.910 S	13.760 E	24.120	0.18
2963.220	2.93	85.15	2962.710	22.770 S	15.080 E	25.150	0.40
2992.320	2.88	83.61	2991.770	22.630 S	16.550 E	26.290	0.10
3021.530	3.01	83.20	3020.940	22.450 S	18.040 E	27.440	0.14
3051.620	3.07	82.21	3050.990	22.250 S	19.620 E	28.640	0.08
3080.660	3.23	81.34	3079.990	22.020 S	21.200 E	29.840	0.17
3101.980	3.47	82.50	3101.270	21.850 S	22.430 E	30.770	0.35
3130.210	3.75	81.59	3129.440	21.600 S	24.190 E	32.100	0.30
3167.650	3.79	84.07	3166.800	21.290 S	26.640 E	33.960	0.13
3194.790	3.87	83.32	3193.880	21.090 S	28.440 E	35.360	0.10
3223.600	4.33	83.41	3222.620	20.860 S	30.480 E	36.930	0.48
3235.000	4.33	83.41	3233.990	20.760 S	31.340 E	37.590	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 0.00 DEGREES(GRID)**

**A TOTAL CORRECTION OF 11.45 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD**

**HORIZONTAL DISPLACEMENT(CLOSURE) AT 3235.00 METRES**

**IS 37.59 METRES ALONG 123.52 DEGREES (GRID)**

**Final Survey Projected to TD**

## Service Interrupt Report

MWD Run Number	: 400	Time/Date of Failure	: 08-Nov-09 12:10
Rig Bit Number	: 5	Depth at time of Failure	: 2510.000 m
MWD Run start time/date	: 08-Nov-09 01:55	Lost Rig Hours	: hr
MWD Run end time/date	: 09-Nov-09 12:21		

**RIG ACTIVITY**

Drilling 8 1/2" hole. Coming out of the 9 5/8" casing shoe.

**DESCRIPTION OF FAILURE**

Density (DLC) pulses up TOOL FAILURE or either a constant value of 1.200 g/cc (137 counts).  
Delta Rho (RLC) pulses up TOOL FAILURE or either a constant value of -0.250 g/cc (0 counts).  
Photoelectric Effect (PLC) pulses up TOOL FAILURE or either a variable value.

**ACTION TAKEN**

The pumps were cycled and a mode switch was performed.

**OPERATION IMPACT**

It was decided to drill ahead.

**REASON FOR FAILURE**

Once on surface it was determined the far detector had failed.



## Service Interrupt Report

MWD Run Number	: 400	Time/Date of Failure	: 08-Nov-09 01:40
Rig Bit Number	: 5	Depth at time of Failure	: 0.000 m
MWD Run start time/date	: 08-Nov-09 01:55	Lost Rig Hours	: hr
MWD Run end time/date	: 09-Nov-09 12:21		

**RIG ACTIVITY**

Drilling 8 1/2" hole.

**DESCRIPTION OF FAILURE**

Tool stopped pulsing.

**ACTION TAKEN**

The pumps were cycled and a mode switch was performed. Confirmed functioning of the pressure transducers.

**OPERATION IMPACT**

Pulled out of hole and change out BHA.

**REASON FOR FAILURE**

Once on surface it was determined from the parameter report that communication between the FE tools and the PCM had been lost at the time of the failure.

Upon plugging in to the tool initially the PCM could not be polled. However, on second attempt communication was established and the PCM successfully passed the post run confidence test. The cause of the loss of communication down hole is unknown.

