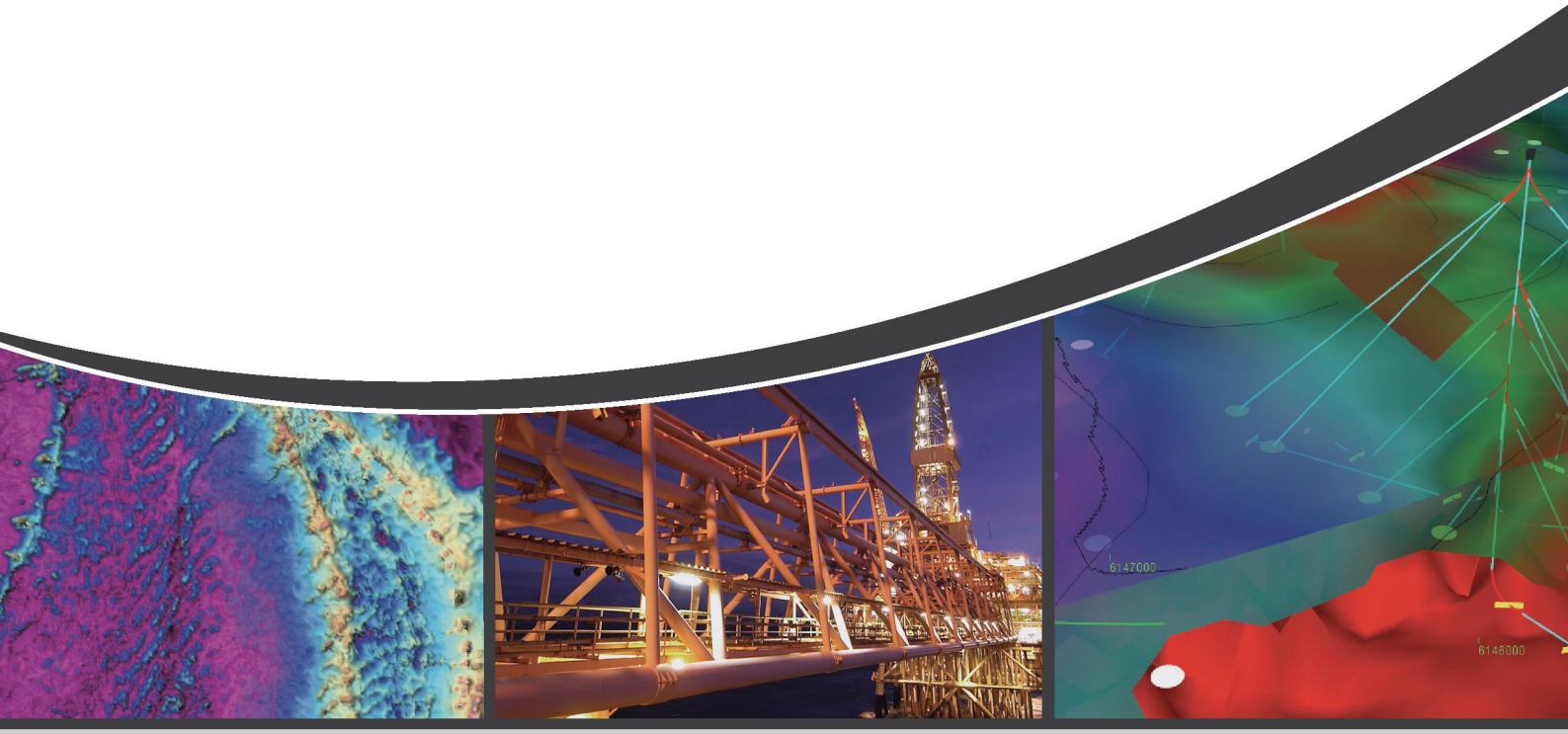
Sperry Drilling - HALLIBURTON

Directional Drilling
End of Well Report

Origin energy

Australian Drilling Associates Pty Ltd ADA

Well: Rockhopper-1 ST1
Rig: Kan Tan IV
Location: Bass Basin, Australia



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SECTION 1

Well Report

Operator : Origin Energy Resources Ltd

Well : Rockhopper-1 ST1

Job Objectives:

Rockhopper-1 ST1 is designed to intersect gas bearing sandstone units identified in Rockhopper-1 at a structurally down-dip location. The sidetrack will allow fluid pressure data and core to be obtained at a down-dip location over any significant gas-bearing reservoir intervals identified in Rockhopper-1. This information will enable gas-water contacts to be interpreted and when integrated with the core data, will be crucial to understanding the size and deliverability of the discovered resource

Summary of Results:

8 1/2" Hole Section BHA # 1 From 1998m to 2112m.
This Motor assembly was run to drill out the cement and build up to 10 degrees before the upcoming Geo-Pilot run The Cement was drilled in good time with no problems .The Kick -off was initiated in the required direction and was control drilled for the first stand to ensure good kick-off .The next few stands suffered from hanging up problems but was mitigated by back-reaming. Toolface control was reasonable and although ROP was slow the objective of a good kick off was met and drilling ceased at 2112m with 9.89 degrees in the hole at 180 Degrees azimuth. At surface the bit was found to be more worn than expected but could be re-run .

8 1/2" Hole Section BHA # 2 From 2112m to 3158 m.
This was a Geo-Pilot BHA and it was run to complete the build section at 33 .34 Degrees inclination with
Azimuth of 178 degrees .The build rate for this run was not as good as expected requiring 3 .5 degree doglegs and working to get 3,s Almost the whole run was plagued by stick-slip and vibration and no parameters were found to mitigate this for any length of time .Some spurious down-links were found during vibration and extra vigilance had to be made to counteract the same .ROP was quite good considering the amount of time spent off bottom re-starting drilling in poor periods of stick-slip .This BHA held out despite all of this to 3158m some 30m short of core point and was pulled for no response to the tools .The bit was found to be in reasonable shape but about 1/16 under-gauge .

8 1/2" Hole Section BHA # 3 From 3158m to 3196m.
This BHA was run to find core point then be re-run to next core point and in turn to TD .This BHA also suffered from stick-slip and vibration .Again all parameters were adopted but it was such a short run with long intervals off bottom that it was impossible to report actual BHA tendencies .This BHA held inclination to core point at 3196m and was pulled for the coring run .

8 1/2" Hole Section BHA # 4 From 3196m to 3213mMD
This was the first core BHA and was deemed to be a success in that some 13.5m of core of interest was cut .

8 1/2" Hole Section BHA # 5 From 3213m to 3284mMD
This BHA only drilled 71 m MD and was very difficult to gauge its performance due to this however the general consensus was that it was marginally better at coping with stick-slip than BHA# 3.This BHA was different by way of having a new FMF3653Z PDC bit which may have helped stick-slip mitigation .

8 1/2" Hole Section BHA # 6 From 3283m to 3298.5mMD This BHA was run to retrieve the second core for Geological evaluation .This BHA recovered 14.08m of core, this was deemed to be insufficient and it was decided to run back in with another coring assembly to attempt to cut another 20m of core.

8 1/2" Hole Section BHA # 7 From 3298.5m to 3309mMD This BHA was run to retrieve the second core for Geological evaluation .This BHA recovered 9.50m of core, this was deemed to be sufficient for evaluation.

8 1/2" Hole Section BHA # 8 From 3309m to 3482m MD This BHA was a Geo-Pilot BHA and was used to drill the section after the core point to TD. Again massive stick-slip was recorded and when the volcanics formations came in this was to be further compounded by vibration also .All attempts were made to mitigate this but was unsuccessful .Despite this the tools made it to TD at 3482m MD The subsequent trip out was good with little drag

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	1	8.500	1998	2112	1998	2111	1.4	10.5	129	182	22	11
2	2	2	8.500	2112	3158	2111	2995	10.5	35.5	182	178	80	16
3	3	3	8.500	3158	3196	2995	3025	35.5	35.6	178	179	5	9
4	4		8.500	3196	3213	3025	3039	35.6	35.7	179	179	5	2
5	3rr1	4	8.500	3213	3283	3039	3096	35.7	35.3	179	178	10	4
6	4rr1		8.500	3283	3298	3096	3108	35.3	35.1	178	178	3	2
7	4rr2		8.500	3298	3309	3108	3117	35.1	35.5	178	178	2	2
8	3rr2	5	8.500	3309	3482	3117	3258	35.5	35.5	178	179	20	8

Table 1 - BHA Summary

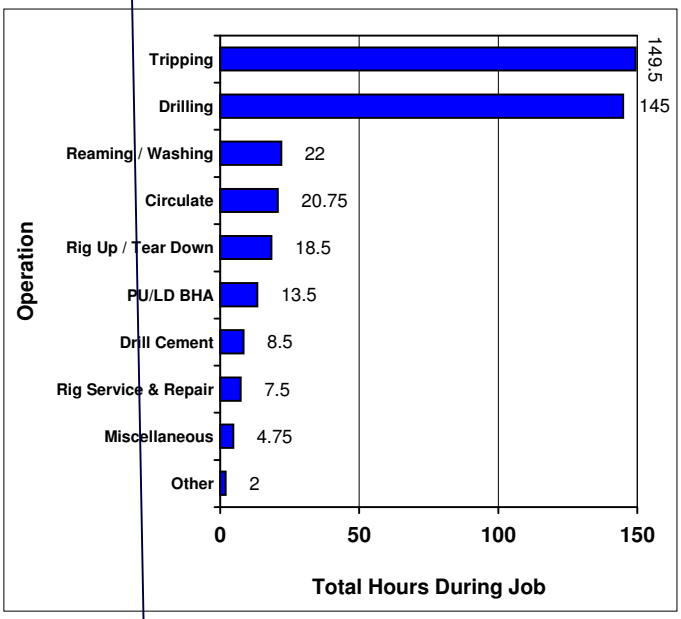
Motor Run #	Manufacturer	Type	Lobe	OD (in)	Gauge (in)	Bend (deg)	Adj	DLS (Ori) (°/30m)	ROP (Ori) (m/hr)	ROP (Rot) (m/hr)
1	SSDS	SperryDrill	7/8	6.750		1.15	Y	3.00	4	6
2	SSDS	Geopilot	/	6.750	8.375	0.00	N	0.30	0	13
3	SSDS	Geopilot	/	6.750	8.375	0.00	N		0	8
4	SSDS	Geopilot	/	6.750	8.375	0.00	N		0	7
5	SSDS	Geopilot	/	6.750	8.375	0.00	N	0.40	0	9

Table 2 - Motor Run Summary

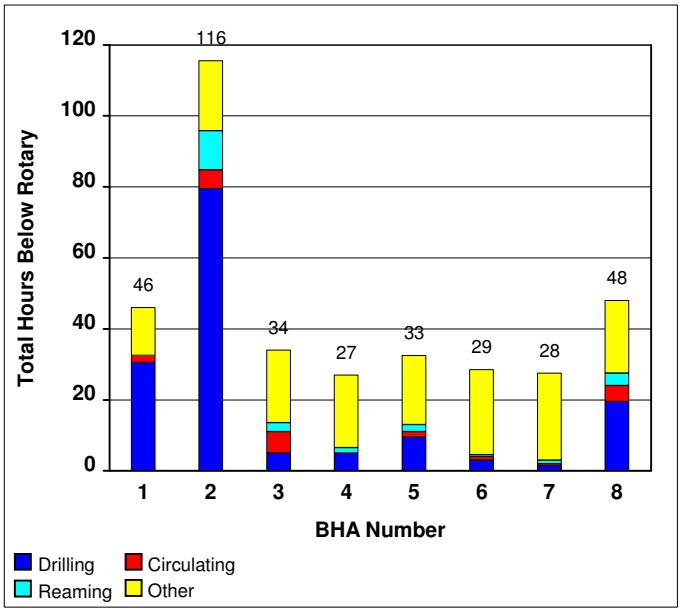
Bit #	Manufacturer	Style	OD (in)	Gge Len (in)	Nozzles (/32's)	TFA (in²)	Dull Grades I O D L B G O R	Ftge (m)	Drlg hrs	ROP (m/hr)
1	Hughes Christensen	MXL-1x	8.500			1.114	2-3-WT-A -2-I-ER-BHA	114	22.00	5
2	Reed Hycalog	RSX616M	8.500		6x18	1.491	2-1-CT-C--X-I-NO-DTF	1046	79.50	13
3	Security DBS	FMF3653Z	8.500	1.500	3x15, 3x12	0.849	0-0-NO-A -X-I-NO-CP	38	5.00	8
4	Corepro		8.500			0.000	0-0-NO-A -X-I-NO-PR	17	5.00	3
3rr1	Security DBS	FMF3653Z	8.500	1.500	3x15, 3x12	0.849	0-0-ER-A -X-I-NO-CP	70	9.50	7
4rr1	Corepro		8.500			0.000	0-0-NO-A -X-I-NO-PR	15	3.00	5
4rr2	Corepro		8.500			0.000	0-0-NO-A -X-I-NO-CP	11	1.50	7
3rr2	Security DBS	FMF3653Z	8.500	1.500	3x15, 3x12	0.849	0-0-RR-A -X-I-NO-TD	173	19.50	9

Table 3 - Bit Run Summary

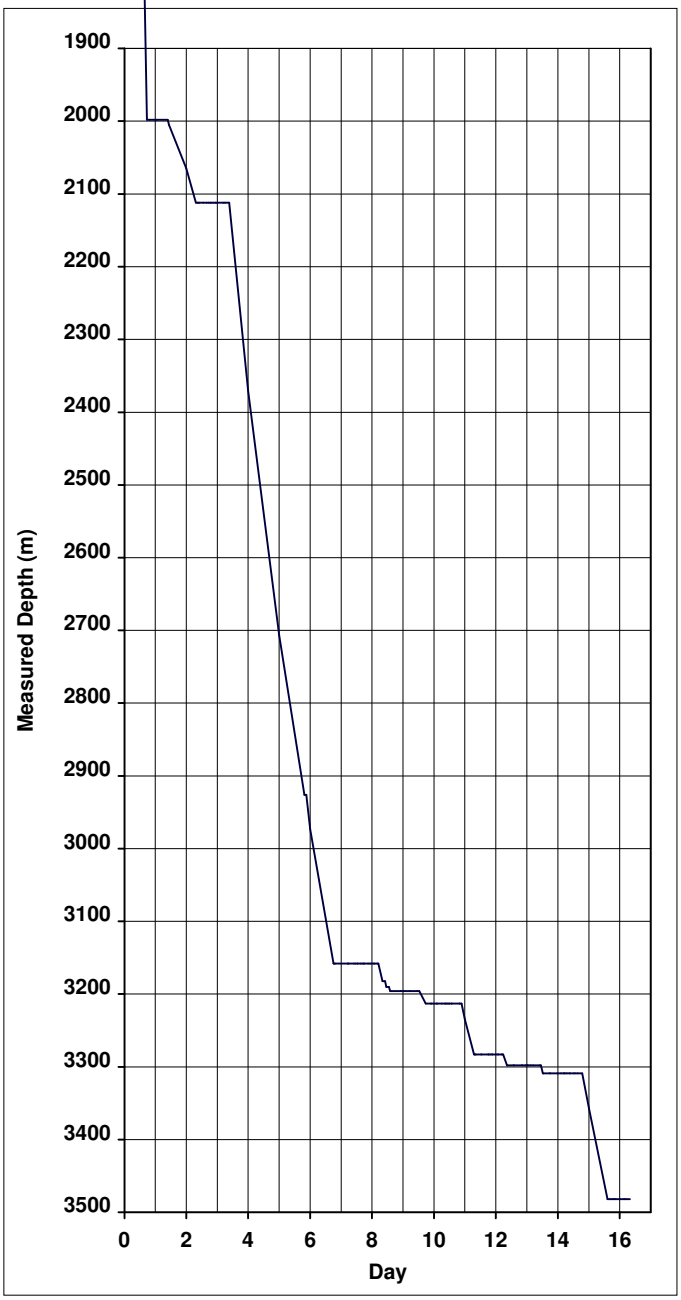
Hours by Operation Summary



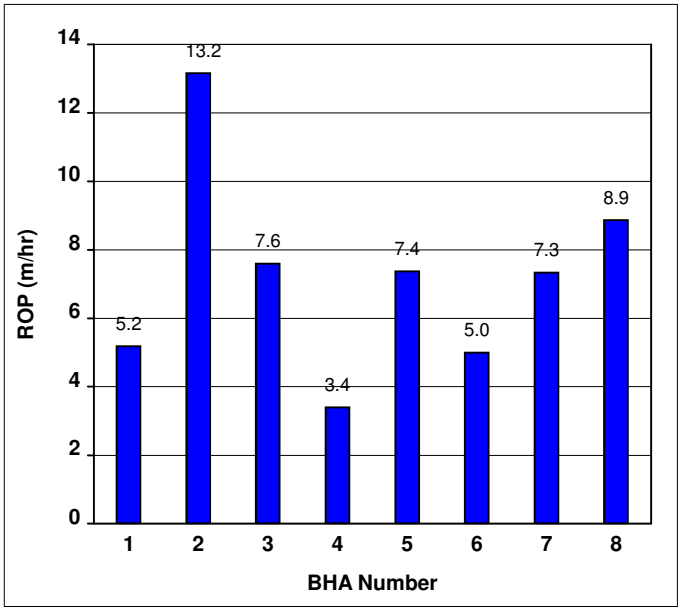
Hours per BHA Breakdown



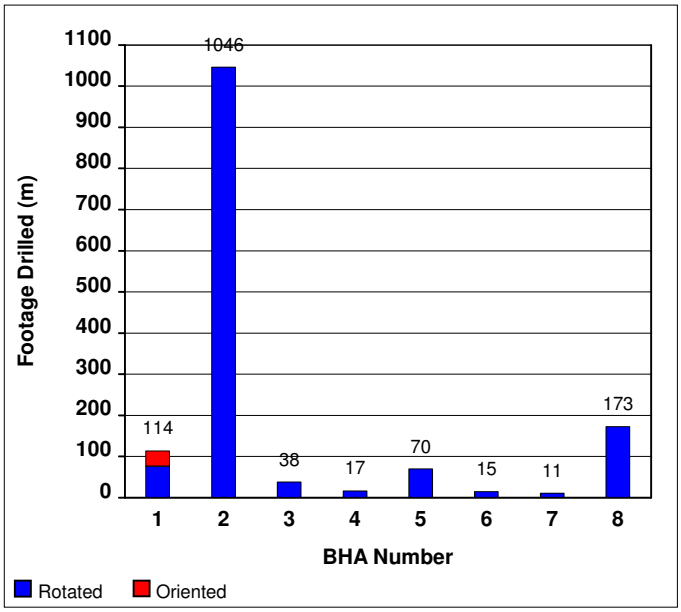
Days vs. Depth



Average Rate of Penetration per BHA



Footage per BHA



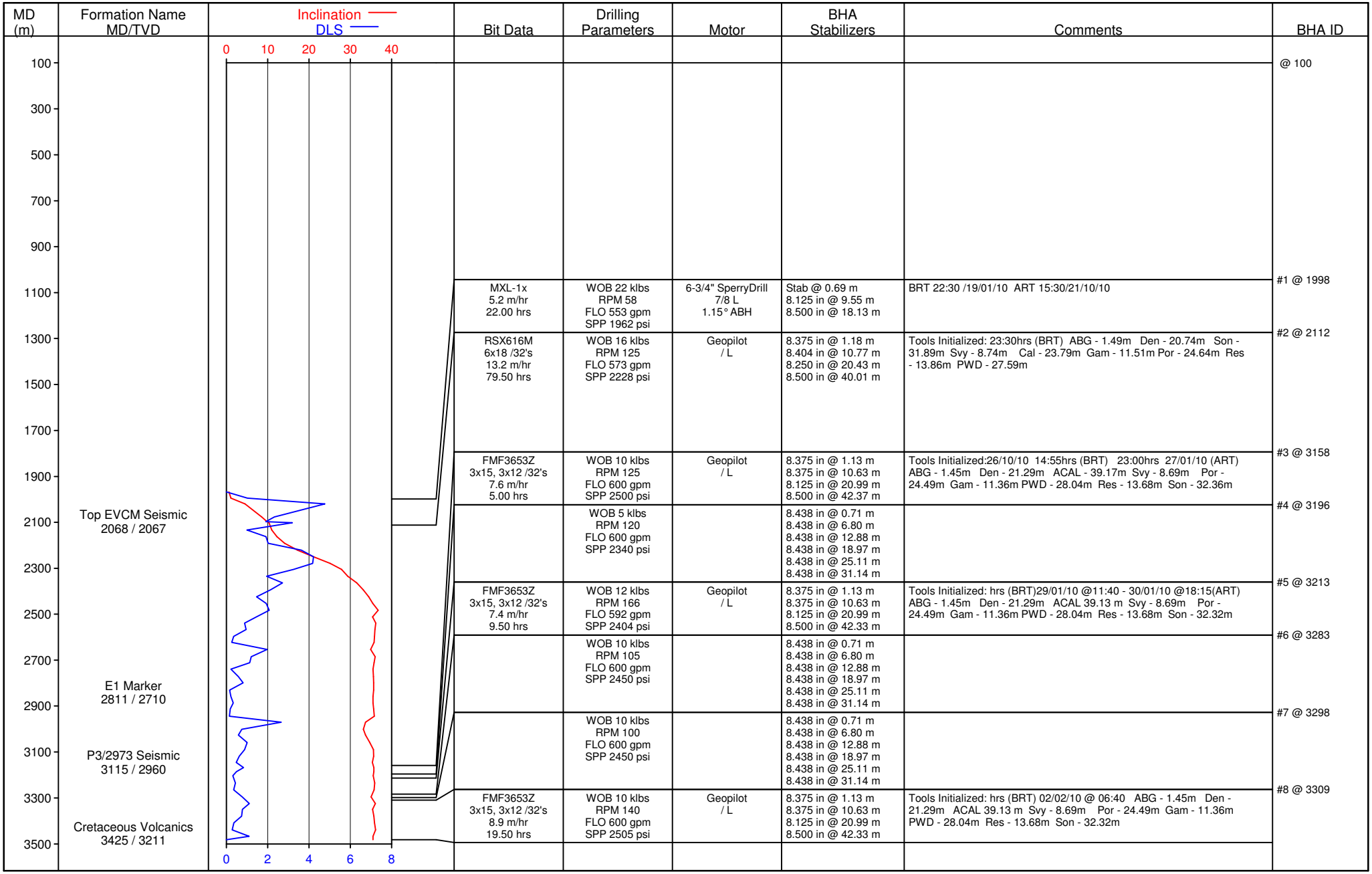
SECTION 2

Drilling Parameters

Sperry-Sun Drilling Services

Origin Energy Resources Ltd
Rockhopper-1 ST1
Kan Tan IV

Australia
Bass Basin
AU-DD-0006791008



SECTION 3

Definitive Survey Report

Sperry Drilling

Origin Energy Resources LTD

Rockhopper-1
Rockhopper-1
Rockhopper-1

Rockhopper-1 ST

Design: Rockhopper-1 ST1 Definitive Survey

Standard Survey Report

02 March, 2010

Origin energy

Company:	Origin Energy Resources LTD	**Local Co-ordinate Reference:**	Well Rockhopper-1
Project:	Rockhopper-1	**TVD Reference:**	Rotary Table @ 26.00m (Above MSL)
Site:	Rockhopper-1	**MD Reference:**	Rotary Table @ 26.00m (Above MSL)
Well:	Rockhopper-1	**North Reference:**	Grid
Wellbore:	Rockhopper-1 ST	**Survey Calculation Method:**	Minimum Curvature
Design:	Rockhopper-1 ST1 Definitive Survey	**Database:**	EDM 2003.21 Sperry NZ DB21

Project Rockhopper-1

Map System:	Universal Transverse Mercator	**System Datum:**	Mean Sea Level
Geo Datum:	GDA94		
Map Zone:	Zone 55S (144 E to 150 E)		

Site Rockhopper-1

Site Position:		**Northing:**	5,594,071.42 m	**Latitude:**	39° 47' 34.1828 S
From:	Map	**Easting:**	366,374.03 m	**Longitude:**	145° 26' 21.4660 E
Position Uncertainty:	0.00 m	**Slot Radius:**	in	**Grid Convergence:**	1.00 °

Well Rockhopper-1

Well Position	**+N/-S**	0.00 m	**Northing:**	5,594,071.42 m	**Latitude:**	39° 47' 34.1828 S
	+E/-W	0.00 m	**Easting:**	366,374.03 m	**Longitude:**	145° 26' 21.4660 E
Position Uncertainty		0.00 m	**Wellhead Elevation:**	26.00 m	**Water Depth:**	74.30 m

Wellbore Rockhopper-1 ST

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2009	4/12/2009	12.49	-70.39	60,969

Design Rockhopper-1 ST1 Definitive Survey

Audit Notes:

Version:	1.0	**Phase:**	ACTUAL	**Tie On Depth:**	1,968.42

Vertical Section:	Depth From (TVD) (m)	+N/-S (m)	+E/-W (m)	Direction (°)
	0.00	0.00	0.00	179.28

Survey Program **Date** 2/03/2010

From (m)	To (m)	Survey (Wellbore)	Tool Name	Description
100.30	100.30	Rockhopper-1 - 36" MWD Survey (Rockho	MWD+SAG+SC	MWD + Sag + SC corrections (no bias)
242.36	956.77	Rockhopper-1 - 17 1/2" MWD Survey (Roc	MWD+SAG+SC	MWD + Sag + SC corrections (no bias)
980.35	1,951.76	Rockhopper-1 - 12 1/4" MWD Survey (Roc	MWD+SAG+SC	MWD + Sag + SC corrections (no bias)
1,968.42	1,968.42	Rockhopper-1 - 8 1/2" MWD Survey (Rock	MWD+SAG+SC	MWD + Sag + SC corrections (no bias)
1,995.26	3,482.00	Rockhopper-1 ST - 8 1/2" MWD Survey (R	MWD+SAG+SC	MWD + Sag + SC corrections (no bias)

Survey

Measured Depth (m)	Inclination (°)	Azimuth (°)	Vertical Depth (m)	+N/-S (m)	+E/-W (m)	Vertical Section (m)	Dogleg Rate (°/30m)	Build Rate (°/30m)	Turn Rate (°/30m)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
100.30	0.00	0.00	100.30	0.00	0.00	0.00	0.000	0.00	0.00
242.36	0.22	278.10	242.36	0.04	-0.27	-0.04	0.046	0.05	0.00
327.42	0.34	318.42	327.42	0.25	-0.60	-0.26	0.079	0.04	14.22
356.38	0.16	310.14	356.38	0.34	-0.69	-0.35	0.190	-0.19	-8.58
414.83	0.43	334.58	414.83	0.59	-0.84	-0.60	0.150	0.14	12.54
502.13	0.25	356.62	502.13	1.08	-1.00	-1.09	0.075	-0.06	7.57
559.33	0.33	356.35	559.33	1.37	-1.01	-1.38	0.042	0.04	-0.14
645.93	0.22	77.08	645.92	1.65	-0.87	-1.66	0.127	-0.04	27.97

Company:	Origin Energy Resources LTD	**Local Co-ordinate Reference:**	Well Rockhopper-1
Project:	Rockhopper-1	**TVD Reference:**	Rotary Table @ 26.00m (Above MSL)
Site:	Rockhopper-1	**MD Reference:**	Rotary Table @ 26.00m (Above MSL)
Well:	Rockhopper-1	**North Reference:**	Grid
Wellbore:	Rockhopper-1 ST	**Survey Calculation Method:**	Minimum Curvature
Design:	Rockhopper-1 ST1 Definitive Survey	**Database:**	EDM 2003.21 Sperry NZ DB21

Survey

Measured Depth (m)	Inclination (°)	Azimuth (°)	Vertical Depth (m)	+N/-S (m)	+E/-W (m)	Vertical Section (m)	Dogleg Rate (°/30m)	Build Rate (°/30m)	Turn Rate (°/30m)
733.40	0.10	264.51	733.39	1.68	-0.78	-1.69	0.110	-0.04	-59.19
819.33	0.13	204.11	819.32	1.59	-0.89	-1.60	0.041	0.01	-21.09
907.20	0.22	337.40	907.19	1.65	-1.00	-1.66	0.110	0.03	45.51
956.77	0.15	112.45	956.76	1.71	-0.98	-1.73	0.208	-0.04	81.73
961.00	0.12	112.45	960.99	1.71	-0.97	-1.72	0.191	-0.19	0.00
13 3/8" Casing									
980.35	0.00	258.48	980.34	1.70	-0.95	-1.71	0.191	-0.19	0.00
1,009.96	0.20	60.48	1,009.95	1.73	-0.90	-1.74	0.203	0.20	0.00
1,039.18	0.22	57.43	1,039.17	1.78	-0.81	-1.79	0.024	0.02	-3.13
1,068.02	0.25	56.38	1,068.01	1.85	-0.71	-1.86	0.032	0.03	-1.09
1,096.69	0.09	334.71	1,096.68	1.90	-0.67	-1.91	0.265	-0.17	-85.46
1,125.20	0.25	23.41	1,125.19	1.98	-0.65	-1.99	0.213	0.17	51.25
1,153.52	0.31	18.55	1,153.51	2.11	-0.61	-2.12	0.068	0.06	-5.15
1,182.12	0.26	64.52	1,182.11	2.21	-0.52	-2.22	0.238	-0.05	48.22
1,210.69	0.31	28.33	1,210.68	2.31	-0.43	-2.31	0.192	0.05	-38.00
1,239.34	0.36	49.88	1,239.33	2.43	-0.32	-2.44	0.141	0.05	22.57
1,298.15	0.40	29.51	1,298.14	2.73	-0.08	-2.73	0.071	0.02	-10.39
1,327.53	0.39	32.18	1,327.52	2.90	0.02	-2.90	0.021	-0.01	2.73
1,356.77	0.31	47.29	1,356.76	3.04	0.14	-3.04	0.125	-0.08	15.50
1,385.60	0.44	56.10	1,385.59	3.16	0.29	-3.15	0.148	0.14	9.17
1,412.81	0.48	46.30	1,412.80	3.29	0.45	-3.29	0.097	0.04	-10.80
1,441.66	0.57	57.51	1,441.65	3.45	0.66	-3.45	0.142	0.09	11.66
1,470.69	0.57	43.73	1,470.68	3.64	0.88	-3.63	0.141	0.00	-14.24
1,499.95	0.59	47.75	1,499.93	3.84	1.10	-3.83	0.046	0.02	4.12
1,529.47	0.61	56.99	1,529.45	4.03	1.34	-4.01	0.100	0.02	9.39
1,558.73	0.62	46.69	1,558.71	4.22	1.59	-4.20	0.114	0.01	-10.56
1,587.90	0.64	49.02	1,587.88	4.44	1.82	-4.42	0.033	0.02	2.40
1,616.89	0.68	52.55	1,616.87	4.65	2.08	-4.62	0.059	0.04	3.65
1,645.39	0.64	67.47	1,645.36	4.81	2.36	-4.78	0.185	-0.04	15.71
1,673.84	0.66	56.91	1,673.81	4.96	2.65	-4.93	0.128	0.02	-11.14
1,702.24	0.67	57.55	1,702.21	5.14	2.93	-5.11	0.013	0.01	0.68
1,759.92	0.72	70.24	1,759.89	5.45	3.55	-5.40	0.084	0.03	6.60
1,789.63	0.84	75.16	1,789.59	5.57	3.94	-5.52	0.139	0.12	4.97
1,848.62	0.80	79.00	1,848.58	5.75	4.76	-5.69	0.035	-0.02	1.95
1,876.78	0.90	76.63	1,876.73	5.84	5.17	-5.78	0.113	0.11	-2.52
1,905.30	0.76	78.61	1,905.25	5.93	5.57	-5.86	0.150	-0.15	2.08
1,934.76	0.91	50.85	1,934.71	6.12	5.94	-6.04	0.434	0.15	-28.27
1,951.76	0.68	51.65	1,951.71	6.27	6.13	-6.19	0.406	-0.41	1.41
1,964.00	0.69	56.15	1,963.95	6.35	6.25	-6.27	0.132	0.02	11.03
9 5/8" Casing									
1,968.42	0.69	57.75	1,968.37	6.38	6.29	-6.30	0.132	0.02	10.86
1,995.26	1.12	112.40	1,995.20	6.37	6.67	-6.28	1.022	0.48	61.09
2,020.27	4.56	164.56	2,020.18	5.32	7.16	-5.23	4.765	4.13	62.57
2,076.85	8.58	180.86	2,076.38	-1.08	7.70	1.17	2.329	2.13	8.64
2,097.43	9.89	180.78	2,096.70	-4.38	7.65	4.47	1.910	1.91	-0.12
2,101.74	10.33	180.02	2,100.94	-5.13	7.64	5.23	3.200	3.06	-5.29
2,133.86	11.00	184.57	2,132.50	-11.07	7.40	11.16	1.005	0.63	4.25
2,162.64	12.26	191.23	2,160.69	-16.80	6.58	16.89	1.917	1.31	6.94
2,191.04	14.09	193.69	2,188.35	-23.12	5.18	23.18	2.021	1.93	2.60
2,221.57	17.24	200.87	2,217.74	-30.96	2.69	30.99	3.629	3.10	7.06
2,249.96	21.12	203.77	2,244.55	-39.58	-0.87	39.56	4.221	4.10	3.06
2,279.09	25.17	203.19	2,271.33	-50.08	-5.43	50.01	4.178	4.17	-0.60
2,305.36	27.89	201.28	2,294.83	-60.94	-9.86	60.81	3.255	3.11	-2.18
2,335.32	29.38	198.65	2,321.13	-74.43	-14.76	74.24	1.954	1.49	-2.63

Company:	Origin Energy Resources LTD	**Local Co-ordinate Reference:**	Well Rockhopper-1
Project:	Rockhopper-1	**TVD Reference:**	Rotary Table @ 26.00m (Above MSL)
Site:	Rockhopper-1	**MD Reference:**	Rotary Table @ 26.00m (Above MSL)
Well:	Rockhopper-1	**North Reference:**	Grid
Wellbore:	Rockhopper-1 ST	**Survey Calculation Method:**	Minimum Curvature
Design:	Rockhopper-1 ST1 Definitive Survey	**Database:**	EDM 2003.21 Sperry NZ DB21

Survey

Measured Depth (m)	Inclination (°)	Azimuth (°)	Vertical Depth (m)	+N/-S (m)	+E/-W (m)	Vertical Section (m)	Dogleg Rate (°/30m)	Build Rate (°/30m)	Turn Rate (°/30m)
2,364.04	31.58	195.91	2,345.88	-88.34	-19.07	88.10	2.718	2.30	-2.86
2,393.22	33.12	193.25	2,370.53	-103.45	-22.99	103.16	2.156	1.58	-2.73
2,424.12	34.46	191.99	2,396.21	-120.22	-26.74	119.88	1.468	1.30	-1.22
2,453.55	35.45	189.16	2,420.33	-136.79	-29.83	136.41	1.936	1.01	-2.88
2,483.19	36.74	186.44	2,444.28	-154.09	-32.20	153.68	2.082	1.31	-2.75
2,512.34	35.42	185.57	2,467.84	-171.16	-33.99	170.72	1.457	-1.36	-0.90
2,539.22	36.20	185.30	2,489.64	-186.82	-35.48	186.36	0.888	0.87	-0.30
2,567.35	35.96	183.83	2,512.38	-203.33	-36.80	202.85	0.958	-0.26	-1.57
2,596.63	35.85	183.27	2,536.09	-220.47	-37.87	219.98	0.355	-0.11	-0.57
2,623.25	35.76	182.90	2,557.68	-236.02	-38.70	235.52	0.264	-0.10	-0.42
2,653.75	34.92	179.74	2,582.56	-253.65	-39.11	253.14	1.978	-0.83	-3.11
2,684.95	36.05	178.78	2,607.97	-271.76	-38.88	271.25	1.211	1.09	-0.92
2,711.61	35.74	177.14	2,629.57	-287.38	-38.32	286.88	1.137	-0.35	-1.85
2,739.68	35.53	177.12	2,652.38	-303.72	-37.50	303.22	0.225	-0.22	-0.02
2,771.60	35.60	176.05	2,678.35	-322.25	-36.40	321.76	0.589	0.07	-1.01
2,799.25	35.65	174.76	2,700.82	-338.30	-35.11	337.83	0.817	0.05	-1.40
2,830.33	35.66	174.48	2,726.07	-356.34	-33.41	355.89	0.158	0.01	-0.27
2,858.86	35.48	174.28	2,749.28	-372.85	-31.78	372.42	0.225	-0.19	-0.21
2,886.55	35.51	174.82	2,771.83	-388.86	-30.26	388.45	0.341	0.03	0.59
2,912.81	35.67	174.71	2,793.18	-404.08	-28.86	403.68	0.197	0.18	-0.13
2,944.72	35.81	174.86	2,819.08	-422.64	-27.17	422.26	0.155	0.13	0.14
2,970.13	33.67	176.07	2,839.96	-437.07	-26.02	436.71	2.654	-2.53	1.43
3,001.24	33.20	177.20	2,865.92	-454.18	-25.01	453.83	0.752	-0.45	1.09
3,026.70	33.66	177.54	2,887.17	-468.19	-24.37	467.85	0.585	0.54	0.40
3,059.36	34.73	177.11	2,914.18	-486.53	-23.51	486.20	1.008	0.98	-0.39
3,089.54	35.58	176.65	2,938.86	-503.88	-22.57	503.56	0.885	0.84	-0.46
3,118.07	35.65	177.66	2,962.05	-520.47	-21.74	520.16	0.623	0.07	1.06
3,145.40	35.32	177.16	2,984.31	-536.32	-21.02	536.02	0.482	-0.36	-0.55
3,167.94	35.69	178.03	3,002.66	-549.40	-20.48	549.10	0.834	0.49	1.16
3,185.27	35.70	178.52	3,016.73	-559.51	-20.17	559.21	0.495	0.02	0.85
3,203.43	35.56	178.76	3,031.49	-570.08	-19.92	569.79	0.327	-0.23	0.40
3,234.73	35.91	179.25	3,056.90	-588.36	-19.60	588.07	0.433	0.34	0.47
3,264.81	35.73	178.72	3,081.29	-605.96	-19.29	605.67	0.358	-0.18	-0.53
3,293.65	35.03	178.07	3,104.80	-622.65	-18.82	622.37	0.827	-0.73	-0.68
3,324.89	36.06	178.66	3,130.22	-640.81	-18.31	640.53	1.043	0.99	0.57
3,350.05	35.41	178.82	3,150.64	-655.50	-17.98	655.22	0.783	-0.78	0.19
3,379.25	35.71	179.95	3,174.40	-672.48	-17.80	672.20	0.742	0.31	1.16
3,408.14	35.85	180.50	3,197.84	-689.37	-17.87	689.09	0.364	0.15	0.57
3,439.04	36.10	180.75	3,222.84	-707.52	-18.07	707.24	0.281	0.24	0.24
3,467.05	35.47	179.36	3,245.56	-723.90	-18.08	723.61	1.101	-0.67	-1.49
3,482.00	35.47	179.36	3,257.74	-732.57	-17.99	732.29	0.000	0.00	0.00
Projected to TD									

Casing Points

Measured Depth (m)	Vertical Depth (m)	Name	Casing Diameter (in)	Hole Diameter (in)
1,964.00	1,963.95	9 5/8" Casing	9.625	12.250
961.00	960.99	13 3/8" Casing	13.375	17.500

Company:	Origin Energy Resources LTD	**Local Co-ordinate Reference:**	Well Rockhopper-1
Project:	Rockhopper-1	**TVD Reference:**	Rotary Table @ 26.00m (Above MSL)
Site:	Rockhopper-1	**MD Reference:**	Rotary Table @ 26.00m (Above MSL)
Well:	Rockhopper-1	**North Reference:**	Grid
Wellbore:	Rockhopper-1 ST	**Survey Calculation Method:**	Minimum Curvature
Design:	Rockhopper-1 ST1 Definitive Survey	**Database:**	EDM 2003.21 Sperry NZ DB21

Design Annotations

Measured Depth (m)	Vertical Depth (m)	Local Coordinates +N/-S (m)	Local Coordinates +E/-W (m)	Comment
3,482.00	3,257.74	-732.57	-17.99	Projected to TD

Checked By: _____ Approved By: _____ Date: _____

SECTION 4

A4 Plot

Sperry Drilling

Project: Rockhopper-1
Site: Rockhopper-1
Well: Rockhopper-1
Wellbore: Rockhopper-1 ST
Design: Rockhopper-1 ST1 Definitive Survey

Origin energy

WELL DETAILS: Rockhopper-1 ST1

Water Depth: 74.30

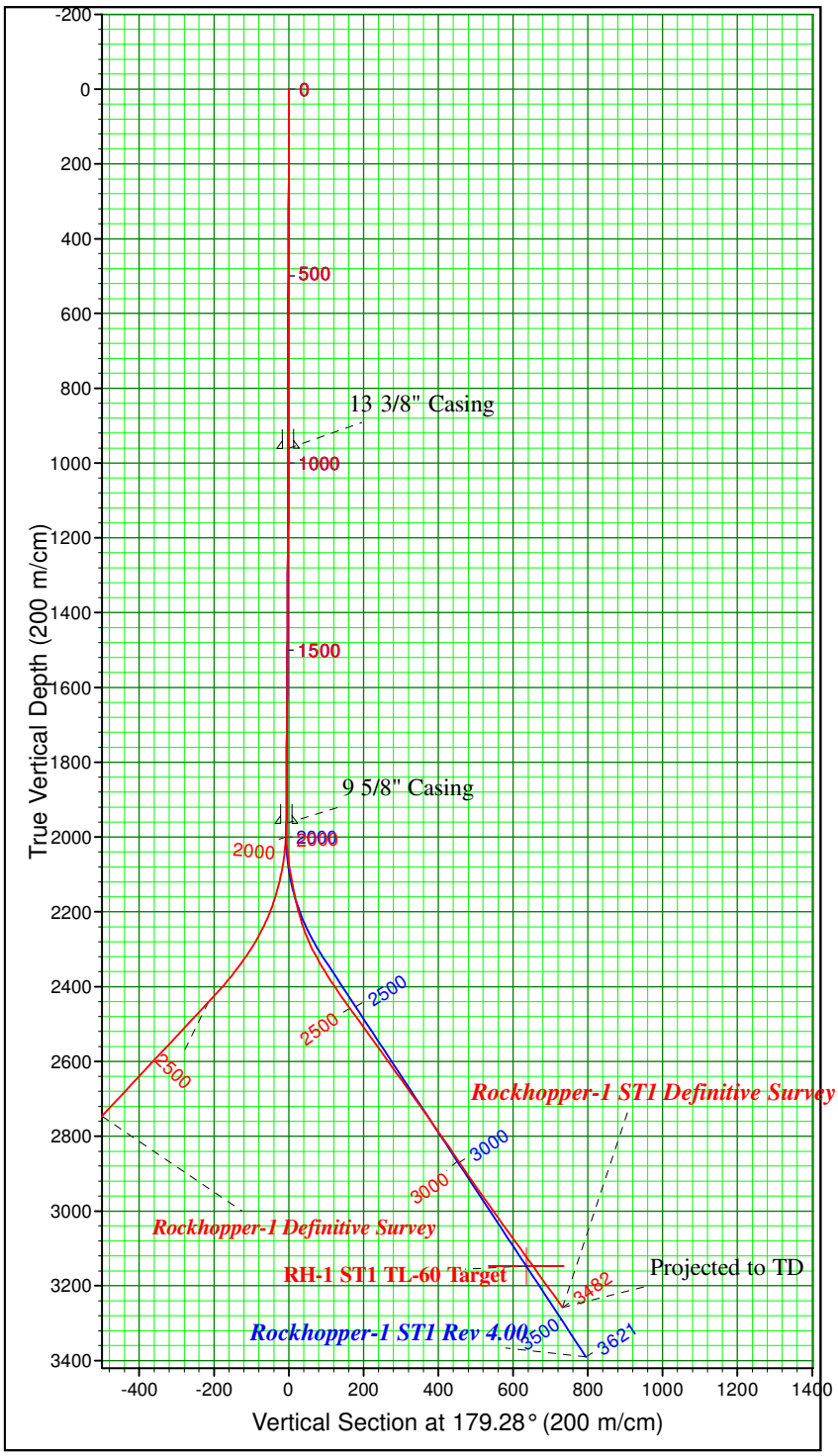
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.00	0.00	5594071.42	366374.03	39° 47' 34.1828 S	145° 26' 21.4660 E

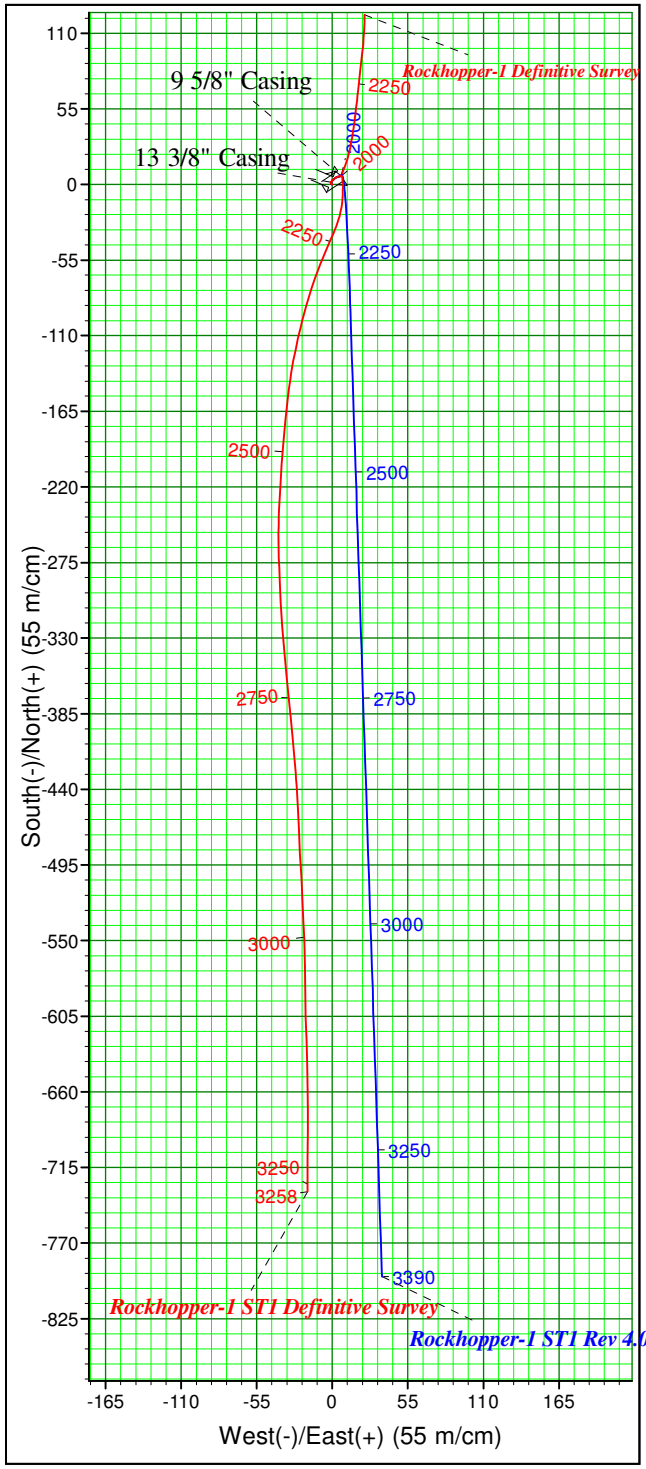
REFERENCE INFORMATION

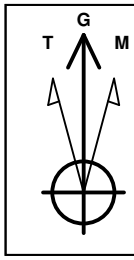
Co-ordinate (N/E) Reference: Well Rockhopper-1, Grid North
Vertical (TVD) Reference: Rotary Table @ 26.00m (Above MSL)
Section (VS) Reference: Slot - (0.00N, 0.00E)
Measured Depth Reference: Rotary Table @ 26.00m (Above MSL)
Calculation Method: Minimum Curvature

CASING DETAILS

TVD	MD	Name	Size
960.99	961.00	13 3/8" Casing	13.375
1963.95	1964.00	9 5/8" Casing	9.625







Azimuths to Grid North
True North: -1.00°
Magnetic North: 11.50°

Magnetic Field
Strength: 60968.9snT
Dip Angle: -70.39°
Date: 4/12/2009
Model: BGGM2009

PROJECT DETAILS: Rockhopper-1

Geodetic System: Universal Transverse Mercator
Datum: GDA94
Ellipsoid: GRS 1980
Zone: Zone 55S (144 E to 150 E)

System Datum: Mean Sea Level

SECTION 5

Drilling Surveys

sperry-sun DRILLING SERVICES

Survey and Drilling Parameters

Operator : Origin Energy Resources Ltd
Well : Rockhopper-1 ST1
Rig : Kan Tan IV

Country : Australia
Location : Bass Basin
Job # : AU-DD-0006791008

North Ref : Mag **Declination :** ° **VS Dir :** 179.28° (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										Tieon
1968.42	0.69	57.75	1968.4	-6.3	6.4	6.3	0.00	0.00	0.00										Tieon
1995.26	1.12	112.40	1995.2	-6.3	6.4	6.7	1.02	0.48	0.00	4		550	2100	1990	1995	LS			
2020.27	4.56	164.56	2020.2	-5.2	5.3	7.2	4.77	4.13	62.57	30		550	1960	1995	1996	LS		1	
														1996	2005	LS		1	
														2020	2020	LS		1	
2076.85	8.58	180.86	2076.4	1.2	-1.1	7.7	2.33	2.13	8.64	22		550	1920	2020	2033	LS		1	
														2070	2077	HS		1	
2097.43	9.89	180.78	2096.7	4.5	-4.4	7.6	1.91	1.91	-0.12	20	60	550	1900	2077	2080	HS	10	1	
2101.74	10.33	180.02	2100.9	5.2	-5.1	7.6	3.20	3.06	-5.29	20	60	550	1900	2098	2100	HS	10	1	
2133.86	11.00	184.57	2132.5	11.2	-11.1	7.4	1.00	0.63	4.25	20	120	550	1950	2102	2104	HS	22	2	TF 10L Def 75%
														2106	2108	HS		2	
														2110	2112	HS		2	
2162.64	12.26	191.23	2160.7	16.9	-16.8	6.6	1.92	1.31	6.94	20	120	550	1950				22	2	TF 20L Def 90%
2191.04	14.09	193.69	2188.4	23.2	-23.1	5.2	2.02	1.93	2.60	20	120	550	1950				22	2	TF 20L Def 100%
2221.57	17.24	200.87	2217.7	31.0	-31.0	2.7	3.63	3.10	7.06	25	140	550	1950				10	2	TF 20L Def 100%
2249.96	21.12	203.77	2244.6	39.6	-39.6	-0.9	4.22	4.10	3.06	25	150	550	1950				36	2	TF 30L Def 100%
2279.09	25.17	203.19	2271.3	50.0	-50.1	-5.4	4.18	4.17	-0.60	20	120	550	1950				55	2	TF 45L Def 90%
2305.36	27.89	201.28	2294.8	60.8	-60.9	-9.9	3.26	3.11	-2.18	20	130	550	1950				40	2	TF 45L Def 90%
2335.32	29.38	198.65	2321.1	74.2	-74.4	-14.8	1.95	1.49	-2.63	16	130	525	1850				14	2	TF 45L Def 95%
2364.04	31.58	195.91	2345.9	88.1	-88.3	-19.1	2.72	2.30	-2.86	16	130	525	1850				14	2	TF 45L Def 90%
2393.22	33.12	193.25	2370.5	103.2	-103.5	-23.0	2.16	1.58	-2.73	16	130	525	1850				14	2	TF 35L Def 100%
2424.12	34.46	191.99	2396.2	119.9	-120.2	-26.7	1.47	1.30	-1.22	21	130	525	1900				10	2	TF 45L Def 100%
2453.55	35.45	189.16	2420.3	136.4	-136.8	-29.8	1.94	1.01	-2.88	21	120	530	1940				16	2	TF 45L Def 100%
2483.19	36.74	186.44	2444.3	153.7	-154.1	-32.2	2.08	1.31	-2.75	21	120	530	1940				16	2	TF 45L Def 100%
2512.34	35.42	185.57	2467.8	170.7	-171.2	-34.0	1.46	-1.36	-0.90	15	120	550	2250				11	2	CR 70% Def -30 Bias
2539.22	36.20	185.30	2489.6	186.4	-186.8	-35.5	0.89	0.87	-0.30	15	120	550	2250				11	2	CR 90% Def -30 Bias
2567.35	35.96	183.83	2512.4	202.9	-203.3	-36.8	0.96	-0.26	-1.57	15	120	550	2250				11	2	CR 90% Def -30 Bias
2596.63	35.85	183.27	2536.1	220.0	-220.5	-37.9	0.35	-0.11	-0.57	15	120	550	2250				11	2	CR 90% Def -30 Bias
2623.25	35.76	182.90	2557.7	235.5	-236.0	-38.7	0.26	-0.10	-0.42	15	115	600	2280				21	2	CR 90% Def -30 Bias

sperry-sun
DRILLING SERVICES

Survey and Drilling Parameters

Operator : Origin Energy Resources Ltd
Well : Rockhopper-1 ST1
Rig : Kan Tan IV

Country : Australia
Location : Bass Basin
Job # : AU-DD-0006791008

North Ref : Mag **Declination :** ° **VS Dir :** 179.28° (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
2653.75	34.92	179.74	2582.6	253.1	-253.7	-39.1	1.98	-0.83	-3.11	15	130	600	2300				30	2	TF 40L Def 100%
2684.95	36.05	178.78	2608.0	271.3	-271.8	-38.9	1.21	1.09	-0.92	13	135	610	2420				24	2	TF 20L Def 100%
2711.61	35.74	177.14	2629.6	286.9	-287.4	-38.3	1.14	-0.35	-1.85	10	140	610	2450				48	2	CR 90% Def -40 Bias
2739.68	35.53	177.12	2652.4	303.2	-303.7	-37.5	0.22	-0.22	-0.02	20	120	610	2450				18	2	CR 90% Def -40 Bias
2771.60	35.60	176.05	2678.4	321.8	-322.2	-36.4	0.59	0.07	-1.01	13	135	610	2470				20	2	CR 90% Def -40 Bias
2799.25	35.65	174.76	2700.8	337.8	-338.3	-35.1	0.82	0.05	-1.40	20	135	610	2520				14	2	CR 90% Def -40 Bias
2830.33	35.66	174.48	2726.1	355.9	-356.3	-33.4	0.16	0.01	-0.27	20	135	610	2520				14	2	CR 90% Def -30 Bias
2858.86	35.48	174.28	2749.3	372.4	-372.9	-31.8	0.23	-0.19	-0.21	15	140	600	2450				10	2	CR 90% Def -30 Bias
2886.55	35.51	174.82	2771.8	388.4	-388.9	-30.3	0.34	0.03	0.59	12	140	600	2450				11	2	CR 90% Def -30 Bias
2912.81	35.67	174.71	2793.2	403.7	-404.1	-28.9	0.20	0.18	-0.13	15	110	610	2450				11	2	CR 90% Def -30 Bias
2944.72	35.81	174.86	2819.1	422.3	-422.6	-27.2	0.16	0.13	0.14	15	125	590	2430				12	2	CR 90% Def -30 Bias
2970.10	33.67	176.07	2839.9	436.7	-437.1	-26.0	2.66	-2.53	1.43	15	130	590	2450				12	2	TF 30L Def 100%
3001.24	33.20	177.20	2865.9	453.8	-454.2	-25.0	0.75	-0.45	1.09	15	130	590	2450				12	2	TF 20L Def 100%
3026.70	33.66	177.54	2887.2	467.9	-468.2	-24.4	0.59	0.54	0.40	15	120	590	2450				11	2	TF 20L Def 100%
3059.36	34.73	177.11	2914.2	486.2	-486.5	-23.5	1.01	0.98	-0.39	12	120	590	2450				10	2	TF 20L Def 100%
3089.54	35.58	176.65	2938.9	503.6	-503.9	-22.6	0.88	0.84	-0.46	12	100	590	2430				10	2	CR 100% Bias -30
3118.07	35.65	177.66	2962.1	520.2	-520.5	-21.7	0.62	0.07	1.06	12	100	590	2430				10	2	CR 100% Bias -30
3145.40	35.32	177.16	2984.3	536.0	-536.3	-21.0	0.48	-0.36	-0.55	10	100	590	2430				11	2	CR @100% Bias -30
3167.94	35.69	178.03	3002.7	549.1	-549.4	-20.5	0.83	0.49	1.16	10	125	600	2500				10	3	CR @100% Bias -30
3185.27	35.70	178.52	3016.7	559.2	-559.5	-20.2	0.50	0.02	0.85	10	125	600	2500				25	3	CR @100% Bias -20
3203.43	35.56	178.75	3031.5	569.8	-570.1	-19.9	0.32	-0.23	0.38	5	120	600	2340				4	4	CR @100% Bias -30
3234.73	35.91	179.25	3056.9	588.1	-588.4	-19.6	0.44	0.34	0.48	10	165	580	2350				5	5	CR @100% Bias -30
3264.81	35.73	178.72	3081.3	605.7	-606.0	-19.3	0.36	-0.18	-0.53	15	170	600	2450				13	5	CR @100% Bias -30
3295.65	35.03	178.07	3106.4	623.5	-623.8	-18.8	0.77	-0.68	-0.63	10	100	600	2450				12	6	Home
3324.89	36.06	178.66	3130.2	640.5	-640.8	-18.3	1.11	1.06	0.61	10	150	600	2360				12	8	CR @100% Bias -30
3350.05	35.41	178.82	3150.7	655.2	-655.5	-18.0	0.78	-0.78	0.19	5	170	600	2360				8	8	CR @100% Bias -30
3379.25	35.71	179.95	3174.4	672.2	-672.5	-17.8	0.74	0.31	1.16	10	160	600	2460				7	8	CR @100% Bias -30
3408.14	35.85	180.50	3197.8	689.1	-689.4	-17.9	0.36	0.15	0.57	15	140	600	2490				15	8	CR @100% Bias -30
3439.04	36.10	180.75	3222.9	707.2	-707.5	-18.1	0.28	0.24	0.24	10	120	600	2490				15	8	CR @100% Bias -30
3467.05	35.47	179.36	3245.6	723.6	-723.9	-18.1	1.10	-0.67	-1.49	10	120	600	2490				15	8	HOME
3482.00	35.47	179.36	3257.7	732.3	-732.6	-18.0	0.00	0.00	0.00	10	120	600	2490				10	8	Projected to TD

SECTION 6

BHA Data

sperry-sun
DRILLING SERVICES

BHA Report

Operator : Origin Energy Resources Ltd
Well : Rockhopper-1 ST1
Country : Australia
Location : Bass Basin
Rig : Kan Tan IV
Job # : AU-DD-0006791008 **BHA# 1**

BHA# 1 : **Date In** 19/01/201 **MD In (m) :** 1998 **TVD In (m) :** 1998 **Date Out** 21/01/201(**MD Out (m):** 2112 **TVD Out (m):** 2111

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
1	8.500	Hughes Christensen	MXL-1x	6062641		1.114	2-3-WT-A -2-I-ER-BHA

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (psi)	Cum Circ Hrs
1	6.750	SSDS	SperryDrill	675400	1.15°		63	32.50

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	8 1/2" Hughes Mill Tooth Bit	6062641	8.500	3.000	8.500	169.30	P 4-1/2" Reg	0.24	
2	6-3/4" SperryDrill Lobe 6/7 - 5.0 stg	675400	6.750	4.498		67.81	B 4-1/2" IF	8.29	0.69
3	8-1/8" Integral Blade Stabilizer	10988869	6.750	2.813	8.125	100.77	B 4-1/2" IF	2.03	9.55
4	6-3/4"PM Sub	194443	6.750	1.920		112.09	B 4-1/2" IF	2.78	
5	6-3/4" HOC	203842	6.750	1.920		112.09	B 4-1/2" IF	3.03	
6	Float Sub w/- Ported Float	11029122	6.750	3.000		97.86	B 4-1/2" IF	0.91	
7	8-1/2" Integral Blade Stabilizer	700802	6.500	2.813	8.500	91.91	B 4-1/2" IF	1.70	18.13
8	6x Drill collar		6.750	2.875		99.83	B 4-1/2" IF	56.16	
9	9x HWDP		5.000	3.000		49.30	B 4-1/2" IF	84.57	
10	6-1/2" Drilling Jars	17602177	6.500	2.750		92.85	B 4-1/2" IF	9.84	
11	5x HWDP		5.000	3.000		49.30	B 4-1/2" IF	47.18	
								216.73	

Parameter	Min	Max	Ave
WOB (klbs) :	20	35	22
RPM (rpm) :	50	65	58
Flow (gpm) :	550	600	553
SPP (psi) :	1890	2200	1962

Activity	Hrs
Drilling :	22.00
Reaming :	0.00
Circ-Other :	10.50
Total :	32.50

BHA Weight	(lb)
in Air (Total) :	48291
in Mud (Total) :	41372
in Air (Bel Jars) :	37663
in Mud (Bel Jars) :	32267

Drill String	OD(in)	Len (m)

PERFORMANCE

	In	Out
Inclination (deg)	1.36	10.54
Azimuth (deg)	129.23	181.54

	Distance (m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :	38.00	4			3.00
Rotated :	76.00	6			
Total :	114.00	5	2.41	13.76	2.57

COMMENTS

BRT 22:30 /19/01/10
ART 15:30/21/10/10

OBJECTIVES:

To drill the Cement down to the kick -off point and then orientate the well to 180 degrees south and build some angle of up to 10 degrees before the upcoming Geo-Pilot BHA run.

RESULTS:

The BHA was run in to the top of the Cement at 1970m MD and was drilled with no problems in good time to 1990m MD where the motor was orientated to 180 Degrees and the well was control drilled for the kick -off. The ROP was controlled until 1998m MD where it was confirmed that samples showed 98% formation and kick-off was initiated

The next stand was also control drilled to gain some angle in the hole F 1998-2033m .Sliding mode gave slow ROP and only realised just over 1 degree from a 13m slide .Again a 10m slide was put in and this time realised a 4 degree dog-leg and so with this the slide ratio was reduced .In Slide mode hanging up became a regular occurrence requiring the well to be back-reamed which had a negative effect on ROP and actual on bottom drilling time however tool-face control was reasonable. The well was successfully kicked -off in the required direction .Once the well was drilled to approximately (Projected) 10 Degrees and after discussion with the company Rep it was decided that this was enough angle in the hole to be confident that the BHA could be pulled and the subsequent Geo-Pilot could commence for the remainder of the well to core point .The actual depth and inclination at this point was 2112m and 8.58 degrees .

The subsequent trip out of the hole was good and there was no back-reaming required and there were no tight spots or other such hole problems .The bit for this run was surprisingly more worn than expected and the motor was in good shape with only 1mm of bearing wear .

sperry-sun
DRILLING SERVICES

BHA Report

Operator : Origin Energy Resources Ltd
Well : Rockhopper-1 ST1
Country : Australia
Location : Bass Basin
Rig : Kan Tan IV
Job # : AU-DD-0006791008 **BHA# 2**

BHA# 2 : **Date In** 21/01/201 **MD In (m) :** 2112 **TVD In (m) :** 2111 **Date Out** 26/01/201(**MD Out (m):** 3158 **TVD Out (m):** 2995

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
2	8.500	Reed Hycalog	RSX616M	220126	6x18	1.491	2-1-CT-C--X-I-NO-DTF

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (psi)	Cum Circ Hrs
2	6.750	SSDS	Geopilot	GP850TL103	0.00°		0	95.75

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	Reed Hycalog RSX616M PDC	220126	8.500	2.500	8.500	176.66	P 4-1/2" Reg	0.44	
2	7600 Geo-Pilot w/- LSH	GP850TL103	6.750	1.920	8.375	112.09	B 4-1/2" IF	7.08	1.18
3	6-3/4" NM Flex with PCDC	CP1005711	6.750	1.920		112.09	B 4-1/2" IF	2.81	
4	6 3/4 RLL Stab	1016171	6.750	1.920	8.404	112.09	B 4-1/2" IF	0.67	10.77
5	6-3/4" RLL w/DGR + EWR	90232556	6.750	1.920		106.76	B 4-1/2" IF	6.54	
6	6 3/4 ALD C/W Stab	902300556	6.750	1.920	8.250	112.09	B 4-1/2" IF	4.32	20.43
7	6-3/4" CTN + ACAL	902300556	6.750	1.920		112.09	B 4-1/2" IF	4.22	
8	6-3/4" PWD	90222556	6.750	1.920		112.09	B 4-1/2" IF	2.54	
9	6- BAT- Sonic	90230519	6.750	1.920		112.09	B 4-1/2" IF	6.68	
10	6-3/4" HOC	203846	6.750	1.920		112.09	B 4-1/2" IF	3.04	
11	6-3/4" Float Sub w/- Ported Float	11029122	6.750	3.000		97.86	B 4-1/2" IF	0.91	
12	8-1/2" Integral Blade Stabilizer	700802	6.500	2.875	8.500	90.96	B 4-1/2" IF	1.70	40.01
13	3x Drill collar		6.750	2.875		99.83	B 4-1/2" IF	27.92	
14	9x HWDP		5.000	3.000		49.30	B 4-1/2" IF	84.57	
15	6-1/2" Drilling Jar	17602177	6.500	2.750		92.85	B 4-1/2" IF	9.84	
16	5x HWDP		5.000	3.000		49.30	B 4-1/2" IF	47.18	
								210.46	

Parameter	Min	Max	Ave
WOB (klbs) :	10	25	16
RPM (rpm) :	80	150	125
Flow (gpm) :	525	610	573
SPP (psi) :	1850	2520	2228

Activity	Hrs
Drilling :	79.50
Reaming :	11.00
Circ-Other :	5.25
Total :	95.75

BHA Weight	(lb)
in Air (Total) :	48329
in Mud (Total) :	41405
in Air (Bel Jars) :	37701
in Mud (Bel Jars) :	32299

Drill String	OD(in)	Len (m)

PERFORMANCE

	In	Out
Inclination (deg)	10.54	35.53
Azimuth (deg)	181.54	177.65

	Distance (m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :	0.00	0			0.30
Rotated :	1046.00	13	0.20	0.20	
Total :	1046.00	13	0.72	-0.11	0.72

COMMENTS

Tools Initialized: 23:30hrs (BRT)
ABG - 1.49m Den - 20.74m Son - 31.89m
Svy - 8.74m Cal - 23.79m
Gam - 11.51m Por - 24.64m
Res - 13.86m PWD - 27.59m

OBJECTIVES:

To continue directionally drilling 8 ½" hole section to TD building inclination and turning azimuth with an average dogleg of 3 degree/30m.This BHA will be run to drill to the first core point then on to the second core point and then to TD as picked by Geology

RESULTS:

The BHA was run to bottom with no hole problems. Response was reasonable throughout the run but was hampered by vibration and stick-slip resulting in pulling off bottom to send down -links at times .. Steering mode was used for the build up section, from 2112m to 2500m, then switched to cruise mode for the remainder of the well other than a two or three occasions when it was put back in to steering mode to combat right hand bit walk . Effective dog leg produced was only 3+ degrees per 30m requiring 100% deflection and lower flow-rate to maintain same .

During the run high stick slip and torsional vibration exposed all tools to extremely high levels of shock. Every possible effort was endeavoured to mitigate stick slip and torsional vibration with limited success. Appeared the bit was generating the down hole torque .The formation was very inter-bedded and despite constant variation of parameters and best drilling practices being used it was almost impossible to stop, resulting in periods off bottom to allow energy out of the string before re-attempting to drill ahead

Frequent false downlinks were received by Geo-Pilot believed to be initiated by the perceived stick-slip down hole. Some down-links could not be sent due to stick-slip and so some were sent while off bottom and stationary before drilling ahead .In the later section of the well downlinks were sent after the survey to ensure the tool was set before drilling ahead .This BHA was pulled when communication was lost at he RLL tools was lost due to the massive stick-slip shocks sustained during this section .The subsequent trip out of the hole was without problems and the bit was worn more than expected from this run.

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DRILLING SERVICES

BHA Report

Operator : Origin Energy Resources Ltd
Well : Rockhopper-1 ST1
Country : Australia
Location : Bass Basin
Rig : Kan Tan IV
Job # : AU-DD-0006791008 **BHA# 3**

BHA# 3 : **Date In** 26/01/201 **MD In (m) :** 3158 **TVD In (m) :** 2995 **Date Out** 28/01/201(**MD Out (m):** 3196 **TVD Out (m):** 3025

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
3	8.500	Security DBS	FMF3653Z	11374625	3x15, 3x12	0.849	0-0-NO-A -X-I-NO-CP

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (psi)	Cum Circ Hrs
3	6.750	SSDS	Geopilot	GP850TL134	0.00°		0	13.50

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	SDBS FMF3653Z PDC	11374625	8.500	2.500	8.500	176.66	P 4-1/2" Reg	0.39	
2	7600 Geo-Pilot w/- LSH	GP850TL134	6.750	1.920	8.375	112.09	B 4-1/2" IF	7.08	1.13
3	6-3/4" NM Flex with PCDC	CP919968	6.750	1.920		112.09	B 4-1/2" IF	2.76	
4	6-3/4" RLL w/- Stab	90224657	6.750	1.920	8.375	112.09	B 4-1/2" IF	0.62	10.63
5	6-3/4" RLL w/DGR + EWR	90224657	6.750	1.920		106.76	B 4-1/2" IF	6.53	
6	6-3/4" ALD w/- Stab	902300556	6.750	1.920	8.125	112.09	B 4-1/2" IF	4.99	20.99
7	6-3/4" CTN	902322813	6.750	1.920		112.09	B 4-1/2" IF	4.15	
8	6-3/4" PWD	90215164	6.750	1.920		112.09	B 4-1/2" IF	2.53	
9	6- BAT- Sonic	90235228	6.750	1.920		112.09	B 4-1/2" IF	6.72	
10	6-3/4" HOC	302842	6.750	1.920		112.09	B 4-1/2" IF	3.03	
11	6-3/4" ACAL	90235611	6.750	1.920		112.09	B 4-1/2" IF	1.81	
12	6-3/4" Float Sub w/- Ported Float	11029122	6.750	3.000		97.86	B 4-1/2" IF	0.91	
13	8-1/2" Integral Blade Stabilizer	700802	6.500	2.875	8.500	90.96	B 4-1/2" IF	1.70	42.37
14	3x Drill collar		6.750	2.875		99.83	B 4-1/2" IF	27.92	
15	9x HWDP		5.000	3.000		49.30	B 4-1/2" IF	84.57	
16	6-1/2" Drilling Jar	17602177	6.500	2.750		92.85	B 4-1/2" IF	9.84	
17	5x HWDP		5.000	3.000		49.30	B 4-1/2" IF	47.18	
								212.73	

Parameter	Min	Max	Ave
WOB (klbs) :	10	10	10
RPM (rpm) :	125	125	125
Flow (gpm) :	600	600	600
SPP (psi) :	2500	2500	2500

Activity	Hrs
Drilling :	5.00
Reaming :	2.50
Circ-Other :	6.00
Total :	13.50

BHA Weight	(lb)
in Air (Total) :	49154
in Mud (Total) :	42186
in Air (Bel Jars) :	38525
in Mud (Bel Jars) :	33064

Drill String	OD(in)	Len (m)

PERFORMANCE

	In	Out
Inclination (deg)	35.53	35.62
Azimuth (deg)	177.65	178.66

	Distance (m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :	0.00	0			
Rotated :	38.00	8			
Total :	38.00	8	0.07	0.80	0.47

COMMENTS

Tools Initialized:26/10/10 14:55hrs (BRT) 23:00hrs 27/01/10 (ART)
ABG - 1.45m Den - 21.29m ACAL - 39.17m
Svy - 8.69m Por - 24.49m
Gam - 11.36m PWD - 28.04m
Res - 13.68m Son - 32.36m

OBJECTIVES:

To drill 30m to the first core point 100m to the second core point and then to TD at 3630m +/_ holding tangent angle and landing to the south of the target TL 60

RESULTS:

This BHA was run to bottom and the hole was re-logged on the way down at the same time .The hole packed off at a few points on the way down which were specifically 3150md and 3152md .Once on bottom drilling began in inclination cruise with a 30 L bias to negate the right hand turn expected from the bit .This section was to be drilled to core point as picked by Geologist .The first drilled depth was F 3158m 3180m MD where the pipe was reciprocated until logs were sent and samples obtained for Geology .This section also suffered from stick-slip and lateral vibration and all attempts were made to mitigate same but the parameters found to minimise this also slowed ROP to an unacceptable 1-1.5m/hr and so again parameters were modified to regain an acceptable ROP while minimising stick-slip .Again this was not successful

The second drilled depth was F3180m-3190m MD as directed by Geology for the core point and once again the pipe was reciprocated while logs were sent and samples got for Geology .This section was the same as before with lateral vibration and stick-slip always present .The parameters were constantly modified to try and prevent this but once again was unsuccessful .This was considered to be core point and the BHA was tripped out of hole .There were no problems on the trip out .The Geo-Pilot performed as expected.

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DRILLING SERVICES

BHA Report

Operator : Origin Energy Resources Ltd
Well : Rockhopper-1 ST1
Country : Australia
Location : Bass Basin
Rig : Kan Tan IV
Job # : AU-DD-0006791008 **BHA# 4**

BHA# 4 : **Date In** 28/01/201 **MD In (m) :** 3196 **TVD In (m) :** 3025 **Date Out** 29/01/201(**MD Out (m):** 3213 **TVD Out (m):** 3039

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
4	8.500	Corepro		83691		0.000	0-0-NO-A -X-I-NO-PR

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	Core Head	83691	8.500	2.500	8.500	176.66	P 4-1/2" Reg	0.37	
2	Stabilizer	WO137258	6.750	5.625	8.438	37.26	B 4-1/2" IF	0.76	0.71
3	Outer Core Barrel	WO135-256	7.125	5.625		51.19	B 4-1/2" IF	5.33	
4	Stabilizer	WO137-237	6.750	5.625	8.438	37.26	B 4-1/2" IF	0.76	6.80
5	Outer Core Barrel	WO135264	7.125	5.625		51.19	B 4-1/2" IF	5.33	
6	Stabilizer	WO137-015	6.750	5.625	8.438	37.26	B 4-1/2" IF	0.76	12.88
7	Outer Core Barrel	WO135-1974	7.125	5.625		51.19	B 4-1/2" IF	5.33	
8	Stabilizer	WO137-219	6.500	5.625	8.438	28.40	B 4-1/2" IF	0.76	18.97
9	Outer Core Barrel	WO135-098	7.125	5.625		51.19	B 4-1/2" IF	5.33	
10	Stabilizer	WO137-219	6.750	5.625	8.438	37.26	B 4-1/2" IF	0.76	25.11
11	Outer Core Barrel	W0135-098	7.063	1.938		123.47	B 4-1/2" IF	5.33	
12	Stabilizer	WO1476014	6.750	5.625	8.438	37.26	B 4-1/2" IF	0.76	31.14
13	Top Head	wo1856027	7.063	2.875		111.40	B 4-1/2" IF	0.60	
14	6x Drill collar		6.750	2.875		99.83	B 4-1/2" IF	56.16	
15	6-1/2" Drilling Jar	17602019	6.500	2.750		92.85	B 4-1/2" IF	9.94	
16	2 x Drill collar		6.750	2.875		99.83	B 4-1/2" IF	18.78	
17	15 x 5" HWDP		5.000	3.000		49.30	B 4-1/2" IF	141.19	
								258.25	

Parameter	Min	Max	Ave
WOB (klbs) :	5	5	5
RPM (rpm) :	120	120	120
Flow (gpm) :	600	600	600
SPP (psi) :	2340	2340	2340

Activity	Hrs
Drilling :	5.00
Reaming :	1.50
Circ-Other :	0.00
Total :	6.50

BHA Weight (lb)	
in Air (Total) :	57119
in Mud (Total) :	49022
in Air (Bel Jars) :	25103
in Mud (Bel Jars) :	21545

Drill String	OD(in)	Len (m)

PERFORMANCE

	In	Out
Inclination (deg)	35.62	35.67
Azimuth (deg)	178.66	178.90

	Distance (m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :	0.00	0			0.00
Rotated :	17.00	3	0.00	0.00	
Total :	17.00	3	0.09	0.44	0.27

COMMENTS

OBJECTIVES:

To retreive 30m of core F 3196m-3226m MD

RESULTS:

This was core BHA and was a success in that the13.4m of core recovered was deemed to be good enough to drill ahead to second core point for evaluation .

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DRILLING SERVICES

BHA Report

Operator : Origin Energy Resources Ltd
Well : Rockhopper-1 ST1
Country : Australia
Location : Bass Basin
Rig : Kan Tan IV
Job # : AU-DD-0006791008 **BHA# 5**

BHA# 5 : **Date In** 29/01/201 **MD In (m) :** 3213 **TVD In (m) :** 3039 **Date Out** 30/01/201(**MD Out (m):** 3283 **TVD Out (m):** 3096

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
3rr1	8.500	Security DBS	FMF3653Z	11374625	3x15, 3x12	0.849	0-0-ER-A -X-I-NO-CP

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (psi)	Cum Circ Hrs
4	6.750	SSDS	Geopilot	GP850TL134	0.00°		0	26.50

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	SDBS FMF3653Z PDC	11374625	8.500	2.500	8.500	176.66	P 4-1/2" Reg	0.39	
2	7600 Geo-Pilot w/- LSH	GP850TL134	6.750	1.920	8.375	112.09	B 4-1/2" IF	7.08	1.13
3	6-3/4" NM Flex with PCDC	CP919968	6.750	1.920		112.09	B 4-1/2" IF	2.76	
4	6-3/4" RLL w/- Stab	90224657	6.750	1.920	8.375	112.09	B 4-1/2" IF	0.62	10.63
5	6-3/4" RLL w/DGR + EWR	90224657	6.750	1.920		106.76	B 4-1/2" IF	6.53	
6	6-3/4" ALD w/- Stab	902300556	6.750	1.920	8.125	112.09	B 4-1/2" IF	4.99	20.99
7	6-3/4" CTN	902322813	6.750	1.920		112.09	B 4-1/2" IF	4.15	
8	6-3/4" PWD	90215164	6.750	1.920		112.09	B 4-1/2" IF	2.53	
9	6- BAT- Sonic	90230519	6.750	1.920		112.09	B 4-1/2" IF	6.68	
10	6-3/4" HOC	302842	6.750	1.920		112.09	B 4-1/2" IF	3.03	
11	6-3/4" ACAL	90235611	6.750	1.920		112.09	B 4-1/2" IF	1.81	
12	6-3/4" Float Sub w/- Ported Float	11029122	6.750	3.000		97.86	B 4-1/2" IF	0.91	
13	8-1/2" Integral Blade Stabilizer	700802	6.500	2.875	8.500	90.96	B 4-1/2" IF	1.70	42.33
14	3x Drill collar		6.750	2.875		99.83	B 4-1/2" IF	27.92	
15	9x HWDP		5.000	3.000		49.30	B 4-1/2" IF	84.57	
16	6-1/2" Drilling Jar	17602177	6.500	2.750		92.85	B 4-1/2" IF	9.84	
17	5x HWDP		5.000	3.000		49.30	B 4-1/2" IF	47.18	
								212.69	

Parameter	Min	Max	Ave
WOB (klbs) :	5	15	12
RPM (rpm) :	120	170	166
Flow (gpm) :	580	600	592
SPP (psi) :	2330	2450	2404

Activity	Hrs
Drilling :	9.50
Reaming :	2.00
Circ-Other :	1.50
Total :	13.00

BHA Weight	(lb)
in Air (Total) :	49139
in Mud (Total) :	42099
in Air (Bel Jars) :	38511
in Mud (Bel Jars) :	32993

Drill String	OD(in)	Len (m)

PERFORMANCE

	In	Out
Inclination (deg)	35.67	35.32
Azimuth (deg)	178.90	178.34

	Distance (m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :	0.00	0			
Rotated :	70.00	7			
Total :	70.00	7	-0.15	-0.24	0.21

COMMENTS

Tools Initialized: hrs (BRT)29/01/10 @11:40 - 30/01/10 @18:15(ART)
ABG - 1.45m Den - 21.29m ACAL 39.13 m
Svy - 8.69m Por - 24.49m
Gam - 11.36m PWD - 28.04m
Res - 13.68m Son - 32.32m

OBJECTIVES:

This BHA will be run to continue tangent section to prognosed core point number 2 then continue to hold tangent angle and inclination to through target TL60 and to TD at 3630m+/_md

RESULTS:

This BHA was the same as BHA#3 other than the Bat-sonic was run .The bit was the same as the previous run which was such a short run that it was difficult to get a feel for the characteristics of it .This BHA was tripped to bottom with no problems and the hole was clean on the trip in .The bit was broken in on bottom to try and establish a new pattern on bottom where the core BHA had left off .Once broken in the RPM was brought up to 155RPM in order to try and minimise stick-slip ,and then on to 170 RPM seen at surface which was deemed to be as fast as the rotary could be turned .Stick-slip was still an issue but marginally less than before .Again varying parameters were attempted and it appeared that 140RPM with 20K WOB seemed to settle the stick-slip, however this was short lived .

Many combinations of WOB and RPM were adopted but as stated earlier only slightly better than before .Again this was only a short run F 3213m -3284m(71m) and again it was very difficult gauge BHA characteristics but overall on this run it would seem to have been an improvement on the previous BHA.

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DRILLING SERVICES

BHA Report

Operator : Origin Energy Resources Ltd
Well : Rockhopper-1 ST1
Country : Australia
Location : Bass Basin
Rig : Kan Tan IV
Job # : AU-DD-0006791008 **BHA# 6**

BHA# 6 : **Date In** 30/01/201 **MD In (m) :** 3283 **TVD In (m) :** 3096 **Date Out** 1/02/2010 **MD Out (m):** 3298 **TVD Out (m):** 3108

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
4rr1	8.500	Corepro		83691		0.000	0-0-NO-A -X-I-NO-PR

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	Core Head	83691	8.500	2.500	8.500	176.66	P 4-1/2" Reg	0.37	
2	Stabilizer	WO137258	6.750	5.625	8.438	37.26	B 4-1/2" Reg	0.76	0.71
3	Outer Core Barrel	WO135-256	7.125	5.625		51.19	B 4-1/2" IF	5.33	
4	Stabilizer	WO137-237	6.750	5.625	8.438	37.26	B 4-1/2" IF	0.76	6.80
5	Outer Core Barrel	WO135264	7.125	5.625		51.19	B 4-1/2" IF	5.33	
6	Stabilizer	WO137-015	6.750	5.625	8.438	37.26	B 4-1/2" IF	0.76	12.88
7	Outer Core Barrel	WO135-1974	7.125	5.625		51.19	B 4-1/2" IF	5.33	
8	Stabilizer	WO137-219	6.500	5.625	8.438	28.40	B 4-1/2" IF	0.76	18.97
9	Outer Core Barrel	WO135-098	7.125	5.625		51.19	B 4-1/2" IF	5.33	
10	Stabilizer	WO137-219	6.750	5.625	8.438	37.26	B 4-1/2" IF	0.76	25.11
11	Outer Core Barrel	W0135-098	7.063	1.938		123.47	B 4-1/2" IF	5.33	
12	Stabilizer	WO1476014	6.750	5.625	8.438	37.26	B 4-1/2" IF	0.76	31.14
13	Top Head	wo1856027	7.063	2.875		111.40	B 4-1/2" IF	0.60	
14	6x Drill collar		6.750	2.875		99.83	B 4-1/2" IF	56.16	
15	6-1/2" Drilling Jar	17602019	6.500	2.750		92.85	B 4-1/2" IF	9.94	
16	2 x Drill collar		6.750	2.875		99.83	B 4-1/2" IF	18.78	
17	15 x 5" HWDP		5.000	3.000		49.30	B 4-1/2" IF	141.19	
								258.25	

Parameter	Min	Max	Ave
WOB (klbs) :	10	13	10
RPM (rpm) :	100	170	105
Flow (gpm) :	600	600	600
SPP (psi) :	2450	2450	2450

Activity	Hrs
Drilling :	3.00
Reaming :	0.50
Circ-Other :	1.00
Total :	4.50

BHA Weight (lb)	
in Air (Total) :	57119
in Mud (Total) :	48935
in Air (Bel Jars) :	25103
in Mud (Bel Jars) :	21506

Drill String	OD(in)	Len (m)

PERFORMANCE

	In	Out
Inclination (deg)	35.32	35.11
Azimuth (deg)	178.34	178.12

	Distance (m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :	0.00	0			
Rotated :	15.00	5			
Total :	15.00	5	-0.41	-0.44	0.48

COMMENTS

OBJECTIVES:

THis BHA will be run to recover 50-70m of core as picked by Geology.

RESULTS:

This BHA cut core from 3283m to 3298.5m before it became jammed. Assembly was then pulled out of hole and 14.08m of core was recovered and was considered not to be enough for evaluation and so a third run would be done..

sperry-sun
DRILLING SERVICES

BHA Report

Operator : Origin Energy Resources Ltd
Well : Rockhopper-1 ST1
Country : Australia
Location : Bass Basin
Rig : Kan Tan IV
Job # : AU-DD-0006791008 **BHA# 7**

BHA# 7 : **Date In** 1/02/2010 **MD In (m) :** 3298 **TVD In (m) :** 3108 **Date Out** 2/02/2010 **MD Out (m):** 3309 **TVD Out (m):** 3117

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
4rr2	8.500	Corepro		83691		0.000	0-0-NO-A -X-I-NO-CP

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	Core Head	83691	8.500	2.500	8.500	176.66	P 4-1/2" Reg	0.37	
2	Stabilizer	WO137258	6.750	5.625	8.438	37.26	B 4-1/2" Reg	0.76	0.71
3	Outer Core Barrel	WO135-256	7.125	5.625		51.19	B 4-1/2" IF	5.33	
4	Stabilizer	WO137-237	6.750	5.625	8.438	37.26	B 4-1/2" IF	0.76	6.80
5	Outer Core Barrel	WO135264	7.125	5.625		51.19	B 4-1/2" IF	5.33	
6	Stabilizer	WO137-015	6.750	5.625	8.438	37.26	B 4-1/2" IF	0.76	12.88
7	Outer Core Barrel	WO135-1974	7.125	5.625		51.19	B 4-1/2" IF	5.33	
8	Stabilizer	WO137-219	6.500	5.625	8.438	28.40	B 4-1/2" IF	0.76	18.97
9	Outer Core Barrel	WO135-098	7.125	5.625		51.19	B 4-1/2" IF	5.33	
10	Stabilizer	WO137-219	6.750	5.625	8.438	37.26	B 4-1/2" IF	0.76	25.11
11	Outer Core Barrel	W0135-098	7.063	1.938		123.47	B 4-1/2" IF	5.33	
12	Stabilizer	WO1476014	6.750	5.625	8.438	37.26	B 4-1/2" IF	0.76	31.14
13	Top Head	wo1856027	7.063	2.875		111.40	B 4-1/2" IF	0.60	
14	6x Drill collar		6.750	2.875		99.83	B 4-1/2" IF	56.16	
15	6-1/2" Drilling Jar	17602019	6.500	2.750		92.85	B 4-1/2" IF	9.94	
16	2 x Drill collar		6.750	2.875		99.83	B 4-1/2" IF	18.78	
17	15 x 5" HWDP		5.000	3.000		49.30	B 4-1/2" IF	141.19	
								258.25	

Parameter	Min	Max	Ave
WOB (klbs) :	10	10	10
RPM (rpm) :	100	100	100
Flow (gpm) :	600	600	600
SPP (psi) :	2450	2450	2450

Activity	Hrs
Drilling :	1.50
Reaming :	1.00
Circ-Other :	0.50
Total :	3.00

BHA Weight (lb)	
in Air (Total) :	57119
in Mud (Total) :	48935
in Air (Bel Jars) :	25103
in Mud (Bel Jars) :	21506

Drill String	OD(in)	Len (m)

PERFORMANCE

	In	Out
Inclination (deg)	35.11	35.50
Azimuth (deg)	178.12	178.34

	Distance (m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :	0.00	0			
Rotated :	11.00	7			
Total :	11.00	7	1.06	0.61	1.11

COMMENTS

OBJECTIVES:

This BHA will be run to retrieve another 20 m of core if possible due to the previous core sample being shorter than expected

RESULTS:

This BHA cut core from 3298.5m to 3309m before it became jammed. Assembly was then pulled out of hole and 9.50m of core was recovered.

sperry-sun
DRILLING SERVICES

BHA Report

Operator : Origin Energy Resources Ltd
Well : Rockhopper-1 ST1
Country : Australia
Location : Bass Basin
Rig : Kan Tan IV
Job # : AU-DD-0006791008 **BHA# 8**

BHA# 8 : **Date In** 2/02/2010 **MD In (m) :** 3309 **TVD In (m) :** 3117 **Date Cur** 4/02/2010 **MD Cur (m):** 3482 **TVD Cur (m):** 3258

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
3rr2	8.500	Security DBS	FMF3653Z	11374625	3x15, 3x12	0.849	0-0-RR-A -X-I-NO-TD

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (psi)	Cum Circ Hrs
5	6.750	SSDS	Geopilot	GP850TL134	0.00°		68	54.00

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	SDBS FMF3653Z PDC	11374625	8.500	2.500	8.500	176.66	P 4-1/2" Reg	0.39	
2	7600 Geo-Pilot w/- LSH	GP850TL134	6.750	1.920	8.375	112.09	B 4-1/2" IF	7.08	1.13
3	6-3/4" NM Flex with PCDC	CP919968	6.750	1.920		112.09	B 4-1/2" IF	2.76	
4	6-3/4" RLL w/- Stab	90224657	6.750	1.920	8.375	112.09	B 4-1/2" IF	0.62	10.63
5	6-3/4" RLL w/DGR + EWR	90224657	6.750	1.920		106.76	B 4-1/2" IF	6.53	
6	6-3/4" ALD w/- Stab	902300556	6.750	1.920	8.125	112.09	B 4-1/2" IF	4.99	20.99
7	6-3/4" CTN	902322813	6.750	1.920		112.09	B 4-1/2" IF	4.15	
8	6-3/4" PWD	90215164	6.750	1.920		112.09	B 4-1/2" IF	2.53	
9	6- BAT- Sonic	90230519	6.750	1.920		112.09	B 4-1/2" IF	6.68	
10	6-3/4" HOC	302842	6.750	1.920		112.09	B 4-1/2" IF	3.03	
11	6-3/4" ACAL	90235611	6.750	1.920		112.09	B 4-1/2" IF	1.81	
12	6-3/4" Float Sub w/- Ported Float	11029122	6.750	3.000		97.86	B 4-1/2" IF	0.91	
13	8-1/2" Integral Blade Stabilizer	700802	6.500	2.875	8.500	90.96	B 4-1/2" IF	1.70	42.33
14	3x Drill collar		6.750	2.875		99.83	B 4-1/2" IF	27.92	
15	9x HWDP		5.000	3.000		49.30	B 4-1/2" IF	84.57	
16	6-1/2" Drilling Jar	17602019	6.500	2.750		92.85	B 4-1/2" IF	9.94	
17	5x HWDP		5.000	3.000		49.30	B 4-1/2" IF	47.18	
								212.79	

Parameter	Min	Max	Ave
WOB (klbs) :	5	15	10
RPM (rpm) :	80	170	140
Flow (gpm) :	600	600	600
SPP (psi) :	2360	3260	2505

Activity	Hrs
Drilling :	19.50
Reaming :	3.50
Circ-Other :	4.50
Total :	27.50

BHA Weight	(lb)
in Air (Total) :	49170
in Mud (Total) :	42125
in Air (Bel Jars) :	38511
in Mud (Bel Jars) :	32993

Drill String	OD(in)	Len (m)

PERFORMANCE

	In	Out
Inclination (deg)	35.50	35.47
Azimuth (deg)	178.34	179.36

	Distance (m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :	0.00	0			0.40
Rotated :	173.00	9	0.30	0.30	
Total :	173.00	9	-0.01	0.18	0.10

COMMENTS

Tools Initialized: hrs (BRT) 02/02/10 @ 06:40
ABG - 1.45m Den - 21.29m ACAL 39.13 m
Svy - 8.69m Por - 24.49m
Gam - 11.36m PWD - 28.04m
Res - 13.68m Son - 32.32m

OBJECTIVES:

This BHA will be run to drill from the core point at 3309m to Prognosed TD at 3620m intersecting the Target TL -60 holding inclination and direction as required for the target.

RESULTS:

This BHA has been run before and after the core point .Again from the outset this BHA suffered from stick -slip as it had done on the previous runs .The stick-slip seen was severe and varying parameters were adopted to try and mitigate it .From the core point at 3309m MD the parameters were 5-15K WOB with 120-170 RPM being the range with periods off bottom to allow the inertia out of the string before re-starting drilling .These parameters were modified almost continuously and at times 120-130 RPM and 10-15K WOB seemed to be the best for a while but was short lived and again severe stick -slip was seen .The rig heave during this was almost as much as the rig was designed for and the compensator seemed to struggle to keep up with the heave and only compounded the stick-slip as keeping a constant weight on bit was extremely difficult if not impossible.

At around 3430m MD the formation changed and the volcanic formations were coming in which not only gave the same stick-slip issues but was now coupled with vibration also .Once again parameters were changed and modified as necessary but it was only minimised as far as possible and not mitigated .ROP during this section was average 10m/hr and although the Geo-Pilot was run out of specification it made the run to TD at 3482m MD as advised by Geologist .The Subsequent trip out of the hole was good with just about 15k drag at some points but easily worked through.

HALLIBURTON

Sperry Drilling Services

LWD End of Well Report

For

Origin Energy Resources Ltd

Rockhopper-1 ST1

Rig:	**Kan Tan IV**
Field:	**Rockhopper-1 ST1**
Country:	**Australia**
Job No:	**AU-FE-0006791008**
Date:	**20 JAN 2010**

HALLIBURTON

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General Information

Company:	Origin Energy Resources Ltd
Rig:	Kan Tan IV
Well:	Rockhopper-1 ST1
Field:	Rockhopper
Lease Name:	
State:	Tasmania
County:	
Country:	Australia
API Number:	
Sperry Job Number:	AU-FE-0006791008
Job start date:	20-Jan-10
Job end date:	03-Feb-10
North reference:	Grid
Declination:	12.495 deg
Dip angle:	-70.395 deg
Total magnetic field:	60970 nT
Date of magnetic data:	01 December, 2009
Wellhead coordinates N:	39 deg. 47 min 34.18 sec South
Wellhead coordinates E:	145 deg. 26 min 21.47 sec East
Vertical section direction:	179.28 deg
Unit Number:	SSH-40
MWD Engineers:	J. Lau, T. Oborne, M. George
Company Representatives:	B. Houston
Company Geologist:	D. Archer, C. Matthews

Operational Overview

Sperry Drilling was contracted by Origin Energy Resources Ltd to provide Logging While Drilling (LWD) services for the drilling of Rockhopper-1 ST1. The well was drilled in permit T/18P by the Maersk MODU Kan Tan IV.

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

This section was drilled in seven bit runs using a Geopilot rotary steerable system (RSS) BHA together with a motor BHA.

LWD tools used in the RSS BHA comprised of the following :
Drillstring Dynamics (DDSr-DGR) 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 run for wellbore surveying.

MWD in the Motor BHA was directional only and consisted of PCDC for directional control.

In the first run, the motor BHA was picked and RIH but failed to find the cement plug. BHA was pulled to set another kick-off plug.
In the second run the motor BHA was picked up and drilled from 1990.0 to 2112.0 mMDRT. BHA was pulled to pickup the RSS BHA.
In the third run, while the RSS BHA was tested at the shallow depth, the PCDC inclination locked up and the BHA was tripped to change out PCDC.
The fourth run was RSS BHA with backup PCDC tool. The kick-off section was wiped from 1970.0m to 2112.0 mMDRT for logging data.. It was then drilled from 2112 mMDRT to 3158.0 mMDRT. POOH to due to RSS BHA LWD failure.
The fifth assembly was drilled from 3158.0m to 3196.0m MDRT. POOH for first coring run.
The sixth RSS assembly was wiped from 3169.0m to 3212.5 mMDRT to log the first core section. It was then drilled from 3212.5m to 3284.0m MDRTand POOH for second and third coring runs.
The seventh RSS assembly was wiped from 3212.5m to 3309.0m to log second and third core section. It was then drilled to TD at 3482.0m MDRT and pull out of hole for wireline logging.

Summary of MWD runs

Run No.	Bit No.	Hole Size (mm)	MWD Service	Start Depth (m)	End Depth (m)	Drill/Wipe Distance (m)	Run Start Date Time	Run End Date Time	BRT Hrs.	Oper. Hrs.	Circ. Hrs.	Max Temp. (degC)	Serv. Int.	Trip for MWD	Failure Type
100	1	216.00	DWD	0.000	0.000	0.000	07-Jan-10 22:30	08-Jan-10 12:30	14.00	14.000	2.330	0.00	No	No	
200	2	216.00	DWD	1990.000	2112.000	122.000	19-Jan-10 18:40	21-Jan-10 15:15	44.58	44.580	24.800	56.30	No	No	
300	3	216.00	Quad GP	2112.000	2112.000	0.000	21-Jan-10 18:02	21-Jan-10 22:00	3.97	3.970	0.830	0.00	Yes	Yes	PCD-C
400	4	216.00	Quad GP	2112.000	3158.000	1046.000	21-Jan-10 23:29	26-Jan-10 10:15	106.76	106.760	82.130	76.00	Yes	Yes	RLL
500	5	216.00	Quad GP	3158.000	3196.000	38.000	26-Jan-10 15:52	27-Jan-10 23:11	31.31	31.340	12.450	109.30	No	No	
600	6	216.00	Quad GP	3212.500	3283.000	70.500	29-Jan-10 11:36	30-Jan-10 18:16	30.66	30.660	12.260	86.00	No	No	
700	7	216.00	Quad GP	3309.000	3482.000	173.000	02-Feb-10 06:38	04-Feb-10 06:19	47.68	47.680	21.350	127.00	No	No	

HALLIBURTON | Sperry Drilling

Bitrun Summary

RUN TIME DATA

MWD Run	: 100	**Run Start**	: 07-Jan-10 22:30	**BRT Hrs**	: 14.00 hr	**Circ. Hrs**	: 2.33 hr
Rig Bit No	: 1	**Run End**	: 08-Jan-10 12:30	**Hole Size**	: 216.00 mm	**Oper. Hrs**	: 14.00 hr

DRILLING DATA

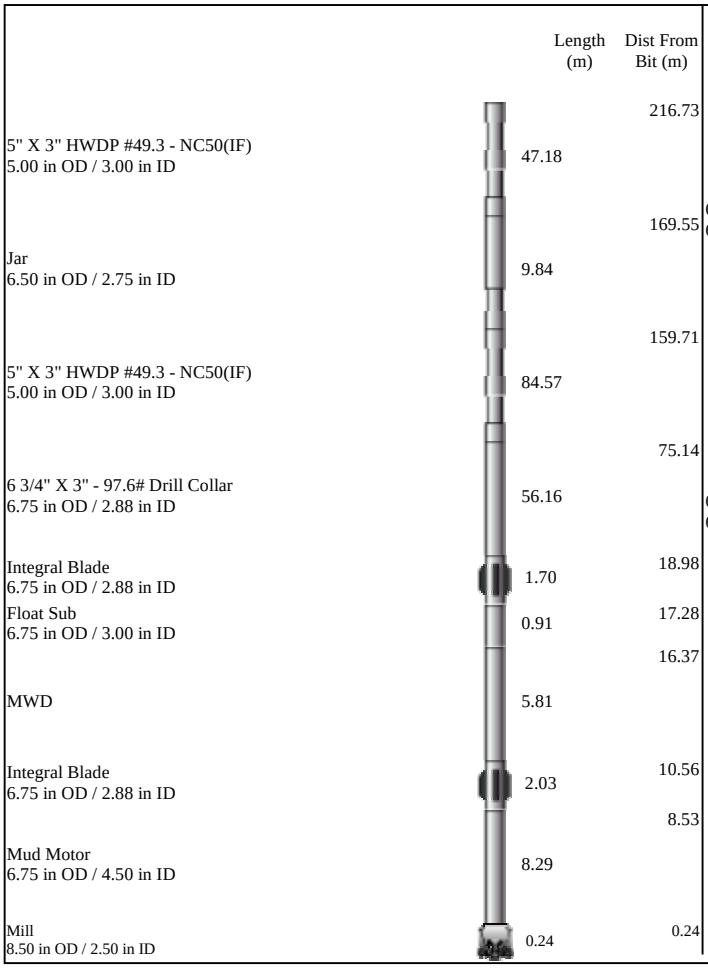
Start Depth	: 0.00 m	**Footage**	: 0.00 m	**Avg RPM**	: 0 rpm	**Avg ROP**	: 0.00 m/hr
End Depth	: 0.00 m	**Avg Flow Rate**	: 0.00 gpm	**Avg WOB**	: 0.0 klb	**Avg SPP**	: 0 psig
Drilling Hours	: 0.000 hr						

MUD DATA

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

MWD PERFORMANCE

Tool OD	: 8.00 in	**Type**	: DWD	**Min. Inc.**	: 0.00 deg	**Min. Inc. Depth**	: 0.000 m
Final Az.	: 0.00 deg	**Max Op. Press.**	: 0 psig	**Max Inc.**	: 0.00 deg	**Max Inc. Depth**	: 0.000 m
	MWD Real-time %	: 0 %		**MWD Recorded %**	: 0 %		



COMMENTS

Attempt to side track well, no cement plug found. POOH to set another kick-off plug.

HALLIBURTON | Sperry Drilling

Bitrun Summary

RUN TIME DATA

MWD Run	: 200	**Run Start**	: 19-Jan-10 18:40	**BRT Hrs**	: 44.58 hr	**Circ. Hrs**	: 24.80 hr
Rig Bit No	: 2	**Run End**	: 21-Jan-10 15:15	**Hole Size**	: 216.00 mm	**Oper. Hrs**	: 44.58 hr

DRILLING DATA

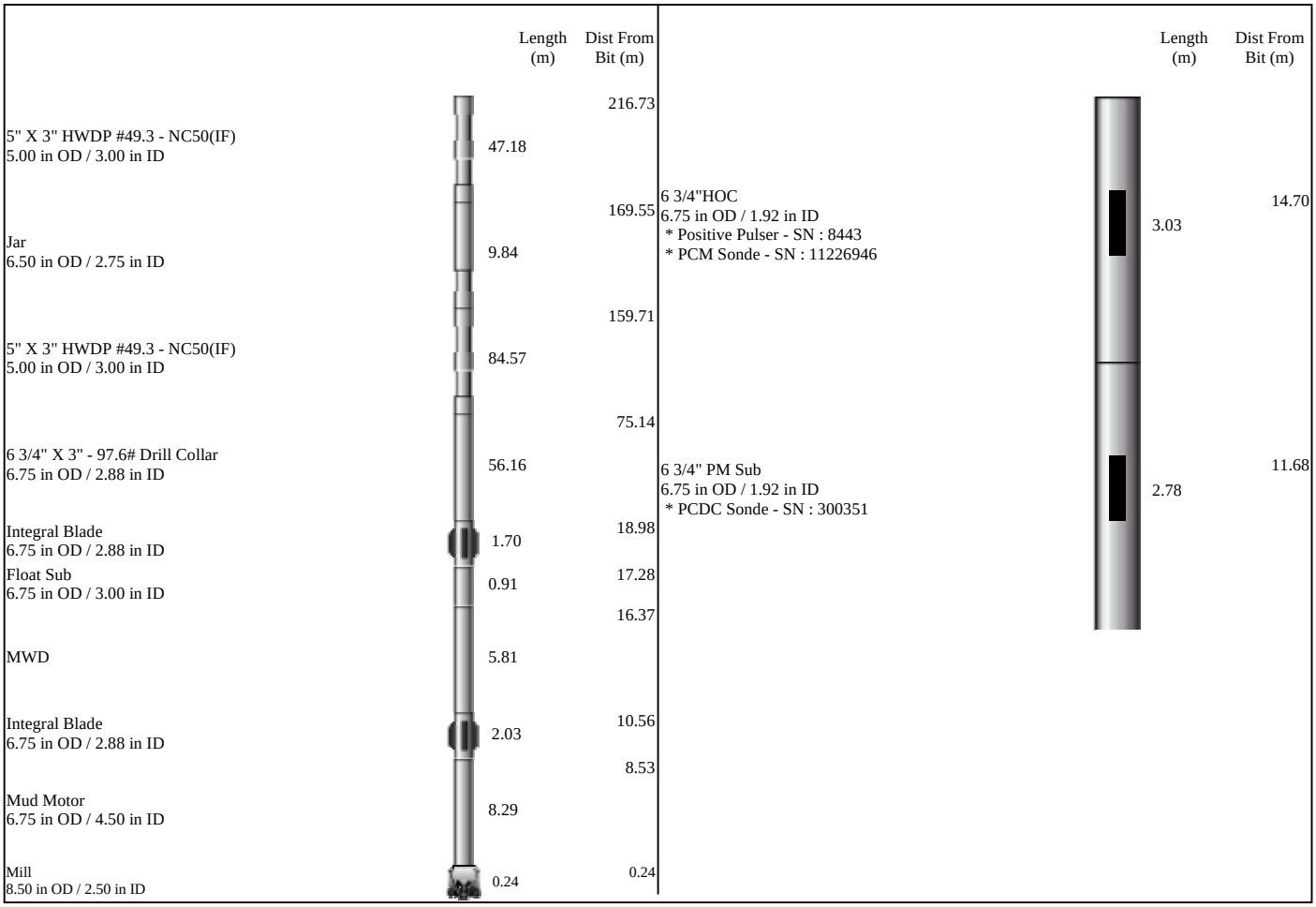
Start Depth	: 1990.00 m	**Footage**	: 122.00 m	**Avg RPM**	: 223 rpm	**Avg ROP**	: 6.70 m/hr
End Depth	: 2112.00 m	**Avg Flow Rate**	: 544.00 gpm	**Avg WOB**	: 13.3 klb	**Avg SPP**	: 1971 psig
Drilling Hours	: 18.200 hr						

MUD DATA

Mud Type	: Polymer						
Weight	: 9.30 ppg	**Viscosity**	: 68.00 spqt	**PV**	: 21 cP	**YP**	: 33.00 lhf2
Chlorides	: 36000.00 ppm	**Max Temp.**	: 56.30 degC	**% Solids**	: 3.30 %	**% Sand**	: 0.25 %
pH	: 10.50 pH	**Fluid Loss**	: 4 mptm	**% Oil**	: 0.00 %	**O:W**	: 0:93.8

MWD PERFORMANCE

Tool OD	: 6.75 in	**Type**	: DWD	**Min. Inc.**	: 1.12 deg	**Min. Inc. Depth**	: 1995.260 m
Final Az.	: 180.78 deg	**Max Op. Press.**	: 3351 psig	**Max Inc.**	: 9.89 deg	**Max Inc. Depth**	: 2097.430 m
	MWD Real-time %	: 100 %		**MWD Recorded %**	: 0 %		



COMMENTS

RIH and initiate kick off of Rockhopper-1ST1 from the well bore of Rockhopper-1 at 1990.0m MDRT and drill ahead steering as required.

HALLIBURTON | Sperry Drilling

Bitrun Summary

RUN TIME DATA

MWD Run	: 300	**Run Start**	: 21-Jan-10 18:02	**BRT Hrs**	: 3.97 hr	**Circ. Hrs**	: 0.83 hr
Rig Bit No	: 3	**Run End**	: 21-Jan-10 22:00	**Hole Size**	: 216.00 mm	**Oper. Hrs**	: 3.97 hr

DRILLING DATA

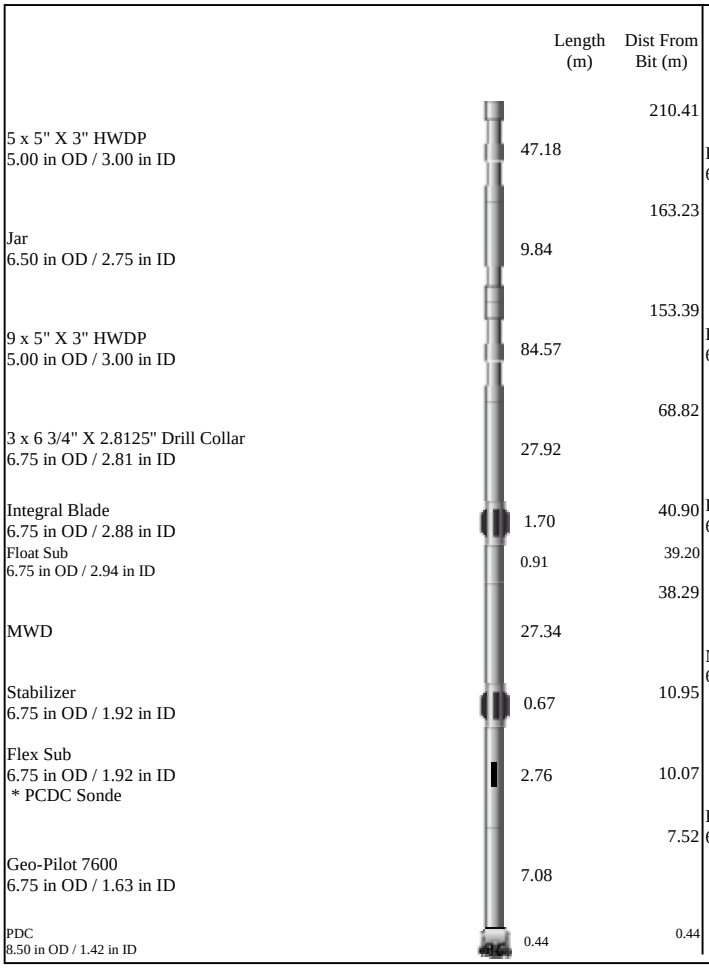
Start Depth	: 2112.00 m	**Footage**	: 0.00 m	**Avg RPM**	: 0 rpm	**Avg ROP**	: 0.00 m/hr
End Depth	: 2112.00 m	**Avg Flow Rate**	: 0.00 gpm	**Avg WOB**	: 0.0 klb	**Avg SPP**	: 0 psig
Drilling Hours	: 0.000 hr						

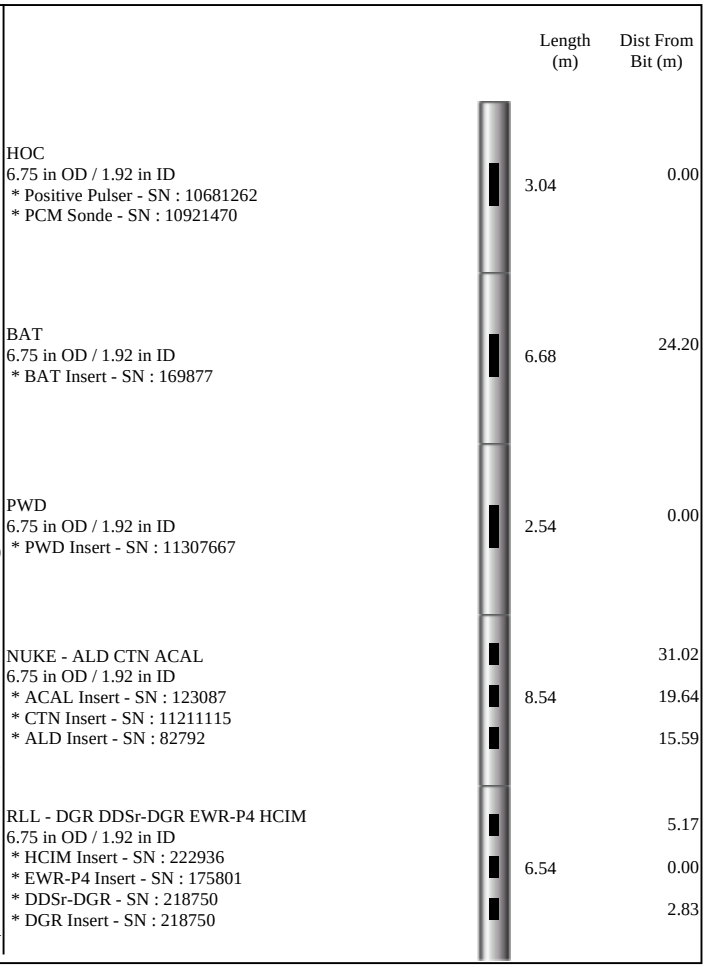
MUD DATA

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

MWD PERFORMANCE

Tool OD	: 6.75 in	**Type**	: Quad GP	**Min. Inc.**	: 0.00 deg	**Min. Inc. Depth**	: 0.000 m
Final Az.	: 0.00 deg	**Max Op. Press.**	: 0 psig	**Max Inc.**	: 0.00 deg	**Max Inc. Depth**	: 0.000 m
	MWD Real-time % : 0 %			**MWD Recorded %** : 0 %			





COMMENTS

RIH to drill 8 1/2" section, during SPT, PCDC locked up giving error readings for Gy and Gtotal. POOH to pick up backup tools.

Bitrun Summary

RUN TIME DATA

MWD Run	: 400	**Run Start**	: 21-Jan-10 23:29	**BRT Hrs**	: 106.76 hr	**Circ. Hrs**	: 82.13 hr
Rig Bit No	: 4	**Run End**	: 26-Jan-10 10:15	**Hole Size**	: 216.00 mm	**Oper. Hrs**	: 106.76 hr

DRILLING DATA

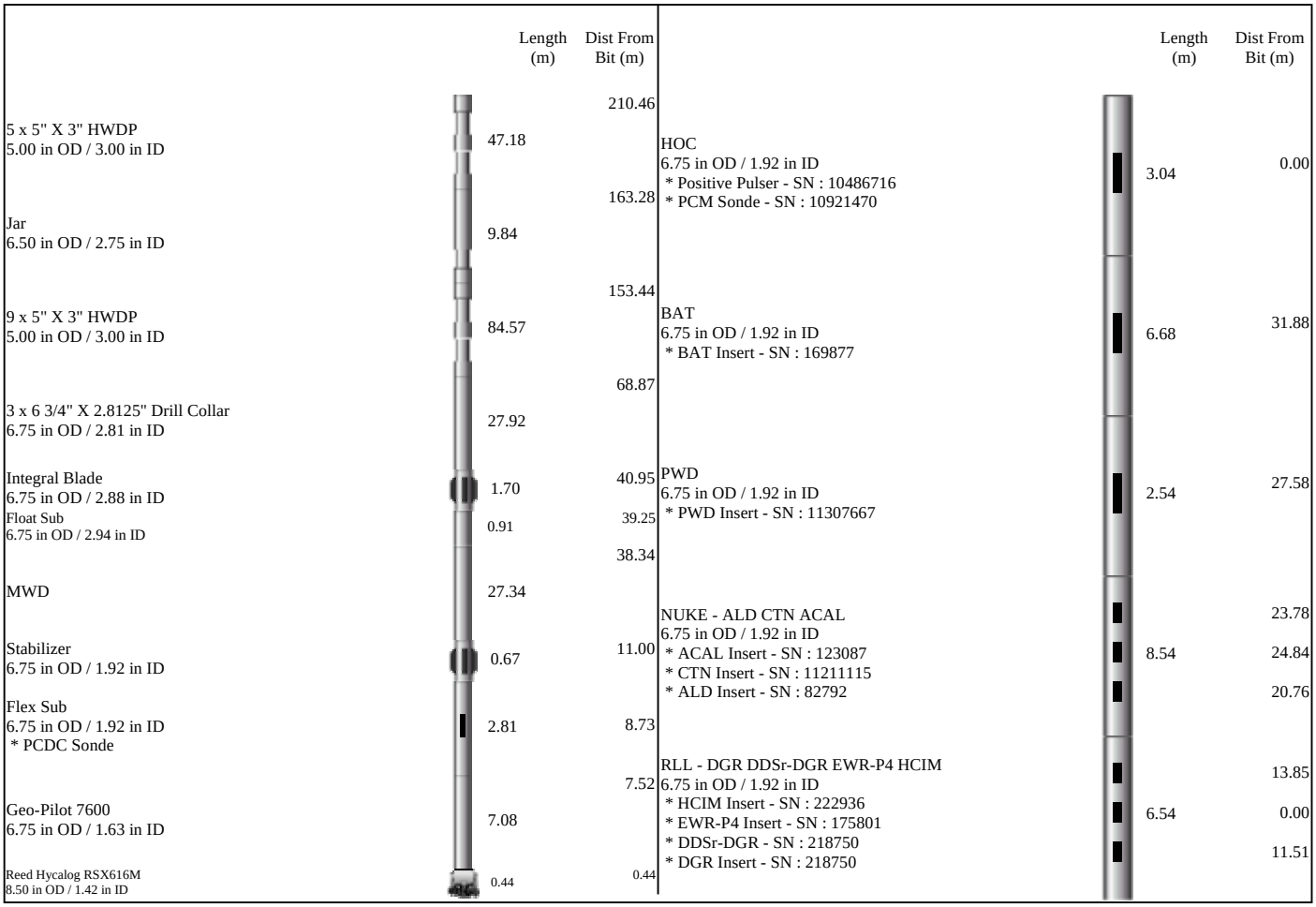
Start Depth	: 2112.00 m	**Footage**	: 1046.00 m	**Avg RPM**	: 108 rpm	**Avg ROP**	: 18.62 m/hr
End Depth	: 3158.00 m	**Avg Flow Rate**	: 574.00 gpm	**Avg WOB**	: 13.2 klb	**Avg SPP**	: 2141 psig
Drilling Hours	: 56.180 hr						

MUD DATA

Mud Type	: Polymer						
Weight	: 9.40 ppg	**Viscosity**	: 65.00 spqt	**PV**	: 19 cP	**YP**	: 30.00 lhf2
Chlorides	: 37000.00 ppm	**Max Temp.**	: 76.00 degC	**% Solids**	: 3.40 %	**% Sand**	: 0.20 %
pH	: 9.50 pH	**Fluid Loss**	: 4 mptm	**% Oil**	: 0.00 %	**O:W**	: 0:94

MWD PERFORMANCE

Tool OD	: 6.75 in	**Type**	: Quad GP	**Min. Inc.**	: 10.33 deg	**Min. Inc. Depth**	: 2101.740 m
Final Az.	: 177.66 deg	**Max Op. Press.**	: 4795 psig	**Max Inc.**	: 36.74 deg	**Max Inc. Depth**	: 2483.190 m
	MWD Real-time % : 100 %			**MWD Recorded %**	: 98 %		



COMMENTS

RIH with Quad Combo and GP assembly. Wipe previously drilled directional only section from 2001m to 2112m MDRT.
Drill new formation to 3158.0mMDRT. POOH for LWD failure.

Bitrun Summary

RUN TIME DATA

MWD Run	: 500	**Run Start**	: 26-Jan-10 15:52	**BRT Hrs**	: 31.31 hr	**Circ. Hrs**	: 12.45 hr
Rig Bit No	: 5	**Run End**	: 27-Jan-10 23:11	**Hole Size**	: 216.00 mm	**Oper. Hrs**	: 31.34 hr

DRILLING DATA

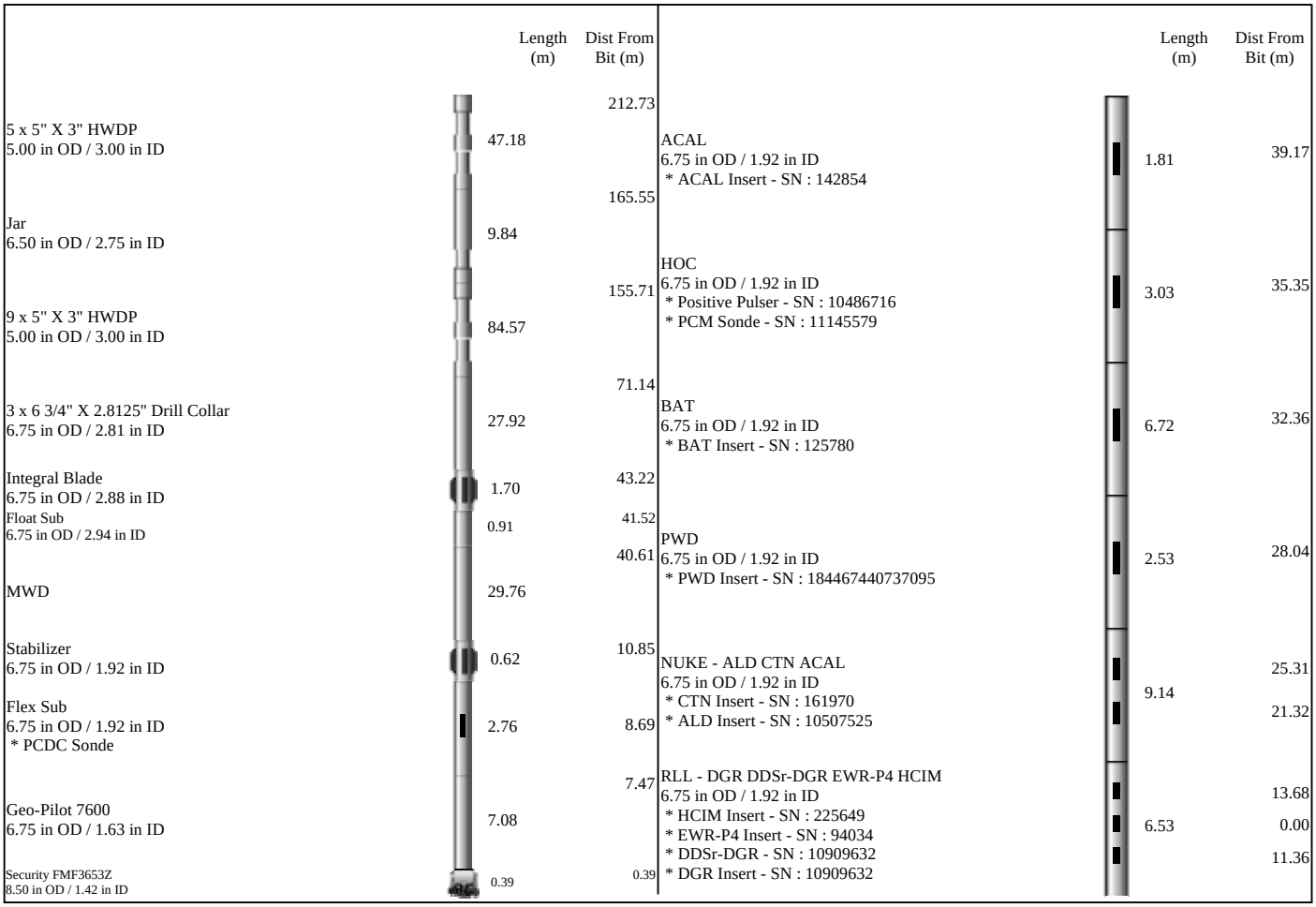
Start Depth	: 3158.00 m	**Footage**	: 38.00 m	**Avg RPM**	: 77 rpm	**Avg ROP**	: 9.74 m/hr
End Depth	: 3196.00 m	**Avg Flow Rate**	: 604.00 gpm	**Avg WOB**	: 9.9 klb	**Avg SPP**	: 2468 psig
Drilling Hours	: 3.900 hr						

MUD DATA

Mud Type	: Polymer						
Weight	: 9.40 ppg	**Viscosity**	: 63.00 spqt	**PV**	: 20 cP	**YP**	: 37.00 lhf2
Chlorides	: 37500.00 ppm	**Max Temp.**	: 109.30 degC	**% Solids**	: 3.40 %	**% Sand**	: 0.20 %
pH	: 9.00 pH	**Fluid Loss**	: 4 mptm	**% Oil**	: 0.00 %	**O:W**	: 0:94.0

MWD PERFORMANCE

Tool OD	: 6.75 in	**Type**	: Quad GP	**Min. Inc.**	: 35.32 deg	**Min. Inc. Depth**	: 3145.400 m
Final Az.	: 178.52 deg	**Max Op. Press.**	: 4859 psig	**Max Inc.**	: 35.70 deg	**Max Inc. Depth**	: 3185.270 m
	MWD Real-time % : 100 %			**MWD Recorded %**	: 100 %		



COMMENTS

Drill 8 1/2" Section from 3158.0 mMDRT to first core point at 3196.0 mMDRT. POOH to run core barrels.

Bitrun Summary

RUN TIME DATA

MWD Run	: 600	**Run Start**	: 29-Jan-10 11:36	**BRT Hrs**	: 30.66 hr	**Circ. Hrs**	: 12.26 hr
Rig Bit No	: 6	**Run End**	: 30-Jan-10 18:16	**Hole Size**	: 216.00 mm	**Oper. Hrs**	: 30.66 hr

DRILLING DATA

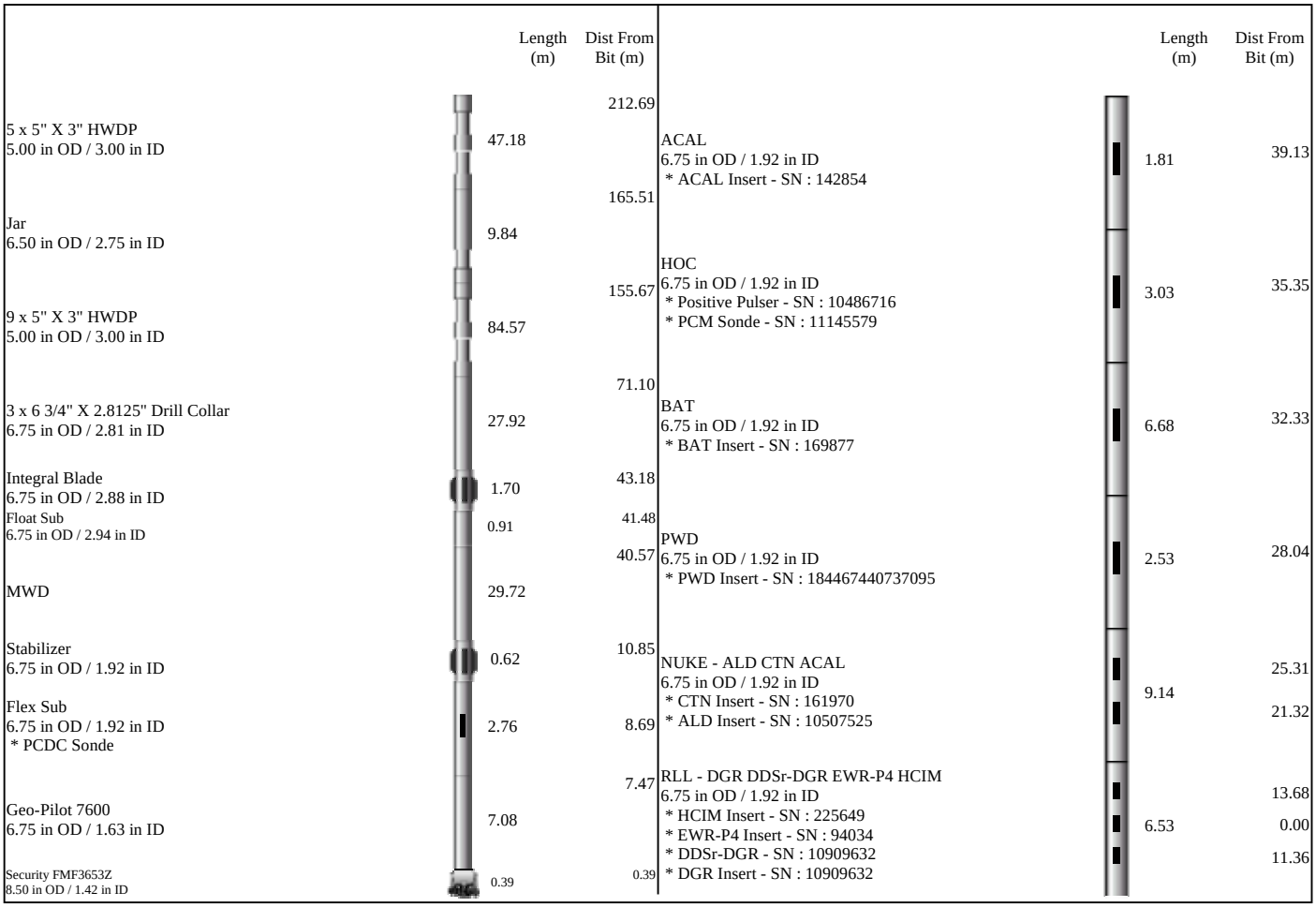
Start Depth	: 3212.50 m	**Footage**	: 70.50 m	**Avg RPM**	: 172 rpm	**Avg ROP**	: 11.79 m/hr
End Depth	: 3283.00 m	**Avg Flow Rate**	: 580.00 gpm	**Avg WOB**	: 12.1 klb	**Avg SPP**	: 2000 psig
Drilling Hours	: 5.980 hr						

MUD DATA

Mud Type	: Polymer						
Weight	: 9.35 ppg	**Viscosity**	: 62.00 spqt	**PV**	: 15 cP	**YP**	: 25.00 lhf2
Chlorides	: 38000.00 ppm	**Max Temp.**	: 86.00 degC	**% Solids**	: 2.90 %	**% Sand**	: 0.15 %
pH	: 9.00 pH	**Fluid Loss**	: 4 mptm	**% Oil**	: 0.00 %	**O:W**	: 0:94

MWD PERFORMANCE

Tool OD	: 6.75 in	**Type**	: Quad GP	**Min. Inc.**	: 35.56 deg	**Min. Inc. Depth**	: 3203.430 m
Final Az.	: 178.72 deg	**Max Op. Press.**	: 4940 psig	**Max Inc.**	: 35.91 deg	**Max Inc. Depth**	: 3234.730 m
	MWD Real-time % : 100 %			**MWD Recorded %**	: 100 %		



COMMENTS

Change out BAT sonic tool and RIH with the previous assembly to wipe core section and drill ahead to second core point. POOH to core.

Bitrun Summary

RUN TIME DATA

MWD Run	: 700	**Run Start**	: 02-Feb-10 06:38	**BRT Hrs**	: 47.68 hr	**Circ. Hrs**	: 21.35 hr
Rig Bit No	: 7	**Run End**	: 04-Feb-10 06:19	**Hole Size**	: 216.00 mm	**Oper. Hrs**	: 47.68 hr

DRILLING DATA

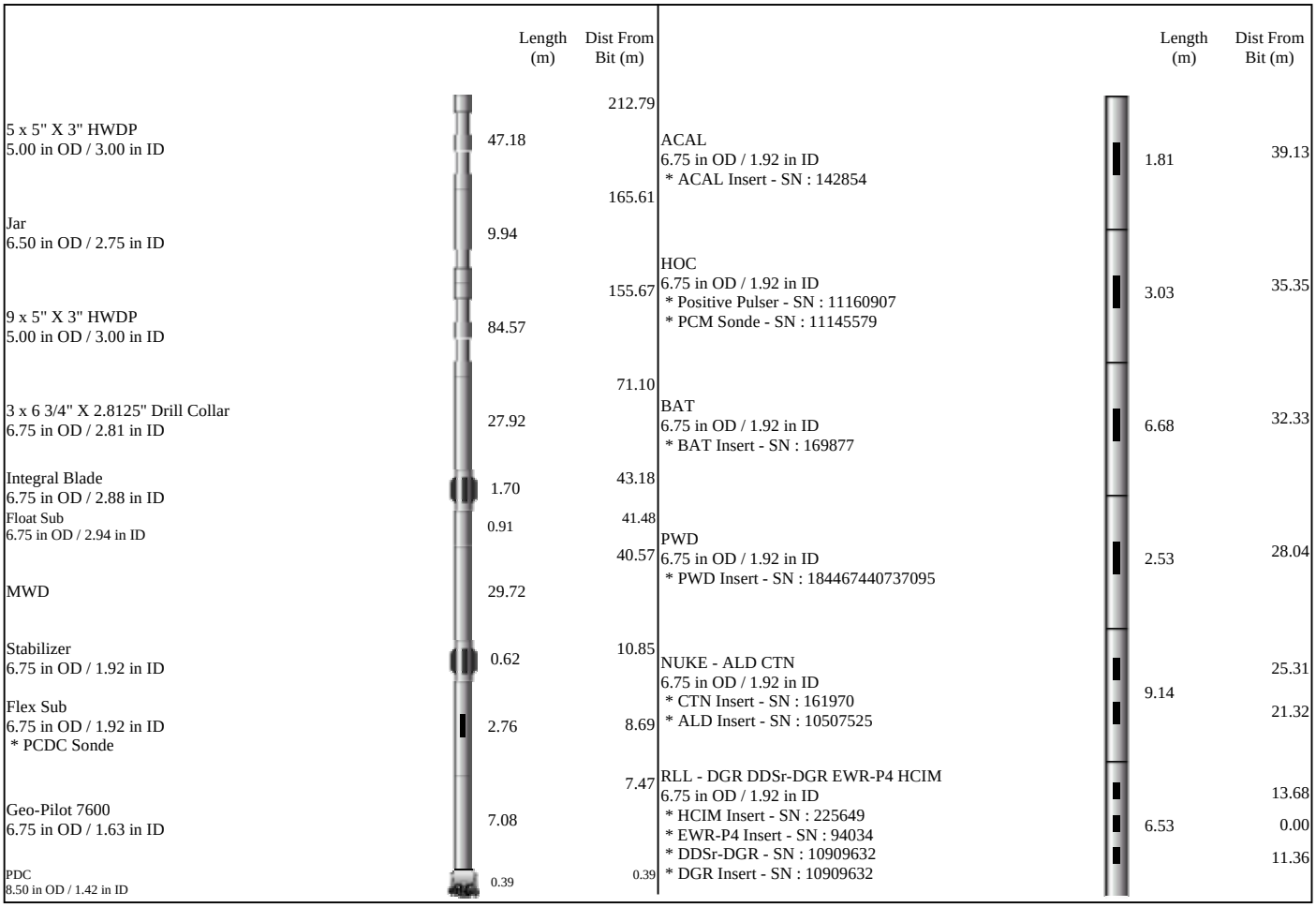
Start Depth	: 3309.00 m	**Footage**	: 173.00 m	**Avg RPM**	: 160 rpm	**Avg ROP**	: 11.09 m/hr
End Depth	: 3482.00 m	**Avg Flow Rate**	: 594.00 gpm	**Avg WOB**	: 12.7 klb	**Avg SPP**	: 2230 psig
Drilling Hours	: 15.600 hr						

MUD DATA

Mud Type	: Polymer						
Weight	: 9.40 ppg	**Viscosity**	: 73.00 spqt	**PV**	: 18 cP	**YP**	: 28.00 lhf2
Chlorides	: 38000.00 ppm	**Max Temp.**	: 127.00 degC	**% Solids**	: 3.50 %	**% Sand**	: 0.20 %
pH	: 9.00 pH	**Fluid Loss**	: 4 mptm	**% Oil**	: 0.00 %	**O:W**	: 0:100

MWD PERFORMANCE

Tool OD	: 6.75 in	**Type**	: Quad GP	**Min. Inc.**	: 35.03 deg	**Min. Inc. Depth**	: 3293.650 m
Final Az.	: 179.36 deg	**Max Op. Press.**	: 5225 psig	**Max Inc.**	: 36.10 deg	**Max Inc. Depth**	: 3439.040 m
	MWD Real-time % : 100 %			**MWD Recorded %**	: 100 %		



COMMENTS

RIH with the previous rotary and LWD assembly to wipe core section and drill ahead to TD. POOH to run wireline logs.

Directional Survey Data

RT- LAT=26.0m
Final survey projected to TD
All surveys are SAG corrected.

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)
100.300	0.00	0.00	100.300	0.000 N	0.000 E	0.000	0.00
242.360	0.22	278.10	242.360	0.040 N	0.270 W	-0.040	0.05
327.420	0.34	318.42	327.420	0.250 N	0.600 W	-0.260	0.08
356.380	0.16	310.14	356.380	0.340 N	0.690 W	-0.350	0.19
414.830	0.43	334.58	414.830	0.590 N	0.840 W	-0.600	0.15
502.130	0.25	356.62	502.130	1.080 N	1.000 W	-1.090	0.08
559.330	0.33	356.35	559.330	1.370 N	1.010 W	-1.380	0.04
645.930	0.22	77.08	645.920	1.650 N	0.870 W	-1.660	0.13
733.400	0.10	264.51	733.390	1.680 N	0.780 W	-1.690	0.11
819.330	0.13	204.11	819.320	1.590 N	0.890 W	-1.600	0.04
907.200	0.22	337.40	907.190	1.650 N	1.000 W	-1.660	0.11
956.770	0.15	112.45	956.760	1.710 N	0.980 W	-1.730	0.21
980.350	0.00	258.48	980.340	1.700 N	0.950 W	-1.710	0.19
1009.960	0.20	60.48	1009.950	1.730 N	0.900 W	-1.740	0.20
1039.180	0.22	57.43	1039.170	1.780 N	0.810 W	-1.790	0.02
1068.020	0.25	56.38	1068.010	1.850 N	0.710 W	-1.860	0.03
1096.690	0.09	334.71	1096.680	1.900 N	0.670 W	-1.910	0.26
1125.200	0.25	23.41	1125.190	1.980 N	0.650 W	-1.990	0.21
1153.520	0.31	18.55	1153.510	2.110 N	0.610 W	-2.120	0.07
1182.120	0.26	64.52	1182.110	2.210 N	0.520 W	-2.220	0.24
1210.690	0.31	28.33	1210.680	2.310 N	0.430 W	-2.310	0.19
1239.340	0.36	49.88	1239.330	2.430 N	0.320 W	-2.440	0.14
1298.150	0.40	29.51	1298.140	2.730 N	0.080 W	-2.730	0.07
1327.530	0.39	32.18	1327.520	2.900 N	0.020 E	-2.900	0.02
1356.770	0.31	47.29	1356.760	3.040 N	0.140 E	-3.040	0.12
1385.600	0.44	56.10	1385.590	3.160 N	0.290 E	-3.150	0.15
1412.810	0.48	46.30	1412.800	3.290 N	0.450 E	-3.290	0.10
1441.660	0.57	57.51	1441.650	3.450 N	0.660 E	-3.450	0.14
1470.690	0.57	43.73	1470.680	3.640 N	0.880 E	-3.630	0.14
1499.950	0.59	47.75	1499.930	3.840 N	1.100 E	-3.830	0.05
1529.470	0.61	56.99	1529.450	4.030 N	1.340 E	-4.010	0.10
1558.730	0.62	46.69	1558.710	4.220 N	1.590 E	-4.200	0.11
1587.900	0.64	49.02	1587.880	4.440 N	1.820 E	-4.420	0.03
1616.890	0.68	52.55	1616.870	4.650 N	2.080 E	-4.620	0.06
1645.390	0.64	67.47	1645.360	4.810 N	2.360 E	-4.780	0.19
1673.840	0.66	56.91	1673.810	4.960 N	2.650 E	-4.930	0.13
1702.240	0.67	57.55	1702.210	5.140 N	2.930 E	-5.110	0.01
1759.920	0.72	70.24	1759.890	5.450 N	3.550 E	-5.400	0.08
1789.630	0.84	75.16	1789.590	5.570 N	3.940 E	-5.520	0.14
1848.620	0.80	79.00	1848.580	5.750 N	4.760 E	-5.690	0.03
1876.780	0.90	76.63	1876.730	5.840 N	5.170 E	-5.780	0.11
1905.300	0.76	78.61	1905.250	5.930 N	5.570 E	-5.860	0.15

Directional Survey Data

Measured Depth (m)	Inclination (deg)	Direction (deg)	Vertical Depth (m)	Latitude (m)	Departure (m)	Vertical Section (m)	Dogleg (°/30m)
1934.760	0.91	50.85	1934.710	6.120 N	5.940 E	-6.040	0.43
1951.760	0.68	51.65	1951.710	6.270 N	6.130 E	-6.190	0.41
1968.420	0.69	57.75	1968.370	6.380 N	6.290 E	-6.300	0.13
1995.260	1.12	112.40	1995.200	6.370 N	6.670 E	-6.280	1.02
2020.270	4.56	164.56	2020.180	5.320 N	7.160 E	-5.230	4.77
2076.850	8.58	180.86	2076.380	1.080 S	7.700 E	1.170	2.33
2097.430	9.89	180.78	2096.700	4.380 S	7.650 E	4.470	1.91
2101.740	10.33	180.02	2100.940	5.130 S	7.640 E	5.230	3.20
2133.860	11.00	184.57	2132.500	11.070 S	7.400 E	11.160	1.00
2162.640	12.26	191.23	2160.690	16.800 S	6.580 E	16.890	1.92
2191.040	14.09	193.69	2188.350	23.120 S	5.180 E	23.180	2.02
2221.570	17.24	200.87	2217.740	30.960 S	2.690 E	30.990	3.63
2249.960	21.12	203.77	2244.550	39.580 S	0.870 W	39.560	4.22
2279.090	25.17	203.19	2271.330	50.080 S	5.430 W	50.010	4.18
2305.360	27.89	201.28	2294.830	60.940 S	9.860 W	60.810	3.26
2335.320	29.38	198.65	2321.130	74.430 S	14.760 W	74.240	1.95
2364.040	31.58	195.91	2345.880	88.340 S	19.070 W	88.100	2.72
2393.220	33.12	193.25	2370.530	103.450 S	22.990 W	103.160	2.16
2424.120	34.46	191.99	2396.210	120.220 S	26.740 W	119.880	1.47
2453.550	35.45	189.16	2420.330	136.790 S	29.830 W	136.410	1.94
2483.190	36.74	186.44	2444.280	154.090 S	32.200 W	153.680	2.08
2512.340	35.42	185.57	2467.840	171.160 S	33.990 W	170.720	1.46
2539.220	36.20	185.30	2489.640	186.820 S	35.480 W	186.360	0.89
2567.350	35.96	183.83	2512.380	203.330 S	36.800 W	202.850	0.96
2596.630	35.85	183.27	2536.090	220.470 S	37.870 W	219.980	0.35
2623.250	35.76	182.90	2557.680	236.020 S	38.700 W	235.520	0.26
2653.750	34.92	179.74	2582.560	253.650 S	39.110 W	253.140	1.98
2684.950	36.05	178.78	2607.970	271.760 S	38.880 W	271.250	1.21
2711.610	35.74	177.14	2629.570	287.380 S	38.320 W	286.880	1.14
2739.680	35.53	177.12	2652.380	303.720 S	37.500 W	303.220	0.22
2771.600	35.60	176.05	2678.350	322.250 S	36.400 W	321.760	0.59
2799.250	35.65	174.76	2700.820	338.300 S	35.110 W	337.830	0.82
2830.330	35.66	174.48	2726.070	356.340 S	33.410 W	355.890	0.16
2858.860	35.48	174.28	2749.280	372.850 S	31.780 W	372.420	0.23
2886.550	35.51	174.82	2771.830	388.860 S	30.260 W	388.450	0.34
2912.810	35.67	174.71	2793.180	404.080 S	28.860 W	403.680	0.20
2944.720	35.81	174.86	2819.080	422.640 S	27.170 W	422.260	0.16
2970.130	33.67	176.07	2839.960	437.070 S	26.020 W	436.710	2.65
3001.240	33.20	177.20	2865.920	454.180 S	25.010 W	453.830	0.75
3026.700	33.66	177.54	2887.170	468.190 S	24.370 W	467.850	0.59
3059.360	34.73	177.11	2914.180	486.530 S	23.510 W	486.200	1.01
3089.540	35.58	176.65	2938.860	503.880 S	22.570 W	503.560	0.88
3118.070	35.65	177.66	2962.050	520.470 S	21.740 W	520.160	0.62
3145.400	35.32	177.16	2984.310	536.320 S	21.020 W	536.020	0.48
3167.940	35.69	178.03	3002.660	549.400 S	20.480 W	549.100	0.83
3185.270	35.70	178.52	3016.730	559.510 S	20.170 W	559.210	0.50
3203.430	35.56	178.76	3031.490	570.080 S	19.920 W	569.790	0.33
3234.730	35.91	179.25	3056.900	588.360 S	19.600 W	588.070	0.43

Directional Survey Data

Measured Depth (m)	Inclination (deg)	Direction (deg)	Vertical Depth (m)	Latitude (m)	Departure (m)	Vertical Section (m)	Dogleg (°/30m)
3264.810	35.73	178.72	3081.290	605.960 S	19.290 W	605.670	0.36
3293.650	35.03	178.07	3104.800	622.650 S	18.820 W	622.370	0.83
3324.890	36.06	178.66	3130.220	640.810 S	18.310 W	640.530	1.04
3350.050	35.41	178.82	3150.640	655.500 S	17.980 W	655.220	0.78
3379.250	35.71	179.95	3174.400	672.480 S	17.800 W	672.200	0.74
3408.140	35.85	180.50	3197.840	689.370 S	17.870 W	689.090	0.36
3439.040	36.10	180.75	3222.840	707.520 S	18.070 W	707.240	0.28
3467.050	35.47	179.36	3245.560	723.900 S	18.080 W	723.610	1.10
3482.000	35.47	179.36	3257.740	732.570 S	17.990 W	732.290	0.00

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 179.28 DEGREES(GRID)
A TOTAL CORRECTION OF 11.50 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD
HORIZONTAL DISPLACEMENT(CLOSURE) AT 3482.00 METRES
IS 732.79 METRES ALONG 181.41 DEGREES (GRID)

Service Interrupt Report

MWD Run Number	: 400	**Time/Date of Failure**	: 21-Jan-10 19:45
Rig Bit Number	: 3	**Depth at time of Failure**	: 360.000 m
MWD Run start time/date	: 21-Jan-10 23:29	**Lost Rig Hours**	: hr
MWD Run end time/date	: 26-Jan-10 10:15		

RIG ACTIVITY

Shallow Pulse Test

DESCRIPTION OF FAILURE

PCDC inclination locked and giving invalid Gy and Gtotal readings.

ACTION TAKEN

Cycle pumps, mode switch and send downlinks to reset sensor. PCDC failed to respond. POOH to pick up backup PCD-C

OPERATION IMPACT

POOH to pick up backup PCD-C.

REASON FOR FAILURE

To be investigated

Service Interrupt Report

MWD Run Number	: 400	**Time/Date of Failure**	: 25-Feb-10 16:24
Rig Bit Number	: 4	**Depth at time of Failure**	: 3156.000 m
MWD Run start time/date	: 21-Jan-10 23:29	**Lost Rig Hours**	: hr
MWD Run end time/date	: 26-Jan-10 10:15		

RIG ACTIVITY

Drilling ahead to core point.

DESCRIPTION OF FAILURE

Tool lost all sensors below EWR, No PCDC, ABG, DGR and Geo-pilot.

ACTION TAKEN

Try to revive tool by pump cycles, send downlink commands in an attempt to take surveys, mode switch and reset sensors. All attempts failed to revive tool.

OPERATION IMPACT

POOH to change tools.

REASON FOR FAILURE

Intermittent communication bus failure.