

Sperry Drilling - HALLIBURTON

Directional Drilling End of Well Report



Australian Drilling Associates Pty Ltd

ADA

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



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SECTION 1

Well Report

Operator : **Origin Energy Resources Ltd**

Well : **Rockhopper-1**

Job Objectives:

Rockhopper-1 will test the crest of the Rockhopper-1 prospect. It is designed as a deviated well in the 8.5in hole section, drilled directionally parallel to the bounding fault in order to intersect all possible reservoirs that lie within the mapped closure in a near crestal position. The top of the primary target sands within the lower L. balmei are mapped as the P3 seismic marker or age equivalent to the Yolla Field top 2973 sand. Water depth is expected to be 76m.

Summary of Results:

The 26/36" and 17 1/2" hole sections were drilled with no directional hand on board the rig.

26/36" Hole Section from 102m to 156m.

Drilled 54m in 3.5 hrs, average 15.4m/hr. 20" casing was run without any dramas.

17 1/2" Hole Section from 156m to 966m.

Drilled 810m in 38.5hrs, average 21m/hr. Section was drilled using sea water with gel sweeps. MWD was set up for 1200 GPM, surveys were taken on the fly. While in the hole, decision to reduce flow rate to 1000 GPM which was too low for the MWD. The procedure to survey with the reduced flow rate, stop drilling and up the flow rate to 1200 for the survey, then back to 1000 GPM and continue drilling. A short dummy trip was conducted prior to POOH to run casing. BHA came out of the hole ok, casing was run, and cemented in place without incident.

12 1/4" Hole Section from 966m to 1972m.

Drilled 1006m in 50.25hr, average 20m/hr. Section was drilled with a closed mud system. Numerous occasions flow rate had to be reduce, at times stopped because of losses at the shakers. Started the nudge 3 stands early, rotary drilled to that point. Unable to build angle because of erratic torque generated from the bit. Pulled 15 stands wet, pumped slug and continue POOH. Last 2 joints of casing were circulated to bottom, from 1945m to 1964m, shoe setting depth. Casing was cemented in place without further incident.

8 1/2" Hole Section from 1972m to 3522m.

The Geo-Pilot assembly was run to drill out the shoe track in a time saving effort which failed. Drilled the plugs, unable to drill through the float shoe. After 8 1/2 hours, large quantities of metal at surface, POOH. Next a motor assembly with a tooth bit was used to finish drilling out, conducted the LOT and kicked the well off in a northerly direction prior to running the Geo-Pilot back in the hole. Back to bottom with the same GP assembly, which failed. Appeared that the RPM sensor was faulty. Tripped yet again, replacing the GP with the back up tool, which was utilized to drill the complete hole section. TD was initially call at 3475m then decided to drill ahead an additional +/- 180. After drilling 47m of basement, bit played out, TD at 3522m.

Extensive wireline logging program put into place. Second run, MDT unable to get to bottom. Made up a clean out assembly, one tight spot while RIH. Once on bottom, circulated and conditioned mud, reducing the mud weight to 9.4, POOH to run MDT and other wire line logs. No tight hole on the trip out.

During the second MDT run the tool became stuck so another wiper trip was performed allowing the MDT to be completed, followed by three additional logging runs.

2 7/8" tubing stinger on drill pipe was run to bottom to abandon the well, cement program as directed by the client.

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)	Drig hrs	Circ hrs
1	1		36.000	100	158	100	158	0.0	0.1	0	278	4	1
2	2		0.000	158	966	158	966	0.1	0.1	278	112	39	4
3	3	1	12.250	966	1972	966	1972	0.1	1.1	112	42	50	14
4	4	2	8.500	1972	1972	1972	1972	1.1	1.1	42	42	0	11
5	5	3	8.500	1972	2019	1972	2019	1.1	5.6	42	22	6	5
6	6	4	8.500	2019	2023	2019	2023	5.6	5.8	22	22	2	2
7	6rr1	5	8.500	2023	3522	2023	3192	5.8	41.3	22	358	124	14
8	5rr1		8.500	3522	3522	3192	3192	41.3	41.3	358	358	0	9
9	5rr2		8.500	3522	3522	3192	3192	41.3	41.3	358	358	0	14
10	?		2.875	3522	3522	3192	3192	41.3	41.3	358	358	0	2

Table 1 - BHA Summary

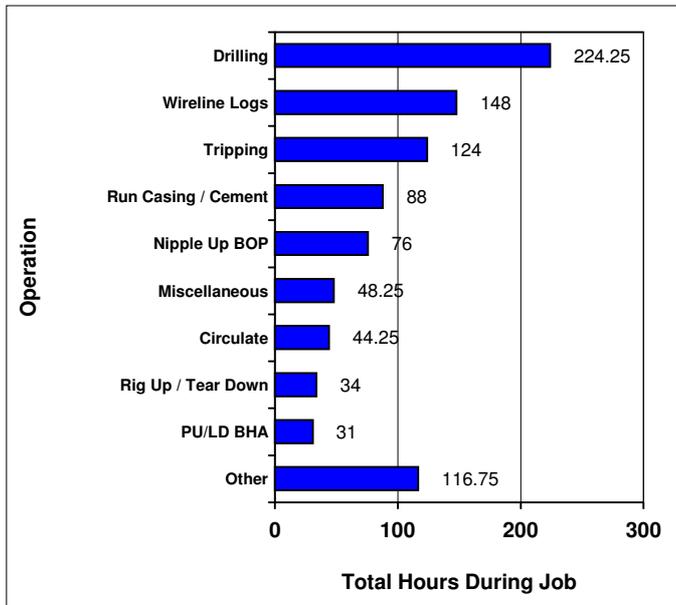
Motor Run #	Manufacturer	Type	Lobe	OD (in)	Gauge (in)	Bend (deg)	Adj	DLS (Ori) (%30m)	ROP (Ori) (m/hr)	ROP (Rot) (m/hr)
1	SSDS	SperryDrill	6/7	9.625	12.125	0.78	Y	0.00	6	21
2	SSDS	Geo Pilot	6/7	6.750	8.375	0.00	N	0.00		
3	SSDS	SperryDrill	6/7	6.750	8.375	1.15	Y	3.00	6	9
4	SSDS	Geo Pilot	6/7	6.750	8.375	0.00	N	0.00	0	2
5	SSDS	Geo Pilot	6/7	6.750	8.375	0.00	N	3.00	0	12

Table 2 - Motor Run Summary

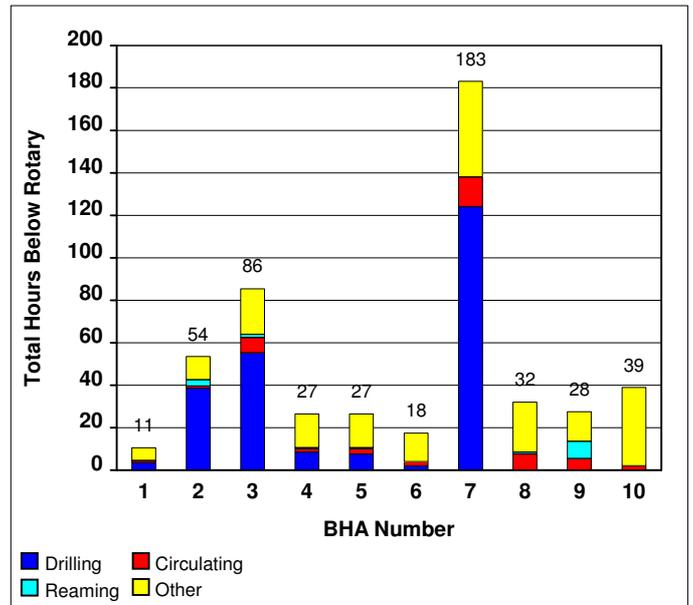
Bit #	Manufacturer	Style	OD (in)	Gge Len (in)	Nozzles (/32's)	TFA (in ²)	Dull Grades I O D L B G O R	Ftge (m)	Drlg hrs	ROP (m/hr)
1	Baker-Hughes	CR-1	26.000		3x18, 1x16	0.942	1-1-WT-A -1-I-NO-TD	58	3.50	16
2	Smith	XR+VCPS	17.500	0.000	3x22, 1x13	1.243	1-1-WT-A -E-I-NO-TD	808	38.50	21
3	Reed	RSX 616m	12.250	2.000	6x15	1.035	4-4-LT-N -X-I-CT-TD	1006	50.25	20
4	Security	FMF 3653Z	8.500	2.000	6x14	0.902	4-4-BT-A -X-I-CT-PR	0	0.00	
5	Hughes Christensen	GT 1	8.500	3.000	3x20	0.920	2-2-WT-A -E-1-NO-BHA	47	6.00	8
6	Security DBS	FMF 3755	8.500	7.000	4x16	0.785	0-0-NO-A -X-I-NO-DTF	4	2.00	2
6rr1	Security DBS	FMF3755	8.500	7.000	4x16	0.785	6-6-BT-A -X-I-NR-PR	1499	124.00	12
5rr1	Hughes Christensen	GT-1	8.500	3.000	3x20	0.920	2-2-WT-A -E-1-NO-LOG	0	0.00	
5rr2	Hughes Christensen	GT-1	8.500	3.000	3x20	0.920	2-2-WT-A -E-1-NO-LOG	0	0.00	

Table 3 - Bit Run Summary

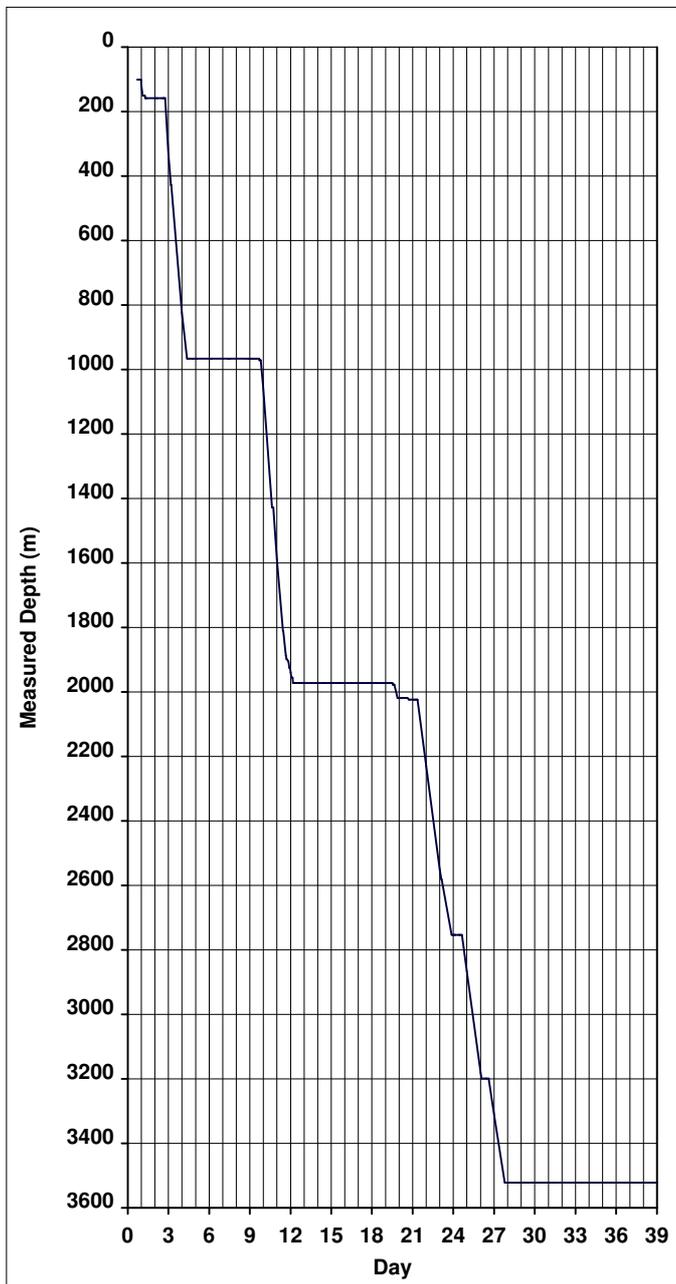
Hours by Operation Summary



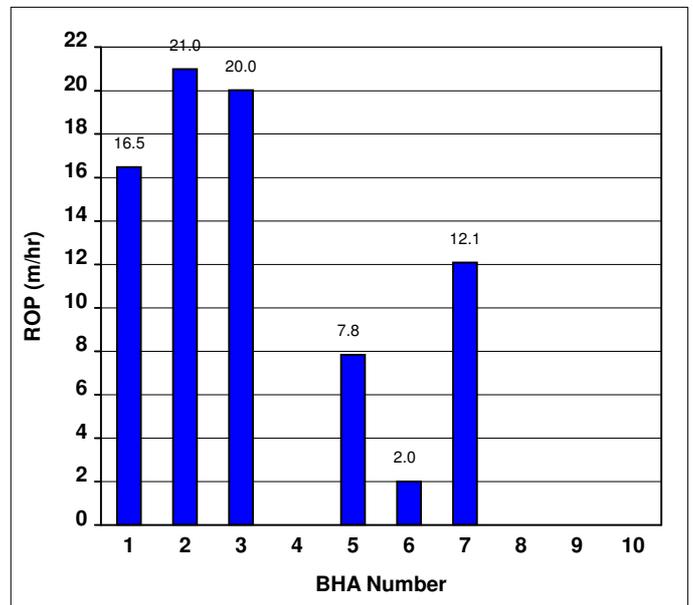
Hours per BHA Breakdown



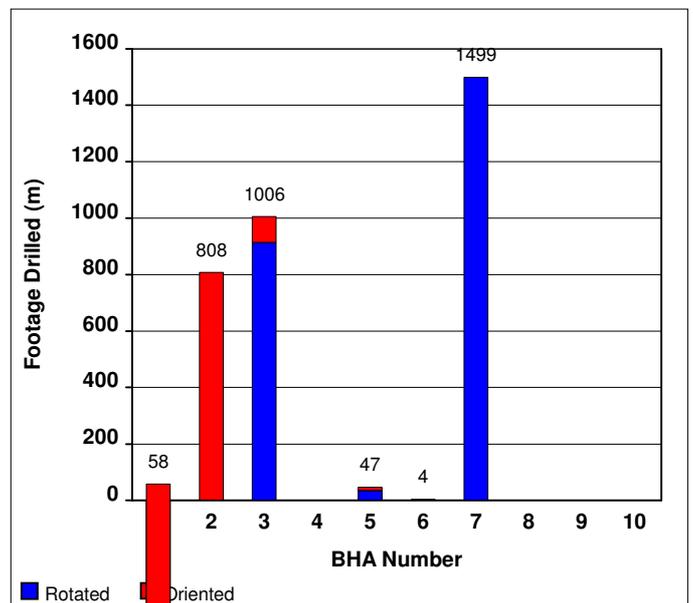
Days vs. Depth



Average Rate of Penetration per BHA



Footage per BHA



SECTION 2

Drilling Parameters

SECTION 3

Definitive Survey Report

Origin Energy Resources LTD

Rockhopper-1

Rockhopper-1

Rockhopper-1

Rockhopper-1

Design: Rockhopper-1 Definitive Survey

Sperry Drilling Services Combo Report

21 January, 2010

Well Coordinates: 5,594,071.42 N, 366,374.03 E (39° 47' 34.18" S, 145° 26' 21.47" E)

Water Depth: 74.30 m

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Centered on Well Rockhopper-1
Rotary Table @ 26.00m (Above MSL)

N

Grid

Modified SI

Version: 2003.21 Build: 43

HALLIBURTON

Design Report for Rockhopper-1 - Rockhopper-1 Definitive Survey

Measured Depth (m)	Inclination (°)	Azimuth (°)	TVD below System (m)	Vertical Depth (m)	Local Coordinates		Map Coordinates		Dogleg Rate (°/30m)	Vertical Section (m)	Comments
					Northing (m)	Easting (m)	Northing (m)	Easting (m)			
0.00	0.00	0.00	26.00	0.00	0.00 N	0.00 E	5,594,071.42	366,374.03	0.000	0.00	
100.30	0.00	0.00	-74.30	100.30	0.00 N	0.00 E	5,594,071.42	366,374.03	0.000	0.00	Torquay Group
242.36	0.22	278.10	-216.36	242.36	0.04 N	0.27 W	5,594,071.46	366,373.76	0.046	0.05	
327.42	0.34	318.42	-301.42	327.42	0.25 N	0.60 W	5,594,071.67	366,373.43	0.079	0.27	
356.38	0.16	310.14	-330.38	356.38	0.34 N	0.69 W	5,594,071.76	366,373.34	0.190	0.36	
414.83	0.43	334.58	-388.83	414.83	0.59 N	0.84 W	5,594,072.01	366,373.19	0.150	0.62	
502.13	0.25	356.62	-476.13	502.13	1.08 N	1.00 W	5,594,072.50	366,373.04	0.075	1.11	
559.33	0.33	356.35	-533.33	559.33	1.37 N	1.01 W	5,594,072.79	366,373.02	0.042	1.40	
645.93	0.22	77.08	-619.92	645.92	1.65 N	0.87 W	5,594,073.08	366,373.16	0.127	1.68	
733.40	0.10	264.51	-707.39	733.39	1.68 N	0.78 W	5,594,073.11	366,373.25	0.110	1.71	
819.33	0.13	204.11	-793.32	819.32	1.59 N	0.89 W	5,594,073.01	366,373.14	0.041	1.62	
907.20	0.22	337.40	-881.19	907.19	1.65 N	1.00 W	5,594,073.07	366,373.03	0.110	1.68	
956.77	0.15	112.45	-930.76	956.76	1.71 N	0.98 W	5,594,073.14	366,373.05	0.208	1.75	
961.00	0.12	112.45	-934.99	960.99	1.71 N	0.97 W	5,594,073.13	366,373.06	0.191	1.74	13 3/8" Casing
980.35	0.00	258.48	-954.34	980.34	1.70 N	0.95 W	5,594,073.13	366,373.08	0.191	1.73	
1,009.96	0.20	60.48	-983.95	1,009.95	1.73 N	0.90 W	5,594,073.15	366,373.13	0.203	1.76	
1,039.18	0.22	57.43	-1,013.17	1,039.17	1.78 N	0.81 W	5,594,073.21	366,373.22	0.024	1.81	
1,068.02	0.25	56.38	-1,042.01	1,068.01	1.85 N	0.71 W	5,594,073.27	366,373.32	0.032	1.87	
1,096.69	0.09	334.71	-1,070.68	1,096.68	1.90 N	0.67 W	5,594,073.33	366,373.36	0.265	1.92	
1,125.20	0.25	23.41	-1,099.19	1,125.19	1.98 N	0.65 W	5,594,073.40	366,373.38	0.213	2.00	
1,140.80	0.28	20.48	-1,114.79	1,140.79	2.05 N	0.63 W	5,594,073.47	366,373.40	0.068	2.07	Anga Group
1,153.52	0.31	18.55	-1,127.51	1,153.51	2.11 N	0.61 W	5,594,073.53	366,373.43	0.068	2.13	
1,182.12	0.26	64.52	-1,156.11	1,182.11	2.21 N	0.52 W	5,594,073.63	366,373.51	0.238	2.23	
1,210.69	0.31	28.33	-1,184.68	1,210.68	2.31 N	0.43 W	5,594,073.73	366,373.60	0.192	2.32	
1,239.34	0.36	49.88	-1,213.33	1,239.33	2.43 N	0.32 W	5,594,073.86	366,373.71	0.141	2.44	
1,298.15	0.40	29.51	-1,272.14	1,298.14	2.73 N	0.08 W	5,594,074.15	366,373.95	0.071	2.73	
1,327.53	0.39	32.18	-1,301.52	1,327.52	2.90 N	0.02 E	5,594,074.33	366,374.06	0.021	2.90	
1,356.77	0.31	47.29	-1,330.76	1,356.76	3.04 N	0.14 E	5,594,074.47	366,374.17	0.125	3.04	
1,385.60	0.44	56.10	-1,359.59	1,385.59	3.16 N	0.29 E	5,594,074.58	366,374.32	0.148	3.15	
1,412.81	0.48	46.30	-1,386.80	1,412.80	3.29 N	0.45 E	5,594,074.72	366,374.49	0.097	3.28	
1,441.66	0.57	57.51	-1,415.65	1,441.65	3.45 N	0.66 E	5,594,074.88	366,374.69	0.142	3.43	
1,470.69	0.57	43.73	-1,444.68	1,470.68	3.64 N	0.88 E	5,594,075.06	366,374.92	0.141	3.60	
1,499.95	0.59	47.75	-1,473.93	1,499.93	3.84 N	1.10 E	5,594,075.27	366,375.13	0.046	3.80	
1,529.47	0.61	56.99	-1,503.45	1,529.45	4.03 N	1.34 E	5,594,075.45	366,375.37	0.100	3.98	
1,558.73	0.62	46.69	-1,532.71	1,558.71	4.22 N	1.59 E	5,594,075.65	366,375.62	0.114	4.17	
1,587.90	0.64	49.02	-1,561.88	1,587.88	4.44 N	1.82 E	5,594,075.86	366,375.86	0.033	4.38	
1,616.89	0.68	52.55	-1,590.87	1,616.87	4.65 N	2.08 E	5,594,076.07	366,376.11	0.059	4.58	
1,645.39	0.64	67.47	-1,619.36	1,645.36	4.81 N	2.36 E	5,594,076.24	366,376.40	0.185	4.73	
1,673.84	0.66	56.91	-1,647.81	1,673.81	4.96 N	2.65 E	5,594,076.39	366,376.68	0.128	4.87	

Design Report for Rockhopper-1 - Rockhopper-1 Definitive Survey

Measured Depth (m)	Inclination (°)	Azimuth (°)	TVD below System (m)	Vertical Depth (m)	Local Coordinates		Map Coordinates		Dogleg Rate (°/30m)	Vertical Section (m)	Comments
					Northing (m)	Easting (m)	Northing (m)	Easting (m)			
1,702.24	0.67	57.55	-1,676.21	1,702.21	5.14 N	2.93 E	5,594,076.57	366,376.96	0.013	5.04	
1,759.92	0.72	70.24	-1,733.89	1,759.89	5.45 N	3.55 E	5,594,076.87	366,377.58	0.084	5.32	
1,789.63	0.84	75.16	-1,763.59	1,789.59	5.57 N	3.94 E	5,594,076.99	366,377.97	0.139	5.43	
1,825.30	0.82	77.44	-1,799.26	1,825.26	5.69 N	4.44 E	5,594,077.11	366,378.47	0.035	5.53	Demons Bluff
1,848.62	0.80	79.00	-1,822.58	1,848.58	5.75 N	4.76 E	5,594,077.18	366,378.79	0.035	5.59	
1,876.78	0.90	76.63	-1,850.73	1,876.73	5.84 N	5.17 E	5,594,077.27	366,379.20	0.113	5.67	
1,905.30	0.76	78.61	-1,879.25	1,905.25	5.93 N	5.57 E	5,594,077.36	366,379.60	0.150	5.74	
1,934.76	0.91	50.85	-1,908.71	1,934.71	6.12 N	5.94 E	5,594,077.54	366,379.97	0.434	5.91	
1,951.76	0.68	51.65	-1,925.71	1,951.71	6.27 N	6.13 E	5,594,077.69	366,380.16	0.406	6.06	
1,964.00	0.69	56.15	-1,937.95	1,963.95	6.35 N	6.25 E	5,594,077.78	366,380.28	0.132	6.14	9 5/8" Casing
1,968.42	0.69	57.75	-1,942.37	1,968.37	6.38 N	6.29 E	5,594,077.80	366,380.32	0.132	6.17	
1,992.64	3.64	23.88	-1,966.57	1,992.57	7.16 N	6.72 E	5,594,078.59	366,380.76	3.829	6.93	
2,006.90	4.80	20.69	-1,980.79	2,006.79	8.13 N	7.12 E	5,594,079.56	366,381.15	2.489	7.89	
2,047.71	7.43	22.90	-2,021.36	2,047.36	12.16 N	8.75 E	5,594,083.59	366,382.78	1.941	11.86	
2,067.50	9.24	19.53	-2,040.94	2,066.94	14.84 N	9.78 E	5,594,086.26	366,383.81	2.836	14.50	Eastern View Coal Measures
2,076.22	10.04	18.43	-2,049.54	2,075.54	16.22 N	10.25 E	5,594,087.64	366,384.28	2.836	15.87	
2,104.97	12.80	14.68	-2,077.72	2,103.72	21.68 N	11.85 E	5,594,093.10	366,385.88	2.981	21.27	
2,134.78	14.54	10.50	-2,106.68	2,132.68	28.55 N	13.37 E	5,594,099.98	366,387.40	2.013	28.09	
2,164.31	17.43	9.42	-2,135.07	2,161.07	36.56 N	14.77 E	5,594,107.99	366,388.80	2.951	36.05	
2,193.36	20.51	7.83	-2,162.54	2,188.54	45.90 N	16.18 E	5,594,117.32	366,390.21	3.225	45.33	
2,250.02	26.59	5.77	-2,214.45	2,240.45	68.37 N	18.81 E	5,594,139.79	366,392.84	3.248	67.70	
2,278.27	29.06	6.68	-2,239.44	2,265.44	81.48 N	20.24 E	5,594,152.90	366,394.27	2.661	80.75	
2,307.32	31.70	6.12	-2,264.50	2,290.50	96.08 N	21.87 E	5,594,167.50	366,395.90	2.742	95.29	
2,336.99	34.05	2.98	-2,289.41	2,315.41	112.13 N	23.14 E	5,594,183.55	366,397.17	2.935	111.28	
2,366.57	36.34	359.97	-2,313.59	2,339.59	129.16 N	23.56 E	5,594,200.59	366,397.59	2.913	128.30	
2,395.13	37.77	356.94	-2,336.38	2,362.38	146.36 N	23.09 E	5,594,217.78	366,397.12	2.436	145.50	
2,423.37	39.84	355.17	-2,358.39	2,384.39	164.01 N	21.87 E	5,594,235.44	366,395.90	2.495	163.18	
2,452.17	42.32	354.45	-2,380.09	2,406.09	182.86 N	20.15 E	5,594,254.28	366,394.18	2.630	182.08	
2,481.68	43.11	354.88	-2,401.78	2,427.78	202.79 N	18.29 E	5,594,274.21	366,392.32	0.856	202.06	
2,511.39	42.92	354.47	-2,423.50	2,449.50	222.97 N	16.41 E	5,594,294.39	366,390.44	0.341	222.29	
2,540.16	43.10	354.54	-2,444.54	2,470.54	242.51 N	14.53 E	5,594,313.93	366,388.56	0.194	241.88	
2,568.35	43.01	353.48	-2,465.14	2,491.14	261.65 N	12.52 E	5,594,333.07	366,386.55	0.776	261.07	
2,596.31	42.88	354.12	-2,485.60	2,511.60	280.58 N	10.46 E	5,594,352.01	366,384.49	0.488	280.07	
2,626.30	43.28	355.27	-2,507.51	2,533.51	300.98 N	8.57 E	5,594,372.40	366,382.60	0.882	300.52	
2,655.72	43.09	355.77	-2,528.96	2,554.96	321.05 N	7.00 E	5,594,392.47	366,381.03	0.399	320.63	
2,683.98	42.76	356.30	-2,549.65	2,575.65	340.25 N	5.67 E	5,594,411.67	366,379.70	0.519	339.87	
2,712.30	43.19	356.38	-2,570.37	2,596.37	359.52 N	4.43 E	5,594,430.94	366,378.46	0.459	359.16	
2,741.97	43.47	355.92	-2,591.96	2,617.96	379.83 N	3.07 E	5,594,451.25	366,377.10	0.427	379.51	
2,770.22	42.94	356.20	-2,612.55	2,638.55	399.12 N	1.74 E	5,594,470.55	366,375.77	0.599	398.84	

Design Report for Rockhopper-1 - Rockhopper-1 Definitive Survey

Measured Depth (m)	Inclination (°)	Azimuth (°)	TVD below System (m)	Vertical Depth (m)	Local Coordinates		Map Coordinates		Dogleg Rate (°/30m)	Vertical Section (m)	Comments
					Northing (m)	Easting (m)	Northing (m)	Easting (m)			
2,799.07	43.15	356.27	-2,633.63	2,659.63	418.77 N	0.44 E	5,594,490.20	366,374.47	0.224	418.52	
2,828.79	42.74	355.82	-2,655.39	2,681.39	438.97 N	0.95 W	5,594,510.40	366,373.08	0.517	438.76	
2,857.71	43.48	356.21	-2,676.50	2,702.50	458.69 N	2.33 W	5,594,530.11	366,371.70	0.816	458.51	
2,886.29	43.02	355.19	-2,697.32	2,723.32	478.22 N	3.80 W	5,594,549.64	366,370.24	0.878	478.07	
2,914.35	43.18	355.63	-2,717.81	2,743.81	497.33 N	5.33 W	5,594,568.75	366,368.70	0.364	497.22	
2,942.96	43.00	355.89	-2,738.70	2,764.70	516.82 N	6.78 W	5,594,588.24	366,367.26	0.265	516.75	
2,972.30	43.13	356.10	-2,760.13	2,786.13	536.80 N	8.18 W	5,594,608.23	366,365.86	0.198	536.77	
3,031.32	43.35	358.13	-2,803.13	2,829.13	577.18 N	10.21 W	5,594,648.60	366,363.82	0.716	577.20	
3,059.74	43.12	357.42	-2,823.84	2,849.84	596.63 N	10.96 W	5,594,668.05	366,363.07	0.568	596.66	
3,116.75	42.91	356.52	-2,865.52	2,891.52	635.47 N	13.02 W	5,594,706.89	366,361.01	0.341	635.55	
3,126.54	42.91	356.42	-2,872.69	2,898.69	642.12 N	13.43 W	5,594,713.55	366,360.60	0.205	642.21	RH-1 Top Reservoir Target (Rev 2.00)
3,175.85	42.94	355.93	-2,908.80	2,934.80	675.63 N	15.67 W	5,594,747.05	366,358.36	0.205	675.77	
3,232.85	42.61	354.97	-2,950.64	2,976.64	714.22 N	18.74 W	5,594,785.64	366,355.29	0.385	714.44	
3,261.40	42.02	354.71	-2,971.75	2,997.75	733.36 N	20.47 W	5,594,804.78	366,353.56	0.647	733.63	
3,290.95	42.18	356.09	-2,993.67	3,019.67	753.11 N	22.06 W	5,594,824.53	366,351.97	0.953	753.42	
3,348.87	42.01	356.27	-3,036.65	3,062.65	791.85 N	24.65 W	5,594,863.27	366,349.38	0.108	792.23	
3,377.12	41.91	356.10	-3,057.66	3,083.66	810.69 N	25.90 W	5,594,882.12	366,348.13	0.161	811.11	
3,405.96	41.76	356.10	-3,079.15	3,105.15	829.88 N	27.21 W	5,594,901.31	366,346.82	0.156	830.33	
3,425.00	41.82	356.78	-3,093.34	3,119.34	842.55 N	28.00 W	5,594,913.97	366,346.03	0.722	843.01	Seabed Volcanics
3,435.82	41.85	357.17	-3,101.41	3,127.41	849.75 N	28.38 W	5,594,921.18	366,345.65	0.722	850.23	
3,494.20	41.35	357.89	-3,145.06	3,171.06	888.48 N	30.05 W	5,594,959.90	366,343.98	0.355	888.99	RH-1 TD Target (Rev 2.00)
3,522.00	41.35	357.89	-3,165.93	3,191.93	906.83 N	30.73 W	5,594,978.25	366,343.30	0.000	907.35	Projected to TD

Design Annotations

Measured Depth (m)	Vertical Depth (m)	Local Coordinates		Comment
		+N/-S (m)	+E/-W (m)	
3,522.00	3,191.93	906.83	-30.73	Projected to TD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (m)
				+N/-S (m)	+E/-W (m)	
User	No Target (Freehand)	358.07	Slot	0.00	0.00	0.00

Design Report for Rockhopper-1 - Rockhopper-1 Definitive Survey**Survey tool program**

From (m)	To (m)	Survey/Plan	Survey Tool
100.30	100.30	Rockhopper-1 - 36" MWD Survey	MWD+SAG+SC
242.36	956.77	Rockhopper-1 - 17 1/2" MWD Survey	MWD+SAG+SC
980.35	1,951.76	Rockhopper-1 - 12 1/4" MWD Survey	MWD+SAG+SC
1,968.42	3,522.00	Rockhopper-1 - 8 1/2" MWD Survey	MWD+SAG+SC

Casing Details

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

Formation Details

Measured Depth (m)	Vertical Depth (m)	TVDSS (m)	Name	Lithology	Dip (°)	Dip Direction (°)
100.30	100.30	74.30	Torquay Group		0.00	
1,140.80	1,140.79	1,114.79	Anga Group		0.00	
1,825.30	1,825.26	1,799.26	Demons Bluff		0.00	
2,067.50	2,066.94	2,040.94	Eastern View Coal Measures		0.00	
3,425.00	3,119.34	3,093.34	Seabed Volcanics		0.00	

Design Targets

Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	()	()	()	()	()	()	()		
- Shape									

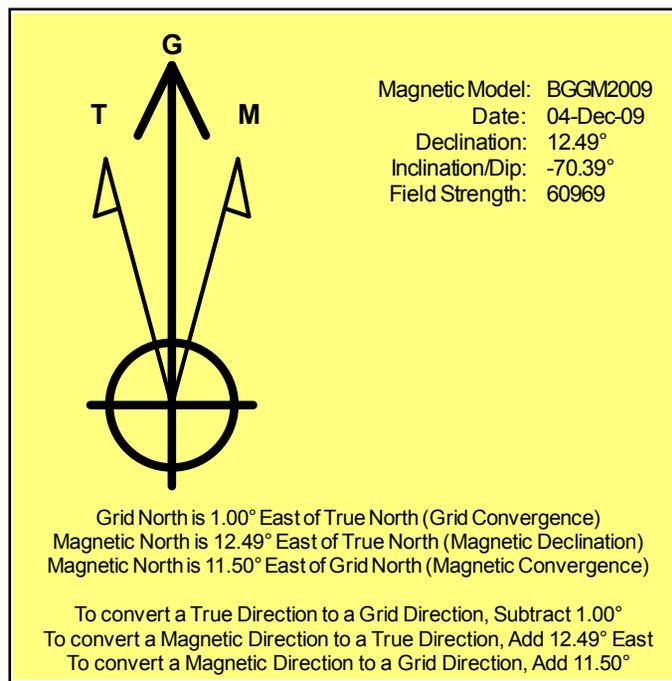
North Reference Sheet for Rockhopper-1 - Rockhopper-1 - Rockhopper-1

All data is in Meters unless otherwise stated. Directions and Coordinates are relative to Grid North Reference.
 Vertical Depths are relative to Rotary Table @ 26.00m (Above MSL). Northing and Easting are relative to Rockhopper-1
 Coordinate System is Universal Transverse Mercator, Zone 55S (144 E to 150 E) using datum GDA94, ellipsoid GRS 1980
 Projection method is Transverse Mercator (Gauss-Kruger)
 Central Meridian is 147° 0' 0.0000 E°, Longitude Origin:0° 0' 0.0000 E°, Latitude Origin:0° 0' 0.0000 N°
 False Easting: 500,000.00m, False Northing: 10,000,000.00m, Scale Reduction: 0.99981987

Grid Coordinates of Well: 5,594,071.42 m N, 366,374.03 m E
 Geographical Coordinates of Well: 39° 47' 34.18" S, 145° 26' 21.47" E
 Grid Convergence at Surface is: 1.00°

Based upon Minimum Curvature type calculations, at a Measured Depth of 3,522.00m
 the Bottom Hole Displacement is 907.35m in the Direction of 358.06° (Grid).

Magnetic Convergence at surface is: -11.50° (4 December 2009, , BGGM2009)



SECTION 4

A4 Plot

WELL DETAILS: Rockhopper-1

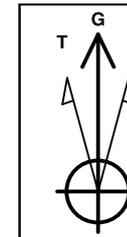
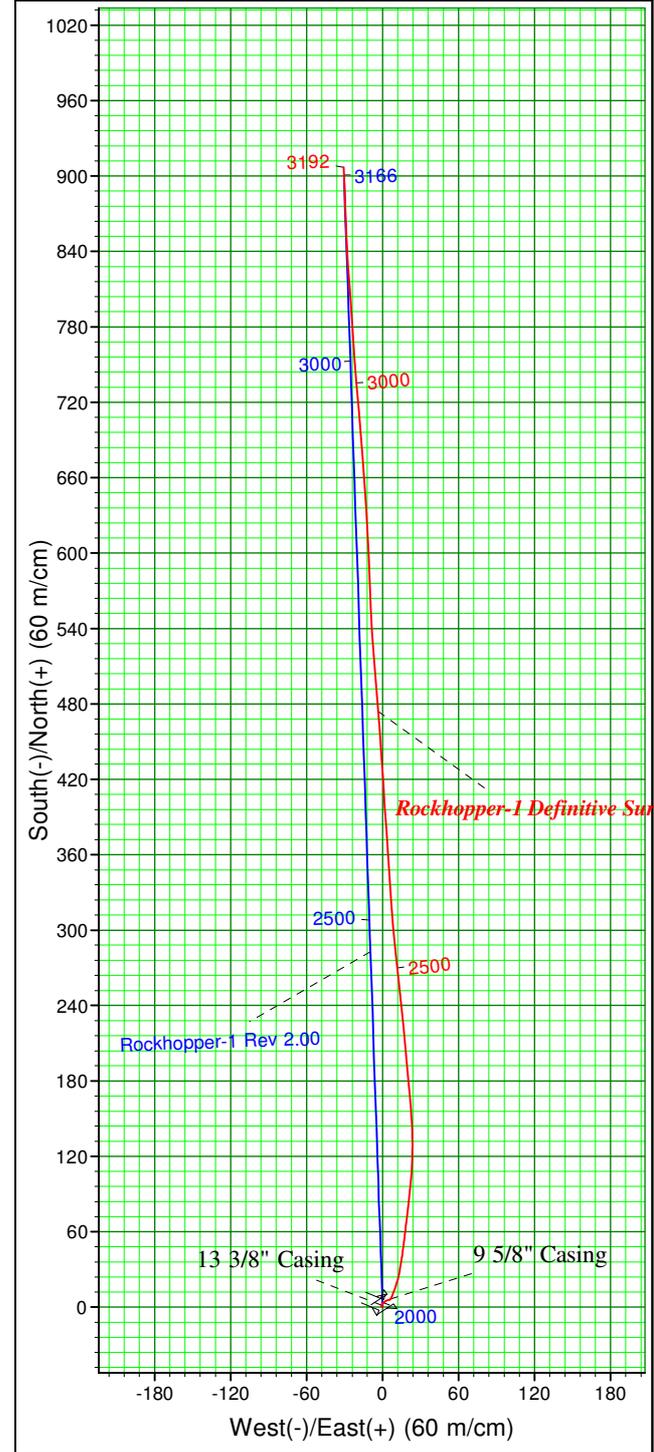
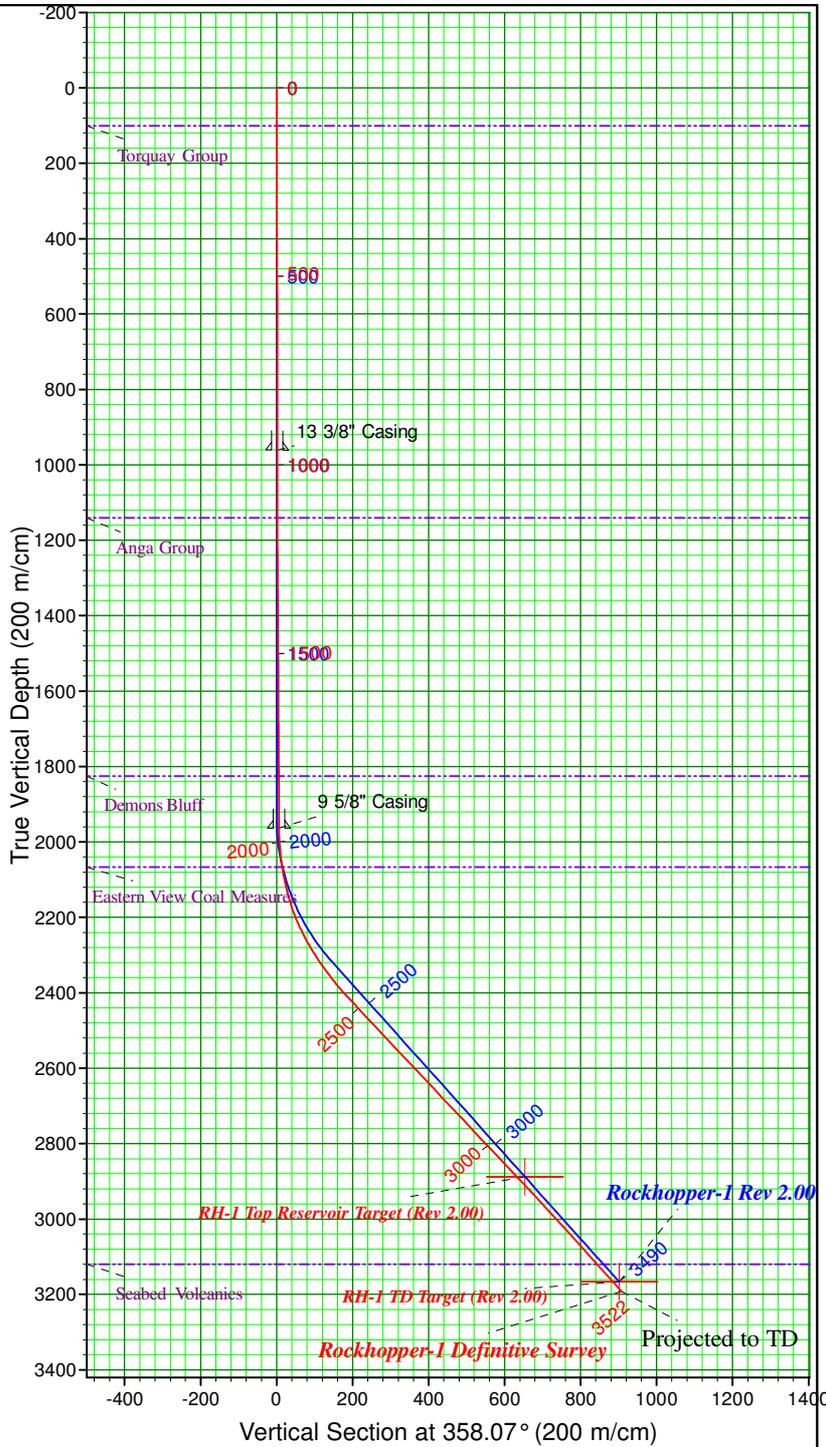
Water Depth: 74.30
 +N/-S +E/-W Northing Easting Latitude Longitude
 0.00 0.00 5594071.42 366374.039° 47' 34.1828 S 145° 26' 21.4660 E

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	961.0013	3/8" Casing	13.375
1963.951964.00	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



DRILLING SERVICES
Survey and Drilling Parameters

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

Country : Australia
Location : Bass Basin
Job # : AU-DD-0006714150

North Ref : Grid **Declination :** ° **VS Dir :** 358.07° (from Wellhead)

WELLBORE SURVEY										DRILLING PARAMETERS								Comment	
Measured Depth (m)	Incl Angle (deg)	Azi Dir (deg)	Vertical Depth (m)	Vertical Section (m)	Coordinates (m)		DLS (%/30m)	Build Rate (%/30m)	Turn Rate (%/30m)	WOB (klbs)	RPM	Flow Rate (gpm)	Stand Pipe (psi)	Orientation (m)		Tool Face (deg)	ROP (m/hr)		BHA No. (#)
0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00										Tieon
100.30	0.00	0.00	100.3	0.0	0.0	0.0	0.00	0.00	0.00									1	
242.36	0.22	278.10	242.4	0.0	0.0	-0.3	0.05	0.05	0.00									2	
327.42	0.34	318.42	327.4	0.3	0.3	-0.6	0.08	0.04	0.00									2	
356.38	0.16	310.14	356.4	0.4	0.3	-0.7	0.19	-0.19	0.00									2	
414.83	0.43	334.58	414.8	0.6	0.6	-0.8	0.15	0.14	0.00									2	
502.13	0.25	356.62	502.1	1.1	1.1	-1.0	0.08	-0.06	0.00									2	
559.33	0.33	356.35	559.3	1.4	1.4	-1.0	0.04	0.04	0.00									2	
645.93	0.22	77.08	645.9	1.7	1.7	-0.9	0.13	-0.04	0.00									2	
733.40	0.10	264.51	733.4	1.7	1.7	-0.8	0.11	-0.04	0.00									2	
819.33	0.13	204.11	819.3	1.6	1.6	-0.9	0.04	0.01	0.00									2	
907.20	0.22	337.40	907.2	1.7	1.7	-1.0	0.11	0.03	0.00									2	
956.77	0.15	112.45	956.8	1.7	1.7	-1.0	0.21	-0.04	0.00									2	
980.35	0.00	258.48	980.3	1.7	1.7	-0.9	0.19	-0.19	0.00	13	80	800	1300				19	3	
1009.96	0.20	60.48	1010.0	1.8	1.7	-0.9	0.20	0.20	0.00	17	70	780	1350				23	3	
1039.18	0.22	57.43	1039.2	1.8	1.8	-0.8	0.00	0.02	0.00	16	80	850	1420				29	3	
1068.02	0.25	56.38	1068.0	1.9	1.8	-0.7	0.03	0.03	0.00	17	100	880	1550				29	3	
1096.69	0.09	334.71	1096.7	1.9	1.9	-0.7	0.26	-0.17	0.00	17	100	900	1675				35	3	
1125.20	0.25	23.41	1125.2	2.0	2.0	-0.7	0.21	0.17	0.00	10	100	950	1825				29	3	
1153.52	0.31	18.55	1153.5	2.1	2.1	-0.6	0.07	0.06	0.00	15	100	900	1775				44	3	
1182.12	0.26	64.52	1182.1	2.2	2.2	-0.5	0.24	-0.05	0.00	17	100	925	1875				54	3	
1210.69	0.31	28.33	1210.7	2.3	2.3	-0.4	0.19	0.05	0.00	16	100	925	1900				39	3	
1239.34	0.36	49.88	1239.3	2.4	2.4	-0.3	0.14	0.05	0.00	7	100	925	1950				44	3	
1298.15	0.40	29.51	1298.1	2.7	2.7	-0.1	0.07	0.02	0.00									3	
1327.53	0.39	32.18	1327.5	2.9	2.9	0.0	0.00	-0.01	0.00	7	100	850	1630				39	3	
1356.77	0.31	47.29	1356.8	3.0	3.0	0.1	0.12	-0.08	0.00	8	100	850	1650				35	3	
1385.60	0.44	56.10	1385.6	3.1	3.2	0.3	0.15	0.14	0.00	10	100	930	1900				29	3	
1412.81	0.48	46.30	1412.8	3.3	3.3	0.5	0.10	0.04	0.00	10	100	930	1900				25	3	
1441.66	0.57	57.51	1441.6	3.4	3.5	0.7	0.14	0.09	0.00	10	100	900	1800				35	3	
1470.69	0.57	43.73	1470.7	3.6	3.6	0.9	0.14	0.00	0.00	20	100	900	1980				39	3	

WELLBORE SURVEY										DRILLING PARAMETERS								Comment	
Measured Depth (m)	Incl Angle (deg)	Azi Dir (deg)	Vertical Depth (m)	Vertical Section (m)	Coordinates		DLS (%30m)	Build Rate (%30m)	Turn Rate (%30m)	WOB (klbs)	RPM	Flow Rate (gpm)	Stand Pipe (psi)	Orientation		Tool Face (deg)	ROP (m/hr)		BHA No. (#)
					N/S (m)	E/W (m)								From (m)	To (m)				
1499.95	0.59	47.75	1499.9	3.8	3.8	1.1	0.05	0.02	0.00	17	100	950	2000				35	3	
1529.47	0.61	56.99	1529.5	4.0	4.0	1.3	0.10	0.02	0.00	13	100	950	2050				43	3	
1558.73	0.62	46.69	1558.7	4.2	4.2	1.6	0.11	0.01	0.00	12	100	950	2150				40	3	
1587.90	0.64	49.02	1587.9	4.4	4.4	1.8	0.03	0.02	0.00	10	100	950	2060				42	3	
1616.89	0.68	52.55	1616.9	4.6	4.7	2.1	0.06	0.04	0.00	10	100	950	2150				35	3	
1645.39	0.64	67.47	1645.4	4.7	4.8	2.4	0.19	-0.04	0.00	12	100	950	2060				35	3	
1673.84	0.66	56.91	1673.8	4.9	5.0	2.6	0.13	0.02	0.00	14	100	950	2190				35	3	
1702.24	0.67	57.55	1702.2	5.0	5.1	2.9	0.00	0.01	0.00	14	100	950	2230				40	3	
1759.92	0.72	70.24	1759.9	5.3	5.4	3.6	0.08	0.03	0.00	13	100	900	2100				32	3	
1789.63	0.84	75.16	1789.6	5.4	5.6	3.9	0.14	0.12	0.00	13	100	950	2140				30	3	
1848.62	0.80	79.00	1848.6	5.6	5.8	4.8	0.03	-0.02	0.00	12	100	950	2240				20	3	
1876.78	0.90	76.63	1876.7	5.7	5.8	5.2	0.11	0.11	0.00	5		950	2275	1869	1877	30R	10	3	
1905.30	0.76	78.61	1905.3	5.7	5.9	5.6	0.15	-0.15	0.00	5		950	2300	1877	1887	30R	3	3	
1934.76	0.91	50.85	1934.7	5.9	6.1	5.9	0.43	0.15	0.00	10		1000	2600	1897	1905	30R		3	
1951.76	0.68	51.65	1951.7	6.1	6.3	6.1	0.41	-0.41	0.00	10		1000	2600	1905	1929	30R	15	3	
1968.42	0.71	57.75	1968.4	6.2	6.4	6.3	0.14	0.05	0.00	10		965	2550	1929	1935	30R		3	
1992.64	3.64	23.88	1992.6	6.9	7.2	6.7	3.81	3.63	0.00	24		550	1750	1935	1952	30R	15	3	
2006.90	4.80	20.69	2006.8	7.9	8.1	7.1	2.49	2.44	-6.71	18	75	550	1820	1952	1956	30R	10	3	
2047.71	7.43	22.90	2047.4	11.9	12.2	8.8	1.94	1.93	1.62	15	140	530	1540	1956	1968	30R		3	
2076.22	10.04	18.43	2075.5	15.9	16.2	10.3	2.84	2.75	-4.70	10	100	565	1800	1968	1972	30R	8	5	
2104.97	12.80	14.68	2103.7	21.3	21.7	11.9	2.98	2.88	-3.91	13	125	550	1600	1981	1993	5L		5	
2134.78	14.54	10.50	2132.7	28.1	28.6	13.4	2.01	1.75	-4.21	15	125	550	1600	1993	1994	5L	13	5	
2164.31	17.43	9.42	2161.1	36.0	36.6	14.8	2.95	2.94	-1.10	15	130	550	1650				15	7	
2193.36	20.51	7.83	2188.5	45.3	45.9	16.2	3.22	3.18	-1.64	12	130	550	1680				22	7	
2250.02	26.59	5.77	2240.5	67.7	68.4	18.8	3.25	3.22	-1.09	10	140	550	1715				23	7	
2278.27	29.06	6.68	2265.4	80.8	81.5	20.2	2.66	2.62	0.97	8	120	550	1745				30	7	
2307.32	31.70	6.12	2290.5	95.3	96.1	21.9	2.74	2.73	-0.58	8	120	550	1810				18	7	
																	20	7	



DRILLING SERVICES
Survey and Drilling Parameters

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

Country : Australia
Location : Bass Basin
Job # : AU-DD-0006714150

North Ref : Grid **Declination :** ° **VS Dir :** 358.07° (from Wellhead)

WELLBORE SURVEY										DRILLING PARAMETERS								Comment	
Measured Depth (m)	Incl Angle (deg)	Azi Dir (deg)	Vertical Depth (m)	Vertical Section (m)	Coordinates (m)		DLS (%/30m)	Build Rate (%/30m)	Turn Rate (%/30m)	WOB (klbs)	RPM	Flow Rate (gpm)	Stand Pipe (psi)	Orientation (m)		Tool Face (deg)	ROP (m/hr)		BHA No. (#)
2336.99	34.05	2.98	2315.4	111.3	112.1	23.1	2.93	2.38	-3.17	8	120	580	2020				18	7	
2366.57	36.34	359.97	2339.6	128.3	129.2	23.6	2.91	2.32	-3.05	8	120	580	2000				16	7	
2395.13	37.77	356.94	2362.4	145.5	146.4	23.1	2.44	1.50	-3.18	10	120	580	2000				19	7	
2423.37	39.84	355.17	2384.4	163.2	164.0	21.9	2.49	2.20	-1.88	10	120	580	2000				18	7	
2452.17	42.32	354.45	2406.1	182.1	182.9	20.2	2.63	2.58	-0.75	10	120	580	2000				17	7	
2481.68	43.11	354.88	2427.8	202.1	202.8	18.3	0.86	0.80	0.44	10	120	580	2000				14	7	
2511.39	42.92	354.47	2449.5	222.3	223.0	16.4	0.34	-0.19	-0.41	14	130	580	2055				19	7	
2540.16	43.10	354.54	2470.5	241.9	242.5	14.5	0.19	0.19	0.07	14	120	580	2060				17	7	
2568.35	43.01	353.48	2491.1	261.1	261.6	12.5	0.78	-0.10	-1.13	14	120	580	2100				22	7	
2596.31	42.88	354.12	2511.6	280.1	280.6	10.5	0.49	-0.14	0.69	5	120	580	2100				12	7	
2626.30	43.28	355.27	2533.5	300.5	301.0	8.6	0.88	0.40	1.15	12	120	580	2150				11	7	
2655.72	43.09	355.77	2555.0	320.6	321.1	7.0	0.40	-0.19	0.51	12	120	580	2150				12	7	
2683.98	42.76	356.30	2575.7	339.9	340.3	5.7	0.52	-0.35	0.56	12	115	580	2150				19	7	
2712.30	43.19	356.38	2596.4	359.2	359.5	4.4	0.46	0.46	0.08	12	130	580	2190				14	7	
2741.97	43.47	355.92	2618.0	379.5	379.8	3.1	0.43	0.28	-0.47	12	130	580	2190				20	7	
2770.22	42.94	356.20	2638.5	398.8	399.1	1.7	0.60	-0.56	0.30	10	130	580	2200				15	7	
2799.07	43.15	356.27	2659.6	418.5	418.8	0.5	0.22	0.22	0.07	10	130	580	2200				14	7	
2828.79	42.74	355.82	2681.4	438.8	439.0	-0.9	0.52	-0.41	-0.45	10	150	580	2210				15	7	
2857.71	43.48	356.21	2702.5	458.5	458.7	-2.3	0.82	0.77	0.40	10	150	580	2210				14	7	
2886.29	43.02	355.19	2723.3	478.1	478.2	-3.8	0.88	-0.48	-1.07	12	150	585	2235				15	7	
2914.35	43.18	355.63	2743.8	497.2	497.3	-5.3	0.36	0.17	0.47	12	155	585	2235				18	7	
2942.96	43.00	355.89	2764.7	516.8	516.8	-6.8	0.27	-0.19	0.27	12	155	585	2230				18	7	
2972.30	43.13	356.10	2786.1	536.8	536.8	-8.2	0.20	0.13	0.21	10	165	580	2245				16	7	
3031.32	43.35	358.13	2829.1	577.2	577.2	-10.2	0.72	0.11	1.03	10	140	580	2450				14	7	
3059.74	43.12	357.42	2849.8	596.7	596.6	-10.9	0.57	-0.24	-0.75	10	140	600	2600				17	7	
3116.75	42.91	356.52	2891.5	635.5	635.5	-13.0	0.34	-0.11	-0.47	10	140	600	2560				17	7	
3175.85	42.94	355.93	2934.8	675.8	675.6	-15.7	0.20	0.02	-0.30	11	150	600	2570				18	7	
3232.85	42.61	354.97	2976.6	714.4	714.2	-18.7	0.38	-0.17	-0.51	10	140	600	2600				14	7	
3261.40	42.02	354.71	2997.7	733.6	733.4	-20.5	0.65	-0.62	-0.27	10	140	600	2600				22	7	
3290.95	42.18	356.09	3019.7	753.4	753.1	-22.0	0.95	0.16	1.40	10	150	600	2610				12	7	
3348.87	42.01	356.27	3062.7	792.2	791.9	-24.6	0.11	-0.09	0.09	10	160	600	2625				13	7	

SECTION 6

BHA Data

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DRILLING SERVICES

BHA Report

Operator : Origin Energy Resources Ltd
 Well : Rockhopper-1
 Country : Australia
 Location : Bass Basin
 Rig : Kan Tan IV
 Job # : AU-DD-0006714150

BHA# 1

BHA# 1 : Date In 30/11/2008 MD In (m) : 100 TVD In (m) : 100 Date Out 1/12/2009 MD Out (m): 158 TVD Out (m): 158

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in ²)	Dull Condition
1	26.000	Baker-Hughes	CR-1	6077163	3x18, 1x16	0.942	1-1-WT-A -1-I-NO-TD

MOTOR DATA

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

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	Hughes CR-1 26" Mill Tooth Bit	6077163	26.000	4.000	17.500		P 7-5/8" Reg	0.54	
2	36" Hole Opener	703394	36.000	4.000	36.000		B 7-5/8" Reg	2.27	
3	9-1/2" Bit Sub w/Float	W'ford	9.500	3.000		217.48	B 7-5/8" Reg	1.20	
4	9-1/2" Ander-Drift Inc sub	Reed	9.500	3.000		217.48	B 7-5/8" Reg	3.07	
5	X-over Sub 7-5/8" R <>6-5/8" R	Rig	8.500	3.000		169.30	B 6-5/8" Reg	1.15	
6	6x 8" Spiral Drill collar	Rig	8.000	2.810		150.00	B 6-5/8" Reg	56.51	
7	X-over Sub 6-5/8" R<>4-1/2"IF	Rig	6.750	2.813		100.77	B 4-1/2" IF	1.09	
8	9x 5" HWDP		5.000	3.000		49.30	B 4-1/2" IF	84.75	
								150.58	

Parameter	Min	Max	Ave	Activity	Hrs	BHA Weight (lb)	Drill String	OD(in)	Len (m)
WOB (klbs) :				Drilling :	3.50	in Air (Total) : 74209	DP(S)-NC50(XH)-19.50#	5.000	7
RPM (rpm) :				Reaming :	0.00	in Mud (Total) : 68352			
Flow (gpm) :				Circ-Other :	1.00	in Air (Bel Jars) : 0			
SPP (psi) :				Total :	4.50	in Mud (Bel Jars) : 0			

PERFORMANCE

	In	Out	Distance(m)	ROP (m/hr)	Build (%/30m)	Turn (%/30m)	DLS (%/30m)
Inclination (deg)	0.00	0.09	Oriented : 865.70	0			0.00
Azimuth (deg)	0.00	278.10	Rotated : -808.00	0	0.00	0.00	
			Total : 57.70	16	0.05	0.00	0.05

COMMENTS

Operator : Origin Energy Resources Ltd

Well : Rockhopper-1

Country : Australia

Location : Bass Basin

Rig : Kan Tan IV

Job # : AU-DD-0006714150

BHA# 1

OBJECTIVES:

Spud well, drill 26" hole and open to 36" in one operation to section TD.

RESULTS:

Drilled to TD, 100.3m to 158m, 41m @ 14.7m/hr.

RECOMMENDATIONS:

No changes required.

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DRILLING SERVICES

BHA Report

Operator : Origin Energy Resources Ltd
 Well : Rockhopper-1
 Country : Australia
 Location : Bass Basin
 Rig : Kan Tan IV
 Job # : AU-DD-0006714150

BHA# 2

BHA# 2 : Date In 2/12/2009 MD In (m) : 158 TVD In (m) : 158 Date Out 4/12/2009 MD Out (m): 966 TVD Out (m): 966

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in ²)	Dull Condition
2	17.500	Smith	XR+VCPS	PN2676	3x22, 1x13	1.243	1-1-WT-A -E-I-NO-TD

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (psi)	Cum Circ Hrs
2								

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	Smith XR+VCPS 17-1/2" Mill Tooth Bit	PN2676	17.500	3.000	17.500	795.63	B 7-5/8" Reg	0.44	
2	9-1/2" Bit Sub w/Float	711621	9.500	3.000		217.48	B 7-5/8" Reg	0.84	
3	9-1/2" Non Mag HOC - 1200 DGWD w/Dir	46811	9.500	3.000		217.48	B 7-5/8" Reg	9.77	
4	17-1/2" Integral Blade Stabilizer	SBD2709	9.000	3.000	17.500	192.72	B 7-5/8" Reg	2.47	12.05
5	1x 9-1/2" Spiral Drill collar	Rig	9.500	3.000		217.00	B 7-5/8" Reg	9.27	
6	17-1/2" Integral Blade Stabilizer	207A97	9.500	3.000	17.500	217.48	B 7-5/8" Reg	2.73	23.79
7	X-over Sub 7-5/8"R<>6-5/8"R	95	9.500	3.000		217.48	B 6-5/8" Reg	1.15	
8	9x 8" Spiral Drill collar	Rig	8.000	2.810		150.00	B 6-5/8" Reg	84.96	
9	8" Drilling Jar	17625074	8.000	3.000		147.22	B 6-5/8" Reg	9.70	
10	2x 8" Spiral Drill collar	Rig	8.000	2.810		150.00	B 6-5/8" Reg	18.75	
11	X-over Sub 6-5/8" <>4-1/2"IF	1783	6.750	2.813		100.77	B 4-1/2" IF	1.09	
12	15x 5" HWDP		5.000	3.000		49.30	B 4-1/2" IF	141.21	
								282.38	

Parameter	Min	Max	Ave	Activity	Hrs	BHA Weight (lb)	Drill String	OD(in)	Len (m)
WOB (klbs) :				Drilling :	38.50	in Air (Total) : 98573			
RPM (rpm) :				Reaming :	3.00	in Mud (Total) : 73373			
Flow (gpm) :				Circ-Other :	1.00	in Air (Bel Jars) : 61460			
SPP (psi) :				Total :	42.50	in Mud (Bel Jars) : 41139			

PERFORMANCE

	In	Out	Distance(m)	ROP (m/hr)	Build (%/30m)	Turn (%/30m)	DLS (%/30m)
Inclination (deg)	0.09	0.09	Oriented : 808.00	0			
Azimuth (deg)	278.10	112.45	Rotated : 0.00	0			
			Total : 808.00	21	0.00	0.00	0.01

COMMENTS

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Operator : Origin Energy Resources Ltd

Well : Rockhopper-1

Country : Australia

Location : Bass Basin

Rig : Kan Tan IV

Job # : AU-DD-0006714150

BHA# 2

OBJECTIVES:

Drill out 20" shoe, drill ahead to 13 3/8" casing point at 966ms.

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DRILLING SERVICES

BHA Report

Operator : Origin Energy Resources Ltd
 Well : Rockhopper-1
 Country : Australia
 Location : Bass Basin
 Rig : Kan Tan IV
 Job # : AU-DD-0006714150

BHA# 3

BHA# 3 : Date In 9/12/2009 MD In (m) : 966 TVD In (m) : 966 Date Out 12/12/2009 MD Out (m): 1972 TVD Out (m): 1972

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in ²)	Dull Condition
3	12.250	Reed	RSX 616m	222170	6x15	1.035	4-4-LT-N -X-I-CT-TD

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (psi)	Cum Circ Hrs
1	9.625	SSDS	SperryDrill	963448	0.78°		91	64.00

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	PDC Reed RSX 616m	222170	12.250	3.000	12.250	377.57	P 6-5/8" Reg	0.28	
2	9-5/8" SperryDrill Lobe 6/7- 5.0 stg w/Float	963448	9.625	6.135	12.125	147.21	B 6-5/8" Reg	9.22	1.18
3	12-1/4" Integral Blade Stabilizer	231191	8.000	2.813	12.250	150.12	B 6-5/8" Reg	1.91	10.23
4	8" RLL w/ EWR + DGR +HCIM	PA90231607	8.000	2.375		156.21	B 6-5/8" Reg	7.38	
5	8" Non Mag HOC w/TM + Dir	246907	8.000	1.920		161.44	B 6-5/8" Reg	4.81	
6	12.-1/4" Integral Blade Stabilizer	701049	8.000	2.813	12.250	150.12	B 6-5/8" Reg	1.87	24.33
7	6 x 8" Spiral Drill collar	Rig	8.000	2.810		150.00	B 6-5/8" Reg	56.51	
8	8" Drilling Jar	W'ford	8.000	3.000		147.22	B 6-5/8" Reg	9.70	
9	2 x 8" Spiral Drill collar	Rig	8.000	2.810		150.00	B 6-5/8" Reg	18.75	
10	XO Sub	Rig	6.750	2.813		100.77	B 4-1/2" IF	1.09	
11	15 x 5" HWDP		5.000	3.000		49.30	B 4-1/2" IF	141.21	
								252.73	

Parameter	Min	Max	Ave	Activity	Hrs	BHA Weight (lb)	Drill String	OD(in)	Len (m)
WOB (klbs) :	4	20	12	Drilling :	50.25	in Air (Total) : 77914	DP(S)-NC50(XH)-19.50#	5.000	1719
RPM (rpm) :	70	100	97	Reaming :	1.50	in Mud (Total) : 66870			
Flow (gpm) :	780	1000	919	Circ-Other :	12.25	in Air (Bel Jars) : 40801			
SPP (psi) :	850	2600	1949	Total :	64.00	in Mud (Bel Jars) : 35018			

PERFORMANCE

	In	Out	Distance(m)	ROP (m/hr)	Build (%/30m)	Turn (%/30m)	DLS (%/30m)
Inclination (deg)	0.09	1.09	Oriented : 93.00	6			0.00
Azimuth (deg)	112.45	41.84	Rotated : 913.00	21	0.00	0.00	
			Total : 1006.00	20	0.03	0.00	0.03

COMMENTS

Operator : Origin Energy Resources Ltd**Well** : Rockhopper-1**Country** : Australia**Location** : Bass Basin**Rig** : Kan Tan IV**Job #** : AU-DD-0006714150**BHA# 3****OBJECTIVES:**

Drill cement, float and shoe. Clean out rat hole and drill 5m of new hole prior to conducting LOT. Rotate ahead to a planned kick off depth of +/- 1926m. Build 2 degrees prior to section TD.

RESULTS:

Drilled out cement and float equipment, cleaned out rat hole and performed LOT. Took 3 1/2 hrs to drill the plugs. Good LOT. Bit performed well, out drilled the surface equipment's ability to handle the cuttings generated, with the mud system in place. Considerable time was spent control drilling for various reasons.

The nudge was started at 1869m, slid a total of 93m with no positive results. Unable to control tool face, aggressive style PDC. MWD detection was 100 %. All recorded surveys were taken on the fly, with no additional cost to the client.

RECOMMENDATIONS:

Utilize a less aggressive PDC bit, such as a Steering Wheel type, one that is more motor friendly. Throughout the bit run, ROP controls were in place for one reason or another.

Set up MWD equipment for maximum allowable flow rate for expected mud weight. Had we been able to handle more flow at the shakers and down hole, might of aided the tool face control issue.

Optimise data transmission of tool face for the section drilled while oriented, decrease the time between updates.

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DRILLING SERVICES

BHA Report

Operator : Origin Energy Resources Ltd
 Well : Rockhopper-1
 Country : Australia
 Location : Bass Basin
 Rig : Kan Tan IV
 Job # : AU-DD-0006714150

BHA# 4

BHA# 4 : Date In 17/12/2009 MD In (m) : 1972 TVD In (m) : 1972 Date Out 19/12/2009 MD Out (m): 1972 TVD Out (m): 1972

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in ²)	Dull Condition
4	8.500	Security	FMF 3653Z	11370552	6x14	0.902	4-4-BT-A-X-I-CT-PR

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (psi)	Cum Circ Hrs
2	6.750	SSDS	Geo Pilot	GP850TL280	0.00°			10.50

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	Security FMF3653Z 8-1/2" PDC	11370552	8.500	2.500	8.500	176.66	P 4-1/2" IF	0.40	
2	7600 GeoPilot Stabilized Housing	GP850TL280	6.750	1.920	8.375	112.09	B 4-1/2" IF	6.13	1.14
3	Non-Mag 6-3/4" NM Flex with PCDC	CP919968	6.740	1.920		111.73	B 4-1/2" IF	2.76	
4	6 3/4" RLL Stabilizer	9999999	6.750	1.920	8.250	112.09	B 4-1/2" IF	0.67	9.73
5	6-3/4" RLL + DGR + EWR + PWD + HCIM	90217460	6.750	1.920		106.76	B 4-1/2" IF	7.93	
6	6 3/4" ALD with Stabilizer	9999999	6.750	1.920	8.250	112.09	B 4-1/2" IF	4.50	21.48
7	6-3/4" CTN	90232558	6.750	1.920		106.95	B 4-1/2" IF	4.73	
8	6-3/4" BAT-Sonic	90232557	6.750	1.920		112.09	B 4-1/2" IF	6.76	
9	6-3/4" HOC	203846	6.750	1.920		112.09	B 4-1/2" IF	3.04	
10	6-3/4" ACAL	90232559	6.625	1.920		107.61	B 4-1/2" IF	1.83	
11	6-3/4" Float Sub with 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	40.42
13	3x Spiral Drill collar	Rig	6.750	2.875		99.83	B 4-1/2" IF	28.20	
14	9x 5" 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 5" HWDP		5.000	3.000		42.83	B 4-1/2" IF	47.18	
								211.15	

Parameter	Min	Max	Ave	Activity	Hrs	BHA Weight (lb)	Drill String	OD(in)	Len (m)
WOB (klbs) :				Drilling :	0.00	in Air (Total) : 47427	DP(S)-NC50(XH)-19.50#	5.000	1761
RPM (rpm) :				Reaming :	0.50	in Mud (Total) : 40704			
Flow (gpm) :				Circ-Other :	10.00	in Air (Bel Jars) : 37801			
SPP (psi) :				Total :	10.50	in Mud (Bel Jars) : 32443			

PERFORMANCE

	In	Out	Distance(m)	ROP (m/hr)	Build (%/30m)	Turn (%/30m)	DLS (%/30m)
Inclination (deg)	1.09	1.09					
Azimuth (deg)	41.84	41.84					
Oriented :							
Rotated :					0.00	0.00	0.00
Total :							

COMMENTS

GeoPilot below RT @ 19:45 hrs on 17th Dec-2009
 GeoPilot above RT @ 00.30 hrs on 19th Dec-2009
 Circulating hrs = 9.3
 Drilling hrs = 6.5
 Bit to ABI - 1.46m
 Bit to survey - 7.73m
 Bit to PWD - 15.38m
 Bit to Gamma - 10.49m

Operator : Origin Energy Resources Ltd**Well** : Rockhopper-1**Country** : Australia**Location** : Bass Basin**Rig** : Kan Tan IV**Job #** : AU-DD-0006714150**BHA# 4****OBJECTIVES:**

To directionally drill 8 1/2" hole section to TD building inclination and turning azimuth with an average dogleg of 3 degree/30m. TD is expected to be +/- 3166.4mTVDRT or 3486.5mMDRT. The well TD must allow sufficient rat hole for logging below the deepest potential hydrocarbon bearing sand

RESULTS:

The six bladed Security FMF3653Z PDC bit with Geo-Pilot and MWD/LWD tools were made up, the Geo-Pilot seals were broken in and successfully shallow pulse tested at 211m. 150 joints of 5" drill pipe was picked up on the trip in hole to facilitate drilling to Td. The last stand was washed down from 1917m and TOC was tagged at 1938m with 5K.

Spent 8 1/2 hrs drilling the cement plugs and float collar, from 1938m to 1940m. Once large volume of metal cuttings came to surface, POOH.

Over the 8 1/2 hr period, various parameters were attempted without limited success. Varying flow rate, WOB, and RPM. The method of putting weight on bit without rotary, then rotating was also tried. Working the string up and down to clear the BHA was done. Appeared there was something stuck on the bit that was preventing the cutters from making contact with the formation.

Sperry-Sun DRILLING SERVICES

BHA Report

Operator : Origin Energy Resources Ltd
Well : Rockhopper-1
Country : Australia
Location : Bass Basin
Rig : Kan Tan IV
Job # : AU-DD-0006714150

BHA# 5

BHA# 5 : Date In 19/12/2009 MD In (m) : 1972 TVD In (m) : 1972 Date Out 20/12/2009 MD Out (m) : 2019 TVD Out (m) : 2019

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in ²)	Dull Condition
5	8.500	Hughes Christensen	GT 1	6076381	3x20	0.920	2-2-WT-A -E-1-NO-BHA

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (psi)	Cum Circ Hrs
3	6.750	SSDS	SperryDrill	675400	1.15°		126	10.50

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" Mill Tooth Bit	6076381	8.500	2.500	8.500	176.66	P 4-1/2" Reg	0.24	
2	6-3/4" SperryDrill Lobe 6/7 - 5.0 stg	675400	6.750	4.498	8.250	67.81	B 4-1/2" IF	8.28	0.91
3	8-1/8" Integral Blade Stab	10988869	6.812	2.875	8.125	102.08	B 4-1/2" IF	2.03	9.49
4	6-3/4" PM Sub	194443	6.750	1.920		106.76	B 4-1/2" IF	2.79	
5	6-3/4" HOC	203842	6.750	1.920		106.76	B 4-1/2" IF	3.03	
6	Float Sub with 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	2.875	8.500	90.96	B 4-1/2" IF	1.70	18.04
8	3x Spiral Drill collar	Rig	6.750	2.875		99.83	B 4-1/2" IF	27.96	
9	3 x Spiral Drill collar	Rig	6.750	2.875		99.83	B 4-1/2" IF	28.20	
10	9 x HWDP		5.000	3.000		42.83	B 4-1/2" IF	84.57	
11	6-1/2" Drilling Jar	17602177	6.500	2.750		92.85	B 4-1/2" IF	9.84	
12	5x HWDP		5.000	3.000		49.30	B 4-1/2" IF	47.18	
								216.73	

Parameter	Min	Max	Ave
WOB (klbs) :	18	24	20
RPM (rpm) :	75	75	75
Flow (gpm) :	550	550	550
SPP (psi) :	1745	1820	1786

Activity	Hrs
Drilling :	6.00
Reaming :	0.50
Circ-Other :	4.00
Total :	10.50

BHA Weight (lb)	
in Air (Total) :	46404
in Mud (Total) :	39685
in Air (Bel Jars) :	35776
in Mud (Bel Jars) :	30595

Drill String	OD(in)	Len(m)
DP(S)-NC50(XH)-19.50#	5.000	1802

PERFORMANCE

	In	Out
Inclination (deg)	1.09	5.58
Azimuth (deg)	41.84	21.56

	Distance(m)	ROP (m/hr)	Build (%30m)	Turn (%30m)	DLS (%30m)
Oriented :	13.00	6			3.00
Rotated :	34.00	9			
Total :	47.00	8	2.86	-12.94	2.92

COMMENTS

Motor Below RT @ 01.00 hrs on 19/12/09 - BRT total 26.5 hrs.
Motor Above RT @ 03.30 hrs on 20-12-09

Drilling hrs - 4.7 hrs
Circulating hrs - 7.8 hrs
123k Revs

Operator : Origin Energy Resources Ltd

Well : Rockhopper-1

Country : Australia

Location : Bass Basin

Rig : Kan Tan IV

Job # : AU-DD-0006714150

BHA# 5

OBJECTIVES:

To drill shoe track, clean out rat hole and drill 5m of new formation before performing a LOT. Then build hole angle to 4 deg before POOH to pick up Geo Pilot.

RESULTS:

This BHA was picked up and motor was scribed to MWD then shallow tested ok. The bottom was tagged at 1940m. The bit was fanned off bottom at 550gpm to try and clear away any debris left in hole from the previous run. drilled out cement and float equipment, cleaned out rat hole and performed LOT. Took 2 hrs to drill the shoe track drilled from 1977m to 2019m one 13m slide was utilised to build inclination up to 4.8 deg by 2006m and turn direction from 57 to 20 deg azimuth which was deemed sufficient enough by client to POOH and pick up Geo Pilot to drill to TD.

RECOMMENDATIONS:

No changes required.

sperry-sun

DRILLING SERVICES

BHA Report

Operator : Origin Energy Resources Ltd
 Well : Rockhopper-1
 Country : Australia
 Location : Bass Basin
 Rig : Kan Tan IV
 Job # : AU-DD-0006714150

BHA# 6

BHA# 6 : Date In 20/12/2009 MD In (m) : 2019 TVD In (m) : 2019 Date Out 20/12/2009 MD Out (m): 2023 TVD Out (m): 2023

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in ²)	Dull Condition
6	8.500	Security DBS	FMF 3755	11103697	4x16	0.785	0-0-NO-A -X-I-NO-DTF

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (psi)	Cum Circ Hrs
4	6.750	SSDS	Geo Pilot	GP850TL280	0.00°		0	14.50

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	Security FMF3755 8-1/2" PDC	11103697	8.500	2.500	8.500	176.66	P 4-1/2" IF	0.43	
2	7600 GeoPilot Stabilized Housing	GP850TL280	6.750	1.920	8.375	112.09	B 4-1/2" IF	6.13	1.17
3	Non-Mag 6-3/4" NM Flex with PCDC	CP919968	6.740	1.920		111.73	B 4-1/2" IF	2.76	
4	6 3/4" RLL Stabilizer	9999999	6.750	1.920	8.250	112.09	B 4-1/2" IF	0.67	9.76
5	6-3/4" RLL + DGR + EWR + PWD + HCIM	90217460	6.750	1.920		106.76	B 4-1/2" IF	7.93	
6	6 3/4" ALD with Stabilizer	9999999	6.750	1.920	8.250	112.09	B 4-1/2" IF	4.50	21.51
7	6-3/4" CTN	90232558	6.750	1.920		106.95	B 4-1/2" IF	4.73	
8	6-3/4" BAT-Sonic	90232557	6.750	1.920		112.09	B 4-1/2" IF	6.76	
9	6-3/4" HOC	203846	6.750	1.920		112.09	B 4-1/2" IF	3.04	
10	6-3/4" ACAL	90232559	6.625	1.920		107.61	B 4-1/2" IF	1.83	
11	6-3/4" Float Sub with 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	40.45
13	3x Spiral Drill collar	Rig	6.750	2.875		99.83	B 4-1/2" IF	27.96	
14	9x 5" 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 5" HWDP		5.000	3.000		42.83	B 4-1/2" IF	47.18	
								210.94	

Parameter	Min	Max	Ave	Activity	Hrs	BHA Weight (lb)	Drill String	OD(in)	Len (m)
WOB (klbs) :	3	3	3	Drilling :	2.00	in Air (Total) :	DP(S)-NC50(XH)-19.50#	5.000	1812
RPM (rpm) :	100	150	138	Reaming :	0.00	in Mud (Total) :			
Flow (gpm) :	550	550	550	Circ-Other :	2.00	in Air (Bel Jars) :			
SPP (psi) :	1500	1500	1500	Total :	4.00	in Mud (Bel Jars) :			
						32217			

PERFORMANCE

	In	Out	Distance (m)	ROP (m/hr)	Build (%/30m)	Turn (%/30m)	DLS (%/30m)
Inclination (deg)	5.58	5.84	Oriented :	0.00	0		0.00
Azimuth (deg)	21.56	21.80	Rotated :	4.00	2	0.00	0.00
			Total :	4.00	2	1.93	1.78
						1.94	

COMMENTS

Geo Pilot below RT @ 04.00 hrs -on 20-12-09
 Geo Pilot above RT @ 00:00 hrs - 21-12-09
 Bit to ABI - 1.49m
 Bit to survey - 7.76m
 Bit to Gamma - 10.52m
 Bit to PWD - 15.41m
 Bit to EWR - 12.88m
 Bit to CTN - 25.91m

Operator : Origin Energy Resources Ltd**Well** : Rockhopper-1**Country** : Australia**Location** : Bass Basin**Rig** : Kan Tan IV**Job #** : AU-DD-0006714150**BHA# 6****OBJECTIVES:**

Continue directionally drilling 8 ½" hole section to TD building inclination and turning azimuth with an average dogleg of 3 degree/30m.

RESULTS:

Washed and reamed, from 1972m to 2019m to clean out motor run footage, and a MAD run to acquire the missed data. Some resistance initially, after a few meters, no torque or weight required to wash and ream down. Several attempts were made to keep the GP in the home mode, without success. As the BHA was following the old hole without effort, and the ABI's confirmed this, continued washing and reaming without being certain what the Geo-Pilot was actually doing.

Once on bottom, unable to get Geo-Pilot to respond to commands. Drilled a total of six meters, GP not responding to commands. Appears RPM sensor is faulty. POOH for failed Geo-Pilot.

sperry-sun

DRILLING SERVICES

BHA Report

Operator : Origin Energy Resources Ltd
 Well : Rockhopper-1
 Country : Australia
 Location : Bass Basin
 Rig : Kan Tan IV
 Job # : AU-DD-0006714150

BHA# 7

BHA# 7 : Date In 21/12/2009 MD In (m) : 2023 TVD In (m) : 2023 Date Out 28/12/2009 MD Out (m): 3522 TVD Out (m): 3192

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in ²)	Dull Condition
6rr1	8.500	Security DBS	FMF3755	11103697	4x16	0.785	6-6-BT-A -X-I-NR-PR

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (psi)	Cum Circ Hrs
5	6.750	SSDS	Geo Pilot	GP850TL085	0.00°		-1	138.00

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	Security FMF 3755 8 1/2" PDC	11103697	8.500	2.500	8.500	176.66	B 4-1/2" IF	0.43	
2	7600 GeoPilot Stabilized Housing	GP850TL085	6.750	1.920	8.375	112.09	B 4-1/2" IF	7.07	1.17
3	Non-Mag 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 Stabilizer	9999999	6.750	1.920	8.250	112.09	B 4-1/2" IF	0.67	10.75
5	6-3/4" RLL + DGR + EWR + PWD + HCIM	90217460	6.750	1.920		106.76	B 4-1/2" IF	7.93	
6	6 3/4" ALD with Stabilizer	9999999	6.750	1.920	8.250	112.09	B 4-1/2" IF	4.50	22.50
7	6-3/4" CTN	90232558	6.750	1.920		106.95	B 4-1/2" IF	4.73	
8	6-3/4" BAT-Sonic	90232557	6.750	1.920		112.09	B 4-1/2" IF	6.76	
9	6-3/4" HOC	203846	6.750	1.920		112.09	B 4-1/2" IF	3.04	
10	6-3/4" ACAL	90232559	6.625	1.920		107.61	B 4-1/2" IF	1.83	
11	6-3/4" Float Sub with 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	41.44
13	3x Spiral Drill collar	Rig	6.750	2.875		99.83	B 4-1/2" IF	27.96	
14	9x 5" 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 5" HWDP		5.000	3.000		42.83	B 4-1/2" IF	47.18	
								211.93	

Parameter	Min	Max	Ave
WOB (klbs) :	5	15	11
RPM (rpm) :	100	165	136
Flow (gpm) :	530	600	581
SPP (psi) :	1500	2740	2205

Activity	Hrs
Drilling :	124.00
Reaming :	0.00
Circ-Other :	14.00
Total :	138.00

BHA Weight (lb)	
in Air (Total) :	47733
in Mud (Total) :	40822
in Air (Bel Jars) :	38107
in Mud (Bel Jars) :	32589

Drill String	OD(in)	Len(m)
DP(S)-NC50(XH)-19.50#	5.000	3310

PERFORMANCE

	In	Out
Inclination (deg)	5.84	41.35
Azimuth (deg)	21.80	357.89

	Distance(m)	ROP (m/hr)	Build (%/30m)	Turn (%/30m)	DLS (%/30m)
Oriented :	0.00	0			3.00
Rotated :	1499.00	12	3.00	0.40	
Total :	1499.00	12	0.71	-0.48	0.72

COMMENTS

Geo Pilot below RT @ 0030 hrs -on 21-12-09
 Geo Pilot above RT @ 1500 hrs -on 28-12-09
 Total BRT @ 182.5hr
 survey to bit- 8.73m
 Bit to Gamma - 11.50m
 Bit to PWD - 16.39m
 Bit to EWR - 13.86m
 Bit to CTN - 26.89m

Operator : Origin Energy Resources Ltd**Well** : Rockhopper-1**Country** : Australia**Location** : Bass Basin**Rig** : Kan Tan IV**Job #** : AU-DD-0006714150**BHA# 7****OBJECTIVES:**

Continue directionally drilling 8 ½" hole section to TD building inclination and turning azimuth with an average dogleg of 3 degree/30m.

RESULTS:

Geo-Pilot performed 100 % during the run, all objectives were achieved.

The BHA was run to bottom, no hole problems. Response was very good throughout the run. Utilized steering mode for the build up section, from 2023m to 2409m, then switched to cruise mode for the remainder of the well. Effective dog leg produced was only 3+ degrees per 30m.

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 which was causing all the drama.

Frequent false downlinks were received by Geo-Pilot believed to be initiated by the vibration down hole. To minimize false downlinks the PWD threshold was raised three times during the late stages of the run. Also, in the later section of the well, down linking while drilling became an issue. Modified procedure to down link while circulating and reaming each stand prior to making connections sorted that issue.

RECOMMENDATIONS:

No changes required.

sperry-sun

DRILLING SERVICES

BHA Report

Operator : Origin Energy Resources Ltd
 Well : Rockhopper-1
 Country : Australia
 Location : Bass Basin
 Rig : Kan Tan IV
 Job # : AU-DD-0006714150

BHA# 8

BHA# 8 : Date In 30/12/2009 MD In (m) : 3522 TVD In (m) : 3192 Date Out 31/12/2009 MD Out (m): 3522 TVD Out (m): 3192

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in ²)	Dull Condition
5rr1	8.500	Hughes Christensen	GT-1	6076381	3x20	0.920	2-2-WT-A -E-1-NO-LOG

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	8 1/2" Milled Tooth Bit	6076381	8.500	2.500	8.500	176.66	P 4-1/2" Reg	0.24	
2	Bit Sub with ported float	0087	6.750	3.000		97.86	B 4-1/2" IF	1.18	
3	8-1/8" Integral Blade Stab	10988869	6.812	2.875	8.125	102.08	B 4-1/2" IF	2.02	2.39
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	1x Spiral Drill collar		6.750	2.813		101.00	B 4-1/2" IF	9.48	
7	8-1/2" Integral Blade Stabilizer	700802	6.500	2.875	8.500	90.96	B 4-1/2" IF	1.70	19.49
8	2x Spiral Drill collar	Rig	6.750	2.875		99.83	B 4-1/2" IF	18.48	
9	9x 5" HWDP		5.000	3.000		49.30	B 4-1/2" IF	84.57	
10	6-1/2" Drilling Jar	17602177	6.500	2.750		92.85	B 4-1/2" IF	9.84	
11	5x 5" HWDP		5.000	3.000		42.83	B 4-1/2" IF	47.18	
								180.50	

Parameter	Min	Max	Ave	Activity	Hrs	BHA Weight (lb)	Drill String	OD(in)	Len (m)
WOB (klbs) :				Drilling :	0.00	in Air (Total) : 36338	DP(S)-NC50(XH)-19.50#	5.000	3341
RPM (rpm) :				Reaming :	1.00	in Mud (Total) : 31076			
Flow (gpm) :				Circ-Other :	7.50	in Air (Bel Jars) : 26711			
SPP (psi) :				Total :	8.50	in Mud (Bel Jars) : 22844			

PERFORMANCE

	In	Out	Distance(m)	ROP (m/hr)	Build (%/30m)	Turn (%/30m)	DLS (%/30m)
Inclination (deg)	41.35	41.35					
Azimuth (deg)	357.89	357.89					
Oriented :							
Rotated :							
Total :							

COMMENTS

Below RT 02:00 30/12/09
 Above RT 08:00 31/12/09

 SPT at 100m, 850psi @ 520gpm

Operator : Origin Energy Resources Ltd

Well : Rockhopper-1

Country : Australia

Location : Bass Basin

Rig : Kan Tan IV

Job # : AU-DD-0006714150

BHA# 8

OBJECTIVES:

To be used as a clean out assembly prior to continuation of wireline logging

RESULTS:

Tight spots were encountered at 2427m, which was worked through and 2482m where the top drive was made up and the hole washed from 2475m to 2490m. Another tight spot at 2510m was worked through. At 3417m the top drive was made up and the hole was washed to bottom (3522m) as a precaution. The hole was circulated and the mud conditioned before POOH. No problems were encountered on the way out.

sperry-sun

DRILLING SERVICES

BHA Report

Operator : Origin Energy Resources Ltd
 Well : Rockhopper-1
 Country : Australia
 Location : Bass Basin
 Rig : Kan Tan IV
 Job # : AU-DD-0006714150

BHA# 9

BHA# 9 : Date In 2/01/2010 MD In (m) : 3522 TVD In (m) : 3192 Date Out 3/01/2010 MD Out (m): 3522 TVD Out (m): 3192

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in ²)	Dull Condition
5rr2	8.500	Hughes Christensen	GT-1	6076381	3x20	0.920	2-2-WT-A -E-1-NO-LOG

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	8 1/2" Milled Tooth Bit	6076381	8.500	2.500	8.500	176.66	P 4-1/2" Reg	0.24	
2	Bit Sub with ported float	0087	6.750	3.000		97.86	B 4-1/2" IF	1.18	
3	8-1/2" Integral Blade Stab	650454	6.500	2.750	8.500	92.85	B 4-1/2" IF	1.35	2.05
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	1x Spiral Drill collar		6.750	2.813		101.00	B 4-1/2" IF	9.48	
7	8-1/2" Integral Blade Stabilizer	700802	6.500	2.875	8.500	90.96	B 4-1/2" IF	1.70	18.82
8	2x Spiral Drill collar	Rig	6.750	2.875		99.83	B 4-1/2" IF	18.48	
9	9x 5" HWDP		5.000	3.000		49.30	B 4-1/2" IF	84.57	
10	6-1/2" Drilling Jar	17602177	6.500	2.750		92.85	B 4-1/2" IF	9.84	
11	5x 5" HWDP		5.000	3.000		42.83	B 4-1/2" IF	47.18	
								179.83	

Parameter	Min	Max	Ave	Activity	Hrs	BHA Weight (lb)	Drill String	OD(in)	Len (m)
WOB (klbs) :				Drilling :	0.00	in Air (Total) : 36072			
RPM (rpm) :				Reaming :	8.00	in Mud (Total) : 30849			
Flow (gpm) :				Circ-Other :	5.50	in Air (Bel Jars) : 26446			
SPP (psi) :				Total :	13.50	in Mud (Bel Jars) : 22617			

PERFORMANCE

	In	Out	Distance(m)	ROP (m/hr)	Build (%/30m)	Turn (%/30m)	DLS (%/30m)
Inclination (deg)	41.35	41.35					
Azimuth (deg)	357.89	357.89					
Oriented :							
Rotated :							
Total :							

COMMENTS

Below Rotary Table @ 0650 2 Jan 10.
 Above Rotary Table @ 0945 3 Jan 10.

Operator : Origin Energy Resources Ltd

Well : Rockhopper-1

Country : Australia

Location : Bass Basin

Rig : Kan Tan IV

Job # : AU-DD-0006714150

BHA# 9

OBJECTIVES:

To be used as a clean out assembly prior to continuation of wireline logging

RESULTS:

The hole wash washed and reamed from 2150m to TD at 3522m, no tight spots were encountered except near to TD, this was worked through easily enough. The hole was circulated and the mud conditioned before POOH. No problems were encountered on the way out.

RECOMMENDATIONS:

No changes required.

sperry-sun

DRILLING SERVICES

BHA Report

Operator : Origin Energy Resources Ltd
 Well : Rockhopper-1
 Country : Australia
 Location : Bass Basin
 Rig : Kan Tan IV
 Job # : AU-DD-0006714150

BHA# 10

BHA# 10 : Date In 6/01/2010 MD In (m) : 3522 TVD In (m) : 3192 Date Cur 7/01/2010 MD Cur (m): 3522 TVD Cur (m): 3192

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in ²)	Dull Condition

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	DP (S) - NC31(IF) - 10.40#		2.875	2.151		11.38		9.14	
2	Cross Over Sub		5.000	2.000		56.21		0.68	
3	365x DP (S) - NC50(XH) - 19.50#		5.000	4.276		22.60		3341.21	
								3351.03	

Parameter	Min	Max	Ave	Activity	Hrs	BHA Weight (lb)	Drill String	OD(in)	Len (m)
WOB (klbs) :				Drilling :	0.00	in Air (Total) : 248207			
RPM (rpm) :				Reaming :	0.00	in Mud (Total) : 212268			
Flow (gpm) :				Circ-Other :	2.00	in Air (Bel Jars) : 0			
SPP (psi) :				Total :	2.00	in Mud (Bel Jars) : 0			

PERFORMANCE

	In	Out	Distance(m)	ROP (m/hr)	Build (%/30m)	Turn (%/30m)	DLS (%/30m)
Inclination (deg)	41.35	41.35	Oriented :				
Azimuth (deg)	357.89	357.89	Rotated :				
			Total :				

COMMENTS

Operator : Origin Energy Resources Ltd

Well : Rockhopper-1

Country : Australia

Location : Bass Basin

Rig : Kan Tan IV

Job # : AU-DD-0006714150

BHA# 10

RECOMMENDATIONS:

No changes required

HALLIBURTON
Sperry Drilling Services

LWD End of Well Report

For

Origin Energy Resources Ltd

Rockhopper-1

Rig: Kan Tan IV
Field: Rockhopper-1
Country: Australia
Job No: AU-FE-0006714150
Date: 2 DEC 2009

HALLIBURTON

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1. General Information
2. Operational Overview
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5. Directional Survey Data

General Information

Company: Origin Energy Resources Ltd
Rig: Kan Tan IV
Well: Rockhopper-1
Field: Rockhopper
Lease Name:
State: Tasmania
County:
Country: Australia
API Number:
Sperry Job Number: AU-FE-0006714150
Job start date: 02-Dec-09
Job end date: 28-Dec-09
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: 358.07 deg
Unit Number: SSH-40
MWD Engineers: J. Lau, A. Nijhof, M. Dillon, M. Ward, J. Ma,
Company Representatives: B. Houston, M. Lanzer
Company Geologist: D. Archer, D. Archer

Operational Overview

Sperry Drilling was contracted by Origin Energy Resources Ltd to provide Logging While Drilling (LWD) services for the drilling of Rockhopper-1. 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 Directional (PCDC) was run for wellbore surveying. The section was drilled from 158.0 mMDRT to section TD at 966.0 mMDRT. Pulled out of hole to run 340mm casing.

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

This section was drilled one bit run 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 whole section was drilled from 966.0 mMDRT to section TD at 1972.0 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 Geopilot rotary steerable system (RSS) BHA together with a motor BHA.

LWD tools used in the RSS BHA was comprised of the following : DDS for drilling optimisation, DGR, 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 PCDC for wellbore surveying.

LWD in the Motor BHA was directional only configuration and was comprised mainly of PCDC for directional control

The first run was RSS BHA with PDC bit. It was pulled out of hole after failing to drill out the cement float. In the second run the motor BHA was pick up and drilled to 2019.0 mMDRT. POOH to pickup the RSS BHA. In the third run, the same RSS BHA was picked up and run in hole, drilled to 2123.0 mMDRT, pull out for GP failure. The fourth run was RSS BHA with backup GP tool. It was drilled from 2023.0 mMDRT to section TD at 3522.0 mMDRT. POOH to run wireline.

Bitrun Summary

RUN TIME DATA

MWD Run : 100	Run Start : 02-Dec-09 06:40	BRT Hrs : 58.33 hr	Circ. Hrs : 37.26 hr
Rig Bit No : 2	Run End : 04-Dec-09 17:00	Hole Size : 445.00 mm	Oper. Hrs : 37.26 hr

DRILLING DATA

Start Depth : 158.00 m	Footage : 808.00 m	Avg RPM : 79 rpm	Avg ROP : 40.00 m/hr
End Depth : 966.00 m	Avg Flow Rate : 996.00 gpm	Avg WOB : 5.0 klb	Avg SPP : 1761 psig
Drilling Hours : 29.900 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. : 25.60 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 : DWD	Min. Inc. : 0.10 deg	Min. Inc. Depth : 733.400 m
Final Az. : 112.45 deg	Max Op. Press. : 0 psig	Max Inc. : 0.43 deg	Max Inc. Depth : 414.830 m
MWD Real-time % : 95 %		MWD Recorded % : 0 %	

	Length (m)	Dist From Bit (m)		Length (m)	Dist From Bit (m)
		253.92			
5" X 3" HWDP #49.3 - NC50(IF) 5.00 in OD / 3.00 in ID	141.21				
X-Over Sub 6.75 in OD / 3.00 in ID	1.09	112.71	HOC 9.50 in OD / 4.13 in ID * Positive Pulser - SN : 10796450 * PCM - SN : 10921470 * PCDC - SN : 300454 * PCG		0.00
8 1/4" X 2.8125" - 160.6# Drill Collar 8.25 in OD / 2.81 in ID	18.75	111.62		9.77	7.38
Jar 8.00 in OD / 3.00 in ID	9.70	92.87			
8 1/4" X 2.8125" - 160.6# Drill Collar 8.25 in OD / 2.81 in ID	56.51	83.17			
X-Over Sub 8.25 in OD / 3.00 in ID	1.15	26.66			
17 1/2" Stabilizer 9.50 in OD / 3.00 in ID	2.47	25.51			
9 1/2" Spiral Drill Collar 9.50 in OD / 3.00 in ID	9.27	23.04			
17 1/2" Stabilizer 9.50 in OD / 3.00 in ID	2.73	13.77			
MWD	9.77	11.04			
Bit Sub 9.50 in OD / 3.00 in ID	0.83	1.27			
17 1/2" Smith XR + VCPS Mill Tooth Bit 9.50 in OD / 3.00 in ID	0.44	0.44			

COMMENTS

Drill 445mm hole from 158.0 mMDRT to section TD at 966.0 mMDRT. POOH to run 340mm casing.

Bitrun Summary

RUN TIME DATA							
MWD Run	: 200	Run Start	: 09-Dec-09 00:53	BRT Hrs	: 85.90 hr	Circ. Hrs	: 58.23 hr
Rig Bit No	: 3	Run End	: 12-Dec-09 14:47	Hole Size	: 311.00 mm	Oper. Hrs	: 85.90 hr

DRILLING DATA							
Start Depth	: 966.00 m	Footage	: 1006.00 m	Avg RPM	: 77 rpm	Avg ROP	: 28.62 m/hr
End Depth	: 1972.00 m	Avg Flow Rate	: 917.00 gpm	Avg WOB	: 5.4 klb	Avg SPP	: 1965 psig
Drilling Hours	: 35.140 hr						

MUD DATA							
Mud Type	: Polymer						
Weight	: 9.20 ppg	Viscosity	: 63.00 spqt	PV	: 11 cP	YP	: 22.00 lhf2
Chlorides	: 35500.00 ppm	Max Temp.	: 59.20 degC	% Solids	: 3.50 %	% Sand	: 0.25 %
pH	: 9.00 pH	Fluid Loss	: 6 mptm	% Oil	: 0.00 %	O:W	: 0:100

MWD PERFORMANCE								
Tool OD	: 8.00 in	Type	: P4M	Min. Inc.	: 0.00 deg	Min. Inc. Depth	: 980.350 m	
Final Az.	: 51.65 deg	Max Op. Press.	: 2813 psig	Max Inc.	: 0.91 deg	Max Inc. Depth	: 1934.760 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	141.21	252.73			
Cross-over Sub 6.75 in OD / 2.81 in ID	1.09	111.52	8" HOC w/ Pulser & Directional 8.06 in OD / 2.38 in ID * Positive Pulser - SN : 11160935	4.81	20.50
2 x 8-1/4" Spiral Drill Collar 8.25 in OD / 2.88 in ID	18.75	110.43	* PCM - SN : 11226946 * PCDC - SN : 300454		19.79
8" Drilling Jar 8.00 in OD / 3.00 in ID	9.70	91.68	8" HF HCIM Collar 8.00 in OD / 2.38 in ID * HCIM - SN : 245814	1.75	18.79
6 x 8-1/4" Spiral Drill Collar 8.25 in OD / 2.88 in ID	56.51	81.98			
12-1/8" Integral Blade Stabilizer 8.06 in OD / 2.81 in ID	1.87	25.47	8" HF EWR-P4 Collar 8.00 in OD / 2.38 in ID * EWR-P4 - SN : 11131559	3.71	14.84
MWD	12.19	23.60			
12-1/8" Integral Blade Stabilizer 8.00 in OD / 2.81 in ID	1.91	11.41	8" HF DGR Collar 8.00 in OD / 2.38 in ID * DDS * DGR - SN : 11158407	1.92	12.37
9-5/8" Sperry Drill Lobe 6/7 - 5.0 stg w/ Float 9.63 in OD / 6.14 in ID	9.22	9.50			
12-1/4" Reed RSR616M-A21 PDC Bit 12.25 in OD / 3.00 in ID	0.28	0.28			

COMMENTS
 Drill 311mm hole from 966.0 to 1972.0mMDRT. POOH to run 9 5/8" casing. All recorded data recovered on surface.

Bitrun Summary

RUN TIME DATA							
MWD Run	: 300	Run Start	: 17-Dec-09 21:52	BRT Hrs	: 25.46 hr	Circ. Hrs	: 9.36 hr
Rig Bit No	: 4	Run End	: 18-Dec-09 23:20	Hole Size	: 216.00 mm	Oper. Hrs	: 25.46 hr

DRILLING DATA							
Start Depth	: 1972.00 m	Footage	: 0.00 m	Avg RPM	: 40 rpm	Avg ROP	: 0.00 m/hr
End Depth	: 1972.00 m	Avg Flow Rate	: 513.00 gpm	Avg WOB	: 8.0 klb	Avg SPP	: 1597 psig
Drilling Hours	: 6.500 hr						

MUD DATA							
Mud Type	: Polymer						
Weight	: 9.55 ppg	Viscosity	: 55.00 spqt	PV	: 11 cP	YP	: 21.00 lhf2
Chlorides	: 35000.00 ppm	Max Temp.	: 94.60 degC	% Solids	: 4.10 %	% Sand	: 0.15 %
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.	: 0.68 deg	Min. Inc. Depth	: 1951.760 m
Final Az.	: 51.65 deg	Max Op. Press.	: 3140 psig	Max Inc.	: 0.68 deg	Max Inc. Depth	: 1951.760 m
MWD Real-time %	: 96 %		MWD Recorded %	: 100 %			

	Length (m)	Dist From Bit (m)		Length (m)	Dist From Bit (m)
5 x 5" HWDP 5.00 in OD / 3.00 in ID	47.18	211.15			
6 1/2" Jar 6.50 in OD / 2.75 in ID	9.84	163.97	6 3/4" ACAL 6.75 in OD / 1.92 in ID SN : SL 90232559B-6 * ACAL Insert - SN : 138159	1.83	37.31
9 x 5" HWDP 5.00 in OD / 3.00 in ID	84.57	154.13	6 3/4" 10ft HOC 6.75 in OD / 1.92 in ID SN : 203846 * Positive Pulser - SN : 11160935 * PCM Sonde - SN : 11055881	3.04	35.00
3 x Spiral Drill Collar 6.75 in OD / 2.88 in ID	28.20	69.56			
Integral Blade Stabiliser 6.75 in OD / 2.88 in ID	1.70	41.36	6 3/4" BAT Collar 6.75 in OD / 1.92 in ID SN : SL90232557O-6 * BAT Insert - SN : 11378929	6.76	30.47
Float Sub w/ Ported Float 6.75 in OD / 3.00 in ID	0.91	39.66			
MWD	29.46	38.75			
6 3/4" NM Flex Collar 6.75 in OD / 1.92 in ID * PCDC Sonde	2.76	7.73	6 3/4" Nukes 6.75 in OD / 1.92 in ID SN : SL9023558N2L2-6 * CTN Insert - SN : 231177 * ALD Insert - SN : 11062362	9.23	25.88
Geo-Pilot 7600 6.75 in OD / 1.92 in ID	6.13	6.53	6 3/4" RLL 6.75 in OD / 1.92 in ID SN : PA90217460H1WRGV2X-6 * Sleeve Stabilizer * HCIM Insert - SN : 246857 * PWD Insert - SN : 184467440737095 * EWR-P4 Insert - SN : 226817 * DGR Insert - SN : 11109929 * DDSr-DGR - SN : 11109929	8.60	15.38
8 1/2" Security FMF3653Z PDC 8.50 in OD / 2.50 in ID	0.40	0.40			12.85
					10.49
					0.00

COMMENTS
RIH with Quad Combo and GP string. Tag cement at 1938mMDRT. Attempt to drill out shoe track. POOH to change bit at 1940mMDRT.

Bitrun Summary

RUN TIME DATA

MWD Run : 400	Run Start : 19-Dec-09 02:00	BRT Hrs : 24.33 hr	Circ. Hrs : 7.80 hr
Rig Bit No : 5	Run End : 20-Dec-09 02:20	Hole Size : 216.00 mm	Oper. Hrs : 7.80 hr

DRILLING DATA

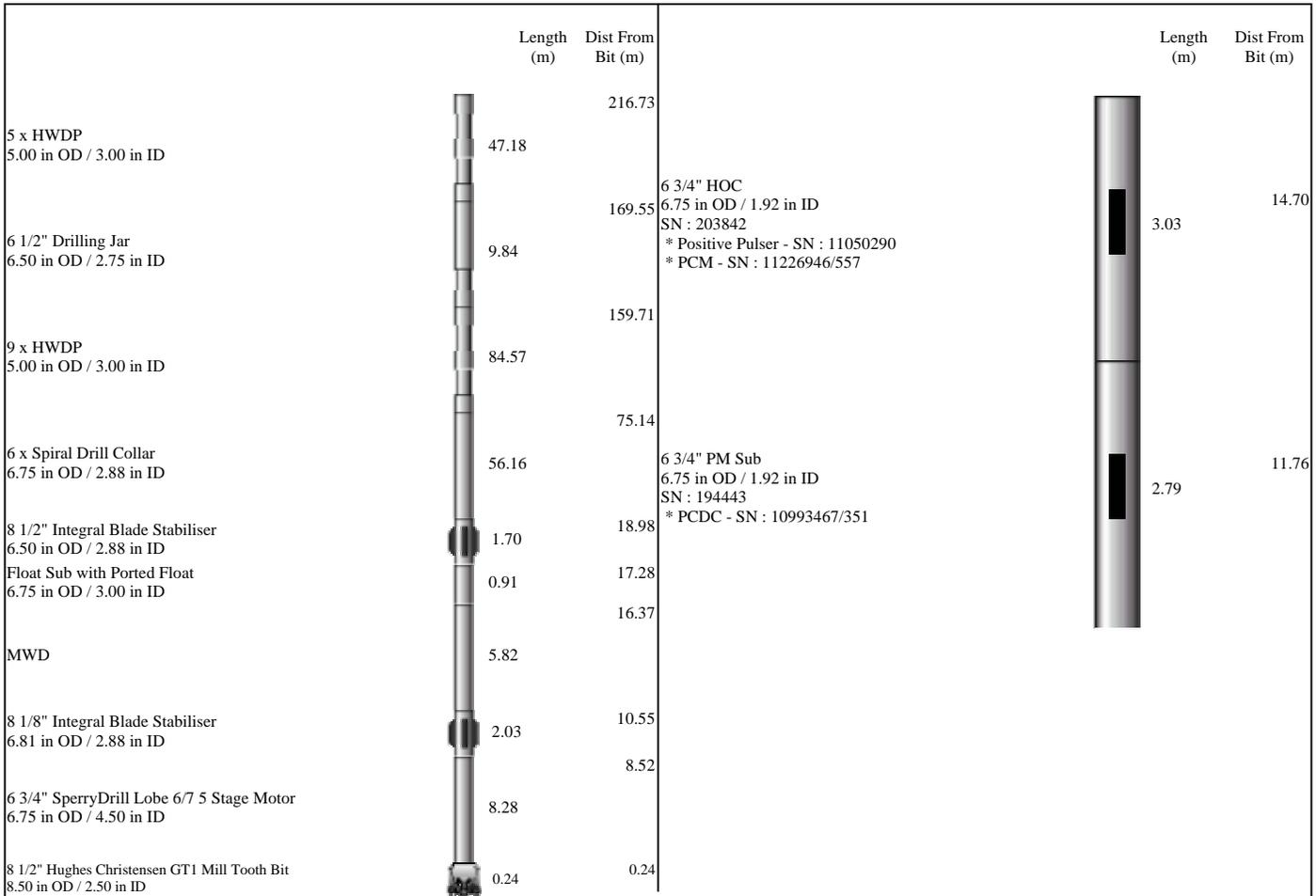
Start Depth : 1972.00 m	Footage : 47.00 m	Avg RPM : 70 rpm	Avg ROP : 10.00 m/hr
End Depth : 2019.00 m	Avg Flow Rate : 552.00 gpm	Avg WOB : 17.7 klb	Avg SPP : 1766 psig
Drilling Hours : 4.700 hr			

MUD DATA

Mud Type : Polymer	Weight : 9.55 ppg	Viscosity : 64.00 spqt	PV : 12 cP	YP : 19.00 lhf2
Chlorides : 35000.00 ppm	Max Temp. : 53.70 degC	% Solids : 4.10 %	% Sand : 0.15 %	O:W : 0:100
pH : 9.50 pH	Fluid Loss : 4 mptm	% Oil : 0.00 %		

MWD PERFORMANCE

Tool OD : 6.75 in	Type : P4M	Min. Inc. : 0.69 deg	Min. Inc. Depth : 1968.420 m
Final Az. : 20.69 deg	Max Op. Press. : 3270 psig	Max Inc. : 4.80 deg	Max Inc. Depth : 2006.900 m
MWD Real-time % : 100 %		MWD Recorded % : 0 %	



COMMENTS

RIH with Motor and DWD assembly. Drill out shoe from 1940mMDRT. Drill new formation from 1972m to 2019mMDRT. POOH to change bit and BHA.

Bitrun Summary

RUN TIME DATA							
MWD Run	: 500	Run Start	: 20-Dec-09 05:35	BRT Hrs	: 17.00 hr	Circ. Hrs	: 2.82 hr
Rig Bit No	: 6	Run End	: 20-Dec-09 22:35	Hole Size	: 216.00 mm	Oper. Hrs	: 17.00 hr

DRILLING DATA							
Start Depth	: 2019.00 m	Footage	: 4.00 m	Avg RPM	: 107 rpm	Avg ROP	: 29.50 m/hr
End Depth	: 2023.00 m	Avg Flow Rate	: 543.00 gpm	Avg WOB	: 13.4 klb	Avg SPP	: 1589 psig
Drilling Hours	: 0.300 hr						

MUD DATA							
Mud Type	: Polymer						
Weight	: 9.60 ppg	Viscosity	: 53.00 spqt	PV	: 12 cP	YP	: 20.00 lhf2
Chlorides	: 35000.00 ppm	Max Temp.	: 80.00 degC	% Solids	: 4.20 %	% 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	: P4M	Min. Inc.	: 4.80 deg	Min. Inc. Depth	: 2006.900 m
Final Az.	: 20.69 deg	Max Op. Press.	: 3313 psig	Max Inc.	: 4.80 deg	Max Inc. Depth	: 2006.900 m
MWD Real-time %	: 100 %		MWD Recorded %	: 100 %			

	Length (m)	Dist From Bit (m)		Length (m)	Dist From Bit (m)
5 x 5" HWDP 5.00 in OD / 3.00 in ID	47.18	211.18			
6 1/2" Jar 6.50 in OD / 2.75 in ID	9.84	164.00	6 3/4" ACAL 6.75 in OD / 1.92 in ID SN : SL 90232559B-6 * ACAL - SN : 138159	1.83	38.32
9 x 5" HWDP 5.00 in OD / 3.00 in ID	84.57	154.16	6 3/4" 10ft HOC 6.75 in OD / 1.92 in ID SN : 203846 * Positive Pulser - SN : 11160935 * PCM - SN : 11055881	3.04	35.30
3 x Spiral Drill Collar 6.75 in OD / 2.88 in ID	28.20	69.59			
Integral Blade Stabiliser 6.75 in OD / 2.88 in ID	1.70	41.39	6 3/4" BAT Collar 6.75 in OD / 1.92 in ID SN : SL90232557O-6 * BAT - SN : 11378929	6.76	30.50
Float Sub w/ Ported Float 6.75 in OD / 3.00 in ID	0.91	39.69			
MWD	29.46	38.78			
6 3/4 NM Flex Collar 6.75 in OD / 1.92 in ID * PCDC	2.76	7.76	6 3/4" Nukes 6.75 in OD / 1.92 in ID SN : SL9023558N2L2-6 * CTN - SN : 231177 * ALD - SN : 11062362	9.23	25.91
Geo-Pilot 7600 6.75 in OD / 1.92 in ID	6.13	6.56	6 3/4" RLL 6.75 in OD / 1.92 in ID SN : PA90217460H1WRGV2X-6 * Sleeve Stabilizer * HCIM - SN : 246857 * PWD - SN : 184467440737095 * EWR-P4 - SN : 226817 * DGR - SN : 11109929 * DDSr-DGR - SN : 11109929	8.60	15.41
8 1/2" Security FM3755 PDC 8.50 in OD / 2.50 in ID	0.43	0.43			12.85
					10.52
					0.00

COMMENTS
 RIH with Quad Combo and GP assembly. Wipe previously drilled directional only section from 1972m to 2019mMDRT. Drill new formation to 2023mMDRT. POOH for GP failure.

Bitrun Summary

RUN TIME DATA							
MWD Run	: 600	Run Start	: 21-Dec-09 02:23	BRT Hrs	: 177.72 hr	Circ. Hrs	: 135.75 hr
Rig Bit No	: 6rr	Run End	: 28-Dec-09 12:07	Hole Size	: 216.00 mm	Oper. Hrs	: 177.72 hr

DRILLING DATA							
Start Depth	: 2023.00 m	Footage	: 1499.00 m	Avg RPM	: 140 rpm	Avg ROP	: 15.00 m/hr
End Depth	: 3522.00 m	Avg Flow Rate	: 580.00 gpm	Avg WOB	: 10.0 klb	Avg SPP	: 2650 psig
Drilling Hours	: 89.400 hr						

MUD DATA							
Mud Type	: Polymer						
Weight	: 9.55 ppg	Viscosity	: 55.00 spqt	PV	: 18 cP	YP	: 37.00 lhf2
Chlorides	: 29000.00 ppm	Max Temp.	: 111.80 degC	% Solids	: 4.70 %	% Sand	: 0.30 %
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.	: 7.43 deg	Min. Inc. Depth	: 2047.710 m
Final Az.	: 357.89 deg	Max Op. Press.	: 5228 psig	Max Inc.	: 43.48 deg	Max Inc. Depth	: 2857.710 m
MWD Real-time %	: 99 %		MWD Recorded %	: 0 %			

	Length (m)	Dist From Bit (m)		Length (m)	Dist From Bit (m)
5 x 5" HWDP 5.00 in OD / 3.00 in ID	47.18	211.93			
6 1/2" Jar 6.50 in OD / 2.75 in ID	9.84	164.75	6 3/4" ACAL 6.75 in OD / 1.92 in ID SN : SL 90232559B-6 * ACAL - SN : 138159	1.83	31.48
9 x 5" HWDP 5.00 in OD / 3.00 in ID	84.57	154.91	6 3/4" 10ft HOC 6.75 in OD / 1.92 in ID SN : 203846 * Positive Pulser - SN : 11160935 * PCM - SN : 11055881	3.04	35.30
3 x Spiral Drill Collar 6.75 in OD / 2.88 in ID	27.96	70.34			
Integral Blade Stabiliser 6.75 in OD / 2.88 in ID	1.70	42.38	6 3/4" BAT Collar 6.75 in OD / 1.92 in ID SN : SL90232557O-6 * BAT - SN : 11378929	6.76	31.48
Float Sub w/ Ported Float 6.75 in OD / 3.00 in ID	0.91	40.68			
MWD	29.46	39.77			
6 3/4" NM Flex Collar 6.75 in OD / 1.92 in ID * PCDC	2.81	8.73	6 3/4" Nukes 6.75 in OD / 1.92 in ID SN : SL9023558N2L2-6 * CTN - SN : 231177 * ALD - SN : 11062362	9.23	26.89
Geo-Pilot 7600 6.75 in OD / 1.92 in ID	7.07	7.50	6 3/4" RLL 6.75 in OD / 1.92 in ID SN : PA90217460H1WRGV2X-6 * Sleeve Stabilizer * HCIM - SN : 246857 * PWD - SN : 11222129 * EWR-P4 - SN : 226817 * DGR - SN : 11109929 * DDSr-DGR - SN : 11109929	8.60	16.39
8 1/2" Security FM3755 PDC 8.50 in OD / 2.50 in ID	0.43	0.43			13.86
					11.50
					0.00

COMMENTS
Continued to drill 216mm hole section to well TD at 3522.0 mMDRT. POOH and all recorded data was recovered at surface.

Directional Survey Data

RT-LAT=26.0 m
Final survey is a projection to TD

Tie-in

0.000	0.00	0.00	0.000	0.000 N	0.000 E	***
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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	0.050	0.05
327.420	0.34	318.42	327.420	0.250 N	0.600 W	0.270	0.08
356.380	0.16	310.14	356.380	0.340 N	0.690 W	0.360	0.19
414.830	0.43	334.58	414.830	0.590 N	0.840 W	0.620	0.15
502.130	0.25	356.62	502.130	1.080 N	1.000 W	1.110	0.08
559.330	0.33	356.35	559.330	1.370 N	1.010 W	1.400	0.04
645.930	0.22	77.08	645.920	1.650 N	0.870 W	1.680	0.13
733.400	0.10	264.51	733.390	1.680 N	0.780 W	1.710	0.11
819.330	0.13	204.11	819.320	1.590 N	0.890 W	1.620	0.04
907.200	0.22	337.40	907.190	1.650 N	1.000 W	1.680	0.11
956.770	0.15	112.45	956.760	1.710 N	0.980 W	1.750	0.21
980.350	0.00	258.48	980.340	1.700 N	0.950 W	1.730	0.19
1009.960	0.20	60.48	1009.950	1.730 N	0.900 W	1.760	0.20
1039.180	0.22	57.43	1039.170	1.780 N	0.810 W	1.810	0.02
1068.020	0.25	56.38	1068.010	1.850 N	0.710 W	1.870	0.03
1096.690	0.09	334.71	1096.680	1.900 N	0.670 W	1.920	0.26
1125.200	0.25	23.41	1125.190	1.980 N	0.650 W	2.000	0.21
1153.520	0.31	18.55	1153.510	2.110 N	0.610 W	2.130	0.07
1182.120	0.26	64.52	1182.110	2.210 N	0.520 W	2.230	0.24
1210.690	0.31	28.33	1210.680	2.310 N	0.430 W	2.320	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	3.280	0.10
1441.660	0.57	57.51	1441.650	3.450 N	0.660 E	3.430	0.14
1470.690	0.57	43.73	1470.680	3.640 N	0.880 E	3.600	0.14
1499.950	0.59	47.75	1499.930	3.840 N	1.100 E	3.800	0.05
1529.470	0.61	56.99	1529.450	4.030 N	1.340 E	3.980	0.10
1558.730	0.62	46.69	1558.710	4.220 N	1.590 E	4.170	0.11
1587.900	0.64	49.02	1587.880	4.440 N	1.820 E	4.380	0.03
1616.890	0.68	52.55	1616.870	4.650 N	2.080 E	4.580	0.06
1645.390	0.64	67.47	1645.360	4.810 N	2.360 E	4.730	0.19
1673.840	0.66	56.91	1673.810	4.960 N	2.650 E	4.870	0.13
1702.240	0.67	57.55	1702.210	5.140 N	2.930 E	5.040	0.01
1759.920	0.72	70.24	1759.890	5.450 N	3.550 E	5.320	0.08
1789.630	0.84	75.16	1789.590	5.570 N	3.940 E	5.430	0.14
1848.620	0.80	79.00	1848.580	5.750 N	4.760 E	5.590	0.03
1876.780	0.90	76.63	1876.730	5.840 N	5.170 E	5.670	0.11
1905.300	0.76	78.61	1905.250	5.930 N	5.570 E	5.740	0.15
1934.760	0.91	50.85	1934.710	6.120 N	5.940 E	5.910	0.43

Directional Survey Data

Measured Depth (m)	Inclination (deg)	Direction (deg)	Vertical Depth (m)	Latitude (m)	Departure (m)	Vertical Section (m)	Dogleg (°/30m)
1951.760	0.68	51.65	1951.710	6.270 N	6.130 E	6.060	0.41
1968.420	0.69	57.75	1968.370	6.380 N	6.290 E	6.170	0.13
1992.640	3.64	23.88	1992.570	7.160 N	6.720 E	6.930	3.83
2006.900	4.80	20.69	2006.790	8.130 N	7.120 E	7.890	2.49
2047.710	7.43	22.90	2047.360	12.160 N	8.750 E	11.860	1.94
2076.220	10.04	18.43	2075.540	16.220 N	10.250 E	15.870	2.84
2104.970	12.80	14.68	2103.720	21.680 N	11.850 E	21.270	2.98
2134.780	14.54	10.50	2132.680	28.550 N	13.370 E	28.090	2.01
2164.310	17.43	9.42	2161.070	36.560 N	14.770 E	36.050	2.95
2193.360	20.51	7.83	2188.540	45.900 N	16.180 E	45.330	3.22
2250.020	26.59	5.77	2240.450	68.370 N	18.810 E	67.700	3.25
2278.270	29.06	6.68	2265.440	81.480 N	20.240 E	80.750	2.66
2307.320	31.70	6.12	2290.500	96.080 N	21.870 E	95.290	2.74
2336.990	34.05	2.98	2315.410	112.130 N	23.140 E	111.280	2.93
2366.570	36.34	359.97	2339.590	129.160 N	23.560 E	128.300	2.91
2395.130	37.77	356.94	2362.380	146.360 N	23.090 E	145.500	2.44
2423.370	39.84	355.17	2384.390	164.010 N	21.870 E	163.180	2.49
2452.170	42.32	354.45	2406.090	182.860 N	20.150 E	182.080	2.63
2481.680	43.11	354.88	2427.780	202.790 N	18.290 E	202.060	0.86
2511.390	42.92	354.47	2449.500	222.970 N	16.410 E	222.290	0.34
2540.160	43.10	354.54	2470.540	242.510 N	14.530 E	241.880	0.19
2568.350	43.01	353.48	2491.140	261.650 N	12.520 E	261.070	0.78
2596.310	42.88	354.12	2511.600	280.580 N	10.460 E	280.070	0.49
2626.300	43.28	355.27	2533.510	300.980 N	8.570 E	300.520	0.88
2655.720	43.09	355.77	2554.960	321.050 N	7.000 E	320.630	0.40
2683.980	42.76	356.30	2575.650	340.250 N	5.670 E	339.870	0.52
2712.300	43.19	356.38	2596.370	359.520 N	4.430 E	359.160	0.46
2741.970	43.47	355.92	2617.960	379.830 N	3.070 E	379.510	0.43
2770.220	42.94	356.20	2638.550	399.120 N	1.740 E	398.840	0.60
2799.070	43.15	356.27	2659.630	418.770 N	0.440 E	418.520	0.22
2828.790	42.74	355.82	2681.390	438.970 N	0.950 W	438.760	0.52
2857.710	43.48	356.21	2702.500	458.690 N	2.330 W	458.510	0.82
2886.290	43.02	355.19	2723.320	478.220 N	3.800 W	478.070	0.88
2914.350	43.18	355.63	2743.810	497.330 N	5.330 W	497.220	0.36
2942.960	43.00	355.89	2764.700	516.820 N	6.780 W	516.750	0.27
2972.300	43.13	356.10	2786.130	536.800 N	8.180 W	536.770	0.20
3031.320	43.35	358.13	2829.130	577.180 N	10.210 W	577.200	0.72
3059.740	43.12	357.42	2849.840	596.630 N	10.960 W	596.660	0.57
3116.750	42.91	356.52	2891.520	635.470 N	13.020 W	635.550	0.34
3175.850	42.94	355.93	2934.800	675.630 N	15.670 W	675.770	0.20
3232.850	42.61	354.97	2976.640	714.220 N	18.740 W	714.440	0.38
3261.400	42.02	354.71	2997.750	733.360 N	20.470 W	733.630	0.65
3290.950	42.18	356.09	3019.670	753.110 N	22.060 W	753.420	0.95
3348.870	42.01	356.27	3062.650	791.850 N	24.650 W	792.230	0.11
3377.120	41.91	356.10	3083.660	810.690 N	25.900 W	811.110	0.16
3405.960	41.76	356.10	3105.150	829.880 N	27.210 W	830.330	0.16
3435.820	41.85	357.17	3127.410	849.750 N	28.380 W	850.230	0.72
3494.200	41.35	357.89	3171.060	888.480 N	30.050 W	888.990	0.36

Directional Survey Data

Measured Depth (m)	Inclination (deg)	Direction (deg)	Vertical Depth (m)	Latitude (m)	Departure (m)	Vertical Section (m)	Dogleg (°/30m)
3522.000	41.35	357.89	3191.930	906.830 N	30.730 W	907.350	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 358.07 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 3522.00 METRES

IS 907.35 METRES ALONG 358.06 DEGREES (GRID)