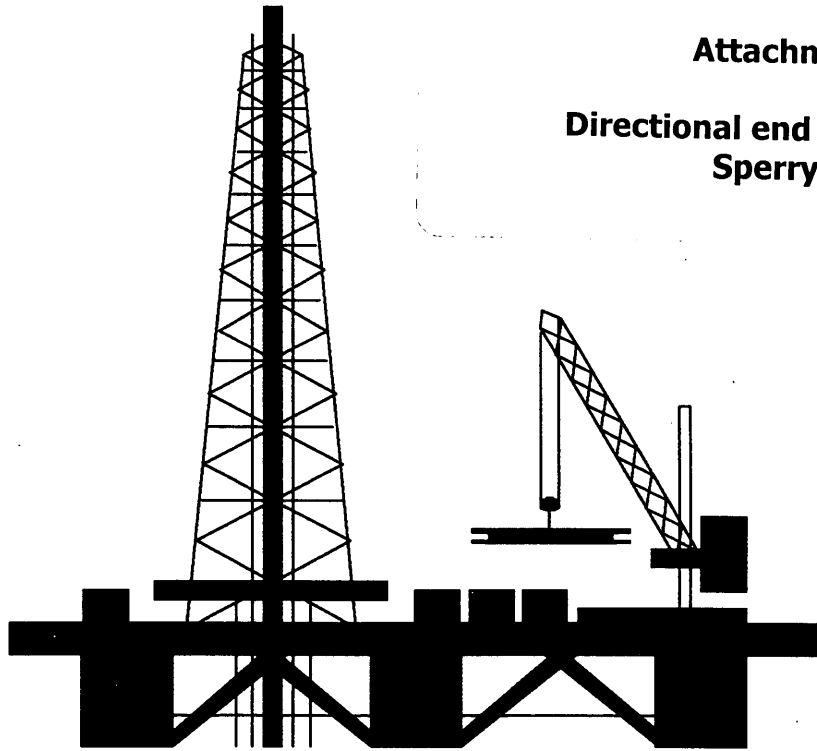


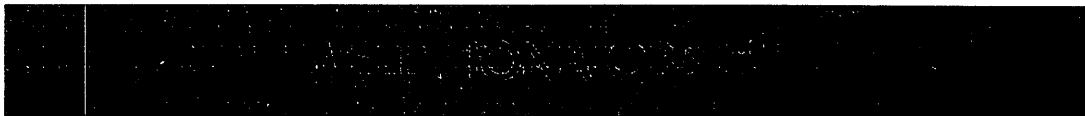
WESTERN UNDERGROUND GAS STORAGE

Attachment 8

Directional end of well report  
Sperry Sun



DIRECTIONAL DRILLING END OF WELL REPORT



**sperry-sun**  
DRILLING SERVICES

WESTERN UNDERGROUND GAS STORAGE

WELL : IONA OBS #1

TABLE OF CONTENTS

SECTION ONE :	WELL SUMMARY
SECTION TWO :	SURVEY PLOT & DEFINITIVE SURVEY REPORTS
SECTION THREE :	SURVEY & DRILLING PARAMETERS
SECTION FOUR :	BHA DATA
SECTION FIVE :	MOTOR PERFORMANCE REPORTS
SECTION SIX :	DAILY DIRECTIONAL DRILLING REPORTS

**Customer** : Western Underground Gas Storage

**Well** : Iona OBS-1

**Job Objectives:**

Iona Obs - 1 is designed as an appraisal well of the Iona gas field, the well bore will be used as an observation well for the purpose of monitoring reservoir pressure and gas water contact movement during gas injection and withdrawal cycles of gas. The well will also be equipped to handle the disposal of produced water.

The well is designed to be the eastern-most well in the field and will monitor water influx from the east along, and adjacent to the northern bounding fault. The well will be drilled as an S-shaped well to enable logging and coring of the objective section in a vertical well bore. The well will be drilled vertically to a depth of 140m, then using a Sperry-Drill adjustable bent housing motor (set with a 1.5 degree bend) and Sperry-Sun DWD, the well bore will be steered from 0 deg inclination to 39.5 deg with dogleg rate of 4°/30m in the direction of 127.15 degrees. Then a tangent section will be drilled to 740m, where the 7" casing will be set.

The 6" hole will be drilled continuing the tangent section to a depth of 774m. The well bore will then be dropped back to 0 degrees inclination at a drop rate of 2°/30m, a Sperry-Drill 4¾" adjustable bent housing motor (set at 1.15 degrees) and a Sperry-Sun 350 system DWD will be utilised to drill this section, The final well TD will be 1550m +/-.

**Summary of Results:**

**Discussion:**

**BHA Summary:**

BHA # 1 : 8½" Tricone Milled tooth bit, with a 6¼" SperryDrill w/1.5 bend.

Objective : To drill 8½" hole to 140m, then build to 39.5 deg @ 4°/30m in the direction of 127.15 deg azimuth. Hold angle and azimuth to 7" casing point of 740 m +/-.

Result : Drilled to 135m and started kick off, oriented 70% per single from 135 m to 173m. Once the desired build rate of 4°/30 was established, the percentage oriented was cut back to 40 - 50% per single. The following drilling parameters were used from 135m ---> 270m, WOB = 5k, Flow = 384 gpm, SPP = 1300 p.s.i., and surface RPM = 50. At 270m the flow rate was increased to 432 gpm giving a stand pipe pressure of 1600 p.s.i.

Continued steerable drilling until 457m where an inclination of 39.8 deg was achieved on an azimuth of 128.8 degrees. Rotary drilled to 499m where a 4m set of 90L was made followed by a 4.5m set of 100L to arrest a build rate of 0.62°/30m and a right hand turn rate of 1.2°/30m. Rotary drilled from 514m to TD with the following parameters, Avg WOB = 5-10k, Flow rate = 432 gpm, Stand pipe pressure = 1950 p.s.i., RPM = 50-60, with an average rate of penetration of 35 - 40 m/hr. The Inclination at TD was 36.9 deg on an azimuth of 126.6 degrees, this put the well path 1.5m to the right and 0.5m low of the proposal.

The steerability of the assembly was very good. Oriented 25% of the bit run.

Formations drilled are as follows :

Narrawatuk Marle @ 209m --->306m

Mepunga sandstone @ 306m ---> 353m

Dilwyn sandstone @ 343m

Pember claystone @ 614m ---> 696m

Pebble point sandstone/claystone 696m ---> 740m.

BHA # 2 : 8½" Clean out assembly

Objective : To clean out hole prior to running 7" casing. Then drop multi shot gyro.

Result : Run in hole to bottom, had to pick up kelly at 725m and wash and ream to bottom, circulated bottoms up, dropped Gyro Data multi shot Gyro and POOH.

BHA # 3 : 6" PDC Bit, 4¾" SperryDrill w/1.15 bend.

Objective : To drill 158m tangent then drop angle from 39.5 degrees to 0 degrees inclination @ 2°/30m, then continue drilling vertically to Core point.

Result : Drilled out cement, float and shoe track, then drilled 2m of new hole to 746m and performed FIT. Continued drilling ahead in rotary to 959m, with the following parameters, RPM=60, WOB=5-7k, GPM=250, average ROP=40m/hr, the off bottom pressure was 1600 p.s.i. and on bottom 1900 - 2000 p.s.i., giving an average differential pressure of 350 - 400 p.s.i.

From the shoe to 798m the formation was the Pebble point, which was a sandstone/claystone mixture, the assembly appeared to have a left hand walk tendency of -0.5 deg/30m and seemed to hold angle in this formation. In the Paaratte formation (sandstone 798 -->1197m) the assembly was dropping at -1.2 to -1.5°/30m and walking left @ -0.3 to -1.0°/30m. Oriented drilling was attempted to arrest and reverse the left hand walk with little success due to the assembly hanging up and the aggressiveness of the bit making tool face control impossible. At 1251m a drop rate of 2.5°/30m with a turn rate of 1.2°/30m was required to target centre and as the assembly was only giving a drop rate of -1.2°/30m, and was walking left at -0.3 to -1.0°/30m, the decision was made to trip out of the hole for a Tricone bit which would be more controllable as a steerable assembly.

Became stuck at 923m while tripping out of the hole, a string shot back off was performed by Schlumberger and fishing tools were run in the hole to try and recover the rest of the drill string and BHA. This was unsuccessful, wash over pipe was then run and washed over the fish five joints at a time, the fish was recovered with this method.

Recommendations : The use of a PDC bit should not be considered with a target as small as the one for Iona Obs-1. Also we might consider instead of drill collars running heavy weight drill pipe; this might reduce the problem of hanging up while oriented drilling, and also reduce the chance of becoming differentially stuck.

BHA # 4 : 6" Rotary Clean out assembly.

Objective : Clean out hole prior to drilling ahead with steerable assembly.

Result : Run in hole to 920m then wash and ream from 920 - 950m. Continued to run in the hole to 1248m, circulated hole clean and conditioned mud, pulled out of the hole to 959m and circulated the hole clean. Pulled out of the hole for the steerable drilling assembly.

BHA # 5 : 6" Tricone insert bit with 4¾" SperryDrill Lobe 4/5 - 6.3 stage, with bend set to 1.15 deg.

Objective : To make correction to well path, then drill to well core Point, heavy weight drillpipe was run in place of drill collars to reduce the chance of differential sticking, and hanging up encountered with BHA # 3.

Result : Drilled from 1251m to 1509.3m, with the following parameters while steerable drilling : WOB = 15-25k, Flow = 200 g.p.m., Off bottom SPP = 2100 p.s.i., On bottom SPP = 2400 p.s.i. with a differential pressure of 400 p.s.i. the average ROP while steering was 10 - 12 m/hr, steerable drilling was 28% of the run, and the steerability was good. The motor was giving 7½°/30m doglegs. In rotary mode the average rate of drop was -0.2°/30m. Rotary drilled with the following parameters : WOB 5 - 8k, Flow = 235 g.p.m., RPM = 60 - 80, On bottom SPP = 2450 p.s.i., Off bottom SPP = 2400 p.s.i. with an average ROP of 8 - 10 m/hr.

The reason for the lower differential pressure in rotary was due to the increased flow rate for hole cleaning, which resulted in a higher off bottom stand pipe pressure, therefore we were unable to use the 400 p.s.i. differential pressure that the motor was capable of as this would have blown the pop offs on the mud pumps which were set for 2500 p.s.i.. The reason for the high pressure was due to the jet selection on location, Ideally we would like to have had 3 x 12 jets in the bit, but the largest jets on location were 11's.

Directionally the run was a success, with the actual well path being 0.6m away from the proposed well path.

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	1	8.500	10	743	10	653	0.0	36.4	24	127	45	1
2	2rr1		8.500	743	743	653	653	36.4	36.4	127	127	0	2
3	3	2	6.000	743	1251	653	1092	36.4	20.6	127	126	26	5
4	4rr1		6.000	1251	1251	1092	1092	20.6	20.6	126	126	0	4
5	5	3	3.000	1251	1509	1092	1345	20.6	1.7	126	38	31	7
6	6		6.000	1509	1538	1345	1374	1.7	2.8	38	347	6	5
7	7rr1		6.000	1538	1568	1374	1403	2.8	4.8	347	330	4	1

Table 1 - BHA Summary

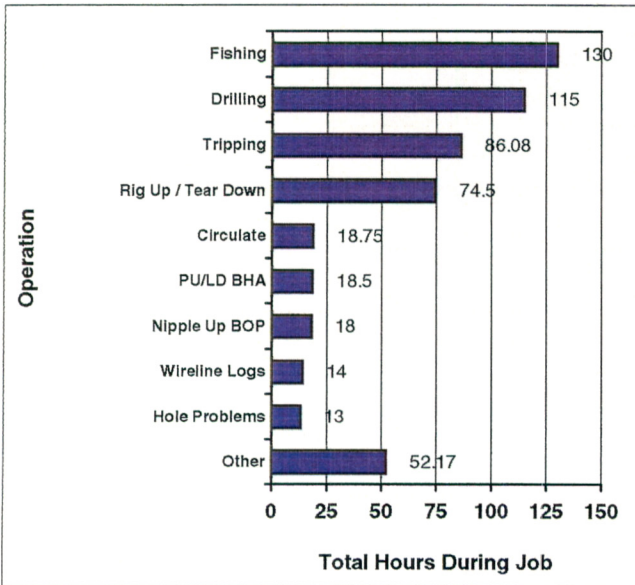
Motor Run #	Manufacturer	Type	Lobe	OD (In)	Gauge (In)	Bend (deg)	Adj	DLS (Ori) (°/30m)	ROP (Ori) (m/hr)	ROP (Rot) (m/hr)
1	SSDS	SperryDrill	7/8	6.750	8.063	1.50	Y	8.00	14	17
2	SSDS	SperryDrill	4/5	4.750	5.690	1.15	Y	4.50	3	20
3	SSDS	SperryDrill	4/5	4.750	5.500	1.15	Y	7.50	9	8

Table 2 - Motor Run Summary

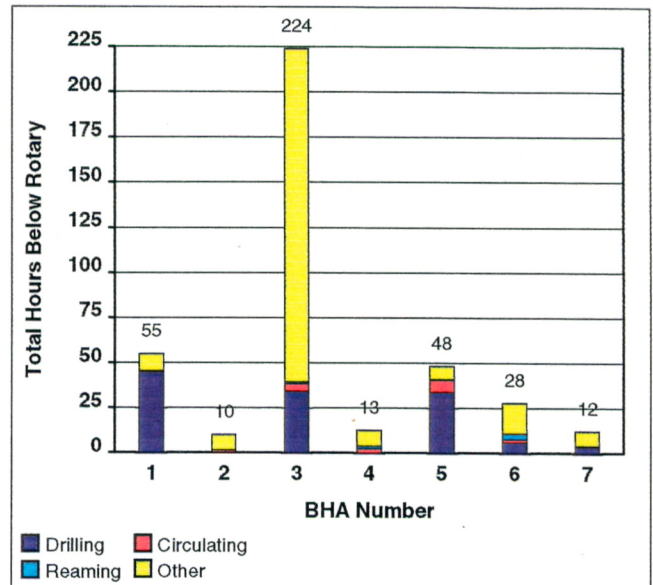
Bit #	Manufacturer	Style	OD (in)	Gge Len (in)	Nozzles (/32's)	TFA (in <sup>2</sup> )	Dull Grades I O D L B G O R	Ftge (m)	Drig hrs	ROP (m/hr)
1	Hughes Christensen	GT-MG1	8.500		3x13	0.389	2-2-NO-A -E-I-NO-TD	733	44.92	16
2rr1	Hughes Christensen	GT-MG1	8.500		3x13	0.389	2-2-NO-A -E-I-NO-CSG	0	0.00	
3	BBL	BB457SRL+ 1	6.000		4x10	0.307	2-4-CT-A -X-I-ER-BHA	508	26.26	19
4rr1	BBL	BB457SRL+ 1	6.000		4x10	0.307	2-4-CT-A -X-I-ER-BHA	0	0.00	
5	Hughes Christensen	STR-09	6.000		3x11	0.278	2-2-ER-A -E-I-NO-CP	258	31.39	8
6			6.000					29	6.00	5
7rr1	Hughes Christensen	STR-09	6.000		3x11	0.278		30	3.50	9

Table 3 - Bit Run Summary

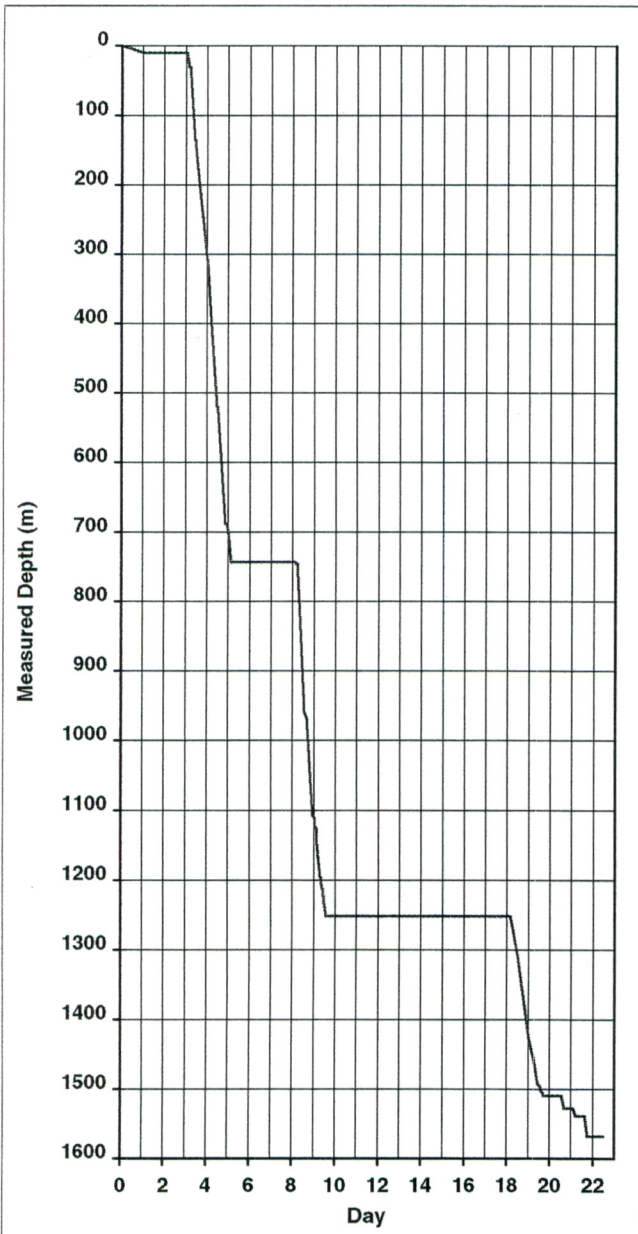
### Hours by Operation Summary



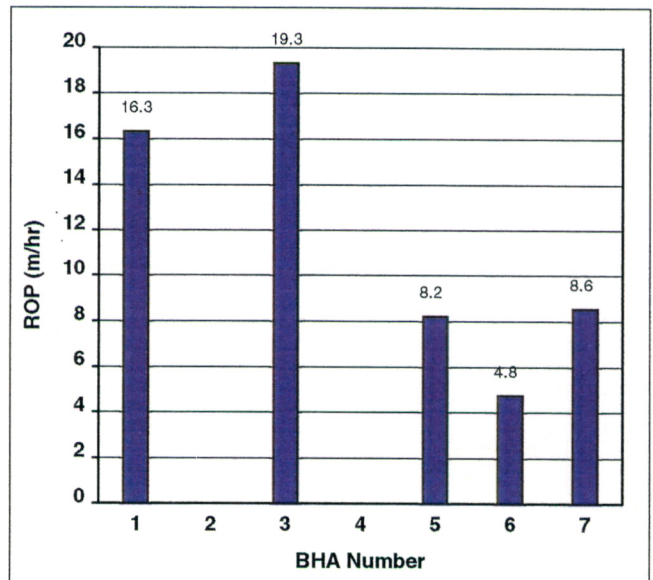
### Hours per BHA Breakdown



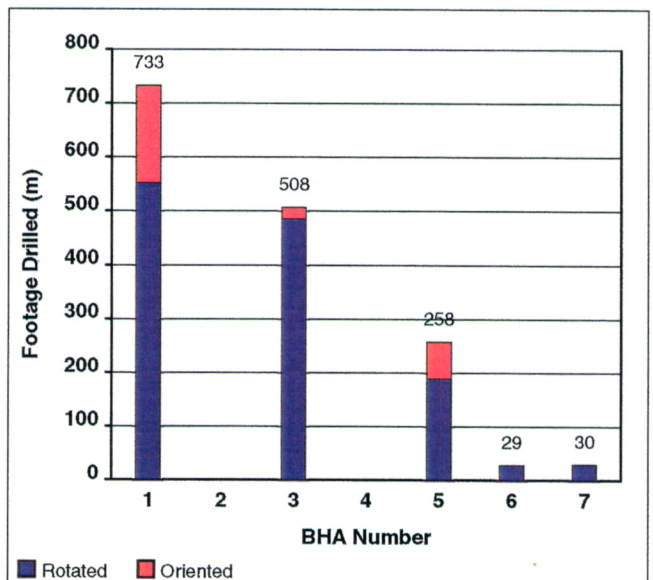
### Days vs. Depth



### Average Rate of Penetration per BHA



### Footage per BHA



MD (m)	Formation Name MD/TVD	Inclination DLS	Bit Data	Drilling Parameters	Motor	BHA Stabilizers	Comments	BHA ID
0		0						@ 0
100		10						#1 @ 10
200	Narrawatuk Marie 210 / 209	20	GT-MG1 3x13 / 32's 16.3 m/hr 44.92 hrs	WOB 8 klbs RPM 50 FLO 405 gpm SPP 1625 psi	6 3/4" SperryDrill 7/8 L 1.50° ABH	8.063 in @ 1.08 m 7.750 in @ 9.21 m	To drill down to Kick off point at 150 m, build to 39.5 deg at 47'30m and hold angle to 7° casing point at 740m. A 8-1/16" gauge motor sleeve stab was run on the motor. Sn#CP075547. The motor was giving a dog leg rate of 7.5 - 8°/30m when oriented high side, and a drop rate of -0.3°/30m with a turn rate of 0.4°/30m in rotary.	
300	Mepunga Formation 306 / 301	30						
400	Dilwyn Formation 353 / 343	40						
500		50						
600	Pember Mudstone 614 / 550	60	BB457SRL+1 4x10 / 32's 19.3 m/hr 26.26 hrs	WOB 6 klbs RPM 58 FLO 248 gpm SPP 1949 psi	4 3/4" SperryDrill 4/5 L 1.15° ABH	5.690 in @ 1.09 m 5.875 in @ 9.84 m	To drill 34m tangent then drop angle from 39.5 degrees to 0 degrees inclination @ 27'30m, then continue drilling vertically to well TD. 6-1/16" Motor stab sn# CP019845 used. This assembly dropped angle at an average rate of -1.2°/30m and had a left hand walk tendency of -0.5°/30m. The assembly was unsteerable due to the aggressiveness of the PDC bit and weight slacking causing Tool face control to be impossible. Became stuck @ 923m when POOH. Performed a string shot back off RIH fishing tools and attempt to recover remaining drill string and BHA, this was unsuccessful. RIH with wash over pipe and recover BHA 5 joints at a time.	#3 @ 743
700	Pebble point 696 / 615	70						
800	Paararte 769 / 674	80						
900		90						
1000		100						
1100		110	STR-09 3x11 / 32's 8.2 m/hr 31.39 hrs	WOB 10 klbs RPM 73 FLO 221 gpm SPP 2335 psi	4 3/4" SperryDrill 4/5 L 1.15° ABH	5.500 in @ 1.09 m 5.750 in @ 9.88 m	6" Tricone insert bit with 4 3/4" SperryDrill Lobe 4/5 - 6.3 stage adjustable bend set to 1.15 deg. Drilled from 1251m to 1509.3m, with the following parameters while steerable drilling, WOB = 15-25k, Flow = 200 g.p.m., Off bottom SPP = 2100 p.s.i., On bottom SPP = 2400 p.s.i. with a differential pressure of 400 p.s.i. the average ROP while steering was 10 - 12 m/hr, steerable drilling was 28 % of the run, and the steerability was good. The motor was giving 7-1/2 deg/30m doglegs. In rotary mode the average rate of drop was -0.2 deg/30m. Rotary drilled with the following parameters: WOB 5 - 8k, Flow = 235 g.p.m., RPM = 60 - 80. On bottom SPP = 2450 p.s.i., Off bottom SPP = 2400 p.s.i. with an average ROP of 8 - 10 m/hr.	#5 @ 1251
1200	Skuil creek Member 1176 / 1023	120						
1300	Nullawarre Greensand 1324 / 1162	130						
1400		140	4.8 m/hr 6.00 hrs	WOB 4 klbs RPM 60 FLO 143 gpm SPP 1100 psi			To core C 1 waarre sandstone.	#6 @ 1509
1500	Belfast Mudstone 1433 / 1268 Waarre D unit 1476 / 1311 Waarre C 1 sand 1498 / 1333	150	STR-09 3x11 / 32's 8.6 m/hr 3.50 hrs	WOB 20 klbs RPM 100 FLO 260 gpm SPP 2450 psi		5.875 in @ 0.75 m 5.750 in @ 11.45 m	To drill +/- 30m.	#7 @ 1538
1600	Waarre C 2 sand 1510 / 1345	160						

# Sperry-Sun Drilling Services

Survey Report for Iona Obs #1  
Surveyed: 23 February, 1999

Western Underground Gas Storage Pty. Ltd.  
Iona

Iona Obs #1

Measured Depth (m)	Incl.	Azim.	Vertical Depth (m)	Northings (m)	Eastings (m)	Vertical Section (m)	Dogleg Rate (°/30m)
<b>Iona Obs #1 : 8½" Gyro</b>							
0.00	0.000	0.000	0.00	0.00 N	0.00 E	0.00	
104.80	0.250	24.410	104.80	0.21 N	0.09 E	-0.05	0.072
114.60	0.110	37.000	114.60	0.24 N	0.11 E	-0.06	0.443
143.30	2.700	131.980	143.29	0.20 S	0.63 E	0.62	2.835
172.30	7.430	129.880	172.17	1.86 S	2.58 E	3.17	4.896
200.70	11.230	125.190	200.19	4.63 S	6.25 E	7.77	4.090
229.40	13.790	127.230	228.20	8.31 S	11.25 E	13.99	2.715
258.40	17.240	129.300	256.14	13.12 S	17.33 E	21.74	3.614
287.40	21.620	128.020	283.48	19.14 S	24.87 E	31.38	4.552
316.40	24.790	129.090	310.14	26.26 S	33.80 E	42.80	3.308
344.80	27.970	129.380	335.57	34.25 S	43.57 E	55.41	3.362
373.80	32.140	128.700	360.67	43.39 S	54.86 E	69.92	4.328
402.30	34.760	126.940	384.45	53.01 S	67.27 E	85.63	2.941
431.00	37.430	126.830	407.64	63.16 S	80.79 E	102.54	2.792
460.10	39.760	128.670	430.38	74.28 S	95.14 E	120.69	2.677
488.60	40.110	129.780	452.23	85.85 S	109.31 E	138.97	0.836
517.60	38.830	126.010	474.62	97.17 S	123.84 E	157.39	2.810
546.60	38.620	125.990	497.25	107.83 S	138.52 E	175.53	0.218
575.60	38.330	126.380	519.95	118.49 S	153.08 E	193.57	0.391
604.60	38.110	126.330	542.73	129.12 S	167.53 E	211.51	0.230
633.60	37.910	126.600	565.58	139.74 S	181.90 E	229.37	0.269
662.60	37.520	126.610	588.52	150.31 S	196.14 E	247.11	0.403
691.60	37.390	126.810	611.55	160.86 S	210.28 E	264.74	0.184
720.60	37.110	126.680	634.63	171.36 S	224.34 E	282.30	0.301
730.30	36.950	126.590	642.37	174.84 S	229.03 E	288.14	0.522

## Iona Obs #1 : MWD Survey

745.86	36.300	126.600	654.86	180.38 S	236.48 E	297.42	1.253
774.82	36.100	125.900	678.23	190.49 S	250.27 E	314.52	0.476
793.23	36.400	126.400	693.08	196.91 S	259.06 E	325.41	0.686
822.23	34.900	126.400	716.64	206.94 S	272.67 E	342.31	1.552
851.25	34.500	127.100	740.50	216.83 S	285.91 E	358.83	0.584
879.67	33.600	128.500	764.05	226.58 S	298.48 E	374.74	1.260
899.17	33.500	129.200	780.30	233.34 S	306.87 E	385.51	0.615
938.10	31.400	129.000	813.15	246.51 S	323.08 E	406.38	1.620
967.10	31.600	129.100	837.88	256.06 S	334.85 E	421.53	0.214
996.20	30.700	127.600	862.78	265.40 S	346.65 E	436.58	1.225
1025.30	29.600	126.800	887.94	274.24 S	358.29 E	451.19	1.207
1054.00	28.300	125.200	913.06	282.40 S	369.53 E	465.08	1.582
1082.80	27.600	124.800	938.50	290.15 S	380.58 E	478.57	0.755
1111.92	26.200	124.500	964.47	297.64 S	391.42 E	491.73	1.449
1140.45	25.000	124.400	990.19	304.61 S	401.59 E	504.04	1.263

Continued...



# Sperry-Sun Drilling Services

Survey Report for Iona Obs #1

Surveyed: 23 February, 1999

Western Underground Gas Storage Pty. Ltd.  
Iona

Iona Obs #1

Measured Depth (m)	Incl.	Azim.	Vertical Depth (m)	Northings (m)	Eastings (m)	Vertical Section (m)	Dogleg Rate (°/30m)
1168.97	24.300	124.800	1016.11	311.37 S	411.38 E	515.93	0.757
1197.84	23.000	125.700	1042.56	318.05 S	420.84 E	527.50	1.402
1227.00	21.900	124.900	1069.51	324.48 S	429.92 E	538.63	1.174
1259.10	20.100	126.900	1099.48	331.22 S	439.25 E	550.13	1.810
1288.20	17.000	128.900	1127.06	336.90 S	446.56 E	559.38	3.262
1317.20	13.200	132.300	1155.06	341.79 S	452.31 E	566.92	4.035
1345.50	10.800	133.900	1182.74	345.80 S	456.61 E	572.77	2.568
1374.60	10.900	127.700	1211.32	349.37 S	460.75 E	578.23	1.207
1403.60	10.700	126.000	1239.80	352.63 S	465.10 E	583.67	0.389
1432.68	8.100	131.300	1268.49	355.57 S	468.82 E	588.41	2.824
1471.30	3.300	98.400	1306.92	357.53 S	471.97 E	592.10	4.366
1486.40	2.400	84.200	1322.00	357.56 S	472.71 E	592.71	2.260
1509.40	2.400	84.200	1344.98	357.47 S	473.67 E	593.42	0.000

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

Coordinate System is UTM Zone 54S on Australian Datum 1984, Meters.

Grid Convergence at Surface is  $-1.273^\circ$ . Magnetic Convergence at Surface is  $-12.207^\circ$  (15-Feb-99)

The Dogleg Severity is in Degrees per 30m.

Vertical Section is from Well and calculated along an Azimuth of  $127.150^\circ$  (Grid).

Based upon Minimum Curvature type calculations, at a Measured Depth of 1509.40m., The Bottom Hole Displacement is 593.42m., in the Direction of  $127.041^\circ$  (Grid).

## Comments

Measured Depth (m)	Station Coordinates			Comment
	TVD (m)	Northings (m)	Eastings (m)	
1509.40	1344.98	357.47 S	473.67 E	Extrapolation to TD

## Formation Tops

Measured Depth (m)	Vertical Depth (m)	Sub-Sea Depth (m)	Northings (m)	Eastings (m)	Formation Name
209.81	209.11	71.61	5.70 S	7.74 E	Narrawatuk Marie
306.00	300.65	163.15	23.58 S	30.48 E	Mepunga
353.00	342.78	205.28	36.73 S	46.61 E	Dilwyn
614.00	550.13	412.63	132.56 S	172.20 E	Pember Mudstone
696.00	615.04	477.54	162.45 S	212.41 E	Pebble Point
769.00	673.53	536.03	188.48 S	247.50 E	Paararte
1176.00	1022.53	885.03	313.01 S	413.74 E	Skull Creek Member
1324.00	1161.68	1024.18	342.81 S	453.43 E	Nullawarre Greensand
1432.61	1268.42	1130.92	355.57 S	468.81 E	Belfast Mudstone
1475.67	1311.28	1173.78	357.56 S	472.21 E	Waarre D Unit

Continued...

# Sperry-Sun Drilling Services

Survey Report for Iona Obs #1

Surveyed: 23 February, 1999

Western Underground Gas Storage Pty. Ltd.  
Iona

Iona Obs #1

Measured Depth (m)	Vertical Depth (m)	Sub-Sea Depth (m)	Northings (m)	Eastings (m)	Formation Name
--------------------------	--------------------------	-------------------------	------------------	-----------------	----------------

### Formation Tops (Continued)

1497.67	1333.26	1195.76	357.52 S	473.18 E	Waarre C1 Sand
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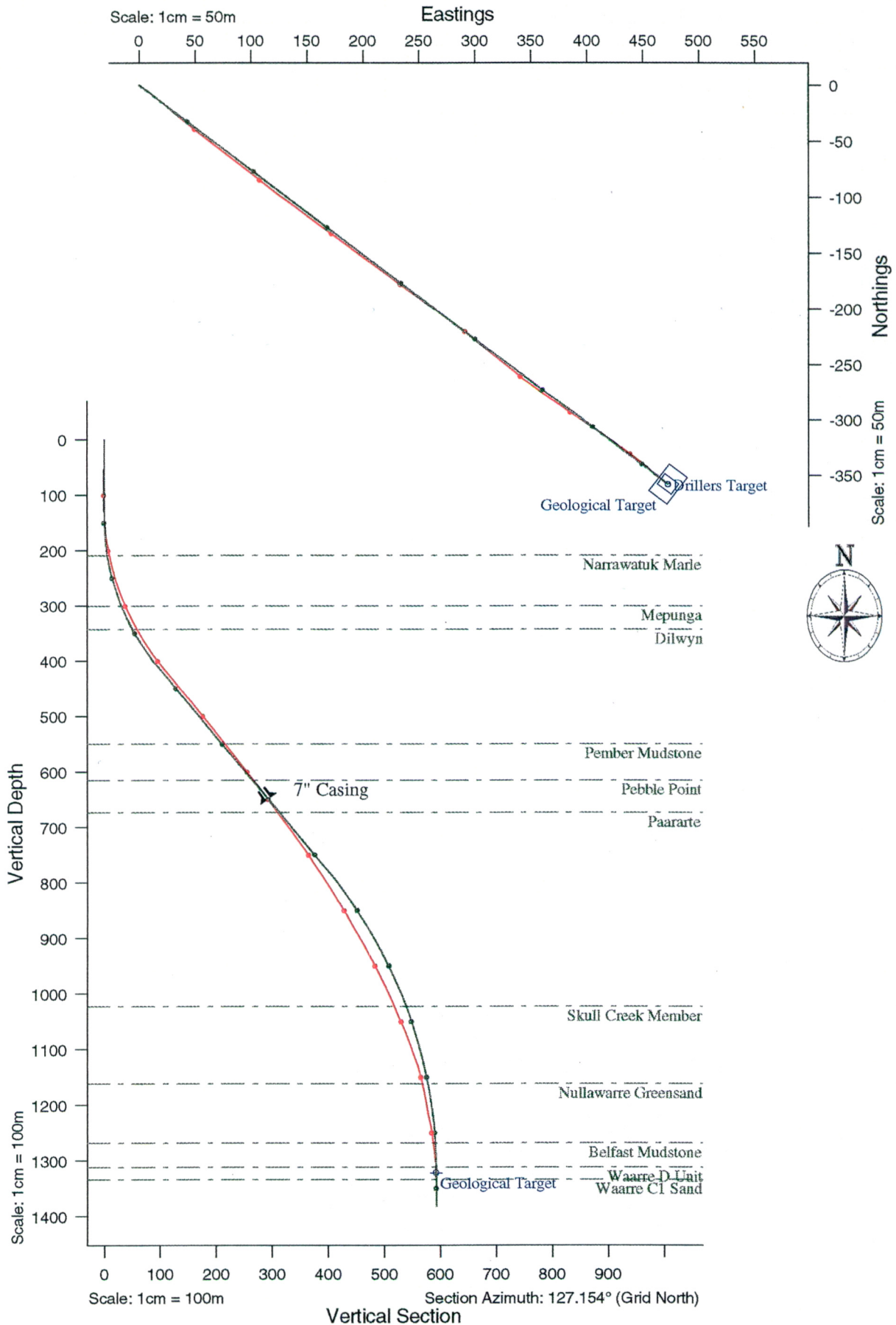
### Casing details

From		To		Casing Detail
Measured Depth (m)	Vertical Depth (m)	Measured Depth (m)	Vertical Depth (m)	
<Surface>	<Surface>	739.00	649.34	7" Casing

### Survey tool program

From		To		Survey Tool Description
Measured Depth (m)	Vertical Depth (m)	Measured Depth (m)	Vertical Depth (m)	
0.00	0.00	730.30	642.37	Northseek Gyro
730.30	642.37	1509.40	1344.98	MWD Magnetic

**Well : Iona Obs #1**



**sperry-sun**  
**DRILLING SERVICES**

BHA Report page 2

Customer : Western Underground Gas Storage

Well : Iona OBS-1

Country : Australia

Lease : PPL2 Otway Basin

Rig : Rig 30

Job # : AD-DD-90003

BHA# 6

**OBJECTIVES:**

To core C 1 waarre sandstone.

**RESULTS:**

Recovered 12 m of core.

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## DRILLING SERVICES

### BHA Report

Customer : Western Underground Gas Storage  
 Well : Iona OBS-1  
 Country : Australia  
 Lease : PPL2 Otway Basin  
 Rig : Rig 30  
 Job # : AD-DD-90003

BHA# 7

BHA# 7 : Date In 23/02/19 MD In (m) : 1538 TVD In (m) : 1374 Date Cur.24/02/199 MD Cur (m): 1568 TVD Cur (m): 1403

#### BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in <sup>2</sup> )	Dull Condition
7rr1	6.000	Hughes Christensen	STR-09	TO9YE	3x11	0.278	

#### 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	Tricone 4-3-7. STR 09	TO9YE	6.000		6.000	60.00	P 3-1/2" Reg	0.20	
2	5-7/8" Near Bit Stabilizer	990	4.750	2.250	5.875	46.84	B 3-1/2" IF	1.36	0.75
3	1x Drill collar	Rig	4.750	2.500		44.00	B 3-1/2" IF	9.40	
4	5 1/2" String Stabilizer	2993	4.750	2.310	5.750	46.11	B 3-1/2" IF	1.18	11.45
5	21x HWDP		3.500	2.063		25.30	B 3-1/2" IF	193.67	
6	Drilling Jar	1447-1026	4.810	2.250		48.38	B 3-1/2" IF	10.08	
7	15x HWDP		3.500	2.063		25.30	B 3-1/2" IF	137.77	
								353.66	

Parameter	Min	Max	Ave
WOB (klbs) :	20	20	20
RPM (rpm) :	100	100	100
Flow (gpm) :	260	260	260
SPP (psi) :	2450	2450	2450

Activity	Hrs
Drilling :	3.50
Reaming :	0.50
Circ-Other :	0.50
<b>Total :</b>	<b>4.50</b>

BHA Weight (lb)
in Air (Total) : 30895
in Mud (Total) : 26657
in Air (Bel Jars) : 17859
in Mud (Bel Jars) : 15410

Drill String	OD(in)	Len (m)
DP(G)-NC38(IF)-13.30#	3.500	1214

#### PERFORMANCE

	In	Out
Inclination (deg)	2.78	4.77
Azimuth (deg)	347.32	330.43

	Distance (m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :	0.00	0			
Rotated :	30.00	9			
<b>Total :</b>	<b>30.00</b>	<b>9</b>	<b>1.99</b>	<b>-16.89</b>	<b>2.26</b>

#### COMMENTS

To drill +/- 30m.

908919 014

**sperry-sun**  
**DRILLING SERVICES**

Customer : Western Underground Gas Storage  
Well : Iona OBS-1  
Country : Australia  
Lease : PPL2 Otway Basin  
Rig : Rig 30  
Job # : AD-DD-90003

BHA Report page 2

BHA# 7

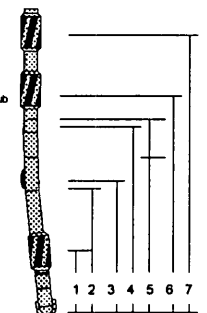
OBJECTIVES:

To drill +/- 30m. to TD of well.

Motor Serial # : 675-439	Job # : AD-DD-90003
Directional Driller(s) : C.Arrindell, B.Wood	Customer : Western Underground Gas Storage
Location : PPL2 Otway Basin	Rig : Rig 30
Well : Iona OBS-1	Bit Run # : 1      BHA # : 1      Motor Run # : 1
Depth In/Out : 10 / 743 m	Date In/Out : 05/02/1999 / 07/02/1999      Hole Size : 8.500 in
Application Details : Steerable Drilling	

**MOTOR CONFIGURATION**

	From Bit (m)	Component	Type	Diam In/Out (in)
Upr Stab	1 1.08	Sleeve Stab/Pad	Yes	8.063 8.063
	2 2.83	Bent Housing	Yes	Adjustable: 1.50° bend
Lwr Stab or Pad Sub	3	Housing Tool Used	No	
Motor Top	4 7.42	Stator Elastomer	Nitrile	Stator: Standard
Pad	5	Bent Sub / 2nd Bent Hsg	No	
Bend (Housing)	6 9.21	Lower String Stab	Yes	7.750 7.750
	7	Upper String Stab	No	



Additional Features :

Flex Collar : No	Short Brg Pack : No	Rtr Noz / Size : /32's	Arr Ret
Brg Cfg (Off/On) :	Lobe Cfg : 7/8	BHA OD/ID : 6.750 / 2.560 in	Pick Up Sub : Yes Yes
			Bit Box Protr : Yes Yes

**MOTOR RUN DATA**

Max Dogleg While Rotating : 1.00 */30m	RPM : 50	Motor Stalled : No	Prev Job/Well Hrs : 0.00
Max Dogleg Overpulled In : */30m	Force : lbf	Float Valve : Yes	Drilling Hrs : 44.92
Max Dogleg Pushed Through : */30m	Force : lbf	DP Filter : No	Circ Hrs : 1.00
Hole Azimuth Start / End : 24.41° / 126.60°	Inc Start / End : 0.02° / 36.40°		Reaming Hrs : 0.00
Interval Oriented / Rot. : 181 / 552 m	Directional Perf Ori / Rot : 8.00 / 0.33 */30m		Total Hrs This Run : 45.92
Jarring Occured : No			New Cumulative Hrs : 45.92

	Diff Press (psi)	Str RPM	Rotn Torque (ft-lbs)	Drag Up/Dn (lbf)	WOB (klbs)	ROP Oriented (m/hr)	ROP Rotated (m/hr)
Avg :	48	50		15000 / 5000	8	14	17
Max :	140	60		25000 / 7000	20	180	200

**PRE-RUN TESTS**

Motor Tested Pre-Run : No with :

Dump Sub Operating : N/A Brg Play : 1.0 mm

Flow 1 : gpm Pressure 1 : psi

Flow 2 : gpm Pressure 2 : psi

Driveshaft Rotation Observed : No

Bearing Leakage Observed : No

**POST-RUN TESTS**

Motor Tested Post-Run : No with :

Dump Sub Operating : N/A Brg Play : 1.0 mm

Flow 1 : gpm Pressure 1 : psi

Flow 2 : gpm Pressure 2 : psi

Driveshaft Rotation Observed : No

Bearing Leakage Observed : No

Driveshaft Rotated to Drain Mud : Yes

Fluid Flushed : Yes Fluid Used : Water

**MUD DATA**

Base : Water Additives : Mud Wt : 8.9 ppg SPP Start/End : 1000 / 1550 psi

% Oil/Water : / % Solids : 2.00 % Sand : 1.00 PV : 12 cp YP : 21.0 lb/100ft² pH : 8.5

DH Temp Avg/Max : / FlowRate Avg/Max : 405 / 432 gpm Chloride Content : 25000 ppm

Principle Formation Name(s) : Narrawatuk Marle, Mepunga Formation, Dilwyn Formation, Pem Lithology : Claystone, Sandstone, Claystone...

**BIT DATA**

Make : Hughes Christensen	Type : GT-MG1	Serial # : V00CS	Dull Grade	1	2	3	4	5	6	7	8
Prev Drilling Hrs : 0.00	Prev Reaming Hrs : 0.00	No of Runs This Bit : 1	In								NEW
Jet Sizes (/32's) : 3x13	TFA : 0.389 in²	Gage Length : in	Out	2	2	NO	A	E	I	NO	TD

**PERFORMANCE COMMENTS**

Problem Perceived : No Problem Date : Service Interrupt : No Service Interrupt Hrs :

Performance Motor : No Tandem Motor : No LIH : No PPR Ref # :

Customer Representative's Signature (optional) : \_\_\_\_\_ Date: \_\_\_\_\_

Motor Serial # : 475-109      Job # : AD-DD-90003  
 Directional Driller(s) : C.Arrindell, B.Wood      Customer : Western Underground Gas Storage  
 Location : PPL2 Otway Basin      Rig : Rig 30  
 Well : Iona OBS-1      Bit Run # : 3      BHA # : 3      Motor Run # : 2  
 Depth In/Out : 743 / 1251 m      Date In/Out : 09/02/1999 / 19/02/1999      Hole Size : 6.000 in  
 Application Details : Steerable Drilling

**MOTOR CONFIGURATION**

	From Bit (m)	Component	Type	Diam In/Out (in)
Upr Stab	1 1.09	Sleeve Stab/Pad	Yes	5.690 5.500
	2 2.27	Bent Housing	Yes	Adjustable: 1.15° bend
Lwr Stab or Pad Sub	3	Housing Tool Used	No	
Motor Top	4 9.09	Stator Elastomer	Nitrile	Stator: Standard
Pad	5	Bent Sub / 2nd Bent Hsg	No	
Bend (Housing)	6 9.84	Lower String Stab	Yes	Stab: 3 180°
	7	Upper String Stab	No	5.875 5.875

<b>Additional Features :</b>				<b>Arr Ret</b>
Flex Collar : No	Short Brg Pack : No	Rtr Noz / Size : /32's	Pick Up Sub : Yes	Yes
Brg Cfg (Off/On) :	Lobe Cfg : 4/5	BHA OD/ID : 4.750 / 2.250 in	Bit Box Protr : Yes	Yes

**MOTOR RUN DATA**

Max Dogleg While Rotating : 1.50 */30m	RPM : 60	Motor Stalled : Yes	Prev Job/Well Hrs : 0.00
Max Dogleg Overpulled In : 1.20 */30m	Force : 40000 lbf	Float Valve : Yes	Drilling Hrs : 26.26
Max Dogleg Pushed Through : 1.20 */30m	Force : 35000 lbf	DP Filter : No	Circ Hrs : 4.60
Hole Azimuth Start / End : 126.60° / 126.36°	Inc Start / End : 36.40° / 20.55°		Reaming Hrs : 0.80
Interval Oriented / Rot. : 22 / 486 m	Directional Perf Ori / Rot : 4.50 / 1.22 */30m		Total Hrs This Run : 31.66
Jarring Occured : Yes			New Cumulative Hrs : 31.66

	Diff Press (psi)	Str RPM	Rotn Torque (ft-lbs)	Drag Up/Dn (lbf)	WOB (klbs)	ROP Oriented (m/hr)	ROP Rotated (m/hr)
Avg :	335	58		20000 / 15000	6	3	20
Max :	400	60		50000 / 35000	30	10	50

**PRE-RUN TESTS**

Motor Tested Pre-Run : Yes with : 2 Collars, Bit, MWD  
 Dump Sub Operating : Yes Brg Play : 1.0 mm  
 Flow 1 : 120 gpm Pressure 1 : 500 psi  
 Flow 2 : gpm Pressure 2 : psi  
 Driveshaft Rotation Observed : No  
 Bearing Leakage Observed : No

**POST-RUN TESTS**

Motor Tested Post-Run : Yes with : 0 Collars  
 Dump Sub Operating : Yes Brg Play : 1.0 mm  
 Flow 1 : 250 gpm Pressure 1 : 500 psi  
 Flow 2 : gpm Pressure 2 : psi  
 Driveshaft Rotation Observed : Yes  
 Bearing Leakage Observed : No  
 Driveshaft Rotated to Drain Mud : Yes  
 Fluid Flushed : No Fluid Used :

**MUD DATA**

Base : Water      Additives : Torque trim      Mud Wt : 8.9 ppg      SPP Start/End : 1700 / 1900 psi  
 % Oil/Water : /      % Solids : 2.70      % Sand : 1.00      PV : 12 cp      YP : 23.0 lbf/100ft²      pH : 8.8  
 DH Temp Avg/Max : /      FlowRate Avg/Max : 248 / 250 gpm      Chloride Content : 22000 ppm  
 Principle Formation Name(s) : Pebble point, Paararte, Skull creek Member      Lithology : Sandstone/Claystone, Sandstone, Claysto

**BIT DATA**

Make : BBL	Type : BB457SRL+1	Serial # : 821355	Dull Grade	1	2	3	4	5	6	7	8
Prev Drilling Hrs : 0.00	Prev Reaming Hrs : 0.00	No of Runs This Bit : 1	In								NEW
Jet Sizes (/32's) : 4x10	TFA : 0.307 in²	Gage Length : in	Out	2	4	CT	A	X	1	ER	BHA

**PERFORMANCE COMMENTS**

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

The motor performed well, however steerability was not possible with the BHA hanging up and the PDC bit being too aggressive to control toolface. POOH and became stuck @ 923m.

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



Motor Serial # : 475-109	Job # : AD-DD-90003
Directional Driller(s) : C.Arrindell, B.Wood	Customer : Western Underground Gas Storage
Location : PPL2 Otway Basin	Rig : Rig 30
Well : Iona OBS-1	Bit Run # : 5      BHA # : 5      Motor Run # : 3
Depth In/Out : 1251 / 1509 m	Date In/Out : 19/02/1999 / 22/02/1999      Hole Size : 3.000 in
Application Details : Steerable Drilling	

**MOTOR CONFIGURATION**

	From Bit (m)	Component	Type	Diam In/Out (in)
Upr Stab	1	Sleeve Stab/Pad	Yes	5.500 5.500
	2	Bent Housing	Yes	
Lwr Stab or Pad Sub	3	Housing Tool Used	No	
Motor Top	4	Stator Elastomer	Nitrile	Stator: Standard
Pad	5	Bent Sub / 2nd Bent Hsg	No	
Bend (Housing)	6	Lower String Stab	Yes	5.750 5.750
	7	Upper String Stab	No	

<b>Additional Features :</b>	Flex Collar : No	Short Brg Pack : No	Rtr Noz / Size : /32's	Arr Ret
	Brg Cfg (Off/On) :	Lobe Cfg : 4/5	BHA OD/ID : 4.750 / 2.310 in	Pick Up Sub : Yes Yes
				Bit Box Protr : Yes Yes

**MOTOR RUN DATA**

Max Dogleg While Rotating : 4.00 */30m	RPM : 80	Motor Stalled : Yes	Prev Job/Well Hrs : 31.66
Max Dogleg Overpulled In : */30m	Force : lbf	Float Valve : Yes	Drilling Hrs : 31.39
Max Dogleg Pushed Through : */30m	Force : lbf	DP Filter : No	Circ Hrs : 6.51
Hole Azimuth Start / End : 126.36° / 38.01°	Inc Start / End : 20.55° / 1.71°		Reaming Hrs : 0.23
Interval Oriented / Rot. : 69 / 190 m	Directional Perf Ori / Rot : 7.50 / 0.20 */30m		Total Hrs This Run : 38.13
Jarring Occured : No			New Cumulative Hrs : 69.79

	Diff Press (psi)	Str RPM	Rotn Torque (ft-lbs)	Drag Up/Dn (lbf)	WOB (klbs)	ROP Oriented (m/hr)	ROP Rotated (m/hr)
Avg :	137	73		17000 / 10000	10	9	8
Max :	450	80		20000 / 10000	20	18	22

**PRE-RUN TESTS**

Motor Tested Pre-Run : Yes      with : 0 Collars  
 Dump Sub Operating : Yes      Brg Play : 2.0 mm  
 Flow 1 : 250 gpm      Pressure 1 : 500 psi  
 Flow 2 : gpm      Pressure 2 : psi  
 Driveshaft Rotation Observed : Yes  
 Bearing Leakage Observed : No

**POST-RUN TESTS**

Motor Tested Post-Run : No      with :  
 Dump Sub Operating : N/A      Brg Play : 2.0 mm  
 Flow 1 : gpm      Pressure 1 : psi  
 Flow 2 : gpm      Pressure 2 : psi  
 Driveshaft Rotation Observed : No  
 Bearing Leakage Observed : No  
 Driveshaft Rotated to Drain Mud : Yes  
 Fluid Flushed : No      Fluid Used :

**MUD DATA**

Base : Water      Additives :      Mud Wt : 9.0 ppg      SPP Start/End : 1950 / 2450 psi  
 % Oil/Water : /      % Solids : 1.90      % Sand : 2.00      PV : 35 cp      YP : 48.0 lbf/100ft<sup>2</sup>      pH : 9.5  
 DH Temp Avg/Max : /      FlowRate Avg/Max : 221 / 235 gpm      Chloride Content : 18500 ppm  
 Principle Formation Name(s) : Skull creek Member, Nullawarre Greensand, Belfast Mudstone..      Lithology : Claystone, Sandstone, Claystone, Sandsto

**BIT DATA**

Make : Hughes Christensen	Type : STR-09	Serial # : TO9YE	Dull Grade	1	2	3	4	5	6	7	8
Prev Drilling Hrs : 0.00	Prev Reaming Hrs : 0.00	No of Runs This Bit : 1	In								NEW
Jet Sizes (/32's) : 3x11	TFA : 0.278 in <sup>2</sup>	Gage Length : in	Out	2	2	ER	A	E	1	NO	CP

**PERFORMANCE COMMENTS**

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

Motor performed well, average differential pressure while oriented drilling was 400 p.s.i. Tripped out of the hole to core.

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







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## DRILLING SERVICES

### Daily Drilling Report

Customer : Western Underground Gas Storage  
 Well : Iona OBS-1  
 Country : Australia  
 Lease : PPL2 Otway Basin  
 Rig : Rig 30  
 Job # : AD-DD-90003

**CURRENT STATUS** Report # 4 05/02/1999

Total Depth (m) : 308	Casing Depth (m) : 10.00	Operator Reps : W.Westman, I.Zurakowski
Drilled last 24 hrs (m) : 298	Casing Diameter (in) : 13.375	SSDS Reps : C.Arrindell (4), B.Wood (1)
Hole Size (in) : 8.500	Casing ID (in) : 12.615	

**LAST SURVEY**

Depth (m)	Inclination	Azimuth	TVD (m)	Displ (m)	Direction
287.40	21.62	128.02	283.48	31.38	S52.42E

**LAST FORMATION TOP**

Formation Name	MD Top (m)	TVD Top (m)
Mepunga Formation	306.00	300.65

**BHA SUMMARY**

BHA 1: 134.02 m; Bit #1 (20.92 hrs), PDM #1 (20.92 hrs), Stab, Sub, DC, MWD, DC, Sub, 8x DC, Jar, 2x DC, Sub

**MUD DATA**

Type	Weight (ppg)	FV (sec)	PV (cp)	YP (lb/100ft <sup>3</sup> )	Gels	Fluid Loss	pH	Solids (%)	Sand (%)	Oil (%)
KCl/Polymer	8.6	40	9	14.0	3.0 / 5.0	12	8.5	0.80	0.10	

**TIME BREAKDOWN**

From	To	Hours	TMD (m)	BHA #	Activity
00:00	00:30	0.50	10.00	1	PU/LD BHA
00:30	01:00	0.50	10.00	1	Pre spud safety meeting.
01:00	01:05	0.08	10.00	1	Trip In
01:05	03:00	1.92	30.00	1	Spud well and drill 8½" hole, make up float sub, Hang off sub while drilling.
03:00	04:30	1.50	30.00	1	Pick up and make up Bails and elevators, trip to motor, set bend to 1.5 deg, Install MWD and orient to motor, Run in hole to 16m, Hung up, Pick up kelly and and wash to 21m.
04:30	09:30	5.00	135.00	1	Rotary drilling to 135m.
09:30	10:00	0.50	135.00	1	Rig up for steerable drilling.
10:00	12:00	2.00	160.00	1	Oriented drilling.
12:00	00:00	12.00	308.00	1	Drilling steerable.

**COMMENTS**

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## DRILLING SERVICES

### Daily Drilling Report

Customer : Western Underground Gas Storage  
 Well : Iona OBS-1  
 Country : Australia  
 Lease : PPL2 Otway Basin  
 Rig : Rig 30  
 Job # : AD-DD-90003

**CURRENT STATUS** Report # 5 06/02/1999

Total Depth (m) :	702	Casing Depth (m) :	10.00	Operator Reps :	W.Westman, I.Zurakowski
Drilled last 24 hrs (m) :	394	Casing Diameter (in) :	13.375	SSDS Reps :	C.Arrindell (5), B.Wood (2)
Hole Size (in) :	8.500	Casing ID (in) :	12.615		

**LAST SURVEY**

Depth (m)	Inclination	Azimuth	TVD (m)	Displ (m)	Direction
691.60	37.39	126.81	611.55	264.75	S52.58E

**LAST FORMATION TOP**

Formation Name	MD Top (m)	TVD Top (m)
Pebble point	696.00	615.04

**BHA SUMMARY**

BHA 1: 134.02 m; Bit #1 (42.42 hrs), PDM #1 (42.42 hrs), Stab, Sub, DC, MWD, DC, Sub, 8x DC, Jar, 2x DC, Sub

**MUD DATA**

Type	Weight (ppg)	FV (sec)	PV (cp)	YP (lb/100ft <sup>2</sup> )	Gels	Fluid Loss	pH	Solids (%)	Sand (%)	Oil (%)
KCl/Polymer	8.9	44	12	21.0	7.0 / 12.0	10	8.5	2.00	1.00	

**TIME BREAKDOWN**

From	To	Hours	TMD (m)	BHA #	Activity
00:00	00:30	0.50	317.00	1	Drilling 308 - 317m
00:30	01:00	0.50	317.00	1	Rig Repair
01:00	11:00	10.00	519.00	1	Drilling 317 - 519m
11:00	11:30	0.50	519.00	1	Service Rig
11:30	12:00	0.50	528.00	1	Drilling 519 - 528m
12:00	20:30	8.50	688.00	1	Drilling 528 - 688m
20:30	22:00	1.50	688.00	1	Rig Repair
22:00	00:00	2.00	702.00	1	Drilling to 702m

**COMMENTS**

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## DRILLING SERVICES

### Daily Drilling Report

Customer : Western Underground Gas Storage  
 Well : Iona OBS-1  
 Country : Australia  
 Lease : PPL2 Otway Basin  
 Rig : Rig 30  
 Job # : AD-DD-90003

CURRENT STATUS Report # 6 07/02/1999

Total Depth (m) : 743	Casing Depth (m) : 739.00	Operator Reps : W.Westman, I.Zurakowski
Drilled last 24 hrs (m) : 41	Casing Diameter (in) : 7.000	SSDS Reps : C.Arrindell (6), B.Wood (3)
Hole Size (in) : 8.500	Casing ID (in) : 6.340	

#### LAST SURVEY

Depth (m)	Inclination	Azimuth	TVD (m)	Displ (m)	Direction
730.30	36.95	126.59	642.37	288.14	S52.64E

#### LAST FORMATION TOP

Formation Name	MD Top (m)	TVD Top (m)
Pebble point	696.00	615.04

#### BHA SUMMARY

BHA 1: 134.02 m; Bit #1 (44.92 hrs), PDM #1 (45.92 hrs), Stab, Sub, DC, MWD, DC, Sub, 8x DC, Jar, 2x DC, Sub  
 BHA 2: 118.47 m; Bit #2r1 (44.92 hrs), Sub, Sub, Stab, DC, Stab, Sub, 8x DC, Jar, 2x DC, Sub

#### MUD DATA

Type	Weight (ppg)	FV (sec)	PV (cp)	YP (lbf/100ft <sup>2</sup> )	Gels	Fluid Loss	pH	Solids (%)	Sand (%)	Oil (%)
KCl/Polymer	8.9	44	12	21.0	7.0 / 12.0	10	8.5	2.00	1.00	

#### TIME BREAKDOWN

From	To	Hours	TMD (m)	BHA #	Activity
00:00	02:30	2.50	743.50	1	Drilling, section TD @ 743.5m
02:30	03:30	1.00	743.50	1	Circulate, Bottoms up, flow check, pump slug and POOH.
03:30	06:30	3.00	743.50	1	Trip Out
06:30	08:00	1.50	743.50	1	Trip Out (at Surface) Lay out MWD, 1 x NMDC, float sub, Hang off sub, stabiliser
08:00	09:00	1.00	743.50	1	PU/LD BHA #1
09:00	10:00	1.00	743.50	2	PU/LD BHA #2
10:00	11:00	1.00	743.50	2	Service Rig
11:00	14:00	3.00	743.50	2	Trip In with wiper trip assy. wash & ream last 2 singles.
14:00	15:30	1.50	743.50	2	Circulate
15:30	16:15	0.75	743.50	2	Drop Gyro Multishot survey tool and pump to bottom, pump slug .
16:15	16:45	0.50	743.50	2	Trip Out 1 single orient gyro data.
16:45	20:45	4.00	743.50	2	Trip Out
20:45	21:00	0.25	743.50	2	Trip Out (at Surface) lay out bha.
21:00	23:30	2.50	743.50	2	Rig Up to run casing.
23:30	00:00	0.50	743.50	2	Hold JSA for running casing.

#### COMMENTS

Drilled to 7" casing point.

# sperry-sun

## DRILLING SERVICES

### Daily Drilling Report

Customer : Western Underground Gas Storage  
 Well : Iona OBS-1  
 Country : Australia  
 Lease : PPL2 Otway Basin  
 Rig : Rig 30  
 Job # : AD-DD-90003

CURRENT STATUS Report # 7 08/02/1999

Total Depth (m) :	743	Casing Depth (m) :	739.00	Operator Reps :	W.Westman, I.Zurakowski
Drilled last 24 hrs (m) :	0	Casing Diameter (in) :	7.000	SSDS Reps :	C.Arrindell (7), B.Wood (4)
Hole Size (in) :		Casing ID (in) :	6.340		

LAST SURVEY

Depth (m)	Inclination	Azimuth	TVD (m)	Displ (m)	Direction
730.30	36.95	126.59	642.37	288.14	S52.64E

LAST FORMATION TOP

Formation Name	MD Top (m)	TVD Top (m)
Pebble point	696.00	615.04

BHA SUMMARY

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MUD DATA

Type	Weight (ppg)	FV (sec)	PV (cp)	YP (lbf/100ft <sup>2</sup> )	Gels	Fluid Loss	pH	Solids (%)	Sand (%)	Oil (%)
KCl/Polymer	8.9	44	12	21.0	7.0 / 12.0	10	8.5	2.00	1.00	

TIME BREAKDOWN

From	To	Hours	TMD (m)	BHA #	Activity
00:00	09:00	9.00	743.50		Run Casing / Cement
09:00	18:00	9.00	743.50		Wait on Cement
18:00	00:00	6.00	743.50		Nipple Up BOP

COMMENTS

Currently nipling up BOP.



# sperry-sun

## DRILLING SERVICES

### Daily Drilling Report

Customer : Western Underground Gas Storage  
 Well : Iona OBS-1  
 Country : Australia  
 Lease : PPL2 Otway Basin  
 Rig : Rig 30  
 Job # : AD-DD-90003

**CURRENT STATUS** Report # 8 09/02/1999

Total Depth (m) :	743	Casing Depth (m) :	739.00	Operator Reps :	W.Westman, I.Zurakowski
Drilled last 24 hrs (m) :	0	Casing Diameter (in) :	7.000	SSDS Reps :	C.Arrindell (8), B.Wood (5)
Hole Size (in) :	6.000	Casing ID (in) :	6.340		

**LAST SURVEY**

Depth (m)	Inclination	Azimuth	TVD (m)	Displ (m)	Direction
730.30	36.95	126.59	642.37	288.14	S52.64E

**LAST FORMATION TOP**

Formation Name	MD Top (m)	TVD Top (m)
Pebble point	696.00	615.04

**BHA SUMMARY**

BHA 3: 178.93 m; Bit #3 (0.4 hrs), PDM #2 (0.2 hrs), Stab, Sub, Flex, MWD, Flex, DC, Jar, 3x DC

**MUD DATA**

Type	Weight (ppg)	FV (sec)	PV (cp)	YP (lb/100ft <sup>2</sup> )	Gels	Fluid Loss	pH	Solids (%)	Sand (%)	Oil (%)
KCl/Polymer	8.9	44	12	21.0	7.0 / 12.0	10	8.5	2.00	1.00	

**TIME BREAKDOWN**

From	To	Hours	TMD (m)	BHA #	Activity
00:00	12:00	12.00	743.50		Nipple Up BOP
12:00	16:30	4.50	743.50		Test BOP
16:30	18:30	2.00	743.50	3	PU/LD BHA
18:30	21:00	2.50	743.50	3	MWD HOC too long, lay out and pick up back up hoc, install MWD and align to motor
21:00	23:00	2.00	743.50	3	Trip In
23:00	23:15	0.25	743.50	3	Test MWD.
23:15	00:00	0.75	743.50	3	Trip In

**COMMENTS**



Daily Drilling Report

Customer : Western Underground Gas Storage  
 Well : Iona OBS-1  
 Country : Australia  
 Lease : PPL2 Otway Basin  
 Rig : Rig 30  
 Job # : AD-DD-90003

CURRENT STATUS Report # 9 10/02/1999

Total Depth (m) : 1110	Casing Depth (m) : 739.00	Operator Reps : W.Westman, I.Zurakowski
Drilled last 24 hrs (m) : 367	Casing Diameter (in) : 7.000	SSDS Reps : C.Arrindell (9), B.Wood (6)
Hole Size (in) : 6.000	Casing ID (in) : 6.340	

LAST SURVEY

Depth (m)	Inclination	Azimuth	TVD (m)	Displ (m)	Direction
1082.80	27.60	124.80	938.50	478.57	S52.68E

LAST FORMATION TOP

Formation Name	MD Top (m)	TVD Top (m)
Paararte	769.00	673.53

BHA SUMMARY

BHA 3: 178.93 m; Bit #3 (17.06 hrs), PDM #2 (17.26 hrs), Stab, Sub, Flex, MWD, Flex, DC, Jar, 3x DC

MUD DATA

Type	Weight (ppg)	FV (sec)	PV (cp)	YP (lb/100ft <sup>2</sup> )	Gels	Fluid Loss	pH	Solids (%)	Sand (%)	Oil (%)
KCl/Polymer	8.9	48	12	23.0	4.0 / 9.0	5	8.5	2.70	1.00	

TIME BREAKDOWN

From	To	Hours	TMD (m)	BHA #	Activity
00:00	01:00	1.00	743.50	3	Trip In
01:00	01:30	0.50	743.50	3	Pick up kelly and wash down to top of cement @ 719.6m.
01:30	03:00	1.50	743.50	3	Drill Cement, plug, shoe and rat hole. to 744m.
03:00	03:20	0.33	746.00	3	Drilling w/ BHA #3 to 746m.
03:20	05:00	1.67	746.00	3	FIT
05:00	12:00	7.00	935.00	3	Drilling 6" hole.
12:00	13:00	1.00	959.00	3	Drilling
13:00	15:30	2.50	969.00	3	Oriented drilling. Tool face control is poor.
15:30	22:00	6.50	1107.00	3	Drilling
22:00	00:00	2.00	1110.00	3	Oriented drilling. Tool face control is poor.

COMMENTS

# sperry-sun

## DRILLING SERVICES

### Daily Drilling Report

Customer : Western Underground Gas Storage  
 Well : Iona OBS-1  
 Country : Australia  
 Lease : PPL2 Otway Basin  
 Rig : Rig 30  
 Job # : AD-DD-90003

**CURRENT STATUS** Report # 10 11/02/1999

Total Depth (m) : 1251	Casing Depth (m) : 739.00	Operator Reps : W.Westman, I.Zurakowski
Drilled last 24 hrs (m) : 141	Casing Diameter (in) : 7.000	SSDS Reps : C.Arrindell (10), B.Wood (7)
Hole Size (in) : 6.000	Casing ID (in) : 6.340	

**LAST SURVEY**

Depth (m)	Inclination	Azimuth	TVD (m)	Displ (m)	Direction
1227.00	21.90	124.90	1069.51	538.63	S52.96E

**LAST FORMATION TOP**

Formation Name	MD Top (m)	TVD Top (m)
Skull creek Member	1176.00	1022.53

**BHA SUMMARY**

BHA 3: 178.93 m; Bit #3 (27.86 hrs), PDM #2 (29.66 hrs), Stab, Sub, Flex, MWD, Flex, DC, Jar, 3x DC

**MUD DATA**

Type	Weight (ppg)	FV (sec)	PV (cp)	YP (lb/100ft <sup>2</sup> )	Gels	Fluid Loss	pH	Solids (%)	Sand (%)	Oil (%)
KCl/Polymer	8.9	55	12	23.0	5.0 / 10.0	5	8.8	2.70	1.00	

**TIME BREAKDOWN**

From	To	Hours	TMD (m)	BHA #	Activity
00:00	01:00	1.00	1123.00	3	Drilling
01:00	02:00	1.00	1126.00	3	Drilling, trying to slide-difficult
02:00	02:45	0.75	1146.60	3	Drilling
02:45	03:15	0.50	1148.80	3	Drilling, attempt to slide
03:15	06:45	3.50	1194.00	3	Drilling
06:45	07:15	0.50	1196.00	3	Drilling, attempt to slide
07:15	08:00	0.75	1205.00	3	Drilling
08:00	08:30	0.50	1206.00	3	Drilling, attempt to slide
08:30	09:00	0.50	1212.00	3	Drilling
09:00	09:15	0.25	1213.00	3	Drilling, attempt to slide
09:15	11:00	1.75	1233.00	3	Drilling
11:00	11:15	0.25	1234.00	3	Drilling, attempt to slide
11:15	11:30	0.25	1238.30	3	Drilling
11:30	12:00	0.50	1238.30	3	Service Rig
12:00	13:00	1.00	1251.00	3	Drilling
13:00	13:30	0.50	1251.00	3	Drilling, attempt to slide no progress
13:30	14:00	0.50	1251.00	3	Hole Problems, work tight hole
14:00	15:00	1.00	1251.00	3	Circulate, W&R 1238-1248m
15:00	15:30	0.50	1251.00	3	Drilling, attempt to slide no progress w/40K
15:30	16:30	1.00	1251.00	3	Circulate Btms up
16:30	17:30	1.00	1251.00	3	Trip Out
17:30	18:30	1.00	1251.00	3	Hole Problems, work stuck pipe at 923m
18:30	20:30	2.00	1251.00	3	Hole Problems, rig up circ head, no circ, work pipe
20:30	00:00	3.50	1251.00	3	Hole Problems, Rig down circ head rig up Schlumberger to back off Drill pipe.

**COMMENTS**

# sperry-sun

## DRILLING SERVICES

### Daily Drilling Report

Customer : Western Underground Gas Storage  
 Well : Iona OBS-1  
 Country : Australia  
 Lease : PPL2 Otway Basin  
 Rig : Rig 30  
 Job # : AD-DD-90003

**CURRENT STATUS** Report # 11 12/02/1999

Total Depth (m) :	1251	Casing Depth (m) :	739.00	Operator Reps :	W.Westman, I.Zurakowski
Drilled last 24 hrs (m) :	0	Casing Diameter (in) :	7.000	SSDS Reps :	C.Arrindell (11), B.Wood (8)
Hole Size (in) :	6.000	Casing ID (in) :	6.340		

**LAST SURVEY**

Depth (m)	Inclination	Azimuth	TVD (m)	Displ (m)	Direction
1227.00	21.90	124.90	1069.51	538.63	S52.96E

**LAST FORMATION TOP**

Formation Name	MD Top (m)	TVD Top (m)
Skull creek Member	1176.00	1022.53

**BHA SUMMARY**

BHA 3: 178.93 m; Bit #3 (27.86 hrs), PDM #2 (30.06 hrs), Stab, Sub, Flex, MWD, Flex, DC, Jar, 3x DC

**MUD DATA**

Type	Weight (ppg)	FV (sec)	PV (cp)	YP (lb/100ft <sup>2</sup> )	Gels	Fluid Loss	pH	Solids (%)	Sand (%)	Oil (%)
KCl/Polymer	8.9	55	12	23.0	5.0 / 10.0	5	8.8	2.70	1.00	

**TIME BREAKDOWN**

From	To	Hours	TMD (m)	BHA #	Activity
00:00	02:00	2.00	1251.00	3	RIH Schlumberger and perform string shot back off.
02:00	04:00	2.00	1251.00	3	Trip Out from top of fish @ 734m. 1 joint drillpipe left on top BHA in hole.
04:00	08:00	4.00	1251.00	3	Make up fishing assy, and RIH to 715m.
08:00	10:00	2.00	1251.00	3	Fishing
10:00	14:00	4.00	1251.00	3	Fishing
14:00	14:30	0.50	1251.00	3	Rig up Schlum, for free point.
14:30	17:30	3.00	1251.00	3	Perform free point.
17:30	18:00	0.50	1251.00	3	Rig down Schlum.
18:00	18:30	0.50	1251.00	3	Back off from fish.
18:30	19:00	0.50	1251.00	3	Circulate & cond mud.
19:00	21:00	2.00	1251.00	3	POOH with fishing tools and L/O Same.
21:00	00:00	3.00	1251.00	3	W. O. Wash pipe.

**COMMENTS**

Currently over fish with wash pipe.

# sperry-sun

## DRILLING SERVICES

### Daily Drilling Report

Customer : Western Underground Gas Storage  
 Well : Iona OBS-1  
 Country : Australia  
 Lease : PPL2 Otway Basin  
 Rig : Rig 30  
 Job # : AD-DD-90003

**CURRENT STATUS** Report # 12 13/02/1999

Total Depth (m) : 1251	Casing Depth (m) : 739.00	Operator Reps : W.Westman, I.Zurakowski
Drilled last 24 hrs (m) : 0	Casing Diameter (in) : 7.000	SSDS Reps : C.Arrindell (12), B.Wood (9)
Hole Size (in) : 6.000	Casing ID (in) : 6.340	

**LAST SURVEY**

Depth (m)	Inclination	Azimuth	TVD (m)	Displ (m)	Direction
1227.00	21.90	124.90	1069.51	538.63	S52.96E

**LAST FORMATION TOP**

Formation Name	MD Top (m)	TVD Top (m)
Skull creek Member	1176.00	1022.53

**BHA SUMMARY**

BHA 3: 178.93 m; Bit #3 (28.26 hrs), PDM #2 (31.26 hrs), Stab, Sub, Flex, MWD, Flex, DC, Jar, 3x DC

**MUD DATA**

Type	Weight (ppg)	FV (sec)	PV (cp)	YP (lb/100ft <sup>3</sup> )	Gels	Fluid Loss	pH	Solids (%)	Sand (%)	Oil (%)
KCl/Polymer	8.9	55	12	23.0	5.0 / 10.0	5	8.8	2.70	1.00	

**TIME BREAKDOWN**

From	To	Hours	TMD (m)	BHA #	Activity
00:00	01:00	1.00	1251.00	3	Makeup wash pipe shoe, RIH 1 jt wash pipe, hang up @ wear bushing, pull wear bushing & check ID, set wear bushing.
01:00	05:00	4.00	1251.00	3	M/up new mill shoe, pick up and make up new wash pipe assy, RIH.
05:00	12:00	7.00	1251.00	3	Break circ at 724m, wash down and rotate over fish from 734 - 764m.
12:00	13:00	1.00	1251.00	3	Continue to wash down over fish to 774m.
13:00	13:30	0.50	1251.00	3	Circulate bottoms up.
13:30	15:00	1.50	1251.00	3	Trip Out f/ 763m to surface.
15:00	15:30	0.50	1251.00	3	Pick up and make up guide jars.
15:30	17:00	1.50	1251.00	3	Trip In with fishing assy.
17:00	17:30	0.50	1251.00	3	Pick up kelly and wash over fish.
17:30	20:30	3.00	1251.00	3	Rig up schlum, RIH with guns to perform string shot back off, failed at 791m, Re-run guns, attempt # 2, "ok" @ 771m.
20:30	21:00	0.50	1251.00	3	Circulate hole clean.
21:00	23:30	2.50	1251.00	3	POOH with fishing tool and fish to surface.
23:30	00:00	0.50	1251.00	3	Back out of fish with fishing tools.

**COMMENTS**

# sperry-sun

## DRILLING SERVICES

### Daily Drilling Report

Customer : Western Underground Gas Storage  
 Well : Iona OBS-1  
 Country : Australia  
 Lease : PPL2 Otway Basin  
 Rig : Rig 30  
 Job # : AD-DD-90003

**CURRENT STATUS** Report # 13 14/02/1999

Total Depth (m) : 1251	Casing Depth (m) : 739.00	Operator Reps : W.Westman, I.Zurakowski
Drilled last 24 hrs (m) : 0	Casing Diameter (in) : 7.000	SSDS Reps : C.Arrindell (13), B.Wood (10)
Hole Size (in) : 6.000	Casing ID (in) : 6.340	

**LAST SURVEY**

Depth (m)	Inclination	Azimuth	TVD (m)	Displ (m)	Direction
1227.00	21.90	124.90	1069.51	538.63	S52.96E

**LAST FORMATION TOP**

Formation Name	MD Top (m)	TVD Top (m)
Skull creek Member	1176.00	1022.53

**BHA SUMMARY**

BHA 3: 178.93 m; Bit #3 (28.26 hrs), PDM #2 (31.66 hrs), Stab, Sub, Flex, MWD, Flex, DC, Jar, 3x DC

**MUD DATA**

Type	Weight (ppg)	FV (sec)	PV (cp)	YP (lb/100ft <sup>2</sup> )	Gels	Fluid Loss	pH	Solids (%)	Sand (%)	Oil (%)
KCl/Polymer	8.9	55	12	23.0	5.0 / 10.0	5	8.8	2.70	1.00	

**TIME BREAKDOWN**

From	To	Hours	TMD (m)	BHA #	Activity
00:00	00:30	0.50	1251.00	3	Lay down 1x Drillpipe, & 1x DC, keep 2x 4-3/4" DC in string.
00:30	04:00	3.50	1251.00	3	Make up every connection.
04:00	04:30	0.50	1251.00	3	Slip 30' drill line, service rig and bop drill.
04:30	11:00	6.50	1251.00	3	Trip In to 762m, pick up kelly and wash over fish from 771 - 819m.
11:00	11:30	0.50	1251.00	3	Circulate bottoms up.
11:30	13:30	2.00	1251.00	3	POOH with wash pipe to surface.
13:30	14:00	0.50	1251.00	3	Pick up Make up fishing tools.
14:00	16:00	2.00	1251.00	3	Trip In with fishing tools.
16:00	16:30	0.50	1251.00	3	Latch on to fish.
16:30	18:30	2.00	1251.00	3	Rig up Schlum to perform back off, Miss run, reload guns and try again, "ok".
18:30	20:30	2.00	1251.00	3	Trip Out with fish.
20:30	21:30	1.00	1251.00	3	Lay out fish.
21:30	22:00	0.50	1251.00	3	Pick up and make up fishing tools.
22:00	00:00	2.00	1251.00	3	Trip in with fishing assembly.

**COMMENTS**

# sperry-sun

## DRILLING SERVICES

### Daily Drilling Report

Customer : Western Underground Gas Storage  
 Well : Iona OBS-1  
 Country : Australia  
 Lease : PPL2 Otway Basin  
 Rig : Rig 30  
 Job # : AD-DD-90003

**CURRENT STATUS** Report # 14 15/02/1999

Total Depth (m) :	1251	Casing Depth (m) :	739.00	Operator Reqs :	W.Westman, I.Zurakowski
Drilled last 24 hrs (m) :	0	Casing Diameter (in) :	7.000	SSDS Reqs :	C.Arrindell (14), B.Wood (11)
Hole Size (in) :	6.000	Casing ID (in) :	6.340		

**LAST SURVEY**

Depth (m)	Inclination	Azimuth	TVD (m)	Displ (m)	Direction
1227.00	21.90	124.90	1069.51	538.63	S52.96E

**LAST FORMATION TOP**

Formation Name	MD Top (m)	TVD Top (m)
Skull creek Member	1176.00	1022.53

**BHA SUMMARY**

BHA 3: 178.93 m; Bit #3 (28.26 hrs), PDM #2 (31.66 hrs), Stab, Sub, Flex, MWD, Flex, DC, Jar, 3x DC

**MUD DATA**

Type	Weight (ppg)	FV (sec)	PV (cp)	YP (lbf/100ft <sup>2</sup> )	Gels	Fluid Loss	pH	Solids (%)	Sand (%)	Oil (%)
KCl/Polymer	8.9	55	12	23.0	5.0 / 10.0	5	8.8	2.70	1.00	

**TIME BREAKDOWN**

From	To	Hours	TMD (m)	BHA #	Activity
00:00	00:00	24.00	1251.00	3	Fishing operations.

**COMMENTS**

BHA # left in the hole is 6 x DC, Flex NMDC, HOC, Flex NMDC, Float sub, 5-7/8" String stab, Motor and Bit. After the current wash over we will have 1 x DC plus all of sperry's tools left in the hole. Then there will be hope fully one more wash over trip before we have recovered every thing.



# Daily Drilling Report

Customer : Western Underground Gas Storage  
 Well : Iona OBS-1  
 Country : Australia  
 Lease : PPL2 Otway Basin  
 Rig : Rig 30  
 Job # : AD-DD-90003

**CURRENT STATUS** Report # 15 16/02/1999

Total Depth (m) :	1251	Casing Depth (m) :	739.00	Operator Reps :	W.Westman, I.Zurakowski
Drilled last 24 hrs (m) :	0	Casing Diameter (in) :	7.000	SSDS Reps :	C.Arrindell (15), B.Wood (12)
Hole Size (in) :	6.000	Casing ID (in) :	6.340		

**LAST SURVEY**

Depth (m)	Inclination	Azimuth	TVD (m)	Displ (m)	Direction
1227.00	21.90	124.90	1069.51	538.63	S52.96E

**LAST FORMATION TOP**

Formation Name	MD Top (m)	TVD Top (m)
Skull creek Member	1176.00	1022.53

**BHA SUMMARY**

BHA 3: 178.93 m; Bit #3 (28.26 hrs), PDM #2 (31.66 hrs), Stab, Sub, Flex, MWD, Flex, DC, Jar, 3x DC

**MUD DATA**

Type	Weight (ppg)	FV (sec)	PV (cp)	YP (lbf/100ft <sup>2</sup> )	Gels	Fluid Loss	pH	Solids (%)	Sand (%)	Oil (%)
KCl/Polymer	8.9	55	12	23.0	5.0 / 10.0	5	8.8	2.70	1.00	

**TIME BREAKDOWN**

From	To	Hours	TMD (m)	BHA #	Activity
00:00	00:00	24.00	1251.00	3	Fishing Operations. Recovered 5 more drill collars.

**COMMENTS**

We are currently washing over the motor will no with in the next couple hours weather we have to burn off the stabiliser blades or not.....



# sperry-sun

## DRILLING SERVICES

### Daily Drilling Report

Customer : Western Underground Gas Storage  
 Well : Iona OBS-1  
 Country : Australia  
 Lease : PPL2 Otway Basin  
 Rig : Rig 30  
 Job # : AD-DD-90003

**CURRENT STATUS** Report # 16 17/02/1999

Total Depth (m) :	1251	Casing Depth (m) :	739.00	Operator Reps :	W.Westman, I.Zurakowski
Drilled last 24 hrs (m) :	0	Casing Diameter (in) :	7.000	SSDS Reps :	C.Arrindell (16), B.Wood (13)
Hole Size (in) :	6.000	Casing ID (in) :	6.340		

**LAST SURVEY**

Depth (m)	Inclination	Azimuth	TVD (m)	Displ (m)	Direction
1227.00	21.90	124.90	1069.51	538.63	S52.96E

**LAST FORMATION TOP**

Formation Name	MD Top (m)	TVD Top (m)
Skull creek Member	1176.00	1022.53

**BHA SUMMARY**

BHA 3: 178.93 m; Bit #3 (28.26 hrs), PDM #2 (31.66 hrs), Stab, Sub, Flex, MWD, Flex, DC, Jar, 3x DC

**MUD DATA**

Type	Weight (ppg)	FV (sec)	PV (cp)	YP (lb/100ft <sup>2</sup> )	Gels	Fluid Loss	pH	Solids (%)	Sand (%)	Oil (%)
KCl/Polymer	8.9	55	12	23.0	5.0 / 10.0	5	8.8	2.70	1.00	

**TIME BREAKDOWN**

From	To	Hours	TMD (m)	BHA #	Activity
00:00	12:00	12.00	1251.00	3	Fishing
12:00	00:00	12.00	1251.00	3	Fishing

**COMMENTS**

Currently milling over the top DC of the fish, as it is suspected that we have swelled the box with the Schlumberger string shot back offs, we had two tries at getting over it with the overshot and grapples but kept slipping off, so once we have milled over with the present wash over that is 4-3/4" id we will continue down to the stabiliser and attempt to burn it off again. We recieved a 5-3/4" string stab yesterday.



Daily Drilling Report

Customer : Western Underground Gas Storage  
 Well : Iona OBS-1  
 Country : Australia  
 Lease : PPL2 Otway Basin  
 Rig : Rig 30  
 Job # : AD-DD-90003

CURRENT STATUS Report # 17 18/02/1999

Total Depth (m) : 1251	Casing Depth (m) : 739.00	Operator Reps : W.Westman, I.Zurakowski
Drilled last 24 hrs (m) : 0	Casing Diameter (in) : 7.000	SSDS Reps : C.Arrindell (17), B.Wood (14)
Hole Size (in) : 6.000	Casing ID (in) : 6.340	

LAST SURVEY

Depth (m)	Inclination	Azimuth	TVD (m)	Displ (m)	Direction
1227.00	21.90	124.90	1069.51	538.63	S52.96E

LAST FORMATION TOP

Formation Name	MD Top (m)	TVD Top (m)
Skull creek Member	1176.00	1022.53

BHA SUMMARY

BHA 3: 178.93 m; Bit #3 (28.26 hrs), PDM #2 (31.66 hrs), Stab, Sub, Flex, MWD, Flex, DC, Jar, 3x DC

MUD DATA

Type	Weight (ppg)	FV (sec)	PV (cp)	YP (lbf/100ft <sup>2</sup> )	Gels	Fluid Loss	pH	Solids (%)	Sand (%)	Oil (%)
KCl/Polymer	8.9	55	12	23.0	5.0 / 10.0	5	8.8	2.70	1.00	

TIME BREAKDOWN

From	To	Hours	TMD (m)	BHA #	Activity
00:00	00:00	24.00	1251.00	3	Fishing

COMMENTS

We have finally got the fish out of the hole, we are currently running in the hole with a clean out assy, Bit, 5-7/8" NB, DC, 5-3/4" string stab, 21 x HWDP, Jars, 15 x HWDP and 3-1/2" drill pipe.

The motor tested ok, will rerun when we go back in with the drilling assy, the monels were also ok. The stabiliser was a little chewed for the first inch but apart from that it was ok.

# sperry-sun

## DRILLING SERVICES

### Daily Drilling Report

Customer : Western Underground Gas Storage  
 Well : Iona OBS-1  
 Country : Australia  
 Lease : PPL2 Otway Basin  
 Rig : Rig 30  
 Job # : AD-DD-90003

**CURRENT STATUS** Report # 18 19/02/1999

Total Depth (m) :	1251	Casing Depth (m) :	739.00	Operator Reps :	W.Westman, I.Zurakowski
Drilled last 24 hrs (m) :	0	Casing Diameter (in) :	7.000	SSDS Reps :	C.Arrindell (18), B.Wood (15)
Hole Size (in) :	3.000	Casing ID (in) :	6.340		

**LAST SURVEY**

Depth (m)	Inclination	Azimuth	TVD (m)	Displ (m)	Direction
1227.00	21.90	124.90	1069.51	538.63	S52.96E

**LAST FORMATION TOP**

Formation Name	MD Top (m)	TVD Top (m)
Skull creek Member	1176.00	1022.53

**BHA SUMMARY**

BHA 3: 178.93 m; Bit #3 (28.26 hrs), PDM #2 (31.66 hrs), Stab, Sub, Flex, MWD, Flex, DC, Jar, 3x DC  
 BHA 4: 353.66 m; Bit #4rr1 (29.76 hrs), Stab, 1x DC, Stab, 21x HWDP, Jar, 15x HWDP  
 BHA 5: 375.85 m; Bit #5 (0.23 hrs), PDM #3 (31.9 hrs), Stab, Sub, Flex, MWD, Flex, 21x HWDP, Jar, 15x HWDP

**MUD DATA**

Type	Weight (ppg)	FV (sec)	PV (cp)	YP (lbf/100ft <sup>2</sup> )	Gels	Fluid Loss	pH	Solids (%)	Sand (%)	Oil (%)
KCl/Polymer	8.9	55	12	23.0	5.0 / 10.0	5	8.8	2.70	1.00	

**TIME BREAKDOWN**

From	To	Hours	TMD (m)	BHA #	Activity
00:00	05:00	5.00	1251.00	3	Trip Out (at Surface) with BHA # 3 (fish)
05:00	08:00	3.00	1251.00	3	Lay out fishing tools, MWD, Braek off bit and Flush and rest motor.
08:00	10:00	2.00	1251.00	3	Lay out wash over pipe and 2 drill collars from derrick.
10:00	10:30	0.50	1251.00	4	PU/Clean out Assy (BHA # 4).
10:30	12:30	2.00	1251.00	4	Trip In
12:30	14:00	1.50	1251.00	4	Reaming / Washing from 920m ---->950m.
14:00	15:00	1.00	1251.00	4	Trip In to 1248m.
15:00	16:30	1.50	1251.00	4	Circulate hole clean and condition mud.
16:30	17:30	1.00	1251.00	4	Trip Out to 959m.
17:30	18:30	1.00	1251.00	4	Circulate hole clean and condition mud.
18:30	20:00	1.50	1251.00	4	Pump pill and trip out to 353m
20:00	21:30	1.50	1251.00	4	Trip In six stands drill pipe then lay out side ways.
21:30	23:00	1.50	1251.00	4	Trip Out (at Surface) Lay out bit, 2 x stabs & drill collar.
23:00	00:00	1.00	1251.00	5	PU/BHA #5, Align motor to MWD. RIH

**COMMENTS**

Got back on bottom at 03:15 am. Drilling ahead OK.

# sperry-sun

## DRILLING SERVICES

### Daily Drilling Report

Customer : Western Underground Gas Storage  
 Well : Iona OBS-1  
 Country : Australia  
 Lease : PPL2 Otway Basin  
 Rig : Rig 30  
 Job # : AD-DD-90003

**CURRENT STATUS** Report # 19 20/02/1999

Total Depth (m) : 1426	Casing Depth (m) : 739.00	Operator Reps : W.Westman, I.Zurakowski
Drilled last 24 hrs (m) : 175	Casing Diameter (in) : 7.000	SSDS Reps : C.Arrindell (19), B.Wood (16)
Hole Size (in) : 3.000	Casing ID (in) : 6.340	

**LAST SURVEY**

Depth (m)	Inclination	Azimuth	TVD (m)	Displ (m)	Direction
1403.60	10.70	126.00	1239.80	583.67	S52.83E

**LAST FORMATION TOP**

Formation Name	MD Top (m)	TVD Top (m)
Nullawarre Greensand	1324.00	1161.68

**BHA SUMMARY**

BHA 5: 375.85 m; Bit #5 (19.53 hrs), PDM #3 (51.19 hrs), Stab, Sub, Flex, MWD, Flex, 21x HWDP, Jar, 15x HWDP

**MUD DATA**

Type	Weight (ppg)	FV (sec)	PV (cp)	YP (lb/100ft <sup>3</sup> )	Gels	Fluid Loss	pH	Solids (%)	Sand (%)	Oil (%)
KCl/Polymer	9.0	131	33	62.0	8.0 / 10.0	3	9.0	1.70	0.75	

**TIME BREAKDOWN**

From	To	Hours	TMD (m)	BHA #	Activity
00:00	01:30	1.50	1251.00	5	Trip In to 400m and shallow pulse test MWD.
01:30	03:00	1.50	1251.00	5	Trip In To 1241 m.
03:00	03:15	0.25	1251.00	5	Reaming / Washing from 1241m to 1251m.
03:15	12:00	8.75	1311.00	5	Oriented and rotary Drilling with Steerable BHA # 5 m ----> 1309m.Orien
12:00	00:00	12.00	1426.00	5	Oriented and rotary Drilling with Steerable BHA # 5

**COMMENTS**

# sperry-sun DRILLING SERVICES

## Daily Drilling Report

Customer : Western Underground Gas Storage  
 Well : Iona OBS-1  
 Country : Australia  
 Lease : PPL2 Otway Basin  
 Rig : Rig 30  
 Job # : AD-DD-90003

**CURRENT STATUS** Report # 20 21/02/1999

Total Depth (m) :	1509	Casing Depth (m) :	739.00	Operator Reps :	W.Westman, I.Zurakowski
Drilled last 24 hrs (m) :	83	Casing Diameter (in) :	7.000	SSDS Reps :	C.Arrindell (20), B.Wood (17)
Hole Size (in) :	3.000	Casing ID (in) :	6.340		

**LAST SURVEY**

Depth (m)	Inclination	Azimuth	TVD (m)	Displ (m)	Direction
1486.40	2.40	84.20	1322.00	592.71	S52.90E

**LAST FORMATION TOP**

Formation Name	MD Top (m)	TVD Top (m)
Waarre C 1 sand	1497.67	1333.26

**BHA SUMMARY**

BHA 5: 375.85 m; Bit #5 (31.62 hrs), PDM #3 (69.79 hrs), Stab, Sub, Flex, MWD, Flex, 21x HWDP, Jar, 15x HWDP

**MUD DATA**

Type	Weight (ppg)	FV (sec)	PV (cp)	YP (lbf/100ft <sup>2</sup> )	Gels	Fluid Loss	pH	Solids (%)	Sand (%)	Oil (%)
KCl/Polymer	9.0	125	35	48.0	6.0 / 8.0	4	9.5	1.90	2.00	

**TIME BREAKDOWN**

From	To	Hours	TMD (m)	BHA #	Activity
00:00	06:00	6.00	1458.00	5	Oriented and rotary Drilling with steerable BHA # 5
06:00	10:30	4.50	1493.00	5	Drilling
10:30	11:30	1.00	1493.00	5	Circulate
11:30	12:00	0.50	1494.00	5	Drilling
12:00	12:30	0.50	1494.00	5	Circulate
12:30	13:00	0.50	1497.00	5	Drilling
13:00	13:30	0.50	1497.00	5	Circulate
13:30	14:00	0.50	1502.00	5	Drilling
14:00	15:00	1.00	1502.00	5	Circulate
15:00	15:30	0.50	1504.00	5	Drilling
15:30	16:00	0.50	1504.00	5	Circulate
16:00	16:30	0.50	1509.40	5	Drilling
16:30	17:00	0.50	1509.40	5	Circulate
17:00	17:30	0.50	1509.40	5	Trip Out to 1444m.
17:30	19:00	1.50	1509.40	5	Circulate bottoms up.
19:00	19:30	0.50	1509.40	5	Circulate at 1415m.
19:30	20:30	1.00	1509.40	5	Trip Out to 1241m
20:30	21:00	0.50	1509.40	5	Circulate hole clean.
21:00	21:30	0.50	1509.40	5	Trip Out to 918m
21:30	22:00	0.50	1509.40	5	Circulate hole clean.
22:00	00:00	2.00	1509.40	5	Trip Out to 228m.

**COMMENTS**

We are currently coring, there is a possibility of a side track but only slim at this stage will let you know when we know whats happening. We recieved a Motor, Monel and a slim phase 4 tool yesterday.

Talk to you later .....Christian.

# sperry-sun

## DRILLING SERVICES

### Daily Drilling Report

Customer : Western Underground Gas Storage  
 Well : Iona OBS-1  
 Country : Australia  
 Lease : PPL2 Otway Basin  
 Rig : Rig 30  
 Job # : AD-DD-90003

**CURRENT STATUS** Report # 21 22/02/1999

Total Depth (m) : 1527	Casing Depth (m) : 739.00	Operator Reps : W.Westman, I.Zurakowski
Drilled last 24 hrs (m) : 18	Casing Diameter (in) : 7.000	SSDS Reps : C.Arrindell (21), B.Wood (18)
Hole Size (in) : 6.000	Casing ID (in) : 6.340	

**LAST SURVEY**

Depth (m)	Inclination	Azimuth	TVD (m)	Displ (m)	Direction
1486.40	2.40	84.20	1322.00	592.71	S52.90E

**LAST FORMATION TOP**

Formation Name	MD Top (m)	TVD Top (m)
Waarre C 2 sand	1509.67	1345.25

**BHA SUMMARY**

BHA 5: 375.85 m; Bit #5 (31.62 hrs), PDM #3 (69.79 hrs), Stab, Sub, Flex, MWD, Flex, 21x HWDP, Jar, 15x HWDP  
 BHA 6: 361.43 m; Bit #6 (6. hrs), Other, Sub, 21x HWDP, Jar, 15x HWDP

**MUD DATA**

Type	Weight (ppg)	FV (sec)	PV (cp)	YP (lbf/100ft <sup>2</sup> )	Gels	Fluid Loss	pH	Solids (%)	Sand (%)	Oil (%)
KCl/Polymer	9.0	125	35	48.0	6.0 / 8.0	4	9.5	1.90	2.00	

**TIME BREAKDOWN**

From	To	Hours	TMD (m)	BHA #	Activity
00:00	00:15	0.25	1509.40	5	Trip Out (at Surface)
00:15	01:30	1.25	1509.40	5	Lay out BHA # 5.
01:30	03:00	1.50	1509.40	6	Make up core assy.
03:00	04:30	1.50	1509.40	6	Trip In
04:30	05:30	1.00	1509.40	6	Cut Drill Line
05:30	06:00	0.50	1509.40	6	Service Rig
06:00	07:30	1.50	1509.40	6	Trip In to 1382m Tight hole.
07:30	10:30	3.00	1509.40	6	Reaming / Washing to 1421m.
10:30	11:30	1.00	1509.40	6	Trip In to 1488m then wash and ream to 1509m.
11:30	12:00	0.50	1509.40	6	Circulate bottoms up.
12:00	12:30	0.50	1509.40	6	Drop ball and record surface pressures.
12:30	15:30	3.00	1527.00	6	Coring from 1509 to 1527m.
15:30	16:00	0.50	1527.00	6	Circulate
16:00	20:00	4.00	1527.00	6	Trip Out (at Surface)
20:00	21:00	1.00	1527.00	6	Lay out core.
21:00	22:00	1.00	1527.00	6	Pick up and make up Core run # 2.
22:00	00:00	2.00	1527.00	6	Trip In Core run # 2 to 883m.

**COMMENTS**

Currently tripping out with core run # 2, only recovered 6m on the first run, still dont know what's going to happen.

# sperry-sun

## DRILLING SERVICES

### Daily Drilling Report

Customer : Western Underground Gas Storage  
 Well : Iona OBS-1  
 Country : Australia  
 Lease : PPL2 Otway Basin  
 Rig : Rig 30  
 Job # : AD-DD-90003

**CURRENT STATUS Report # 22 23/02/1999**

Total Depth (m) : 1568	Casing Depth (m) : 739.00	Operator Reps : W.Westman, I.Zurakowski
Drilled last 24 hrs (m) : 41	Casing Diameter (in) : 7.000	SSDS Reps : C.Arrindell (22), B.Wood (19)
Hole Size (in) : 6.000	Casing ID (in) : 6.340	

**LAST SURVEY**

Depth (m)	Inclination	Azimuth	TVD (m)	Displ (m)	Direction
1486.40	2.40	84.20	1322.00	592.71	S52.90E

**LAST FORMATION TOP**

Formation Name	MD Top (m)	TVD Top (m)
Waarre C 2 sand	1509.67	1345.25

**BHA SUMMARY**

BHA 6: 361.43 m; Bit #6 (9. hrs), Other, Sub, 21x HWDP, Jar, 15x HWDP  
 BHA 7: 353.66 m; Bit #7r1 (35.62 hrs), Stab, 1x DC, Stab, 21x HWDP, Jar, 15x HWDP

**MUD DATA**

Type	Weight (ppg)	FV (sec)	PV (cp)	YP (lb/100ft <sup>2</sup> )	Gels	Fluid Loss	pH	Solids (%)	Sand (%)	Oil (%)
	9.0	130	35	48.0	6.0 / 8.0	4	9.5	1.90	2.00	

**TIME BREAKDOWN**

From	To	Hours	TMD (m)	BHA #	Activity
00:00	01:30	1.50	1527.00	6	Trip In
01:30	02:00	0.50	1527.00	6	Circulate
02:00	05:00	3.00	1538.00	6	Coring
05:00	07:00	2.00	1538.00	6	Trip Out
07:00	07:30	0.50	1538.00	6	Service Rig
07:30	09:00	1.50	1538.00	6	Trip Out (at Surface)
09:00	11:00	2.00	1538.00	6	PU/LD BHA & Core
11:00	11:30	0.50	1538.00	7	Pick up rotary assy # 7.
11:30	14:00	2.50	1538.00	7	Trip In
14:00	14:30	0.50	1538.00	7	Reaming / Washing
14:30	18:00	3.50	1568.00	7	Drilling
18:00	18:30	0.50	1568.00	7	Circulate
18:30	23:00	4.50	1568.00	7	Trip Out
23:00	23:45	0.75	1568.00	7	Trip Out (at Surface)
23:45	00:00	0.25	1568.00	7	LD BHA

**COMMENTS**



Daily Drilling Report

Customer : Western Underground Gas Storage  
 Well : Iona OBS-1  
 Country : Australia  
 Lease : PPL2 Otway Basin  
 Rig : Rig 30  
 Job # : AD-DD-90003

CURRENT STATUS Report # 23 24/02/1999

Total Depth (m) : 1568	Casing Depth (m) : 739.00	Operator Reps : W.Westman, I.Zurakowski
Drilled last 24 hrs (m) : 0	Casing Diameter (in) : 7.000	SSDS Reps : C.Arrindell (23), B.Wood (20)
Hole Size (in) : 6.000	Casing ID (in) : 6.340	

LAST SURVEY

Depth (m)	Inclination	Azimuth	TVD (m)	Displ (m)	Direction
1486.40	2.40	84.20	1322.00	592.71	S52.90E

LAST FORMATION TOP

Formation Name	MD Top (m)	TVD Top (m)
Waarre C 2 sand	1509.67	1345.25

BHA SUMMARY

BHA 7: 353.66 m; Bit #7rr1 (35.62 hrs), Stab, 1x DC, Stab, 21x HWDP, Jar, 15x HWDP

MUD DATA

Type	Weight (ppg)	FV (sec)	PV (cp)	YP (lb/100ft <sup>2</sup> )	Gels	Fluid Loss	pH	Solids (%)	Sand (%)	Oil (%)
	9.0	130	35	48.0	6.0 / 8.0	4	9.5	1.90	2.00	

TIME BREAKDOWN

From	To	Hours	TMD (m)	BHA #	Activity
00:00	12:00	12.00	1568.00	7	Wireline Logs

COMMENTS

Arrindell & Wood leave location.



# SPERRY-SUN

## DRILLING SERVICES

### Survey and Drilling Parameters

Customer : Western Underground Gas Storage  
 Well : Iona OBS-1  
 Rig : Rig 30

Country : Australia  
 Lease : PPL2 Otway Basin  
 Job # : AD-DD-90003

North Ref : Grid Declination : ° VS Dir : 127.15° (from Wellhead)

WELLBORE SURVEY														DRILLING PARAMETERS					
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. (#)	Comment
					N/S (m)	E/W (m)								From (m)	To (m)				
0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00	4	50	384	1300				120	1	Tieon
104.80	0.25	24.41	104.8	-0.1	0.2	0.1	0.07	0.00	0.00	4	50	384	1300				120	1	
114.60	0.11	37.00	114.6	-0.1	0.2	0.1	0.44	0.00	0.00	5	50	384	1350	135	143	127m	50	1	
143.30	2.70	131.98	143.3	0.6	-0.2	0.6	2.83	2.71	0.00	5	50	384	1300	143	152	127m	95	1	
172.30	7.43	129.88	172.2	3.2	-1.9	2.6	4.90	4.89	-2.17	5	50	384	1300	152	155	127m		1	
200.70	11.23	125.19	200.2	7.8	-4.6	6.2	4.09	4.01	-4.95	5	50	384	1300	155	161	127m		1	
229.40	13.79	127.23	228.2	14.0	-8.3	11.3	2.72	2.68	2.13	5	50	384	1300	164	171	127m		1	
258.40	17.24	129.30	256.1	21.7	-13.1	17.3	3.61	3.57	2.14	5	50	384	1300	174	179	111m	120	1	
287.40	21.62	128.02	283.5	31.4	-19.1	24.9	4.55	4.53	-1.32	7	50	432	1600	183	188	30L		1	
316.40	24.79	129.09	310.1	42.8	-26.3	33.8	3.31	3.28	1.11	7	50	432	1600	193	198	15R		1	
344.80	27.97	129.38	335.6	55.4	-34.2	43.6	3.36	3.36	0.31	9	50	432	1600	203	208	8L	30	1	
373.80	32.14	128.70	360.7	69.9	-43.4	54.9	4.33	4.31	-0.70	8	50	432	900	212	216	5R		1	
														221	225	25R		1	
														231	236	10R	24	1	
														241	245	10R		1	
														250	255	5R		1	
														260	265	10L	35	1	
														270	274	10L		1	
														279	284	13L		1	
														289	293	2L	75	1	
														299	303	8L		1	
														308	312	8L		1	
														318	321	8L	180	1	
														327	332	2L		1	
														337	343	15L		1	
														347	351	18L	180	1	
														357	361	20L		1	
														366	372	10L		1	

# SPERRY-SUN

## DRILLING SERVICES

### Survey and Drilling Parameters

Customer : Western Underground Gas Storage  
 Well : Iona OBS-1  
 Rig : Rig 30  
 Country : Australia  
 Lease : PPL2 Otway Basin  
 Job # : AD-DD-90003  
 North Ref : Grid  
 Declination : °  
 VS Dir : 127.15° (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)	E/W (m)	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.	Comment
														From (m)	To (m)				
402.30	34.76	126.94	384.4	85.6	-53.0	67.3	2.94	2.76	-1.85	8	50	432	1700	375	380	15L	75	1	
431.00	37.43	126.83	407.6	102.5	-63.2	80.8	2.79	2.79	-0.11	8	50	432	1800	385	389	20L		1	
460.10	39.76	128.67	430.4	120.7	-74.3	95.1	2.68	2.40	1.90	10	60	432	1800	395	399	30L	80	1	
488.60	40.11	129.78	452.2	139.0	-85.8	109.3	0.84	0.37	1.17	12	60	432	1980	404	418	HS		1	
517.60	38.63	126.01	474.6	157.4	-97.2	123.8	2.81	-1.32	-3.90	20	50	432	2000	414	427	20R		1	
546.60	38.62	125.99	497.2	175.5	-107.8	138.5	0.22	-0.22	-0.02	10	50	432	2040	423	438	HS		1	
575.60	38.33	126.38	520.0	193.6	-118.5	153.1	0.39	-0.30	0.40	10	50	432	2050	433	448	HS		1	
604.60	38.11	126.33	542.7	211.5	-129.1	167.5	0.23	-0.23	-0.05	10	50	432	2050	442	457	10L		1	
633.60	37.91	126.60	565.6	229.4	-139.7	181.9	0.27	-0.21	0.28	10	50	432	2060	452		30L		1	
662.60	37.52	126.61	588.5	247.1	-150.3	196.1	0.40	-0.40	0.01	8	50	432	2100	500	504	90L		1	
691.60	37.39	126.81	611.5	264.7	-160.9	210.3	0.18	-0.13	0.21	4	50	335	1350	509	514	100L		1	
720.60	37.11	126.68	634.6	282.3	-171.4	224.3	0.30	-0.29	-0.13	10	50	345	1550					1	
730.30	36.95	126.59	642.4	288.1	-174.8	229.0	0.52	-0.49	-0.28	10	50	345	1550					1	
745.86	36.30	126.60	654.9	297.4	-180.4	236.5	1.25	-1.25	0.02	5	30	250	1700					3	
774.82	36.10	125.90	678.2	314.5	-190.5	250.3	0.48	-0.21	-0.73	7	60	250	2000					3	
793.23	36.40	126.40	693.1	325.4	-196.9	259.1	0.69	0.49	0.81	7	60	250	2000					3	
822.23	34.90	126.40	716.6	342.3	-206.9	272.7	1.55	-1.55	0.00	7	60	250	2000					3	
851.25	34.50	127.10	740.5	358.8	-216.8	285.9	0.58	-0.41	0.72	7	60	250	2000					3	
879.67	33.60	128.50	764.0	374.7	-226.6	298.5	1.26	-0.95	1.48	7	60	250	2000					3	
899.17	33.50	129.20	780.3	385.5	-233.3	306.9	0.61	-0.15	1.08	7	60	250	2000					3	
938.10	31.40	129.00	813.1	406.4	-246.5	323.1	1.62	-1.62	-0.15	7	60	250	2000					3	
967.10	31.60	129.10	837.9	421.5	-256.1	334.8	0.21	0.21	0.10	10		160	1000	959	960	30L		8	

# SPERRY-SUN

## DRILLING SERVICES

### Survey and Drilling Parameters

Customer : Western Underground Gas Storage  
 Well : Iona OBS-1  
 Rig : Rig 30  
 Country : Australia  
 Lease : PPL2 Otway Basin  
 Job # : AD-DD-90003

North Ref : Grid      Declination : °      VS Dir : 127.15° (from Wellhead)

WELLBORE SURVEY										DRILLING PARAMETERS									
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. (#)	Comment
					N/S (m)	E/W (m)								From (m)	To (m)				
996.20	30.70	127.60	862.8	436.6	-265.4	346.7	1.22	-0.93	-1.55	4	60	250	2000	963	967	50L	30	3	
1025.30	29.60	126.80	887.9	451.2	-274.2	358.3	1.21	-1.13	-0.82	4	60	250	2000	967	969	50L	30	3	
1054.00	28.30	125.20	913.1	465.1	-282.4	369.5	1.58	-1.36	-1.67	4	60	250	2000				30	3	
1082.80	27.60	124.80	938.5	478.6	-290.1	380.6	0.75	-0.73	-0.42	4	60	250	2000				30	3	
1111.92	26.20	124.50	964.5	491.7	-297.6	391.4	1.45	-1.44	-0.31	3	60	250	1900	1107	1111	100R	25	3	
1140.45	25.00	124.40	990.2	504.0	-304.6	401.6	1.26	-1.26	-0.11	3	60	250	1900	1126	1128	100R	25	3	
1168.97	24.30	124.80	1016.1	515.9	-311.4	411.4	0.76	-0.74	0.42	3	50	250	1900	1147	1150	120R	25	3	
1197.84	23.00	125.70	1042.6	527.5	-318.0	420.8	1.40	-1.35	0.94	5	50	250	1900	1194	1196	LS	20	3	
1227.00	21.90	124.90	1069.5	538.6	-324.5	429.9	1.17	-1.13	-0.82	4	50	250	1900	1205	1206	LS	20	3	
														1212	1213	LS		3	
1259.10	20.10	126.90	1099.5	550.1	-331.2	439.2	1.81	-1.68	1.87	7	70	192	1950	1224	1225	LS	20	5	
1288.20	17.00	128.90	1127.1	559.4	-336.9	446.6	3.26	-3.20	2.06	8	70	235	2450	1233	1234	LS	20	5	
1317.20	13.20	132.30	1155.1	566.9	-341.8	452.3	4.03	-3.93	3.52	15		195	2000	1255	1258	150R	12	5	
1345.50	10.80	133.90	1182.7	572.8	-345.8	456.6	2.57	-2.54	1.70	8	70	235	2450	1274	1277	150R	10	5	Good steerability.
														1284	1288	170R		5	
1374.60	10.90	127.70	1211.3	578.2	-349.4	460.7	1.21	0.10	-6.39	15		195	2040	1294	1298	170R	10	5	
1403.60	10.70	126.00	1239.8	583.7	-352.6	465.1	0.39	-0.21	-1.76	8	70	235	2450	1303	1308	178R	12	5	
1432.68	8.10	131.30	1268.5	588.4	-355.6	468.8	2.82	-2.68	5.47	15		195	2200	1314	1317	178R	10	5	
														1317	1318	178R		5	
														1324	1328	178L		5	
1471.30	3.30	98.40	1306.9	592.1	-357.5	472.0	4.37	-3.73	-25.56	8	80	235	2450	1333	1338	178L	7	5	
														1371	1375	80L	10	5	
														1375	1378	80L	12	5	
														1409	1417	170R	10	5	
														1429	1433	170R	7	5	
														1433	1433	170R	7	5	
														1438	1442	160L		5	

**SPERRY-SUN**

**DRILLING SERVICES**

Survey and Drilling Parameters

Customer : Western Underground Gas Storage      Country : Australia  
 Well : Iona OBS-1      Lease : PPL2 Otway Basin  
 Rig : Rig 30      Job # : AD-DD-90003  
 North Ref : Grid      Declination : °      VS Dir : 127.15° (from Wellhead)

WELLBORE SURVEY										DRILLING PARAMETERS									
Measured Depth (m)	Incl Angle (deg)	Azi Dir (deg)	Vertical Depth (m)	Vertical Section (m)	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)	To (m)	Tool Face (deg)	ROP (m/hr)	BHA No. (#)	Comment
1486.40	2.40	84.20	1322.0	592.7	-357.6	472.7	2.26	-1.79	-28.21	8	80	235	2450	1448	1452	175L		5	
														1458	1462	LS		5	
														1477	1481	LS	10	5	

# sperry-sun

## DRILLING SERVICES

### BHA Report

Customer : Western Underground Gas Storage  
 Well : Iona OBS-1  
 Country : Australia  
 Lease : PPL2 Otway Basin  
 Rig : Rig 30  
 Job # : AD-DD-90003

BHA# 1

BHA# 1 : Date In 05/02/19 MD In (m) : 10 TVD In (m) : 10 Date Out 07/02/199 MD Out (m) : 743 TVD Out (m) : 653

#### BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in <sup>2</sup> )	Dull Condition
1	8.500	Hughes Christensen	GT-MG1	V00CS	3x13	0.389	2-2-NO-A -E-I-NO-TD

#### MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (psi)	Cum Circ Hrs
1	6.750	SSDS	SperryDrill	675-439	1.50°		48	45.92

#### COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	Tricone GT-MG1	V00CS	8.500		8.500	90.00	P 4-1/2" Reg	0.25	
2	6 3/4" SperryDrill Lobe 7/8 - 3.0 stg	675-439	6.750	4.469	8.063	68.49	B 4-1/2" IF	7.17	1.08
3	7 1/4" String Stabilizer	2924	6.750	2.560	7.750	104.41	B 4-1/2" IF	1.79	9.21
4	6 1/2" Non-Mag Float Sub	A-225	6.500	2.813		91.91	B 4-1/2" IF	0.84	
5	6 1/2" Non-Mag Drill collar	C-462	6.500	2.810		91.95	B 4-1/2" IF	8.91	
6	6 1/4" DWD 650 System HOS	46728	6.560	3.000		91.10	B 4-1/2" IF	1.97	
7	6 1/2" Non-Mag Drill collar	49072	6.500	2.750		92.85	B 4-1/2" IF	8.79	
8	6 1/2" Cross Over Sub	101	6.250	2.125		92.47	B 4" IF	0.52	
9	8x Spiral Drill collar	RIG	6.500	2.880		90.89	B 4" IF	74.51	
10	Drilling Jar Dailey	D2302	6.250	2.250		91.01	B 4" IF	10.16	
11	2x Spiral Drill collar	RIG	6.500	2.880		90.89	B 4" IF	18.65	
12	Cross Over Sub	RIG	6.375	2.813		87.60	B 3-1/2" IF	0.46	
								134.02	

Parameter	Min	Max	Ave
WOB (klbs) :	3	20	8
RPM (rpm) :	35	60	50
Flow (gpm) :	240	432	405
SPP (psi) :	900	2100	1625

Activity	Hrs
Drilling :	44.92
Reaming :	0.00
Circ-Other :	1.00
<b>Total :</b>	<b>45.92</b>

BHA Weight	(lb)
in Air (Total) :	39608
in Mud (Total) :	34235
in Air (Bel Jars) :	30881
in Mud (Bel Jars) :	26692

Drill String	OD(in)	Len (m)
DP(G)-NC38(IF)-13.30#	3.500	609

#### PERFORMANCE

	In	Out
Inclination (deg)	0.02	36.40
Azimuth (deg)	24.41	126.60

	Distance (m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :	181.00	14			8.00
Rotated :	552.50	17	-0.30	0.40	
<b>Total :</b>	<b>733.50</b>	<b>16</b>	<b>1.49</b>	<b>0.00</b>	<b>1.49</b>

#### COMMENTS

To drill down to Kick off point at 150 m, build to 39.5 deg at 4°/30m and hold angle to 7" casing point at 740m. A 8-1/16" gauge motor sleeve stab was run on the motor, Sn#CP075547.  
 The motor was giving a dog leg rate of 7.5 - 8°/30m when oriented high side, and a drop rate of -0.3°/30m with a turn rate of 0.4°/30m in rotary.

**sperry-sun**  
**DRILLING SERVICES**
**BHA Report**      page 2

**Customer :** Western Underground Gas Storage

**Well :** Iona OBS-1

**Country :** Australia

**Lease :** PPL2 Otway Basin

**Rig :** Rig 30

**Job # :** AD-DD-90003

**BHA# 1**
**OBJECTIVES:**

To drill 8½" hole to 140m, then build to 39.5 deg @ 4°/30m in the direction of 127.15 degrees azimuth. Then hold angle and azimuth to 7" casing point of 740m +/-.

**RESULTS:**

Drilled to 135m and started kick off, oriented 70% per single from 135 m to 173m, once the desired build rate of 4°/30m was established, the percentage oriented was cut back to 40 - 50% per single. The following drilling parameters were used from 135m ----> 270m, WOB = 5k, Flow = 384 gpm, SPP = 1300 p.s.i., and surface RPM = 50. At 270m the flow rate was increased to 432 gpm giving a stand pipe pressure of 1600 p.s.i.

Continued steerable drilling until 457m where an inclination of 39.8 deg was achieved on an azimuth of 128.8 degrees.

Rotary drilled to 499m where a 4m set of 90L was made followed by a 4.5m set of 100L to arrest a build rate of 0.62°/30m and a right hand turn rate of 1.2°/30m. Rotary drilled from 514m to TD with the following parameters, Avg WOB = 5-10k, Flow rate = 432 gpm, Stand pipe pressure = 1950 p.s.i., RPM = 50 -60, with an average rate of penetration of 35 - 40 m/hr. The inclination at TD was 36.9 deg on an azimuth of 126.6 degrees, this put the well path 1.5 m to the right and 0.5 m low of the proposal.

The steerability of the assembly was very good. Oriented 25% of the bit run.

Formations drilled are as follows : Narrawatuk Marle @ 209m ---->306m, Mepunga sandstone @ 306m ----> 353m, Dilwyn sandstone @ 343m, Pember claystone @ 614m ----> 696m and the Pebble point sandstone/claystone from 696m ----> 740m.

# sperry-sun

## DRILLING SERVICES

### BHA Report

Customer : Western Underground Gas Storage

Well : Iona OBS-1

Country : Australia

Lease : PPL2 Otway Basin

Rig : Rig 30

Job # : AD-DD-90003

BHA# 2

BHA# 2 : Date In 07/02/19 MD In (m) : 743 TVD In (m) : 653 Date Out 07/02/199 MD Out (m): 743 TVD Out (m): 653

#### BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in <sup>2</sup> )	Dull Condition
2rr1	8.500	Hughes Christensen	GT-MG1	V00CS	3x13	0.389	2-2-NO-A -E-I-NO-CSG

#### 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	Tricone GT-MG1	V00CS	8.500		8.500	90.00	P 4-1/2" Reg	0.25	
2	Bit Sub	RIG	6.500	2.813		91.91	B 4" IF	0.92	
3	6½" Non-Mag Cross Over Sub	A-175	6.500	2.813		91.91	B 4-1/2" IF	0.84	
4	8½" String Stabilizer	47697	6.500	2.813	8.250	91.91	B 4-1/2" IF	1.58	2.76
5	6½" Non-Mag Drill collar	49072	6.500	2.750		92.85	B 4-1/2" IF	8.79	
6	7½" String Stabilizer	2924	6.750	2.560	7.750	104.41	B 4-1/2" IF	1.79	14.17
7	6½" Cross Over Sub	101	6.250	2.125		92.47	B 4" IF	0.52	
8	8x Spiral Drill collar	RIG	6.500	2.880		90.89	B 4" IF	74.51	
9	Drilling Jar Dailey	D2302	6.250	2.250		91.01	B 4" IF	10.16	
10	2x Spiral Drill collar	RIG	6.500	2.880		90.89	B 4" IF	18.65	
11	Cross Over Sub	RIG	6.375	2.813		87.60	B 3-1/2" IF	0.46	
								118.47	

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

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

BHA Weight	(lb)
in Air (Total) :	35474
in Mud (Total) :	30662
in Air (Bel Jars) :	26747
in Mud (Bel Jars) :	23119

Drill String	OD(in)	Len (m)
DP(G)-SLH90-13.30#	3.500	625

#### PERFORMANCE

	In	Out
Inclination (deg)	36.40	36.40
Azimuth (deg)	126.60	126.60

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

#### COMMENTS

To clean out hole prior to running 7" casing.

**sperry-sun**  
**DRILLING SERVICES**

BHA Report page 2

Customer : Western Underground Gas Storage

Well : Iona OBS-1

Country : Australia

Lease : PPL2 Otway Basin

Rig : Rig 30

Job # : AD-DD-90003

BHA# 2

**OBJECTIVES:**

To clean out hole prior to running 7" casing. Then drop multi shot gyro.

**RESULTS:**

Run in hole to bottom, had to pick up kelly at 725m and wash and ream to bottom. Circulated bottoms up, dropped Gyro Data multi shot Gyro and POOH.



# sperry-sun

## DRILLING SERVICES

### BHA Report

Customer : Western Underground Gas Storage  
 Well : Iona OBS-1  
 Country : Australia  
 Lease : PPL2 Otway Basin  
 Rig : Rig 30  
 Job # : AD-DD-90003

BHA# 3

BHA# 3 : Date In 09/02/19 MD In (m) : 743 TVD In (m) : 653 Date Out 19/02/199 MD Out (m): 1251 TVD Out (m): 1092

#### BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in")	Dull Condition
3	6.000	BBL	BB457SRL+1	821355	4x10	0.307	2-4-CT-A -X-1-ER-BHA

#### MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (psi)	Cum Circ Hrs
2	4.750	SSDS	SperryDrill	475-109	1.15°		335	31.66

#### COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	PDC BBL 457 SRL	821355	6.000		6.000	35.00	P 3-1/2" Reg	0.20	
2	4 3/4" SperryDrill Lobe 4/5 - 6.3 stg	475-109	4.750	2.794	5.690	39.50	B 3-1/2" IF	8.89	1.09
3	5-7/8" String Stabilizer	7089601	4.750	2.250	5.875	46.84	B 3-1/2" IF	1.68	9.84
4	4 3/4" Float Sub	2949	4.750	1.750		52.19	B 3-1/2" IF	0.49	
5	4 3/4" Non-Mag Flex Drill Collar	A-191	4.750	2.630		41.88	B 3-1/2" IF	9.27	
6	4 3/4" DWD Hang off collar	A-180	4.750	2.630		41.88	B 3-1/2" IF	3.08	
7	4 3/4" Non-Mag Flex Drill Collar	A-278	4.750	2.630		41.88	B 3-1/2" IF	9.26	
8	12 x Drill collar	RIG	4.750	2.250		47.00	B 3-1/2" IF	108.89	
9	Drilling Jar	1400-1252	4.750	2.250		46.84	B 3-1/2" IF	9.08	
10	3x Drill collar	RIG	4.750	2.250		47.00	B 3-1/2" IF	28.09	
								178.93	

Parameter	Min	Max	Ave
WOB (klbs) :	3	30	6
RPM (rpm) :	30	60	58
Flow (gpm) :	160	250	248
SPP (psi) :	1000	2100	1949

Activity	Hrs
Drilling :	26.26
Reaming :	0.80
Circ-Other :	4.60
<b>Total :</b>	<b>31.66</b>

BHA Weight	(lb)
in Air (Total) :	27004
in Mud (Total) :	23341
in Air (Bel Jars) :	21277
in Mud (Bel Jars) :	18391

Drill String	OD(in)	Len (m)
DP(G)-NC38(IF)-13.30#	3.500	1072

#### PERFORMANCE

	In	Out
Inclination (deg)	36.40	20.55
Azimuth (deg)	126.60	126.36

	Distance (m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :	21.70	3			4.50
Rotated :	485.80	20	-1.20	-0.50	
<b>Total :</b>	<b>507.50</b>	<b>19</b>	<b>-0.94</b>	<b>-0.01</b>	<b>0.94</b>

#### COMMENTS

To drill 34m tangent then drop angle from 39.5 degrees to 0 degrees inclination @ 2°/30m, then continue drilling vertically to well TD.  
 6-11/16" Motor stab sn# CP019845 used.  
 This assembly dropped angle at an average rate of -1.2°/30m and had a left hand walk tendency of -0.5°/30m. The assembly was unsteerable due to the aggressiveness of the PDC bit and weight stacking causing Tool face control to be impossible. Became stuck @ 923m when POOH. Performed a string shot back off, RIH fishing tools and attempt to recover remaining drill string and BHA; this was unsuccessful. RIH with wash over pipe and recover BHA 5 joints at a time.

**sperry-sun**  
**DRILLING SERVICES**

BHA Report page 2

Customer : Western Underground Gas Storage

Well : Iona OBS-1

Country : Australia

Lease : PPL2 Otway Basin

Rig : Rig 30

Job # : AD-DD-90003

BHA# 3

**OBJECTIVES:**

To drill 158m tangent then drop angle from 39.5 degrees to 0 degrees inclination @ 2°/30m. then continue drilling vertically to well TD.

**RESULTS:**

Drilled out cement, float and shoe track, then drilled 2m of new hole to 746m and performed FIT. Continued drilling ahead in rotary to 959m, with the following parameters, RPM=60, WOB=5-7k, GPM=250, average ROP=40m/hr, the off bottom pressure was 1600 p.s.i. and on bottom 1900 - 2000 p.s.i., giving an average differential pressure of 350 - 400 p.s.i. From the shoe to 798m the formation was the Pebble point, which was a sandstone/claystone mixture, the assembly appeared to have a left hand walk tendency of -0.5°/30m and seemed to hold angle in this formation.

In the Paaratte formation (sandstone 798 -->1197m) the assembly was dropping at -1.2 to -1.5°/30m and walking left @ -0.3 to -1.0°/30m. Oriented drilling was attempted to arrest and reverse the left hand walk with little success due to the assembly hanging up and the aggressiveness of the bit making tool face control impossible.

At 1251m a drop rate of 2.5°/30m with a turn rate of 1.2°/30m was required to target centre and as the assembly was only giving a drop rate of -1.2°/30m, and was walking left at -0.3 to -1.0°/30m, the decision was made to trip out of the hole for a Tricone bit which would be more controllable as a steerable assembly.

Became stuck at 923m while tripping out of the hole. A string shot back off was performed by Schlumberger and fishing tools were run in the hole to try and recover the rest of the drill string and BHA. This was unsuccessful. Wash over pipe was then run and washed over the fish five joints at a time, the fish was recovered with this method.

**RECOMMENDATIONS:**

The use of a PDC bit should not be considered with a target as small as the one for Iona Obs-1. Also we might consider instead of drill collars running heavy weight drill pipe. This might reduce the problem of hanging up while oriented drilling, and also reduce the chance of becoming differentially stuck.

# sperry-sun

## DRILLING SERVICES

### BHA Report

Customer : Western Underground Gas Storage

Well : Iona OBS-1

Country : Australia

Lease : PPL2 Otway Basin

Rig : Rig 30

Job # : AD-DD-90003

BHA# 4

BHA# 4 : Date In 19/02/19 MD In (m) : 1251 TVD In (m) : 1092 Date Out 19/02/199 MD Out (m): 1251 TVD Out (m): 1092

#### BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in <sup>2</sup> )	Dull Condition
4rr1	6.000	BBL	BB457SRL+1	821355	4x10	0.307	2-4-CT-A -X-I-ER-BHA

#### MOTOR DATA

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

#### COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	PDC BBL 457 SRL	821355	6.000		6.000	60.00	P 3-1/2" Reg	0.20	
2	5-7/8" Near Bit Stabilizer	990	4.750	2.250	5.875	46.84	B 3-1/2" IF	1.36	0.75
3	1x Drill collar	Rig	4.750	2.500		44.00	B 3-1/2" IF	9.40	
4	5 3/4" String Stabilizer	2993	4.750	2.310	5.750	46.11	B 3-1/2" IF	1.18	11.45
5	21x HWDP		3.500	2.063		25.30	B 3-1/2" IF	193.67	
6	Drilling Jar	1447-1026	4.810	2.250		48.38	B 3-1/2" IF	10.08	
7	15x HWDP		3.500	2.063		25.30	B 3-1/2" IF	137.77	
								353.66	

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

Activity	Hrs
Drilling :	0.00
Reaming :	1.50
Circ-Other :	2.50
<b>Total :</b>	<b>4.00</b>

BHA Weight	(lb)
in Air (Total) :	30895
in Mud (Total) :	26704
in Air (Bel Jars) :	17859
in Mud (Bel Jars) :	15437

Drill String	OD(in)	Len (m)
DP(G)-NC38(IF)-13.30#	3.500	897

#### PERFORMANCE

	In	Out
Inclination (deg)	20.55	20.55
Azimuth (deg)	126.36	126.36

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

#### COMMENTS

Clean out assembly.  
Run in hole to 920m then wash and ream from 920 - 950m. Continued to run in the hole to 1248m, circulated hole clean and conditioned mud, pulled out of the hole to 959m and circulated the hole clean. Pulled out of the hole for the steerable drilling assembly.

**sperry-sun**  
**DRILLING SERVICES**

BHA Report page 2

Customer : Western Underground Gas Storage

Well : Iona OBS-1

Country : Australia

Lease : PPL2 Otway Basin

Rig : Rig 30

Job # : AD-DD-90003

BHA# 4

**OBJECTIVES:**

To clean out hole prior to drilling ahead with steerable assembly.

**RESULTS:**

Run in hole to 920m then wash and ream from 920 - 950m. Continued to run in the hole to 1248m, circulated hole clean and conditioned mud. Pulled out of the hole to 959m and circulated the hole clean. Pulled out of the hole for the steerable drilling assembly.

# sperry-sun DRILLING SERVICES

## BHA Report

Customer : Western Underground Gas Storage

Well : Iona OBS-1

Country : Australia

Lease : PPL2 Otway Basin

Rig : Rig 30

Job # : AD-DD-90003

BHA# 5

BHA# 5 : Date In 19/02/19 MD In (m) : 1251 TVD In (m) : 1092 Date Out 22/02/19 MD Out (m): 1509 TVD Out (m): 1345

### BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in <sup>2</sup> )	Dull Condition
5	6.000	Hughes Christensen	STR-09	TO9YE	3x11	0.278	2-2-ER-A -E-1-NO-CP

### MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (psi)	Cum Circ Hrs
3	4.750	SSDS	SperryDrill	475-109	1.15°		137	69.79

### COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	Tricone	TO9YE	6.000		6.000	60.00	P 3-1/2" Reg	0.20	
2	4 3/4" SperryDrill Lobe 4/5 - 6.3 stg	475-109	4.750	2.794	5.500	39.50	B 3-1/2" IF	8.89	1.09
3	5 3/4" String Stabilizer	2993	4.750	2.310	5.750	46.11	B 3-1/2" IF	1.18	9.58
4	4 3/4" Float Sub	2949	4.750	1.750		52.19	B 3-1/2" IF	0.49	
5	4 3/4" Non-Mag Flex Drill Collar	A-191	4.750	2.630		41.88	B 3-1/2" IF	9.27	
6	4 3/4" DWD Hang off collar	64085	4.750	2.630		41.88	B 3-1/2" IF	5.04	
7	4 3/4" Non-Mag Flex Drill Collar	A-278	4.750	2.630		41.88	B 3-1/2" IF	9.26	
8	21x HWDP		3.500	2.063		25.30	B 3-1/2" IF	193.67	
9	Drilling Jar	1447-1026	4.750	2.250		46.84	B 3-1/2" IF	10.08	
10	15x HWDP		3.500	2.063		25.30	B 3-1/2" IF	137.77	
								375.85	

Parameter	Min	Max	Ave	Activity	Hrs	BHA Weight (lb)	Drill String	OD(in)	Len (m)
WOB (klbs) :	7	20	10	Drilling :	31.39	in Air (Total) :	DP(G)-NC38(IF)-13.30#	3.500	1134
RPM (rpm) :	60	80	73	Reaming :	0.23	in Mud (Total) :			
Flow (gpm) :	192	235	221	Circ-Other :	6.51	in Air (Bel Jars) :			
SPP (psi) :	1950	2450	2335	Total :	38.13	in Mud (Bel Jars) :			

### PERFORMANCE

	In	Out	Distance (m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Inclination (deg)	20.55	1.71	Oriented :	68.70	9		7.50
Azimuth (deg)	126.36	38.01	Rotated :	189.70	8	-0.20	0.00
			Total :	258.40	8	-2.19	-10.26
							2.39

### COMMENTS

6" Tricone insert bit with 4 3/4" SperryDrill Lobe 4/5 - 6.3 stage adjustable bend set to 1.15 deg.  
 Drilled from 1251m to 1509.3m, with the following parameters while steerable drilling, WOB = 15-25k, Flow = 200 g.p.m., Off bottom SPP = 2100 p.s.i., On bottom SPP = 2400 p.s.i. with a differential pressure of 400 p.s.i. the average ROP while steering was 10 - 12 m/hr, steerable drilling was 28 % of the run, and the steerability was good. The motor was giving 7-1/2 deg/30m doglegs. In rotary mode the average rate of drop was -0.2 deg / 30m, Rotary drilled with the following parameters, WOB 5 - 8k, Flow = 235 g.p.m., RPM = 60 - 80, On bottom SPP = 2450 p.s.i., Off bottom SPP = 2400 p.s.i. with an average ROP of 8 - 10 m/hr.

**sperry-sun**  
**DRILLING SERVICES**

BHA Report page 2

Customer : Western Underground Gas Storage

Well : Iona OBS-1

Country : Australia

Lease : PPL2 Otway Basin

Rig : Rig 30

Job # : AD-DD-90003

BHA# 5

**OBJECTIVES:**

To make correction to well path, then drill to well TD. Heavy weight drillpipe was run in place of drill collars to reduce the chance of differential sticking and hanging up encountered with BHA # 3.

**RESULTS:**

Drilled from 1251m to 1509.3m, with the following parameters while steerable drilling, WOB = 15-25k, Flow = 200 g.p.m., Off bottom SPP = 2100 p.s.i., On bottom SPP = 2400 p.s.i. with a differential pressure of 400 p.s.i. the average ROP while steering was 10 - 12 m/hr, steerable drilling was 28 % of the run, and the steerability was good. The motor was giving 7½°/30m doglegs. In rotary mode the average rate of drop was -0.2°/30m, Rotary drilled with the following parameters, WOB 5 - 8k, Flow = 235 g.p.m., RPM = 60 - 80, On bottom SPP = 2450 p.s.i., Off bottom SPP = 2400 p.s.i. with an average ROP of 8 - 10 m/hr.

The reason for the lower differential pressure in rotary was due to the increased flow rate for hole cleaning, which resulted in a higher off bottom stand pipe pressure, therefore we were unable to use the 400 p.s.i. differential pressure that the motor was capable of as this would have blown the pop offs on the mud pumps which were set for 2500 p.s.i.. The reason for the high pressure was due to the jet selection on location. Ideally we would like to have had 3 x 12 jets in the bit, but the largest jets on location were 11's. Directionally the run was a success, with the actual well path being 0.6m away from the proposed well path.

# sperry-sun

## DRILLING SERVICES

### BHA Report

Customer : Western Underground Gas Storage

Well : Iona OBS-1

Country : Australia

Lease : PPL2 Otway Basin

Rig : Rig 30

Job # : AD-DD-90003

BHA# 6

BHA# 6 : Date In 22/02/19 MD In (m) : 1509 TVD In (m) : 1345 Date Out 23/02/199 MD Out (m): 1538 TVD Out (m): 1374

#### BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in <sup>2</sup> )	Dull Condition
6	6.000						

#### 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		6.000		6.000	60.00	B 3-1/2" Reg	0.25	
2	3 x CoreBarrel		4.750	2.700		40.88	B 3-1/2" IF	19.07	
3	Head sub		4.750	2.700		40.88	B 3-1/2" IF	0.59	
4	21x HWDP		3.500	2.063		25.30	B 3-1/2" IF	193.67	
5	Drilling Jar	1447-1026	4.750	2.250		46.84	B 3-1/2" IF	10.08	
6	15x HWDP		3.500	2.063		25.30	B 3-1/2" IF	137.77	
								361.43	

Parameter	Min	Max	Ave
WOB (klbs) :	3	5	4
RPM (rpm) :	60	60	60
Flow (gpm) :	143	143	143
SPP (psi) :	1100	1100	1100

Activity	Hrs
Drilling :	6.00
Reaming :	3.00
Circ-Other :	2.00
<b>Total :</b>	<b>11.00</b>

BHA Weight	(lb)
in Air (Total) :	31746
in Mud (Total) :	27391
in Air (Bel Jars) :	18762
in Mud (Bel Jars) :	16188

Drill String	OD(in)	Len (m)
DP(G)-NC38(IF)-13.30#	3.500	1177

#### PERFORMANCE

	In	Out
Inclination (deg)	1.71	2.78
Azimuth (deg)	38.01	347.32

	Distance (m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :	0.00	0			
Rotated :	28.60	5			
<b>Total :</b>	<b>28.60</b>	<b>5</b>	<b>1.13</b>	<b>-53.16</b>	<b>2.26</b>

#### COMMENTS

To core C 1 waarre sandstone.