

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

**LWD End of Well Report**  
**for**  
**Apache Energy Ltd**

**Fur Seal -1**

**Rig: Ocean Patriot**  
**Field: Exploration**  
**Country: Australia**  
**Job No: AU-FE-0003890148**  
**Date: 25<sup>th</sup> October 2005**

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## General Information

Company:	Apache Energy Ltd	
Rig:	Ocean Patriot	
Well:	Fur Seal-1	
Field:	Exploration	
Country:	Australia	
API Number:		
Sperry-Sun Job Number:	AU-FE-0003890148	
Job start date:	25-Oct-05	
Job end date:	01-Nov-05	
North reference:	Grid	
Declination:	13.083	deg
Dip angle:	-68.668	deg
Total magnetic field:	59915	nT
Date of magnetic data:	24-Oct-05	
Wellhead coordinates N:	38 deg. 7 min 47.91 sec South	
Wellhead coordinates E:	148 deg. 9 min 8.44 sec East	
Vertical section direction:	Closure	
MWD Engineers:	A. Oraekwuotu	J. Nicolson
	B. Glassborow	A. Rule
Company Representatives:	J. Herriot	
Company Geologist:	M. Woodmansee	R. Blackmore
Lease Name:	VIC/P-54	
Unit Number:	182	
State:	Victoria	
County:		

## Operational Overview

Sperry Drilling Services (Halliburton) were contracted by Apache Energy Ltd to provide Logging While Drilling (LWD) services for the drilling of exploration well Fur Seal-1, in permit VIC/P-54, from the semi-submersible drilling rig Ocean Patriot.

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

This hole section was drilled in one bit run using Sperry's Formation Evaluation While Drilling (FEWD) tool suite, comprising of Dual Gamma Ray (DGR), Electromagnetic Wave Resistivity (EWR-P4) and Bi-Modal Acoustic Sonic Tool (BAT) for Formation Evaluation. A Drillstring Dynamics Sensor (DDS) was used for drilling optimisation and a Position Monitor (PM) for directional control. This section was drilled to 824.0 mMDRT.

### 206mm (8 1/2") Hole Section:

This hole section was drilled in one bit run using Sperry's Wireline Replacement (QUAD) tool suite, comprising of a Dual Gamma Ray (DGR), Electromagnetic Wave Resistivity (EWR-P4), Stabilized Litho Density (SLD), Compensated Neutron Porosity (CNP) with Bi-Modal Acoustic Sonic Tool (BAT) for reservoir evaluation. A Drillstring Dynamics Sensor (DDS) was used for drilling optimisation and a Position Monitor (PM) for directional control. Fur Seal-1 was drilled to a well TD of 2610.0 mMDRT.

**Summary of MMDruns**

Run No.	Bit No.	Hole Size (mm)	MMD Service	Start Depth (m)	End Depth (m)	Drill/Wipe Distance (m)	Run Start Date Time	Run End Date Time	BRT Hrs.	Oper. Hrs.	Circ. Hrs.	Max. Temp. (degC)	Serv. Int.	Trip for MMD	Failure Type
0100	2	311.00	DIR-FE	111.70	824.00	712.00	25-Oct-05 03:08	26-Oct-05 05:54	26.76	26.76	15.80	25.00	No	No	
0200	3	216.00	DIR-FE-NUKE	824.00	2610.00	1786.00	28-Oct-05 12:54	01-Nov-05 14:23	97.47	97.47	75.49	78.00	No	No	

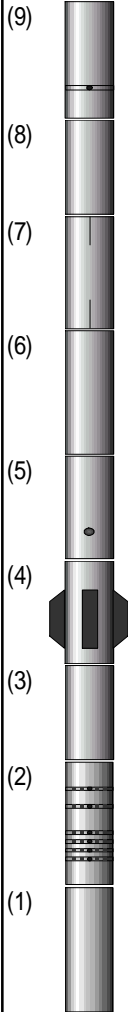
TOTALS ==> 2498.00 124.23 124.23 91.29 0 0

## Bitrun Summary

Run Time Data		Drilling Data		Mud Data																																																																			
MWD Run :	0100	Start Depth :	111.70 m	Mud Type :	Seawater/PHG																																																																		
Rig Bit No:	2	End Depth :	824.00 m	Weight / Visc :	1.06	sg /	N/A spqt																																																																
Hole Size :	311.00 mm	Footage :	712.00 m	Chlorides :	N/A	ppm																																																																	
Run Start :	25-Oct-05 03:08	Avg. Flow Rate :	1060 gpm	PV / YP :	N/A	cp /	N/A lhf2																																																																
Run End :	26-Oct-05 05:54	Avg. RPM :	100 rpm	Solids/Sand :	% /		%																																																																
BRT Hrs :	26.76	Avg. WOB :	10.00 klb	%Oil / O:W :	% /																																																																		
Circ. Hrs :	15.80	Avg. ROP :	67.10 m/hr	pH/Fluid Loss:	N/A	pH /	N/A mptm																																																																
Oper. Hrs :	26.76	Avg. SPP :	3000 psig	Max. Temp. :	25.00	degC																																																																	
MWD Schematics		BHA Schematics																																																																					
<p>(7) BAT SN: 136555 26.13 m From Bit</p> <p>(6) Positive Pulsar SN: 8351</p> <p>(5) TM SN: 177893</p> <p>(4) PM SN: 022873 18.36 m From Bit</p> <p>(3) HCIM</p> <p>(2) DGR SN: 184694 14.98 m From Bit</p> <p>(1) EWR-P4 SN: 123048 11.95 m From Bit</p>		<table border="1"> <thead> <tr> <th>Component</th> <th>Length (m)</th> <th>O.D. (mm)</th> <th>I.D. (mm)</th> </tr> </thead> <tbody> <tr><td>(10)</td><td></td><td></td><td></td></tr> <tr><td>(9)</td><td></td><td></td><td></td></tr> <tr><td>(8)</td><td></td><td></td><td></td></tr> <tr><td>(7)</td><td></td><td></td><td></td></tr> <tr><td>(6)</td><td></td><td></td><td></td></tr> <tr><td>10. HWDP</td><td>138.10</td><td>162.000</td><td>78.000</td></tr> <tr><td>09. Cross Over Sub</td><td>1.10</td><td>203.000</td><td>71.000</td></tr> <tr><td>08. Drill Collar</td><td>17.47</td><td>203.200</td><td>76.200</td></tr> <tr><td>07. Drilling Jars</td><td>9.05</td><td>203.000</td><td>70.000</td></tr> <tr><td>06. Drill Collar</td><td>70.48</td><td>203.200</td><td>76.200</td></tr> <tr><td>05. Integral Blade Stabilizer</td><td>2.15</td><td>203.000</td><td>74.000</td></tr> <tr><td>04. MWD</td><td>19.61</td><td>203.000</td><td>74.000</td></tr> <tr><td>03. Cross Over Sub</td><td>0.97</td><td>244.000</td><td>75.000</td></tr> <tr><td>02. 9-5/8" SperryDrill Lobe 6/7 5 stg</td><td>8.54</td><td>244.602</td><td>0.000</td></tr> <tr><td>01. PDC Security FS2563</td><td>0.42</td><td>311.000</td><td>50.800</td></tr> </tbody> </table>						Component	Length (m)	O.D. (mm)	I.D. (mm)	(10)				(9)				(8)				(7)				(6)				10. HWDP	138.10	162.000	78.000	09. Cross Over Sub	1.10	203.000	71.000	08. Drill Collar	17.47	203.200	76.200	07. Drilling Jars	9.05	203.000	70.000	06. Drill Collar	70.48	203.200	76.200	05. Integral Blade Stabilizer	2.15	203.000	74.000	04. MWD	19.61	203.000	74.000	03. Cross Over Sub	0.97	244.000	75.000	02. 9-5/8" SperryDrill Lobe 6/7 5 stg	8.54	244.602	0.000	01. PDC Security FS2563	0.42	311.000	50.800
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Comments				MWD Performance																																																																			
Drilled out shoe, cement and shoe track. Drilled 406 mm (16") hole from 111.7 to 824.0 mMDRT. All recorded data recovered at surface.				Tool OD / Type : 203.00 mm / P4M MWD Real-time%: 95.00 % MWD Recorded%: 100.00 % Min. Inc. : 0.19 deg / 316.46 m Max. Inc. : 1.36 deg / 804.24 m Final Az. : 261.58 deg Max Op. Press. : 1202 psig																																																																			

## Bitrun Summary

Run Time Data		Drilling Data		Mud Data			
MWD Run :	0200	Start Depth :	824.00 m	Mud Type :	KCI/PHPA		
Rig Bit No:	3	End Depth :	2610.00 m	Weight / Visc :	1.22 sg /	67.00 spqt	
Hole Size :	216.00 mm	Footage :	1786.00 m	Chlorides :	47000 ppm		
Run Start :	28-Oct-05 12:54	Avg. Flow Rate :	600 gpm	PV / YP :	26.00 cp /	18.50 lhf2	
Run End :	01-Nov-05 14:23	Avg. RPM :	100 rpm	Solids/Sand :	14 % /	0.6 %	
BRT Hrs :	97.47	Avg. WOB :	16.00 klb	%Oil / O:W :	0 % /	0:91	
Circ. Hrs :	75.49	Avg. ROP :	29.63 m/hr	pH/Fluid Loss:	8.90 pH /	4.80 mptm	
Oper. Hrs :	97.47	Avg. SPP :	2490 psig	Max. Temp. :	78.00 degC		

MWD Schematics		BHA Schematics			
		Component	Length (m)	O.D. (mm)	I.D. (mm)
(9)		(9)			
(8)		(8)			
(7)		(7)			
(6)	9. Positive Pulser SN: 8047	(6)			
(5)	8. TM SN: 177893	(5)			
(4)	7. PM SN: 126995 32.73 m From Bit	(4)			
(3)	6. BAT SN: 195076 28.03 m From Bit	(3)			
(2)	5. CNP SN: 087644 23.21 m From Bit	(2)			
(1)	4. SLD SN: 071411 20.40 m From Bit	(1)			
	3. HCIM SN: 209729				
	2. EWR-P4 SN: 165129 13.72 m From Bit				
	1. DGR SN: 53520 11.51 m From Bit				
		09. HWDP	110.55	162.000	78.000
		08. Drill Collar	18.62	171.450	76.200
		07. Drilling Jars	9.68	171.450	70.000
		06. Drill Collar	83.68	171.450	76.200
		05. MWD	26.92	171.450	74.000
		04. Integral Blade Stabilizer	1.53	171.450	74.000
		03. Float Sub	0.88	171.450	74.000
		02. 6 3/4" SperryDrill 6/7 Lobe 5 stg	7.70	171.450	74.000
		01. PDC Smith S73VPX	0.22	216.000	50.800

Comments	MWD Performance		
Drilled shoe, cement, and rathole to 826.0 m. Drilled 3m of new formation and perform FIT. Drilled ahead 8½" hole to 2610.0 mMDRT. All recorded data recovered at surface.	Tool OD / Type :	171.00 mm /	QUAD
	MWD Real-time%:	95.80 %	
	MWD Recorded%:	100.00 %	
	Min. Inc. :	0.47 deg /	2030.20 m
	Max. Inc. :	1.41 deg /	2517.63 m
	Final Az. :	56.39 deg	
	Max Op. Press. :	4525 psig	

## Directional Survey Data

Measured Depth (metres)	Inclination (degrees)	Direction (degrees)	Vertical Depth (metres)	Latitude (metres)	Departure (metres)	Vertical Section (metres)	Dogleg (deg/30m)
147.58	0.20	177.10	147.58	0.26 S	0.01 E	-0.26	TIE-IN
202.77	0.44	176.34	202.77	0.57 S	0.03 E	-0.57	0.13
230.70	0.60	175.42	230.70	0.82 S	0.05 E	-0.82	0.17
259.17	0.44	182.26	259.17	1.08 S	0.06 E	-1.08	0.17
316.46	0.19	202.22	316.46	1.39 S	0.01 E	-1.39	0.14
431.05	0.42	169.27	431.04	1.98 S	0.02 E	-1.98	0.08
574.28	0.77	174.99	574.27	3.46 S	0.20 E	-3.46	0.07
631.93	0.59	187.00	631.91	4.14 S	0.20 E	-4.14	0.12
747.01	1.16	234.79	746.98	5.40 S	0.82 W	-5.40	0.23
804.24	1.36	261.58	804.20	5.83 S	1.96 W	-5.83	0.32
825.39	1.41	257.87	825.34	5.92 S	2.47 W	-5.92	0.15
854.17	1.08	262.66	854.11	6.03 S	3.08 W	-6.03	0.36
882.94	1.07	265.44	882.88	6.09 S	3.62 W	-6.09	0.05
911.81	1.19	271.36	911.74	6.10 S	4.19 W	-6.10	0.17
940.40	1.16	271.02	940.33	6.09 S	4.77 W	-6.09	0.04
969.00	1.14	275.16	968.92	6.06 S	5.35 W	-6.06	0.09
997.65	1.07	274.19	997.57	6.01 S	5.90 W	-6.01	0.09
1026.35	1.05	269.72	1026.26	5.99 S	6.43 W	-5.99	0.09
1054.97	0.93	273.03	1054.88	5.98 S	6.92 W	-5.98	0.14
1083.56	0.88	279.71	1083.46	5.93 S	7.37 W	-5.93	0.12
1112.05	0.86	280.50	1111.95	5.86 S	7.79 W	-5.86	0.02
1140.78	0.80	280.28	1140.68	5.78 S	8.21 W	-5.78	0.06
1169.42	0.69	281.95	1169.31	5.71 S	8.57 W	-5.71	0.12
1198.14	0.81	286.36	1198.03	5.62 S	8.93 W	-5.62	0.14
1255.86	1.01	305.38	1255.74	5.21 S	9.74 W	-5.21	0.19
1284.62	0.87	311.34	1284.50	4.92 S	10.10 W	-4.92	0.18
1313.27	0.86	333.94	1313.15	4.58 S	10.36 W	-4.58	0.35
1341.99	0.67	334.23	1341.86	4.24 S	10.53 W	-4.24	0.21
1370.65	0.68	330.15	1370.52	3.94 S	10.69 W	-3.94	0.05
1427.72	0.77	326.65	1427.59	3.33 S	11.07 W	-3.33	0.05
1456.16	0.82	328.79	1456.03	2.99 S	11.28 W	-2.99	0.07
1484.95	0.85	336.79	1484.81	2.62 S	11.47 W	-2.62	0.12
1513.89	0.88	324.92	1513.75	2.24 S	11.68 W	-2.24	0.19
1542.83	0.86	327.87	1542.69	1.88 S	11.92 W	-1.88	0.05
1571.59	0.87	324.35	1571.44	1.52 S	12.17 W	-1.52	0.06
1599.70	0.77	338.40	1599.55	1.17 S	12.36 W	-1.17	0.24
1657.30	0.97	353.39	1657.14	0.32 S	12.56 W	-0.32	0.15
1686.01	0.88	355.80	1685.85	0.14 N	12.60 W	0.14	0.10
1715.08	0.89	6.11	1714.92	0.59 N	12.60 W	0.59	0.16
1743.68	0.78	6.96	1743.51	1.00 N	12.55 W	1.00	0.12



## Directional Survey Data

Measured Depth (metres)	Inclination (degrees)	Direction (degrees)	Vertical Depth (metres)	Latitude (metres)	Departure (metres)	Vertical Section (metres)	Dogleg (deg/30m)
1772.08	0.50	6.19	1771.91	1.32 N	12.51 W	1.32	0.29
1800.65	0.48	16.78	1800.48	1.55 N	12.46 W	1.55	0.10
1829.26	0.58	38.40	1829.09	1.78 N	12.34 W	1.78	0.23
1858.09	0.50	34.50	1857.92	2.00 N	12.18 W	2.00	0.09
1887.20	0.56	59.17	1887.03	2.18 N	11.98 W	2.18	0.24
1916.07	0.69	58.49	1915.89	2.34 N	11.72 W	2.34	0.14
1944.74	0.66	50.11	1944.56	2.54 N	11.44 W	2.54	0.11
1973.02	0.75	60.07	1972.84	2.73 N	11.16 W	2.73	0.16
2001.54	0.62	65.93	2001.36	2.89 N	10.85 W	2.89	0.15
2030.20	0.47	54.96	2030.02	3.02 N	10.61 W	3.02	0.19
2058.70	0.51	43.07	2058.52	3.18 N	10.43 W	3.18	0.11
2087.39	0.51	81.71	2087.20	3.29 N	10.22 W	3.29	0.35
2116.44	0.55	117.19	2116.25	3.24 N	9.97 W	3.24	0.34
2144.78	0.56	102.11	2144.59	3.15 N	9.71 W	3.15	0.16
2231.21	0.95	136.21	2231.02	2.55 N	8.80 W	2.55	0.20
2317.05	0.95	103.22	2316.84	1.87 N	7.62 W	1.87	0.19
2402.73	0.93	77.31	2402.51	1.86 N	6.25 W	1.86	0.15
2431.36	1.07	70.01	2431.14	2.00 N	5.78 W	2.00	0.20
2460.09	1.06	56.97	2459.86	2.24 N	5.30 W	2.24	0.25
2488.89	1.28	60.60	2488.66	2.54 N	4.80 W	2.54	0.24
2517.63	1.41	56.39	2517.39	2.90 N	4.23 W	2.90	0.17
2610.00	1.41	56.39	2609.73	4.15 N	2.33 W	4.15	0.00

## Directional Survey Data

CALCULATION BASED ON Minimum Curvature METHOD

SURVEY COORDINATES RELATIVE TO WELL SYSTEM REFERENCE POINT

TVD VALUES GIVEN RELATIVE TO DRILLING MEASUREMENT POINT

VERTICAL SECTION RELATIVE TO WELL HEAD

VERTICAL SECTION IS COMPUTED ALONG A DIRECTION OF 0.00 DEGREES (GRID)

A TOTAL CORRECTION OF 13.80 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.

HORIZONTAL DISPLACEMENT(CLOSURE) AT 2610.00 METRES

IS 4.76 METRES ALONG 330.68 DEGREES (GRID)

Final Survey projected to TD.

RT - AHD = 21.5 m

