

End of Well Report for Santos SBU

Rig: Ocean Epoch
Well: Hill-1
Field: Exploration
Country: Australia
Job No: AU-FE-0002774266
Date: 08-Dec-03
API No:

Table of Contents

1. General Information
2. Operational Overview
3. Summary of MWD Runs
4. Bitrun Summary
5. Directional Survey Data

General Information

Company: Santos SBU
Rig: Ocean Epoch
Well: Hill-1
Field: Exploration
Country: Australia
API Number:
Sperry-Sun Job Number: AU-FE-0002774266
Job start date: 08-Dec-03
Job end date: 20-Dec-03
North reference: Grid
Declination: 10.483 deg
Dip angle: -70.112 deg
Total magnetic field: 61074.953 nT
Date of magnetic data: 12-Dec-03
Wellhead coordinates N: 38 deg. 48 min 50.380 sec South
Wellhead coordinates E: 141 deg. 50 min 39.580 sec East
Vertical section direction: Closure deg
MWD Engineers: T.Oborne A.Wilson

Company Representatives: G.Howard

Company Geologist: J.Pittman
Lease Name: VIC-P-51
Unit Number: LT-1087
State: Victoria
County:

Operational Overview

Sperry-Sun Drilling Services was contracted by Santos SBU to supply Logging While Drilling (LWD) services on the well Hill-1 in permit VIC-P-51. The well was drilled with Diamond Offshore's MODU Ocean Epoch.

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

Sperry-Sun's 8" FEWD tool suite was utilised in this hole section. This consists of a Dual Gamma Ray (DGR), Four Phase Electromagnetic Wave Resistivity (EWR-P4) and a Directional Modual (DM) for deviation control. This hole section was drilled in one bit run from 777.0 - 1810.0 mMDRT. All recorded data was recovered on surface.

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

Sperry-Sun's 6 3/4" FEWD tool suite was utilised in this hole section. This consists of a Dual Gamma Ray (DGR), Four Phase Electromagnetic Wave Resistivity (EWR-P4) and a Directional Modual (DM) for deviation control. This hole section was drilled in one bit run from 1810.0 mMDRT to the well TD at 2575.0 mDMRT. All recorded data was recovered on surface.

| | | | | | | | |
|--------|-------|---------|--------|--------|-------|---|---|
| TOTALS | ====> | 1798.00 | 105.45 | 103.56 | 65.70 | 0 | 0 |
|--------|-------|---------|--------|--------|-------|---|---|

Bitrun Summary

| Run Time Data | | Drilling Data | | Mud Data | | | | |
|--|-----------------|--|--------------|------------------|----------------------|--|--|--|
| MWD Run : | 0100 | Start Depth : | 777.00 m | Mud Type : | KCI/PHPA | | | |
| Rig Bit No: | 100 | End Depth : | 1810.00 m | Weight / Visc : | 1.11 sg / 42.30 spl | | | |
| Hole Size : | 311.00 mm | Footage : | 1033.00 m | Chlorides : | 37000 ppm | | | |
| Run Start : | 14-Dec-03 18:29 | Avg. Flow Rate : | 860.00 gpm | PV / YP : | 16.00 cp / 11.50 pa | | | |
| Run End : | 16-Dec-03 21:59 | Avg. RPM : | 145.00 rpm | Solids/Sand : | 6 % / 0.6 % | | | |
| BRT Hrs : | 51.50 | Avg. WOB : | 25.00 klb | %Oil / O:W : | N/A % / N/A:100 | | | |
| Circ. Hrs : | 32.00 | Avg. ROP : | 43.20 m/hr | pH/Fluid Loss: | 8.80 pH / 7.00 cptm | | | |
| Oper. Hrs : | 49.59 | Avg. SPP : | 3800.00 psig | Max. Temp. : | 52.00 degC | | | |
| MWD Schematics | | BHA Schematics | | | | | | |
| <div><div>(5)</div><div>(4)</div><div>(3)</div><div>(2)</div><div>(1)</div><div>5. Hang-off Sub SN :</div><div>4. PM SN : 103286 16.02 m From Bit</div><div>3. HCIM SN : 170439</div><div>2. DGR SN : 188554 12.49 m From Bit</div><div>1. EWR-P4 SN : 77242 9.46 m From Bit</div></div> | | <div><div>(13)</div><div>(12)</div><div>(11)</div><div>(10)</div><div>(9)</div><div>(8)</div><div>(7)</div><div>(6)</div><div>(5)</div><div>(4)</div><div>(3)</div><div>(2)</div><div>(1)</div><div>Component</div><div>Length (m)</div><div>O.D. (mm)</div><div>I.D. (mm)</div><div>13. HWDP113.33114.00076.000</div><div>12. Cross Over Sub1.10214.00049.000</div><div>11. Drill Collar9.51209.55071.438</div><div>10. Cross Over Sub8.19214.00076.000</div><div>09. Drill Collar27.61209.55071.438</div><div>08. Drilling Jars9.77214.00049.000</div><div>07. Drill Collar65.76209.55071.438</div><div>06. 3-Point String Reamer2.01214.00076.000</div><div>05. MWD12.92214.00054.400</div><div>04. Cross Over Sub2.01203.00076.000</div><div>03. Drill Collar2.97209.55071.438</div><div>02. Bit Sub2.15214.00076.000</div><div>01. HC-6050.38311.0000.000</div></div> | | | | | | |
| Comments | | | | MWD Performance | | | | |
| Drilled 311mm hole section from 777.0 - 1810.00 mMDRT. All recorded data was recovered at surface. | | | | Tool OD / Type : | 203.20 mm / P4M | | | |
| | | | | MWD Real-time%: | 95.00 % / 100.00 % | | | |
| | | | | MWD Recorded%: | 96.00 % / 100.00 % | | | |
| | | | | Min. Inc. : | 0.12 deg / 787.46 m | | | |
| | | | | Max. Inc. : | 1.04 deg / 1569.90 m | | | |
| | | | | Final Az. : | 348.35 deg | | | |
| | | | | Max Op. Press. : | 2730 psig | | | |

Bitrun Summary

| Run Time Data | | Drilling Data | | Mud Data | | | | |
|---|-----------------|------------------|--------------|-------------------------|-------------|-----------|--------|--|
| MWD Run : | 0200 | Start Depth : | 1810.00 m | Mud Type : | KCI/PHPA | | | |
| Rig Bit No: | 200 | End Depth : | 2575.00 m | Weight / Visc : | 1.15 sg / | 74.00 spl | | |
| Hole Size : | 216.00 mm | Footage : | 765.00 m | Chlorides : | 42000 ppm | | | |
| Run Start : | 18-Dec-03 12:37 | Avg. Flow Rate : | 650.00 gpm | PV / YP : | 23.00 cp / | 16.70 pa | | |
| Run End : | 20-Dec-03 18:34 | Avg. RPM : | 145.00 rpm | Solids/Sand : | 9.5 % / | 0.25 % | | |
| BRT Hrs : | 53.95 | Avg. WOB : | 25.00 klb | %Oil / O:W : | N/A % / | N/A:100 | | |
| Circ. Hrs : | 33.70 | Avg. ROP : | 32.70 m/hr | pH/Fluid Loss: | 9.00 pH / | 4.20 cptm | | |
| Oper. Hrs : | 53.97 | Avg. SPP : | 3200.00 psig | Max. Temp. : | 70.00 degC | | | |
| MWD Schematics | | BHA Schematics | | | | | | |
| <p>4. Hang-off Sub SN :</p> <p>3. HCIM SN : 191774</p> <p>2. DGR SN : 016131 7.51 m From Bit</p> <p>1. EWR-P4 SN : 130937 4.47 m From Bit</p> | | | | Component | Length | O.D. | I.D. | |
| | | | | (m) | (mm) | (mm) | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | 13. HWDP | 113.34 | 114.000 | 76.000 | |
| | | | | 12. Drill collar | 28.08 | 165.000 | 76.000 | |
| | | | | 11. Cross Over Sub | 0.36 | 166.000 | 76.000 | |
| | | | | 10. Drilling Jars | 9.63 | 166.000 | 76.000 | |
| | | | | 09. Cross Over Sub | 0.82 | 169.000 | 76.000 | |
| | | | | 08. Spiral Drill collar | 111.52 | 166.000 | 76.000 | |
| | | | | 07. Cross Over Sub | 0.36 | 169.000 | 76.000 | |
| 06. 3-Point String Reamer | 1.42 | 171.000 | 76.000 | | | | | |
| 05. Cross Over Sub | 0.59 | 169.000 | 76.000 | | | | | |
| 04. MWD | 12.00 | 171.000 | 83.000 | | | | | |
| 03. Cross Over Sub | 0.50 | 171.000 | 76.000 | | | | | |
| 02. Bit Sub | 1.58 | 160.000 | 76.000 | | | | | |
| 01. DSX104-HGN | 0.23 | 311.000 | 0.000 | | | | | |
| Comments | | | | MWD Performance | | | | |
| Drill 8 1/2" hole section from 1810.0 to 2575.0 mMDRT. All recorded data was recovered on surface. | | | | Tool OD / Type : | 171.45 mm / | P4M | | |
| | | | | MWD Real-time%: | 95.00 % / | 100.00 % | | |
| | | | | MWD Recorded%: | 95.00 % / | 100.00 % | | |
| | | | | Min. Inc. : | 0.12 deg / | 2266.83 m | | |
| | | | | Max. Inc. : | 0.88 deg / | 1830.94 m | | |
| | | | | Final Az. : | 204.43 deg | | | |
| | | | | Max Op. Press. : | 4250 psig | | | |

Directional Survey Data

| Measured Depth (metres) | Inclination (degrees) | Direction (degrees) | Vertical Depth (metres) | Latitude (metres) | Departure (metres) | Vertical Section (metres) | Dogleg (deg/30m) |
|----------------------------|--------------------------|------------------------|----------------------------|----------------------|-----------------------|------------------------------|---------------------|
| 215.00 | 0.00 | 0.00 | 215.00 | 0.00 N | 0.00 E | 0.00 | TIE-IN |
| 256.00 | 1.00 | 0.00 | 256.00 | 0.00 N | 0.00 E | 0.00 | 0.01 |
| 771.00 | 0.50 | 0.00 | 771.00 | 0.22 N | 0.54 E | 0.35 | 0.01 |
| 787.46 | 0.12 | 67.24 | 787.46 | 0.24 N | 0.57 E | 0.37 | 0.01 |
| 843.00 | 0.22 | 48.21 | 843.00 | 0.33 N | 0.70 E | 0.49 | 0.06 |
| 904.44 | 0.31 | 35.64 | 904.44 | 0.55 N | 0.89 E | 0.75 | 0.05 |
| 929.63 | 0.40 | 38.33 | 929.63 | 0.67 N | 0.98 E | 0.89 | 0.11 |
| 1017.40 | 0.87 | 38.98 | 1017.39 | 1.42 N | 1.59 E | 1.76 | 0.16 |
| 1045.49 | 0.84 | 22.92 | 1045.48 | 1.78 N | 1.80 E | 2.16 | 0.26 |
| 1075.66 | 0.81 | 9.37 | 1075.65 | 2.19 N | 1.92 E | 2.59 | 0.19 |
| 1107.14 | 0.72 | 9.97 | 1107.12 | 2.60 N | 1.99 E | 3.01 | 0.08 |
| 1162.24 | 0.83 | 10.31 | 1162.22 | 3.34 N | 2.12 E | 3.75 | 0.06 |
| 1191.38 | 0.96 | 20.31 | 1191.36 | 3.77 N | 2.25 E | 4.20 | 0.21 |
| 1222.78 | 0.96 | 24.23 | 1222.75 | 4.26 N | 2.45 E | 4.72 | 0.06 |
| 1248.55 | 0.97 | 35.16 | 1248.52 | 4.64 N | 2.66 E | 5.14 | 0.21 |
| 1280.63 | 0.93 | 40.57 | 1280.59 | 5.05 N | 2.98 E | 5.63 | 0.09 |
| 1309.30 | 0.84 | 37.96 | 1309.26 | 5.40 N | 3.27 E | 6.02 | 0.10 |
| 1339.10 | 0.93 | 39.70 | 1339.06 | 5.75 N | 3.55 E | 6.44 | 0.09 |
| 1394.96 | 0.89 | 36.10 | 1394.91 | 6.45 N | 4.10 E | 7.25 | 0.04 |
| 1455.71 | 0.92 | 32.58 | 1455.65 | 7.24 N | 4.64 E | 8.15 | 0.03 |
| 1483.05 | 1.02 | 32.83 | 1482.99 | 7.63 N | 4.89 E | 8.59 | 0.11 |
| 1510.37 | 1.03 | 29.55 | 1510.30 | 8.05 N | 5.14 E | 9.05 | 0.06 |
| 1538.70 | 1.01 | 27.64 | 1538.63 | 8.49 N | 5.38 E | 9.54 | 0.04 |
| 1569.90 | 1.04 | 13.43 | 1569.82 | 9.01 N | 5.58 E | 10.09 | 0.24 |
| 1627.36 | 1.04 | 9.82 | 1627.27 | 10.03 N | 5.78 E | 11.13 | 0.03 |
| 1655.58 | 0.87 | 5.35 | 1655.49 | 10.50 N | 5.85 E | 11.60 | 0.19 |
| 1685.81 | 0.94 | 10.68 | 1685.72 | 10.97 N | 5.92 E | 12.07 | 0.11 |
| 1712.12 | 0.96 | 9.64 | 1712.02 | 11.40 N | 5.99 E | 12.51 | 0.03 |
| 1745.90 | 0.99 | 6.48 | 1745.80 | 11.97 N | 6.07 E | 13.08 | 0.06 |
| 1772.73 | 0.77 | 353.39 | 1772.62 | 12.38 N | 6.08 E | 13.48 | 0.33 |
| 1791.40 | 0.69 | 348.35 | 1791.29 | 12.61 N | 6.04 E | 13.70 | 0.17 |
| 1830.94 | 0.88 | 326.25 | 1830.83 | 13.10 N | 5.82 E | 14.12 | 0.27 |
| 1856.75 | 0.78 | 329.33 | 1856.64 | 13.42 N | 5.62 E | 14.38 | 0.12 |
| 1918.20 | 0.81 | 316.68 | 1918.08 | 14.09 N | 5.11 E | 14.91 | 0.09 |
| 1944.22 | 0.66 | 306.66 | 1944.10 | 14.32 N | 4.87 E | 15.07 | 0.22 |
| 1973.45 | 0.62 | 331.70 | 1973.33 | 14.56 N | 4.66 E | 15.25 | 0.29 |
| 2002.66 | 0.61 | 346.23 | 2002.54 | 14.85 N | 4.55 E | 15.50 | 0.16 |
| 2031.42 | 0.65 | 345.22 | 2031.29 | 15.15 N | 4.47 E | 15.78 | 0.04 |
| 2059.75 | 0.63 | 337.25 | 2059.62 | 15.45 N | 4.37 E | 16.05 | 0.10 |
| 2089.98 | 0.79 | 349.72 | 2089.85 | 15.81 N | 4.26 E | 16.37 | 0.21 |

Directional Survey Data

| Measured Depth (metres) | Inclination (degrees) | Direction (degrees) | Vertical Depth (metres) | Latitude (metres) | Departure (metres) | Vertical Section (metres) | Dogleg (deg/30m) |
|----------------------------|--------------------------|------------------------|----------------------------|----------------------|-----------------------|------------------------------|---------------------|
| 2122.03 | 0.73 | 341.38 | 2121.90 | 16.22 N | 4.16 E | 16.74 | 0.12 |
| 2151.02 | 0.47 | 3.16 | 2150.89 | 16.51 N | 4.11 E | 17.02 | 0.35 |
| 2179.66 | 0.45 | 356.67 | 2179.52 | 16.74 N | 4.11 E | 17.24 | 0.06 |
| 2206.86 | 0.38 | 7.86 | 2206.72 | 16.94 N | 4.11 E | 17.43 | 0.12 |
| 2237.90 | 0.14 | 43.04 | 2237.76 | 17.06 N | 4.15 E | 17.56 | 0.27 |
| 2266.83 | 0.12 | 51.65 | 2266.69 | 17.11 N | 4.20 E | 17.62 | 0.02 |
| 2323.77 | 0.31 | 195.67 | 2323.63 | 17.00 N | 4.21 E | 17.51 | 0.22 |
| 2352.55 | 0.50 | 187.16 | 2352.41 | 16.80 N | 4.17 E | 17.31 | 0.20 |
| 2382.66 | 0.57 | 188.78 | 2382.52 | 16.52 N | 4.13 E | 17.03 | 0.07 |
| 2412.01 | 0.59 | 186.72 | 2411.87 | 16.23 N | 4.09 E | 16.73 | 0.03 |
| 2440.80 | 0.65 | 189.72 | 2440.66 | 15.92 N | 4.05 E | 16.42 | 0.08 |
| 2470.12 | 0.64 | 190.52 | 2469.98 | 15.59 N | 3.99 E | 16.09 | 0.01 |
| 2498.18 | 0.66 | 197.21 | 2498.03 | 15.28 N | 3.91 E | 15.77 | 0.08 |
| 2524.20 | 0.70 | 194.84 | 2524.05 | 14.98 N | 3.83 E | 15.46 | 0.06 |
| 2553.31 | 0.86 | 204.43 | 2553.16 | 14.61 N | 3.69 E | 15.07 | 0.21 |
| 2575.00 | 0.86 | 204.43 | 2574.85 | 14.32 N | 3.55 E | 14.75 | 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 CLOSURE OF 13.95 DEGREES (GRID)

A TOTAL CORRECTION OF 11.01 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.

HORIZONTAL DISPLACEMENT(CLOSURE) AT 2575.00 METRES

IS 14.75 METRES ALONG 13.95 DEGREES (GRID)

Final survey is projected to TD.

Surveys at 256.0 and 771.0 mMDRT are from an Andergauge survey tool.

Sperry-Sun, A Halliburton Company

