



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

**LWD End of Well Report**  
**for**  
**Santos Ltd**

**Henry-1 & Henry-1 ST1**

**Rig:** Ocean Patriot  
**Field:** Exploration  
**Country:** Australia  
**Job No:** AU-FE-0003730529 & AU-FE-0003841251  
**Date:** 10<sup>th</sup> July 2005

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## General Information

|                             |                                 |
|-----------------------------|---------------------------------|
| Company:                    | Santos Ltd                      |
| Rig:                        | Ocean Patriot                   |
| Well:                       | Henry-1 & Henry-1ST1            |
| Field:                      | Exploration                     |
| Country:                    | Australia                       |
| Sperry Job Number:          | Henry-1 : AU-FE-0003730529      |
| Sperry Job Number:          | Henry-1 ST1: AU-FE-0003841251   |
| Job start date:             | 10-Jul-05                       |
| Job end date:               | 28-Jul-05                       |
| North reference:            | Grid                            |
| Declination:                | 10.836 deg                      |
| Dip angle:                  | -69.940 deg                     |
| Total magnetic field:       | 60864 nT                        |
| Date of magnetic data:      | 22-Jul-05                       |
| Wellhead coordinates N:     | 38 deg. 43 min 11.630 sec South |
| Wellhead coordinates E:     | 142 deg. 39 min 39.780 sec East |
| Vertical section direction: | Closure                         |
| MWD Engineers:              | A.Rule J.Nicolson               |

Company Representatives: R.Buitenhuis

Company Geologist: R. Subramanian

Lease Name: Vic P-44

Unit Number: SDL\_197

State: Victoria

County:

## Operational Overview

Sperry Drilling Services, a division of Halliburton, were contracted by Santos Ltd to provide Surveying and Logging While Drilling (LWD) services on the well, Henry-1. Henry-1 was drilled using Diamond Offshore Drilling Module, the Ocean Patriot, in the Bass Strait, offshore Victoria.

### Henry-1

914mm (36") Open Hole Section

Sperry tools were not run in the 36" hole section.

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

An Electronic Multishot (EMS) was dropped at 720.0 mMDRT, section TD.

216mm (8½") Open Hole Section

The hole section was drilled with a steerable assembly and logging while drilling (LWD) tools to provide realtime and recorded drilling and formation evaluation data. The tools incorporated a positive pulser, Direction Module (DM), Dual Gamma Ray (DGR) and Electromagnetic Wave Resistivity (EWR).

The section was drilled, in one bit run, to a total depth of 2100.0 mMDRT. The drillstring became stuck when backreaming out of hole. After attempting to jar free, the drillstring was severed, leaving the BHA and LWD tool downhole. Henry-1 was plugged back and sidetracked as Henry-1 ST1.

### Henry-1 ST1

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

The kick off point from Henry-1 was 1095.0 mMDRT. Henry-1 ST1 was drilled, in four bit runs, using Sperry Drilling Services logging while drilling (LWD) tools to provide realtime and recorded drilling and formation evaluation data. The tools incorporated a positive pulser, Direction Module (DM), Dual Gamma Ray (DGR) and Electromagnetic Wave Resistivity (EWR).



At 1464.0 mMDRT, the LWD lower bus failed, resulting in loss of Gamma and Resistivity data. A decision was made to drill ahead without LWD. A bit trip was made at 1748.0 mMDRT, and LWD tools laid out. It was decided to complete the well without MWD.

## Summary of MMDruns

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## Bitrun Summary

| Run Time Data  |                 | Drilling Data   |            | Mud Data         |             |           |      |
|--|-----------------|---|------------|------------------|-------------|-----------|------|
| MWD Run :  | 0100            | Start Depth :   | 720.00 m   | Mud Type :       | KCl/Polymer |           |      |
| Rig Bit No:  | 3               | End Depth :   | 2100.00 m  | Weight / Visc :  | 1.23 sg /   | 70.00     | spqt |
| Hole Size :  | 216.00 mm       | Footage :   | 1380.00 m  | Chlorides :      | 34000 ppm   |           |      |
| Run Start :  | 14-Jul-05 18:02 | Avg. Flow Rate :  | 718 gpm    | PV / YP :        | 21.00 cp /  | 30.00     | lhf2 |
| Run End :  | 21-Jul-05 16:30 | Avg. RPM :  | 157 rpm    | Solids/Sand :    | 10.5 % /    | 1.5 %     |      |
| BRT Hrs :  | 166.47          | Avg. WOB :  | 33.80 klb  | %Oil / O:W:      | 0 % /       | N/A       |      |
| Circ. Hrs :  | 41.00           | Avg. ROP :  | 95.00 m/hr | pH/Fluid Loss:   | 8.50 pH /   | 4.00      | mptm |
| Oper. Hrs :  | 166.47          | Avg. SPP :  | 2871 psig  | Max. Temp. :     | 62.90 degC  |           |      |
| MWD Schematics   |                 | BHA Schematics  |            |                  |             |           |      |
| (5)    |                 | Component   |            |                  |             |           |      |
|  |                 | Length O.D. I.D.<br>(m) (mm) (mm)   |            |                  |             |           |      |
| (4)  |                 | (10)  |            |                  |             |           |      |
| (3)  |                 | (9)   |            |                  |             |           |      |
| (2)  |                 | (8)   |            |                  |             |           |      |
| (1)  |                 | (7)   |            |                  |             |           |      |
| 5. 8 DGWD 650 System   |                 | (6) 10. HWDP 138.97 162.000 78.000  |            |                  |             |           |      |
| 4. DM  |                 | 09. Drill Collar 18.63 171.000 71.000   |            |                  |             |           |      |
| SN : 180031  |                 | 08. Drilling Jars 9.76 165.000 70.000   |            |                  |             |           |      |
| 18.01 m From Bit   |                 | (5) 07. Drill Collar 101.88 171.000 71.000  |            |                  |             |           |      |
| 3. HCIM  |                 | 06. NMDC 8.85 171.000 74.000  |            |                  |             |           |      |
| SN : 076300  |                 | (4) 05. MWD 12.93 171.000 74.000  |            |                  |             |           |      |
| 2. EWR-P4  |                 | (3) 04. Integral Blade Stabilizer 1.78 171.000 74.000                                   |            |                  |             |           |      |
| SN : 149022  |                 | 03. Pony collar 5.04 170.000 70.000   |            |                  |             |           |      |
| 12.83 m From Bit   |                 | (2) 02. Integral Blade Stabilizer 2.40 167.000 90.000                                   |            |                  |             |           |      |
| 1. DGR   |                 | (1) 01. PDC Reed Hycalog DSX-104 0.23 216.000 50.800                                    |            |                  |             |           |      |
| SN : 10505499  |                 |   |            |                  |             |           |      |
| 10.51 m From Bit   |                 |   |            |                  |             |           |      |
| Comments   |                 |   |            | MWD Performance  |             |           |      |
| Drilled to well TD at 2100.0 mMDRT. Drillstring became stuck while back-reaming out. After attempting to jar free the drillstring was severed leaving the BHA and LWD tool downhole. |                 |   |            | Tool OD / Type : | 171.45 mm / | P4M       |      |
|  |                 |   |            | MWD Real-time%:  | 96.00 %     |           |      |
|  |                 |   |            | MWD Recorded%:   | N/A %       |           |      |
|  |                 |   |            | Min. Inc. :      | 0.57 deg /  | 737.29 m  |      |
|  |                 |   |            | Max. Inc. :      | 2.28 deg /  | 2078.99 m |      |
|  |                 |   |            | Final Az. :      | 277.99 deg  |           |      |
|  |                 |   |            | Max Op. Press. : | 3670 psig   |           |      |

## Bitrun Summary



| Run Time Data   |                 | Drilling Data   |            | Mud Data         |             |           |      |
|---|-----------------|---|------------|------------------|-------------|-----------|------|
| MWD Run :   | 0200            | Start Depth :   | 1095.00 m  | Mud Type :       | KCl/Polymer |           |      |
| Rig Bit No:   | 4               | End Depth :   | 1370.00 m  | Weight / Visc :  | 1.24 sg /   | 70.00     | spqt |
| Hole Size :   | 216.00 mm       | Footage :   | 275.00 m   | Chlorides :      | 35000 ppm   |           |      |
| Run Start :   | 22-Jul-05 20:15 | Avg. Flow Rate :  | 556 gpm    | PV / YP :        | 23.00 cp /  | 34.00     | lhf2 |
| Run End :   | 24-Jul-05 18:51 | Avg. RPM :  | 235 rpm    | Solids/Sand :    | 10.5 % /    | 1         | %    |
| BRT Hrs :   | 46.59           | Avg. WOB :  | 21.00 klb  | %Oil / O:W:      | 0 % /       | 0.0/89.5  |      |
| Circ. Hrs :   | 26.50           | Avg. ROP :  | 31.60 m/hr | pH/Fluid Loss:   | 9.00 pH /   | 4.60      | mptm |
| Oper. Hrs :   | 46.59           | Avg. SPP :  | 2205 psig  | Max. Temp. :     | 51.00 degC  |           |      |
| MWD Schematics  |                 | BHA Schematics  |            |                  |             |           |      |
| <div><div><div>(6)</div><div>(5)</div><div>(4)</div><div>(3)</div><div>(2)</div><div>(1)</div></div><div><div>6. 8 DGWD 650 System</div><div>0.00 m</div><div>5. DM</div><div>SN: 149865</div><div>21.29 m From Bit</div><div>4. HCIM</div><div>SN: 076895</div><div>3. EWR-P4</div><div>SN: 128946</div><div>14.83 m From Bit</div><div>2. DGR</div><div>SN: 076895</div><div>12.56 m From Bit</div><div>1. Sub</div><div>0.00 m</div></div></div> |                 | <div><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><div><div>Component</div><div>Length</div><div>O.D.</div><div>I.D.</div><div>(m)</div><div>(mm)</div><div>(mm)</div></div><div><div>09. HWDP</div><div>138.43</div><div>162.000</div><div>78.000</div><div>08. Drill Collar</div><div>19.02</div><div>171.000</div><div>71.000</div><div>07. Drilling Jars</div><div>9.24</div><div>165.000</div><div>70.000</div><div>06. Drill Collar</div><div>102.88</div><div>171.000</div><div>71.000</div><div>05. MWD</div><div>15.51</div><div>171.000</div><div>74.000</div><div>04. Float Sub</div><div>0.85</div><div>171.000</div><div>73.000</div><div>03. Integral Blade Stabilizer</div><div>1.37</div><div>167.000</div><div>90.000</div><div>02. 6-3/4" SperryDrill Mud Motor</div><div>7.66</div><div>171.450</div><div>0.000</div><div>01. PDC Smith XR</div><div>0.24</div><div>216.000</div><div>73.000</div></div></div> |            |                  |             |           |      |
| Comments  |                 |   |            | MWD Performance  |             |           |      |
| Henry-1 ST1 kicked off Henry-1 at 1095.0 mMDRT. Pulled out to change the BHA. All recorded data recovered at surface.   |                 |   |            | Tool OD / Type : | 171.45 mm / | P4M       |      |
|   |                 |   |            | MWD Real-time%:  | 99.33 %     |           |      |
|   |                 |   |            | MWD Recorded%:   | 100.00 %    |           |      |
|   |                 |   |            | Min. Inc. :      | 2.74 deg /  | 1344.90 m |      |
|   |                 |   |            | Max. Inc. :      | 10.43 deg / | 1187.85 m |      |
|   |                 |   |            | Final Az. :      | 275.83 deg  |           |      |
|   |                 |   |            | Max Op. Press. : | 2414 psig   |           |      |

## Bitrun Summary

| Run Time Data   |                 | Drilling Data  |           | Mud Data         |             |           |      |
|---|-----------------|--|-----------|------------------|-------------|-----------|------|
| MWD Run :   | 0300            | Start Depth :  | 1370.00 m | Mud Type :       | KCl/Polymer |           |      |
| Rig Bit No:   | 5               | End Depth :  | 1394.00 m | Weight / Visc :  | 1.24 sg /   | 73.00     | spqt |
| Hole Size :   | 216.00 mm       | Footage :  | 24.00 m   | Chlorides :      | 38000 ppm   |           |      |
| Run Start :   | 24-Jul-05 19:19 | Avg. Flow Rate :   | 614 gpm   | PV / YP :        | 21.00 cp /  | 37.00     | lhf2 |
| Run End :   | 25-Jul-05 16:43 | Avg. RPM :   | 134 rpm   | Solids/Sand :    | 11 % /      | 1.25      | %    |
| BRT Hrs :   | 21.39           | Avg. WOB :   | 17.60 klb | %Oil / O:W:      | 0 % /       | 0.0/89.0  |      |
| Circ. Hrs :   | 10.90           | Avg. ROP :   | 6.20 m/hr | pH/Fluid Loss:   | 9.00 pH /   | 4.00      | mptm |
| Oper. Hrs :   | 21.39           | Avg. SPP :   | 2175 psig | Max. Temp. :     | 57.00 degC  |           |      |
| MWD Schematics  |                 | BHA Schematics   |           |                  |             |           |      |
| <div><div>(6)</div><div>(5)</div><div>(4)</div><div>(3)</div><div>(2)</div><div>(1)</div></div> <div><div>6. 8 DGWD 650 System</div><div>SN :</div><div>0.00 m From Bit</div><div>5. DM</div><div>SN : 149865</div><div>12.77 m From Bit</div><div>4. HCIM</div><div>SN : 076895</div><div>3. EWR-P4</div><div>SN : 128946</div><div>6.31 m From Bit</div><div>2. DGR</div><div>SN : 076895</div><div>4.04 m From Bit</div><div>1. Sub</div><div>0.00 m</div></div> |                 | <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> <div><div>08. HWDP</div><div>138.43 162.000 78.000</div><div>07. Drill Collar</div><div>19.02 171.000 71.000</div><div>06. Drilling Jars</div><div>9.24 165.000 70.000</div><div>05. Drill Collar</div><div>102.88 171.000 71.000</div><div>04. Integral Blade Stabilizer</div><div>1.30 171.000 73.000</div><div>03. MWD</div><div>14.51 171.000 74.000</div><div>02. Integral Blade Stabilizer</div><div>1.36 167.000 90.000</div><div>01. PDC Reed Hycalog DSX104</div><div>0.24 216.000 73.000</div></div> |           | Component        | Length      | O.D.      | I.D. |
|   |                 |  |           | (m)              | (mm)        | (mm)      |      |
| Comments  |                 |  |           | MWD Performance  |             |           |      |
| RIH with rotary assembly. Drilled to 1394.0 mMDRT when it was decided to POH due to low ROP. MWD tool read and tested at end of Run 400 to conserve rig time.   |                 |  |           | Tool OD / Type : | 171.45 mm / | P4M       |      |
|   |                 |  |           | MWD Real-time%:  | 99.00 %     |           |      |
|   |                 |  |           | MWD Recorded%:   | 100.00 %    |           |      |
|   |                 |  |           | Min. Inc. :      | 0.94 deg /  | 1361.38 m |      |
|   |                 |  |           | Max. Inc. :      | 0.94 deg /  | 1361.38 m |      |
|   |                 |  |           | Final Az. :      | 282.18 deg  |           |      |
|   |                 |  |           | Max Op. Press. : | 2456 psig   |           |      |



## Bitrun Summary

| Run Time Data  |                 | Drilling Data  |            | Mud Data         |             |            |  |
|--|-----------------|--|------------|------------------|-------------|------------|--|
| MWD Run :  | 0400            | Start Depth :  | 1394.00 m  | Mud Type :       | KCl/Polymer |            |  |
| Rig Bit No:  | 6               | End Depth :  | 1464.00 m  | Weight / Visc :  | 1.24 sg /   | 75.00 spqt |  |
| Hole Size :  | 216.00 mm       | Footage :  | 70.00 m    | Chlorides :      | 36000 ppm   |            |  |
| Run Start :  | 25-Jul-05 17:02 | Avg. Flow Rate :   | 630 gpm    | PV / YP :        | 20.00 cp /  | 37.00 lhf2 |  |
| Run End :  | 26-Jul-05 15:13 | Avg. RPM :   | 164 rpm    | Solids/Sand :    | 10 % /      | 0.6 %      |  |
| BRT Hrs :  | 22.19           | Avg. WOB :   | 36.00 klb  | %Oil / O:W:      | 0.0 % /     | 0.0/88.5   |  |
| Circ. Hrs :  | 10.87           | Avg. ROP :   | 14.49 m/hr | pH/Fluid Loss:   | 8.60 pH /   | 4.80 mptm  |  |
| Oper. Hrs :  | 22.19           | Avg. SPP :   | 2200 psig  | Max. Temp. :     | 57.00 degC  |            |  |
| MWD Schematics   |                 | BHA Schematics   |            |                  |             |            |  |
| <div><div>(6)</div><div></div><div>(5)</div><div>6. 8 DGWD 650 System</div><div>0.00 m</div><div>(4)</div><div>5. DM</div><div>SN : 149865</div><div>12.77 m From Bit</div><div>(3)</div><div>4. HCIM</div><div>SN : 076895</div><div>(2)</div><div>3. EWR-P4</div><div>SN : 128946</div><div>6.31 m From Bit</div><div>(1)</div><div>2. DGR</div><div>SN : 076895</div><div>4.04 m From Bit</div><div>1. Sub</div><div>0.00 m</div></div> |                 | <div><div>(8)</div><div></div><div>(7)</div><div>Component</div><div>Length</div><div>O.D.</div><div>I.D.</div><div>(m)</div><div>(mm)</div><div>(mm)</div><div>(6)</div><div>08. HWDP</div><div>138.43</div><div>162.000</div><div>78.000</div><div>(5)</div><div>07. Drill Collar</div><div>19.02</div><div>171.000</div><div>71.000</div><div>(4)</div><div>06. Drilling Jars</div><div>9.24</div><div>165.000</div><div>70.000</div><div>(3)</div><div>05. Drill Collar</div><div>102.88</div><div>171.000</div><div>71.000</div><div>(2)</div><div>04. Integral Blade Stabilizer</div><div>1.30</div><div>171.000</div><div>73.000</div><div>(1)</div><div>03. MWD</div><div>15.51</div><div>171.000</div><div>74.000</div><div>02. Integral Blade Stabilizer</div><div>1.36</div><div>167.000</div><div>90.000</div><div>01. PDC Reed Hycalog DSX104</div><div>0.24</div><div>216.000</div><div>73.000</div></div> |            |                  |             |            |  |
| Comments   |                 |  |            | MWD Performance  |             |            |  |
| Drilled 8 1/2" hole from 1394.0 m to 1464.0 mMDRT. POOH to change BHA. All recorded data recovered at surface.   |                 |  |            | Tool OD / Type : | 171.45 mm / | P4M        |  |
|  |                 |  |            | MWD Real-time%:  | 99.00 %     |            |  |
|  |                 |  |            | MWD Recorded%:   | 100.00 %    |            |  |
|  |                 |  |            | Min. Inc. :      | 0.45 deg /  | 1418.64 m  |  |
|  |                 |  |            | Max. Inc. :      | 0.45 deg /  | 1418.64 m  |  |
|  |                 |  |            | Final Az. :      | 1418.64 deg |            |  |
|  |                 |  |            | Max Op. Press. : | 2580 psig   |            |  |

## Bitrun Summary

| Run Time Data   |                 | Drilling Data  |            | Mud Data         |             |            |  |
|---|-----------------|--|------------|------------------|-------------|------------|--|
| MWD Run :   | 0500            | Start Depth :  | 1464.00 m  | Mud Type :       | KCl/Polymer |            |  |
| Rig Bit No:   | 7               | End Depth :  | 1748.00 m  | Weight / Visc :  | 1.24 sg /   | 63.00 spqt |  |
| Hole Size :   | 216.00 mm       | Footage :  | 284.00 m   | Chlorides :      | 38000 ppm   |            |  |
| Run Start :   | 26-Jul-05 17:01 | Avg. Flow Rate :   | 730 gpm    | PV / YP :        | 26.00 cp /  | 37.00 lhf2 |  |
| Run End :   | 28-Jul-05 13:17 | Avg. RPM :   | 80 rpm     | Solids/Sand :    | 11.7 % /    | 0.5 %      |  |
| BRT Hrs :   | 44.27           | Avg. WOB :   | 25.00 klb  | %Oil / O:W:      | 0.0 % /     | 0.0/88.3   |  |
| Circ. Hrs :   | 29.25           | Avg. ROP :   | 12.17 m/hr | pH/Fluid Loss:   | 9.20 pH /   | 4.00 mptm  |  |
| Oper. Hrs :   | 44.27           | Avg. SPP :   | 2200 psig  | Max. Temp. :     | 73.00 degC  |            |  |
| MWD Schematics  |                 | BHA Schematics   |            |                  |             |            |  |
| <div><div><div>(6)</div><div></div></div><div><div>(5)</div><div></div></div><div><div>(4)</div><div>6. 8 DGWD 650 System</div><div>0.00 m</div></div><div><div>(3)</div><div>5. DM</div><div>SN : 149865</div><div>12.76 m From Bit</div></div><div><div>(2)</div><div>4. HCIM</div><div>SN : 076895</div></div><div><div>(1)</div><div>3. EWR-P4</div><div>SN : 128946</div><div>6.30 m From Bit</div></div><div><div></div><div>2. DGR</div><div>SN : 076895</div><div>4.03 m From Bit</div></div><div><div></div><div>1. Sub</div><div>0.00 m</div></div></div> |                 | <div><div><div>(8)</div><div></div></div><div><div>(7)</div><div></div></div><div><div>(6)</div><div></div></div><div><div>(5)</div><div></div></div><div><div>(4)</div><div>08. HWDP</div><div>138.43 162.000 78.000</div></div><div><div>(3)</div><div>07. Drill Collar</div><div>19.02 171.000 71.000</div></div><div><div>(2)</div><div>06. Drilling Jars</div><div>9.24 165.000 70.000</div></div><div><div>(1)</div><div>05. Drill Collar</div><div>102.88 171.000 71.000</div></div><div><div></div><div>04. Integral Blade Stabilizer</div><div>1.30 171.000 73.000</div></div><div><div></div><div>03. MWD</div><div>15.51 171.000 74.000</div></div><div><div></div><div>02. Integral Blade Stabilizer</div><div>1.36 167.000 90.000</div></div><div><div></div><div>01. Tricone Hughes MX03</div><div>0.23 216.000 73.000</div></div></div> |            |                  |             |            |  |
| Comments  |                 |  |            | MWD Performance  |             |            |  |
| Drilled 216mm hole from 1464.0 to 1748.0 mMDRT. MWD lower bus failure @ 1460.0 mMDRT (Gamma Ray depth). Drilled ahead to 1748.0 mMDRT without Gamma and Resistivity, but had survey data. POOH to change bit.   |                 |  |            | Tool OD / Type : | 165.10 mm / | P4M        |  |
|   |                 |  |            | MWD Real-time%:  | 36.67 %     |            |  |
|   |                 |  |            | MWD Recorded%:   | 5.00 %      |            |  |
|   |                 |  |            | Min. Inc. :      | 0.39 deg /  | 1504.63 m  |  |
|   |                 |  |            | Max. Inc. :      | 0.62 deg /  | 1705.43 m  |  |
|   |                 |  |            | Final Az. :      | 207.87 deg  |            |  |
|   |                 |  |            | Max Op. Press. : | 3081 psig   |            |  |

## Henry-1 Directional Survey Data

| Measured Depth<br>(metres) | Inclination<br>(degrees) | Direction<br>(degrees) | Vertical Depth<br>(metres) | Latitude<br>(metres) | Departure<br>(metres) | Vertical Section<br>(metres) | Dogleg<br>(deg/30m) |
|----------------------------|--------------------------|------------------------|----------------------------|----------------------|-----------------------|------------------------------|---------------------|
| 89.00                      | 0.00                     | 0.00                   | 89.00                      | 0.00 N               | 0.00 E                | 0.00                         | TIE-IN              |
| 129.12                     | 0.20                     | 77.22                  | 129.12                     | 0.02 N               | 0.07 E                | -0.06                        | 0.15                |
| 156.83                     | 0.27                     | 96.57                  | 156.83                     | 0.02 N               | 0.18 E                | -0.16                        | 0.11                |
| 184.38                     | 0.31                     | 94.92                  | 184.38                     | 0.00 N               | 0.32 E                | -0.29                        | 0.04                |
| 212.40                     | 0.36                     | 101.14                 | 212.40                     | 0.02 S               | 0.48 E                | -0.45                        | 0.07                |
| 240.24                     | 0.31                     | 95.93                  | 240.24                     | 0.04 S               | 0.64 E                | -0.61                        | 0.06                |
| 267.99                     | 0.35                     | 94.89                  | 267.99                     | 0.06 S               | 0.80 E                | -0.76                        | 0.04                |
| 295.63                     | 0.31                     | 95.74                  | 295.63                     | 0.07 S               | 0.96 E                | -0.91                        | 0.04                |
| 323.24                     | 0.23                     | 103.56                 | 323.24                     | 0.09 S               | 1.09 E                | -1.04                        | 0.10                |
| 352.03                     | 0.26                     | 106.91                 | 352.03                     | 0.13 S               | 1.21 E                | -1.16                        | 0.03                |
| 380.74                     | 0.19                     | 216.56                 | 380.74                     | 0.18 S               | 1.24 E                | -1.21                        | 0.39                |
| 409.48                     | 0.57                     | 86.36                  | 409.48                     | 0.21 S               | 1.35 E                | -1.33                        | 0.74                |
| 438.11                     | 0.38                     | 225.33                 | 438.11                     | 0.27 S               | 1.43 E                | -1.42                        | 0.93                |
| 466.79                     | 0.09                     | 330.95                 | 466.79                     | 0.32 S               | 1.35 E                | -1.37                        | 0.43                |
| 495.63                     | 0.22                     | 334.71                 | 495.63                     | 0.25 S               | 1.32 E                | -1.31                        | 0.14                |
| 524.11                     | 0.69                     | 109.83                 | 524.10                     | 0.26 S               | 1.45 E                | -1.44                        | 0.91                |
| 552.73                     | 0.65                     | 125.39                 | 552.72                     | 0.41 S               | 1.75 E                | -1.77                        | 0.19                |
| 581.38                     | 0.34                     | 245.98                 | 581.37                     | 0.54 S               | 1.80 E                | -1.87                        | 0.91                |
| 609.98                     | 0.51                     | 66.01                  | 609.97                     | 0.52 S               | 1.84 E                | -1.90                        | 0.89                |
| 638.77                     | 0.48                     | 95.99                  | 638.76                     | 0.48 S               | 2.08 E                | -2.10                        | 0.27                |
| 667.35                     | 0.33                     | 183.45                 | 667.34                     | 0.58 S               | 2.19 E                | -2.24                        | 0.60                |
| 695.83                     | 0.26                     | 213.55                 | 695.82                     | 0.71 S               | 2.15 E                | -2.26                        | 0.18                |
| 706.66                     | 0.29                     | 230.45                 | 706.65                     | 0.75 S               | 2.12 E                | -2.24                        | 0.24                |
| 737.29                     | 0.57                     | 330.57                 | 737.28                     | 0.67 S               | 1.98 E                | -2.09                        | 0.67                |
| 765.14                     | 0.66                     | 326.31                 | 765.13                     | 0.41 S               | 1.83 E                | -1.84                        | 0.11                |
| 794.77                     | 0.69                     | 317.64                 | 794.76                     | 0.14 S               | 1.61 E                | -1.54                        | 0.11                |
| 823.45                     | 0.69                     | 313.37                 | 823.43                     | 0.11 N               | 1.37 E                | -1.22                        | 0.05                |
| 852.04                     | 0.58                     | 306.57                 | 852.02                     | 0.32 N               | 1.13 E                | -0.91                        | 0.14                |
| 880.68                     | 0.74                     | 315.86                 | 880.66                     | 0.54 N               | 0.88 E                | -0.60                        | 0.20                |
| 938.13                     | 0.84                     | 298.53                 | 938.10                     | 1.00 N               | 0.25 E                | 0.16                         | 0.13                |
| 967.55                     | 1.23                     | 303.40                 | 967.52                     | 1.28 N               | 0.20 W                | 0.68                         | 0.41                |
| 1024.83                    | 1.38                     | 293.31                 | 1024.78                    | 1.89 N               | 1.35 W                | 1.98                         | 0.14                |
| 1081.75                    | 1.29                     | 292.11                 | 1081.69                    | 2.41 N               | 2.57 W                | 3.31                         | 0.05                |
| 1110.62                    | 1.33                     | 294.08                 | 1110.55                    | 2.66 N               | 3.18 W                | 3.96                         | 0.06                |
| 1139.33                    | 1.33                     | 293.79                 | 1139.25                    | 2.93 N               | 3.79 W                | 4.63                         | 0.01                |
| 1168.05                    | 1.48                     | 288.35                 | 1167.97                    | 3.19 N               | 4.45 W                | 5.33                         | 0.21                |
| 1196.68                    | 1.24                     | 288.75                 | 1196.59                    | 3.40 N               | 5.09 W                | 6.01                         | 0.25                |
| 1225.29                    | 1.26                     | 290.84                 | 1225.19                    | 3.61 N               | 5.68 W                | 6.64                         | 0.05                |
| 1282.58                    | 1.27                     | 292.53                 | 1282.47                    | 4.08 N               | 6.86 W                | 7.90                         | 0.02                |
| 1311.27                    | 1.36                     | 293.99                 | 1311.15                    | 4.34 N               | 7.46 W                | 8.56                         | 0.10                |

## Henry-1 Directional Survey Data

| Measured Depth<br>(metres) | Inclination<br>(degrees) | Direction<br>(degrees) | Vertical Depth<br>(metres) | Latitude<br>(metres) | Departure<br>(metres) | Vertical Section<br>(metres) | Dogleg<br>(deg/30m) |
|----------------------------|--------------------------|------------------------|----------------------------|----------------------|-----------------------|------------------------------|---------------------|
| 1369.44                    | 1.09                     | 288.80                 | 1369.31                    | 4.80 N               | 8.62 W                | 9.80                         | 0.15                |
| 1397.42                    | 1.06                     | 288.53                 | 1397.28                    | 4.97 N               | 9.11 W                | 10.33                        | 0.03                |
| 1426.06                    | 1.19                     | 298.59                 | 1425.92                    | 5.20 N               | 9.63 W                | 10.89                        | 0.25                |
| 1454.68                    | 1.13                     | 292.49                 | 1454.53                    | 5.45 N               | 10.15 W               | 11.46                        | 0.14                |
| 1512.37                    | 1.14                     | 299.08                 | 1512.21                    | 5.94 N               | 11.17 W               | 12.60                        | 0.07                |
| 1541.16                    | 1.08                     | 295.34                 | 1540.99                    | 6.20 N               | 11.67 W               | 13.16                        | 0.10                |
| 1569.99                    | 1.17                     | 304.47                 | 1569.82                    | 6.48 N               | 12.16 W               | 13.72                        | 0.21                |
| 1598.80                    | 1.11                     | 303.05                 | 1598.62                    | 6.80 N               | 12.63 W               | 14.28                        | 0.07                |
| 1627.56                    | 1.11                     | 297.60                 | 1627.38                    | 7.08 N               | 13.11 W               | 14.83                        | 0.11                |
| 1713.62                    | 1.43                     | 291.23                 | 1713.42                    | 7.85 N               | 14.85 W               | 16.74                        | 0.12                |
| 1742.16                    | 1.36                     | 293.01                 | 1741.95                    | 8.12 N               | 15.50 W               | 17.43                        | 0.09                |
| 1799.36                    | 1.55                     | 290.26                 | 1799.13                    | 8.65 N               | 16.85 W               | 18.88                        | 0.11                |
| 1856.78                    | 1.58                     | 284.63                 | 1856.53                    | 9.12 N               | 18.34 W               | 20.44                        | 0.08                |
| 1885.32                    | 1.76                     | 284.43                 | 1885.05                    | 9.33 N               | 19.15 W               | 21.27                        | 0.19                |
| 1914.03                    | 1.68                     | 290.65                 | 1913.75                    | 9.59 N               | 19.97 W               | 22.12                        | 0.21                |
| 1971.24                    | 1.69                     | 283.89                 | 1970.94                    | 10.08 N              | 21.57 W               | 23.79                        | 0.10                |
| 2000.03                    | 1.94                     | 285.67                 | 1999.71                    | 10.32 N              | 22.45 W               | 24.70                        | 0.27                |
| 2057.67                    | 2.08                     | 278.62                 | 2057.32                    | 10.74 N              | 24.43 W               | 26.68                        | 0.15                |
| 2078.99                    | 2.28                     | 277.99                 | 2078.62                    | 10.85 N              | 25.23 W               | 27.46                        | 0.28                |
| 2100.00                    | 2.28                     | 277.99                 | 2099.61                    | 10.97 N              | 26.06 W               | 28.27                        | 0.00                |

## Henry-1 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 292.83 DEGREES (GRID)

A TOTAL CORRECTION OF 11.88 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.

HORIZONTAL DISPLACEMENT(CLOSURE) AT 2100.00 METRES

IS 28.27 METRES ALONG 292.83 DEGREES (GRID)

RT to LAT = 21.5m

Final Survey Projected to TD

EMS surveys from 129.12 to 706.66m, followed by MWD surveys.

## Henry-1 ST1 Directional Survey Data

| Measured Depth<br>(metres) | Inclination<br>(degrees) | Direction<br>(degrees) | Vertical Depth<br>(metres) | Latitude<br>(metres) | Departure<br>(metres) | Vertical Section<br>(metres) | Dogleg<br>(deg/30m) |
|----------------------------|--------------------------|------------------------|----------------------------|----------------------|-----------------------|------------------------------|---------------------|
| 89.00                      | 0.00                     | 0.00                   | 89.00                      | 0.00 N               | 0.00 E                | 0.00                         | TIE-IN              |
| 129.12                     | 0.20                     | 77.22                  | 129.12                     | 0.02 N               | 0.07 E                | -0.07                        | 0.15                |
| 156.83                     | 0.27                     | 96.57                  | 156.83                     | 0.02 N               | 0.18 E                | -0.18                        | 0.11                |
| 184.38                     | 0.31                     | 94.92                  | 184.38                     | 0.00 N               | 0.32 E                | -0.32                        | 0.04                |
| 212.40                     | 0.36                     | 101.14                 | 212.40                     | 0.02 S               | 0.48 E                | -0.48                        | 0.07                |
| 240.24                     | 0.31                     | 95.93                  | 240.24                     | 0.04 S               | 0.64 E                | -0.64                        | 0.06                |
| 267.99                     | 0.35                     | 94.89                  | 267.99                     | 0.06 S               | 0.80 E                | -0.80                        | 0.04                |
| 295.63                     | 0.31                     | 95.74                  | 295.63                     | 0.07 S               | 0.96 E                | -0.96                        | 0.04                |
| 323.24                     | 0.23                     | 103.56                 | 323.24                     | 0.09 S               | 1.09 E                | -1.09                        | 0.10                |
| 352.03                     | 0.26                     | 106.91                 | 352.03                     | 0.13 S               | 1.21 E                | -1.21                        | 0.03                |
| 380.74                     | 0.19                     | 216.56                 | 380.74                     | 0.18 S               | 1.24 E                | -1.25                        | 0.39                |
| 409.48                     | 0.57                     | 86.36                  | 409.48                     | 0.21 S               | 1.35 E                | -1.37                        | 0.74                |
| 438.11                     | 0.38                     | 225.33                 | 438.11                     | 0.27 S               | 1.43 E                | -1.45                        | 0.93                |
| 466.79                     | 0.09                     | 330.95                 | 466.79                     | 0.32 S               | 1.35 E                | -1.37                        | 0.43                |
| 495.63                     | 0.22                     | 334.71                 | 495.63                     | 0.25 S               | 1.32 E                | -1.33                        | 0.14                |
| 524.11                     | 0.69                     | 109.83                 | 524.10                     | 0.26 S               | 1.45 E                | -1.47                        | 0.91                |
| 552.73                     | 0.65                     | 125.39                 | 552.72                     | 0.41 S               | 1.75 E                | -1.78                        | 0.19                |
| 581.38                     | 0.34                     | 245.98                 | 581.37                     | 0.54 S               | 1.80 E                | -1.85                        | 0.91                |
| 609.98                     | 0.51                     | 66.01                  | 609.97                     | 0.52 S               | 1.84 E                | -1.88                        | 0.89                |
| 638.77                     | 0.48                     | 95.99                  | 638.76                     | 0.48 S               | 2.08 E                | -2.12                        | 0.27                |
| 667.35                     | 0.33                     | 183.45                 | 667.34                     | 0.58 S               | 2.19 E                | -2.24                        | 0.60                |
| 695.83                     | 0.26                     | 213.55                 | 695.82                     | 0.71 S               | 2.15 E                | -2.21                        | 0.18                |
| 706.66                     | 0.29                     | 230.45                 | 706.65                     | 0.73 S               | 2.12 E                | -2.18                        | 0.53                |
| 1072.48                    | 3.04                     | 270.46                 | 1072.40                    | 2.19 N               | 3.13 W                | 3.32                         | 1.16                |
| 1101.39                    | 9.78                     | 276.53                 | 1101.11                    | 2.47 N               | 6.33 W                | 6.54                         | 7.02                |
| 1130.11                    | 9.92                     | 275.93                 | 1129.41                    | 3.01 N               | 11.22 W               | 11.46                        | 0.19                |
| 1158.84                    | 10.14                    | 276.98                 | 1157.70                    | 3.57 N               | 16.19 W               | 16.46                        | 0.29                |
| 1187.85                    | 10.43                    | 276.79                 | 1186.24                    | 4.19 N               | 21.33 W               | 21.64                        | 0.31                |
| 1216.57                    | 8.59                     | 274.16                 | 1214.57                    | 4.65 N               | 26.06 W               | 26.38                        | 1.97                |
| 1245.34                    | 5.93                     | 275.44                 | 1243.10                    | 4.95 N               | 29.68 W               | 30.02                        | 2.78                |
| 1273.93                    | 5.77                     | 274.36                 | 1271.54                    | 5.20 N               | 32.58 W               | 32.93                        | 0.20                |
| 1302.49                    | 4.52                     | 272.18                 | 1299.99                    | 5.35 N               | 35.14 W               | 35.49                        | 1.33                |
| 1331.70                    | 3.40                     | 272.95                 | 1329.13                    | 5.44 N               | 37.15 W               | 37.51                        | 1.15                |
| 1344.90                    | 2.74                     | 275.83                 | 1342.31                    | 5.49 N               | 37.86 W               | 38.21                        | 1.55                |
| 1361.38                    | 0.94                     | 282.18                 | 1358.78                    | 5.56 N               | 38.38 W               | 38.74                        | 3.29                |
| 1418.64                    | 0.45                     | 253.56                 | 1416.04                    | 5.60 N               | 39.06 W               | 39.42                        | 0.31                |
| 1504.63                    | 0.39                     | 264.79                 | 1502.02                    | 5.47 N               | 39.67 W               | 40.02                        | 0.03                |
| 1533.16                    | 0.40                     | 256.46                 | 1530.55                    | 5.44 N               | 39.86 W               | 40.20                        | 0.06                |
| 1562.37                    | 0.39                     | 243.20                 | 1559.76                    | 5.37 N               | 40.05 W               | 40.38                        | 0.09                |
| 1590.63                    | 0.44                     | 219.82                 | 1588.02                    | 5.25 N               | 40.21 W               | 40.53                        | 0.18                |

## Henry-1 ST1 Directional Survey Data

| Measured<br>Depth<br>(metres) | Inclination<br>(degrees) | Direction<br>(degrees) | Vertical<br>Depth<br>(metres) | Latitude<br>(metres) | Departure<br>(metres) | Vertical<br>Section<br>(metres) | Dogleg<br>(deg/30m) |
|-------------------------------|--------------------------|------------------------|-------------------------------|----------------------|-----------------------|---------------------------------|---------------------|
| 1676.69                       | 0.57                     | 215.52                 | 1674.08                       | 4.65 N               | 40.66 W               | 40.92                           | 0.05                |
| 1705.43                       | 0.62                     | 207.87                 | 1702.82                       | 4.39 N               | 40.82 W               | 41.05                           | 0.10                |
| 1748.00                       | 0.62                     | 207.87                 | 1745.38                       | 3.99 N               | 41.04 W               | 41.23                           | 0.00                |

## Henry-1 ST1 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 275.45 DEGREES (GRID)

A TOTAL CORRECTION OF 11.88 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.

HORIZONTAL DISPLACEMENT(CLOSURE) AT 1755.00 METRES

IS 41.26 METRES ALONG 275.45 DEGREES (GRID)

RT to LAT = 21.5m

Final Survey Projected to TD

EMS surveys from 129.12 to 706.66, followed by MWD surveys.



## Service Interrupt Report

|                           |                 |                            |                  |
|---------------------------|-----------------|----------------------------|------------------|
| MWD run number :          | 0500            | Time/Date of Failure :     | 26-Jul-05 21:30  |
| Rig Bit Number :          | 7               | Depth at time of Failure : | 1464.00 (metres) |
| MWD Run start time/date : | 26-Jul-05 17:01 | Lost Rig Hours :           | 0.00             |
| MWD Run end time/date :   | 28-Jul-05 13:17 |                            |                  |

### Rig Activity

Drilling 8 1/2" hole.

### Description of Failure

Tool pulsing up "No Response" / "Bus off", but could still get surveys at connections.

### Action Taken

Cycled pumps, to no avail.

### Operation Impact

No LWD data obtained below 1460.0 mMDRT.

### Reason for Failure

Suspect a dodgy connection between the HCIM (Downhole processor) and the PWD. Undergoing further investigation at local R&M Facility.

