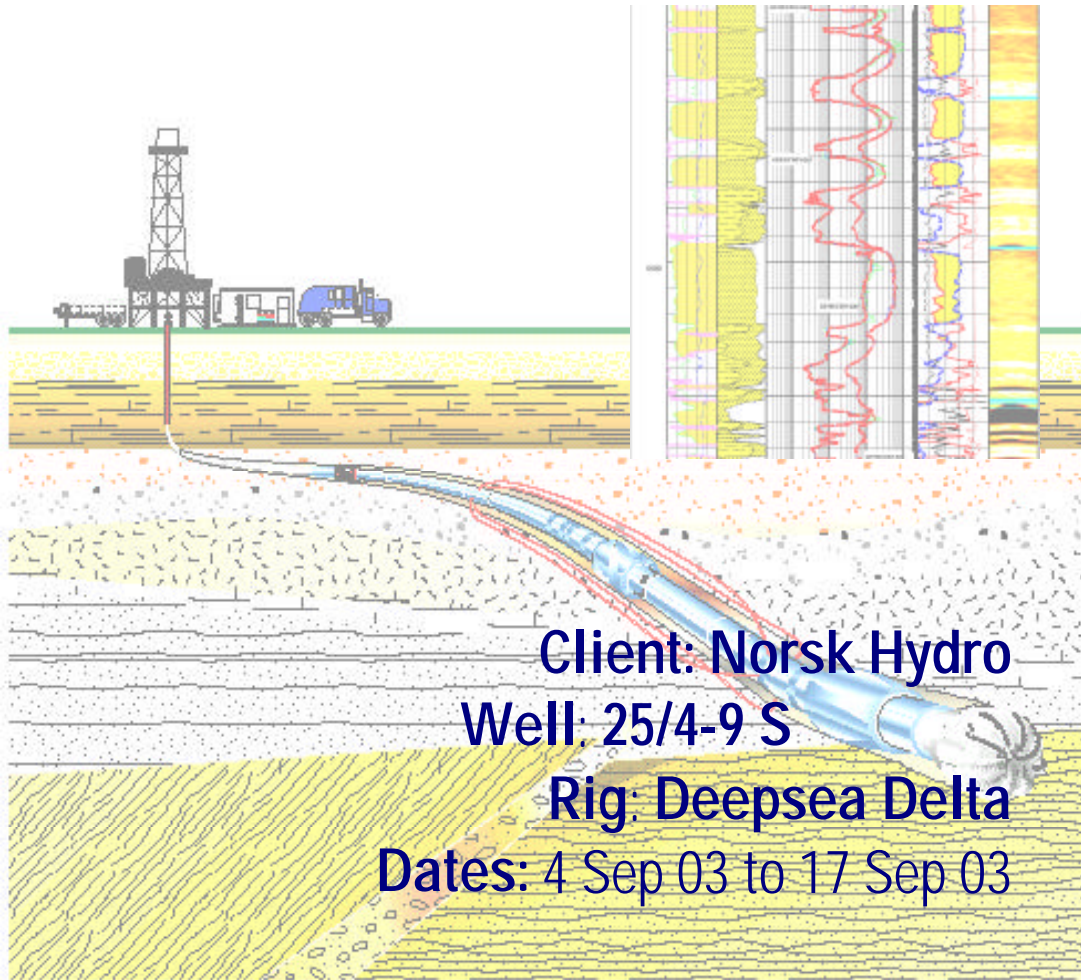




End of Well Report



Services provided by : Drilling and Measurements
Schlumberger Offshore Services Ltd.
Report compiled by : Deepsea Delta Crew
Date : 17 September-03
Report verified by : Julian Coles
Report approved by : Julian Coles



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1. Introduction

Company : Norsk Hydro
Well : 25/4-9 S
Field : Klegg
Area : Norwegian North Sea
Country : Norway
Rig : Deepsea Delta
Drilling Contractor : Odfjell
Spud Date : 5 September 2003
TD Date : 17 September 2003
Total Depth : 2377m MD
BRT-MSL : 29m
MSL-Seabed : 120m
BRT-Seabed : 149m



2. Services Provided

2.1. MWD Services

The Schlumberger Drilling and Measurements IDEAL* Wellsite Information System (IWIS) provided the interface for Measurements While Drilling (MWD) data acquisition along with the real-time outputs needed for Drilling and Formation Evaluation.

Schlumberger Drilling and Measurements provided MWD services for all of the boreholes, starting from seabed at 149m below rotary table right through to when TD was called.

The PowerPulse MWD system provided stationary and continuous surveys and also transmitted Logging While Drilling (LWD) data up hole in real-time. It employs a mud siren to encode data digitally into a format, which is transmitted in the mud column inside the drill string. This is picked up at surface by pressure transducers mounted on the standpipe and decoded by the IWIS system. Data for this well was transmitted at a rate of 6 bits per second (6-bps) using Quadrant Phase Shift Keying (QPSK) technology.

In addition toolface, continuous inclination and continuous azimuth measurements were available as parts of the repeating frame format to continuously monitor the wellbore as it was drilled. All surveys from the tool are transmitted with all 6-axis raw data measurements to allow quality checking of surveys on the surface.

As well as these core directional measurements, the MWD tools provided down hole tool temperature, MWD turbine RPM, which can give early warning of drill string washouts and down hole shock measurements to give early warning of potential damage to downhole equipment and inefficient drilling conditions. The MWD tool also provided a RPM and Stick-Slip measurements. These measurements can be used to improve drilling performance and also assists in preventing tool failure by detecting adverse downhole conditions.



2.2. LWD Services

Schlumberger Drilling and Measurements provided Logging While Drilling (LWD) as part of the data acquisition strategy for the well. The LWD tools used provided Resistivity and Gamma Ray measurements, in various bottom hole assembly (BHA) configurations, to optimise real-time decision making.

All real-time data acquired while drilling was transferred to town in real-time using InterACT Web Witness. In addition, surface drilling parameters from BHI was transferred using the same.

During 17 ½” and 12 ¼” sections of 25/4-9S, a Compensated Dual Resistivity (CDR) tool were used to provide resistivity, gamma ray, annular pressure and temperature measurements. These were used to evaluate the geology of the shallow formations and measure the downhole equivalent circulating density (ECD) in order to assist with hole cleaning. Also in the 12 ¼” section, a GeoVision Resistivity (GVR) tool was used to provide bit resistivity only because we were drilling with OBM, this was for qualitative analyses as we drilled in real-time.

During 8 ½” section of 25/4-9S, a Vision Resistivity (V675) tool was used to provide resistivity, gamma ray, annular pressure and temperature measurements; also a GeoVision Resistivity (GVR) tool was used to provide bit, ring and button resistivities. These were used to evaluate the geology of the shallow formations and measure the downhole equivalent circulating density (ECD) in order to assist with hole cleaning.

All data was transmitted in Real-time by a PowerPulse MWD tool. Images were provided in recorded mode from the GeoVision Resistivity (GVR) tool in the 8 ½” section.

2.3. Directional Drilling Services

Schlumberger D & M provided the Directional Drilling Services on the well 25/4-9S of the Klegg prospect located offshore Norway. The service was provided in the 12 ¼” section of the well only.



During the 12 ¼” section, Schlumberger provided PowerDrive tool to kick and build to 23° and to hold to TD in that particular section.

Throughout that section of the well, two directional drillers were on location to supervise the drilling of the well and to ensure defined target criteria were adhered too.



2.4. Schlumberger Personnel

2.4.1. MWD Personnel

Ole K. Jørstad
Jan Henrik Jørgensen
Lina Leknes
Ukato Ayemere

2.4.2. LWD Personnel

Khaled Saidi

2.4.3. DD Personnel

Egil Stranden
Gert Widding

2.4.4. Project Manager

Julian Coles



3. Open Hole and Casing Record

3.1. Open Hole Record

| Hole Size | Operation | Start Depth | TD |
|-----------|-----------|-------------|----------|
| 36 in | Drilling | 149m MD | 220m MD |
| 26 in. | Drilling | 220m MD | 223m MD |
| 17 1/2in. | Drilling | 223m MD | 1086m MD |
| 12 1/4in. | Drilling | 1086m MD | 2236m MD |
| 8 1/2 in | Drilling | 2236m MD | 2377m MD |

3.2. Casing Record

| Casing Size | Start Depth | TD |
|-------------|-------------|----------|
| 30 in. | 145m MD | 220m MD |
| 13 3/8 in. | 145m MD | 1080m MD |
| 9 5/8 in | 145m MD | 2231 MD |



4. Drilling Objectives and Results

4.1. Section Summary

4.1.1. 36" Section

The 36" section was drilled with a 17 ½" bit and a 26 x 36" hole opener in one bit run from 149m MD to 220m MD.

The BHA incorporated a 9" PowerPulse MWD tool. The tool behaved well throughout the section, with good signal quality. The maximum observed inclination was 0.66°.

POOH due to section TD at 220m MD

Recommendations:

This BHA met the drilling criteria.

4.1.2. 26" Section

The 26" section was drilled from 220m MD to 223m MD in one bit run and with no problems.

A 9" PowerPulse MWD tool programmed with 12Hz/6bps was provided to obtain borehole surveys. It was a clean up run so the PowerPulse was used at all even though it was in the BHA.

POOH due to section TD at 223m MD

Recommendations:

This BHA met the drilling criteria.



4.1.3. 17" Section

Drilled in one run from 223m to 1086m MD. A CDR tool was used to provide resistivity, gamma ray, annular pressure and temperature measurements. These were used to evaluate formation geology and pore pressure

A PowerPulse MWD tool was used for borehole surveys. Drilling was completed in one bit run with 100% data acquisition, real time and memory.

We POOH in the TD at 1086MD.

Recommendations:

This BHA met the drilling criteria.

4.1.4. 12 ¼" Section

Drilled in one run from 1086m to 2236m MD. A 8.25" CDR tool was used to provide resistivity, gamma ray, annular pressure and temperature measurements whilst a 8.25" GVR tool were used to provide resistivity data.

A 8.25" PowerPulse MWD tool programmed with 12Hz/6bps was provided to obtain borehole surveys.

Schlumberger provided PowerDrive tool to kick and build to 23° and to hold to TD in this section.

We POOH in the TD at 2236MD.

Drilling was completed in one run with 100% data acquisition, real time and memory.

Recommendations:

This BHA met the drilling criteria.



4.1.5. 8 ½" Section

Drilled from 2236m to 2377m MD in one bit run and one core run. A Vision675R tool was used to provide resistivity, gamma ray, annular pressure and temperature measurements.

A PowerPulse MWD tool was used for borehole survey. It included a multi axis vibration cartridge. These were used as aids to improve drilling performance by monitoring the amount of BHA stick-slip and bit bounce. Drilling was completed in one bit runs with 100% data acquisition, real time and memory.

The drilling assembly for the 8 ½" section used no directional drilling service. The bit was connected directly to the GVR tool. There were no DD's on the rig when this section was drilled.

Here, a one core run was done from 2236 to 2255 mMD before the drilling commenced. The cored section was reamed to get those data in real time and recorded mode.

Stick slip and shocks were monitored during reaming and drilling and whenever they exceeded low limit the drilling parameters were changed to improve downhole conditions. There were no reports of drilling problems however there were high shocks recorded on the Vision Resistivity after the OWC at 2303m MD to levels as high as level-3.

We POOH at TD; 2377m MD.

Recommendations:

This BHA met the drilling criteria.



5. Run Details

5.1. BHA Reports





Schlumberger

Kiegg

ROTARY BHA REPORT



RIG: DeepSea Delta
 RUN No: 3
 MD In: 223.0m

WELL: 25/4-9 S
 BHA No. 3
 MD Out: 1086.0m

PHASE: 17 1/2"
 BIT No: 3
 INTERVAL: 863m

OBJECTIVE:

General: Drill 17 1/2" hole vertical to 1086m
 Inclination: Vertical
 Azimuth: N/A

| BIT No. 3 | #1 | #2 | #3 | #4 | #5 | #6 | | |
|---------------|--|--------------|------|-------|-------------|---------|-----------|-------|
| Nozzles: | 22 | 22 | 18 | 16 | | | | |
| Size | Cone | Fixed cutter | IADC | Make | Type | Ser. No | TOTAL TFA | Gauge |
| 17 | Insert | | 435 | Smith | 10GMODGRDPD | MJ2229 | 1.187 | 1.5" |
| Features: | Insert | | | | | | | |
| Condition in: | 1-1-NQ-A-EEE-IN-NO | | | | | | | |
| Hydraulics: | With a MWV of 1.13 SG at 3500 lpm bit pd = 37 bar and H.S.I = 1.27 | | | | | | | |
| Dull Grading: | No bit grading on Hydro DBR | | | | | | | |

| BHA No. 3 | | * Non Ported Float | | | | | | |
|------------|--------------|--------------------|------------|------------|-----------------|----------|------------|--------------|
| Serial No | Size/OD | Component | ID | Con dn | Con up | Length | Acc length | Comments |
| MJ2229 | 17.1/2" | Bit | | | 7 5/8 R P | 0.43 | 0.43 | |
| 11002 | 9 | Bit Sub | | 7 5/8 R B | 7 5/8 R B | 0.96 | 1.39 | |
| 504005 | 9 | Steel Drill collar | | 7 5/8 R P | 7 5/8 R B | 9.27 | 10.66 | |
| 35878 | 17.1/4" | NM Stabiliser | 3 | 7 5/8 R P | 7 5/8 R B | 2.14 | 12.80 | |
| 9545 | 9 5/8 | CDR | | 7 5/8 R P | 7 5/8 FH | 7.12 | 19.92 | |
| HB278W | 9 3/16 | MWV | | 7 5/8 FH | 7 5/8 R B | 8.47 | 28.39 | D&I @ 23.76m |
| 35882 | 17 | NM Stabiliser | 3 | 7 5/8 R P | 7 5/8 R B | 1.64 | 30.23 | |
| 464 | 9 | X/O Sub | 2 13/16 | 7 5/8 R P | 6 5/8 R B | 0.74 | 30.97 | |
| 3690 | 8 1/8 | NMDC | 2 3/4 | 6 5/8 R P | 6 5/8 R B | 9.04 | 40.01 | |
| 23787 | 8 1/8 | NMDC | 2 3/4 | 6 5/8 R P | 6 5/8 R B | 9.22 | 49.23 | |
| | 8 | 8" DC's | 3 | 6 5/8 R P | 6 5/8 R B | 65.24 | | |
| WVHC2264 | 8 1/4 | Jar | 2 15/16 | 6 5/8 R P | 6 5/8 R B | 9.67 | 58.90 | |
| | 8 | DC's | 2 7/8 | 6 5/8 R P | 6 5/8 R B | 36.32 | 95.22 | |
| | 7 7/8 | X/O Sub | 3 | 6 5/8 R P | 4 1/2 IF | 1.06 | 96.28 | |
| | 5 | HWDP | | 4 1/2 IF | 4 1/2 IF | 129.58 | 225.86 | |
| Motor | Stab | Bend | Flow (min) | Flow (max) | rev/litre | Opt dp | Bear In | Bear Out |
| N/A | | | | | | | | |
| PowerDrive | Comms Softw. | Sensor Softw. | Imp. size | Mud Data | Oil/Water Ratio | % Solids | % Sand | LCM Used |
| N/A | | | | | | | | |

OPERATIONS:

| Time & Date | | MD | Pump | Drill | Shoe/cement | Circ | Other | TOTAL |
|-------------|---------------|---------|----------|---------|-------------|-----------|-------|-------|
| In: | 11:30; 06/Sep | 223.0m | | | | | | |
| Out: | 10:30; 08/Sep | 1086.0m | 30.5 | 22.0 | 0.0 | 8.5 | 16.5 | 47 |
| ROP: | | 863m | In | 22.0hrs | = | 39.2 | m/hr | |
| Drilled: | | 863m | Rotated: | 0m | 0% | Oriented: | 0m | 0% |

PARAMETERS:

| | FLW | SPP | RPM | WOB | TRQ | STRING WEIGHTS | | |
|------|-------|-------|----------|--------|--------|----------------|--------|--------|
| | (lpm) | (bar) | (string) | (kdaN) | (KN.m) | ROT | UP | DN |
| Min: | 1070 | 87 | 70 | 1 | 1 | (tons) | (tons) | (tons) |
| Max: | 4800 | 195 | 126 | 15 | 7 | 87 | 89 | 87 |

SURVEY DATA:

| | MD | Inc | Azm | TVD | VS | N-S | E-W | Max DLS |
|---------------|---------|------|--------|---------|------|-------|------|---------|
| First survey: | 208.60 | 0.75 | 334.29 | 208.60 | 0.21 | -0.25 | 0.39 | 0.70 |
| Last survey: | 1061.73 | 0.40 | 41.84 | 1061.61 | 3.84 | -4.43 | 6.50 | |

FORMATION:

| Age | Group | Formation | MD Top | Lithology |
|----------|-----------|------------------|--------|--|
| Tertiary | Nordland | Base Pleistocene | 248m | Shales, siltstones and sandstones |
| | Hordaland | Top Utsira | 456m | Very Unconsolidated Sandstone |
| | Hordaland | Base Utsira | 975m | Very Unconsolidated Sandstone |
| | Hordaland | Skade | 1157m | Olive grey to dusky yellow brown claystone w/ thin limestone stringers |

MUD:

| Type | Water Base | Oil Base | WT | FV | PV | YP | Sand | DH Temp |
|-----------|------------|----------|------|----|----|----|-------|---------|
| Versavert | + | | 1.27 | | 20 | 8 | 0.30% | 25 |

RESULTS:

There were no DD's on the rig when this section was drilled.
 The report is compiled on land from the Hydro DBR, Smith bit recommendation and D&M MWD bit run summary data.
 There were no reports of drilling problems.
 This MWD configuration showed H values over specification for the section (1 count).



Schlumberger

Klegg

STEERABLE BHA REPORT



RIG: DeepSea Delta
 RUN No: 4
 MD In: 1086.0m

WELL: 24/4-9S
 BHA No. 4
 MD Out: 2236.0m

PHASE: 12.25
 BIT No: 4
 INTERVAL: 1150m

OBJECTIVE:

General: Drill 12 1/4" hole to top reservoir.
 Inclination: Kick off from vertical, build with 2 deg/30m to 23.1 deg. Hold to TD
 Azimuth: Kick off and hold 185.07 deg

| BIT No. 4 | #1 | #2 | #3 | #4 | #5 | #6 | | |
|---------------|---|--------------|-------|-------|---------|---------|-----------|-------|
| Nozzles: | 15 | 15 | 15 | 16 | 16 | 16 | | |
| Size | Cone | Fixed cutter | IADC | Make | Type | Ser. No | TOTAL TFA | Gauge |
| 12 1/4 | | PDC | M 222 | Smith | MRS74PX | JS9847 | 1.107 | 1" |
| Features: | Rotary steerable short gauge profile | | | | | | | |
| Condition in: | 0-0-WT-S-X-IN-NO | | | | | | | |
| Hydraulics: | With a MW of 1.35 SG at 3600 lpm bit pd = 53 bar and H.S.I = 3.65 | | | | | | | |
| Dull Grading: | 1-3-WT-S-X-IN-CT-TD | | | | | | | |

BHA No. 4 * Non Ported Float

| Serial No | Size/OD | Component | ID | Con dn | Con up | Length | Acc length | Comments |
|------------|-------------|--------------------|------------|------------|-----------------|----------|------------|---------------|
| JS7846 | 12 1/4 | Bit | - | - | 6 5/8 R P | 0.24 | 0.24 | |
| 90135 | 12 1/4 | PD Bias Unit | - | 6 5/8 R B | 7 5/8 R B | 0.99 | 1.23 | |
| 90164 | 9 3/8 | PD Extension Sub | 4 | 7 5/8 R P | 7 5/8 R P | 0.40 | 1.63 | |
| 90057 | 9 1/16 | PD Control Collar | 5 1/8 | 7 5/8 R B | 6 5/8 R B | 3.06 | 4.69 | |
| 37215 | 12 1/8 | RAB | - | 6 5/8 R P | 6 5/8 FH B | 4.16 | 8.85 | RAB incl @ 6m |
| 90022 | 6 3/8 | In-Line Flex Joint | - | 6 5/8 FH P | 6 5/8 FH B | 2.88 | 11.73 | |
| 8060 | 8 1/4 | CDR | - | 6 5/8 FH P | | 6.36 | 18.09 | D&I @ 22.11m |
| 32 | 8 3/8 | MWD | - | 6 5/8 FH P | 6 5/8 R B | 8.30 | 26.39 | |
| 26120 | 12 | NM Stab | - | 6 5/8 R P | 6 5/8 R B | 2.35 | 28.74 | |
| 3690/23787 | 8 | NMDC | 2 15/16 | 6 5/8 R P | 6 5/8 R B | 18.26 | 47.00 | |
| 4X | 8 | DC's | 2 13/16 | 6 5/8 R P | 6 5/8 R B | 37.00 | 84.00 | |
| WHC 2264 | 7 5/8 | Jar | 2 13/16 | 6 5/8 R P | 6 5/8 R B | 9.67 | 93.67 | |
| 2X | 8 | DC's | 3 | 6 5/8 R P | 6 5/8 R B | 18.00 | 111.67 | |
| | 7 7/8 | X/O Sub | 3 | 6 5/8 R P | 4 1/2 IF | 1.06 | 112.73 | |
| 15X | 5 | HWDP | | 4 1/2 IF | 4 1/2 IF | 139.62 | 252.35 | |
| To SRF | 5 | DP | | 4 1/2 IF | 4 1/2 IF | | | |
| Motor | Stab | Bend | Flow (min) | Flow (max) | rev/litre | Opt dp | Bear In | Bear Out |
| N/A | | | | | | | | |
| PowerDrive | Comms Softw | Sensor Softw | Imp. size | Mud Data | Oil/Water Ratio | % Solids | % Sand | LCM Used |
| PD 900 | 3.31 | 1.91 | Medium | Versavert | 73 / 27 | 13.24 | 0.25 | No |

OPERATIONS:

| Time & Date | MD | Pump | Drill | Cumulative Run Hours | Circ | Other | TOTAL |
|--------------------|---------|----------|---------|----------------------|-----------|-------|-------|
| In: 13:00, 10/Sep | 1086.0m | | | | | | |
| Out: 13:00, 13/Sep | 2236.0m | 53.6 | 30.0 | 3.5 | 23.6 | 18.4 | 72 |
| ROP: | 1150m | in | 30.0hrs | = | 38.3 | m/hr | |
| Drilled: | 1150m | Rotated: | 1150m | 100% | Oriented: | 0m | 0% |

PARAMETERS:

| FLW (lpm) | SPP (bar) | RPM (string) | WOB (kdaN) | TRQ (KN.m) | ROT (tons) | UP (tons) | DN (tons) |
|-----------|-----------|--------------|------------|------------|------------|-----------|-----------|
| Min: 3000 | 214 | 125 | 1 | 1 | 1 | | |
| Max: 3700 | 289 | 140 | 15 | 9 | 101 | 105 | 101 |

SURVEY DATA:

| MD | Inc | Azm | TVD | VS | N-S | E-W | Max DLS |
|-----------------------|-------|--------|---------|--------|---------|--------|---------|
| First survey: 1121.64 | 2.45 | 202.07 | 1121.51 | 4.07 | -4.66 | 6.50 | 3.71 |
| Last survey: 2185.80 | 21.54 | 180.61 | 2119.06 | 361.47 | -369.75 | -35.42 | |

| Age | Group | Formation | MD Top | Lithology |
|----------|-----------|-----------|--------|--|
| Tertiary | Hordaland | Skade | 1157 | Olive grey to dusky yellow brown limestone stringers |
| | Hordaland | Grid | 1270 | Fine to very fine grained sand |
| | Hordaland | Frigg | 1335 | Dark grey to brown claystone w/ thin limestone stringers |
| | Rogaland | Balder | 2147 | Light to medium grey to black claystone |
| | Rogaland | Sele | 2168 | Medium grey to black, laminated silty claystone |
| | Rogaland | Lista | 2202 | Green, light to dark grey, brown and red claystones |
| | Rogaland | Heimdal | 2230 | Fine to very fine grained sand |

MUD:

| Type | Water Base | Oil Base | Wt | FV | PV | YP | Sand | DH Temp |
|---------------|------------|----------|------|----|----|------|-------|---------|
| Versavert OBM | | * | 1.35 | 69 | 24 | 11.5 | 0.25% | 70 |

RESULTS:



Schlumberger

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ROTARY BHA REPORT



RIG: DeepSea Delta
 RUN No: 3
 MD In: 2236.0m

WELL: 25/4-9 S
 BHA No. 5
 MD Out: 2237.0m

PHASE: 8 1/2"
 BIT No: 5
 INTERVAL: 1m

OBJECTIVE:

General: Drill out 9 5/8" shoe prior to coring.
 Inclination: Hold
 Azimuth: Hold

| BIT No. 5 | #1 | #2 | #3 | #4 | #5 | #6 | | |
|---------------|---|--------------|------|-------|----------|---------|-----------|-------|
| Nozzles: | 18 | 18 | 18 | | | | | |
| Size | Cone | Fixed cutter | IADC | Make | Type | Ser. No | TOTAL TFA | Gauge |
| 8 1/2 | Insert | | 447 | Smith | 15GFDGPD | LR9981 | 0.746 | 1.5" |
| Features: | Insert | | | | | | | |
| Condition in: | 1-D-WT-M-EEE-IN-ER | | | | | | | |
| Hydraulics: | With a MW of 1.20 SG at 2000 lpm bit pd = 32 bar and H.S.I = 2.55 | | | | | | | |
| Dull Grading: | No bit grading on Hydro DBR | | | | | | | |

| BHA No. 5 | | *. Non Ported Float | | | | | | |
|------------|-------------|---------------------|------------|--------------|-----------------|----------|------------|----------|
| Serial No | Size/OD | Component | ID | Con dn | Con up | Length | Acc length | Comments |
| LR9981 | 8 1/2" | Bit | - | - | 4 1/2" R.P. | 0.25 | 0.25 | |
| AH 001 | 8 3/8" | Near Bit Stab. | - | 4 1/2" R.B. | 4 1/2" IF B. | 2.39 | 2.64 | |
| OWS 9164 | 6 1/2" | Steel Drill collar | 2.13/16" | 4 1/2" IF P. | 4 1/2" IF B. | 9.46 | 12.10 | |
| 98414 | 8 1/2" | NM Stabiliser | 2. 7/8 | 4 1/2" IF P. | 4 1/2" IF B. | 1.68 | 13.78 | |
| | 6 1/2" | DC's | 2.15/16 | 4 1/2" IF P. | 4 1/2" IF B. | 74.47 | 88.25 | |
| WHC0309 | 6 1/2" | Jar | 2.15/16 | 4 1/2" IF P. | 4 1/2" IF B. | 9.57 | 97.92 | |
| | 6 1/2" | DC's | 2.15/16 | 4 1/2" IF P. | 4 1/2" IF B. | 18.82 | 116.64 | |
| | 5 | HWDP | | 4 1/2" IF P. | 4 1/2" IF B. | 55.27 | 171.91 | |
| Motor | Stab | Bend | Flow (min) | Flow (max) | rev/litre | Opt dp | Bear In | Bear Out |
| N/A | | | | | | | | |
| PowerDrive | Comms Softw | Sensor Softw. | Imp. size | Mud Data | Oil/Water Ratio | % Solids | % Sand | LCM Used |
| N/A | | | | | | | | |

| OPERATIONS: | | Comments: | | Cumulative Run Hours | | | | |
|--------------------|---------|-------------|-------|----------------------|------|-----------------|-------|--|
| Time & Date | MD | Pump | Drill | Shoe/cement | Circ | Other | TOTAL | |
| In: 11:30, 15/Sep | 2236.0m | | | | | | | |
| Out: 04:00, 16/Sep | 2237.0m | 5.1 | 0.2 | 0.0 | 4.9 | 11.4 | 16.5 | |
| ROP: 1m | | in 0.2hrs | | = 5.0 m/hr | | | | |
| Drilled: 1m | | Rotated: 0m | | 0% | | Oriented: 0m 0% | | |

| PARAMETERS: | | Comments: | | | | | STRING WEIGHTS | | |
|-------------|-------|-----------|--------|--------|--------|--------|----------------|--|--|
| FLW | SPP | RPM | WOB | TRQ | ROT | UP | DN | | |
| (lpm) | (bar) | (string) | (kdaN) | (KN.m) | (tons) | (tons) | (tons) | | |
| Min: 3372 | 192 | 129 | 1 | 1 | | | | | |
| Max: 3376 | 195 | 176 | 15 | 7 | | | | | |

| SURVEY DATA: | | Comments: | | | | | VS Azimuth | |
|---------------|-----|-----------|-----|----|-----|-----|------------|--|
| MD | Inc | Azm | TVD | VS | N-S | E-W | Max DLS | |
| First survey: | | | | | | | | |
| Last survey: | | | | | | | | |

| FORMATION: | | Comments: Actual formation tops. | | | |
|------------|-----------|----------------------------------|--------------------------------|--|--|
| Age | Group | Formation | MD Top | Lithology | |
| Tertiary | Hordaland | Skade | 1157 | Olive grey to dusky yellow brown claystone w/ thin limestone stringers | |
| | Hordaland | Grid | 1270 | Fine to very fine grained sand | |
| | Hordaland | Frigg | 1335 | Dark grey to brown claystone w/ thin limestone stringers | |
| | Rogaland | Balder | 2147 | Light to medium grey to black claystone | |
| | Rogaland | Sele | 2168 | Medium grey to black, laminated silty claystone | |
| | Rogaland | Lista | 2202 | Green, light to dark grey, brown and red claystones | |
| Rogaland | Heimdal | 2230 | Fine to very fine grained sand | | |

| MUD: | | Comments: Temp is maximum MVD temperature | | | | | | |
|--------------|------------|---|------|----|----|----|-------|---------|
| Type | Water Base | Oil Base | Wt | FV | PV | YP | Sand | DH Temp |
| NaCl Polymer | * | | 1.25 | | 20 | 8 | 0.30% | 40 |

RESULTS:
 There were no DD's on the rig when this section was drilled.
 The report is compiled on land from the Hydro DBR, Smith bit recommendation and D&M MWD bit run summary data.
 There were no reports of drilling problems.



Schlumberger

Klegg

ROTARY BHA REPORT



RIG: DeepSea Delta
 RUN No: 3
 MD In: 2237.0m

WELL: 25/4-9 S
 BHA No. 7
 MD Out: 2377.0m

PHASE: 8 1/2"
 BIT No: 7
 INTERVAL: 140m

OBJECTIVE:

General: Ream over cored interval and drill to section TD
 Inclination: Hold
 Azimuth: Hold

| BIT No. 7 | #1 | #2 | #3 | #4 | #5 | #6 | | |
|---------------|--|--------------|------|-------|--------|---------|-----------|-------|
| Nozzles: | 12 | 12 | 12 | 12 | 12 | 12 | | |
| Size | Cone | Fixed cutter | IADC | Make | Type | Ser. No | TOTAL TFA | Gauge |
| 8 1/2 | | PDC | M223 | Smith | MA89PX | JS7053 | 0.663 | 2" |
| Features: | Matrix body for soft to medium formations - spiral blades and gauge, unsymmetrical blade layout. | | | | | | | |
| Condition in: | New | | | | | | | |
| Hydraulics: | With a MW of 1.27 SG at 2300 lpm bit pd = 57 bar and H.S.I = 5.19 | | | | | | | |
| Dull Grading: | 1-1-NO-A-X-I-BT-TD (from Hydro DBR) | | | | | | | |

| BHA No. 7 | | | | | | | | |
|---------------------|-----------------|--------------------|------------|--------------|-----------------|----------|------------|----------|
| *: Non Ported Float | | | | | | | | |
| Serial No | Size/OD | Component | ID | Con dn | Con up | Length | Acc length | Comments |
| JS7053 | 8 1/2" | Bit | - | - | 4 1/2" R P | 0.25 | 0.25 | |
| 156 | 8 3/8" - 6 3/4" | GVR | - | 4 1/2" R B | 5 1/2" F H B | 3.49 | 3.74 | |
| 1718 | 6 3/4" | Vision Resistivity | - | 5 1/2" F H P | 5 1/2" F H B | 5.73 | 9.47 | |
| 312890 | 8 1/2" - 6 3/4" | In Line Stabiliser | - | 5 1/2" F H P | 5 1/2" F H B | 1.34 | 10.81 | |
| MDC 109 | 6 3/4" | MWD | - | 5 1/2" F H P | 4 1/2" I F B | 8.47 | 19.28 | |
| 98414 | 8 1/2" | NM Stabiliser | 2. 7/8 | 4 1/2" I F P | 4 1/2" I F B | 1.68 | 20.96 | |
| MWS288 | 6 1/4" | NM HWDP | 2.13/16 | 4 1/2" I F P | 4 1/2" I F B | 9.42 | 30.38 | |
| MWS290 | 6 1/4" | NM HWDP | 2.13/16 | 4 1/2" I F P | 4 1/2" I F B | 9.41 | | |
| | 6 1/2" | DC's | 2.15/16 | 4 1/2" I F P | 4 1/2" I F B | 46.61 | | |
| WHC 0309 | 6 1/2" | Jar | 2.15/16 | 4 1/2" I F P | 4 1/2" I F B | 9.57 | | |
| | 6 1/2" | DC's | 2.15/16 | 4 1/2" I F P | 4 1/2" I F B | 18.82 | | |
| | 5" | HWDP | | 4 1/2" I F P | 4 1/2" I F B | 55.27 | 85.65 | |
| | | 5" DP to surface | | | | | | |
| Motor | Stab | Bend | Flow (min) | Flow (max) | rev/litre | Opt dp | Bear In | Bear Out |
| N/A | | | | | | | | |
| PowerDrive | Comms Softw | Sensor Softw | Imp. size | Mud Data | Oil/Water Ratio | % Solids | % Sand | LCM Used |
| N/A | | | | | | | | |

| OPERATIONS: | | | | | | | | | |
|---------------|---------------|---------|----------------------|--------|-------------|-----------|-------|-------|----|
| Comments: | | | | | | | | | |
| Time & Date | | MD | Cumulative Run Hours | | | | | | |
| In: | Out: | | Pump | Drill | Shoe/cement | Circ | Other | TOTAL | |
| 00:30, 17/Sep | 22:30, 17/Sep | 2237.0m | 2377.0m | 12.3 | 8.2 | 0.0 | 4.1 | 9.7 | 22 |
| ROP: | | 140m | in | 8.2hrs | = | 17.1 | m/hr | | |
| Drilled: | | 140m | Rotated: | 0m | 0% | Oriented: | 0m | 0% | |

| PARAMETERS: | | | | | | | | |
|-------------|------|-------|----------|--------|--------|----------------|--------|--------|
| Comments: | | | | | | | | |
| FLW | | SPP | RPM | WOB | TRQ | STRING WEIGHTS | | |
| (lpm) | | (bar) | (string) | (kdaN) | (KN.m) | ROT | UP | DN |
| Min: | 1177 | 101 | 86 | 10 | 1 | (tons) | (tons) | (tons) |
| Max: | 2619 | 221 | 164 | 14 | 7 | | | |

| SURVEY DATA: | | | | | | | | |
|---------------|---------|-------|--------|---------|--------|---------|--------|---------|
| Comments: | | | | | | | | |
| MD | | Inc | Azm | TVD | VS | N-S | E-W | Max DLS |
| First survey: | 2253.81 | 20.98 | 180.10 | 2182.44 | 386.05 | -384.41 | -35.57 | |
| Last survey: | 2358.08 | 21.55 | 173.79 | 2279.68 | 423.08 | -421.88 | -32.24 | 1.80 |



| FORMATION: | | | | |
|----------------------------------|-----------|-----------|--------|--|
| Comments: Actual formation tops. | | | | |
| Age | Group | Formation | MD Top | Lithology |
| Tertiary | Hordaland | Skade | 1157 | Olive grey to dusky yellow brown claystone w/ thin limestone stringers |
| | Hordaland | Grid | 1270 | Fine to very fine grained sand |
| | Hordaland | Frigg | 1335 | Dark grey to brown claystone w/ thin limestone stringers |
| | Rogaland | Balder | 2147 | Light to medium grey to black claystone |
| | Rogaland | Sele | 2168 | Medium grey to black, laminated silty claystone |
| | Rogaland | Lista | 2202 | Green, light to dark grey, brown and red claystones |
| | Rogaland | Heimdal | 2230 | Fine to very fine grained sand |

| MUD: | | | | | | | | |
|---|------------|----------|------|----|----|----|-------|---------|
| Comments: Temp is maximum MWD temperature | | | | | | | | |
| Type | Water Base | Oil Base | Wt | FV | PV | YP | Sand | DH Temp |
| NaCl Polymer | + | | 1.25 | | 20 | 8 | 0.30% | 40 |

RESULTS:
 There were no DD's on the rig when this section was drilled.
 The report is compiled on land from the Hydro DBR, Smith bit recommendation and D&M MWD bit run summary data.
 There were no reports of drilling problems however there were high shocks recorded on the Vision Resistivity after the OWC at 2303m MD these resulted in premature failure of the GVR tool.



5.2. Bit Record

|  | | | | | | | <i>Klegg</i> BIT RECORD WELL: 25/4-9 S | | | | | | |  | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|--------|-------|------------|---------|-------|--|------|------|------|------|---|---|---|---|-----|----|----|----|--|----------|---------|------|-------|----------|----------|-------|----------------|-----|----|-----|------|----|----|----|---|---|----|----|----|
| | | | | | | | | | | | | | | | | | | | | | MD | | | TOTAL | | | | DULL CONDITION | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | Well No. | Bit No. | Size | Make | Type | Ser. No. | TFA | In | Out | m | hrs | ROP | IR | OR | D | L | B | G | O | R |
| | | | | | | | | | | | | | | | | | | | | | 25/4-9 S | 1 | 36 | Smith | 10GMODPD | LV8943 | 1.035 | 149 | 220 | 71 | 6.9 | 10.3 | 1 | 2 | ER | A | E | IN | BT | TD |
| 25/4-9 S | 2 | 26 | Smith | MSDSHC | LR6304 | 1.362 | 220 | 223 | 3 | 0.5 | 6.0 | 1 | 1 | WT | A | E | IN | NO | TD | | | | | | | | | | | | | | | | | | | | | |
| 25/4-9 S | 3 | 17 1/2 | Smith | 10GMODGRPD | MJ2229 | 1.187 | 223 | 1086 | 863 | 22.0 | 39.2 | 1 | 1 | NO | A | EEE | IN | NO | TD | | | | | | | | | | | | | | | | | | | | | |
| 25/4-9 S | 4 | 12 1/4 | Smith | MRST4SPX | JS 9847 | 1.107 | 1086 | 2236 | 1150 | 30.0 | 38.3 | 1 | 3 | WT | G | X | IN | CT | TD | | | | | | | | | | | | | | | | | | | | | |
| 25/4-9 S | 5 | 8 1/2 | Smith | MA89PX | JS7053 | 0.663 | 2236 | 2377 | 141 | 12.3 | 11.5 | 1 | 1 | NO | A | X | I | BT | TD | | | | | | | | | | | | | | | | | | | | | |



5.3. Drilling Parameters

Drilling parameter plots are presented in the Mud logging companies EOWR.



5.4 Run Details

5.3.1. MWD Run #1

| | |
|---------------------|-------------|
| BHA No. | : 1 |
| Depth in | : 149m MD |
| Depth out | : 220m MD |
| Drilled | : 71 |
| MWD Elec No. | : 835 |
| MWD Collar No. | : 278 |
| Bit to Survey Depth | : 13.84m |
| Pumping Ho | : 8.5 hrs |
| Operating Hours | : 8.5 hrs |
| % Operating | : 100 % |
| Sensor Failure | : No |
| RPM | : 85(bit) |
| Flow Rate | : 3700 lpm |
| Inclination | : 0°- 0.66° |

COMMENTS:

The 36" section was drilled with a 17 ½" bit and a 26x36" hole opener in one bit run from 149m MD to 220m MD.

The BHA incorporated a 9" PowerPulse MWD tool.
The tool behaved well throughout the section, with good signal quality.

POOH due to section TD at 220 m MD.



5.3.2. MWD Run #2

BHA No. : 2
Depth in : 220m MD
Depth out : 223m MD
Drilled : 3 m MD
MWD Elec No. : 835
MWD Collar No. : 278
Bit to Survey Depth : 6.13m
Pumping Hours : 2.1 hrs
Operating Hours : 2.1 hrs
% Operating : 100 %
Sensor Failure : No

RPM : 55(bit)
Flow Rate : 3700 lpm
Inclination : 0.66

COMMENTS:

The 26" section was drilled from 220m MD to 223m MD in one bit run and with no problems.

A 9" PowerPulse MWD tool programmed with 12Hz/6bps was provided to obtain borehole surveys. It was a clean up run so the PowerPulse was used at all even though it was in the BHA.

POOH due to section TD at 223m MD



5.3.3. MWD Run #3

| | | | |
|---------------------|-----------------|--------------------|----------|
| BHA No. | : 3 | CDR Collar | : 9545 |
| Depth in | : 223m MD | CDR Electronics | : 578 |
| Depth out | : 1086m MD | Bit to GR | : 18.24m |
| Drilled | : 863m | Bit to Resistivity | : 14.76m |
| MWD Elec No. | : 835 | Bit to APRS | : 15.47m |
| MWD Collar No. | : 278 | Sensor Failure | : ECD |
| Bit to Survey Depth | : 24.05m | Meters Logged | : 863m |
| Pumping Hours | : 22 hrs | | |
| Operating Hours | : 30.5 hrs | | |
| % Operating | : 100 % | | |
| Sensor Failure | : No | | |
| | | | |
| RPM | : 140 (bit) | | |
| Flow Rate | : 3800 lpm | | |
| Inclination | : 0.75° - 0.40° | | |

COMMENTS:

Drilled in one run from 223m to 1086m MD. A CDR tool was used to provide resistivity, gamma ray, annular pressure and temperature measurements. These were used to evaluate formation geology and pore pressure

A PowerPulse MWD tool was used for borehole surveys. Drilling was completed in one bit run with 100% data acquisition, real time and memory.

We POOH in the TD at 1086MD.



5.3.4. MWD Run #4

| | | | |
|---------------------|-----------------|------------------------|----------|
| BHA No. | : 4 | CDR Collar | : 8060 |
| Depth in | : 1086m MD | CDR Electronics | : 355 |
| Depth out | : 2236m MD | Bit to GR | : 16.38m |
| Drilled | : 1150m | Bit to Resistivity | : 13.03m |
| MWD Elec No. | : 675 | Bit to APRS | : 13.56m |
| MWD Collar No. | : 32 | Sensor Failure | : No |
| Bit to Survey Depth | : 22.11m | Meters Logged | : 1150m |
| Pumping Hours | : 53.6hrs | | |
| Operating Hours | : 53.6 hrs | RAB Collar | : 37215 |
| % Operating | : 100 % | RAB Electronics | : 28 |
| Sensor Failure | : No | Bit to GR | : 5.82m |
| | | Bit to Bit Resistivity | : 0.11m |
| RPM | : 120 (bit) | Sensor Failure | : No |
| Flow Rate | : 3400 lpm | Meters Logged | : 1150m |
| Inclination | : 0.4° - 21.54° | | |

COMMENTS:

Run # 4 was drilled in one run from 1086m to 2236m MD. A 8.25" CDR tool was used to provide resistivity, gamma ray, annular pressure and temperature measurements whilst a 8.25" GVR tool were used to provide resistivity data.

A 8.25" PowerPulse MWD tool programmed with 12Hz/6bps was provided to obtain borehole surveys.

Schlumberger provided PowerDrive tool to kick and build to 23° and to hold to TD in this section.

We POOH in the TD at 2236MD.



5.3.5. MWD Run #5

| | | | |
|---------------------|------------------|-------------------------|----------|
| BHA No. | : 5 | CDR Collar | : 1718 |
| Depth in | : 2236m MD | CDR Electronics | : 1718 |
| Depth out | : 2377m MD | Bit to GR | : 16.38m |
| Drilled | : 141m | Bit to Resistivity | : 13.03m |
| MWD Elec No. | : 1358 | Bit to APRS | : 13.56m |
| MWD Collar No. | : 109 | Sensor Failure | : No |
| Bit to Survey Depth | : 16.49m | Meters Logged | : 141m |
| Pumping Hours | : 12.3hrs | | |
| Operating Hours | : 12.3 hrs | RAB Collar | : 156 |
| % Operating | : 100 % | RAB Electronics | : 138 |
| Sensor Failure | : No | Bit to GR | : 1.50m |
| | | Bit to Bit Resistivity | : 0.49m |
| RPM | : 130 (bit) | Bit to Ring Resistivity | : .m |
| Flow Rate | : 2500 lpm | Sensor Failure | : Yes |
| Inclination | : 21.54°- 21.55° | Meters Logged | : 141m |

COMMENTS:

Run # 5 was drilled from 2236m to 2377m MD in one bit run and one core run. A Vision675R tool was used to provide resistivity, gamma ray, annular pressure and temperature measurements.

A PowerPulse MWD tool was used for borehole survey. It included a multi axis vibration cartridge. These were used as aids to improve drilling performance by monitoring the amount of BHA stick-slip and bit bounce. Drilling was completed in one bit runs with 100% data acquisition, real time and memory.

The drilling assembly for the 8 ½” section used no directional drilling service. The bit was connected directly to the GVR tool. There were no DD's on the rig when this section was drilled.

Here, a one core run was done from 2236 to 2255 mMD before the drilling



commenced. The cored section was reamed to get those data in real time and recorded mode.

Stick slip and shocks were monitored during reaming and drilling and whenever they exceeded low limit the drilling parameters were changed to improve downhole conditions. There were no reports of drilling problems however there were high shocks recorded on the Vision Resistivity after the OWC at 2303m MD to levels as high as level-3.

POOH at TD of 2377m MD.



6. Service Quality Reports & Performance Summary



6.1. MWD Configuration



Rig: Deepsea Delta
 Well: 25/4-9 S
 Hole Size: 36", 26", 17 1/2", 12 1/4", 8 1/2"
 Job Type: MWD/CDR/ARC/RAB

TOOL CONFIGURATIONS

| RUN No. | MWD No. | CDR/ARC No. | CDN/ADN No. | RAB No. | PowerPulse Flow range (lpm) | Res tool Flowrate (lpm) | ISonic/ADN Flowrate (lpm) | Bit-Survey (m) | Bit-GR (m) | Bit-Res (m) | Bit-Por (m) | Bit-Dens (m) | Bit-Delta T (m) | Bitrate bps |
|---------|---------|-------------|-------------|---------|-----------------------------|-------------------------|---------------------------|----------------|------------|-------------|-------------|--------------|-----------------|-------------|
| 1 | 278 | n/a | n/a | n/a | 2271-5300 | n/a | n/a | 13.84 | n/a | n/a | n/a | n/a | n/a | 6 |
| 2 | 278 | n/a | n/a | n/a | 2271-5300 | n/a | n/a | 6.13 | n/a | n/a | n/a | n/a | n/a | 6 |
| 3 | 278 | 9545 | n/a | n/a | 2271-5300 | 2250-4540 | n/a | 24.05 | 18.24 | 14.76 | n/a | n/a | n/a | 6 |
| 4 | 032 | 8060 | n/a | 37215 | 2271-4542 | 2250-4440 | n/a | 22.11 | 16.38 | 13.03 | n/a | n/a | n/a | 6 |
| 5 | 109 | 1718 | n/a | 156 | 1514-3028 | 1534-2640 | n/a | 16.49 | 6.18 | 6.13 | n/a | n/a | n/a | 6 |
| | | | | | | | | | | | | | | |



6.2. MWD Performance

| NORSK HYDRO LOGGING WHILE DRILLING REPORT | | | | | | | | | |
|--|--|-------------|-------------------|-------------------------------|------------------|----------------------|-------------------------|--|--|
| GENERAL WELL INFORMATION | | | | | | | | | |
| Field | Klegg | | | Supplier / service company | Schlumberger D&M | | | | |
| Well name | 25/4-9 S | | | Max well temperature | 55.0 deg C | | | | |
| Wellbore name(s) | 25/4-9 S | | | Max well deviation | 23.61 deg | | | | |
| Rig | Deepsea Delta | | | LWD Logging engineers | Khaled Sadi | | | | |
| Job number | 03SCA094 | | | Hydro offshore representative | Trond Kjennerud | | | | |
| Logging start datetime | 04 Sept 03 / 22:30 | | | | | | | | |
| End last logging datetime | 17 Sept 03 / 22:00 | | | | | | | | |
| Total well depth | 2377 m MD | | | | | | | | |
| LWD BIT RUNS | | | | | | | | | |
| LWD RUN | BIT RUN | Bit Section | LWD Logging Suite | LWD logging tools | Renamed Files | Logging Top (meters) | Logging Bottom (meters) | Comments | |
| 1 | 1 | 36 | | | | - | - | No LWD, MWD data | |
| 2 | 2 | 26 | | | | - | - | No LWD, MWD only | |
| 3 | 3 | 17.5 | GAM-RES-PRES | CDR | | 223 | 1006 | Good run | |
| 4 | 4 | 12.35 | GAM-RES-PRES | CDR - GVR | | 1006 | 2236 | Good run | |
| 5 | 5 | 8.5 | GAM-RES-PRES | VS25 - GVR | | 2236 | 2377 | Good run, POCH @ TD. GVR failed under reserve. | |
| TOTALS | | | | | | | | 2154 | |
| GAM | Gamma Ray | | | | | | | | |
| TEMP | Temperature | | | | | | | | |
| RES | Resistivity | | | | | | | | |
| DEN | Density | | | | | | | | |
| NEU | Neutron | | | | | | | | |
| PRES | Pressure | | | | | | | | |
| MECH | Mechanical (Realtime vibration / Shock monitoring, DWOB, DTRC) | | | | | | | | |



7. Failure Reports



7.1. Annular Pressure Sensor Failure

| | | | |
|-----------------------|--------------|---------------------|----------|
| MWD Run no: | 3 | Date: | -Sept-03 |
| Tool no: | RGDC-CC-9545 | % Operating: | 100 % |
| Transmission failure: | Yes | Meters Drilled: | 863 m |
| Circulating hrs: | 30.5 | Meters operational: | 863 m |
| Operating hrs: | 30.5 | | |
| Drilling parameters: | | | |
| WOB: | 2 tons | Flow rate: | 3700 lpm |
| RPM: | 126 | Inclination: | 0.4 deg |

ECD behaved strange. Reading in seawater 1.08-1.09 SG (should be 1.03). Reading in 1.5 SG mud after displaced the well after TD: 1.17 SG. In the beginning of the run we could easily see when we were pumping 1.3-1.5 SG hivis pills. In the end of the run, the ECD did not give the expected response.

7.2. GVR Failure in 8.5in Section

| | | | |
|-----------------------|--------|---------------------|------------|
| MWD Run no: | 5 | Date: | 16-Sept-03 |
| Tool no: | 266 | % Operating: | 0 % |
| Transmission failure: | Yes | Meters Drilled: | 0 m |
| Circulating hrs: | 0 | Meters operational: | 0 m |
| Operating hrs: | 0 | | |
| Drilling parameters: | | | |
| WOB: | 0 tons | Flow rate: | 0 lpm |
| RPM: | 0 | Inclination: | 0 deg |

Description of failure:

The Rab6 tool failed while initializing it. The voltage check after putting the batteries was showing zero. Trying to communicate with the tool by powering it from TSIM did not work, it was showing a high draw of current (more then 2 DC AMPS). Failed to communicate through LTB too. The fuse of the battery found blow after taking it out.



Remedial actions:

Changed to backup tool and backloaded tool to workshop in town for repair.

Failure Diagnostics:

Short circuit in control electronics.

Correction:

Picked up new tool for next run and back-loaded damaged tool.

7.3. GVR sensors failure in 8.5in Section

| | | | |
|-----------------------|----------|---------------------|------------|
| MWD Run no: | 5 | Date: | 17-Sept-03 |
| Tool no: | 156 | % Operating: | 70 % |
| Transmission failure: | No | Meters Drilled: | 141 m |
| Circulating hrs: | 12.3 | Meters operational: | 102 m |
| Operating hrs: | 12.3 | | |
| Drilling parameters: | | | |
| WOB: | 2.5 tons | Flow rate: | 2500 lpm |
| RPM: | 130 | Inclination: | 21.55 deg |

Description of failure:

At about 2338 m MD, there was a sudden jump in the all the GVR resistivities. At first we were not sure what it was, but at surface when we processed the techlog, we saw from its analyses that the tool failed. This failure happen when we started experiencing high shock levels (shock-level 3).

Remedial actions:

Gave client ARC-Lite data instead of GVR data from that depth in recorded mode only.

Failure Diagnostics:



Techlogs showed that currents were not tracking each other as they should from the depth that the tool failed.

Correction:

Design BHA than minimises shock and vibration.
Control drilling parameters to minimise vibratinon.
Use rock bit.



8. Survey Details



8.1. MWD Survey Hold File – Raw & Corrected

Survey hold data is retained on file in the Schlumberger D&M Drilling Engineering center for reference.



8.2. DD Survey Report

Survey data is presented in a separate file.



8.3. BHA Sag Corrections

| MWD run | Inclination | Sag correction |
|----------|-------------------|----------------|
| 1 | 0.00– 5.00 | n/a |
| 2 | 0.00– 5.00 | n/a |
| 3 | 0.00– 5.00 | n/a |
| 4 | 0.00– 25 | n/a |
| 5 | 0.00– 25 | n/a |



9. Logs

The following table specifies the end of well logs from 25/4-9S Please note that all logs are only given in digital format, i.e. no paper copies are distributed.

| 25/4-9 S | Combined | Interval 210m – 2377m |
|----------------------------|---------------------------------------|-------------------------------|
| CDR/V675/GVR - Resistivity | 1:200 & 1:500 MD 1:200 & 1:500 TVD | GR, Resistivity 2 MHz |
| | 8.5in section | Interval 2236m – 2377m |
| GeoVISION Image | Resistivity - 1:500 MD | GR, Resistivity Image |