

### 6.3 Mud report

For detailed mud properties, refer to table B-5.

#### 36" hole, 30" casing

The 36" hole was drilled 198 m (third spud), using sea water and spotting high viscosity gel pills on each connection. Before running the casing the hole was displaced with spud mud.

Materials used in this section were bentonite, caustic soda, soda ash, lime and calcium chloride.

#### 26" hole, 20" casing

The 21" riser was run prior to drilling 17-1/2" pilot hole to 615 m, using sea water and spotting 5 m<sup>3</sup> high viscosity mud pills on every second connection. At 615 m 8 m<sup>3</sup> high viscosity mud was pumped and the hole displaced with 64 m<sup>3</sup>, 1.08 r.d. mud.

However, as the Schlumberger logging tool would not pass below 359 m, a wiper trip to TD was made, and the hole was displaced with 64 m<sup>3</sup>, 1.20 r.d. mud.

The 17-1/2" hole was opened to 26" using an underreamer. 1.15 r.d. mud was used while underreaming, and at 615 m an 8 m<sup>3</sup> high viscosity mud pill was displaced around. After having pulled the riser, a wiper trip with a 26" bit was made. Tight hole had to be reamed from 478 m to 615 m, spotting 3 m<sup>3</sup> gel mud on every connection. 8 m<sup>3</sup> gel mud was displaced around before making a short trip to the 30" casing shoe. 65 m<sup>3</sup> 1.20 r.d. high viscosity mud was spotted on bottom before pulling out of the hole and running the casing. Mud materials used in this section were bentonite, caustic soda, soda ash, lime and baryte.

17-1/2" hole, 13-3/8" casing

The 17-1/2" hole was drilled without having any hole problems to 2029 m (TD), using a "seawater/dextrid" mud type. Mud weights varied from 1.10 r.d. to 1.13 r.d. A wiper trip to the 20" casing shoe was made at 1120 m and a round trip at 1735 m.

At 2029 m a 50 stand wiper trip was made. Running back, tight spots were reamed at 1450 m and from 1634 to TD, where the pipe got stuck. (Maximum overpull 490 kN). The hole was circulated and the mud weight increased to 1.17 r.d. before pulling out of the hole. Tight hole was encountered from TD to 1972 m and from 1422 m to 1403 m. Running back, tight spots were reamed from 1940 m to TD. The hole was circulated and the mud weight raised to 1.26 r.d. before logging. A wiper trip was made before successfully running and landing the 13-3/8" casing. At the end of the displacement of the cement the mud return flow was totally lost. Mud materials used in this section were bentonite, barite, caustic soda, soda ash, Q-broxin, Dextrid, Surflo W.300, salt and aluminium stearate.

12-1/4" hole, 9-5/8" casing

The 12-1/4" hole was drilled to a total depth of 3544 m. The interval from 2721 m to 3345 m was drilled using a turbine. The mud type was a seawater/polymer/Q.Broxin mud type. Mud weights down to 3113 m ranged from 1.26 to 1.28 r.d., where it was raised to 1.46 due to high gas readings. 1.46 r.d. mud weight was maintained when drilling the rest of the section. Throughout this section the following hole problems were encountered:

- reaming from 2029 m to 2050 m when running in the hole with a stiff bottom hole assembly (after the 13-3/8" casing job).

- reaming from 2250 m to 2721 m when running in the hole with the turbine.
- reaming tight hole at 2250 m when pulling out of the hole with the turbine.
- reaming from 3138 m to 3345 m (TD) when running in the hole with a new bit (after the diamond bit run).
- reaming from 3098 m to 3110 m when making a wiper trip within the log period after having drilled to the 9-5/8" casing setting depth.

The 9-5/8" cas run, landed and cemented with no difficulties.

Mud materials used in this section were bentonite, barite, caustic soda, CC-16, CMC-LV, HPD polymer, Dextrid, soda ash, sodium bicarbonate, surflo W-300, and torque trim.

8-3/8" hole, 7" liner

The 8-3/8" hole was drilled to a total depth of 4063 m. A seawater/Q-Broxin mud system was used down to 3834 m, where a salt saturated/Dextrid mud system was built and used to drill the rest of the section. The mud weight was held at 1.46 r.d. down to 3711 m, where it was raised to 1.80 r.d., and further raised to 1.86 r.d. at 4652 m, which was maintained to TD.

Throughout this section the following hole problems were encountered:

- reaming from 4106 to 4114 m when running in the hole with a new bit.

- had 7 m fill on bottom at 4467 m after having made a round trip.
- reaming through a tight section at 4814 after a 3 stand wiper trip.
- had 445 kN overpull at 4482 m when pulling out of the hole from TD (4863 m).

When running the liner, there was no back flow. The running was stopped, circulation initiated and had return flow when circulating at 10 SPM. The mud was treated for unbalance and high viscosity, and the running of the liner continued, circulating 5 - 10 SPM every 5 stand. The liner was landed and cemented having full return flow.

Mud materials used in this section where barite, caustic soda, CC-16, CMC-LV, HPD polymer, Dextrid, Q-Broxin, salt, soda ash, sodium bicarbonate, XC polymer, Durenex, and surflo W-300.

#### 5-7/8" and 5-27/32" sections

A 5-7/8" hole was drilled 5027 m, and the well was drilled to a total depth of 5042 m using 5-27/32" bits.

The mud system used was the same as for the 8-3/8" section.

Throughout this section the following hole problems were encountered:

- were unable to rotate at 4881 (after a bit change). Pulled out to the 7" liner shoe, maximum overpull 556 kN. Reamed back to bottom.
- reamed tight hole from 4982 to 5003 m after a bit change.

- due to low annular velocities (3.5 - 4.5 m/min) the drill cuttings tended to load up in the riser. The cooling effect of the riser caused the salt to precipitate and mask the drill cuttings when drilling the interval from 5013 m to 5038 m.

Mud materials used in this section were bentonite, barite, caustic soda, CC-16, CMC LV HPD polymer, Dextrid, Q-Broxin, salt, soda ash, sodium bicarbonate, XC polymer, Durenex, Coat B-1400, and surflo W-300.