## General information

| | |
|---|---|
| Wellbore name | 6603/12-1 |
| Type | EXPLORATION |
| Purpose | WILDCAT |
| Status | P&A |
| Press release | link to press release |
| Factmaps in new window | link to map |
| Main area | NORWEGIAN SEA |
| Discovery | 6603/12-1 (Gro) |
| Well name | 6603/12-1 |
| Seismic location | sh0402-line 1851 & trace 2992 |
| Production licence | 326 |
| Drilling operator | A/S Norske Shell |
| Drill permit | 1215-L |
| Drilling facility | LEIV EIRIKSSON |
| Drilling days | 87 |
| Entered date | 26.03.2009 |
| Completed date | 20.06.2009 |
| Plugged and abondon date | 20.06.2009 |
| Release date | 20.06.2011 |
| Publication date | 20.06.2011 |
| Purpose - planned | WILDCAT |
| Reentry | NO |
| Content | GAS |
| Discovery wellbore | YES |
| 1st level with HC, age | LATE CRETACEOUS |
| 1st level with HC, formation | SPRINGAR FM |
| Kelly bushing elevation [m] | 25.0 |
| Water depth [m] | 1376.0 |
| Total depth (MD) [m RKB] | 3830.0 |
| Final vertical depth (TVD) [m RKB] | 3830.0 |
| Maximum inclination [°] | 0.8 |
| Bottom hole temperature [°C] | 143 |
| Oldest penetrated age | LATE CRETACEOUS |
| Oldest penetrated formation | SPRINGAR FM |
| Geodetic datum | ED50 |
| NS degrees | 66° 8' 52.35'' N |
| EW degrees | 3° 56' 29.67'' E |
| NS UTM [m] | 7336898.26 |

| | |
|---|---|
| EW UTM [m] | 542488.15 |
| UTM zone | 31 |
| NPDID wellbore | 5985 |

## Wellbore history

**General**

Well 6603/12-1 was drilled as an exploration wildcat well in the Norwegian Atlantic Margin (Vøring Basin). The main objectives of the well were to prove the presence and quality of reservoir and hydrocarbons in the Late Cretaceous (K98 - Maastrichtian) Springar Formation Sandstone.

**Operations and results**

A 12 1/4" pilot hole (6603/12-U-1) was spudded 63 m to the southwest of the main hole in order to evaluate pore pressures, assess the risk of shallow water flow and to gain insight into the wellbore stability in the interval down to the 20" casing depth in the main hole. The pilot was drilled to 2195 m into the Brygge Formation and below the Opal A to CT transition, without encountering shallow geohazards. The water temperature at seafloor, measured by means of a ROV, was -1 deg C.

Wildcat well 6603/12-1 was spudded with the semi-submersible installation Leiv Eriksson on 26 March 2009 and drilled to TD at 3830 m in the Late Cretaceous Springar Formation. No shallow gas was encountered. The well was drilled with Seawater and hi-vis sweeps down to 2359 m, with Glydril mud from 2359 m to 3509 m, and with Paratherm oil based mud from 3509 m to TD.

The well penetrated rocks of Quaternary, Tertiary and Cretaceous age. Top Maastrichtian Springar Formation came in at 3505 m with the target Springar Formation sandstone member at 3704 m, 40 m shallower than prognosed. The Springar Formation sandstone member was gas-bearing with a 15 m gas column from the top down to 3720 m. Poor pressure data did not allow estimation of the true OWC.

One 18m core was taken from the reservoir interval (3712.7 - 3730.7 m) with 100% recovery. An extensive wire line program was carried out successfully after reaching TD. Due to concerns about stability of the planned water based mud a thorough temperature logging was conducted, using the Schlumberger Environmental Measurement Sonde (EMS) tool. Repeated measurements near TD with up to 128 hrs waiting time after last circulation gave a Horner corrected temperature of 139 deg C at 3736.5 m (2335.5 m TVD below sea floor). This gives a linear temperature gradient from sea bed of 60 deg C/km, a record in Norwegian Exploration wells. MDT fluid samples were successfully taken in the Springar Formation sandstone member at 3705.7 m (gas), at 3720.0 m (gas), and at 3730.24 m (water).

The well was permanently abandoned on 20 June 2009 as a gas discovery.

**Testing**

No drill stem test was performed.

## Cuttings at the Norwegian Offshore Directorate

| Cutting sample, top depth [m] | Cutting samples, bottom depth [m] |
|---|---|
| 2360.00 | 3830.00 |

| Cuttings available for sampling? | YES |
|---|---|

**Cores at the Norwegian Offshore Directorate**

| Core sample number | Core sample - top depth | Core sample - bottom depth | Core sample depth - uom |
|---|---|---|---|
| 1 | 3714.0 | 3732.5 | [m ] |

| Total core sample length [m] | 18.5 |
|---|---|
| Cores available for sampling? | YES |

**Palynological slides at the Norwegian Offshore Directorate**

| Sample depth | Depth unit | Sample type | Laboratory |
|---|---|---|---|
| 2770.0 | [m] | DC | PETROSTA |
| 2800.0 | [m] | DC | PETROS |
| 2830.0 | [m] | DC | PETROS |
| 2860.0 | [m] | DC | PETROS |
| 3100.0 | [m] | DC | PETROS |
| 3510.0 | [m] | SWC | PETROS |
| 3513.5 | [m] | SWC | PETROS |
| 3531.0 | [m] | SWC | PETROS |
| 3533.5 | [m] | SWC | PETROS |
| 3563.5 | [m] | SWC | PETROS |
| 3671.2 | [m] | SWC | PETROS |
| 3687.5 | [m] | SWC | PETROS |
| 3691.0 | [m] | SWC | PETROS |
| 3696.5 | [m] | SWC | PETROS |
| 3697.5 | [m] | SWC | PETROS |
| 3700.5 | [m] | SWC | PETROS |
| 3703.5 | [m] | SWC | PETROS |
| 3704.2 | [m] | SWC | PETROS |
| 3707.0 | [m] | SWC | PETROS |
| 3714.7 | [m] | C | PETROS |
| 3716.6 | [m] | C | PETROS |
| 3718.1 | [m] | C | PETROS |

| | | | |
|---|---|---|---|
| 3718.5 | [m] | C | PETROS |
| 3718.9 | [m] | C | PETROS |
| 3719.2 | [m] | C | PETROS |
| 3719.6 | [m] | C | PETROS |
| 3720.5 | [m] | C | PETROS |
| 3722.0 | [m] | C | PETROS |
| 3722.3 | [m] | C | PETROS |
| 3723.9 | [m] | C | PETROS |
| 3724.3 | [m] | C | PETROS |
| 3725.9 | [m] | C | PETROS |
| 3726.9 | [m] | C | PETROS |
| 3727.6 | [m] | C | PETROS |
| 3727.8 | [m] | C | PETROS |
| 3728.5 | [m] | C | PETROS |
| 3730.1 | [m] | C | PETROS |
| 3732.5 | [m] | C | PETROS |
| 3736.5 | [m] | SWC | PETROS |
| 3738.0 | [m] | SWC | PETROS |
| 3744.0 | [m] | SWC | PETROS |
| 3747.5 | [m] | SWC | PETROS |
| 3758.5 | [m] | SWC | PETROS |
| 3810.0 | [m] | SWC | PETROS |

**Lithostratigraphy**

| Top depth [mMD RKB] | Lithostrat. unit |
|---|---|
| 1400 | NORDLAND GP |
| 1400 | NAUST FM |
| 1673 | KAI FM |
| 2100 | HORDALAND GP |
| 2100 | BRYGGE FM |
| 2842 | ROGALAND GP |
| 2842 | TARE FM |
| 3070 | TANG FM |
| 3505 | SHETLAND GP |
| 3505 | SPRINGAR FM |
| 3704 | NO FORMAL NAME |
| 3740 | SPRINGAR FM |

### Composite logs

| Document name | Document format | Document size [MB] |
|---|---|---|
| 5985 | pdf | 0.40 |

### Logs

| Log type | Log top depth [m] | Log bottom depth [m] |
|---|---|---|
| EMS PPC1 PPC2 | 2602 | 3467 |
| MDT | 3705 | 3720 |
| MDT MINI-DST | 3705 | 3730 |
| MDT MINI-DST | 3705 | 3730 |
| MSCT | 3510 | 3745 |
| MWD - DI GR RES APWD DEN NEU | 2608 | 3830 |
| MWD LWD - DI GR RES APWD | 1517 | 2608 |
| OBMI MSIP PPC | 3393 | 3825 |
| PEX MSIP EMS | 1400 | 3474 |
| RT SCAN PEX HNGS CMR+ | 3287 | 3828 |
| VSP | 1376 | 3790 |

### Casing and leak-off tests

| Casing type | Casing diam. [inch] | Casing depth [m] | Hole diam. [inch] | Hole depth [m] | LOT/FIT mud eqv. [g/cm3] | Formation test type |
|---|---|---|---|---|---|---|
| CONDUCTOR | 30 | 1512.0 | 36 | 1517.0 | 0.00 | LOT |
| SURF.COND. | 20 | 2347.0 | 26 | 2359.0 | 1.25 | LOT |
| INTERM. | 13 5/8 | 2602.0 | 17 1/2 | 2608.0 | 1.36 | LOT |
| INTERM. | 9 5/8 | 3497.0 | 12 1/4 | 3500.0 | 1.46 | LOT |
| OPEN HOLE | | 3820.0 | 8 1/2 | 3820.0 | 0.00 | LOT |

### Drilling mud

| Depth MD [m] | Mud weight [g/cm3] | Visc. [mPa.s] | Yield point [Pa] | Mud type | Date measured |
|---|---|---|---|---|---|
| 1398 | 1.02 | | | Seawater | |
| 2332 | 1.18 | | | Seawater | |
| 2364 | 1.03 | | | Glydril | |

| | | | | | |
|---|---|---|---|---|---|
| 2608 | 1.18 | | | KPM KCl Polymer | |
| 2616 | 1.25 | | | Glydril DW | |
| 3420 | 1.28 | | | Glydril DWHT | |
| 3466 | 1.18 | | | Glydril DW | |
| 3466 | 1.31 | | | Paratherm | |
| 3497 | 1.26 | | | Glydril DWHT | |
| 3500 | 1.27 | | | Glydril DWHT | |
| 3714 | 1.30 | | | Paratherm | |
| 3723 | 1.30 | | | Paratherm | |
| 3830 | 1.30 | | | Paratherm | |

**Pressure plots**

The pore pressure data is sourced from well logs if no other source is specified. In some wells where pore pressure logs do not exist, information from Drill stem tests and kicks have been used. The data has been reported to the NPD, and further processed and quality controlled by IHS Markit.

| Document name | Document format | Document size [MB] |
|---|---|---|
| 5985_Formation_pressure_(Formasjonstrykk) | pdf | 0.23 |