

**General information**

|                                    |                                       |
|------------------------------------|---------------------------------------|
| Wellbore name                      | 16/2-6                                |
| Type                               | EXPLORATION                           |
| Purpose                            | WILDCAT                               |
| Status                             | P&A                                   |
| Press release                      | <a href="#">link to press release</a> |
| Factmaps in new window             | <a href="#">link to map</a>           |
| Main area                          | NORTH SEA                             |
| Field                              | <a href="#">JOHAN SVERDRUP</a>        |
| Discovery                          | <a href="#">16/2-6 Johan Sverdrup</a> |
| Well name                          | 16/2-6                                |
| Seismic location                   | Ln0902-inline2210 & crossline 7260    |
| Production licence                 | <a href="#">501</a>                   |
| Drilling operator                  | Lundin Norway AS                      |
| Drill permit                       | 1311-L                                |
| Drilling facility                  | <a href="#">TRANSOCEAN WINNER</a>     |
| Drilling days                      | 63                                    |
| Entered date                       | 20.07.2010                            |
| Completed date                     | 20.09.2010                            |
| Release date                       | 20.09.2012                            |
| Publication date                   | 16.10.2012                            |
| Purpose - planned                  | WILDCAT                               |
| Reentry                            | NO                                    |
| Content                            | OIL                                   |
| Discovery wellbore                 | YES                                   |
| 1st level with HC, age             | LATE JURASSIC                         |
| 1st level with HC, formation       | INTRA DRAUPNE FM SS                   |
| 2nd level with HC, age             | MIDDLE JURASSIC                       |
| 2nd level with HC, formation       | VESTLAND GP                           |
| Kelly bushing elevation [m]        | 26.0                                  |
| Water depth [m]                    | 115.0                                 |
| Total depth (MD) [m RKB]           | 2131.0                                |
| Final vertical depth (TVD) [m RKB] | 2131.0                                |
| Oldest penetrated age              | LATE PERMIAN                          |
| Oldest penetrated formation        | ZECHSTEIN GP                          |
| Geodetic datum                     | ED50                                  |
| NS degrees                         | 58° 49' 25.26" N                      |
| EW degrees                         | 2° 36' 54.76" E                       |
| NS UTM [m]                         | 6520633.12                            |



|                |           |
|----------------|-----------|
| EW UTM [m]     | 477779.05 |
| UTM zone       | 31        |
| NPDID wellbore | 6374      |

## Wellbore history

### General

Well 16/2-6 was drilled on the Avaldsnes prospect on the Utsira High in the North Sea. The primary objective was to prove oil in Jurassic and pre-Jurassic sandstone in the Karmsund Graben. The secondary objective was to prove oil in the Paleocene Ty Formation Sandstone. Planned TD was 50 m into solid basement rock.

### Operations and results

Wildcat well 16/2-6 was spudded with the semi-submersible installation Transocean Winner on 20 July 2010 and drilled to TD at 2131 m. The well encountered severe loss problems in the Zechstein Group and a technical sidetrack was drilled (well 16/2-6 T2) through the reservoir. The sidetrack was kicked off from 1830 m and drilled to 2131 m where severe losses again were experienced and the well was completed without reaching its planned TD. All wire line logging and a DST were performed in the sidetrack. The well was drilled with seawater and hi-vis pills down to 748 m and with Glydril WBM (3- 5% glycol) from 748 m to TD.

No Ty Formation sand was seen in the well. Top Viking Group, Draupne Formation was encountered at 1925.5 m (1927.5 m in sidetrack) and top of the Draupne reservoir sand came in at 1931 m (1931 m in sidetrack). The top of the reservoir consists of an 8 m thick, coarse to very coarse, sand. Underlying this is finer grained sand laminated with shale. A reworked calcareous formation lies on top of the Triassic. Pressure points, MDT sampling and DST results confirmed the presence of oil in the reservoir with an oil-water contact at 1948.6 m. Residual oil was found down to 1966 m. In addition to the main reservoir section, oil was sampled in calcareous slumps with vuggy porosity between the Jurassic sandstone and the Triassic. Apart from this there were no shows of hydrocarbons reported elsewhere in the well bores.

Three conventional cores were cut from 5 m into the Draupne sandstone, through the Middle Jurassic Vestland Group down to 1961.5 m in the Late Triassic Skagerrak Formation. MDT fluid samples were taken at 1933.2 m (oil), 1936.0 m (oil), 1945.2 m (oil), 1948 m (oil and water), 1953 m (water), and at 1962.5 m (water and oil).

The well was permanently abandoned on 20 September 2010 on as an oil discovery.

### Testing

A drill stem test was performed from the interval 1931.8 m to 1938.1 m. The test flowed 786 Sm<sup>3</sup> oil and 18700 Sm<sup>3</sup> through a 52/64" choke. At single stage separation The GOR was 39.6 Sm<sup>3</sup>/Sm<sup>3</sup>, the oil density was 0.891 g/cm<sup>3</sup>, and the gas gravity was 1.012 (air = 1). The maximum DST temperature was 82.7 deg C. The interpretation of the DST indicated a continuous reservoir without barriers in a radius of 2-3 km with extremely good flow characteristics.

## Cuttings at the Norwegian Offshore Directorate



| Cutting sample, top depth [m] | Cutting samples, bottom depth [m] |
|-------------------------------|-----------------------------------|
| 750.00                        | 2131.00                           |

|                                  |     |
|----------------------------------|-----|
| 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                  | 1935.0                  | 1939.5                     | [m ]                    |
| 2                  | 1939.5                  | 1956.2                     | [m ]                    |
| 3                  | 1958.6                  | 1960.3                     | [m ]                    |

|                               |      |
|-------------------------------|------|
| Total core sample length [m]  | 22.9 |
| Cores available for sampling? | YES  |

**Oil samples at the Norwegian Offshore Directorate**

| Test type | Bottle number | Top depth MD [m] | Bottom depth MD [m] | Fluid type | Test time          | Samples available |
|-----------|---------------|------------------|---------------------|------------|--------------------|-------------------|
| DST       |               | 0.00             | 0.00                |            | 11.09.2010 - 00:00 | YES               |

**Lithostratigraphy**

| Top depth [mMD RKB] | Lithostrat. unit               |
|---------------------|--------------------------------|
| 141                 | <a href="#">NORDLAND GP</a>    |
| 829                 | <a href="#">UTSIRA FM</a>      |
| 876                 | <a href="#">NO FORMAL NAME</a> |
| 939                 | <a href="#">HORDALAND GP</a>   |
| 939                 | <a href="#">SKADE FM</a>       |
| 1097                | <a href="#">NO FORMAL NAME</a> |
| 1468                | <a href="#">ROGALAND GP</a>    |
| 1468                | <a href="#">BALDER FM</a>      |
| 1493                | <a href="#">SELE FM</a>        |
| 1505                | <a href="#">LISTA FM</a>       |
| 1604                | <a href="#">VÅLE FM</a>        |
| 1628                | <a href="#">SHETLAND GP</a>    |



|      |                                     |
|------|-------------------------------------|
| 1628 | <a href="#">EKOFISK FM</a>          |
| 1639 | <a href="#">TOR FM</a>              |
| 1669 | <a href="#">HOD FM</a>              |
| 1775 | <a href="#">BLODØKS FM</a>          |
| 1777 | <a href="#">SVARTE FM</a>           |
| 1805 | <a href="#">CROMER KNOLL GP</a>     |
| 1805 | <a href="#">RØDBY FM</a>            |
| 1907 | <a href="#">SOLA FM</a>             |
| 1912 | <a href="#">ÅSGARD FM</a>           |
| 1926 | <a href="#">VIKING GP</a>           |
| 1926 | <a href="#">DRAUPNE FM</a>          |
| 1931 | <a href="#">INTRA DRAUPNE FM SS</a> |
| 1938 | <a href="#">DRAUPNE FM</a>          |
| 1942 | <a href="#">VESTLAND GP</a>         |
| 1955 | <a href="#">NO GROUP DEFINED</a>    |
| 1955 | <a href="#">SKAGERRAK FM</a>        |
| 2075 | <a href="#">ZECHSTEIN GP</a>        |

**Geochemical information**

| Document name                                 | Document format | Document size [MB] |
|-----------------------------------------------|-----------------|--------------------|
| <a href="#">6374_01_16_2_6_gch_transfer_1</a> | txt             | 0.00               |
| <a href="#">6374_02_16_2_6_gch_results_1</a>  | txt             | 0.29               |

**Drill stem tests (DST)**

| Test number | From depth MD [m] | To depth MD [m] | Choke size [mm] |
|-------------|-------------------|-----------------|-----------------|
| 1.0         | 1932              | 1938            | 20.6            |

| Test number | Final shut-in pressure [MPa] | Final flow pressure [MPa] | Bottom hole pressure [MPa] | Downhole temperature [°C] |
|-------------|------------------------------|---------------------------|----------------------------|---------------------------|
| 1.0         |                              |                           |                            |                           |

| Test number | Oil [Sm3/day] | Gas [Sm3/day] | Oil density [g/cm3] | Gas grav. rel.air | GOR [m3/m3] |
|-------------|---------------|---------------|---------------------|-------------------|-------------|
| 1.0         | 780           |               |                     |                   |             |



**Logs**

| Log type                         | Log top depth [m] | Log bottom depth [m] |
|----------------------------------|-------------------|----------------------|
| CMR HRLA XPT                     | 1835              | 2060                 |
| FMI MSIP                         | 1300              | 2070                 |
| HRLA PEX ECS HNGS                | 1803              | 2070                 |
| LWD - GR RES DEN NEU SON PWD DIR | 748               | 2131                 |
| LWD - GR RES PWD DIR             | 141               | 750                  |
| LWD - GR RES PWD DIR             | 1803              | 2068                 |
| LWD - GR RES SON DEN NEU         | 2083              | 2122                 |
| LWD - PWD DIR                    | 141               | 748                  |
| MDT GR                           | 1932              | 2027                 |
| MSCT GR                          | 1820              | 2053                 |
| VSP GR                           | 115               | 2072                 |

**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                  | 218.0            | 36                | 220.0          | 0.00                     | LOT                 |
| SURF.COND.  | 13 3/8              | 742.0            | 17 1/2            | 748.0          | 1.81                     | LOT                 |
| PILOT HOLE  |                     | 750.0            | 9 7/8             | 750.0          | 0.00                     | LOT                 |
| INTERM.     | 9 5/8               | 1803.0           | 12 1/4            | 1810.0         | 1.75                     | LOT                 |
| OPEN HOLE   |                     | 2131.0           | 8 1/2             | 2131.0         | 0.00                     | LOT                 |

**Drilling mud**

| Depth MD [m] | Mud weight [g/cm3] | Visc. [mPa.s] | Yield point [Pa] | Mud type | Date measured |
|--------------|--------------------|---------------|------------------|----------|---------------|
| 752          | 1.30               |               |                  | Water    |               |
| 1633         | 1.35               |               |                  | Water    |               |
| 1810         | 1.37               |               |                  | Water    |               |
| 1814         | 1.20               |               |                  | Water    |               |
| 1965         | 1.20               |               |                  | Water    |               |
| 2010         | 1.18               |               |                  | Water    |               |
| 2082         | 1.20               |               |                  | Water    |               |
| 2103         | 1.25               |               |                  | Water    |               |
| 2128         | 1.20               |               |                  | Water    |               |



|      |      |  |  |       |  |
|------|------|--|--|-------|--|
| 2131 | 1.25 |  |  | Water |  |
|------|------|--|--|-------|--|

**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] |
|-----------------------------------------------------------|-----------------|--------------------|
| <a href="#">6374 Formation pressure (Formasjonstrykk)</a> | pdf             | 0.20               |

