## General information

| | |
|---|---|
| Wellbore name | 6406/12-4 S |
| Type | EXPLORATION |
| Purpose | WILDCAT |
| Status | P&A |
| Press release | link to press release |
| Factmaps in new window | link to map |
| Main area | NORWEGIAN SEA |
| Well name | 6406/12-4 |
| Seismic location | inline 5508.xline 5986 |
| Production licence | 586 |
| Drilling operator | VNG Norge AS |
| Drill permit | 1587-L |
| Drilling facility | TRANSOCEAN ARCTIC |
| Drilling days | 56 |
| Entered date | 23.06.2015 |
| Completed date | 17.08.2015 |
| Plugged date | 17.08.2015 |
| Release date | 17.08.2017 |
| Publication date | 19.08.2017 |
| Purpose - planned | WILDCAT |
| Reentry | NO |
| Content | OIL SHOWS |
| Discovery wellbore | NO |
| 1st level with HC, age | LATE JURASSIC |
| 1st level with HC, formation | ROGN FM |
| Kelly bushing elevation [m] | 25.5 |
| Water depth [m] | 319.0 |
| Total depth (MD) [m RKB] | 4318.0 |
| Final vertical depth (TVD) [m RKB] | 3882.9 |
| Maximum inclination [°] | 43 |
| Bottom hole temperature [°C] | 128 |
| Oldest penetrated age | LATE JURASSIC |
| Oldest penetrated formation | INTRA MELKE FM SS |
| Geodetic datum | ED50 |
| NS degrees | 64° 1' 7.48'' N |
| EW degrees | 6° 46' 31.29'' E |
| NS UTM [m] | 7101175.99 |
| EW UTM [m] | 391272.15 |

| | |
|---|---|
| UTM zone | 32 |
| NPDID wellbore | 7721 |

## Wellbore history

### General

Well 6406/12-4 S was drilled on the flank of the Frøya High close to the southern end of the Halten Terrace in the Norwegian Sea. The exploration objective was to test Intra Melke sandstone in the Boomerang South West Prospect, younger than the reservoir in the Pil discovery. The well also had as appraisal objective to core the transition into the top of the Pil discovery reservoir close to the established oil-water contact.

### Operations and results

Wildcat well 6406/12-4 S was spudded with the semi-submersible installation Transocean Arctic on 23 June 2015 and drilled to TD at 4318 m (3882.9 m TVD) m in Late Jurassic Intra-Melke sandstone. The well was drilled vertical down to 1203 m. From 1203 m to 3660 m, the well was drilled deviated with a sail angle of 41°. From there and through the reservoir to final TD the sail angle was changed to ca 7°. Due to a highly overbalanced mud weight during drilling in the 8 1/2" section, a significant drill break was experienced in the Rogn Formation, with substantial mud losses to the formation at approximately 3746 m. This caused serious mud invasion into the formation. The well was drilled with seawater and sweeps down to 1210 m and with XP-07 oil based mud from 1210 m to TD.

The well encountered 26 m of Rogn Formation of good quality at 3726 m. A 196 m thick package of Spekk shales and siltstones followed down to top Melke Formation at 3946 m. Small amounts of oil was recovered in an RCX fluid sample from the Rogn Formation. Both this oil and pressure data from the Rogn Formation were seriously affected by the mud invasion, making it difficult to conclude on the nature of the oil. The petrophysical logs indicated hydrocarbon saturations of up to 20% across the cored interval in the Melke Formation sandstone. No oil shows above the mud were recorded in the Rogn Formation. Weak oil shows were described on cores and cuttings throughout the Melke Formation and Intra Melke sandstones.

A total of 41.95 m core was recovered in three cores from the interval 3941 to 3984.3 m (96.9% total recovery) across the base Spekk-top Melke boundary. An RCX fluid sample was taken at 3736 m (3281.3 m TVD) in the intra Spekk Formation sandstone. This sample contained 90 vol-% formation water, 5 vol-% mud filtrate and 5 vol-% reservoir oil. Further RCX samples recovered formation water at 3956.7 m, 3968.2 m, 3988.2 m and 4021.6 m in the Intra-Melke Formation sandstone

The well was permanently abandoned on 17 August 2015.

### Testing

No drill stem test was performed.

## Cuttings at the Norwegian Offshore Directorate

| Cutting sample, top depth [m] | Cutting samples, bottom depth [m] |
|---|---|
| 1210.00 | 4319.00 |

| | |
|---|---|
| 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 | 3941.0 | 3941.9 | [m ] |
| 2 | 3942.5 | 3950.5 | [m ] |
| 3 | 3950.7 | 3983.8 | [m ] |

| | |
|---|---|
| Total core sample length [m] | 42.0 |
| 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 |
|---|---|---|---|---|---|---|
| MDT | | 0.00 | 0.00 | BASE OIL | | YES |
| MDT | | 0.00 | 0.00 | BASE OIL | | YES |
| MDT | | 0.00 | 0.00 | BASE OIL | | YES |

### Lithostratigraphy

| Top depth [mMD RKB] | Lithostrat. unit |
|---|---|
| 345 | NORDLAND GP |
| 345 | NAUST FM |
| 1085 | KAI FM |
| 1160 | HORDALAND GP |
| 1160 | BRYGGE FM |
| 1850 | ROGALAND GP |
| 1850 | TARE FM |
| 1968 | TANG FM |
| 2215 | SHETLAND GP |
| 2215 | SPRINGAR FM |
| 2317 | NISE FM |

| | |
|---|---|
| 2539 | KVITNOS FM |
| 3251 | CROMER KNOLL GP |
| 3251 | LANGE FM |
| 3478 | NO FORMAL NAME |
| 3699 | LYR FM |
| 3726 | VIKING GP |
| 3726 | ROGN FM |
| 3753 | SPEKK FM |
| 3946 | MELKE FM |
| 3951 | INTRA MELKE FM SS |

## Logs

| Log type | Log top depth [m] | Log bottom depth [m] |
|---|---|---|
| HDIL XMAC ORIT ZDL CN DSL | 360 | 4072 |
| HDIL ZMAC ORIT ZDL CN DSL | 3650 | 4322 |
| MREX FLEX DSL | 3650 | 4060 |
| MWD - ATK ZTKR ZTKG COP OTK SDTK | 2248 | 4318 |
| MWD - DIR PWD | 1 | 415 |
| MWD - DIR PWD GR RES | 415 | 1210 |
| MWD - DIR PWD GR RES SON | 1210 | 2248 |
| PCOR | 3726 | 4021 |
| PCOR | 3912 | 4267 |
| RCX | 3730 | 4025 |
| RCX | 4069 | 4308 |
| UXPL ORIT GXPL GR | 3650 | 4060 |
| VSP | 1745 | 4310 |

## 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 | 411.3 | 36 | 415.0 | 0.00 | |
| SURF.COND. | 20 | 1203.5 | 26 | 1210.0 | 1.66 | FIT |
| PILOT HOLE | | 1210.0 | 9 7/8 | 1210.0 | 0.00 | |
| INTERM. | 13 3/8 | 2242.0 | 17 1/2 | 2248.0 | 1.69 | FIT |
| INTERM. | 9 5/8 | 3652.0 | 12 1/4 | 3660.0 | 1.79 | FIT |
| OPEN HOLE | | 4318.0 | 8 1/2 | 4318.0 | 0.00 | |

## Drilling mud

| Depth MD [m] | Mud weight [g/cm3] | Visc. [mPa.s] | Yield point [Pa] | Mud type | Date measured |
|---|---|---|---|---|---|
| 344 | 1.34 | 21.0 | | WBM | |
| 1153 | 1.54 | 35.0 | | XP07 Low ECD | |
| 1213 | 1.49 | 21.0 | | XP-07 Low ECD OBM | |
| 1316 | 1.54 | 30.0 | | XP07 Low ECD | |
| 1743 | 1.51 | 24.0 | | XP-07 Low ECD OBM | |
| 1935 | 1.54 | 29.0 | | XP-07 Low ECD OBM | |
| 2463 | 1.54 | 31.0 | | XP-07 Low ECD OBM | |
| 2918 | 1.54 | 34.0 | | XP-07 Low ECD OBM | |
| 3538 | 1.54 | 28.0 | | XP07 Low ECD | |
| 3660 | 1.47 | 33.0 | | XP-07 Low ECD OBM | |
| 3660 | 1.54 | 33.0 | | XP-07 Low ECD OBM | |
| 3746 | 1.49 | 36.0 | | XP-07 Low ECD | |
| 3942 | 1.39 | 23.0 | | XP07 Low ECD | |
| 4318 | 1.39 | 33.0 | | XP07 Low ECD | |
| 4318 | 1.39 | 27.0 | | XP07 Low ECD | |