General information

Wellbore name	16/1-29 S
Type	EXPLORATION
Purpose	WILDCAT
Status	P&A
Press release	link to press release
Factmaps in new window	link to map
Main area	NORTH SEA
Field	SYMRA
Discovery	16/1-29 S Symra
Well name	16/1-29
Seismic location	LN12M02R14 Inline 4603 Xline 4141
Production licence	167
Drilling operator	Statoil Petroleum AS
Drill permit	1691-L
Drilling facility	DEEPSEA BERGEN
Drilling days	43
Entered date	22.04.2018
Completed date	03.06.2018
Plugged and abondon date	03.06.2018
Release date	03.06.2020
Publication date	03.06.2020
Purpose - planned	WILDCAT
Reentry	NO
Content	OIL/GAS
Discovery wellbore	YES
1st level with HC, age	EOCENE
1st level with HC, formation	GRID FM
2nd level with HC, age	PALEOCENE
2nd level with HC, formation	HEIMDAL FM
3rd level with HC, age	PERMIAN
3rd level with HC, formation	ZECHSTEIN GP
Kelly bushing elevation [m]	23.0
Water depth [m]	114.0
Total depth (MD) [m RKB]	2024.0
Final vertical depth (TVD) [m RKB]	2010.0
Maximum inclination [°]	12
Bottom hole temperature [°C]	100
Oldest penetrated formation	BASEMENT

Geodetic datum	ED50
NS degrees	58° 58' 22.21'' N
EW degrees	2° 17' 44.19'' E
NS UTM [m]	6537391.31
EW UTM [m]	459497.66
UTM zone	31
NPDID wellbore	8383

Wellbore history

General

Well 16/1-29 S was drilled to test the Lille Prinsen prospect on the north-western part of the Utsira High in the North Sea. The exploration objective was to test the Lille Prinsen prospect, believed to mainly consist of Triassic sediments, with the possibility of (thin) transgressive Jurassic sands similar to Johan Sverdrup on top. In addition, the well was expected to penetrate Grid and Heimdal sands, which were found to contain oil and gas in the 16/1-6 S Verdandi well.

Operations and results

Wildcat well 16/1-29 S was spudded with the semi-submersible installation Deepsea Bergen on 22 April 2018. During the operation, the well (16/1-29 S) experienced unexpected heavy mud losses when drilling into the reservoir section, eventually leading to well collapse and stuck drill string. Consequently, a technical side-track (16/1-29 ST2) was kicked off at 1225 m and this was successfully drilled through the reservoir section. Continuous mud losses were also experienced in the reservoir section of the technical side-track, but these were controlled by lowering the mud weight. The well was finally drilled to planned TD at 2024 m (2010 m TVD) in Basement rock. The well was drilled with seawater and hi-vis pills down to 550 m, with KCl mud from 550 m to 1210 m, with Enviromul oil-based mud from 1210 m to 1863 m (mainwell and side-track) and with KCl/polymer/GEM mud from 1863 m to final TD.

The Eocene Grid Formation and the Paleocene Heimdal Formation were encountered at 1419 m (1416 m TVD), and 1794 m (1785 m TVD), respectively. They both contained gas over oil. In the Grid formation a gas-oil contact was found at 1462.6 m (1459.9 m TVD) with a free water level at 1498.9 m (1495.8 m TVD). In the Heimdal Formation a gas-oil contact was found at 1808.1 m (1798.4 m TVD) with a thin oil leg down-to 1809.2 m (1799.5 m TVD). The oil-leg was confirmed by PVT analyses, which found the fluid samples taken at 1808.5 m (1798.8 m TVD) to contain both gas-condensate and black oil.

The well did not encounter any of the expected Jurassic/Triassic sands, but instead encountered 26.6 m of oil filled Permian Zechstein Group Dolostone carbonates with top at 1885 m (1874 m TVD), immediately below the Cretaceous Shetland Group. The Permian Carbonates show varying, but good reservoir quality, with an average net/gross of 0.91 and porosity of 23%. The core and thin sections show variations within the carbonate reservoir, with the better zones in the upper parts, which can be associated with vuggy porosity, low content of calcite cement and karst development.

Poor shows were described from drilled cuttings in Grid sand at 1475 m and in Heimdal sand at 1800 m. Shows from drilled cuttings in Zechstein were described as patchy even brown oil stain, even yellow direct fluorescence, weak blooming cut and weak patchy yellow residual. Oil shows (direct and cut fluorescence and spots of oil stain) continued in basement down to TD.

Two cores were cut in the technical side-track from 1888.2 to 1907.5 m in the Permian Zechstein Group. MDT fluid samples were taken at 1474.5 m (oil with 3% mud contamination), 1808.5 m (gas-condensate and oil with <1% mud contamination), 1892.5 m (oil, no mud contamination), and 1985.7 m (formation water and filtrate).

The well was permanently abandoned on 3 June 2018 as an oil discovery.

Testing

No drill stem test was performed.

Cuttings at the Norwegian Offshore Directorate

Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
560.00	1881.00

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	1888.3	1892.0	[m]
2	1892.5	1904.3	[m]

Total core sample length [m]	15.5
Cores available for sampling?	YES

Palynological slides at the Norwegian Offshore Directorate

Sample depth	Depth unit	Sample type	Laboratory
1240.0	[m]	DC	APT
1320.0	[m]	DC	APT
1380.0	[m]	DC	APT
1430.0	[m]	DC	APT
1475.0	[m]	DC	APT
1490.0	[m]	DC	APT
1502.0	[m]	DC	APT
1520.0	[m]	DC	APT
1535.0	[m]	DC	APT
1547.0	[m]	DC	APT
1565.0	[m]	DC	APT
1580.0	[m]	DC	APT
1620.0	[m]	DC	APT
1640.0	[m]	DC	APT
1660.0	[m]	DC	APT
1680.0	[m]	DC	APT
1700.0	[m]	DC	APT
1740.0	[m]	DC	APT
1770.0	[m]	DC	APT
1779.0	[m]	DC	APT
1785.0	[m]	DC	APT

1788.0	[m]	DC	APT
1791.0	[m]	DC	APT
1797.0	[m]	DC	APT
1803.0	[m]	DC	APT
1809.0	[m]	DC	APT
1815.0	[m]	DC	APT
1821.0	[m]	DC	APT
1827.0	[m]	DC	APT
1833.0	[m]	DC	APT
1839.0	[m]	DC	APT
1842.0	[m]	DC	APT
1845.0	[m]	DC	APT
1848.0	[m]	DC	APT
1851.0	[m]	DC	APT
1857.0	[m]	DC	APT
1860.0	[m]	DC	APT
1890.0	[m]	DC	APT
1896.0	[m]	DC	APT
1898.0	[m]	DC	APT
1899.0	[m]	DC	APT
1903.5	[m]	C	APT
1905.0	[m]	DC	APT
1914.0	[m]	DC	APT
1923.0	[m]	DC	APT
1935.0	[m]	DC	APT

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
137	NORDLAND GP
757	UTSIRA FM
973	HORDALAND GP
999	SKADE FM
1123	UNDIFFERENTIATED
1419	GRID FM
1561	UNDIFFERENTIATED
1715	ROGALAND GP
1715	BALDER FM
1743	SELE FM

1751	LISTA FM
1794	HEIMDAL FM
1809	NO FORMAL NAME
1874	SHETLAND GP
1874	EKOFISK FM
1885	ZECHSTEIN GP
1912	ROTLIEGEND GP
1915	BASEMENT

Logs

Log type	Log top depth [m]	Log bottom depth [m]
FMI HRLA	1857	2018
LWD - GR RES	550	1201
LWD - GR RES DIR ECD	1201	2024
LWD - GR RES DIR ECD NBGR	1250	1860
LWD - GR RES NEU DEN CAL NBGR	1201	1893
MDT	1419	1616
MDT	1892	2002
MDT CMR	1857	2012
MSCT	1870	1967
MSIP UIB	1857	2015
PEX AIT MSIP	1200	1860
PEX HNGS ECS CMR	1857	2008
ZO VSP	130	2019

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	187.0	36	187.0	0.00	
INTERM.	13 3/8	540.0	17 1/2	550.0	1.49	FIT
INTERM.	9 5/8	1200.0	12 1/4	1201.0	1.71	FIT
LINER	7	1857.2	8 1/2	1860.0	1.51	FIT
OPEN HOLE		2024.0	8 1/2	2024.0	0.00	

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
325	1.10	21.0		KCl/Polymer/GEM	
550	1.21	13.0		KCl/Polymer/GEM	
930	1.10	22.0		KCl/Polymer/GEM	
1054	1.21	15.0		KCl/Polymer/GEM	
1150	1.22	19.0		Enviromul	
1174	1.21	17.0		KCl/Polymer/GEM	
1201	1.28	24.0		Enviromul	
1201	1.20	13.0		KCl/Polymer/GEM	
1210	1.22	21.0		Enviromul	
1305	1.10	22.0		KCl/Polymer/GEM	
1407	1.28	25.0		Enviromul	
1600	1.10	21.0		KCl/Polymer/GEM	
1610	1.28	25.0		Enviromul	
1876	1.23	21.0		Enviromul	
1876	1.28	27.0		Enviromul	
1893	1.22	20.0		Enviromul	
1893	1.15	15.0		Enviromul	
2005	1.10	14.0		KCl/Polymer/GEM	
2024	1.10	14.0		KCl/Polymer/GEM	