General information

Wellbore name	16/1-16
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	IVAR AASEN
Discovery	16/1-9 Ivar Aasen
Well name	16/1-16
Seismic location	LN902-R10.inline1365 & xline6012
Production licence	457
Drilling operator	Wintershall Norge ASA
Drill permit	1391-L
Drilling facility	BREDFORD DOLPHIN
Drilling days	46
Entered date	23.10.2012
Completed date	07.12.2012
Release date	07.12.2014
Publication date	11.03.2015
Purpose - planned	WILDCAT
Reentry	NO
Content	OIL
Discovery wellbore	NO
1st level with HC, age	MIDDLE JURASSIC
1st level with HC, formation	HUGIN FM
2nd level with HC, age	TRIASSIC
2nd level with HC, formation	SKAGERRAK FM
Kelly bushing elevation [m]	25.0
Water depth [m]	113.0
Total depth (MD) [m RKB]	2722.0
Final vertical depth (TVD) [m RKB]	2721.0
Maximum inclination [°]	2.6
Oldest penetrated age	PERMIAN
Oldest penetrated formation	ROTLIEGEND GP
Geodetic datum	ED50
NS degrees	58° 54' 47.78'' N
EW degrees	2° 15' 54.62'' E

NS UTM [m]	6530777.71
EW UTM [m]	457674.77
UTM zone	31
NPDID wellbore	6823

Wellbore history

General

Well 16/1-16 was drilled on the east side of the Gudrun Terrace towards the Utsira High in the North Sea. The main objectives were to test the hydrocarbon potential in Late Jurassic/Early Cretaceous sands (the Noor prospect), and to appraise the extension of the Ivar Aasen Field of Middle Jurassic/Triassic age into PL457 area (Asha prospect). A possible secondary target at Paleocene level is the Heimdal sand pinchout. The well was planned to drill into Zechstein carbonates that may act as reservoir in this area.

Operations and results

Well 16/1-16 was spudded with the semi-submersible installation Bredford Dolphin on 23 October 2012 and drilled to TD at 2722 m in the Permian Rotliegend Group. A 9 7/8" pilot hole was first drilled to 600 m to check for shallow gas. No shallow gas was observed. Operations proceeded without significant problems. The well was drilled with

No significant problem was encountered in the operations. The well was drilled with seawater and hi-vis sweeps down to 592 m and with water based Performadril mud from 592 m to TD.

The interpreted Heimdal Formation sand reservoir was absent. The Lista Formation consists predominantly of Claystone with Limestone stringers.

In the first main exploration target (Noor prospect), the well penetrated approximately 90 m gross sandstones altogether, but there were no hydrocarbon shows or anomalous gas values seen. The Early Cretaceous Åsgard Formation is a Limestone/Chalk - sandstone sequence, with a predominantly limestone/chalk in the top 50 m and sandstone from 2120 m and towards the base. The Draupne Formation was found as a primarily siltstone sequence with abundant thin sandstones and limestone streaks throughout.

In the other main target (Asha prospect), the 16/1-16 well encountered a gross oil column of around 70 m in excellent reservoirs within the Middle Jurassic Hugin Formation, and into the Triassic Skagerrak Formation. Two hydrocarbon zones were found in separate pressure regime (0.6 bars difference). The first oil zone has an ODT at ca. 2435 m in the Hugin Formation. The deeper oil zone has an ODT at ca. 2454.2 m in the Skagerrak Formation. No oil/water contact was encountered. The oil found in 16/1-16 is of different type (heavier) than the oil previously proven in the Ivar Aasen field to the West. Moreover, unlike in Ivar Aasen, no gas cap is present in the Asha Discovery.

The 29 m thick Zechstein Group was found water wet. It is composed of dolomites and limestone and has relatively poor reservoir properties

Three consecutive cores were cut from 2385 m in the Hugin Formation to 2441 m in the Skagerrak Formation. MDT fluid samples were taken at 2163.28 m (water), 2385.2 m (oil), 2399.9 m (oil), 2424 m (oil), 2452.7 m (oil), 2458 m (water), and 2498.2 m (water).

The well was plugged back and completed for sidetracking on 7 December 2012.

Testing

No drill stem test was performed.

Cuttings at the Norwegian Offshore Directorate

Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
600.00	2722.00

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	2385.0	2411.9	[m]
2	2412.8	2428.5	[m]
3	2428.5	2441.6	[m]

Total core sample length [m]	55.7
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	OIL		NO
MDT		0.00	0.00	OIL		NO

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
138	NORDLAND GP
791	UTSIRA FM
874	HORDALAND GP
950	SKADE FM
1221	NO FORMAL NAME
1633	GRID FM
1731	NO FORMAL NAME
1893	ROGALAND GP
1893	BALDER FM
1919	SELE FM
1931	LISTA FM
2035	SHETLAND GP
2035	TOR FM
2071	CROMER KNOLL GP

2071	ÅSGARD FM
2176	VIKING GP
2176	DRAUPNE FM
2357	HEATHER FM
2382	VESTLAND GP
2382	HUGIN FM
2429	HEGRE GP
2429	SKAGERRAK FM
2642	ZECHSTEIN GP
2671	ROTLIEGEND GP

Logs

Log type	Log top depth [m]	Log bottom depth [m]
BNS ILEF AH184 HRLT TLD HNGS EDT	2010	2604
FMI PPC MSIP PPC EDTC LEHQT	2010	2602
MSCT GR LEHQT	2085	2121
MWD - DI	138	592
MWD - GR RES DEN NEU SON DI	2610	2722
MWD - GR RES DI	592	1304
MWD - GR RES PWD DI	138	600
SC PO PQ HY PO IFA MS1-2-3 PC GR	2163	2385
VSI4 GR LEHQT	1219	2593
XPT CMR GR LEHQT	2081	2502

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	216.0	36	218.0	0.00	
SURF.COND.	20	586.0	26	592.0	0.00	
PILOT HOLE		586.0	9 7/8	586.0	0.00	
INTERM.	13 3/8	1296.0	17 1/2	1304.0	0.00	
INTERM.	9 5/8	2036.0	12 1/4	2043.0	0.00	
OPEN HOLE		2722.0	8 1/2	2722.0	0.00	

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
149	1.02			Spud Mud	
1247	1.19	16.0		KCL/Polymer/GEM	
1990	1.29	36.0		Performadrill	
2043	1.31	38.0		Performadrill	
2043	1.29	37.0		Performadrill	
2335	1.14	25.0		Performadrill	
2610	1.14	29.0		Performadrill	
2722	1.14	30.0		Performadrill	

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]
6823_Formation_pressure_(Formasjonstrykk)	pdf	0.23