

**General information**

Wellbore name	16/3-7
Type	EXPLORATION
Purpose	APPRAISAL
Status	P&A
Press release	link to press release
Factmaps in new window	link to map
Main area	NORTH SEA
Field	JOHAN SVERDRUP
Discovery	16/2-6 Johan Sverdrup
Well name	16/3-7
Seismic location	LN0902R12;inline 5238 & crossline 3686
Production licence	501
Drilling operator	Lundin Norway AS
Drill permit	1474-L
Drilling facility	BREDFORD DOLPHIN
Drilling days	40
Entered date	30.09.2013
Completed date	08.11.2013
Release date	08.11.2015
Publication date	08.11.2015
Purpose - planned	APPRAISAL
Reentry	NO
Content	OIL SHOWS
Discovery wellbore	NO
1st level with HC, age	LATE JURASSIC
1st level with HC, formation	INTRA DRAUPNE FM SS
Kelly bushing elevation [m]	25.0
Water depth [m]	116.5
Total depth (MD) [m RKB]	2100.0
Final vertical depth (TVD) [m RKB]	2100.0
Maximum inclination [°]	0.7
Bottom hole temperature [°C]	89
Oldest penetrated age	PERMIAN
Oldest penetrated formation	BASEMENT
Geodetic datum	ED50
NS degrees	58° 45' 39.65" N
EW degrees	2° 44' 42.53" E
NS UTM [m]	6513618.97



EW UTM [m]	485256.08
UTM zone	31
NPDID wellbore	7276

Wellbore history

General

Well 16/3-7 was drilled to appraise the southeast flank of the Joan Sverdrup Field on the Utsira High in the North Sea. It is located approximately 2.8 km southeast of the appraisal well 16/3-5 and approximately 4.2 km south-west of the exploration well 16/3-2. The objectives were to determine the presence and thickness of the Upper Jurassic Draupne shale and Draupne sandstone, to calibrate the seismic interpretation and depth conversion, and find the free-water level. The well should also investigate the reservoir properties in the Permian.

Operations and results

Appraisal well 16/3-7 was spudded with the semi-submersible installation Bredford Dolphin on 30 September 2013 and drilled to TD at 2100 m, 12 m into granitic basement rock. A 9 7/8" Pilot Hole section was drilled from Seabed to 711 m. No shallow gas was observed while drilling the pilot hole or while opening it up to 36". No significant problem was encountered in the operations. The well was drilled with seawater and hi-vis sweeps down to 711 m and with Aquadril glycol mud from 711 m to TD.

The Draupne Formation shale section was encountered at 1937 m and was 13 m thick. The Intra Draupne Formation Sandstone was encountered at 1949 m, which was 12 m deep to prognosis. It was 14 m thick and of excellent quality. Live oil was proved in the uppermost part, but the reservoir was encountered almost completely in the water zone. Sampling indicated that the oil-water contact is at or near 1950 m. Permian carbonates, belonging to the Zechstein Group, were encountered at 1963 m, directly under the Jurassic section. The 36 m thick dolomitic carbonate reservoir has moderate to good reservoir properties. The pressure measurements confirmed the reservoir to be in the same pressure regime as the Johan Sverdrup discovery and the well showed a common water gradient in both the sandstone and Permian carbonates, demonstrating good communication between the two reservoirs. The carbonate reservoir is resting on a two meter thick Kupferschiefer, which in turn rests on 89 m of sandstone and conglomerate belonging to the Rotliegendes Group. Oil shows continued below the thin live oil, throughout the Intra Draupne Formation sandstones, the Zechstein carbonates and a few meters into the Rotliegendes Group.

A total of 35.7 m core was recovered in two cores from the interval 1935.5 to 1977.5 m (85% overall recovery). The cores captured most of the Draupne Formation shale, parts of the Intra Draupne Formation sandstone reservoir, and 15 m of the Zechstein Group carbonate. The core to log depth shift was +0.3 m for core 1 and -0.32 m for core 2. RCX fluid samples were taken at 1949.9 m (water and oil), 1950 m (water and trace oil), 1952 m (water), 1952.1 m (water), and 1967 m (water).

The well was permanently abandoned on 8 November 2013 as an oil appraisal well.

Testing

No drill stem test was performed.

**Cuttings at the Norwegian Offshore Directorate**

Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
720.00	2099.00

Cuttings available for sampling?	YES
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Cores at the Norwegian Offshore Directorate

Core sample number	Core sample - top depth	Core sample - bottom depth	Core sample depth - uom
1	1935.5	1954.8	[m]
2	1961.0	1977.5	[m]

Total core sample length [m]	35.7
Cores available for sampling?	YES

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
142	NORDLAND GP
779	UTSIRA FM
861	UNDIFFERENTIATED
875	HORDALAND GP
875	SKADE FM
920	NO FORMAL NAME
1286	NO FORMAL NAME
1324	ROGALAND GP
1324	BALDER FM
1353	SELE FM
1358	LISTA FM
1434	VÅLE FM
1452	SHETLAND GP
1452	EKOFISK FM
1471	TOR FM
1538	HOD FM
1686	TRYGGVASON FM
1703	BLODØKS FM
1736	SVARTE FM
1776	CROMER KNOLL GP



1776	RØDBY FM
1867	SOLA FM
1890	ÅSGARD FM
1937	VIKING GP
1937	DRAUPNE FM
1950	INTRA DRAUPNE FM SS
1963	ZECHSTEIN GP
1963	UNDIFFERENTIATED
1998	KUPFERSCHIEFER FM
2000	ROTLIEGEND GP
2000	UNDIFFERENTIATED
2089	BASEMENT

Logs

Log type	Log top depth [m]	Log bottom depth [m]
MRCH JAR TTRM DSL CN ZDL MLL RTE	1821	2099
MRCH JAR TTRM DSL FLEX MREX	1821	2093
MRCH JAR TTRM DSL XMACF1 STAR OR	1821	2092
MRCH JAR TTRM GR COR PCOR	1934	2029
MRCH JAR TTRM R6TC IFX RLVP GR	1949	1996
MRCH JAR TTRM R6TC IFX VIT RCX R	1952	1952
MTCH GR GW	962	2068
MWD - GR ECD RES DIR SON	340	708
MWD - PWD GR RES DIR	1820	1932
MWD - RES GR PWD DIR CAL DEN NEU	708	1811
PWD GR RES DIR DEN CAL NEU SON	1820	2097

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	221.0	36	223.0	0.00	
SURF.COND.	20	704.0	26	711.0	1.75	FIT
PILOT HOLE		711.0	9 7/8	711.0	0.00	



OPEN HOLE		716.0	17 1/2	716.0	0.00	
INTERM.	9 5/8	1820.0	12 1/4	1828.0	1.73	LOT
OPEN HOLE		2100.0	8 1/2	2100.0	0.00	

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
158	1.03	100.0		Water Based	
224	1.04	100.0		Water Based	
704	1.13	21.0		Water Based	
1732	1.40	24.0		Water Based	
1832	1.40	16.0		Water Based	
2100	1.15	24.0		Water Based	
2100	1.15	25.0		Water Based	