

**General information**

Wellbore name	16/2-U-18
Type	OTHER
Purpose	APPRAISAL
Status	P&A
Multilateral	NO
Main area	NORTH SEA
Field	JOHAN SVERDRUP
Discovery	16/2-6 Johan Sverdrup
Well name	16/2-U-18
Production licence	501
Drilling operator	Statoil Petroleum AS
Drill permit	776-G
Drilling facility	DEEPSEA ATLANTIC
Drilling days	24
Entered date	05.11.2016
Completed date	28.11.2016
Release date	28.11.2018
Plugged and abandon date	28.11.2016
Publication date	28.11.2018
Purpose - planned	PILOT
Content	DRY
Discovery wellbore	NO
Kelly bushing elevation [m]	30.0
Water depth [m]	115.2
Total depth (MD) [m RKB]	2143.0
Final vertical depth (TVD) [m RKB]	2138.6
Maximum inclination [°]	6
Bottom hole temperature [°C]	89
Oldest penetrated age	TRIASSIC
Oldest penetrated formation	SKAGERRAK FM
Geodetic datum	ED50
NS degrees	58° 52' 4.3" N
EW degrees	2° 32' 43.9" E
NS UTM [m]	6525577.57
EW UTM [m]	473788.38
UTM zone	31
NPDID wellbore	8052



Wellbore history

General

Well 16/2-U-18 was drilled on the Johan Sverdrup Field on the Utsira High in the North Sea. The well objective was to reduce the geological uncertainty in the Espev er North structure in order to place the planned injectors from the E-template in a robust location with regards to sand thickness and FWL.

Operations and results

well 16/2-U-18 was spudded with the semi-submersible installation Deepsea Atlantic on 5 November 2016 and drilled to TD at 2143 m (2139 m TVD) m in the Triassic Skagerrak Formation. Operations proceeded without significant problems. The well was drilled with Seawater and hi-vis pills down to 951 m, with Aquadrill mud from 951 to 1748 m, and with Carbosea oil-based mud from 1748 m to TD.

The Draupne Formation was encountered at 1947 m (1943 m TVD) and constitutes of muddy spiculites. Intra-Draupne Formation sandstone was penetrated from 1954 m (1950 m TVD) to 1978 m (1974 m TVD). A thin Hugin Formation sandstone is between the Viking Group and the Statfjord Group and is in communication with the Viking Group. Shales in the top of the Eiriksson Formation constitutes a pressure barrier. Hence, the pressure gradient in the water in the Intra-Draupne and Hugin sandstones is 0.4 bar higher than in the homogeneous thick sand of the Eiriksson Formation below the shale. These sands have better reservoir properties than the Intra-Draupne Formation sandstone. The Eiriksson Formation sandstone is 1 bar depleted compared to well 16/2-10 reservoir sandstone. This is as expected based on the regional pressure depletion in the area.

Fluid contacts are not conclusive in the well. The deepest possible water up to depth is 1956.5 m where a clean formation water sample was taken. A free water level is weakly indicated by the logs in the homogeneous sand at 1954.6 m, but this cannot be confirmed by pressure data. A paleo-OWC can be interpreted down to 1967 m, but again this is uncertain due to partially missing core at this level.

Shows were present in sandstones in the interval 1988 to 2028 m in the Statfjord Group. They were typically described as poor to moderate to strong hydrocarbon odour, no to even stain, poor streaming cloudy cut fluorescence white stain, yellowish gold occasionally bluish gold even bright direct fluorescence, moderately streaming becoming strongly cloudy cut fluorescence, spotted residual fluorescent ring, brown patchy residual ring.

The interval from 1937 to 2077 m was cored in seven cores with variable recovery from 29.71% in core 3 to 100% in cores 5 and 7. Water samples were taken with the RCX tool at 1956.5 m, 2020.5 m and 2046.5 m.

The well was permanently abandoned on 28 November 2016.

Testing

No drill stem test was performed.

Cuttings at the Norwegian Offshore Directorate





Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
950.00	2143.00

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	1937.0	1937.5	[m]
2	1937.6	1963.6	[m]
3	1965.0	1967.1	[m]
4	1972.0	1994.3	[m]
5	1995.5	2023.1	[m]
6	2023.1	2050.9	[m]
7	2050.9	2078.8	[m]

Total core sample length [m]	134.2
Cores available for sampling?	YES

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	36	208.3	42	209.0	0.00	
		936.0		0.0	1.49	FIT
INTERM.	13 3/8	940.5	17 1/2	948.0	0.00	
LINER	9 5/8	1742.0	12 1/4	1748.0	1.51	FIT
OPEN HOLE		2143.0	8 1/2	2143.0	0.00	

Logs

Log type	Log top depth [m]	Log bottom depth [m]
DSL CN ZDL ORIT XMAC HDIL	950	2138
DSL FLEX MREX	1925	2138
GR GXPL ORIT UCPL	1742	2138
GR RTC IFX RLVP RCX SEN RLVP	1947	2118
MWD - GR RES	216	948
MWD - GR RES	1936	2143



MWD - GR RES AC	948	1745
MWD - NBGR GR RES	1745	1938
ZVSP	160	2138

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
154	NORDLAND GP
822	UTSIRA FM
999	HORDALAND GP
999	SKADE FM
1553	ROGALAND GP
1553	BALDER FM
1574	SELE FM
1591	LISTA FM
1663	VÅLE FM
1689	SHETLAND GP
1689	EKOFISK FM
1699	TOR FM
1744	HOD FM
1802	BLODØKS FM
1817	SVARTE FM
1852	CROMER KNOLL GP
1852	RØDBY FM
1909	SOLA FM
1935	ÅSGARD FM
1947	VIKING GP
1947	DRAUPNE FM
1954	INTRA DRAUPNE FM SS
1978	VESTLAND GP
1978	HUGIN FM
1981	STATFJORD GP
2057	HEGRE GP
2057	SKAGERRAK FM

Drilling mud



Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
948	1.25	12.0		Aquadrill	
1748	1.20	18.0		CARBOSEA	
1971	1.21	19.0		CARBOSEA	
1996	1.23	23.0		CARBOSEA	
2040	1.22	24.0		CARBOSEA	
2078	1.23	20.0		CARBOSEA	
2143	1.22	20.0		CARBOSEA	

Palynological slides at the Norwegian Offshore Directorate

Sample depth	Depth unit	Sample type	Laboratory
1950.6	[m]	C	CGG
1952.0	[m]	C	CGG
1953.0	[m]	C	CGG
1955.0	[m]	C	CGG
1978.4	[m]	C	CGG
1986.0	[m]	C	CGG
1987.1	[m]	C	CGG
1991.0	[m]	C	CGG
1993.3	[m]	C	CGG
2009.4	[m]	C	CGG
2014.0	[m]	C	CGG
2024.7	[m]	C	CGG
2050.1	[m]	C	CGG
2054.1	[m]	C	CGG