General information

Wellbore name	16/2-13 S
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	16/2-13
Seismic location	LN0902R10:inline4479 & crossline 3814
Production licence	501
Drilling operator	Lundin Norway AS
Drill permit	1404-L
Drilling facility	TRANSOCEAN ARCTIC
Drilling days	36
Entered date	24.07.2012
Completed date	30.08.2012
Release date	30.08.2014
Publication date	09.12.2014
Purpose - planned	APPRAISAL
Reentry	NO
Content	OIL
Discovery wellbore	NO
1st level with HC, age	LATE JURASSIC
1st level with HC, formation	INTRA DRAUPNE FM SS
2nd level with HC, age	MIDDLE JURASSIC
2nd level with HC, formation	HUGIN FM
Kelly bushing elevation [m]	24.0
Water depth [m]	116.0
Total depth (MD) [m RKB]	2090.0
Final vertical depth (TVD) [m RKB]	2086.0
Maximum inclination [°]	13.5
Oldest penetrated age	PRE-PERMIAN
Oldest penetrated formation	NO GROUP DEFINED
Geodetic datum	ED50
NS degrees	58° 49' 58.48'' N
EW degrees	2° 39' 10.34'' E

NS UTM [m]	6521648.76
EW UTM [m]	479959.23
UTM zone	31
NPDID wellbore	6888

Wellbore history

General

Well 16/2-13 S was drilled on the Johan Sverdrup discovery on the Utsira High in the North Sea, 6.7 km northeast of well 16/2-8 and 2.4 km north-east of well 16/2-6. The main objectives were to confirm an oil saturated Upper Jurassic Draupne sand thickness of approximately 30 meter in the northeastern part of Johan Sverdrup; to establish the Johan Sverdrup pressure system and oil-water-contact in this area; and to improve the understanding of Draupne sand facies changes and lateral Draupne shale thickness variations.

Operations and results

The 16/2‐13 (later renamed as 16/2‐U‐13) well was drilled according to the well design with the semi-submersible installation Transocean Arctic. A 9 7/8” pilot hole was drilled from the seabed and encountered shallow gas at 382 m. The hole was then plugged back with gas tight cement and the rig was moved 45 m SW. The appraisal well 16/2‐13 S was then re‐spudded on 24 July 2012 and a new 9 7/8” pilot hole was drilled to 725 m without seeing shallow gas. Drilling continued with 36”, 26”, 12 ¼” and 8 ½” hole sections and reached TD at 2090 m (2085.7 m TVD) in Pre-Permian fractured granite and quartzite rock. Seawater and high viscosity pill was used as drilling fluid on the riserless sections down to 725 m, while Performadril water based mud was used from 725 m To TD.

The Draupne Formation shale was encountered at 1914.5 m (1910.2 m TVD) and was 10 m thick. Intra Draupne Formation sandstone was drilled from 1924.4 m to 1939.9 m (1920.1 m to 1935.6 m TVD). A 25 m oil column was confirmed in these sandstones and down through sandstones in the underlying Heather Formation (1 m thick) and Hugin Formation (8 m thick) to top Skagerrak Formation at 1949.3 m (1945 m TVD). The reservoir was oil filled to the base with an oil-down-to contact at top Skagerrak Formation. The upper Intra Draupne Formation sandstone had very good reservoir properties. No shows were recorded above top Jurassic or below the oil-bearing reservoir.

Two cores were cut across the reservoir from 1918 m in Draupne Formation shale to 1971.8 m in the Rotliegend Group. The core to log depth shift is -1.6 m for both cores. The core recovery was 100%. RCX oil samples were collected at, 1925.0 m, 1940.7 m and 1948.7 m.

The well was permanently abandoned on 30 August 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]
730.00	2090.00

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	1918.0	1944.4	[m]
2	1944.4	1971.8	[m]

Total core sample length [m]	53.8
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
DST		1940.67	0.00	OIL	21.08.2012 - 00:00	NO
DST		1925.00	0.00	OIL	21.08.2012 - 00:00	NO
DST		0.00	1948.67	OIL	21.08.2012 - 00:00	YES

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
140	NORDLAND GP
838	UTSIRA FM
934	HORDALAND GP
934	SKADE FM
1082	NO FORMAL NAME
1383	NO FORMAL NAME
1418	ROGALAND GP
1418	BALDER FM
1443	SELE FM
1460	LISTA FM

1549	VÅLE FM
1570	SHETLAND GP
1570	EKOFISK FM
1584	TOR FM
1647	HOD FM
1730	BLODØKS FM
1761	SVARTE FM
1799	CROMER KNOLL GP
1799	RØDBY FM
1870	SOLA FM
1886	ÅSGARD FM
1915	VIKING GP
1915	DRAUPNE FM
1925	INTRA DRAUPNE FM SS
1940	HEATHER FM
1941	VESTLAND GP
1941	HUGIN FM
1949	HEGRE GP
1949	SKAGERRAK FM
1955	ROTLIEGEND GP
2035	UNDEFINED GP

Logs

Log type	Log top depth [m]	Log bottom depth [m]
GR GEOWAVES VSP	0	0
MRCH JAR GR MAXCOR	2065	2081
MRCH JAR GR PCOR	1868	2059
MRCH JAR TTRM DSL CN ZDL RTEX ML	1833	2084
MRCH JAR TTRM DSL FLEX MREX	1860	2085
MRCH JAR TTRM DSL XMAC ORIT STAR	1420	2084
MRCH JAR TTRM ROTC IFX RLVP RCX	1902	1946
MWD LWD - DIR PWD GR RES SON	140	723
MWD LWD - PWD GR RES DEN NEU SON	682	2086

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	218.0	36	220.0	0.00	
SURF.COND.	20	717.0	26	725.0	1.74	LOT
PILOT HOLE		725.0	9 7/8	725.0	0.00	
OPEN HOLE		730.0	17 1/2	730.0	0.00	
INTERM.	9 5/8	1854.0	12 1/2	1860.0	1.80	LOT
OPEN HOLE		2090.0	8 1/2	2090.0	0.00	

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
730	1.32	26.0		Water Base	
750	1.35	28.0		Water Base	
1010	1.40	31.0		Water Base	
1860	1.40	42.0		Water Base	
1918	1.40	30.0		Water Base	
2090	1.20	30.0		Water Base	

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.

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