

**General information**

Wellbore name	16/1-12
Type	EXPLORATION
Purpose	WILDCAT
Status	P&A
Press release	link to press release
Factmaps in new window	link to map
Main area	NORTH SEA
Discovery	16/1-12 Trolldhaugen
Well name	16/1-12
Seismic location	inline:LN09M2 36056 Crossline:LN09M2 127920
Production licence	338
Drilling operator	Lundin Norway AS
Drill permit	1262-L
Drilling facility	SONGA DEE
Drilling days	42
Entered date	29.07.2009
Completed date	08.09.2009
Release date	08.09.2011
Publication date	08.09.2011
Purpose - planned	WILDCAT
Reentry	NO
Content	OIL
Discovery wellbore	YES
1st level with HC, age	PRE-DEVONIAN
1st level with HC, formation	BASEMENT
Kelly bushing elevation [m]	25.0
Water depth [m]	107.0
Total depth (MD) [m RKB]	2055.0
Final vertical depth (TVD) [m RKB]	2055.0
Maximum inclination [°]	1.3
Bottom hole temperature [°C]	80
Oldest penetrated age	PRE-DEVONIAN
Oldest penetrated formation	BASEMENT
Geodetic datum	ED50
NS degrees	58° 48' 22.53" N
EW degrees	2° 15' 50.77" E
NS UTM [m]	6518862.54



EW UTM [m]	457482.17
UTM zone	31
NPDID wellbore	6166

Wellbore history

General

Well 16/1-12 was drilled south of the Luno Discovery on the south-western part of the Utsira High. The Luno Discovery sits in an inlier basin where well 16/1-8 Luno Discovery well proved a 275 m thick Late Triassic to Jurassic sequence, overlain by a 25 m thick Late Cretaceous chalk sequence. The purpose of the well is to prove oil-filled sediments of Late - Middle Jurassic fluvial/marine and pre-Jurassic sediments south of the established Luno sediment basin. The potential reservoir was expected from the top of the Jurassic conglomeratic sandstones to the base of the Triassic sandstones and conglomerates (TD).

Operations and results

Well was spudded with the semi-submersible installation Songa Dee on 29 July 2009 and drilled to TD at 2055 m in pre-Devonian Basement rock. The well was drilled with seawater and sweeps down to 603 m and with Glydril mud from 603 m to TD.

Well 16/1-12 proved oil in weathered and faulted/fractured granitic basement beneath a thin, 20 - 30 cm, Early Cretaceous conglomerate. An oil/water contact was established at approximately 1954 m. An extensive data acquisition program was undertaken and the oil column was confirmed by oil sampling, pressure measurements and observations in both cores and sidewall cores. The weathered and fractured basement showed moderate reservoir characteristics with an average porosity of 9% and an average permeability of 1 mD. As fractured basement plays are rare on the Norwegian continental shelf, a large uncertainty applied to both reservoir properties and the lateral outline of the discovery. The latter being due to seismic image quality and to difficulties mapping the fracture/fault density.

The first oil shows in well 16/1-12 were observed in Core 4 at 1912 m after penetrating the thin, Cretaceous age, conglomerate layer below the Cromer Knoll marls. Moderate oil shows continued throughout the remainder of the cored interval, which consisted of fractured basement rocks. In cuttings from the subsequent drilling below the cored interval oil shows were more difficult to detect, however, poor shows were reported down to 1956 m. Oil was present in both the fractures and in secondary pore spaces.

A total of 8 conventional cores were taken in well 16/1-12. As planned, coring operations commenced at 1864 m in the Shetland Group limestones in order to core the transition into the reservoir. Mini DSTs were performed at 1922.5 m, 1946.8 m, and 1956.6 m. Test interpretation indicated permeability ranges of 2-30 mD, 5-100 mD, and approximately 700 mD respectively, for the three tests. Oil samples were obtained from the first two DSTs and water from the last.

The well was permanently abandoned on 8 September 2009 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]
610.00	2055.00

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	1864.0	1877.9	[m]
2	1878.5	1904.7	[m]
3	1904.7	1912.0	[m]
4	1912.0	1919.4	[m]
5	1919.5	1922.8	[m]
6	1923.0	1925.8	[m]
7	1926.0	1931.1	[m]
8	1931.5	1937.5	[m]

Total core sample length [m]	71.8
Cores available for sampling?	YES

Palynological slides at the Norwegian Offshore Directorate

Sample depth	Depth unit	Sample type	Laboratory
1786.0	[m]	DC	LUNDIN
1795.0	[m]	DC	LUNDIN
1804.0	[m]	DC	LUNDIN
1813.0	[m]	DC	LUNDIN
1822.0	[m]	DC	LUNDIN
1831.0	[m]	DC	LUNDIN

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
132	NORDLAND GP
734	UTSIRA FM
930	HORDALAND GP
1003	SKADE FM



1179	NO FORMAL NAME
1633	GRID FM
1661	NO FORMAL NAME
1727	ROGALAND GP
1727	BALDER FM
1751	SELE FM
1777	LISTA FM
1837	VÅLE FM
1845	SHETLAND GP
1845	EKOFISK FM
1865	TOR FM
1888	HOD FM
1902	CROMER KNOLL GP
1902	SOLA FM
1909	ÅSGARD FM
1912	VIKING GP
1912	DRAUPNE FM
1913	BASEMENT

Composite logs

Document name	Document format	Document size [MB]
6166	pdf	0.41

Geochemical information

Document name	Document format	Document size [MB]
6166_01_16_1_12_gch_transfer_1	txt	0.00
6166_02_16_1_12_gch_results_1	txt	0.22
6166_03_16_1_12_gch_transfer_2	txt	0.00
6166_04_16_1_12_gch_results_2	txt	0.09

Logs

Log type	Log top depth [m]	Log bottom depth [m]
FMI PPC MSIP GR	1570	2039





MDT	1922	1956
MSCT GR	1941	1986
MSCT GR	2027	2042
MWD LWD - GR RES PWD	1835	1864
MWD LWD - GR RES PWD DIR	131	592
MWD LWD - GR RES PWD DIR SON DEN	606	1835
MWD LWD - GR RES PWD DIR SON NEU	1938	2055
VSI GR	84	1981
XPT HRLT PEX	1826	2042

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	212.0	36	216.0	0.00	LOT
SURF.COND.	20	597.0	26	606.0	1.88	LOT
INTERM.	9 5/8	1826.0	12 1/2	1835.0	1.76	LOT
OPEN HOLE		2055.0	8 1/2	2055.0	0.00	LOT

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
272	1.04			Water	
606	1.30			Water	
1835	1.35			Water	
1910	1.20			Water	
1933	1.21			Water	
2055	1.20			Water	
2055	1.21			Water	

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]
6166 Formation pressure (Formasjonstrykk)	PDF	0.22

