

**General information**

Wellbore name	16/2-5
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	16/2-5 (P-Graben)
Well name	16/2-5
Seismic location	3D survey SNST3D-inline 3589 & crossline 5365
Production licence	265
Drilling operator	StatoilHydro Petroleum AS
Drill permit	1227-L
Drilling facility	WEST EPSILON
Drilling days	81
Entered date	22.02.2009
Completed date	13.05.2009
Release date	13.05.2011
Publication date	13.05.2011
Purpose - planned	WILDCAT
Reentry	NO
Content	OIL/GAS
Discovery wellbore	YES
1st level with HC, age	JURASSIC
1st level with HC, formation	UNDEFINED GP
Kelly bushing elevation [m]	49.2
Water depth [m]	109.0
Total depth (MD) [m RKB]	2373.0
Final vertical depth (TVD) [m RKB]	2373.0
Maximum inclination [°]	2.8
Bottom hole temperature [°C]	90
Oldest penetrated age	PRE-DEVONIAN
Oldest penetrated formation	BASEMENT
Geodetic datum	ED50
NS degrees	58° 48' 50.74" N
EW degrees	2° 22' 11.05" E
NS UTM [m]	6519672.84



EW UTM [m]	463593.42
UTM zone	31
NPDID wellbore	6042

Wellbore history

General

Well 16/2-5 was drilled on the Ragnarock III prospect on the Utsira High in the North Sea. The primary objective of the well was to prove the presence of hydrocarbons in the pre-BCU interval and establish the composition and age of the sediments. The secondary target was the chalk in the Ekofisk and Tor Formations of Late Cretaceous age. The presence of hydrocarbons in these formations at the well location was possible, but not expected.

Operations and results

Wildcat well 16/2-5 was spudded with the jack-up installation West Epsilon on 22 February 2009 and drilled to TD at 2373 m in pre-Devonian Basement. After drilling the 36" hole to 288 m a 9 7/8" pilot hole was drilled to 513 m to check for shallow gas. No shallow gas or shallow water flow was observed. The well was drilled with spud mud down to 519 m, with KCl/polymer/glycol mud from 519 m to 1747 m, and with KCl/polymer/glycol low-sulphate mud from 1747 m to TD.

The well penetrated rocks of Quaternary, Tertiary and Cretaceous age, it then penetrated Graben Fill before TD in Basement. Base Cretaceous/top Graben Fill was encountered at 1884 m. A total thickness of 458 m of Graben Fill consisting of coarse, clastic sediments was penetrated and 3 cores were cut from 1894 to 1994 m. Due to lack of fossils no reliable dating was obtained for the Graben Fill. The Graben Fill was gas/condensate filled from top of the reservoir and down to 1902 m. High quality gas condensate samples were acquired by use of wire line sampling tools. A water sample was acquired at 1935 m and oil was scanned at 1916 m MD. An interval with oil was confirmed also by sampling at 1921.5 m, but due to poor pressure measurements in this interval the OWC was only tentatively set at 1917 m based on logs and geochemistry. No oil shows were observed above reservoir level. In the reservoir oil shows were seen down to 1981 m and no shows were seen below this level.

The well was permanently abandoned on 13 May 2009 as a gas discovery.

Testing

A full scale DST was performed in the interval 1885 - 1902 m. The perforated interval was placed in the gas zone with the lowermost interval close to the interpreted GOC. The gas rate for the main flow was 110 000 Sm³/d with a 40/64" choke size. A maximum gas rate of 120 000 Sm³/day was achieved on a 60/64" choke size. The total test production of associated condensate with the gas was about 6 Sm³ mixed with some oil, no water was produced during testing. At top reservoir the formation pressure was 191.8 bar at 1885 m. The bottom hole temperature recorded in the test was 71 deg C.

Cuttings at the Norwegian Offshore Directorate

Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
300.00	2373.00



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	1894.0	1947.3	[m]
2	1948.0	1966.9	[m]
3	1967.0	1992.0	[m]

Total core sample length [m]	97.2
Cores available for sampling?	YES

Palynological slides at the Norwegian Offshore Directorate

Sample depth	Depth unit	Sample type	Laboratory
600.0	[m]	DC	NETWORK
620.0	[m]	DC	NETWOR
645.0	[m]	DC	NETWOR
660.0	[m]	DC	NETWOR
680.0	[m]	DC	NETWOR
700.0	[m]	DC	NETWOR
720.0	[m]	DC	NETWOR
740.0	[m]	DC	NETWOR
760.0	[m]	DC	NETWOR
780.0	[m]	DC	NETWOR
800.0	[m]	DC	NETWOR
810.0	[m]	DC	NETWOR
820.0	[m]	DC	NETWOR
830.0	[m]	DC	NETWOR
840.0	[m]	DC	NETWOR
850.0	[m]	DC	NETWOR
860.0	[m]	DC	NETWOR
870.0	[m]	DC	NETWOR
880.0	[m]	DC	NETWOR
890.0	[m]	DC	NETWOR
900.0	[m]	DC	NETWOR
910.0	[m]	DC	NETWOR
920.0	[m]	DC	NETWOR



930.0	[m]	DC	NETWOR
940.0	[m]	DC	NETWOR
950.0	[m]	DC	NETWOR
960.0	[m]	DC	NETWOR
970.0	[m]	DC	NETWOR
980.0	[m]	DC	NETWOR
990.0	[m]	DC	NETWOR
1000.0	[m]	DC	NETWOR
1010.0	[m]	DC	NETWOR
1020.0	[m]	DC	NETWOR
1030.0	[m]	DC	NETWOR
1050.0	[m]	DC	NETWOR
1070.0	[m]	DC	NETWOR
1090.0	[m]	DC	NETWOR
1110.0	[m]	DC	NETWOR
1130.0	[m]	DC	NETWOR
1150.0	[m]	DC	NETWOR
1170.0	[m]	DC	NETWOR
1190.0	[m]	DC	NETWOR
1210.0	[m]	DC	NETWOR
1230.0	[m]	DC	NETWOR
1250.0	[m]	DC	NETWOR
1270.0	[m]	DC	NETWOR
1290.0	[m]	DC	NETWOR
1310.0	[m]	DC	NETWOR
1330.0	[m]	DC	NETWOR
1350.0	[m]	DC	NETWOR
1370.0	[m]	DC	NETWOR
1390.0	[m]	DC	NETWOR
1410.0	[m]	DC	NETWOR
1430.0	[m]	DC	NETWOR
1450.0	[m]	DC	NETWOR
1470.0	[m]	DC	NETWOR
1490.0	[m]	DC	NETWOR
1510.0	[m]	DC	NETWOR
1530.0	[m]	DC	NETWOR
1550.0	[m]	DC	NETWOR
1570.0	[m]	DC	NETWOR
1590.0	[m]	DC	NETWOR
1610.0	[m]	DC	NETWOR



1630.0	[m]	DC	NETWOR
1640.0	[m]	DC	NETWOR
1650.0	[m]	DC	NETWOR
1660.0	[m]	DC	NETWOR
1670.0	[m]	DC	NETWOR
1680.0	[m]	DC	NETWOR
1690.0	[m]	DC	NETWOR
1700.0	[m]	DC	NETWOR
1710.0	[m]	DC	NETWOR
1720.0	[m]	DC	NETWOR
1730.0	[m]	DC	NETWOR
1740.0	[m]	DC	NETWOR
1746.0	[m]	DC	NETWOR
1752.0	[m]	DC	NETWOR
1761.0	[m]	DC	NETWOR
1767.0	[m]	DC	NETWOR
1773.0	[m]	DC	NETWOR
1779.0	[m]	DC	NETWOR
1785.0	[m]	DC	NETWOR
1791.0	[m]	DC	NETWOR
1800.0	[m]	DC	NETWOR
1806.0	[m]	DC	NETWOR
1812.0	[m]	DC	NETWOR
1818.0	[m]	DC	NETWOR
1827.0	[m]	DC	NETWOR
1836.0	[m]	DC	NETWOR
1842.0	[m]	DC	NETWOR
1848.0	[m]	DC	NETWOR
1854.0	[m]	DC	NETWOR
1860.0	[m]	DC	NETWOR
1866.0	[m]	DC	NETWOR
1872.0	[m]	DC	NETWOR
1878.0	[m]	DC	NETWOR
1884.0	[m]	DC	NETWOR
1890.0	[m]	DC	NETWOR
1895.9	[m]	C	NETWOR
1899.6	[m]	C	NETWOR
1901.8	[m]	C	NETWOR
1907.8	[m]	C	NETWOR
1915.6	[m]	C	NETWOR



1916.0	[m]	C	NETWOR
1919.9	[m]	C	NETWOR
1922.8	[m]	C	NETWOR
1930.7	[m]	C	NETWOR
1941.2	[m]	C	NETWOR
1948.0	[m]	C	NETWOR
1953.5	[m]	C	NETWOR
1962.4	[m]	C	NETWOR
1965.4	[m]	C	NETWOR
1965.8	[m]	C	NETWOR
1966.5	[m]	C	NETWOR
1967.0	[m]	C	NETWOR
1971.3	[m]	C	NETWOR
1973.7	[m]	C	NETWOR
1979.1	[m]	C	NETWOR
1983.6	[m]	C	NETWOR
1987.6	[m]	C	NETWOR
1989.7	[m]	C	NETWOR
1995.0	[m]	DC	NETWOR
2001.0	[m]	DC	NETWOR
2007.0	[m]	DC	NETWOR
2013.0	[m]	DC	NETWOR
2019.0	[m]	DC	NETWOR
2025.0	[m]	DC	NETWOR
2031.0	[m]	DC	NETWOR
2037.0	[m]	DC	NETWOR
2043.0	[m]	DC	NETWOR
2049.0	[m]	DC	NETWOR
2055.0	[m]	DC	NETWOR
2061.0	[m]	DC	NETWOR
2067.0	[m]	DC	NETWOR
2076.0	[m]	DC	NETWOR
2082.0	[m]	DC	NETWOR
2088.0	[m]	DC	NETWOR
2094.0	[m]	DC	NETWOR
2100.0	[m]	DC	NETWOR
2106.0	[m]	DC	NETWOR
2112.0	[m]	DC	NETWOR
2118.0	[m]	DC	NETWOR
2124.0	[m]	DC	NETWOR



2130.0	[m]	DC	NETWOR
2136.0	[m]	DC	NETWOR
2142.0	[m]	DC	NETWOR
2148.0	[m]	DC	NETWOR
2154.0	[m]	DC	NETWOR
2160.0	[m]	DC	NETWOR
2163.0	[m]	DC	NETWOR
2166.0	[m]	DC	NETWOR
2169.0	[m]	DC	NETWOR
2172.0	[m]	DC	NETWOR
2175.0	[m]	DC	NETWOR
2178.0	[m]	DC	NETWOR
2181.0	[m]	DC	NETWOR
2184.0	[m]	DC	NETWOR
2187.0	[m]	DC	NETWOR
2190.0	[m]	DC	NETWOR
2193.0	[m]	DC	NETWOR
2196.0	[m]	DC	NETWOR
2202.0	[m]	DC	NETWOR
2205.0	[m]	DC	NETWOR
2208.0	[m]	DC	NETWOR
2214.0	[m]	DC	NETWOR
2220.0	[m]	DC	NETWOR
2226.0	[m]	DC	NETWOR
2232.0	[m]	DC	NETWOR
2238.0	[m]	DC	NETWOR
2244.0	[m]	DC	NETWOR
2250.0	[m]	DC	NETWOR
2256.0	[m]	DC	NETWOR
2262.0	[m]	DC	NETWOR
2268.0	[m]	DC	NETWOR
2277.0	[m]	DC	NETWOR
2283.0	[m]	DC	NETWOR
2289.0	[m]	DC	NETWOR
2295.0	[m]	DC	NETWOR
2301.0	[m]	DC	NETWOR
2307.0	[m]	DC	NETWOR
2316.0	[m]	DC	NETWOR
2328.0	[m]	DC	NETWOR
2334.0	[m]	DC	NETWOR



2340.0 [m]	DC	NETWOR
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Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
158	NORDLAND GP
798	UTSIRA FM
971	NO FORMAL NAME
998	HORDALAND GP
998	SKADE FM
1048	NO FORMAL NAME
1077	SKADE FM
1102	NO FORMAL NAME
1192	GRID FM
1242	NO FORMAL NAME
1287	GRID FM
1305	NO FORMAL NAME
1631	ROGALAND GP
1631	BALDER FM
1652	SELE FM
1672	LISTA FM
1748	VÅLE FM
1757	SHETLAND GP
1757	EKOFISK FM
1762	TOR FM
1803	HOD FM
1855	CROMER KNOLL GP
1855	RØDBY FM
1875	ÅSGARD FM
1880	MIME FM
1884	NO GROUP DEFINED
1884	NO FORMAL NAME
2342	BASEMENT

Composite logs

Document name	Document format	Document size [MB]
6042	pdf	0.48



**Drill stem tests (DST)**

Test number	From depth MD [m]	To depth MD [m]	Choke size [mm]
1.0	1885	1902	23.8

Test number	Final shut-in pressure [MPa]	Final flow pressure [MPa]	Bottom hole pressure [MPa]	Downhole temperature [°C]
1.0		19.000		71

Test number	Oil [Sm3/day]	Gas [Sm3/day]	Oil density [g/cm3]	Gas grav. rel.air	GOR [m3/m3]
1.0		120000			

Logs

Log type	Log top depth [m]	Log bottom depth [m]
CMR HRLA PEX ECS	1722	2363
FMI SONIC SCANNER	1722	2363
MDT PRETEST	1722	2340
MDT-DP VIT-PB MINI DST	1722	2030
MDT-DP VIT-PB MINI DST	1722	1899
MDT-DP VIT-PB SPACING	1722	1916
MSCT	1722	2348
MWD LWD - ARCVRES8 PP	289	513
MWD LWD - ARCVRES9 PP	289	1744
MWD LWD - ARCVRS6 PP	1880	2373
MWD LWD - GVR6 ARCVRES6 PP	1744	1894
PEX HRLT SONIC SCANNER	157	1747
UBI HNGS	1722	2350
ZOVSP	303	1717
ZOVSP	1399	2352

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	281.0	36	288.0	1.10	LOT
SURF.COND.	20	500.0	26	519.0	1.51	LOT
INTERM.	13 3/8	1734.0	17 1/2	1747.0	1.60	LOT
LINER	7	2341.0	8 1/2	2373.0	1.49	LOT

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
298	1.05	13.0		Spud Mud	
355	1.05	15.0		Spud Mud	
513	1.10	13.0		Spud Mud	
513	1.05	16.0		Spud Mud	
627	1.25	15.0		KCl/Polymer/GEM	
1695	1.35	24.0		KCl/Polymer/GEM	
1744	1.37	22.0		KCl/Polymer/GEM	
1948	1.20	20.0		KCl/Polymer/Glycol	
2370	1.20	22.0		KCl/Polymer/Glycol	
2373	1.20	28.0		KCl/Polymer/Glycol	
2373	1.20	22.0		KCl/Polymer/Glycol	

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]
6042 Formation pressure (Formasjonstrykk)	pdf	0.22

