General information

Wellbore name	16/2-3
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	16/2-3 (Ragnarock)
Well name	16/2-3
Seismic location	ST06M02-inline 1728 & crossline 752
Production licence	265
Drilling operator	Statoil ASA (old)
Drill permit	1139-L
Drilling facility	WEST EPSILON
Drilling days	59
Entered date	01.08.2007
Completed date	28.09.2007
Release date	28.09.2009
Publication date	28.09.2009
Purpose - planned	WILDCAT
Reentry	NO
Content	OIL/GAS
Discovery wellbore	YES
1st level with HC, age	PALEOCENE
1st level with HC, formation	EKOFISK FM
2nd level with HC, age	LATE CRETACEOUS
2nd level with HC, formation	TOR FM
Kelly bushing elevation [m]	49.0
Water depth [m]	113.0
Total depth (MD) [m RKB]	1905.0
Final vertical depth (TVD) [m RKB]	1905.0
Maximum inclination [°]	0.6
Bottom hole temperature [°C]	89
Oldest penetrated age	PRE-DEVONIAN
Oldest penetrated formation	BASEMENT
Geodetic datum	ED50
NS degrees	58° 53' 0.3'' N
EW degrees	2° 22' 24.3'' E

NS UTM [m]	6527389.84
EW UTM [m]	463878.26
UTM zone	31
NPDID wellbore	5551

Wellbore history

General

Well 16/2-3 was drilled on the Ragnarrock prospect in the North Sea.The Ragnarrock prospect is situated on the top of the Utsira High, southeast of the Verdandi discovery in PL 167 and east of the Gudrun field in PL 025. The main objective was to prove presence of hydrocarbons in the Tor Formation of Maastrichtian age and to test its permeability and its productivity. The secondary target was to check the presence of hydrocarbon in the Basement and to test its permeability and its productivity.

Operations and results

Well 16/2-3 was spudded with the jack-up installation West Epsilon on 1 August 2007 and drilled to TD at 1905 m, 9 m into basement rock. No significant problem was encountered during drilling, but an incident with a falling object during P&A caused several days stand still for investigation before the well could be abandoned. No shallow gas was observed by the ROV at the well head or by the MWD while drilling the 36" hole and the 12 1/4" pilot hole. The well was drilled with spud mud down to 640 m and with KCl/polymer/glycol mud from 640 m to TD.

The well encountered the Tor reservoir section at 1716 m, 6 m shallower than prognosed. A HC discovery was proven in the Tor Formation but the results from the MDT suggested the formation to be tight and tightening with depth. The basement was penetrated at 1894 m, 22 m deeper than prognosed. Only occasional dead oil stain was found in the upper 7 m of the basement so no further formation evaluation was performed here. No oil shows were recorded above top Tor Formation.

Three cores were cut from 1715.7 to 1852.5 m. The first core covered the transition zone between the Lista and Tor Formations. Cores 2 and 3 were cut in the Tor and Hod Formations. Two mini-DST runs were performed for pressure points and fluid sampling in the Tor Formation.Sampling was performed at depths 1716.8 m (gas), 1720.5 m (oil) and 1742.6 m (oil), 1769.9 m, and 1781.1. Only the samples at 1720.5 m were found to be representative of reservoir fluid.PVT analyses of these samples gave a single stage GOR around 140 Sm3/Sm3 and an oil density of 0.861 /cm3. Sample bottles from depth 1716.8 m, 1742.6 m, 1769.9 m and 1781.1 contained mainly water

The well was permanently abandoned on 28 September 2007 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]
290.00	1905.00

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	1715.7	1749.9	[m]
2	1743.0	1798.6	[m]
3	1798.0	1852.9	[m]

Total core sample length [m]	144.6
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		1720.50	0.00	OIL		YES

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
162	NORDLAND GP
817	UTSIRA FM
1051	HORDALAND GP
1079	SKADE FM
1150	NO FORMAL NAME
1251	GRID FM
1267	NO FORMAL NAME
1617	ROGALAND GP
1617	BALDER FM
1636	SELE FM
1651	LISTA FM
1716	SHETLAND GP
1716	EKOFISK FM
1717	TOR FM
1814	HOD FM

1875	CROMER KNOLL GP
1875	RØDBY FM
1889	SOLA FM
1894	BASEMENT

Composite logs

Document name	Document format	Document size [MB]
5551	pdf	0.24

Geochemical information

Document name	Document format	Document size [MB]
5551_1	pdf	0.20

Logs

Log type	Log top depth [m]	Log bottom depth [m]
CMR PEX HRLA	1693	1905
FMI DSI	1274	1900
MDT PP SAMPLE	1716	1864
MDT PP SAMPLE	1716	1864
MWD - PP	162	280
MWD - PP ARC VISION	271	640
MWD - PP ARC VISION	631	1695
MWD - PP ARC VISION	1852	1905
MWD - PP GEO VISION	1667	1715
ZO VSP	1467	1905

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	267.0	36	280.0	1.15	LOT
SURF.COND.	13 3/8	631.0	17 1/2	640.0	1.45	LOT

INTERM.	9 5/8	1693.0	12 1/4	1695.0	1.45	LOT
OPEN HOLE		1905.0	8 1/2	1905.0	0.00	LOT

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
271	1.05			SPUD MUD	
274	1.05			SPUD MUD	
280	1.05			SPUD MUD	
392	1.09	10.0		SPUD MUD	
640	1.08	20.0		SPUD MUD	
1200	1.35	52.0		SPUD MUD	
1695	1.20	28.0		KCL/POLYMER/GLYCOL	
1720	1.20	25.0		KCL/POLYMER/GLYCOL	
1721	1.20	26.0		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]
5551_Formation_pressure_(Formasjonstrykk)	pdf	0.18