General information

Wellbore name	6603/12-1
Type	EXPLORATION
Purpose	WILDCAT
Status	P&A
Press release	link to press release
Factmaps in new window	link to map
Main area	NORWEGIAN SEA
Discovery	6603/12-1 (Gro)
Well name	6603/12-1
Seismic location	sh0402-line 1851 & trace 2992
Production licence	326
Drilling operator	A/S Norske Shell
Drill permit	1215-L
Drilling facility	LEIV EIRIKSSON
Drilling days	87
Entered date	26.03.2009
Completed date	20.06.2009
Plugged and abondon date	20.06.2009
Release date	20.06.2011
Publication date	20.06.2011
Purpose - planned	WILDCAT
Reentry	NO
Content	GAS
Discovery wellbore	YES
1st level with HC, age	LATE CRETACEOUS
1st level with HC, formation	SPRINGAR FM
Kelly bushing elevation [m]	25.0
Water depth [m]	1376.0
Total depth (MD) [m RKB]	3830.0
Final vertical depth (TVD) [m RKB]	3830.0
Maximum inclination [°]	0.8
Bottom hole temperature [°C]	143
Oldest penetrated age	LATE CRETACEOUS
Oldest penetrated formation	SPRINGAR FM
Geodetic datum	ED50
NS degrees	66° 8' 52.35'' N
EW degrees	3° 56' 29.67'' E
NS UTM [m]	7336898.26

EW UTM [m]	542488.15
UTM zone	31
NPDID wellbore	5985

Wellbore history

General

Well 6603/12-1 was drilled as an exploration wildcat well in the Norwegian Atlantic Margin (Vøring Basin). The main objectives of the well were to prove the presence and quality of reservoir and hydrocarbons in the Late Cretaceous (K98 - Maastrichtian) Springar Formation Sandstone.

Operations and results

A 12 1/4" pilot hole (6603/12-U-1) was spudded 63 m to the southwest of the main hole in order to evaluate pore pressures, assess the risk of shallow water flow and to gain insight into the wellbore stability in the interval down to the 20" casing depth in the main hole. The pilot was drilled to 2195 m into the Brygge Formation and below the Opal A to CT transition, without encountering shallow geohazards. The water temperature at seafloor, measured by means of a ROV, was -1 deg C.

Wildcat well 6603/12-1 was spudded with the semi-submersible installation Leiv Eriksson on 26 March 2009 and drilled to TD at 3830 m in the Late Cretaceous Springar Formation. No shallow gas was encountered. The well was drilled with Seawater and hi-vis sweeps down to 2359 m, with Glydril mud from 2359 m to 3509 m, and with Paratherm oil based mud from 3509 m to TD.

The well penetrated rocks of Quaternary, Tertiary and Cretaceous age. Top Maastrichtian Springar Formation came in at 3505 m with the target Springar Formation sandstone member at 3704 m, 40 m shallower than prognosed. The Springar Formation sandstone member was gas-bearing with a 15 m gas column from the top down to 3720 m. Poor pressure data did not allow estimation of the true OWC.

One 18m core was taken from the reservoir interval (3712.7 - 3730.7 m) with 100% recovery. An extensive wire line program was carried out successfully after reaching TD. Due to concerns about stability of the planned water based mud a thorough temperature logging was conducted, using the Schlumberger Environmental Measurement Sonde (EMS) tool. Repeated measurements near TD with up to 128 hrs waiting time after last circulation gave a Horner corrected temperature of 139 deg C at 3736.5 m (2335.5 m TVD below sea floor). This gives a linear temperature gradient from sea bed of 60 deg C/km, a record in Norwegian Exploration wells. MDT fluid samples were successfully taken in the Springar Formation sandstone member at 3705.7 m (gas), at 3720.0 m (gas), and at 3730.24 m (water).

The well was permanently abandoned on 20 June 2009 as a gas discovery.

Testing

No drill stem test was performed.

Cuttings at the Norwegian Offshore Directorate

Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
2360.00	3830.00

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	3714.0	3732.5	[m]

Total core sample length [m]	18.5
Cores available for sampling?	YES

Palynological slides at the Norwegian Offshore Directorate

Sample depth	Depth unit	Sample type	Laboratory
2770.0	[m]	DC	PETROSTA
2800.0	[m]	DC	PETROS
2830.0	[m]	DC	PETROS
2860.0	[m]	DC	PETROS
3100.0	[m]	DC	PETROS
3510.0	[m]	SWC	PETROS
3513.5	[m]	SWC	PETROS
3531.0	[m]	SWC	PETROS
3533.5	[m]	SWC	PETROS
3563.5	[m]	SWC	PETROS
3671.2	[m]	SWC	PETROS
3687.5	[m]	SWC	PETROS
3691.0	[m]	SWC	PETROS
3696.5	[m]	SWC	PETROS
3697.5	[m]	SWC	PETROS
3700.5	[m]	SWC	PETROS
3703.5	[m]	SWC	PETROS
3704.2	[m]	SWC	PETROS
3707.0	[m]	SWC	PETROS
3714.7	[m]	C	PETROS
3716.6	[m]	C	PETROS
3718.1	[m]	C	PETROS

3718.5	[m]	C	PETROS
3718.9	[m]	C	PETROS
3719.2	[m]	C	PETROS
3719.6	[m]	C	PETROS
3720.5	[m]	C	PETROS
3722.0	[m]	C	PETROS
3722.3	[m]	C	PETROS
3723.9	[m]	C	PETROS
3724.3	[m]	C	PETROS
3725.9	[m]	C	PETROS
3726.9	[m]	C	PETROS
3727.6	[m]	C	PETROS
3727.8	[m]	C	PETROS
3728.5	[m]	C	PETROS
3730.1	[m]	C	PETROS
3732.5	[m]	C	PETROS
3736.5	[m]	SWC	PETROS
3738.0	[m]	SWC	PETROS
3744.0	[m]	SWC	PETROS
3747.5	[m]	SWC	PETROS
3758.5	[m]	SWC	PETROS
3810.0	[m]	SWC	PETROS

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
1400	NORDLAND GP
1400	NAUST FM
1673	KAI FM
2100	HORDALAND GP
2100	BRYGGE FM
2842	ROGALAND GP
2842	TARE FM
3070	TANG FM
3505	SHETLAND GP
3505	SPRINGAR FM
3704	NO FORMAL NAME
3740	SPRINGAR FM

Composite logs

Document name	Document format	Document size [MB]
5985	pdf	0.40

Logs

Log type	Log top depth [m]	Log bottom depth [m]
EMS PPC1 PPC2	2602	3467
MDT	3705	3720
MDT MINI-DST	3705	3730
MDT MINI-DST	3705	3730
MSCT	3510	3745
MWD - DI GR RES APWD DEN NEU	2608	3830
MWD LWD - DI GR RES APWD	1517	2608
OBMI MSIP PPC	3393	3825
PEX MSIP EMS	1400	3474
RT SCAN PEX HNGS CMR+	3287	3828
VSP	1376	3790

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	1512.0	36	1517.0	0.00	LOT
SURF.COND.	20	2347.0	26	2359.0	1.25	LOT
INTERM.	13 5/8	2602.0	17 1/2	2608.0	1.36	LOT
INTERM.	9 5/8	3497.0	12 1/4	3500.0	1.46	LOT
OPEN HOLE		3820.0	8 1/2	3820.0	0.00	LOT

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
1398	1.02			Seawater	
2332	1.18			Seawater	
2364	1.03			Glydril	

2608	1.18			KPM KCl Polymer	
2616	1.25			Glydril DW	
3420	1.28			Glydril DWHT	
3466	1.18			Glydril DW	
3466	1.31			Paratherm	
3497	1.26			Glydril DWHT	
3500	1.27			Glydril DWHT	
3714	1.30			Paratherm	
3723	1.30			Paratherm	
3830	1.30			Paratherm	

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]
5985_Formation_pressure_(Formasjonstrykk)	pdf	0.23