

**General information**

Wellbore name	6604/10-1
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	6604/10-1
Well name	6604/10-1
Seismic location	inline 2462 & xline 3306 on sh0903 3D Volume
Production licence	326
Drilling operator	A/S Norske Shell
Drill permit	1307-L
Drilling facility	AKER BARENTS
Drilling days	101
Entered date	26.05.2010
Completed date	03.09.2010
Release date	01.01.2012
Publication date	01.01.2012
Purpose - planned	APPRAISAL
Reentry	NO
Content	GAS
Discovery wellbore	YES
1st level with HC, age	LATE CRETACEOUS
1st level with HC, formation	SHETLAND GP
Kelly bushing elevation [m]	40.0
Water depth [m]	1354.0
Total depth (MD) [m RKB]	3715.0
Final vertical depth (TVD) [m RKB]	3715.0
Maximum inclination [°]	2
Bottom hole temperature [°C]	129
Oldest penetrated age	LATE CRETACEOUS
Oldest penetrated formation	SPRINGAR FM
Geodetic datum	ED50
NS degrees	66° 11' 0.1" N
EW degrees	4° 11' 42.79" E
NS UTM [m]	7341048.53



EW UTM [m]	553857.27
UTM zone	31
NPDID wellbore	6356

Wellbore history

General

Well 6604/10-1 was drilled to appraise the 6603/12-1 Gro gas discovery in the Vigrid Syncline in the Vøring Basin of the Norwegian Sea. Before 6604/10-1 was drilled, resource estimates for the discovery were between 10 and 100 billion standard cubic metres (Sm³) of recoverable gas.

Operations and results

Appraisal well 6604/10-1 was spudded with the semi-submersible installation Aker Barents on 26 May 2010 and drilled to TD at 3715 m in the Late Cretaceous Springar Formation. No pilot hole was drilled and no shallow gas or shallow water flow was encountered in this well, as predicted. When running the BOP a leak in the mini connector on choke line was discovered. The well was suspended for seven days while this was repaired. The well was drilled with seawater and hi-vis pills down to 2320 m, with Glydril mud from 2320 m to 2848 m, and with Paratherm oil based mud from 2848 m to TD.

The well penetrated rocks of Quaternary, Tertiary and Cretaceous age. Top Maastrichtian Springar reservoir came in at 3597.2 m, 36.8 m shallower than the pre-drill prediction. Based on poor MDT pressure data it appears that the upper reservoir unit (3597 - 3616 m) and the middle reservoir unit (3616 - 3626 m) are different pressure regimes. No valid pressures were obtained in the lower unit (3626 - 3648 m). After analysing the acquired data it was concluded that the upper interval of the Springar reservoir was gas bearing. The reservoir quality was in general very poor, apart from a short section near the very top. No staining or fluorescence on cuttings was detected throughout the 6604/10-1 well. The hydrocarbon core scanner detected "heavy oil" between 3601 and 3621, but this is not confirmed by other data. The well was re-classified as a wildcat well, as it proved two minor deposits which are not in communication with 6603/12-1 Gro gas discovery.

One 54 m core was taken from the reservoir interval 3601.4 to 3655.4 m (3598.8 to 3652.8 m wire line depth) with 100% recovery. An extensive wire line program was successfully carried out after reaching TD. Two MDT runs were made and only two valid and three slightly supercharged pressure points out of 35 tests were obtained. MDT fluid samples were taken at 3601.8 m (gas), 3613.0 m (gas/water), and at 3617 m (gas/water/filtrate). PVT analyses of the gas samples show a higher liquid content than in the 6603/12-1 gas, but it is not possible to exclude OBM contamination as the cause of this difference.

The well was permanently abandoned on 3 September 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]
2335.00	3715.00

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	3601.4	3655.3	[m]

Total core sample length [m]	53.9
Cores available for sampling?	YES

Palynological slides at the Norwegian Offshore Directorate

Sample depth	Depth unit	Sample type	Laboratory
2695.0	[m]	DC	PETROSTA
2715.0	[m]	DC	PETROS
2745.0	[m]	DC	PETROS
2805.0	[m]	DC	PETROS
2825.0	[m]	DC	PETROS
2845.0	[m]	DC	PETROS
2875.0	[m]	DC	PETROS
2945.0	[m]	DC	PETROS
2965.0	[m]	DC	PETROS
2985.0	[m]	DC	PETROS
3005.0	[m]	DC	PETROS
3025.0	[m]	DC	PETROS
3045.0	[m]	DC	PETROS
3065.0	[m]	DC	PETROS
3075.0	[m]	DC	PETROS
3095.0	[m]	DC	PETROS
3115.0	[m]	DC	PETROS
3135.0	[m]	DC	PETROS
3155.0	[m]	DC	PETROS



3175.0 [m]	DC	PETROS
3195.0 [m]	DC	PETROS
3215.0 [m]	DC	PETROS
3235.0 [m]	DC	PETROS
3265.0 [m]	DC	PETROS
3285.0 [m]	DC	PETROS
3305.0 [m]	DC	PETROS
3325.0 [m]	DC	PETROS
3345.0 [m]	DC	PETROS
3470.0 [m]	DC	PETROS
3480.0 [m]	DC	PETROS
3490.0 [m]	DC	PETROS
3495.0 [m]	DC	PETROS
3505.0 [m]	DC	PETROS
3510.0 [m]	DC	PETROS
3515.0 [m]	DC	PETROS
3525.0 [m]	DC	PETROS
3530.0 [m]	DC	PETROS
3540.0 [m]	DC	PETROS
3545.0 [m]	DC	PETROS
3550.0 [m]	DC	PETROS
3555.0 [m]	DC	PETROS
3575.0 [m]	DC	PETROS
3603.0 [m]	C	PETROS
3605.0 [m]	C	PETROS
3605.4 [m]	C	PETROS
3607.8 [m]	C	PETROS
3608.6 [m]	C	PETROS
3611.8 [m]	C	PETROS
3614.9 [m]	C	PETROS
3616.6 [m]	C	PETROS
3618.2 [m]	C	PETROS
3618.5 [m]	C	PETROS
3618.7 [m]	C	PETROS
3618.9 [m]	C	PETROS
3621.5 [m]	C	PETROS
3624.9 [m]	C	PETROS
3625.1 [m]	C	PETROS
3628.7 [m]	C	PETROS
3628.8 [m]	C	PETROS



3630.3 [m]	C	PETROS
3633.3 [m]	C	PETROS
3637.8 [m]	C	PETROS
3639.5 [m]	C	PETROS
3640.8 [m]	C	PETROS
3642.8 [m]	C	PETROS
3643.5 [m]	C	PETROS
3644.8 [m]	C	PETROS
3648.2 [m]	C	PETROS
3648.9 [m]	C	PETROS
3649.4 [m]	C	PETROS
3650.6 [m]	C	PETROS
3651.5 [m]	C	PETROS
3652.5 [m]	C	PETROS
3653.5 [m]	C	PETROS
3654.5 [m]	C	PETROS
3660.0 [m]	DC	PETROS
3665.0 [m]	DC	PETROS
3670.0 [m]	DC	PETROS
3675.0 [m]	DC	PETROS
3680.0 [m]	DC	PETROS
3685.0 [m]	DC	PETROS
3690.0 [m]	DC	PETROS
3695.0 [m]	DC	PETROS
3700.0 [m]	DC	PETROS
3705.0 [m]	DC	PETROS
3710.0 [m]	DC	PETROS
3715.0 [m]	DC	PETROS

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
1385	NORDLAND GP
1385	NAUST FM
1578	KAI FM
2075	HORDALAND GP
2075	BRYGGE FM
2673	ROGALAND GP
2673	TARE FM



2950	TANG FM
3371	SHETLAND GP
3371	SPRINGAR FM
3597	NO FORMAL NAME
3645	SPRINGAR FM

Logs

Log type	Log top depth [m]	Log bottom depth [m]
AIT DSI PPC	2320	3711
HNGS PEX	3450	3711
MDT DP GR	3613	3617
MDT GR	3601	3617
MR SCANN	3591	3675
MWD ARC	1466	2856
MWD ARC	3656	3715
MWD ARC RAB	3470	3601
MWD ARC SON VISION	2856	3470
VSP	1400	3702

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	36	1465.0	42	1466.0	0.00	LOT
SURF.COND.	20	2320.0	26	2326.0	1.28	LOT
INTERM.	13 3/8	2848.0	17 1/2	2855.0	1.27	LOT
LINER	9 5/8	3468.0	12 1/4	3470.0	1.39	LOT
OPEN HOLE		3715.0	8 1/2	3715.0	0.00	LOT

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
1419	1.02			Other	
2326	1.12			Glydril	
2326	1.12			Glydril	
2326	1.39			PAD	



2855	1.17			Glydril	
2855	1.21			Glydril	
2855	1.21			Glydril	
2855	1.17			Glydril	
3320	1.22			Paratherm	
3470	1.25			Paratherm	
3470	1.25			Paratherm	
3520	1.31			Paratherm	
3601	1.28			Paratherm	
3715	1.18			Glydril	
3750	1.17			Glydril	

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]
6356 Formation pressure (Formasjonstrykk)	pdf	0.23

