

**General information**

Wellbore name	6407/1-5 S
Type	EXPLORATION
Purpose	APPRAISAL
Status	P&A
Press release	link to press release
Factmaps in new window	link to map
Main area	NORWEGIAN SEA
Field	MARIA
Discovery	6406/3-8 Maria
Well name	6407/1-5
Seismic location	ST0614WIR10 -inline7836 & crossline 2118
Production licence	475 BS
Drilling operator	Wintershall Norge ASA
Drill permit	1357-L
Drilling facility	BORGLAND DOLPHIN
Drilling days	112
Entered date	31.01.2012
Completed date	21.05.2012
Release date	21.05.2014
Publication date	21.05.2014
Purpose - planned	APPRAISAL
Reentry	NO
Content	OIL/GAS
Discovery wellbore	NO
1st level with HC, age	MIDDLE JURASSIC
1st level with HC, formation	GARN FM
Kelly bushing elevation [m]	31.0
Water depth [m]	298.0
Total depth (MD) [m RKB]	4177.0
Final vertical depth (TVD) [m RKB]	4164.0
Maximum inclination [°]	10.6
Bottom hole temperature [°C]	145
Oldest penetrated age	EARLY JURASSIC
Oldest penetrated formation	TILJE FM
Geodetic datum	ED50
NS degrees	64° 59' 20.12" N
EW degrees	7° 0' 17.16" E



NS UTM [m]	7208885.51
EW UTM [m]	405879.91
UTM zone	32
NPDID wellbore	6774

Wellbore history

General

Well 6407/1-5 S was drilled to appraise the northern extension of the Maria Field in the Haltenbanken area in the Norwegian Sea. The primary objective was to test the sands in the Middle Jurassic Garn, Ile and Tilje Formations. In case of petroleum in the Garn Formation, a DST was planned to be carried out.

Operations and results

Appraisal well 6407/1-5 S was spudded with the semi-submersible installation Borgland Dolphin on 31 January 2012 and drilled to TD at 4177 m (4164 m TVD) in the Early Jurassic Tilje Formation. A 12 1/4" pilot hole was drilled from 398 m to 703 m and shallow gas was indicated. The 20" casing was set above the shallow gas zone, at 563 m. Due to the shallow gas, rough weather, rig repair, and additional coring and wire line runs total rig time became 26 days longer than planned, but otherwise there were no serious problem related to the operations and all objectives were met. It was drilled vertically down to 2300 m, with a 10.6 deg deviation from ca 2300 m to ca 3200 m and then again vertically from 3200 m through the reservoir section and down to TD. The well was drilled water based down to 1199 m and with Omniflow oil based mud from 1199 m to TD.

The target Garn Formation was encountered at 3811 m (3797.8 m TVD) with a 40 m oil column down to the OWC at 3851 m. The Garn sandstone had a net/gross ratio of 0.99 only using a calcite flag as cut-off. The Ile and Tilje Formations were water bearing. Apart from shows in the hydrocarbon bearing section in the Garn Formation the only oil shows above the oil based mud in the well were in thin sandstone stringers in the lower part of the Melke Formation.

Three cores were cut from 3785 m in the base of the Melke Formation to 3859 m in the Garn Formation. A fourth core was attempted but was accidentally left in the hole. RCI wire line samples were taken at 3826.5 m (oil), 3841.5 m (oil), 3858 m (water), and 3863.4 m (water).

The well was permanently abandoned on 21 May 2012 as an oil and gas appraisal well.

Testing

One drill stem test was carried out from the interval 3809 m to 3832 m in the Garn Formation. The test produced 101 Sm³ oil and 18512 Sm³ gas /day through a 28/64" choke. The gas contained 6 ppm H₂S and 4 % CO₂. The GOR was 183 Sm³/Sm³. The bottom hole temperature in the main flow was 135.2 deg C.

Cuttings at the Norwegian Offshore Directorate

Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
570.00	4175.00



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	3785.0	3793.1	[m]
2	3793.1	3832.6	[m]
3	3832.6	3858.8	[m]

Total core sample length [m]	73.8
Cores available for sampling?	YES

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
329	NORDLAND GP
329	NAUST FM
1483	KAI FM
1868	HORDALAND GP
1868	BRYGGE FM
2225	ROGALAND GP
2225	TARE FM
2289	TANG FM
2358	SHETLAND GP
2358	SPRINGAR FM
2536	NISE FM
2730	KVITNOS FM
3188	CROMER KNOLL GP
3188	LYSING FM
3228	LANGE FM
3737	VIKING GP
3737	SPEKK FM
3758	MELKE FM
3811	FANGST GP
3811	GARN FM
3902	NOT FM
3939	ILE FM
4024	BÅT GP



4024	ROR FM
4119	TILJE FM

Drill stem tests (DST)

Test number	From depth MD [m]	To depth MD [m]	Choke size [mm]
1.0	3809	3822	16.0

Test number	Final shut-in pressure [MPa]	Final flow pressure [MPa]	Bottom hole pressure [MPa]	Downhole temperature [°C]
1.0				135

Test number	Oil [Sm3/day]	Gas [Sm3/day]	Oil density [g/cm3]	Gas grav. rel.air	GOR [m3/m3]
1.0	101	18512	0.789	0.904	183

Logs

Log type	Log top depth [m]	Log bottom depth [m]
GR GEOWAVES	2100	3900
LWD - DIR GR PWD	329	562
LWD - DIR GR RES PWD	562	3908
LWD - DIR GR SON RES PWD	398	703
LWD - RES BIT DIR GR RES PWD	2015	4177
MARCH JAR TTR GR XMAC 6CAL ORIT	3766	4177
MARCH JAR TTRM DSL CN ZDL FLEX	3766	4177
MRCH JAR GR PCOR	3857	3869
MRCH JAR TTR DSL CN ZDL ORIT XMA	2015	3773
MRCH JAR TTRM 6TC IFX RCI SPKR D	3826	3858
MRCH JAR TTRM GR EI ORIT ECBIL G	3766	3975
MRCH JAR TTRM GR MREX	3766	4040
MRCH JAR TTRM GR RCI IFX 6TC 4L	3912	3950
RCI	2015	3215



TLD APS ECS IS EDTC GR	3766	3895
ZAIT ADT5 HNGS IS EDTC	3766	3908

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	395.0	36	0.0	0.00	
SURF.COND.	20	556.0	26	556.0	1.36	FIT
LINER	16	1163.0	17 1/2	1202.0	1.63	FIT
LINER	13 3/8	1976.0	14 3/4	2019.0	1.77	FIT
LINER	9 5/8	3766.0	12 1/4	3776.0	1.60	FIT
LINER	7	4175.0	8 1/2	0.0	0.00	
OPEN HOLE		4177.0	8 1/2	0.0	0.00	

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
395	1.24	21.0		Aqua-Drill	
434	1.39	32.0		Aqua-Drill	
468	1.53	19.0		Aquadrill	
533	1.24	18.0		Aqua-Drill	
1200	1.24	14.0		Aqua-Drill	
1235	1.34	20.0		Aqua-Drill	
1935	1.53	25.0		Aqua-Drill	
3726	1.69	36.0		Carbo-sea OBM	
3832	1.19	23.0		Omniflow DIF	
3840	1.69	46.0		Carbosea	
3840	1.19			Brine	
4177	1.19	23.0		Omniflow DIF	