

**General information**

Wellbore name	15/12-19
Type	EXPLORATION
Purpose	WILDCAT
Status	P&A
Press release	link to press release
Factmaps in new window	link to map
Main area	NORTH SEA
Field	GAUPE
Discovery	15/12-19
Well name	15/12-19
Seismic location	
Production licence	292
Drilling operator	BG Norge AS
Drill permit	1164-L
Drilling facility	MÆRSK GUARDIAN
Drilling days	93
Entered date	18.02.2008
Completed date	20.05.2008
Release date	20.05.2010
Publication date	20.05.2010
Purpose - planned	WILDCAT
Reentry	NO
Content	OIL/GAS
Discovery wellbore	YES
1st level with HC, age	TRIASSIC
1st level with HC, formation	SKAGERRAK FM
Kelly bushing elevation [m]	43.0
Water depth [m]	85.0
Total depth (MD) [m RKB]	3212.0
Final vertical depth (TVD) [m RKB]	3211.0
Maximum inclination [°]	3.5
Bottom hole temperature [°C]	134
Oldest penetrated age	TRIASSIC
Oldest penetrated formation	SKAGERRAK FM
Geodetic datum	ED50
NS degrees	58° 0' 13.64" N
EW degrees	1° 55' 16.36" E
NS UTM [m]	6429787.22



EW UTM [m]	436238.87
UTM zone	31
NPDID wellbore	5705

Wellbore history

**General**

The Pi North well 15/12-19 was drilled on the northern lobe of the Maureen Terrace in the North Sea. The prospect is adjacent to the UK Armada complex of Fields (Fleming, Drake and Hawkins) and the Seymour Fields to the West and the Varg and Rev Fields to the North. The main objective of the well was to test the hydrocarbon potential in Sleipner/Skagerrak sandstone formations in the Pi North structure.

Operations and results

Well was spudded with the jack-up installation Mærsk Guardian on 18 February 2008 and drilled to TD at 3212 m in Triassic rocks of the Skagerrak Formation. A 9 7/8" shallow gas pilot hole was drilled from TD in the 36" section at 203.5 m to 672 m. No shallow gas was seen. No significant problem was encountered in the operations. The well was drilled with sea water and pre-hydrated bentonite down to 672 m, with Aquadrill mud from 672 m to 1364 m, and with Carbo SEA oil based mud from 1364 m to TD.

Top Jurassic was encountered at 2969 m and consisted of only 4 m Draupne Formation directly overlying the Triassic Skagerrak Formation. No sediments of the Jurassic Sleipner Formation were encountered. The Skagerrak Formation was hydrocarbon bearing. The sandstones had an average porosity of 17% net when using an 11.8% cut off in the oil case and 8.1% in the gas case. The reservoir system was complex with an upper reservoir with gas down to 2986.8 m (13.8 m TVD gross gas column, 9.21m net pay) and an underlying oil column of 35.7 m TVD gross (13.11m net pay). A lower reservoir with a 16.5 m TVD gross oil-leg (3.81 m net pay) was encountered at 3044.5 m. The two oil zones were separated by a 22 m thick zone of movable water (confirmed by RCI water samples). Pressure data in the different reservoir zones indicated different pressure regimes and varying pressure depletion caused by production from neighbouring fields. No oil shows were observed in the well other than in the Skagerrak reservoir sections.

Three cores totalling 156.69 m were cut with 100% core recovery from 2975.0 to 3131.7 m in the Skagerrak Formation.

RCI wire line fluid samples were taken at 2973.5 m (gas), 2983 m (gas), 2994.5 (oil), 3023.5 m (water/oil mix), 3056.2 m (oil), 3030.1 m (water), 3015 m (oil), and 3117.5 m (water).

The well was permanently abandoned on 20 May as an oil and gas discovery.

Testing

Three drill stem tests were conducted in the Skagerrak Formation.

DST 1A tested the interval 3088 - 3102 m. It produced 318 Sm³ oil and 29450 Sm³ gas /day through a 28/64" choke in the main flow. The GOR was 93 Sm³/Sm³. The bottom hole temperature was 130.8 deg C.

DST 1B tested the intervals 3088 - 3102 m and 3036.5 - 3064 m. It produced 657 Sm³ oil and 156620 Sm³ gas /day through a 44/64" choke in the main flow. The GOR was 239 Sm³/Sm³. The bottom hole temperature was 130.0 deg C.

DST 1C tested the interval 3088 - 3102 m, 3036.5 - 3064 m, and 3023 - 3029 m. It produced 396 Sm³ oil and 831297 Sm³ gas /day through a 56/64" choke in the main flow. The GOR was 2102 Sm³/Sm³. The bottom hole temperature was 127.8 deg C.

Cuttings at the Norwegian Offshore Directorate



Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
200.00	3212.00

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	2975.0	3002.5	[m]
2	3002.5	3066.9	[m]
3	3067.1	3131.6	[m]

Total core sample length [m]	156.3
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		0.00	0.00	OIL		YES
DST		0.00	0.00	WATER		YES
DST	1 C	3058.00	2980.00	OIL	10.05.2008 - 02:26	YES

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
128	NORDLAND GP
1303	HORDALAND GP
2419	ROGALAND GP
2419	BALDER FM
2433	SELE FM
2507	LISTA FM
2622	VÅLE FM
2653	SHETLAND GP
2653	EKOFISK FM



2663	TOR FM
2737	HOD FM
2896	CROMER KNOLL GP
2896	RØDBY FM
2911	SOLA FM
2927	ÅSGARD FM
2969	VIKING GP
2969	DRAUPNE FM
2973	NO GROUP DEFINED
2973	SKAGERRAK FM

Drill stem tests (DST)

Test number	From depth MD [m]	To depth MD [m]	Choke size [mm]
1.0	3088	3102	11.0
2.0	3036	3102	17.5
3.0	3023	3102	22.0

Test number	Final shut-in pressure [MPa]	Final flow pressure [MPa]	Bottom hole pressure [MPa]	Downhole temperature [°C]
1.0				131
2.0				131
3.0				127

Test number	Oil [Sm3/day]	Gas [Sm3/day]	Oil density [g/cm3]	Gas grav. rel.air	GOR [m3/m3]
1.0	318	29450		0.680	93
2.0	657	156621		0.680	239
3.0	396	831297		0.680	2102

Logs

Log type	Log top depth [m]	Log bottom depth [m]
MRCH TTRM GR EI	2911	3210
MRCH TTRM GR RCI	2973	3190
MRCH TTRM MREX	2924	3208
MRT TTRM GR VSP MLR4+ARS	275	3200



MWD - DIR	127	206
MWD - DIR	206	669
MWD - DIR GR RES PWD	206	672
MWD - DIR GR RES PWD D/N	2906	3212
MWD- DIR GR RES PWD	1359	2911
TTRM GR CN CDL	2880	3212
TTRM GR SW MT	2973	3117
TTRM SGR HDIL XMAC F1	128	3212

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	194.0	36	203.0	0.00	LOT
SURF.COND.	20	661.0	24	672.0	1.56	LOT
INTERM.	13 3/8	1360.0	17 1/2	1364.0	1.56	LOT
INTERM.	9 5/8	2905.0	12 1/4	2911.0	1.56	LOT
OPEN HOLE		3212.0	8 1/2	3212.0	0.00	LOT

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
447	1.06	9.0		Spud Mud	
471	0.00	5.0		Spud Mud	
606	1.08	5.0		Spud Mud	
672	1.25	17.0		KCl/Poly/Glycol	
893	0.00	13.0		KCl/Poly/Glycol	
1282	0.00	17.0		KCl/Poly/Glycol	
1364	1.42	17.0		KCl/Poly/Glycol	
1364	0.00	16.0		KCl/Poly/Glycol	
1400	1.47	37.0		CarboSEA	
2160	0.00	35.0		CarboSEA	
2737	0.00	31.0		CarboSEA	
2911	1.47	29.0		CarboSEA	
2955	1.38	29.0		CarboSEA	
2975	0.00	29.0		CarboSEA	
3001	0.00	29.0		CarboSEA	
3131	1.31	27.0		CarboSEA	



3175	1.34			Salt Base	
3212	0.00			Salt Base	
3212	0.00	32.0		CarboSEA	
3212	1.35	29.0		CarboSEA	