

General information

Wellbore name	36/7-4
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	DUVA
Discovery	36/7-4 Duva
Well name	36/7-4
Seismic location	ST0703MR13: in-line 994 / x-line 2965
Production licence	636
Drilling operator	ENGIE E&P Norge AS
Drill permit	1630-L
Drilling facility	TRANSOCEAN ARCTIC
Drilling days	71
Entered date	18.07.2016
Completed date	26.09.2016
Release date	26.09.2018
Publication date	26.09.2018
Purpose - planned	WILDCAT
Reentry	NO
Content	OIL/GAS
Discovery wellbore	YES
1st level with HC, age	EARLY CRETACEOUS
1st level with HC, formation	AGAT FM
Kelly bushing elevation [m]	24.0
Water depth [m]	349.0
Total depth (MD) [m RKB]	2726.0
Final vertical depth (TVD) [m RKB]	2726.0
Maximum inclination [°]	3.2
Bottom hole temperature [°C]	86
Oldest penetrated age	EARLY CRETACEOUS
Oldest penetrated formation	ÅSGARD FM
Geodetic datum	ED50
NS degrees	61° 24' 59.72" N
EW degrees	4° 4' 8.06" E
NS UTM [m]	6809820.06

EW UTM [m]	557055.06
UTM zone	31
NPDID wellbore	7988

Wellbore history

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General

Well 36/7-4 was drilled to test the Cara prospect ca 5 km northeast of the Gjøa Field in the North Sea. The primary objective was to test for hydrocarbons in the Early Cretaceous Agat Formation.

Operations and results

Wildcat well 36/7-4 was spudded with the semi-submersible installation Transocean Arctic on 18 July 2016 and drilled to TD at 2726 m in the Early Cretaceous Åsgard Formation. Operations proceeded without significant problems. The well was drilled with seawater and hi-vis sweeps down to 587 m and with KCl/glycol mud from 587 m to TD.

Well 36/7-4 successfully penetrated 118.1 of hydrocarbon-bearing Agat Formation sandstone reservoir before reaching a final TD of 2726 m in the Åsgard Formation. The well proved a 51.7 m gas column in good quality reservoir, with a GOC at 2479.2 m. Oil was proven down to close to the base of the Agat sandstone at 2544.4 m, but the reservoir below 2492 m is of reduced quality with low permeability and poor production potential. No oil-water contact (OWC) was seen, neither from pressures, nor on logs or core.

Three cores were cut from 2437 to 2555 m in the Agat Formation, including the Agat Formation basal conglomerates. MDT fluid samples were taken at 2440 m (gas), 2458.13 m (gas), 2484.03 m (oil), 2488 m (oil), 2536.61 m (oil), and 2544.4 m (oil/water).

The well was permanently abandoned on 26 September 2016 as an oil and gas discovery.

Testing

A drill stem test was conducted from the gas column in the interval 2428 to 2470 m.

Very good overall reservoir properties were proven. The maximum gas rate achieved was 1240000 Sm3/day, through a 72/64" fixed choke. The gas gravity was 0.6378 (air = 1). The condensate had a density of 0.801 g/cm3 (45.2 °API). The Gas/Condensate Ratio was 15592 Sm3/Sm3. The gas had 0.5% CO2 and 0.2 ppm H2S. Measurements at the end of the main shut-in periods (up to 72 hrs) gave the most representative formation temperatures. The temperature at the gas-oil contact is estimated to 80.0 °C.

Cuttings at the Norwegian Offshore Directorate

Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
590.00	2726.00

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	2436.9	2490.7	[m]
2	2491.0	2499.7	[m]
3	2499.7	2554.6	[m]

Total core sample length [m]	117.4
Cores available for sampling?	YES

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
372	NORDLAND GP
372	UNDIFFERENTIATED
602	ROGALAND GP
602	LISTA FM
1092	VÅLE FM
1258	SHETLAND GP
1258	JORSALFARE FM
1285	KYRRE FM
2005	TRYGGVASON FM
2215	BLODØKS FM
2220	SVARTE FM
2376	CROMER KNOLL GP
2376	RØDBY FM
2428	AGAT FM
2554	SOLA FM
2620	ÅSGARD FM

Drill stem tests (DST)

Test number	From depth MD [m]	To depth MD [m]	Choke size [mm]
1.0	2428	2470	28.6

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

Test number	Oil [Sm ³ /day]	Gas [Sm ³ /day]	Oil density [g/cm ³]	Gas grav. rel.air	GOR [m ³ /m ³]
1.0		1240000	0.801	0.637	15592

Logs

Log type	Log top depth [m]	Log bottom depth [m]
CMR ADT HRLA PEX ECS	2364	2724
FMI MSIP GR	2364	2725
MDT GR	2429	2567
MDT GR SP	2435	2536
MSCT SWC	2378	2640
MWD - DIR ECD	373	439
MWD - GR DIR ECD RES	439	587
MWD - GR DIR ECD RES SON	487	590
MWD - GR DIR ECD RES SON	590	1710
MWD - GR ECD RES SON DIR	1710	2115
MWD - GR ECD RES SON NEU POR DEN	2115	2780
MWD - GR RES ECD RES SON	373	587
USIT CBL GR	0	0
VSP GR	1689	2656

Casing and leak-off tests

Casing type	Casing diam. [inch]	Casing depth [m]	Hole diam. [inch]	Hole depth [m]	LOT/FIT mud eqv. [g/cm ³]	Formation test type
CONDUCTOR	30	439.0	36	439.0	0.00	
SURF.COND.	20	583.0	26	587.0	0.00	
PILOT HOLE		587.0	9 7/8	587.0	0.00	

		590.0		590.0	1.25	LOT
INTERM.	13 3/8	1701.0	17 1/2	1710.0	0.00	
		1713.0		1713.0	1.50	FIT
INTERM.	9 5/8	2364.0	12 1/4	2370.0	0.00	
		2374.0		2374.0	1.48	LOT
LINER	7	2663.0	8 1/2	2726.0	0.00	

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
372	1.03	9.0		Sweeps	
439	1.15	40.0		KCL/Polymer/Glycol	
442	1.49	36.0		Kill/DIsplacment Mud	
504	1.03	13.0		Sweeps	
504	1.49	34.0		Kill/DIsplacment Mud	
535	1.01	1.0		Seawater	
535	1.17	19.0		KCl mud	
587	1.15	40.0		KCL/Polymer/Glycol	
587	1.49	34.0		Kill/DIsplacment Mud	
590	1.15	25.0		KCL/Polymer/Glycol	
917	1.16	24.0		KCL/Polymer/Glycol	
1091	1.17	24.0		KCL/Polymer/Glycol	
1234	1.16	23.0		KCL/Polymer/Glycol	
1488	1.17	22.0		KCL/Polymer/Glycol	
1525	1.16	25.0		KCL/Polymer/Glycol	
1710	1.17	26.0		KCL/Polymer/Glycol	
1710	1.15	27.0		KCL/Polymer/Glycol	
2100	1.19	17.0		KCl mud	
2100	1.17	17.0		KCl mud	
2141	1.17	20.0		KCL/Polymer/GEM	
2374	1.19	22.0		KCL/Polymer/Glycol	
2665	1.19	2.0		NaCl Brine	
2665	1.21	17.0		KCl Polymer GEM	
2726	1.19	22.0		KCL/Polymer/Glycol	