General information

Wellbore name	16/1-21 A
Type	EXPLORATION
Purpose	APPRAISAL
Status	P&A
Press release	link to press release
Factmaps in new window	link to map
Main area	NORTH SEA
Field	IVAR AASEN
Discovery	16/1-9 Ivar Aasen
Well name	16/1-21
Seismic location	inline2500&crossline2957
Production licence	001 B
Drilling operator	Det norske oljeselskap ASA
Drill permit	1534-L
Drilling facility	MAERSK INTERCEPTOR
Drilling days	49
Entered date	03.03.2015
Completed date	20.04.2015
Release date	20.04.2017
Publication date	20.04.2017
Purpose - planned	APPRAISAL
Reentry	NO
Content	OIL
Discovery wellbore	NO
1st level with HC, age	LATE TRIASSIC
1st level with HC, formation	SKAGERRAK FM
2nd level with HC, age	MIDDLE JURASSIC
2nd level with HC, formation	SLEIPNER FM
Kelly bushing elevation [m]	55.0
Water depth [m]	114.0
Total depth (MD) [m RKB]	3313.0
Final vertical depth (TVD) [m RKB]	2517.0
Maximum inclination [°]	64.3
Oldest penetrated age	LATE TRIASSIC
Oldest penetrated formation	SKAGERRAK FM
Geodetic datum	ED50
NS degrees	58° 55' 41.83'' N
EW degrees	2° 13' 22.97'' E

NS UTM [m]	6532476.90
EW UTM [m]	455267.90
UTM zone	31
NPDID wellbore	7530

Wellbore history

General

Well 16/1-21 A is a geological sidetrack to well 16/1-21 S. It was drilled to appraise the 16/1-9 Ivar Aasen discovery on the Gungne Terrace in the North Sea. The objective was to obtain key depth and reservoir information for field development in the eastern part of the Ivar Aasen Discovery. The targets were reservoirs in the Hugin/Sleipner and Skagerrak Formations.

Operations and results

Wildcat well 16/1-21 A was kicked off on 3 March 2015, from the main well 16/1-21 S with an open hole kick off below the 13 3/8" casing shoe at 1317 m. The well was drilled with the jack-up installation Mærsk Innovator to TD at 3313 m (2517 m TVD) in the Triassic Hegre Group. Due to severe losses when drilling the 12 1/4" section at 2951 m a cement plug was set and the 9 5/8" liner was run with shoe depth at 2796 m. The well was drilled with Versatec oil based mud from kick-off to TD.

The well penetrated a 6.3 m net sand in the Sleipner Formation above the Skagerrak formation. The reservoir quality in the sand is very good with an average porosity in the net sand of 24 percent. The sand contains gas-condensate and oil. A gas oil contact is interpreted to be at 3192.0 m (2408.0 m TVD).

The underlying Skagerrak reservoir is oil filled and the net sand interval above the Alluvial Fan is 20.3 meters. The average porosity in the net intervals is 23 percent in Skagerrak 2 and 21 percent in Skagerrak 1. The formation pressures in 16/1-21 A indicated a contact at 3273.9 m (2481.6 m TVD) in Skagerrak Alluvial Fan. However, the pressures in this very calcite cemented part of Skagerrak Formation is about 0.6 bar higher than in the oil-filled Skagerrak above, and the actual contact is not resolved. The deepest oil sample is from 3221.1 m.

Oil shows were recorded on cores from 3183 m, in the Sleipner Formation. Shows were visible throughout the cored sections with a weakening trend towards the lowermost part of core 3 in the Skagerrak Formation. No shows are described below base of core 3 at 3234 m.

Three cores were cut from 3174 m in the Heather Formation, through the Sleipner Formation and down to 3235.8 m in the Triassic Skagerrak Formation. The core recovery varied from 92.7% to 99.0 %. The core to log shift is reported to vary between +2.0 m to +3.0 m in different sections of the cores. MDT fluid samples were taken at 3191.03 m (gas-condensate), 3193.44 m (oil), 3195.53 m (oil), 3208.93 m (oil), and 3221.1 m (oil).

The well was permanently abandoned on 20 April 2015 as a dry well.

Testing

No drill stem test was performed.

Cuttings at the Norwegian Offshore Directorate

Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
1300.00	3312.00

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	3174.0	3200.8	[m]
2	3201.0	3218.6	[m]
3	3218.8	3224.6	[m]

Total core sample length [m]	50.1
Cores available for sampling?	YES

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
168	NORDLAND GP
168	UNDIFFERENTIATED
802	UTSIRA FM
848	NO FORMAL NAME
959	HORDALAND GP
959	SKADE FM
1264	NO FORMAL NAME
1811	GRID FM
2094	NO FORMAL NAME
2576	ROGALAND GP
2576	BALDER FM
2634	SELE FM
2736	LISTA FM
2826	HEIMDAL FM
2828	LISTA FM
2890	VÅLE FM
2919	SHETLAND GP
2919	TOR FM

2926	CROMER KNOLL GP
2926	ÅSGARD FM
2972	VIKING GP
2972	DRAUPNE FM
3155	HEATHER FM
3187	VESTLAND GP
3187	SLEIPNER FM
3194	HEGRE GP
3194	SKAGERRAK FM

Logs

Log type	Log top depth [m]	Log bottom depth [m]
LWD - DI	168	373
LWD - GR RES DEN NEU SON DI PWD	168	1304
LWD - GR RES DI PWD	1317	2951
LWD - GR RES DI PWD NEU DEN	3133	3313
MDT HC	3024	3024
MDT HC	3119	3221
MDT PPC	2820	2820
MRX XPT GR	3070	3300
PPC SS EMM GR UT	3311	1656
PPC SS GR EMM	1100	2798
VSI	1081	3154
ZAIT NMH IS AH NEXT PEX HNGS	2965	3302

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	223.1	36	223.1	0.00	
SURF.COND.	20	368.0	26	373.0	1.48	LOT
PILOT HOLE		376.0	9 7/8	376.0	0.00	
INTERM.	13 3/8	1299.0	17 1/2	1304.0	1.67	LOT
LINER	9 5/8	2796.0	12 1/4	2951.0	1.60	FIT
LINER	7	3015.0		0.0	0.00	
OPEN HOLE		3315.0	8 1/2	3315.0	0.00	

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
1440	1.51	34.0		Versatec OBM	
1850	1.51	33.0		Versatec OBM	
2550	1.51	33.0		Versatec OBM	
2950	1.29	22.0		Versatec OBM	
2950	1.51	37.0		Versatec OBM	
3009	1.29	23.0		Versatec OBM	
3219	1.34	23.0		Versatec OBM	
3313	0.99			Sea water	
3313	1.34	30.0		Versatec OBM	