General information

Wellbore name	16/1-21 S
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	inline 2500&crossline 2957
Production licence	001 B
Drilling operator	Det norske oljeselskap ASA
Drill permit	1533-L
Drilling facility	MAERSK INTERCEPTOR
Drilling days	42
Entered date	21.01.2015
Completed date	03.03.2015
Release date	03.03.2017
Publication date	03.03.2017
Purpose - planned	APPRAISAL
Reentry	NO
Content	OIL
Discovery wellbore	NO
1st level with HC, age	LATE TRIASSIC
1st level with HC, formation	SKAGERRAK FM
Kelly bushing elevation [m]	55.0
Water depth [m]	114.0
Total depth (MD) [m RKB]	2630.0
Final vertical depth (TVD) [m RKB]	2584.0
Maximum inclination [°]	19.9
Bottom hole temperature [°C]	99
Oldest penetrated age	LATE TRIASSIC
Oldest penetrated formation	HEGRE GP
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	7529

Wellbore history

General

Well 16/1-21 S 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 north-eastern part of the Ivar Aasen Discovery. The targets were reservoirs in the Heimdal, Hugin/Sleipner and Skagerrak Formations.

Operations and results

Wildcat well 16/1-21 S was spudded with the jack-up installation Mærsk Interceptor on 21 January 2015 and drilled to TD at 2630 m (2584 m TVD) m in the Triassic Hegre Group. A 9 7/8" pilot hole was drilled from the 30" conductor shoe to 376 m. No shallow gas was encountered. The well was drilled with seawater and hi-vis pills down to 373 m, with Glydril mud from 373 m to 1304 m, and with Versatec oil based mud from 1304 m to TD.

The Heimdal Formation was encountered water filled at 2176 m (2138.7 m TVD). Reservoir properties were excellent with 26.5 m net sand with 30% average porosity. The distribution of the Jurassic versus the Triassic sequence was different from the expected. Triassic reservoir was thicker than predicted, while the Jurassic had no reservoir at all. However, the total actual reservoir quality and hydrocarbon pore volume height was in agreement with the predicted, since the Triassic proved better than expected combined with a deeper hydrocarbon contact. The Triassic reservoir (Skagerrak Formation) was penetrated at 2491 m (2446.6 m TVD) and it was hydrocarbon bearing with 20.3 m net pay with 20% average porosity. The hydrocarbon type was undersaturated oil, as in well 16/1-16. No gas cap was present and an oil down-to situation was established at ca 2535 m (2490 m TVD). Hydrocarbon shows were first evident in the lowermost part of core #1, from 2489 m in the Skagerrak Formation. Good hydrocarbon shows continued in the sandy sections in the cores. No shows were recorded below 2554 m, in the lowermost part of the Skagerrak Formation.

Three cores were cut in succession from 2499 m in the Heather Formation to 2586.2 m in the Skagerrak Formation. Core recovery was 100%. The core to log shift is +1.85 m for all three cores. Fluid samples were taken at 2178.25 m (water), 2497.71 m (oil), 2514.7 m (oil), 2525.25 m (oil), 2533.61 m (oil), and 2538.92 m (water).

The well was plugged back and abandoned on 3 March 2015 as an oil appraisal well.

Testing

No drill stem test was performed.

Cuttings at the Norwegian Offshore Directorate

Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
380.00	2630.00

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	2449.0	2492.2	[m]
2	2492.3	2546.7	[m]
3	2546.2	2586.2	[m]

Total core sample length [m]	137.5
Cores available for sampling?	YES

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
168	NORDLAND GP
168	UNDIFFERENTIATED
802	UTSIRA FM
848	UNDIFFERENTIATED
959	HORDALAND GP
959	SKADE FM
1264	NO FORMAL NAME
1664	GRID FM
1730	NO FORMAL NAME
1759	GRID FM
1808	NO FORMAL NAME
2035	ROGALAND GP
2035	BALDER FM
2075	SELE FM
2113	LISTA FM
2176	HEIMDAL FM
2212	LISTA FM
2253	VÅLE FM
2281	SHETLAND GP
2281	TOR FM
2286	CROMER KNOLL GP
2286	ÅSGARD FM
2294	VIKING GP

2294	DRAUPNE FM
2462	HEATHER FM
2491	HEGRE GP
2491	SKAGERRAK FM

Logs

Log type	Log top depth [m]	Log bottom depth [m]
EMA XPT ADT MRX GR	1239	2625
LWD - DI	168	373
LWD - GR RES DEN NEU DI PWD	1305	2630
LWD - GR RES DEN NEU SON DI PWD	168	1304
MDT HC	2153	2541
QGEO PPC MSIP GR SAH	550	2616
RES DEN NEU LIT SON GR	368	1239
SS PP GR	368	1239
VSI4 GR ACTS	669	2620
XLROCK IS EDTC GR	1531	2483
ZAIT PEX NEXT HNGS	1290	2632

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	30	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
OPEN HOLE		2630.0	8 1/2	2630.0	0.00	

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
385	1.09	9.0		WBM	
1265	1.19	17.0		WBM	
1340	1.29	39.0		Versatec OBM	
1500	1.51	34.0		Versatec OBM	

2448	1.29	28.0		Versatec OBM	
2546	0.99	27.0		Versatec OBM	
2630	1.31	37.0		Versatec OBM	