



General information

Wellbore name	16/1-34 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	SYMRA
Discovery	16/1-29 S Symra
Well name	16/1-34
Seismic location	PGS19M05VIK: inline 36270. Xline 129478
Production licence	167
Drilling operator	Lundin Energy Norway AS
Drill permit	1865-L
Drilling facility	DEEPSEA STAVANGER
Drilling days	46
Entered date	01.08.2021
Completed date	15.09.2021
Plugged and abandon date	15.09.2021
Release date	15.09.2023
Publication date	12.09.2023
Purpose - planned	APPRAISAL
Reentry	NO
Content	OIL
Discovery wellbore	NO
1st level with HC, age	PERMIAN
1st level with HC, formation	ZECHSTEIN GP
Kelly bushing elevation [m]	30.0
Water depth [m]	112.0
Total depth (MD) [m RKB]	2195.0
Final vertical depth (TVD) [m RKB]	2024.0
Maximum inclination [°]	30.1
Bottom hole temperature [°C]	90
Oldest penetrated formation	BASEMENT
Geodetic datum	ED50
NS degrees	58° 58' 51.4" N
EW degrees	2° 18' 48.55" E



NS UTM [m]	6538283.49
EW UTM [m]	460534.88
UTM zone	31
NPDID wellbore	9354

Wellbore history

**General**

Well 16/1-34 A is located on the Utsira High, north of the Edvard Grieg Field in the North Sea. The primary objective was to appraise the lateral extension and producibility of the Permian Zechstein carbonates found in well 16/1-29 S. The secondary objective was to appraise the Grid Formation injectites and Heimdal Formation sandstones.

Operations and results

Appraisal well 16/1-34 A was kicked off at 555 m in the main well on 1 August 2021. It was drilled with the semi-submersible installation Deepsea Stavanger to TD at 2195 m (2024 m TVD) in the Permian Zechstein Group. The well was drilled vertical down to 543 m, then drilled towards WSW with up to ca 30 deviation at most, then dropping to 20 deviation in the bottom section. Severe mud losses (60 90 m³/hr) were encountered after coring the first core to 2067 in the Zechstein section. The well was drilled with Rheguard Prime oil-based mud from kick-off to 2047 m and with Glydril Plus mud from 2047 m to TD.

The Shetland, Viking and Statfjord groups that are present in 16/1-34 S are missing in 16/1-34 A. In 16/1-34 A this interval, between 2047 m (lower V le) to 2064 (upper Zechstein), contain reworked Shetland Group chinks, possible Cromer Knoll basal conglomerates and reworked Zechstein. The Basement can be divided into a weathered section from 2104 to 2149 m and a non-weathered section below.

Well 16/1-34 A encountered an oil column of about 66 metres, of which 46 metres was in Zechstein dolomite, with good reservoir quality. About 20 metres of the oil column was encountered in basement rock with poor reservoir quality. Pressure measurements acquired using XPT and ORA tools confirmed oil and water fluid gradients were present with a free-water level estimated at 2130 m (1962.8 m TVD RKB). As in the offset 16/1-29 S well, the formations (Zechstein and Basement) were found to be slightly depleted.

The Grid Formation was penetrated below the hydrocarbon-water contact previously observed in the 16/1-34 S wellbore. The sandstones in 16/1-34 A had very good reservoir properties but contained only water. Sandstones of the Heimdal Member were of poorer quality than expected and were water filled. Pressure points were slightly scattered, and the formation was found to be pressure depleted.

Oil shows above OBM were observed in the uppermost Heimdal Formation down to ca 1970 m, in the Zechstein section on conventional cores and sidewall cores down to 2108.5 m, and on cuttings throughout the Basement section. In the unweathered Basement the shows are weak.

Four cores were cut in the well. Core 1 was cut from 2059.5 to 2067.3 m. Cores 2 to 4 were cut in succession from 2074.8 to 2079.8. total recovery for all four cores was 10.18 m (79.5%). MDT water samples were taken in the Heimdal Formation at 1975.01 m and 1985.01 m. In the Zechstein section ORA samples were taken at 2087.86 m (oil/water), 2098.86 m (oil), and 2162.13 m (water).

The well was permanently abandoned on 15 September 2021 as an oil appraisal well.

Testing

A drill-stem test was conducted in the Zechstein section from the intervals 2057.6 to 2073.4 m and 2079.8 to 2108.5 m. The main flow produced 468 Sm³ oil, 107 Sm³ water and 48150 Sm³ gas /day through a 42/64" choke. The GOR was 103 Sm³/Sm³, the oil density at 15 C was 0.854 g/cm³ and the gas gravity was 0.84 (air=1). The gas had 0.5 ppm H₂S and 0.2% CO₂. The temperature at 1880.4 m was 83.6 C.

**Cuttings at the Norwegian Offshore Directorate**

Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
560.00	2193.00

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	2059.5	2065.6	[m]
2	2074.8	2075.6	[m]
3	2076.1	2077.7	[m]
4	2078.1	2079.8	[m]

Total core sample length [m]	10.2
Cores available for sampling?	YES

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
142	NORDLAND GP
142	NAUST FM
355	UNDIFFERENTIATED
752	UTSIRA FM
805	UNDIFFERENTIATED
911	HORDALAND GP
911	SKADE FM
1049	NO FORMAL NAME
1535	NO FORMAL NAME
1692	GRID FM
1743	NO FORMAL NAME
1866	ROGALAND GP
1866	BALDER FM
1896	SELE FM
1903	LISTA FM
1969	HEIMDAL FM
1989	LISTA FM
2014	VÅLE FM



2058	CROMER KNOLL GP
2061	ZECHSTEIN GP
2109	BASEMENT

Logs

Log type	Log top depth [m]	Log bottom depth [m]
AIT PEX HNGS XPT GR JAR	1484	2048
CMR MDT	1484	2048
CMR NEXT ADT XPT GR	2047	2192
FMI MSIP PPC GR	980	2192
GR CCL	1970	2141
MWD - DVMT TELE SONSCOPE	2045	2191
MWD - PDORBIT ARC TELE	537	1478
MWD - PDORBIT RAB ARC TELE ADN	1484	2047
MWD - TELE	141	194
MWD - TELE ARC	209	522
ORA	2087	2162
UBI URLA PEX HNGS GR	2047	2186
VSIT C	137	2182
XLROCK GR	2054	2165
XLROCK GR	2058	2084

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	209.0	36	209.0	0.00	
INTERM.	20	537.0	24	543.0	1.74	FIT
INTERM.	13 3/8	1484.0	16	1490.0	1.61	FIT
LINER	9 5/8	2046.0	12 1/4	2047.0	1.33	FIT
OPEN HOLE		2195.0	8 1/2	2195.0	0.00	

Drilling mud



Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
190	1.05	1.0	1.0	Bentonite Spud Mud	
191	1.38	22.0	14.3	KCL/Polymer mud	
545	1.35	22.0	6.2	OBM	
610	1.39	32.0	6.5	Rheguard Prime	
1902	1.40	31.0	9.5	OBM	
2016	1.42	38.0	8.5	OBM	
2020	1.31	38.0	8.5	Glydril	
2047	1.38	35.0	8.5	Rheguard Prime	
2067	1.03	1.0	1.0	Other	
2079	1.04	11.0	6.7	Other	
2086	1.31	17.0	8.5	Glydril Plus	
2126	1.32	15.0	10.5	Glydril Plus	
2195	1.05	5.0	7.1	WBM	
2384	1.31	24.0	12.9	Glydril Plus	