

**General information**

Wellbore name	35/11-23
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	FRAM
Discovery	35/11-23 (Echino Sør)
Well name	35/11-23
Seismic location	Inline: 2262. Xline: 6323. 3-D survey ST13M03
Production licence	090
Drilling operator	Equinor Energy AS
Drill permit	1794-L
Drilling facility	DEEPSEA ATLANTIC
Drilling days	32
Entered date	06.10.2019
Completed date	06.11.2019
Plugged date	06.11.2019
Release date	06.11.2021
Publication date	10.11.2021
Purpose - planned	WILDCAT
Reentry	NO
Content	OIL/GAS
Discovery wellbore	YES
1st level with HC, age	LATE JURASSIC
1st level with HC, formation	SOGNEFJORD FM
2nd level with HC, age	MIDDLE JURASSIC
2nd level with HC, formation	BRENT GP
Kelly bushing elevation [m]	30.0
Water depth [m]	350.0
Total depth (MD) [m RKB]	2977.0
Final vertical depth (TVD) [m RKB]	2977.0
Oldest penetrated age	EARLY JURASSIC
Oldest penetrated formation	DUNLIN GP
Geodetic datum	ED50
NS degrees	61° 1' 14.7" N



EW degrees	3° 27' 49.21" E
NS UTM [m]	6765347.72
EW UTM [m]	525062.70
UTM zone	31
NPDID wellbore	8929

Wellbore history

General

Well 35/11-23 was drilled to test the Echino Sør prospect on the Lomre Terrace north of the Troll Field in the North Sea. The primary objective was to prove petroleum in the Late Jurassic Sognefjord Formation. The secondary objective was to prove petroleum in the Middle Jurassic Brent Group and to investigate the presence of reservoirs and reservoir quality in the Middle Jurassic Etive and Oseberg Formations.

Operations and results

Wildcat well 35/11-23 was spudded with the semi-submersible installation Deepsea Atlantic on 6 October 2019 and drilled to TD at 2977 m in the Early Jurassic Cook Formation. While drilling 17 ½" section, a gas peak of 4% was observed at 455m MD. Flow check showed a stable well. However, a shallow water flow was observed after cementing the 13 3/8" casing. This was observed on the Wellhead with ROV, declining to no flow after 24 hrs. Otherwise operations proceeded without significant problems. The well was drilled with seawater and hi-vis pills down to 432 m, with Aqua-drill mud from 432 to 1297 m, and with Synteq oil-based mud from 1297 m to TD.

Two Sognefjord Formation sands were penetrated, a J56 sand from 2292 to 2321 m, and a J52 sand from 2385 to 2406 m. The J56 sand contained gas and oil with a GOC at 2312 m and an oil-leg down-to the base of the sand. The J52 sand contained oil with an OWC in-well at ca 2397 m. A 16 m thick Krossfjord Formation Equivalent with top at 2541 m had indications of hydrocarbons.

In the Brent Group, the Ness Formation consists of interbedded coal beds and claystone with thin sands. Ness had hydrocarbon indications from 2725 to 2743 m in four sandstone bodies based on elevated gas and resistivity readings, and a gas sample was taken in the uppermost sand. The Etive Formation with top at 2759 m proved to contain gas and oil with a GOC at 2772 m and oil with an OWC at 2792 m. The Oseberg Formation and sand beds in the Dunlin Group proved to be water bearing.

Three consecutive cores were cut from 2301.5 to 2463.8 m in the Sognefjord and underlying Heather formation with 100% total recovery. The core-log shifts are -4.2 m for core 1 and -3.55 m for cores 2 and 3. RCX fluid samples were taken at 2293 m (gas), 2312.9 m (oil), 2320.5 m (oil), 2385.3 m (oil), 2403.5 m (water), 2724.5 m (gas), 2766.4 m (gas), 2771.1 m (oil/gas), 2774.6 m (oil), 2803.5 m (water), and 2840 m (water) .

The wellbore was permanently abandoned on 4 November as an oil and gas discovery.

Testing

No drill stem test was performed.

Cuttings at the Norwegian Offshore Directorate



Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
440.00	2977.00

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	2301.5	2355.5	[m]
2	2355.5	2410.0	[m]
3	2410.8	2465.5	[m]

Total core sample length [m]	163.2
Cores available for sampling?	YES

Palynological slides at the Norwegian Offshore Directorate

Sample depth	Depth unit	Sample type	Laboratory
440.0	[m]	DC	PETROSTR
470.0	[m]	DC	PETROS
500.0	[m]	DC	PETROS
530.0	[m]	DC	PETROS
560.0	[m]	DC	PETROS
590.0	[m]	DC	PETROS
620.0	[m]	DC	PETROS
650.0	[m]	DC	PETROS
680.0	[m]	DC	PETROS
710.0	[m]	DC	PETROS
740.0	[m]	DC	PETROS
770.0	[m]	DC	PETROS
800.0	[m]	DC	PETROS
830.0	[m]	DC	PETROS
840.0	[m]	DC	PETROS
860.0	[m]	DC	PETROS
890.0	[m]	DC	PETROS
920.0	[m]	DC	PETROS
950.0	[m]	DC	PETROS
980.0	[m]	DC	PETROS
1010.0	[m]	DC	PETROS



1050.0	[m]	DC	PETROS
1080.0	[m]	DC	PETROS
1090.0	[m]	DC	PETROS
1120.0	[m]	DC	PETROS
1150.0	[m]	DC	PETROS
1180.0	[m]	DC	PETROS
1210.0	[m]	DC	PETROS
1240.0	[m]	DC	PETROS
1270.0	[m]	DC	PETROS
1290.0	[m]	DC	PETROS
1300.0	[m]	DC	PETROS
1330.0	[m]	DC	PETROS
1360.0	[m]	DC	PETROS
1370.0	[m]	DC	PETROS
1400.0	[m]	DC	PETROS
1430.0	[m]	DC	PETROS
1460.0	[m]	DC	PETROS
1490.0	[m]	DC	PETROS
1520.0	[m]	DC	PETROS
1550.0	[m]	DC	PETROS
1570.0	[m]	DC	PETROS
1580.0	[m]	DC	PETROS
1590.0	[m]	DC	PETROS
1610.0	[m]	DC	PETROS
1625.0	[m]	DC	PETROS
1640.0	[m]	DC	PETROS
1655.0	[m]	DC	PETROS
1670.0	[m]	DC	PETROS
1685.0	[m]	DC	PETROS
1700.0	[m]	DC	PETROS
1715.0	[m]	DC	PETROS
1730.0	[m]	DC	PETROS
1745.0	[m]	DC	PETROS
1760.0	[m]	DC	PETROS
1775.0	[m]	DC	PETROS
1790.0	[m]	DC	PETROS
1800.0	[m]	DC	PETROS
1815.0	[m]	DC	PETROS
1830.0	[m]	DC	PETROS
1845.0	[m]	DC	PETROS



1855.0 [m]	DC	PETROS
1860.0 [m]	DC	PETROS
1875.0 [m]	DC	PETROS
1890.0 [m]	DC	PETROS
1905.0 [m]	DC	PETROS
1920.0 [m]	DC	PETROS
1940.0 [m]	DC	PETROS
1970.0 [m]	DC	PETROS
1980.0 [m]	DC	PETROS
1990.0 [m]	DC	PETROS
2010.0 [m]	DC	PETROS
2030.0 [m]	DC	PETROS
2050.0 [m]	DC	PETROS
2070.0 [m]	DC	PETROS
2090.0 [m]	DC	PETROS
2110.0 [m]	DC	PETROS
2130.0 [m]	DC	PETROS
2146.0 [m]	DC	PETROS
2158.0 [m]	DC	PETROS
2167.0 [m]	DC	PETROS
2173.0 [m]	DC	PETROS
2185.0 [m]	DC	PETROS
2197.0 [m]	DC	PETROS
2209.0 [m]	DC	PETROS
2221.0 [m]	DC	PETROS
2233.0 [m]	DC	PETROS
2239.0 [m]	DC	PETROS
2245.0 [m]	DC	PETROS
2254.0 [m]	DC	PETROS
2263.0 [m]	DC	PETROS
2272.0 [m]	DC	PETROS
2281.0 [m]	DC	PETROS
2290.0 [m]	DC	PETROS
2293.0 [m]	DC	PETROS
2299.0 [m]	DC	PETROS
2302.8 [m]	C	PETROS
2304.1 [m]	C	PETROS
2306.4 [m]	C	PETROS
2310.8 [m]	C	PETROS
2312.1 [m]	C	PETROS



2313.0	[m]	C	PETROS
2316.8	[m]	C	PETROS
2317.7	[m]	C	PETROS
2319.2	[m]	C	PETROS
2321.8	[m]	C	PETROS
2323.8	[m]	C	PETROS
2325.8	[m]	C	PETROS
2328.1	[m]	C	PETROS
2331.7	[m]	C	PETROS
2334.4	[m]	C	PETROS
2337.5	[m]	C	PETROS
2340.6	[m]	C	PETROS
2343.4	[m]	C	PETROS
2346.4	[m]	C	PETROS
2349.8	[m]	C	PETROS
2352.3	[m]	C	PETROS
2355.6	[m]	C	PETROS
2358.7	[m]	C	PETROS
2361.7	[m]	C	PETROS
2364.6	[m]	C	PETROS
2367.4	[m]	C	PETROS
2370.1	[m]	C	PETROS
2373.8	[m]	C	PETROS
2376.6	[m]	C	PETROS
2379.2	[m]	C	PETROS
2382.9	[m]	C	PETROS
2384.2	[m]	C	PETROS
2387.9	[m]	C	PETROS
2388.7	[m]	C	PETROS
2393.8	[m]	C	PETROS
2397.4	[m]	C	PETROS
2401.2	[m]	C	PETROS
2404.8	[m]	C	PETROS
2406.7	[m]	C	PETROS
2408.5	[m]	C	PETROS
2411.2	[m]	C	PETROS
2414.9	[m]	C	PETROS
2418.7	[m]	C	PETROS
2422.6	[m]	C	PETROS
2426.9	[m]	C	PETROS



2430.9 [m]	C	PETROS
2434.4 [m]	C	PETROS
2438.7 [m]	C	PETROS
2443.7 [m]	C	PETROS
2446.9 [m]	C	PETROS
2449.7 [m]	C	PETROS
2452.9 [m]	C	PETROS
2455.8 [m]	C	PETROS
2458.7 [m]	C	PETROS
2461.6 [m]	C	PETROS
2464.5 [m]	C	PETROS
2467.0 [m]	DC	PETROS
2476.0 [m]	DC	PETROS
2485.0 [m]	DC	PETROS
2494.0 [m]	DC	PETROS
2503.0 [m]	DC	PETROS
2512.0 [m]	DC	PETROS
2521.0 [m]	DC	PETROS
2530.0 [m]	DC	PETROS
2539.0 [m]	DC	PETROS
2548.0 [m]	DC	PETROS
2566.0 [m]	DC	PETROS
2575.0 [m]	DC	PETROS
2584.0 [m]	DC	PETROS
2593.0 [m]	DC	PETROS
2602.0 [m]	DC	PETROS
2611.0 [m]	DC	PETROS
2620.0 [m]	DC	PETROS
2629.0 [m]	DC	PETROS
2638.0 [m]	DC	PETROS
2647.0 [m]	DC	PETROS
2656.0 [m]	DC	PETROS
2665.0 [m]	DC	PETROS
2674.0 [m]	DC	PETROS
2683.0 [m]	DC	PETROS
2692.0 [m]	DC	PETROS
2701.0 [m]	DC	PETROS
2707.0 [m]	DC	PETROS
2713.0 [m]	DC	PETROS
2719.0 [m]	DC	PETROS



2722.0	[m]	DC	PETROS
2728.0	[m]	DC	PETROS
2734.0	[m]	DC	PETROS
2740.0	[m]	DC	PETROS
2746.0	[m]	DC	PETROS
2752.0	[m]	DC	PETROS
2758.0	[m]	DC	PETROS
2764.0	[m]	DC	PETROS
2770.0	[m]	DC	PETROS
2776.0	[m]	DC	PETROS
2782.0	[m]	DC	PETROS
2788.0	[m]	DC	PETROS
2794.0	[m]	DC	PETROS
2800.0	[m]	DC	PETROS
2806.0	[m]	DC	PETROS
2812.0	[m]	DC	PETROS
2818.0	[m]	DC	PETROS
2824.0	[m]	DC	PETROS
2830.0	[m]	DC	PETROS
2836.0	[m]	DC	PETROS
2842.0	[m]	DC	PETROS
2848.0	[m]	DC	PETROS
2854.0	[m]	DC	PETROS
2860.0	[m]	DC	PETROS
2866.0	[m]	DC	PETROS
2872.0	[m]	DC	PETROS
2878.0	[m]	DC	PETROS
2884.0	[m]	DC	PETROS
2890.0	[m]	DC	PETROS
2896.0	[m]	DC	PETROS
2902.0	[m]	DC	PETROS
2905.0	[m]	DC	PETROS
2908.0	[m]	DC	PETROS
2914.0	[m]	DC	PETROS
2920.0	[m]	DC	PETROS
2926.0	[m]	DC	PETROS
2932.0	[m]	DC	PETROS
2938.0	[m]	DC	PETROS
2944.0	[m]	DC	PETROS
2950.0	[m]	DC	PETROS



2956.0	[m]	DC	PETROS
2962.0	[m]	DC	PETROS
2968.0	[m]	DC	PETROS
2974.0	[m]	DC	PETROS

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
380	NORDLAND GP
811	UTSIRA FM
835	HORDALAND GP
1581	ROGALAND GP
1609	SELE FM
1653	LISTA FM
1758	VÅLE FM
1791	UNDIFFERENTIATED
1980	SHETLAND GP
1980	JORSALFARE FM
2059	KYRRE FM
2168	VIKING GP
2234	HEATHER FM
2292	UNDIFFERENTIATED
2321	HEATHER FM
2385	UNDIFFERENTIATED
2406	HEATHER FM
2541	UNDIFFERENTIATED
2557	HEATHER FM
2722	BRENT GP
2722	NESS FM
2759	ETIVE FM
2816	RANNOCH FM
2835	OSEBERG FM
2894	DUNLIN GP
2894	DRAKE FM
2911	COOK FM

Logs



Log type	Log top depth [m]	Log bottom depth [m]
DSL FLEX MREX FTEX	2132	2985
DSL XMAC 3DEX HDI	2050	2987
GR GXPL UXPL	2132	2985
LWD - ECD DIR	380	432
LWD - GR RES ECD DIR	432	1297
LWD - GR RES ECD DIR	2141	2302
LWD - GR RES ECD DIR	2302	2977
LWD - GR RES ECD DIR DEN NEU SON	1297	2141
MAXCOR	2537	2840
MRCH JAR TTRM DSL CN ZDL	2132	2987
RCX SENTINEL	2293	2774
RCX SENTINEL	2303	2803
RCX SENTINEL	2320	2840
ULTEX CBL	361	1240
VSP	348	2898

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	36	429.5	42	432.0	0.00	
SURF.COND.	13 3/8	1287.9	17 1/2	1297.0	1.47	FIT
LINER	9 5/8	2140.0	12 1/4	2141.0	1.42	FIT
OPEN HOLE		2976.8	8 1/2	2976.8	0.00	