

**General information**

Wellbore name	30/9-16
Type	EXPLORATION
Purpose	WILDCAT
Status	P&A
Factmaps in new window	link to map
Main area	NORTH SEA
Field	OSEBERG SØR
Discovery	30/9-16 K Oseberg Sør
Well name	30/9-16
Seismic location	NH9111- ROW 1047& COLUMN 713
Production licence	104
Drilling operator	Norsk Hydro Produksjon AS
Drill permit	789-L
Drilling facility	WEST VANGUARD
Drilling days	56
Entered date	14.06.1994
Completed date	08.08.1994
Release date	08.08.1996
Publication date	13.01.2015
Purpose - planned	WILDCAT
Reentry	NO
Content	OIL/GAS
Discovery wellbore	YES
1st level with HC, age	LATE JURASSIC
1st level with HC, formation	INTRA HEATHER FM SS
2nd level with HC, age	MIDDLE JURASSIC
2nd level with HC, formation	TARBERT FM
Kelly bushing elevation [m]	22.0
Water depth [m]	101.0
Total depth (MD) [m RKB]	3550.0
Final vertical depth (TVD) [m RKB]	3549.0
Maximum inclination [°]	4
Bottom hole temperature [°C]	131
Oldest penetrated age	EARLY JURASSIC
Oldest penetrated formation	EIRIKSSON FM
Geodetic datum	ED50
NS degrees	60° 15' 10.35" N
EW degrees	2° 45' 0.84" E



NS UTM [m]	6679756.73
EW UTM [m]	486174.38
UTM zone	31
NPDID wellbore	2361

Wellbore history

**General**

Well 30/9-16 was drilled on the Bjørgvin Arch south of the Oseberg Fault block in the North Sea. The primary objective was to prove hydrocarbon accumulations in the Tarbert Formation and the "NORE" (lower Brent Group) reservoir. Secondary objective was to test the hydrocarbon potential in the Cook Formation and Statfjord Group reservoirs within closure.

Operations and results

Wildcat well 30/9-16 was spudded with the semi-submersible installation West Vanguard on 14 June 1994 and drilled to TD at 3550 m in the Early Jurassic Eiriksson Formation. No significant problem was encountered in the operations. The well was drilled with spud mud down to 165 m, with ANCO 2000 mud from 165 m to 2668 m, and with KCl/polymer mud from 2668 m to TD.

Intra Heather Formation sandstone came in at 2685 m and proved to be gas bearing with GOC at 2706 m, based on geochemical data. Based on RFT pressure gradients the GOC is at 2711 m. The Tarbert Formation came in at 2718 m and was 101 m thick, 11 m thicker than prognosed. It was oil-bearing with an OWC at 2764 m. There is a 10 bars pressure difference in the oil zone, between 30/9-13 S and 30/9-16. The 30/9-9 Lower Ness oil gradient is 14 bars higher than the 30/9-16 oil gradient. The water gradient is only 1.5 bars higher than 30/9-13 S and three bars lower than 30/9-9. No hydrocarbons or shows were reported below OWC in the Brent Group, but weak shows, with gas shows at the top and oil shows below, were reported from the Statfjord Group at 3455 – 3475 m. Further, down to TD, these shows disappeared or became localised.

Four cores were cut. The three first were cut from 2694 m in the Heather Formation sandstone to 2796.4 m in the Tarbert Formation. Core 4 was cut from 3459 m to 3486.2 m in the upper part of the Statfjord Group. An RFT fluid sample was taken at 2727 m in the Tarbert Formation. It contained oil and water.

The well was permanently abandoned on 8 August 1994 as an oil and gas discovery.

Testing

Two drill stem tests were performed.

DST 1 tested the interval 2722 - 2753 m in the Tarbert Formation. It produced 264000 Sm³ gas and 1600 Sm³ oil/day through a 72/64" choke. The GOR was 165 Sm³/Sm³, the oil density was 0.836 g/cc density, and the gas gravity was 0.733 (air = 1) with 2.1 % CO₂ and 1.5 ppm H₂S. The flowing bottom hole temperature was 106.6 °C.

DST2 tested the interval 2685.1 - 2694.1 min the Intra-Heather Formation sandstone.

It produced 722000 Sm³ gas and 238 Sm³ oil/day through a 64/64" choke. The GOR was 3030 Sm³/Sm³, the condensate density was 0.836 g/cc density, and the gas gravity was 0.733 (air = 1) with 2.1 % CO₂ and 1.5 ppm H₂S. The flowing bottom hole temperature was 106.6 °C.

No water was produced in the tests.

Cuttings at the Norwegian Offshore Directorate

Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
1590.00	3550.00



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	2694.0	2722.4	[m]
2	2722.5	2759.7	[m]
3	2759.7	2796.4	[m]
4	3459.0	3486.2	[m]

Total core sample length [m]	129.4
Cores available for sampling?	YES

Core photos



2694-2699m



2699-2704m



2704-2709m



2709-2714m



2714-2719m



2719-2722m



2722-2727m



2727-2732m



2732-2737m



2737-2742m



2742-2747m



2747-2752m



2752-2757m



2757-2759m



2759-2764m



2764-2769m



2769-2774m



2774-2779m



2779-2784m



2784-2789m



2789-2794m



2794-2796m



3459-3464m



3464-3469m



3469-3474m



3474-3479m



3479-3484m



3484-3486m

Palynological slides at the Norwegian Offshore Directorate

Sample depth	Depth unit	Sample type	Laboratory
1590.0	[m]	DC	SPT
1610.0	[m]	DC	SPT
1630.0	[m]	DC	SPT
1660.0	[m]	DC	SPT
1680.0	[m]	DC	SPT
1700.0	[m]	DC	SPT
1720.0	[m]	DC	SPT
1750.0	[m]	DC	SPT
1780.0	[m]	DC	SPT
1800.0	[m]	DC	SPT
1820.0	[m]	DC	SPT
1840.0	[m]	DC	SPT
1860.0	[m]	DC	SPT
1880.0	[m]	DC	SPT
1900.0	[m]	DC	SPT
1930.0	[m]	DC	SPT



1950.0	[m]	DC	SPT
1970.0	[m]	DC	SPT
1990.0	[m]	DC	SPT
2010.0	[m]	DC	SPT
2030.0	[m]	DC	SPT
2050.0	[m]	DC	SPT
2070.0	[m]	DC	SPT
2090.0	[m]	DC	SPT
2110.0	[m]	DC	SPT
2130.0	[m]	DC	SPT
2140.0	[m]	DC	SPT
2150.0	[m]	DC	SPT
2170.0	[m]	DC	SPT
2190.0	[m]	DC	SPT
2205.0	[m]	DC	SPT
2225.0	[m]	DC	SPT
2245.0	[m]	DC	SPT
2265.0	[m]	DC	SPT
2285.0	[m]	DC	SPT
2305.0	[m]	DC	SPT
2325.0	[m]	DC	SPT
2345.0	[m]	DC	SPT
2365.0	[m]	DC	SPT
2385.0	[m]	DC	SPT
2395.0	[m]	DC	SPT
2405.0	[m]	DC	SPT
2425.0	[m]	DC	SPT
2445.0	[m]	DC	SPT
2465.0	[m]	DC	SPT
2485.0	[m]	DC	SPT
2505.0	[m]	DC	SPT
2525.0	[m]	DC	SPT
2545.0	[m]	DC	SPT
2565.0	[m]	DC	SPT
2585.0	[m]	DC	SPT
2605.0	[m]	DC	SPT
2625.0	[m]	DC	SPT
2645.0	[m]	DC	SPT
2655.0	[m]	DC	SPT
2667.0	[m]	DC	SPT



2670.0	[m]	SWC	SPT
2672.5	[m]	SWC	SPT
2679.0	[m]	SWC	SPT
2682.0	[m]	SWC	SPT
2684.0	[m]	SWC	SPT
2695.7	[m]	C	SPT
2707.8	[m]	C	SPT
2720.8	[m]	DC	SPT
2739.0	[m]	C	SPT
2796.5	[m]	C	SPT
2798.0	[m]	SWC	SPT
2807.0	[m]	SWC	SPT
2813.0	[m]	SWC	SPT
2817.0	[m]	DC	SPT
2825.0	[m]	DC	SPT
2830.0	[m]	SWC	SPT
2839.0	[m]	SWC	SPT
2850.0	[m]	DC	SPT
2855.5	[m]	SWC	SPT
2862.0	[m]	DC	SPT
2870.0	[m]	DC	SPT
2880.0	[m]	SWC	SPT
2910.0	[m]	DC	SPT
2917.0	[m]	DC	SPT
2925.0	[m]	DC	SPT
2940.0	[m]	SWC	SPT
2955.0	[m]	SWC	SPT
2965.0	[m]	DC	SPT
2976.0	[m]	SWC	SPT
2992.0	[m]	SWC	SPT
2998.0	[m]	SWC	SPT
3010.0	[m]	DC	SPT
3016.0	[m]	SWC	SPT
3020.0	[m]	DC	SPT
3033.0	[m]	SWC	SPT
3040.0	[m]	DC	SPT
3050.0	[m]	DC	SPT
3056.0	[m]	SWC	SPT
3070.0	[m]	SWC	SPT
3080.0	[m]	DC	SPT



3080.0	[m]	SWC	SPT
3100.0	[m]	DC	SPT
3110.0	[m]	SWC	SPT
3120.0	[m]	DC	SPT
3130.0	[m]	SWC	SPT
3140.0	[m]	DC	SPT
3150.0	[m]	SWC	SPT
3160.0	[m]	DC	SPT
3170.0	[m]	SWC	SPT
3185.0	[m]	SWC	SPT
3190.0	[m]	DC	SPT
3203.0	[m]	SWC	SPT
3210.0	[m]	DC	SPT
3220.0	[m]	SWC	SPT
3230.0	[m]	DC	SPT
3240.0	[m]	SWC	SPT
3250.0	[m]	DC	SPT
3260.0	[m]	DC	SPT
3265.0	[m]	SWC	SPT
3280.0	[m]	SWC	SPT
3295.0	[m]	SWC	SPT
3305.0	[m]	DC	SPT
3315.0	[m]	SWC	SPT
3325.0	[m]	DC	SPT
3335.0	[m]	SWC	SPT
3345.0	[m]	DC	SPT
3355.0	[m]	SWC	SPT
3360.0	[m]	DC	SPT
3370.0	[m]	DC	SPT
3383.0	[m]	SWC	SPT
3400.0	[m]	DC	SPT
3412.0	[m]	DC	SPT
3420.0	[m]	DC	SPT
3430.0	[m]	DC	SPT
3440.0	[m]	DC	SPT
3450.0	[m]	DC	SPT
3459.0	[m]	C	SPT
3465.0	[m]	DC	SPT
3475.0	[m]	DC	SPT
3475.0	[m]	C	SPT



3481.0	[m]	C	SPT
3490.0	[m]	DC	SPT
3500.0	[m]	DC	SPT
3510.0	[m]	DC	SPT
3521.0	[m]	SWC	SPT
3533.0	[m]	SWC	SPT
3540.0	[m]	DC	SPT
3550.0	[m]	DC	SPT

Oil samples at the Norwegian Offshore Directorate

Test type	Bottle number	Top depth MD [m]	Bottom depth MD [m]	Fluid type	Test time	Samples available
DST	DST1	2753.00	2722.00	OIL	23.04.1994 - 06:45	YES
DST	DST2	2694.10	2685.10	OIL	02.08.1994 - 12:00	YES

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
123	NORDLAND GP
639	UTSIRA FM
800	HORDALAND GP
800	NO FORMAL NAME
2120	ROGALAND GP
2120	BALDER FM
2170	SELE FM
2225	LISTA FM
2320	VÅLE FM
2386	SHETLAND GP
2386	HARDRÅDE FM
2587	KYRRE FM
2623	CROMER KNOLL GP
2623	RØDBY FM
2640	SOLA FM
2648	MIME FM
2652	VIKING GP
2652	DRAUPNE FM



2670	HEATHER FM
2685	INTRA HEATHER FM SS
2718	BRENT GP
2718	TARBERT FM
2820	NESS FM
2977	ETIVE FM
2989	RANNOCH FM
3001	DUNLIN GP
3001	DRAKE FM
3073	COOK FM
3140	BURTON FM
3267	AMUNDSEN FM
3457	STATFJORD GP
3457	NANSEN FM
3476	EIRIKSSON FM

Geochemical information

Document name	Document format	Document size [MB]
2361_GCH_1	pdf	0.37
2361_GCH_2	pdf	0.47

Documents - reported by the production licence (period for duty of secrecy expired)

Document name	Document format	Document size [MB]
2361_30_9_16_Completion_log	pdf	14.67
2361_30_9_16_Completion_report	pdf	19.85

Drill stem tests (DST)

Test number	From depth MD [m]	To depth MD [m]	Choke size [mm]
1.0	2722	2753	28.6
2.0	2685	2694	25.4

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





2.0				
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Test number	Oil [Sm3/day]	Gas [Sm3/day]	Oil density [g/cm3]	Gas grav. rel.air	GOR [m3/m3]
1.0	1604	264000	0.836		165
2.0	283	722000	0.750		3030

Logs

Log type	Log top depth [m]	Log bottom depth [m]
CST	2970	3550
DLL LSS GP GR CAL AMS	123	3353
FMI GR AMS	2658	3352
LDL CNL	1578	3532
NGT	2658	3301
NGT	2658	3523
RFT	2688	2990
RFT	2688	2790
RFT	3185	3519
VSP	460	3540

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	207.0	36	208.0	0.00	
SURF.COND.	13 3/8	1578.0	17 1/2	1588.0	1.70	LOT
INTERM.	9 5/8	2658.0	12 1/2	2668.0	1.60	FIT
LINER	7	2958.0	8 1/2	3550.0	0.00	

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
123	1.05			WATER BASED	14.06.1994
208	1.05			WATER BASED	15.06.1994
488	1.05			WATER BASED	17.06.1994



1155	1.05			WATER BASED	17.06.1994
1588	1.05			WATER BASED	20.06.1994
1588	1.05			WATER BASED	20.06.1994
1905	1.43	30.0	13.0	WATER BASED	24.06.1994
2271	1.43	29.0	17.0	WATER BASED	24.06.1994
2379	1.43	29.0	16.5	WATER BASED	28.06.1994
2522	1.43	28.0	15.5	WATER BASED	28.06.1994
2668	1.43	26.0	15.0	WATER BASED	28.06.1994
2668	1.43	27.0	14.5	WATER BASED	28.06.1994
2668	1.43	27.0	14.5	WATER BASED	30.06.1994
2668	1.45	24.0	16.0	WATER BASED	01.07.1994
2675	1.13	12.0	9.5	WATER BASED	08.08.1994
2694	1.12	20.0	12.5	WATER BASED	07.07.1994
2760	1.14	16.0	10.0	WATER BASED	07.07.1994
2872	1.14	15.0	11.5	WATER BASED	07.07.1994
2872	1.14	15.0	11.5	WATER BASED	07.07.1994
2958	1.43	14.0	10.0	WATER BASED	09.08.1994
2958	1.14	15.0	10.5	WATER BASED	22.07.1994
2958	1.13	20.0	12.0	WATER BASED	26.07.1994
2958	1.14	15.0	11.5	WATER BASED	01.08.1994
2958	1.13	12.0	9.5	WATER BASED	08.08.1994
2958	1.43	15.0	8.5	WATER BASED	09.08.1994
2958	1.13	20.0	12.0	WATER BASED	26.07.1994
2958	1.13	20.0	12.0	WATER BASED	27.07.1994
2958	1.13	20.0	12.0	WATER BASED	28.07.1994
2958	1.13	18.0	13.0	WATER BASED	29.07.1994
2958	1.13	15.0	12.5	WATER BASED	01.08.1994
2958	1.13	13.0	11.0	WATER BASED	02.08.1994
2958	1.13	13.0	11.5	WATER BASED	03.08.1994
2958	1.13	21.0	16.5	WATER BASED	15.07.1994
2958	1.13	14.0	13.5	WATER BASED	18.07.1994
2958	1.13	14.0	13.5	WATER BASED	18.07.1994
2958	1.13	14.0	14.0	WATER BASED	18.07.1994
2958	1.13	13.0	13.5	WATER BASED	19.07.1994
2958	1.13	13.0	13.5	WATER BASED	20.07.1994
2958	1.14	15.0	10.5	WATER BASED	21.07.1994
2958	1.13	11.0	11.0	WATER BASED	25.07.1994
2959	1.13	20.0	12.0	WATER BASED	26.07.1994
3040	1.12	19.0	11.0	WATER BASED	07.07.1994
3040	1.12	19.0	11.0	WATER BASED	07.07.1994



3265	1.30	23.0	21.0	WATER BASED	11.07.1994
3265	1.23	213.0	17.0	WATER BASED	12.07.1994
3445	1.30	22.0	16.5	WATER BASED	07.07.1994
3486	1.30	24.0	21.0	WATER BASED	11.07.1994
3550	1.30	24.0	21.0	WATER BASED	11.07.1994
3550	1.23	20.0	11.0	WATER BASED	13.07.1994
3550	1.30	24.0	21.0	WATER BASED	11.07.1994

Pressure plots

The pore pressure data is sourced from well logs if no other source is specified. In some wells where pore pressure logs do not exist, information from Drill stem tests and kicks have been used. The data has been reported to the NPD, and further processed and quality controlled by IHS Markit.

Document name	Document format	Document size [MB]
2361 Formation pressure (Formasjonstrykk)	pdf	0.23

