General information

Wellbore name	15/12-6 S
Type	EXPLORATION
Purpose	APPRAISAL
Status	RE-CLASS TO DEV
Factmaps in new window	link to map
Main area	NORTH SEA
Field	VARG
Discovery	15/12-4 Varg
Well name	15/12-6
Seismic location	ST 8802 - 381 SP. 948
Production licence	038
Drilling operator	Den norske stats oljeselskap a.s
Drill permit	644-L
Drilling facility	DEEPSEA BERGEN
Drilling days	78
Entered date	19.08.1990
Completed date	04.11.1990
Release date	04.11.1992
Publication date	15.08.2008
Purpose - planned	WILDCAT
Reclassified to wellbore	15/12-A-2
Reentry	NO
Content	OIL
Discovery wellbore	NO
1st level with HC, age	LATE JURASSIC
1st level with HC, formation	INTRA HEATHER FM SS
Kelly bushing elevation [m]	23.0
Water depth [m]	84.0
Total depth (MD) [m RKB]	3050.0
Final vertical depth (TVD) [m RKB]	3034.0
Maximum inclination [°]	11.7
Bottom hole temperature [°C]	128
Oldest penetrated age	TRIASSIC
Oldest penetrated formation	SKAGERRAK FM
Geodetic datum	ED50
NS degrees	58° 4' 40.3'' N
EW degrees	1° 53' 25.41'' E
NS UTM [m]	6438063.13

EW UTM [m]	434552.91
UTM zone	31
NPDID wellbore	1524

Wellbore history

Block 15/12 is situated between the Jæren High to the south, Central Graben to the south-southwest, Andrew Ridge to the west, Ling Graben to the north and Viking Graben to the north-northwest. Well 15/12-6 S was the third well within the license area. It was drilled ca 3 km north of the 15/12-4 Varg Discovery well, which found 1.5 oil column in Jurassic sandstone. The main objective of 15/12-6 S was to test the hydrocarbon potential in Oxfordian sandstone in the north-western segment of the Beta west structure. Secondary objectives were Palaeocene sandstones (Maureen formation) and Triassic sandstones. Due to possible shallow gas problems, the well was moved 100 south to avoid this problem.

Operations and results

Well 15/12-6 S was spudded 19 August 1990 with the semi-submersible rig Deepsea Bergen and drilled to 3050 m in the Triassic Skagerrak Formation. While drilling the 12 1/4" hole the penetration stopped at 2560 m. The BHA was pulled out and it was found that the MWD tool had been twisted off. The hole was cemented back and sidetracked from 2495 m with increased mud weight. Ran 7" liner to 3046 m, and cemented inside the liner to 2960 m. No shallow gas was encountered. The well was drilled with bentonite spud mud and CMC/seawater down to 615 m, with gypsum/polymer mud from 615 m to 2757 m, and with gel/lignosulphonate mud from 2757 m to TD.

Logs and shows indicated presence of hydrocarbons in the interval from 2428 to 2473 m in the late Cretaceous chalk but tests were not performed here due to tight formation. The Late Jurassic Oxfordian sandstone (Hugin Formation) came in at 2871 m, 80.5 m deeper than prognosed. It contained oil and from logs the OWC was found to be at 2943 m. There were no shows or other hydrocarbon indications below this depth.

A total of seven cores were cut, six in the interval 2838 to 2966 m and the seventh from 2980 to 2988.5 m. An FMT run in Oxfordian sandstone gave 12 pressure readings out of 27 attempts. One sample was taken at 2935.5 m. The sample contained a mixture of mud filtrate and formation water with traces of hydrocarbons.

The well was suspended on 4 November 1990 as an oil appraisal well, and was converted to development well (15/12-A-2).

Testing

Two DST tests were performed in this well:

DST 1 from 2922 - 2930 m produced 153.8 Sm3/d oil and 11.683 Sm3/d gas through a 12.7 mm choke. The GOR was 76 Sm3/Sm3. A breakthrough, possibly through a fault, occurred at the end of the cleanup flow in this test, and this totally changed well productivity and also altered the flowing temperature. Before the breakthrough the temperature was 127 deg C and still increasing. After breakthrough the temperature sunk to 123 deg C.

DST 2 from 2875 - 2895 m produced 866 Sm3/d oil and 52530 Sm3/d gas through a 15.9 mm choke. The GOR was 61 Sm3/Sm3, the oil density was 0.843 g/cm3 and the gas gravity was 0.740 (air = 1). The reservoir temperature was measured to 127.5 deg C.

Cuttings at the Norwegian Offshore Directorate

Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
620.00	2787.00

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	2838.0	2864.6	[m]
2	2865.0	2891.8	[m]
3	2892.0	2907.9	[m]
4	2910.0	2937.4	[m]
5	2937.6	2953.0	[m]
6	2953.0	2964.4	[m]
7	2980.0	2988.3	[m]

Total core sample length [m]	131.8
Cores available for sampling?	YES

Core photos


2838-2843m


2848-2853m


2853-2858m


2858-2863m


2863-2864m


2865-2870m


2870-2875m


2875-2880m


2880-2885m


2885-2890m


2890-2891m


2892-2897m


2897-2902m


2902-2907m


2907-2908m


2910-2915m


2915-2910m


2920-2925m


2925-2930m


2930-2935m


2935-2937m


2937-2942m


2942-2947m


2947-2952m


2952-2953m


2953-2958m


2958-2963m


2963-2964m


2980-2985m


2985-2988m

Palynological slides at the Norwegian Offshore Directorate

Sample depth	Depth unit	Sample type	Laboratory
1250.0	[m]	DC	GEOCH
1270.0	[m]	DC	GEOCH
1280.0	[m]	DC	GEOCH
1300.0	[m]	DC	GEOCH
1310.0	[m]	DC	GEOCH
1330.0	[m]	DC	GEOCH
1340.0	[m]	DC	GEOCH
1360.0	[m]	DC	GEOCH
1370.0	[m]	DC	GEOCH

1390.0	[m]	DC	GEOCH
1400.0	[m]	DC	GEOCH
1420.0	[m]	DC	GEOCH
1430.0	[m]	DC	GEOCH
1450.0	[m]	DC	GEOCH
1460.0	[m]	DC	GEOCH
1480.0	[m]	DC	GEOCH
1490.0	[m]	DC	GEOCH
1510.0	[m]	DC	GEOCH
1520.0	[m]	DC	GEOCH
1540.0	[m]	DC	GEOCH
1550.0	[m]	DC	GEOCH
1570.0	[m]	DC	GEOCH
1580.0	[m]	DC	GEOCH
1600.0	[m]	DC	GEOCH
1610.0	[m]	DC	GEOCH
1630.0	[m]	DC	GEOCH
1640.0	[m]	DC	GEOCH
1660.0	[m]	DC	GEOCH
1670.0	[m]	DC	GEOCH
1690.0	[m]	DC	GEOCH
1700.0	[m]	DC	GEOCH
1715.0	[m]	DC	GEOCH
1730.0	[m]	DC	GEOCH
1750.0	[m]	DC	GEOCH
1760.0	[m]	DC	GEOCH
1780.0	[m]	DC	GEOCH
1790.0	[m]	DC	GEOCH
1810.0	[m]	DC	GEOCH
1820.0	[m]	DC	GEOCH
1840.0	[m]	DC	GEOCH
1850.0	[m]	DC	GEOCH
1870.0	[m]	DC	GEOCH
1880.0	[m]	DC	GEOCH
1900.0	[m]	DC	GEOCH
1910.0	[m]	DC	GEOCH
1930.0	[m]	DC	GEOCH
1940.0	[m]	DC	GEOCH
1951.0	[m]	SWC	STATOIL
1960.0	[m]	DC	GEOCHEM

1970.0	[m]	DC	GEOCHE
1990.0	[m]	DC	GEOCHE
2000.0	[m]	DC	GEOCHE
2020.0	[m]	DC	GEOCHE
2030.0	[m]	DC	GEOCHE
2050.0	[m]	DC	GEOCHE
2060.0	[m]	DC	GEOCHE
2080.0	[m]	DC	GEOCHE
2110.0	[m]	DC	GEOCHE
2120.0	[m]	DC	GEOCHE
2140.0	[m]	DC	GEOCHE
2150.0	[m]	DC	GEOCHE
2170.0	[m]	DC	GEOCHE
2180.0	[m]	DC	GEOCHE
2200.0	[m]	DC	GEOCHE
2210.0	[m]	DC	GEOCHE
2230.0	[m]	DC	GEOCHE
2240.0	[m]	DC	GEOCHE
2260.0	[m]	DC	GEOCHE
2270.0	[m]	DC	GEOCHE
2290.0	[m]	DC	GEOCHE
2300.0	[m]	DC	GEOCHE
2306.0	[m]	DC	GEOCHE
2310.0	[m]	SWC	STATOIL
2318.0	[m]	DC	GEOCHEM
2324.0	[m]	DC	GEOCHE
2342.0	[m]	DC	GEOCHE
2360.0	[m]	DC	GEOCHE
2372.0	[m]	DC	GEOCHE
2384.0	[m]	DC	GEOCHE
2402.0	[m]	DC	GEOCHE
2417.0	[m]	DC	GEOCHE
2417.0	[m]	SWC	STATOIL
2426.0	[m]	DC	GEOCHEM
2432.0	[m]	DC	GEOCHE
2736.0	[m]	SWC	STATOIL
2747.5	[m]	SWC	STATOI
2755.0	[m]	SWC	STATOI
2761.3	[m]	SWC	STATOI
2768.5	[m]	SWC	STATOI

2780.5	[m]	SWC	STATOI
2787.5	[m]	SWC	STATOI
2791.5	[m]	SWC	STATOI
2803.5	[m]	SWC	STATOI
2810.9	[m]	SWC	STATOI
2821.9	[m]	SWC	STATOI
2835.5	[m]	SWC	STATOI
2839.2	[m]	C	STATOI
2840.5	[m]	C	
2840.6	[m]	C	
2845.2	[m]	C	STATOIL
2845.2	[m]	C	STATOI
2849.5	[m]	C	
2850.5	[m]	C	STATOIL
2856.5	[m]	C	STATOI
2861.7	[m]	C	STATOI
2866.3	[m]	C	STATOI
2868.5	[m]	C	
2868.6	[m]	C	STATOIL
2869.5	[m]	C	
2871.4	[m]	C	STATOIL
2871.5	[m]	C	
2887.3	[m]	C	STATOIL
2896.4	[m]	C	STATOI
2899.1	[m]	C	
2900.8	[m]	C	STATOIL
2901.5	[m]	C	STATOI
2912.5	[m]	C	
2913.5	[m]	C	
2913.6	[m]	C	STATOIL
2926.3	[m]	C	STATOI
2929.5	[m]	C	STATOI
2936.5	[m]	C	
2936.7	[m]	C	STATOIL
2942.7	[m]	C	STATOI
2943.7	[m]	C	STATOI
2947.4	[m]	C	STATOI
2947.4	[m]	C	
2950.2	[m]	C	STATOIL
2951.0	[m]	C	STATOI

2951.8	[m]	C	STATOI
2953.9	[m]	C	STATOI
2957.2	[m]	C	STATOI
2960.0	[m]	C	STATOI
2986.2	[m]	C	STATOI
3047.0	[m]	SWC	STATOI

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	TEST1	2922.00	2930.00		13.10.1990 - 20:00	YES
DST	TEST2	2875.00	2895.00		24.10.1990 - 19:30	YES

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
107	NORDLAND GP
1020	UTSIRA FM
1252	HORDALAND GP
2311	ROGALAND GP
2311	BALDER FM
2323	SELE FM
2351	LISTA FM
2421	VÅLE FM
2428	SHETLAND GP
2428	TOR FM
2548	HOD FM
2708	BLODØKS FM
2732	CROMER KNOLL GP
2746	VIKING GP
2746	DRAUPNE FM
2834	HEATHER FM
2871	VESTLAND GP
2871	HUGIN FM
2949	SLEIPNER FM
2979	NO GROUP DEFINED

2979	SKAGERRAK FM

Geochemical information

Document name	Document format	Document size [MB]
1524_1	pdf	0.50
1524_2	pdf	0.15
1524_3	pdf	1.96

Documents - older Norwegian Offshore Directorate WDSS reports and other related documents

Document name	Document format	Document size [MB]
1524_01_WDSS_General_Information	pdf	0.22
1524_02_WDSS_completion_log	pdf	0.18

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

Document name	Document format	Document size [MB]
1524_15_12_6_S_COMPLETION_LOG	pdf	2.12
1524_15_12_6_S_COMPLETION_REPORT	pdf	13.79

Drill stem tests (DST)

Test number	From depth MD [m]	To depth MD [m]	Choke size [mm]
1.0	2922	2930	12.7
2.0	2875	2895	15.9

Test number	Final shut-in pressure [MPa]	Final flow pressure [MPa]	Bottom hole pressure [MPa]	Downhole temperature [°C]
1.0		10.000		123
2.0		8.000		127

Test number	Oil [Sm3/day]	Gas [Sm3/day]	Oil density [g/cm3]	Gas grav. rel.air	GOR [m3/m3]
1.0	154	11683	0.850	0.795	76
2.0	866	52530	0.843	0.740	61

Logs

Log type	Log top depth [m]	Log bottom depth [m]
ACBL VDL GR	95	1701
ACBL VDL GR	1450	2926
CDL CNL GR CAL	2345	2756
DIFL AC SP GR	2742	3048
DIFL ACL SP GR	1699	2756
DIPLOG GR	2401	2755
DIPLOG GR	2743	3049
FMT GR	2429	2470
FMT HP GR	2976	3032
MLL DLL GR	2742	3019
MWD - GR RES DIR	170	3090
SP	2742	3049
VELOCITY	500	3050
ZDL CN SL	2742	3049

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	167.0	36	167.0	0.00	LOT
INTERM.	20	599.0	26	615.0	1.56	LOT
INTERM.	13 3/8	1700.0	17 1/2	1715.0	1.82	LOT
INTERM.	9 5/8	2743.0	12 1/4	2757.0	1.97	LOT
LINER	7	3046.0	8 1/2	3050.0	0.00	LOT

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
615	0.00			WATER BASED	23.08.1990

615	1.03			DUMMY	27.08.1990
618	1.15	15.0	5.0	WATER BASED	27.08.1990
1355	1.15	21.0	5.5	WATER BASED	27.08.1990
1710	1.30	21.0	5.5	WATER BASED	28.08.1990
1710	1.30	23.0	6.5	WATER BASED	29.08.1990
1710	1.30	23.0	6.0	WATER BASED	30.08.1990
1710	1.30	22.0	6.0	WATER BASED	31.08.1990
1851	1.40	20.0	6.0	WATER BASED	04.09.1990
2155	1.40	20.0	6.0	WATER BASED	04.09.1990
2200	1.50	22.0	6.5	WATER BASED	04.09.1990
2310	1.50	23.0	6.0	WATER BASED	04.09.1990
2310	1.50	23.0	6.0	WATER BASED	05.09.1990
2310	1.50	23.0	6.5	WATER BASED	06.09.1990
2310	1.55	23.0	6.5	WATER BASED	07.09.1990
2310	1.55	23.0	7.0	WATER BASED	10.09.1990
2310	1.50	22.0	6.5	WATER BASED	04.09.1990
2310	1.55	23.0	6.0	WATER BASED	10.09.1990
2310	1.58	23.0	8.0	WATER BASED	14.09.1990
2310	1.61	25.0	10.0	WATER BASED	17.09.1990
2310	1.61	26.0	9.5	WATER BASED	17.09.1990
2310	1.61	24.0	10.0	WATER BASED	18.09.1990
2310	1.61	25.0	10.0	WATER BASED	17.09.1990
2310	1.55	23.0	6.0	WATER BASED	10.09.1990
2310	1.55	23.0	7.0	WATER BASED	13.09.1990
2345	1.50	23.0	6.0	WATER BASED	04.09.1990
2474	1.50	22.0	6.5	WATER BASED	04.09.1990
2495	1.55	23.0	6.5	WATER BASED	07.09.1990
2511	1.55	23.0	7.0	WATER BASED	10.09.1990
2520	1.55	23.0	6.0	WATER BASED	10.09.1990
2560	1.50	23.0	6.5	WATER BASED	06.09.1990
2560	1.50	23.0	6.0	WATER BASED	05.09.1990
2587	1.55	23.0	6.0	WATER BASED	10.09.1990
2743	1.32	15.0	4.0	WATER BASED	25.09.1990
2743	1.32	28.0	4.0	WATER BASED	05.10.1990
2743	1.32	30.0	5.0	WATER BASED	08.10.1990
2743	1.32	28.0	5.0	WATER BASED	08.10.1990
2743	1.32	28.0	4.5	WATER BASED	08.10.1990
2743	1.32	24.0	5.0	WATER BASED	26.09.1990
2743	1.32	22.0	5.0	WATER BASED	27.09.1990
2743	1.32	24.0	4.0	WATER BASED	01.10.1990

2743	1.32	28.0	5.0	WATER BASED	01.10.1990
2743	1.32	23.0	5.0	WATER BASED	26.09.1990
2743	1.32	28.0	4.0	WATER BASED	01.10.1990
2743	1.32	21.0	4.0	WATER BASED	01.10.1990
2743	1.32	21.0	4.0	WATER BASED	02.10.1990
2743	1.32	26.0	4.0	WATER BASED	03.10.1990
2743	1.32	28.0	4.0	WATER BASED	04.10.1990
2757	1.61	26.0	9.5	WATER BASED	17.09.1990
2757	1.61	24.0	10.0	WATER BASED	18.09.1990
2757	1.61	25.0	10.0	WATER BASED	17.09.1990
2757	1.61	25.0	10.0	WATER BASED	20.09.1990
2757	1.61	25.0	10.0	WATER BASED	20.09.1990
2757	1.61	26.0	10.0	WATER BASED	21.09.1990
2757	1.61	26.0	10.0	WATER BASED	24.09.1990
2757	1.61	26.0	10.0	WATER BASED	25.09.1990
2757	1.55	23.0	7.0	WATER BASED	13.09.1990
2757	1.61	25.0	10.0	WATER BASED	17.09.1990
2757	1.58	23.0	8.0	WATER BASED	14.09.1990
2830	1.32	15.0	4.0	WATER BASED	25.09.1990
2865	1.32	23.0	5.0	WATER BASED	26.09.1990
2876	1.32	28.0	4.0	WATER BASED	05.10.1990
2876	1.32	28.0	5.0	WATER BASED	08.10.1990
2876	1.32	30.0	5.0	WATER BASED	08.10.1990
2876	1.32	28.0	4.5	WATER BASED	08.10.1990
2910	1.32	24.0	5.0	WATER BASED	26.09.1990
2952	1.32	22.0	5.0	WATER BASED	27.09.1990
2966	1.32	24.0	4.0	WATER BASED	01.10.1990
2985	1.32	28.0	4.0	WATER BASED	01.10.1990
2985	1.32	28.0	5.0	WATER BASED	01.10.1990
2985	1.32	21.0	4.0	WATER BASED	02.10.1990
2985	1.32	21.0	4.0	WATER BASED	01.10.1990
3019	1.32	26.0	4.0	WATER BASED	03.10.1990
3050	1.32	28.0	4.0	WATER BASED	04.10.1990
3050	1.32	30.0	5.0	WATER BASED	08.10.1990
3050	1.32	28.0	4.0	WATER BASED	05.10.1990
3050	1.32	28.0	5.0	WATER BASED	08.10.1990
3050	1.32	28.0	4.5	WATER BASED	08.10.1990

Thin sections at the Norwegian Offshore Directorate

Depth	Unit
2892.20	[m]
2892.80	[m]

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]
1524_Formation_pressure_(Formasjonstrykk)	pdf	0.22