General information

Wellbore name	2/4-3
Type	EXPLORATION
Purpose	APPRAISAL
Status	P&A
Factmaps in new window	link to map
Main area	NORTH SEA
Field	EKOFISK
Discovery	2/4-2 Ekofisk
Well name	2/4-3
Seismic location	
Production licence	018
Drilling operator	Phillips Petroleum Company Norway
Drill permit	35-L
Drilling facility	OCEAN VIKING
Drilling days	125
Entered date	27.01.1970
Completed date	31.05.1970
Release date	31.05.1972
Publication date	02.04.2007
Purpose - planned	APPRAISAL
Reentry	NO
Content	OIL
Discovery wellbore	NO
1st level with HC, age	PALEOCENE
1st level with HC, formation	EKOFISK FM
2nd level with HC, age	LATE CRETACEOUS
2nd level with HC, formation	TOR FM
Kelly bushing elevation [m]	27.0
Water depth [m]	71.0
Total depth (MD) [m RKB]	3431.0
Maximum inclination [°]	16.4
Bottom hole temperature [°C]	138
Oldest penetrated age	LATE CRETACEOUS
Oldest penetrated formation	TOR FM
Geodetic datum	ED50
NS degrees	56° 32' 42.12'' N
EW degrees	3° 14' 55.49'' E
NS UTM [m]	6266910.18

EW UTM [m]	515295.52
UTM zone	31
NPDID wellbore	97

Wellbore history

General

Well 2/4-3 (named 2/4-2X by operator Phillips) was drilled to appraise the 2/4-2 Ekofisk discovery in the southern Norwegian North Sea. The target was to test the Tertiary and the top of the Late Cretaceous.

Operations and results

Well 2/4-3 was spudded with the semi-submersible installation Ocean Viking on 27 January 1970 and drilled to TD at 3431 m in the Late Cretaceous Tor Formation. The well was planned vertical, but the deviation was significant. Maximum deviation was 1 deg at 618 m, 3 deg at 1077 m, 11.5 deg at 1316 m, 16.4 deg at 1605 m, 10 deg at 2167 m, 4 deg at 3002 m, and 1.7 deg at 3292 m. This indicates that TVD RKB is ca 30 m shallower than MD RKB at TD, but exact records are not available. The well was drilled with seawater and hi-vis mud down to 619 m, with CaCl2 / Dextrid (modified potato starch) from 619 m to 1695 m, and with lignosulphonate / seawater from 1695 m to TD. One - four percent diesel was added to the mud below 619 m.

The Danian chalk (Ekofisk Formation) was encountered at 3090 m, and the Late Cretaceous chalk (Tor Formation) at 3253 m. The formations were tested hydrocarbon bearing from 3124 m to 3319 m.

Eighteen conventional cores were cut in the well. Core 1was cut in the interval 1705 - 1717 m with only 0.6 m core recovered. Cores 2 - 13 were cut in the Danian chalk (Ekofisk Formation), while cores 14 - 18 were cut in the Maastrichtian chalk (Tor Formation). No fluid samples were taken on wire line.

The well was permanently abandoned on 31 May 1970 as an oil appraisal.

Testing

Ten drill stem tests were carried out through perforations in the 7" liner. DST 1 and 2 tested the intervals 3352 - 3362 m and 3331 - 3341 in the in the Tor Formation. They produced only water. DST 3 to 9 tested different zones in the interval from 3124 to 3319 m in the Ekofisk and Tor Formations. They produced gas and oil. The oils were in the range 33.2 to 36 deg API and the GOR varied from 182 to 243 Sm3/Sm3. DST 10 tested the interval 3016 - 3024 m in the Sele Formation. It flowed 2.4 Sm3 of water, and then died. Reservoir temperatures at mid perforation were reported to be: 134.4 deg C (at 3317.7 m) in DST 3, 133.6 deg C (at 3281.2 m) in DST 4, and 132.2 deg C (at 3238.5 m) in DST 5.

Cuttings at the Norwegian Offshore Directorate

Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
627.90	3431.13

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
2	10220.0	10225.0	[ft]
3	10226.0	10233.0	[ft]
4	10235.0	10252.0	[ft]
5	10250.0	10276.0	[ft]
6	10276.0	10279.0	[ft]
7	10279.0	10289.0	[ft]
8	10294.0	10310.0	[ft]
9	10314.0	10324.0	[ft]
10	10379.0	10388.0	[ft]
11	10385.0	10395.0	[ft]
12	10550.0	10573.0	[ft]
13	10665.0	10669.0	[ft]
14	10669.0	10679.0	[ft]
15	10679.0	10708.0	[ft]
16	10750.0	10769.0	[ft]
17	10870.0	10894.5	[ft]
18	10894.5	10949.0	[ft]

Total core sample length [m]	84.4
Cores available for sampling?	YES

Palynological slides at the Norwegian Offshore Directorate

Sample depth	Depth unit	Sample type	Laboratory
10668.0	[ft]	C	OD

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
98	NORDLAND GP
1730	HORDALAND GP
2960	ROGALAND GP
2960	BALDER FM

2969	SELE FM
2976	LISTA FM
3005	VIDAR FM
3023	LISTA FM
3076	VÅLE FM
3090	SHETLAND GP
3090	EKOFISK FM
3253	TOR FM

Composite logs

Document name	Document format	Document size [MB]
97	pdf	0.43

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

Document name	Document format	Document size [MB]
97_01_WDSS_General_Information	pdf	1.05

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

Document name	Document format	Document size [MB]
97_01_2_4_3 (2X)_Completion_Report_and_Completion_log	pdf	11.81
97_02_2_4_3(2X)_Well_Recompletion_Report	pdf	9.41
97_03_2_4_3(2X)_Well_Completion_Report	pdf	0.12
97_04_2_4_3 (2X)_Individual_Well_Completion_Record	pdf	1.18
97_05_2_4_3(2X)_Drill_Stem_Tests	pdf	55.84
97_05_2_4_3(2X)_Reservoir_Fluid_Studies	pdf	1.40
97_05_2_4_3 (2X)_Reservoir_Fluid_Study_DST_1-4	pdf	29.21
97_05_2_4_3 (2X)_Reservoir_Fluid_Study_DST_5-10	pdf	29.53
97_05_2_4_3 (2X)_Reservoir_Fluid_Study_DST_6	pdf	1.19

97_05_2_4_3 (2X)_Reservoir_Fluid_Study_DST_6C-7-8-9	pdf	1.24
97_06_2_4_3 (2X)_Petrography_Environment_of_Deposition	pdf	32.20
97_07_2_4_3(2X)_Mud_Report_1	pdf	27.19
97_07_2_4_3(2X)_Mud_Report_2	pdf	19.24

Drill stem tests (DST)

Test number	From depth MD [m]	To depth MD [m]	Choke size [mm]
1.0	3354	3363	25.4
2.0	3332	3341	25.4
3.0	3317	3320	19.0
4.0	3268	3296	28.5
5.0	3235	3244	19.0
6.0	3195	3226	6.3
7.0	3195	3226	19.0
8.0	3139	3148	6.0
9.0	3124	3154	25.4
10.0	3124	3224	19.0
11.0	3015	3023	25.4

Test number	Final shut-in pressure [MPa]	Final flow pressure [MPa]	Bottom hole pressure [MPa]	Downhole temperature [°C]
1.0				
2.0				
3.0	7.300		27.500	
4.0				
5.0	28.000			
6.0	28.500		46.000	
7.0	28.000		33.000	
8.0	28.000		46.000	
9.0	28.000		20.000	
10.0	28.000		38.000	
11.0				

Test number	Oil [Sm3/day]	Gas [Sm3/day]	Oil density [g/cm3]	Gas grav. rel.air	GOR [m3/m3]
1.0					
2.0					
3.0	323	58581	0.855		
4.0	328	62967	0.845		
5.0	172	36337	0.853		
6.0	166	35799	0.848		
7.0	609	129812	0.854		
8.0	186	39337	0.847		
9.0	326	79240	0.849		
10.0	595	132925	0.859		
11.0					

Logs

Log type	Log top depth [m]	Log bottom depth [m]
CBL	2947	3379
CDM	610	3429
CDS	1402	2012
DIR	607	3430
FDC	1629	3429
GR	98	607
GRN	2942	3372
IES	607	3429
LL-7	3008	3429
MLL-C	3008	3429
SGR	607	1629
SGR-C	1629	3426
SNP	3008	3429
VDL	2988	3384
VELOCITY	607	3426
AA	3008	3425

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	131.0	36	131.0	0.00	LOT
SURF.COND.	20	607.0	26	619.0	0.00	LOT
INTERM.	13 3/8	1629.0	17 1/2	1633.0	0.00	LOT
INTERM.	9 5/9	3007.0	12 1/4	3018.0	0.00	LOT
LINER	7	3389.0	8 1/2	3432.0	0.00	LOT

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
619	1.03			seawater	
1153	1.70			cacl/broxin	
1632	1.71			seaw/broxin	
2320	1.71			seaw/broxin	
3018	1.71			seaw/broxin	
3225	1.71			seaw/broxin	

Thin sections at the Norwegian Offshore Directorate

Depth	Unit
10679.00	[ft]
10685.00	[ft]
10759.00	[ft]
149.00	[m]
150.00	[m]
151.00	[m]
156.00	[m]
157.00	[m]
160.00	[m]
161.00	[m]
162.00	[m]
165.00	[m]
170.00	[m]