General information

Wellbore name	24/6-2
Type	EXPLORATION
Purpose	WILDCAT
Status	P&A
Factmaps in new window	link to map
Main area	NORTH SEA
Field	ALVHEIM
Discovery	24/6-2 Alvheim
Well name	24/6-2
Seismic location	NH 9603 INLINE 716 & X-LINE 4914
Production licence	203
Drilling operator	Norsk Hydro Produksjon AS
Drill permit	929-L
Drilling facility	TRANSOCEAN LEADER
Drilling days	45
Entered date	25.05.1998
Completed date	08.07.1998
Release date	08.07.2000
Publication date	29.05.2002
Purpose - planned	WILDCAT
Reentry	NO
Content	OIL/GAS
Discovery wellbore	YES
1st level with HC, age	PALEOCENE
1st level with HC, formation	HEIMDAL FM
Kelly bushing elevation [m]	23.5
Water depth [m]	124.0
Total depth (MD) [m RKB]	2722.0
Final vertical depth (TVD) [m RKB]	2705.7
Maximum inclination [°]	16.5
Bottom hole temperature [°C]	76
Oldest penetrated age	PALEOCENE
Oldest penetrated formation	VÅLE FM
Geodetic datum	ED50
NS degrees	59° 33' 32.41'' N
EW degrees	1° 57' 17.26'' E
NS UTM [m]	6602917.98
EW UTM [m]	440925.36

UTM zone	31
NPDID wellbore	3397

Wellbore history

General

Well 24/6-2 was designed to test the hydrocarbon potential of the A2 North Heimdal T60 sand prospect within the Lista Formation in the northern part of the license acreage in block 24/6. A secondary target was defined in the A1 North Hermod T80 sand within the Sele Formation. The well should also test the seismic amplitudes in an area with indications of the presence of the Hermod sand. The well was planned to be drilled to a total depth of 2774 m within the Shetland Group.

Operations and results

Well 24/6-2 was drilled with the semi-submersible rig "Transocean Leader". It was spudded on 26 May 1998 and reached a total depth of 2722 m in the Paleocene Våle Formation on 18 June 1998. The well was drilled water based with bentonite mud to 1331 m and with KCl / Polymer mud from 1331 to TD. "BP PCD 208" (polyalkylene glycol) was added to the KCl / Polymer mud from 1802 m to TD (through the 8 1/2" section).

As TD was set in the Våle Formation the target Shetland Group was not encountered in the well. Both oil and gas were encountered within the Heimdal T60 sand. The gas zone extended from the top of the reservoir at 2099m and down to the oil-gas contact at 2151m (52m gross) and the oil extended down to the oil- water contact at 2168m (17m gross). The reservoir quality is generally excellent, but locally it is reduced either by fines or by calcite cement within what appear to be calcite nodules. The massive channel sands in the upper part of the reservoir confirm the braided channel model used for the T60 sand. Lower down in the reservoir oil zone much more fine material is present as laminations. Some of these units appear as shales on the gamma log, but are in fact fine-grained, argillaceous sands. No Hermod T80 sands were encountered in the well, nor was the "High Acoustic Interval" that was used to map the apparent sand distribution identified on the logs. Twelve cores were cut in the well from 2010 m in the lower part of the Balder Formation Tuff Member, through the Sele Formation and upper Lista Formation shale and down to under the oil-water contact in the Heimdal Formation at 2192 m (182 m in all). Recovery was generally excellent and in some cases over 100% due to gas expansion. The sands in the cores are generally unconsolidated and friable especially in the lower cores. This made plug cutting for core analysis difficult even after core 11 and 12 were frozen. MDT wireline oil samples were collected from 2164 m and 2167 m in the Heimdal Formation.

The well was permanently plugged and abandoned as an oil and gas discovery on 8 July 1998.

Testing

One drill stem test was run in the Heimdal Formation oil zone (perforation 2156.75 - 2165.75 m). The well flowed with a stable flow rate of 550 Sm3/day and 44.000 Sm3/day of gas through a 48/64" choke. Oil density was measured as 0.855 gm/cc. Gas gravity was 0.690 gm/cc and the GOR was 80 Sm3/Sm3. Water was produced during the higher flow rates.

Cuttings at the Norwegian Offshore Directorate

Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
1340.00	2195.00

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	2010.0	2011.3	[m]
2	2012.0	2028.8	[m]
3	2029.0	2057.0	[m]
4	2057.0	2062.9	[m]
5	2075.0	2075.6	[m]
6	2076.0	2083.6	[m]
7	2084.0	2102.0	[m]
8	2102.0	2119.9	[m]
9	2120.0	2138.8	[m]
10	2138.0	2155.5	[m]
11	2156.0	2174.3	[m]
12	2174.0	2192.0	[m]

Total core sample length [m]	168.6
Cores available for sampling?	YES

Core photos


2010-2011m


2012-2017m


2017-2022m


2022-2027m


2027-2028m


2029-2034m


2034-2039m


2039-2044m


2044-2049m


2049-2054m


2054-2057m


2057-2062m


2062-2063m


2075-2076m


2076-2081m


2081-2083m


2084-2089m


2089-2094m


2094-2099m


2099-2102m


2102-2107m


2107-2112m


2112-2117m


2117-2120m


2120-2125m


2125-2130m


2130-2135m


2135-2138m


2138-2143m


2143-2148m


2148-2153m


2153-2155m


2156-2161m


2161-2166m


2166-2171m


2171-2174m


2174-2179m


2179-2184m


2184-2189m


2189-2192m

Palynological slides at the Norwegian Offshore Directorate

Sample depth	Depth unit	Sample type	Laboratory
1400.0	[m]	DC	RRI
1420.0	[m]	DC	RRI
1440.0	[m]	DC	RRI
1460.0	[m]	DC	RRI
1480.0	[m]	DC	RRI
1500.0	[m]	DC	RRI
1520.0	[m]	DC	RRI
1540.0	[m]	DC	RRI
1560.0	[m]	DC	RRI
1580.0	[m]	DC	RRI
1600.0	[m]	DC	RRI
1620.0	[m]	DC	RRI
1640.0	[m]	DC	RRI
1660.0	[m]	DC	RRI
1680.0	[m]	DC	RRI
1700.0	[m]	DC	RRI
1720.0	[m]	DC	RRI
1740.0	[m]	DC	RRI
1760.0	[m]	DC	RRI
1780.0	[m]	DC	RRI
1800.0	[m]	DC	RRI
1817.0	[m]	SWC	RRI
1822.0	[m]	SWC	RRI
1831.0	[m]	SWC	RRI
1842.0	[m]	SWC	RRI
1850.0	[m]	SWC	RRI
1859.0	[m]	SWC	RRI
1869.0	[m]	SWC	RRI
1881.0	[m]	SWC	RRI

1892.0	[m]	SWC	RRI
1899.0	[m]	SWC	RRI
1901.0	[m]	SWC	RRI
1910.0	[m]	SWC	RRI
1920.0	[m]	DC	RRI
1930.0	[m]	SWC	RRI
1939.0	[m]	SWC	RRI
1953.0	[m]	SWC	RRI
1957.0	[m]	SWC	RRI
1965.0	[m]	SWC	RRI
1971.0	[m]	SWC	RRI
1972.0	[m]	DC	RRI
1977.0	[m]	DC	RRI
1981.0	[m]	SWC	RRI
1987.0	[m]	SWC	RRI
1992.0	[m]	SWC	RRI
1994.0	[m]	SWC	RRI
2000.0	[m]	SWC	RRI
2000.0	[m]	DC	RRI
2010.0	[m]	C	RRI
2014.0	[m]	C	RRI
2018.0	[m]	C	RRI
2022.0	[m]	C	RRI
2026.0	[m]	C	RRI
2031.0	[m]	C	RRI
2034.0	[m]	C	RRI
2038.0	[m]	C	RRI
2042.0	[m]	C	RRI
2046.0	[m]	C	RRI
2050.0	[m]	C	RRI
2058.0	[m]	C	RRI
2062.0	[m]	C	RRI
2078.0	[m]	C	RRI
2082.0	[m]	C	RRI
2098.0	[m]	C	RRI
2117.0	[m]	C	RRI
2127.0	[m]	C	RRI
2141.0	[m]	C	RRI
2147.0	[m]	C	RRI
2152.0	[m]	C	RRI

2154.0	[m]	C	RRI
2156.0	[m]	C	RRI
2158.0	[m]	C	RRI
2161.0	[m]	C	RRI
2162.0	[m]	C	RRI
2163.0	[m]	C	RRI
2195.0	[m]	DC	RRI
2209.0	[m]	SWC	RRI
2216.0	[m]	SWC	RRI
2225.0	[m]	SWC	RRI
2238.0	[m]	SWC	RRI
2250.0	[m]	SWC	RRI
2262.0	[m]	SWC	RRI
2270.0	[m]	DC	RRI
2281.0	[m]	SWC	RRI
2327.0	[m]	SWC	RRI
2344.0	[m]	SWC	RRI
2347.0	[m]	SWC	RRI
2362.0	[m]	SWC	RRI
2370.0	[m]	DC	RRI
2380.0	[m]	DC	RRI
2393.0	[m]	SWC	RRI
2407.0	[m]	SWC	RRI
2416.0	[m]	SWC	RRI
2439.0	[m]	SWC	RRI
2456.0	[m]	SWC	RRI
2483.0	[m]	SWC	RRI
2494.0	[m]	SWC	RRI
2505.0	[m]	SWC	RRI
2510.0	[m]	DC	RRI
2521.0	[m]	SWC	RRI
2530.0	[m]	DC	RRI
2542.0	[m]	SWC	RRI
2555.0	[m]	SWC	RRI
2567.0	[m]	SWC	RRI
2582.0	[m]	SWC	RRI
2597.0	[m]	SWC	RRI
2600.0	[m]	DC	RRI
2613.0	[m]	SWC	RRI
2626.0	[m]	SWC	RRI

2630.0	[m]	DC	RRI
2648.0	[m]	SWC	RRI
2659.0	[m]	SWC	RRI
2670.0	[m]	DC	RRI
2674.0	[m]	SWC	RRI
2679.0	[m]	SWC	RRI
2690.0	[m]	SWC	RRI

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	2165.75	2156.75		30.06.1998 - 16:00	YES

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
148	NORDLAND GP
394	UTSIRA FM
680	HORDALAND GP
707	SKADE FM
958	NO FORMAL NAME
1183	GRID FM
1279	NO FORMAL NAME
1905	ROGALAND GP
1905	BALDER FM
2015	SELE FM
2054	LISTA FM
2099	HEIMDAL FM
2535	LISTA FM
2590	VÅLE FM
2622	TY FM
2678	VÅLE FM

Geochemical information

Document name	Document format	Document size [MB]
3397_1	pdf	1.99
3397_2	pdf	2.24

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

Document name	Document format	Document size [MB]
3397_24_6_2_COMPLETION_LOG	.pdf	1.27
3397_24_6_2_COMPLETION_REPORT	.pdf	52.99

Drill stem tests (DST)

Test number	From depth MD [m]	To depth MD [m]	Choke size [mm]
1.0	2166	2157	19.0

Test number	Final shut-in pressure [MPa]	Final flow pressure [MPa]	Bottom hole pressure [MPa]	Downhole temperature [°C]
1.0	4.800		18.680	69

Test number	Oil [Sm3/day]	Gas [Sm3/day]	Oil density [g/cm3]	Gas grav. rel.air	GOR [m3/m3]
1.0	550	44000	0.860	0.690	80

Logs

Log type	Log top depth [m]	Log bottom depth [m]
CST GR	1809	2720
FMI NGT	2720	2797
HALS DSI TLD CNL SP GRL GR	147	2720
MDT GR	2102	2205
MWD DPR GR-DIR	147	2722
VSP GR	1600	2710

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	221.0	36	221.0	0.00	LOT
INTERM.	13 3/8	1326.0	17 1/2	1331.0	0.00	LOT
INTERM.	9 5/8	1797.0	12 1/4	1802.0	1.81	LOT
OPEN HOLE		2722.0	8 1/2	2722.0	0.00	LOT

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
488	1.05			WATER BASED	
1285	1.05			WATER BASED	
1331	1.05			WATER BASED	
1429	1.36	22.0		WATER BASED	
1802	1.36	25.0		WATER BASED	
1822	1.25	23.0		WATER BASED	
2010	1.25	29.0		WATER BASED	
2056	1.26	26.0		WATER BASED	
2102	1.26	25.0		WATER BASED	
2138	1.25	23.0		WATER BASED	
2174	1.25	22.0		WATER BASED	
2192	1.25	24.0		WATER BASED	
2303	1.25	20.0		WATER BASED	
2304	1.25	20.0		WATER BASED	
2593	1.25	22.0		WATER BASED	
2722	0.00	26.0		WATER BASED	

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]
3397_Formation_pressure_(Formasjonstrykk)	pdf	0.23