General information

Wellbore name	35/11-13
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	BYRDING
Discovery	35/11-13 Byrding
Well name	35/11-13
Seismic location	MN92001R03:inline934 & crossline 976
Production licence	090
Drilling operator	Norsk Hydro Produksjon AS
Drill permit	1092-L
Drilling facility	DEEPSEA TRYM
Drilling days	72
Entered date	18.03.2005
Completed date	28.05.2005
Release date	28.05.2007
Publication date	28.02.2008
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
Kelly bushing elevation [m]	25.0
Water depth [m]	362.0
Total depth (MD) [m RKB]	3291.5
Final vertical depth (TVD) [m RKB]	3291.0
Maximum inclination [°]	2
Bottom hole temperature [°C]	122
Oldest penetrated age	MIDDLE JURASSIC
Oldest penetrated formation	HEATHER FM
Geodetic datum	ED50
NS degrees	61° 9' 44.1'' N
EW degrees	3° 32' 21.4'' E
NS UTM [m]	6781140.46

EW UTM [m]	529019.63
UTM zone	31
NPDID wellbore	5063

Wellbore history

General

Well 35/11-13 is an exploration well in PL 090B on the Astero prospect, which is located north of the Fram West field. The primary objectives were to test the presence and type of hydrocarbons in the Oxfordian Turbidite sands of the Astero prospect. The chosen location was designed to test the Astero prospect within structural closure and stratigraphic trap, close to the top of the structure, in an area where there was good HC indication with thick reservoir sand thickness, leaving acceptable up dip volumes.

Operations and results

Well 35/11-13 was spudded with the semi-submersible installation Deepsea Trym on 18 March 2005 and drilled to TD at 3296 m in sediments of the Late Jurassic Heather Formation. The well was drilled without significant technical problems or delays. The mud used was spud mud down to 701 m and "Aquadrill" glycol mud from 701 m to TD.

Water wet Paleocene sandstones were penetrated at 1697 - 1752 m (Heimdal Formation) and at 1842 - 1923 m (Ty Formation). The well encountered a 111 m thick Draupne Formation at 2902 m. The Heather Formation was encountered at 3013 m with Intra-Heather Oxfordian turbiditic sandstones from 3096 m to 3206 m. The sandstones were hydrocarbon bearing and from MDT pressure test results, a gas oil contact was inferred at 3098 m and an oil water contact (FWL) at 3137 m.

Two cores were cut in the interval 3100 to 3142 m in the Oxfordian turbidites. They cores comprised mainly sandstones with occasional thin siltstones. MDT fluid samples were taken at four levels across the reservoir: 3097.0 m (gas and 0.789 g/cm3 oil), 3107.0 m (0.848 g/cm3 Oil), 3128.0 m (Oil), and 3157.5 m (Water).

The well was permanently abandoned on 28 May 2005 as an oil and gas discovery.

Testing

A Drill Stem Test was undertaken at 3111.5 to 3130 m in the oil-bearing zone of the Oxfordian sands. A fixed choke size of 32/64" was selected for the main flow period achieving average flow rates of 500 m3/day oil and 78000 m3/day of gas (a total of 2.7 m3 produced water was recorded). A maximum of 2.5 ppm H2S and 6 % CO2 was measured during this period. The oil gravity at 15 deg C was 36 deg API and the GOR was 160 Sm3/Sm3. The formation temperature at mid perforation was determined to 118 deg C.

Cuttings at the Norwegian Offshore Directorate

Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
710.00	3292.00

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	3100.0	3114.4	[m]
2	3115.0	3134.3	[m]

Total core sample length [m]	33.7
Cores available for sampling?	YES

Palynological slides at the Norwegian Offshore Directorate

Sample depth	Depth unit	Sample type	Laboratory
3104.4	[m]	C	GEOSTRAT
3105.3	[m]	C	GEOSTR
3106.8	[m]	C	GEOSTR
3109.5	[m]	C	GEOSTR
3115.2	[m]	C	GEOSTR
3125.8	[m]	C	GEOSTR
3127.5	[m]	C	GEOSTR
3132.8	[m]	C	GEOSTR
3133.7	[m]	C	GEOSTR

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	TEST 1	0.00	0.00	OIL	12.05.2005 - 17:15	YES

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
387	NORDLAND GP
763	HORDALAND GP
1541	ROGALAND GP

1541	BALDER FM
1553	LISTA FM
1598	SELE FM
1697	NO FORMAL NAME
1752	LISTA FM
1769	VÅLE FM
1842	NO FORMAL NAME
1923	VÅLE FM
1938	SHETLAND GP
1938	JORSALFARE FM
2088	KYRRE FM
2565	TRYGGVASON FM
2626	BLODØKS FM
2646	SVARTE FM
2671	CROMER KNOLL GP
2671	RØDBY FM
2700	ÅSGARD FM
2902	VIKING GP
2902	DRAUPNE FM
3013	HEATHER FM
3096	INTRA HEATHER FM SS
3206	HEATHER FM

Geochemical information

Document name	Document format	Document size [MB]
5063_1	pdf	0.38
5063_2	pdf	0.31

Logs

Log type	Log top depth [m]	Log bottom depth [m]
MDT GR	3097	3205
MDT GR	3097	3157
MSCT GR	2960	3151
MWD LWD - DIR ECD	386	476
MWD LWD - DIR GR RES ECD	476	3291
SP DSI HRLA PEX ECS	2925	3268

VSP GR	1611	3290

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	471.0	36	474.0	0.00	LOT
SURF.COND.	20	695.0	26	701.0	1.47	LOT
INTERM.	13 3/8	1751.0	17 1/2	1757.0	1.64	LOT
INTERM.	9 5/8	2924.0	12 1/4	2932.0	1.70	LOT
LINER	7	3290.0	8 1/2	3291.0	0.00	LOT

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
441	1.05			WATER BASED	
474	1.50			WATER BASED	
701	1.20	13.0		WATER BASED	
923	1.20	12.0		WATER BASED	
1500	1.30	11.0		WATER BASED	
1757	1.34	17.0		WATER BASED	
1781	1.30	16.0		WATER BASED	
2555	1.30	15.0		WATER BASED	
2690	1.30	11.0		WATER BASED	
2814	1.30	14.0		WATER BASED	
2932	1.30	16.0		WATER BASED	
3100	1.30	15.0		WATER BASED	
3142	1.30	17.0		WATER BASED	
3290	1.10			WATER BASED	
3291	1.30	18.0		WATER BASED	

Thin sections at the Norwegian Offshore Directorate

Depth	Unit
3133.00	[m]
3123.76	[m]
3111.43	[m]
3103.50	[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]
5063_Formation_pressure_(Formasjonstrykk)	pdf	0.22