General information

Wellbore name	2/5-10
Type	EXPLORATION
Purpose	WILDCAT
Status	P&A
Factmaps in new window	link to map
Main area	NORTH SEA
Well name	2/5-10
Seismic location	SH 8903-103 SP. 370/SH 82-411 SP. 484
Production licence	067
Drilling operator	Norsk Agip AS
Drill permit	761-L
Drilling facility	POLAR PIONEER
Drilling days	96
Entered date	23.05.1993
Completed date	26.08.1993
Release date	26.08.1995
Publication date	24.09.2003
Purpose - planned	WILDCAT
Reentry	NO
Content	OIL SHOWS
Discovery wellbore	NO
Kelly bushing elevation [m]	23.0
Water depth [m]	65.0
Total depth (MD) [m RKB]	4701.0
Final vertical depth (TVD) [m RKB]	4700.0
Maximum inclination [°]	2.8
Bottom hole temperature [°C]	165
Oldest penetrated age	TRIASSIC
Oldest penetrated formation	SKAGERRAK FM
Geodetic datum	ED50
NS degrees	56° 41' 21.66'' N
EW degrees	3° 29' 27.32'' E
NS UTM [m]	6283054.46
EW UTM [m]	530071.86
UTM zone	31
NPDID wellbore	2044

Wellbore history

General

Exploration well 2/5-10 is located in the Central Graben on the Steinbit Terrace. The well was drilled with Late Jurassic sandstone of Oxfordian age, in a combination trap with structural and dip closing elements, as the primary target. Secondary targets were the Middle Jurassic Bryne Formation in the same combination trapping configuration, while the Late Cretaceous Chalk and the Lower Cretaceous Cromer Knoll Group were stratigraphic trap targets. After reaching TD evaluation of the cores and electric logs concluded that a fault had been intercepted within the main Jurassic target, justifying a sidetrack in search of a better pay zone. Well 2/5-10 was therefore plugged back in and well 2/5-10 A sidetracked.

Operations and results

Well 2/5-10 was spudded with the semi-submersible installation "Polar Pioneer" on 23 May 1993 and drilled to TD at 4701 m in rocks of the Triassic Smith Bank Formation. The well was drilled with sea water and hi-vis sweeps down to 865 m, with KCl/Polymer mud from 865 m to 4235 m, and with HPHT/Polymer mud from 4235 m to TD. Shallow gas was encountered after drilling the 8 1/2" pilot hole, prior to opening up the hole to 26" and running 20" casing. In order to ensure a good 20" casing cement job without compromising rig safety it was decided to plug back the gas bearing zone and set 20" casing at 509m, 291m shallower than originally planned 800m. To avoid gas migration the cement slurries for the 20" and 13 3/8" were redesigned with gas tight cement (microblock added).

Top reservoir was encountered at 4582 m, 174 m deeper than prognosis due to complex geology and higher than expected shale interval velocities in the Late Jurassic. The main part of the Late Jurassic sandstone target was removed by faulting, and Triassic strata were encountered 5 m below top reservoir through a fault plane. The Late Jurassic sandstone was highly affected by the faulting, and the reservoir quality was poor. The secondary target Middle Jurassic Bryne Formation was not present. The Smith Bank Formation was encountered 5 m below top reservoir through a fault plane. A small hydrocarbon accumulation was found in the main target Late Jurassic Oxfordian age sandstone. Weak shows were encountered also in the Chalk and in the Vestland Group.

Two conventional cores were cut from 4575 m in the Late Jurassic sandstone and down to 4591 m in the Smith Bank Formation. Two samples collected at 4594.3 m and 4583.1 m in the Vestland Group during the MDT run contained weak hydrocarbon shows, a discontinuous film of oil in sample #1 and gas traces in sample #2. Because of a failure of the MDT tool's equalization valve, a leakage between the two chambers was considered likely and therefore the location of these hydrocarbon shows is doubtful. However they should more likely be attributed to the top part of the Late Jurassic SST as confirmed by the sample #3 collected in the following RFT run which contained at 4594.3 m (same depth as sample #1) formation water. Only mud filtrate was finally recovered in the sample #4 taken at 4614 m. Well bore 2/5-10 was subsequently plugged back and permanently abandoned on 26 August 1993 as a well with shows.

Sidestep 2/5-10 A was kicked off from 4306 m in 2/5-10 on 27 August 1993 and was drilled to a total depth of 4715 m in the Triassic Smith Bank Formation. The well was drilled with HPHT/polymer mud from kick-off to TD. The expected reservoir was encountered at 4616 m with a thickness of 57 m and with poor to medium reservoir characteristics. The shows encountered were poor, and no hydrocarbons could be extracted using downhole testing tools. Three conventional cores were cut in the Late Jurassic sandstone from 4612 m to 4640.1 m. Four RFT samples collected at 4619 m,

4624.1 m, 4630 m and 4657 m contained formation water and mud filtrate with only traces of oil. Sidetrack 2/5-10 A was permanently plugged and abandoned on 25 September 1993 as a well with shows.

Testing

No drill stem test was performed.

Cuttings at the Norwegian Offshore Directorate

Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
820.00	4700.00

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	4575.0	4584.7	[m]
2	4584.7	4590.0	[m]

Total core sample length [m]	15.0
Cores available for sampling?	YES

Core photos


4575-4580m


4580-4584m


4584-4589m


4589-4591m

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
88	NORDLAND GP
1733	HORDALAND GP
3052	ROGALAND GP

3052	BALDER FM
3062	SELE FM
3072	LISTA FM
3181	VÅLE FM
3214	SHETLAND GP
3214	EKOFISK FM
3342	TOR FM
3735	HOD FM
4295	CROMER KNOLL GP
4295	RØDBY FM
4298	TYNE GP
4298	FARSUND FM
4582	VESTLAND GP
4587	NO GROUP DEFINED
4587	SKAGERRAK FM

Composite logs

Document name	Document format	Document size [MB]
2044	pdf	0.61

Geochemical information

Document name	Document format	Document size [MB]
2044_1	pdf	1.95
2044_2	pdf	1.44
2044_3	pdf	0.93

Logs

Log type	Log top depth [m]	Log bottom depth [m]
BGT SLS GR AMS	509	938
CBL VDL GR	2100	4219
CBL VDL GR CCL	88	2241
CST GR	4350	4710
DIL SLS GR AMS	88	694

DIL SLS MSFL GR AMS	934	4235
FMI	4219	4709
FMS GR	0	0
LDL CNL NGS DLL AMS	4219	4706
LDL CNL NGS FMS AMS	2254	4236
MDT-PO GR	4582	4600
MFCT GR AMS	88	2000
MWD - GR RAR RPD DIR	185	2265
MWD - GR RAR RPD DIR	3956	3963
MWD - GR RAR RPD DIR	4298	4701
MWD - GR RSN DIR	2265	3956
MWD - GR RSN DIR	4077	4111
PI BHC MSFL GR AMS	4219	4709
RFT GR	3264	4127
RFT GR	4586	4614
VSP	250	4230
VSP	4219	4709

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	185.0	36	185.0	0.00	LOT
INTERM.	20	509.0	26	510.0	0.00	LOT
INTERM.	13 3/8	2254.0	17 1/2	2255.0	0.00	LOT
INTERM.	9 5/8	4217.0	12 1/4	4219.0	0.00	LOT
OPEN HOLE		4701.0	8 3/8	4701.0	0.00	LOT

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
65	1.06			WATER BASED	
110	1.65	24.0		WATER BASED	
185	1.06			WATER BASED	
520	1.30	20.0		WATER BASED	
815	1.06	22.0		WATER BASED	
1037	1.30	18.0		WATER BASED	
1254	1.30	20.0		WATER BASED	

1619	1.43	20.0		WATER BASED	
1959	1.50	40.0		WATER BASED	
2102	1.66	23.0		WATER BASED	
2129	1.55	52.0		WATER BASED	
2265	1.64	43.0		WATER BASED	
2541	1.62	43.0		WATER BASED	
2649	1.62	42.0		WATER BASED	
2753	1.62	37.0		WATER BASED	
2994	1.62	49.0		WATER BASED	
3131	1.62	49.0		WATER BASED	
3210	1.62	42.0		WATER BASED	
3211	1.62	51.0		WATER BASED	
3252	1.62	51.0		WATER BASED	
3311	1.62	46.0		WATER BASED	
3361	1.62	48.0		WATER BASED	
3471	1.62	49.0		WATER BASED	
3499	1.61	53.0		WATER BASED	
3502	1.61	49.0		WATER BASED	
3590	1.61	42.0		WATER BASED	
3652	1.61	40.0		WATER BASED	
3680	1.61	46.0		WATER BASED	
3730	1.61	44.0		WATER BASED	
3837	1.61	41.0		WATER BASED	
3952	1.61	42.0		WATER BASED	
3989	1.61	45.0		WATER BASED	
4035	1.61	44.0		WATER BASED	
4077	1.61	44.0		WATER BASED	
4100	1.61	47.0		WATER BASED	
4111	1.61	51.0		WATER BASED	
4115	2.06	39.0		WATER BASED	
4144	1.65	50.0		WATER BASED	
4227	1.65	44.0		WATER BASED	
4235	1.66	35.0		WATER BASED	
4286	1.98	44.0		WATER BASED	
4292	2.08	37.0		WATER BASED	
4298	1.98	45.0		WATER BASED	
4352	1.98	43.0		WATER BASED	
4395	1.98	42.0		WATER BASED	
4520	2.08	47.0		WATER BASED	
4547	2.02	30.0		WATER BASED	

4585	2.08	33.0		WATER BASED	
4591	2.08	32.0		WATER BASED	
4653	2.08	27.0		WATER BASED	
4701	2.08	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]
2044_Formation_pressure_(Formasjonstrykk)	pdf	0.21