

**General information**

Wellbore name	24/9-1
Type	EXPLORATION
Purpose	WILDCAT
Status	P&A
Factmaps in new window	link to map
Main area	NORTH SEA
Well name	24/9-1
Seismic location	LINE CN 24-25 R SP.130
Production licence	039
Drilling operator	Conoco Norway Inc.
Drill permit	152-L
Drilling facility	ROSS RIG (1)
Drilling days	126
Entered date	29.02.1976
Completed date	03.07.1976
Release date	03.07.1978
Publication date	01.12.2004
Purpose - planned	WILDCAT
Reentry	NO
Content	DRY
Discovery wellbore	NO
Kelly bushing elevation [m]	25.0
Water depth [m]	118.0
Total depth (MD) [m RKB]	4907.0
Bottom hole temperature [°C]	127
Oldest penetrated age	LATE JURASSIC
Oldest penetrated formation	HEATHER FM
Geodetic datum	ED50
NS degrees	59° 16' 9.48" N
EW degrees	1° 47' 31.18" E
NS UTM [m]	6570815.42
EW UTM [m]	431138.99
UTM zone	31
NPDID wellbore	344

Wellbore history

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**General**

Wildcat well 24/9-1 is located in the Vana Sub-basin in the Southern Viking Graben, about 11 km east of the border to British sector. The well was drilled to test a large, dip-closed structure located in the centre of the Viking Graben. The target was Late Jurassic sandstones. Two sandstone intervals were expected in the well, with a possible gross thickness of about 250-300 m. The prognosis was based on a correlation with the UK wells 16/7-1, 16/8-1 and the Norwegian well 15/3-1 which are situated in a similar position as 24/9-1 relative to the eastern boundary fault of the Viking Graben.

The well is Reference Well for the Svarte, Tryggvason, Kyrre, and Jorsalfare Formations.

Operations and results

Well 24/9-1 was spudded with the semi-submersible installation Ross Rig on 29 February 1976 and drilled to TD at 4907 m in the Late Jurassic Heather Formation. Below the 20" casing at 758.3 m the Formations drilled contained abundant sand and was drilled extremely fast. This created problems as the solids removal system on the rig was incapable of removing the sand as fast as it was drilled. In addition the polymer mud system chosen did not provide sufficient fluid loss control in the porous formation and large amounts of fluids were lost to the formation. From ca 2440 m to TD at 2752 m in the 17 1/2" hole low penetration rates was a problem. Of 126 rig days 20 % was counted as lost time, but the total time spent on the well was still less than the originally estimated 139 days. Problems related to tight/sloughing hole and down hole tool failure accounted for roughly half of the lost time. The well was drilled with seawater down to 256 m, with lime / lignosulphonate from 256 m to 3983 m, with Dextrid / Lignosulphonate from 3983 m to 4613 m, and with lime / lignosulphonate from 4613 m to TD.

Tertiary sandstones were encountered in the Grid Formation (1131 m to 1420 m), The Heimdal Formation (2202 m to 2497 m), and the Ty Formation (2545 m to 2659 m). The well encountered Jurassic shales at 4330 m with a high increase in background gas and additional ethane to pentane gases. The Draupne Formation proved to be 470 m thick, while The Heather Formation was encountered at 4800 m and continued down to TD. Only thin Jurassic sandstones (Intra Heather Formation Sandstones) were penetrated.

Both cuttings and sidewall cores revealed that Late Jurassic sandstones had low visible porosities. Evaluation of petrophysical logs substantiate this observation. The net thickness sandstone was approximately 18.5 m, none of the individual beds were, however, thicker than 4 m, scattered throughout a gross of about 490 m. Average porosity was 13 % and average Sw is 40%.

No oil shows were found while drilling and only two of the sidewall cores at 2582 and 4832 m showed trace of cut fluorescence. Gas shows and log analysis suggested that the Jurassic sands are gas bearing. Down to a depth of about 4325 m only minor amounts of methane background gas were encountered. Below this depth down to TD, variable but largely high amounts of gas lighter than hexane were recorded. Shows of gas were continuous and the highest amounts are associated with some of the thin sand-stringers. Shale gas was also present. The Draupne Formation represent a significant source rock with TOC typically in the range 4 % to 6 % and Hydrogen Index typically in the range 130 to 160 mg HC/g rock. Maturity is advanced with Vitrinite reflectance %Ro from 0.9 to 1.3, which imply that most of the hydrocarbon potential already has been realised and expelled. The Heather Formation shales are also source rocks, but slightly leaner (TOC = 3% to 5%). One core was cut in the interval 4441.9 m to 4460.2 m in the Draupne Formation. Fluid sampling was attempted on wire line at 4815 m and at 4816.5 m, but failed due to tight Formation.

The well was considered a valid test of the Late Jurassic sands, which were demonstrated to be thin with no commercial hydrocarbons. The well was plugged and abandoned on 3 July 1976 with gas shows in Late Jurassic sandstones.

Testing



No drill stem test was performed

Cuttings at the Norwegian Offshore Directorate

Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
256.00	4907.00

Cuttings available for sampling?	NO
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Cores at the Norwegian Offshore Directorate

Core sample number	Core sample - top depth	Core sample - bottom depth	Core sample depth - uom
1	4441.9	4460.1	[m]

Total core sample length [m]	18.2
Cores available for sampling?	YES

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
143	NORDLAND GP
440	UTSIRA FM
793	HORDALAND GP
1131	GRID FM
1264	NO FORMAL NAME
1358	GRID FM
1420	NO FORMAL NAME
2024	ROGALAND GP
2024	BALDER FM
2098	SELE FM
2202	HEIMDAL FM
2497	LISTA FM
2545	TY FM
2659	VÅLE FM
2752	SHETLAND GP
2752	JORSALFARE FM
3117	KYRRE FM



3638	TRYGGVASON FM
3783	BLODØKS FM
3804	SVARTE FM
3992	CROMER KNOLL GP
3992	RØDBY FM
4050	SOLA FM
4170	ÅSGARD FM
4330	VIKING GP
4330	DRAUPNE FM
4800	HEATHER FM
4815	INTRA HEATHER FM SS
4837	HEATHER FM

Composite logs

Document name	Document format	Document size [MB]
344	pdf	0.76

Geochemical information

Document name	Document format	Document size [MB]
344 1	pdf	2.37
344 1 Geochemical analysis of core samples from well 24 9 1	pdf	2.03
344 2 A maturation and source rock study of well 24 9 1	pdf	3.64

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

Document name	Document format	Document size [MB]
344 01 WDSS General Information	pdf	0.25

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





Document name	Document format	Document size [MB]
344 1 Completion Report & Completion log	pdf	24.84
344 2 A maturation and source rock study of well 24 9 1	pdf	3.64

Logs

Log type	Log top depth [m]	Log bottom depth [m]
BHC GR	256	763
BHC GR	3650	3999
BHC GR CAL	3981	4170
BHC GR CAL	3981	4453
BHC GR CAL	3981	4612
CBL	1240	3983
CNL FDC GR CAL	760	2749
DLL SP	4300	4901
FDC CNL GR CAL	4300	4905
FDC GR CAL	3680	3999
HDT	4300	4900
ISF BHC GR SP	760	2750
ISF BHC GR SP	2670	3715
ISF BHC GR SP	4430	4904
ISF GR CAL	3650	4000
ISF GR SP	3981	4614
ML MLL	4300	4905
VBL	3750	3980

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	256.0	36	257.0	0.00	LOT
INTERM.	20	758.0	26	760.0	0.00	LOT
INTERM.	13 3/8	2736.0	17 1/2	2739.0	0.00	LOT
INTERM.	9 5/8	3986.0	12 1/4	3986.0	0.00	LOT
OPEN HOLE		4907.0	8 1/2	4907.0	0.00	LOT

Drilling mud





Depth MD [m]	Mud weight [g/cm ³]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
256	1.01			water mud	
765	1.10	65.0		water based	
1770	1.25	65.0		water based	
2193	1.25	59.0		water based	
2322	1.31	54.0		water based	
2665	1.31	52.0		water based	
2872	1.26	50.0		water based	
3998	1.66	45.0		water based	
4039	1.79	55.0		water based	