General information

Wellbore name	31/5-3
Type	EXPLORATION
Purpose	APPRAISAL
Status	P&A
Factmaps in new window	link to map
Main area	NORTH SEA
Field	TROLL
Discovery	31/2-1 (Troll Vest)
Well name	31/5-3
Seismic location	8007 - 134 & SP 566
Production licence	085
Drilling operator	Saga Petroleum ASA
Drill permit	405-L
Drilling facility	TREASURE SAGA
Drilling days	61
Entered date	10.04.1984
Completed date	09.06.1984
Release date	09.06.1986
Publication date	06.06.2006
Purpose - planned	APPRAISAL
Reentry	NO
Content	OIL/GAS
Discovery wellbore	NO
1st level with HC, age	LATE JURASSIC
1st level with HC, formation	SOGNEFJORD FM
Kelly bushing elevation [m]	26.0
Water depth [m]	327.0
Total depth (MD) [m RKB]	2250.0
Final vertical depth (TVD) [m RKB]	2249.0
Maximum inclination [°]	3.2
Bottom hole temperature [°C]	90
Oldest penetrated age	EARLY JURASSIC
Oldest penetrated formation	DRAKE FM
Geodetic datum	ED50
NS degrees	60° 44' 37.17'' N
EW degrees	3° 26' 20.44'' E
NS UTM [m]	6734474.49
EW UTM [m]	523936.46

UTM zone	31
NPDID wellbore	101

Wellbore history

General

Well 31/5-3 was drilled in the southern part of the Troll West Field. The main objectives were to appraise and test the reservoir qualities and the lithology of the Late Jurassic Sognefjord Formation.

Operations and results

Well 31/5-3 was spudded with the semi-submersible installation Treasure Saga on 10 April 1984 and drilled to TD at 2250 m in the Late Jurassic Drake Formation. At 1426 m circulation was lost, and 450 bbls mud was lost to formation before the well was stabilized. The well was drilled with spud mud down to 950 m, with KCl/polymer mud from 950 m to 1497 m, and with a Pro-wate/NaCl-brine/pro-salt mud from 1497 m to TD.

The well proved the existence of a stratigraphy ranging from Lower Jurassic to Quarternary. The Tertiary and Quaternary sections were mainly composed of claystones, with a minor sand developed in Pleistocene at the base of the Nordland Group. The Jurassic was composed of sandstone and siltstones in the Viking and Brent Groups, and mainly claystone with an interbedded sandstone layer in the Dunlin Group. One major unconformity was found between Early Portlandian and Maastrichtian. Four other unconformities were also observed in the well, from Aalenian to Bathonian, from Early Kimmeridgian to Early Portlandian, from Late Oligocene to Pliocene, and one intra-Oligocene.

The Sognefjord Formation was hydrocarbon bearing with a 39.5 m hydrocarbon column, of which 17.5 m was gas and 22 m was oil. Top reservoir was found at 1555 m, the GOC was at 1572.5 m, and the OWC at 1594.5 m. Oil shows persisted further down, but decreased from 1595 m and disappeared below 1622 m. No other interval in the well was hydrocarbon bearing.

Three cores were cut from 1550 m to 1622.5 m in the Late Jurassic Sognefjord Formation. FMT gas samples were taken at 1557 m and 1567. Three more FMT fluid samples were taken in the oil zone at 1577 m, 1591 m, and at 1592 m.

The well was permanently abandoned on 9 June 1984 as a gas and oil appraisal well.

Testing

Two drill stem tests were performed in the Sognefjord Formation. Both the intervals were gravel packed. DST # 1 from 1606 - 1610 m produced formation water. DST # 2 from 1582.3 - 1586.3 m produced 1100 Sm3/day of oil with a constant GOR of approximately 55Sm3/Sm3. Gas coning occurred as the rate was increased to 1550 m /day. The GOR stabilized at its original value as the rate was reduced to 1050 Sm3 /day

Cuttings at the Norwegian Offshore Directorate

Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
440.00	2250.00

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	1550.0	1568.0	[m]
2	1568.0	1594.4	[m]
3	1595.0	1622.0	[m]

Total core sample length [m]	71.4
Cores available for sampling?	YES

Core photos


1550-1555m


155-1560m


1560-1565m


1565-1568m


1568-1573m


1573-1578m


1578-1583m


1583-1588m


1588-1593m


1593-1594m


1595-1600m


1600-1605m


1605-1610m


1610-1615m


1615-1620m



1620-1622m

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	DST2	1582.30	1586.30	OIL	02.06.1984 - 19:00	YES

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
353	NORDLAND GP
780	HORDALAND GP
1340	ROGALAND GP
1340	BALDER FM
1402	SELE FM
1477	LISTA FM
1547	VIKING GP
1547	DRAUPNE FM
1555	SOGNEFJORD FM
1666	HEATHER FM
1718	FENSFJORD FM
1848	KROSSFJORD FM
1905	HEATHER FM
1992	BRENT GP
2103	DUNLIN GP
2103	DRAKE FM

Composite logs

Document name	Document format	Document size [MB]
101	pdf	0.35

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

Document name	Document format	Document size [MB]
101_01_WDSS_General_Information	pdf	0.22
101_02_WDSS_completion_log	pdf	0.22

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

Document name	Document format	Document size [MB]
101_01_31_5_3_Completion_Report_and_Completion_log	pdf	12.08

Drill stem tests (DST)

Test number	From depth MD [m]	To depth MD [m]	Choke size [mm]
1.0	1606	1618	0.0
2.0	1582	1586	44.5

Test number	Final shut-in pressure [MPa]	Final flow pressure [MPa]	Bottom hole pressure [MPa]	Downhole temperature [°C]
1.0				71
2.0				

Test number	Oil [Sm3/day]	Gas [Sm3/day]	Oil density [g/cm3]	Gas grav. rel.air	GOR [m3/m3]
1.0					
2.0	1230	59040		0.650	48

Logs

Log type	Log top depth [m]	Log bottom depth [m]
CDL CNL GR	1497	1911
CDL CNL GR	1905	2244
CDL GR	425	964
CDL GR	950	1506
DIFL LSBHC GR	425	965
DIFL LSBHC GR	950	1512
DIFL LSBHC GR	1497	1914
DIFL LSBHC GR	1905	2246
DIPLOG	1492	1900
DIPLOG	1905	2243
DLL MLL GR	1497	1912
FMT	1555	1663
FMT	1948	2168
GR	327	430
SPECTRALOG	1497	1906
VELOCITY	970	2230

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	425.0	36	430.0	0.00	LOT
SURF.COND.	20	950.0	26	963.0	1.89	LOT
INTERM.	13 3/8	1497.0	17 1/2	1515.0	1.57	LOT
INTERM.	9 5/8	1905.0	12 1/4	2236.0	1.73	LOT
OPEN HOLE		2253.0	8 1/2	2253.0	0.00	LOT

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
426	1.03			WATER BASED	30.04.1984
430	1.03			WATER BASED	30.04.1984
440	1.08			WATER BASED	30.04.1984
791	1.14			WATER BASED	30.04.1984
837	1.16			WATER BASED	30.04.1984
963	1.20	47.0	25.0	WATER BASED	30.04.1984

963	1.20	47.0	25.0	WATER BASED	30.04.1984
963	1.18			WATER BASED	30.04.1984
965	1.14			WATER BASED	30.04.1984
1080	1.30	49.0	28.0	WATER BASED	30.04.1984
1177	1.25	47.0	24.0	WATER BASED	30.04.1984
1395	1.30	49.0	28.0	WATER BASED	30.04.1984
1426	1.30	46.0	24.0	WATER BASED	30.04.1984
1515	1.30	46.0	23.0	WATER BASED	30.04.1984
1515	1.30	46.0	23.0	WATER BASED	30.04.1984
1515	1.30	46.0	23.0	WATER BASED	30.04.1984
1518	1.18	80.0	60.0	WATER BASED	30.04.1984
1568	1.18	78.0	50.0	WATER BASED	30.04.1984
1595	1.00	78.0	51.0	WATER BASED	03.05.1984
1623	1.18	69.0	45.0	WATER BASED	03.05.1984
1730	1.18	77.0	52.0	WATER BASED	03.05.1984
1880	1.18	80.0	54.0	WATER BASED	03.05.1984
1915	1.18	79.0	56.0	WATER BASED	03.05.1984
1915	1.18	78.0	53.0	WATER BASED	03.05.1984
1915	1.18	85.0	60.0	WATER BASED	03.05.1984
1915	1.19	87.0	58.0	WATER BASED	04.05.1984
1915	1.19	75.0	52.0	WATER BASED	07.05.1984
1915	1.19	87.0	58.0	WATER BASED	04.05.1984
1915	1.18	78.0	53.0	WATER BASED	03.05.1984
1915	1.18	85.0	60.0	WATER BASED	03.05.1984
1915	1.19	75.0	52.0	WATER BASED	07.05.1984
2236	1.20	61.0	42.0	WATER BASED	07.05.1984
2250	1.20	61.0	42.0	WATER BASED	08.05.1984
2250	0.00	61.0	42.0	WATER BASED	07.06.1984

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]
101_Formation_pressure_(Formasjonstrykk)	pdf	0.22