

**General information**

Wellbore name	31/2-11
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	31/2-11
Seismic location	79 - 406 SP 778
Production licence	054
Drilling operator	A/S Norske Shell
Drill permit	365-L
Drilling facility	BORGNY DOLPHIN
Drilling days	70
Entered date	17.03.1983
Completed date	25.05.1983
Release date	25.05.1985
Publication date	19.12.2007
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]	25.0
Water depth [m]	336.0
Total depth (MD) [m RKB]	1744.0
Final vertical depth (TVD) [m RKB]	1744.0
Maximum inclination [°]	1.25
Bottom hole temperature [°C]	76
Oldest penetrated age	MIDDLE JURASSIC
Oldest penetrated formation	FENSFJORD FM
Geodetic datum	ED50
NS degrees	60° 49' 27.76" N
EW degrees	3° 25' 30.16" E
NS UTM [m]	6743460.35
EW UTM [m]	523116.74



UTM zone	31
NPDID wellbore	6

Wellbore history

General

Well 31/2-11 was drilled as an appraisal well in the Troll West oil province in the Northern North Sea. The main objectives were to appraise the reservoir quality and the extension of the 28-m oil column in the southern part of the 31/2-7 accumulation in the Viking Group reservoir sequence. The well would assist in the mapping of the permeability distribution in the oil province, provide an additional data point for the correlation and mapping of the depositional units, and obtain additional oil production test data for input to the field development.

Operations and results

Well 31/2-11 was spudded with the semi-submersible installation Borgny Dolphin on 17 March 1983 and drilled to TD at 1744 m in the Middle Jurassic Fensfjord Formation. No major problems occurred during drilling. The well was drilled with Seawater and gel down to 810 m, with KCl/polymer mud from 810 m to 1535 m, and with CaCl₂/CaCO₃/polymer mud from 1535 m to TD.

Top Jurassic, Sognefjord Formation, was encountered at 1558 m. The reservoir sands were found to be hydrocarbon bearing with GOC at 1566 m (1541 m sub-sea) and OWC (50% saturation) at 1593 m (1567 m sub-sea), in-line with the regional contacts in this area of the Troll West Oil Province. Below OWC residual oil was interpreted down to some 1640 m.

A total of eight cores were cut. To enable investigation of the shallow sediments, 2 cores were cut in the interval 380 m to 399 m and one from 475 to 476 m. Five cores were cut in the Late Jurassic reservoir sands from 1555 to 1629 m using fibre glass sleeve techniques to achieve better recovery in the poorly consolidated sands. Attempts to obtain RFT fluid samples were unsuccessful due to plugging of the tool with chalk particles from the mud.

The well was permanently abandoned on 25 May 1983 as an oil and gas appraisal.

Testing

Two DST's were performed, one in the water zone and one in the oil zone. DST 1 tested the interval 1681 to 1685 m in the water zone with the objective of obtaining representative formation water samples. The test produced 20 m³ water before the well died. Representative Formation water samples were obtained. DST 2 in the oil zone was carried out in a clean sand interval between 1571 and 1582 m. It produced at maximum rate on 2x128/64" choke 1248 Sm³ oil with a GOR of 315 Sm³/Sm³. The oil produced had a gravity of 28.6 deg API and the separator gas gravity was 0.66 (air = 1). The gas contained about 2% CO₂ and no measurable H₂S. No water or gas breakthrough was observed, probably due to tight calcareous streaks above and below the tested interval. The maximum temperature recorded in DST 2 was 68.6 deg C.

Cuttings at the Norwegian Offshore Directorate



Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
480.00	1734.00

Cuttings available for sampling?	YES
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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
4	1555.0	1562.4	[m]
5	1564.0	1568.9	[m]
6	1578.0	1587.5	[m]
7	1592.0	1610.5	[m]
8	1610.5	1628.8	[m]

Total core sample length [m]	58.7
Cores available for sampling?	YES

Core photos



1555-1561m



1561-1562m



1564-1568m



1578-1584m



1584-1587m



1592-1598m



1598-1604m



1604-1610m



1610-1611m



1610-1615m



1616-1622m



1622-1627m



1628-1629m

**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		1576.00	1582.00		08.05.1983 - 00:00	YES

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
361	NORDLAND GP
788	HORDALAND GP
1342	ROGALAND GP
1342	BALDER FM
1408	SELE FM
1443	LISTA FM
1537	SHETLAND GP
1550	CROMER KNOLL GP
1558	VIKING GP
1558	SOGNEFJORD FM
1611	HEATHER FM
1678	FENSFJORD FM

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

Document name	Document format	Document size [MB]
6_01_WDSS_General_Information	pdf	0.18
6_02_WDSS_completion_log	pdf	0.18

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

Document name	Document format	Document size [MB]
6_01_31_2_11_Completion_Report_and_Completion_log	PDF	9.09





6 02 31 2 11 Assey of crude oil sample	pdf	0.36
6 02 31 2 11 Drilling programme	pdf	1.33
6 02 31 2 11 Emulsions of Troll crude oil	pdf	0.31
6 02 31 2 11 Grain size analysis	pdf	0.14
6 02 31 2 11 High acc.press temp measur e	pdf	1.86
6 02 31 2 11 High acc.press temp measur e gravel pack	pdf	28.94
6 02 31 2 11 High acc.press temp measur e injection test	pdf	19.25
6 02 31 2 11 Production test programme b	pdf	1.87
6 02 31 2 11 PVT study	pdf	1.07
6 02 31 2 11 Report on the low damaging	pdf	0.29
6 02 31 2 11 Routine core analysis	pdf	0.85
6 02 31 2 11 Sedimentologi av kjerne	pdf	18.45
6 02 31 2 11 Water samples	pdf	0.29
6 02 31 2 11 Well summary	pdf	1.59
6 02 31 2 11 Well test.rep.no.83-2301- 22 Anx	pdf	12.13
6 02 31 2 11 Well testing rep.no.83-2301- 22	pdf	8.89
6 02 31 2 11 Well testing rep.no.83-2301- 23	pdf	1.25
6 02 31 2 11 Well testing rep.no.83-2301- 24	pdf	2.04
6 02 31 2 11 Well test Int Report 290	pdf	0.99

Drill stem tests (DST)

Test number	From depth MD [m]	To depth MD [m]	Choke size [mm]
1.0	1681	1685	50.8
2.0	1576	1582	50.8

Test number	Final shut-in pressure [MPa]	Final flow pressure [MPa]	Bottom hole pressure [MPa]	Downhole temperature [°C]
1.0				
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	1240	69000	0.883	0.667	56

Logs

Log type	Log top depth [m]	Log bottom depth [m]
CBL VDL	500	1523
CBL VDL	1150	1686
CST	1537	1725
DLL MSFL	1523	1728
HDT	1523	1730
ISF BHC GR	460	814
ISF BHC GR	799	1534
ISF BHC GR	1523	1731
LDL CNL GR CAL	460	810
LDL CNL GR CAL	799	1535
LDL CNL NGT CAL	1523	1732
RFT	0	0
WST	1110	1725

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	460.0	36	470.0	0.00	LOT
SURF.COND.	20	799.0	26	810.0	1.49	LOT
INTERM.	13 3/8	1525.0	17 1/2	1535.0	1.50	LOT
INTERM.	9 5/8	1720.0	12 1/4	1744.0	0.00	LOT

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
500	1.05			waterbased	
650	1.09			waterbased	
950	1.32	53.0		waterbased	



1200	1.33	53.0		waterbased	
1350	1.35	53.0		waterbased	
1600	1.15	77.0		waterbased	
1744	1.18	60.0		waterbased	

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]
6 Formation pressure (Formasjonstrykk)	pdf	0.17

