

**General information**

Wellbore name	31/2-15
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	31/2-15
Seismic location	8007 - 154 SP. 290
Production licence	054
Drilling operator	A/S Norske Shell
Drill permit	434-L
Drilling facility	BORGNY DOLPHIN
Drilling days	67
Entered date	10.09.1984
Completed date	15.11.1984
Release date	15.11.1986
Publication date	06.06.2006
Purpose - planned	APPRAISAL
Reentry	NO
Content	OIL/GAS
Discovery wellbore	NO
1st level with HC, age	PALEOCENE
1st level with HC, formation	NO FORMAL NAME
2nd level with HC, age	LATE JURASSIC
2nd level with HC, formation	SOGNEFJORD FM
Kelly bushing elevation [m]	25.0
Water depth [m]	343.0
Total depth (MD) [m RKB]	1677.0
Final vertical depth (TVD) [m RKB]	1677.0
Maximum inclination [°]	3.5
Bottom hole temperature [°C]	37
Oldest penetrated age	MIDDLE JURASSIC
Oldest penetrated formation	FENSFJORD FM
Geodetic datum	ED50
NS degrees	60° 55' 25.45" N
EW degrees	3° 34' 2.57" E



NS UTM [m]	6754585.85
EW UTM [m]	530762.08
UTM zone	31
NPDID wellbore	439

Wellbore history

General

Well 31/2-15 was drilled in the northern part of the Troll West oil and gas province to evaluate reservoir quality and development in the northern part of the Troll West accumulation, and to establish fluid contacts in an undrilled fault compartment.

Operations and results

Appraisal well 31/2-15 was spudded with the semi-submersible installation Borgny Dolphin on 10 September 1984 and drilled to TD at 1677 m in the Middle Jurassic Fensfjord Formation. No major problems were encountered in the operations. The well was drilled with seawater and hi-vis pills down to 810 m, with KCl/polymer mud from 810 m to 1460 m, and with chalk mud (calcium chloride/calcium carbonate) from 1460 m to TD.

Top reservoir was encountered at 1482 m as prognosed, but the age of the upper part was found to be of Paleocene and not Late Jurassic age. The expected Sognefjord Formation came in at 1515 m. The well thus correlate with the situation in well 31/2-18 and 31/2-18 A. Both the Paleocene sand and the Sognefjord Formation sand were gas filled, and the gas continued down to a low permeable micaceous gas/oil transition zone at 1561 m to 1567 m. Testing and sampling proved no mobile oil down to at least 1567 m, and the free oil level was concluded to be very close to the Field-GOC at 1572 m (1547 m SS). The OWC was unambiguously placed at 1583 m, in a highly permeable sand. No shows were recorded above 1482 m or below 1583 m. From petrophysical analysis there were indications of gas saturation in poor quality formation within a 10 m interval below top Fensfjord. However an RFT sample from this interval contained no oil, only gas and brine.

Twelve cores were cut from 1486 m to 1595 m from the lower Paleocene, the Late Jurassic and Sognefjord Formation, and into the Heather Formation. A total of 4 RFT samples were taken. Of these 2 initial failed because of tight formation and seal failure while brine and gas were recovered from the samples at 1637 and 1568 m.

The well was permanently abandoned on 15 November as a gas and oil appraisal.

Testing

Two tests were performed in the Late Jurassic sequence. Test 1 from 1572 m to 1580 m produced oil at rates up to 570 Sm³ /day. The GOR was 54 Sm³/Sm³ and the oil gravity was 28 deg API. Test 2 from 1564 m to 1567 m had the objective to establish hydrocarbon type in the gas/oil transition zone. It gave initially no flow, but after displacing the tubing content partially to nitrogen a small flow of gas was established (10000 m³ gas/day). The gas contained only trace amounts of condensate.

Cuttings at the Norwegian Offshore Directorate



Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
490.00	1676.00

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	1486.0	1491.6	[m]
2	1493.0	1499.8	[m]
3	1501.0	1501.9	[m]
4	1503.0	1507.5	[m]
5	1510.0	1516.6	[m]
6	1516.5	1520.5	[m]
7	1520.0	1528.9	[m]
8	1530.0	1532.5	[m]
9	1533.0	1540.2	[m]
10	1541.0	1559.0	[m]
11	1559.0	1574.4	[m]
12	1577.0	1588.2	[m]

Total core sample length [m]	91.6
Cores available for sampling?	YES

Core photos



1486-1491m



1493-1499m



1499-1500m



1501-1502m



1503-1507m



1510-1516m



1516-1517m



1516-1520m



1520-1526m



1526-1528m



1530-1532m



1533-1539m



1539-1540m



1541-1547m



1547-1553m



1553-1559m



1559-1565m



1565-1571m



1571-1574m



1577-1583m



1583-1588m

Palynological slides at the Norwegian Offshore Directorate

Sample depth	Depth unit	Sample type	Laboratory
1493.1	[m]	C	OD
1493.2	[m]	C	OD
1493.3	[m]	C	OD
1493.6	[m]	C	OD
1493.6	[m]	C	OD
1493.7	[m]	C	OD

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	TEST1	1572.00	1584.00		18.10.1984 - 00:00	YES

**Lithostratigraphy**

Top depth [mMD RKB]	Lithostrat. unit
368	NORDLAND GP
680	HORDALAND GP
1200	ROGALAND GP
1200	BALDER FM
1256	SELE FM
1316	LISTA FM
1482	NO FORMAL NAME
1504	UNDEFINED GP
1515	VIKING GP
1515	SOGNEFJORD FM
1559	HEATHER FM
1636	FENSFJORD FM

Composite logs

Document name	Document format	Document size [MB]
439	pdf	0.27

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

Document name	Document format	Document size [MB]
439_01_WDSS_General_Information	pdf	0.22
439_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]
439_01_31_2_15_Completion_Report_and_Competition_log	pdf	7.84
439_02_31_2_15_Drilling_programme	pdf	1.27
439_02_31_2_15_Drilling_programme_encl_1	pdf	0.41
439_02_31_2_15_Well_summary_by_Dresser	pdf	1.79





439 03 31 2 15 Petrofysisk hurtig-evaluering by Statoil	pdf	0.95
439 04 31 2 15 Routine core analysis	pdf	1.94
439 05 31 2 15 Bottom hole press and temp	pdf	3.22
439 05 31 2 15 Compl.and prod.test nr.2	pdf	1.32
439 05 31 2 15 Compl. and prod. test nr. 1 by Shell	pdf	1.33
439 05 31 2 15 Press. and temp. frac test 84222 84186 Flopetrol	pdf	1.14
439 05 31 2 15 Press. and temp. frac test 84223 84178 Flopetrol	pdf	0.88
439 05 31 2 15 Press. and temp. gradient run 1 84178 84163 Flopetrol	pdf	0.72
439 05 31 2 15 Press. and temp. gradient run 2 834222 84186 Flopetrol	pdf	0.89
439 05 31 2 15 Press. and temp. Run 1 84178 84163 Flopetrol	pdf	1.18
439 05 31 2 15 Press. and temp. Run 2 84223 84178 Flopetrol	pdf	0.59
439 05 31 2 15 Well test report prod.test 1,2 by Flopetrol	pdf	17.91
439 06 31 2 15 Processing SHDT 1444-1671m	pdf	2.99
439 06 31 2 15 Processing SHDT 1444-1671m encl 1	pdf	2.19
439 06 31 2 15 Processing SHDT 1444-1671m encl 2	pdf	0.26
439 06 31 2 15 Processing SHDT 1444-1671m encl 3	pdf	0.45

Logs

Log type	Log top depth [m]	Log bottom depth [m]
CBL VDL GR	625	1442
CBL VDL GR	850	1631
DLL MSFL GR	1444	1671
ISF BHC GR	466	808
ISF BHC GR	800	1437
ISF BHC GR	1444	1676
LDL CNL GR	466	808
LDL CNL GR	800	1100
LDL CNL GR	1100	1436
LDL CNL SGR	1444	1676





PCT	1540	1600
RFT	1496	1562
RFT	1496	1662
RFT	1496	1662
RFT	1562	1637
RFT	1562	1637
SHDT GR	1444	1674
SWS	58	0
VELOCITY	450	1676
WST	680	1660

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	466.0	36	477.0	0.00	LOT
SURF.COND.	20	800.5	26	810.0	1.38	LOT
INTERM.	13 3/8	1444.0	17 1/2	1460.0	1.62	LOT
INTERM.	9 5/8	1663.0	12 1/4	1677.0	0.00	LOT

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
430	1.03	9.0	34.0	WATER BASED	11.09.1984
477	1.03			WATER BASED	12.09.1984
480	1.03	15.0	60.0	WATER BASED	13.09.1984
810	1.03	6.0	31.0	WATER BASED	14.09.1984
810	1.03	6.0	31.0	WATER BASED	16.09.1984
810	1.03			WATER BASED	17.09.1984
810	1.26	20.0	19.0	WATER BASED	18.09.1984
810	1.03	6.0	31.0	WATER BASED	16.09.1984
810	1.03			WATER BASED	16.09.1984
810	1.03			WATER BASED	17.09.1984
810	1.26	20.0	19.0	WATER BASED	18.09.1984
810	1.03			WATER BASED	16.09.1984
1069	1.26	27.0	18.0	WATER BASED	19.09.1984
1440	1.29	18.0	18.0	WATER BASED	20.09.1984
1460	1.29	16.0	16.0	WATER BASED	23.09.1984



1460	1.27	14.0	16.0	WATER BASED	23.09.1984
1460	1.27	14.0	16.0	WATER BASED	23.09.1984
1474	1.21	14.0	18.0	WATER BASED	25.09.1984
1493	1.21	15.0	19.0	WATER BASED	25.09.1984
1510	1.21	15.0	19.0	WATER BASED	26.09.1984
1521	1.21	15.0	19.0	WATER BASED	27.09.1984
1530	1.21	15.0	19.0	WATER BASED	29.09.1984
1538	1.21	15.0	19.0	WATER BASED	29.09.1984
1562	1.21	18.0	19.0	WATER BASED	29.09.1984
1564	1.20			WATER BASED	01.11.1984
1572	1.20			WATER BASED	17.10.1984
1595	1.21	17.0	20.0	WATER BASED	01.10.1984
1634	1.20			WATER BASED	14.10.1984
1634	1.20			WATER BASED	15.10.1984
1634	1.20			WATER BASED	16.10.1984
1634	1.20			WATER BASED	15.10.1984
1634	1.20			WATER BASED	16.10.1984
1638	1.23	18.0	21.0	WATER BASED	08.10.1984
1638	1.22	17.0	19.0	WATER BASED	10.10.1984
1638	1.23	18.0	21.0	WATER BASED	11.10.1984
1638	1.23	18.0	21.0	WATER BASED	14.10.1984
1638	1.20			WATER BASED	14.10.1984
1638	1.22	17.0	19.0	WATER BASED	10.10.1984
1638	1.23	18.0	21.0	WATER BASED	11.10.1984
1638	1.23	18.0	21.0	WATER BASED	14.10.1984
1638	1.20			WATER BASED	14.10.1984
1663	0.00			WATER BASED	21.10.1984
1663	1.22	12.0	19.0	WATER BASED	10.10.1984
1677	1.23	18.0	21.0	WATER BASED	08.10.1984
1677	1.24	19.0	21.0	WATER BASED	08.10.1984
1677	1.24	20.0	21.0	WATER BASED	08.10.1984
1677	1.24	19.0	21.0	WATER BASED	08.10.1984
1677	1.23	19.0	21.0	WATER BASED	03.10.1984
1677	1.24	20.0	21.0	WATER BASED	08.10.1984
1677	1.23	18.0	21.0	WATER BASED	08.10.1984

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]
439 Formation pressure (Formasjonstrykk)	pdf	0.15

