General information

Wellbore name	31/2-14
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	31/2-14
Seismic location	Line 8007-147
Production licence	054
Drilling operator	A/S Norske Shell
Drill permit	411-L
Drilling facility	BORGNY DOLPHIN
Drilling days	60
Entered date	23.04.1984
Completed date	21.06.1984
Release date	21.06.1986
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]	25.0
Water depth [m]	340.0
Total depth (MD) [m RKB]	1725.0
Final vertical depth (TVD) [m RKB]	1725.0
Maximum inclination [°]	1
Bottom hole temperature [°C]	74
Oldest penetrated age	MIDDLE JURASSIC
Oldest penetrated formation	FENSFJORD FM
Geodetic datum	ED50
NS degrees	60° 51' 26.52'' N
EW degrees	3° 25' 37.68'' E
NS UTM [m]	6747135.56
EW UTM [m]	523206.43

UTM zone	31
NPDID wellbore	106

Wellbore history

General

Appraisal well 31/2-14 was drilled on the north-western margin of the Troll field. The main objectives of the well were to demonstrate the production potential for oil in the northern part of the Troll oil province, to evaluate the proposed template development scheme and to confirm the predicted extension of high energy progradation sands in the northern region.

Operations and results

Well 31/2-14 was spudded with the semi-submersible installation Borgny Dolphin on 23 April 1984 and drilled to TD at 1725 m in the Middle Jurassic Fensfjord Formation. The site survey before spud showed, as usual for the area, a seabed with numerous pockmarks (12 pockmarks/km3 on average). After setting the 13 3/8" casing shoe at 1498 m a leak in the kill-line was discovered, leading to repairs of the BOP and replacement of the marine riser. After 10 days lost time normal operations could resume. The well was drilled with seawater and hi-vis pills down to 814 m, with KCl/polymer mud from 814 m to 1513 m, and with chalk mud from 1513 m to TD.

No sands were encountered above the Jurassic.The well encountered hydrocarbons in the Late Jurassic Sognefjord Formation. Top reservoir was penetrated at 1533 m (1508 m SS). The GOC was at 1566 m (1541 m SS) and the FWL was at 1592 m (1567 m SS). The oil-bearing interval consists of medium to low quality sands with a very clean layer (7m) some 3 m above the OWC. Below 1595 m (top Heather Formation) the sands are micaceous. The core measured permeability values range from 10 mD to 10 Darcy. In the gas bearing part of the cored interval no to weak fluorescence was recorded. In the oil zone (1561 - 1592 m) the fluorescence varied from weak to strong. Below 1594 m no fluorescence was recorded. Seven cores were cut from 1535 m to 1599 m in the Late Jurassic sequence. No samples were taken on wire line.

The well was permanently abandoned on 21 June as a gas and oil appraisal.

Testing

The clean sand interval 1583.3 - 1590.3 m in the oil zone was perforated and completed with an internal gravel. A long duration production test was carried out in an attempt to obtain gas breakthrough. The well was beaned up to 1335 Sm3 oil/day and flowed for 9.5 days. Gas breakthrough did not occur. The oil was a 28.1 deg API gravity oil with a GOR of 60 Sm3/Sm3. Maximum temperature recorded during the test was 68.3 deg. C, which correspond to a temperature gradient of 53 deg C/km above the reservoir.

Cuttings at the Norwegian Offshore Directorate

Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
490.00	1725.00

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	1535.0	1542.2	[m]
2	1544.5	1553.8	[m]
3	1560.0	1562.9	[m]
4	1564.0	1570.0	[m]
5	1571.0	1576.9	[m]
6	1580.0	1586.3	[m]
7	1589.5	1598.2	[m]

Total core sample length [m]	46.3
Cores available for sampling?	YES

Core photos


1535-1541m


1541-1542m


1544-1550m


1550-1553m


1560-1562m


1564-1570m


1570-1570m


1571-1576m


1580-1586m


1586-1586m


1589-1595m


1595-1598m

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	TEST-1	1590.00	1583.00	OIL	10.06.1984 - 00:00	YES

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
365	NORDLAND GP
799	HORDALAND GP
1326	ROGALAND GP
1326	BALDER FM
1375	SELE FM
1421	LISTA FM
1526	VÅLE FM
1530	SHETLAND GP
1532	VIKING GP
1532	DRAUPNE FM
1533	SOGNEFJORD FM
1595	HEATHER FM
1685	FENSFJORD FM

Composite logs

Document name	Document format	Document size [MB]
106	pdf	0.23

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

Document name	Document format	Document size [MB]
106_01_WDSS_General_Information	pdf	0.17
106_02_WDSS_completion_log	pdf	0.17

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

Document name	Document format	Document size [MB]
106_01_31_2_14_Completion_Report_and_Completion_log	PDF	8.20
106_02_31_2_14_Core_description_core_1-7	pdf	2.69
106_02_31_2_14_Drilling_programme_encl_1	pdf	0.39
106_02_31_2_14_Drilling_programme	pdf	1.27
106_02_31_2_14_Drilling_programme_	pdf	1.27
106_02_31_2_14_Drilling_programme_encl_01	pdf	0.39
106_02_31_2_14_Frigg_field_res.simulation	pdf	2.69
106_02_31_2_14_Grain_size_distr.analysis	pdf	0.16
106_02_31_2_14_High_accuracy_pressure_ELS84-49A	pdf	3.33
106_02_31_2_14_High_accuracy_pressure_ELS84-49A_encl_1	pdf	0.62
106_02_31_2_14_High_accuracy_pressure_ELS84-49A_encl_2	pdf	0.09
106_02_31_2_14_High_accuracy_pressure_ELS84-49A_encl_3	pdf	0.06
106_02_31_2_14_High_accuracy_pressure_ELS84-49A_encl_4	pdf	0.05
106_02_31_2_14_High_accuracy_pressure_ELS84-49B	pdf	3.08
106_02_31_2_14_High_accuracy_pressure_ELS84-49B_encl_1	pdf	0.52
106_02_31_2_14_High_accuracy_pressure_ELS84-49B_encl_2	pdf	0.10
106_02_31_2_14_High_accuracy_pressure_ELS84-49B_encl_3	pdf	0.06
106_02_31_2_14_High_accuracy_pressure_ELS84-49B_encl_4	pdf	0.07
106_02_31_2_14_Palynological_results	pdf	2.00
106_02_31_2_14_Petrofysisk_hurtig-evaluering	pdf	1.02
106_02_31_2_14_Petrofysisk_hurtig-evaluering_encl_1	pdf	0.91
106_02_31_2_14_Pressure_survey_report	pdf	0.96
106_02_31_2_14_PVT_Study	pdf	1.13
106_02_31_2_14_Routine_core_analysis	pdf	1.27
106_02_31_2_14_Well_summary_by_Dresser	pdf	1.54
106_02_31_2_14_Well_summary	pdf	0.89

106_02_31_2_14_Well_summary_2	pdf	1.54
106_02_31_2_14_Well_summary_3	pdf	0.53
106_02_31_2_14_Well_summary_by_Anchor	pdf	0.89
106_02_31_2_14_Well_summary_by_Shell	pdf	0.53
106_03_31_2_14_Frigg_field_res.simulation	pdf	2.69
106_03_31_2_14_Palynological_results_by_Shell	pdf	2.00
106_03_31_2_14_Petrofysisk_hurtig-evaluering_by_Statoil	pdf	1.02
106_03_31_2_14_Petrofysisk_hurtig-evaluering_encl_1	pdf	0.91
106_04_31_2_14_Core_description_core_1-7	pdf	2.69
106_04_31_2_14_Grain_size_distr.analysis	pdf	0.16
106_04_31_2_14_Routine_core_analysis	pdf	1.27
106_05_31_2_14_High_accuracy_ELS84-49A_encl_4	pdf	0.05
106_05_31_2_14_High_accuracy_pressure_ELS84-49A	pdf	3.33
106_05_31_2_14_High_accuracy_pressure_ELS84-49A_encl_1	pdf	0.62
106_05_31_2_14_High_accuracy_pressure_ELS84-49A_encl_2	pdf	0.09
106_05_31_2_14_High_accuracy_pressure_ELS84-49A_encl_3	pdf	0.06
106_05_31_2_14_High_accuracy_pressure_ELS84-49B	pdf	3.08
106_05_31_2_14_High_accuracy_pressure_ELS84-49B_encl_1	pdf	0.52
106_05_31_2_14_High_accuracy_pressure_ELS84-49B_encl_2	pdf	0.10
106_05_31_2_14_High_accuracy_pressure_ELS84-49B_encl_3	pdf	0.06
106_05_31_2_14_High_accuracy_pressure_ELS84-49B_encl_4	pdf	0.07
106_05_31_2_14_Pressure_survey_report	pdf	0.96
106_05_31_2_14_PVT_Study	pdf	1.13

Logs

Log type	Log top depth [m]	Log bottom depth [m]
BGT GR	345	515
CBL VDL	364	1488
CBL VDL	900	1690

CET GR	900	1690
CNL GR	1530	1580
CST	1510	1602
CST	1604	1713
GR CCL	1550	1692
ISF SONIC GR	350	814
ISF SONIC GR	814	1506
ISF SONIC GR	1503	1719
LDL CNL GR	464	814
LDL CNL GR	814	1513
LDT CNL SGT	1496	1654
MSFL DLL GR	1496	1714
RFT	1533	1633
SHDT GR	1496	1718

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	464.0	36	474.0	0.00	LOT
SURF.COND.	20	799.0	26	810.0	1.37	LOT
INTERM.	13 3/8	1498.0	17 1/2	1514.0	1.52	LOT
INTERM.	9 5/8	1724.0	12 1/4	1725.0	0.00	LOT

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
500	1.03			WATER BASED	
550	1.12			WATER BASED	
600	1.14			WATER BASED	
650	1.10			WATER BASED	
750	1.11			WATER BASED	
800	1.12			WATER BASED	
850	1.25			WATER BASED	
900	1.26			WATER BASED	
1000	1.27			WATER BASED	
1200	1.31			WATER BASED	
1250	1.30			WATER BASED	

1515	1.16			WATER BASED	
1535	1.13			WATER BASED	
1545	1.16			WATER BASED	
1570	1.17			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]
106_Formation_pressure_(Formasjonstrykk)	pdf	0.14