General information

Wellbore name	31/2-5
Type	EXPLORATION
Purpose	APPRAISAL
Status	SUSPENDED
Factmaps in new window	link to map
Main area	NORTH SEA
Field	TROLL
Discovery	31/2-1 (Troll Vest)
Well name	31/2-5
Seismic location	79421 SP. 274
Production licence	054
Drilling operator	A/S Norske Shell
Drill permit	263-L
Drilling facility	WEST VENTURE OLD
Drilling days	57
Entered date	26.10.1980
Completed date	21.12.1980
Release date	21.12.1982
Publication date	07.11.2005
Purpose - planned	WILDCAT
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]	32.0
Water depth [m]	333.0
Total depth (MD) [m RKB]	2532.0
Final vertical depth (TVD) [m RKB]	2532.0
Maximum inclination [°]	1.5
Bottom hole temperature [°C]	79
Oldest penetrated age	TRIASSIC
Oldest penetrated formation	HEGRE GP
Geodetic datum	ED50
NS degrees	60° 46' 16.2'' N
EW degrees	3° 25' 53.46'' E
NS UTM [m]	6737535.76
EW UTM [m]	523507.71

UTM zone	31
NPDID wellbore	210

Wellbore history

General

Wildcat well 31/2-5 is located in the southern part of the oil province in the Troll West area, some 6 km west of the discovery well 31/2-1, in a downthrown fault block. The objectives of the well were to test presence and nature of hydrocarbons in a structure west of the main gas reservoir; to test lateral variation in reservoir characteristics westwards; to investigate possible causes for the difference in flat spot appearance in this fault block; and to get a good geologic identification of the various seismic reflectors for lateral extrapolation of well data.

Operations and results

Problems were experienced during positioning and anchoring of semi-submersible installation West Venture for the wildcat well 31/2-5. After 6 days efforts the installation had to be repositioned 25 m from the intended location and the anchors were successfully laid out and tensioned. The well was spudded on 26 October 1980 and drilled to TD at 2532 m in the Triassic Hegre Group. The well was drilled with seawater and viscous pills down to 443 m, with gelled seawater from 443 m to 810 m, with KCl/polymer mud from 810 m to 1807 m, and with seawater/gel from 1807 m to TD.

Well 31/2-5 confirmed that the Late Jurassic Sognefjord Formation sandstone reservoir was well developed also in the western part of the structure. A gas column was penetrated from 1536 m to 1579 m (43 m), followed by a 21 m thick oil column down to an OWC at 1600 m. Good oil shows continued down to 1644.5 m. The GOC was found at the same depth as seen in the other wells in the area. The most interesting observation in this well was the presence of the thick oil column below the gas, some 9 m thicker than seen in any of the other wells, and the oil was encountered in a section of the reservoir with very good clean sand. It is yet too early to explain the difference in oil thickness, and the importance of a thicker oil column in a good sand will remain unknown until a full production test of the oil has been carried out. A few carbonate cemented, apparently field-wide bands occur with very low poroperm values. A seal over the structure is provided by the Paleocene claystones.

A total of 21 cores (125.8 m) were cut using five Christensen core heads with a total recovery of 98.51 m (78%) from 1511.7 - 1652 m. RFT sampling of pressure points and two successful fluid samples (gas at 1578 m and oil/gas at 1597 m) were consistent with the fluid contacts assessed from the electrical logs. The oil sampled from 1597 m had a gravity of 30.5 deg API compared to 25 deg API in other 31/2 wells.

The well was plugged from 1204 m to 1465 m and suspended on 21 December 1980 as an oil and gas appraisal well.

Testing

No drill stem test was performed.

Cuttings at the Norwegian Offshore Directorate

Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
450.00	2532.00

Cuttings available for sampling?	YES

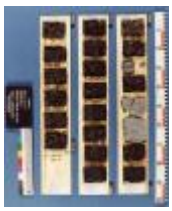
Cores at the Norwegian Offshore Directorate

Core sample number	Core sample - top depth	Core sample - bottom depth	Core sample depth - uom
1	1511.7	1514.3	[m]
2	1514.8	1517.4	[m]
4	1536.0	1538.0	[m]
5	1539.5	1540.5	[m]
6	1542.0	1545.6	[m]
7	1547.0	1563.7	[m]
8	1555.0	1555.2	[m]
9	1555.5	1564.5	[m]
10	1565.0	1573.4	[m]
11	1573.4	1573.9	[m]
12	1573.9	1577.4	[m]
13	1589.5	1589.6	[m]
14	1590.5	1599.5	[m]
15	1599.5	1604.0	[m]
16	1604.0	1611.9	[m]
17	1613.0	1615.4	[m]
18	1616.0	1625.0	[m]
19	1625.0	1633.4	[m]
20	1634.0	1642.9	[m]
21	1643.0	1651.6	[m]

Total core sample length [m]	108.5
Cores available for sampling?	YES

Core photos


1512-1513m


1515-1516m

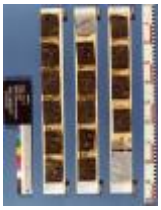

1536-1538m


1539-1540m


1542-1544m


1544-1545m


1547-1549m


1549-1552m


1555-1555m


1552-1553m


1555-1558m


1558-1560m


1560-1563m


1563-1564m


1565-1567m


1567-1570m


1570-1573m


1573-1573m


1573-1574m


1573-1576m


1576-1577m


1589-1589m


1590-1593m


1593-1595m


1595-1598m


1598-1599m


1599-1602m


1602-1604m


1604-1606m


1606-1609m


1609-1611m


1613-1615m


1616-1618m


1618-1621m


1621-1624m


1624-1625m


1625-1627m


1627-1630m


1630-1633m


1633-1633m


1634-1636m


1636-1639m


1639-1642m


1642-1643m


1643-1645m


1645-1648m


1648-1651m


1651-1652m

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
365	NORDLAND GP
788	HORDALAND GP
788	NO FORMAL NAME
815	NO FORMAL NAME
1346	ROGALAND GP
1346	BALDER FM
1396	SELE FM
1426	LISTA FM
1533	SHETLAND GP
1536	VIKING GP
1536	SOGNEFJORD FM
1617	HEATHER FM
1693	FENSFJORD FM
1789	KROSSFJORD FM

1860	HEATHER FM
1957	BRENT GP
2070	DUNLIN GP
2070	DRAKE FM
2201	COOK FM
2277	AMUNDSEN FM
2308	JOHANSEN FM
2387	AMUNDSEN FM
2404	STATFJORD GP
2471	HEGRE GP

Composite logs

Document name	Document format	Document size [MB]
210	pdf	0.32

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

Document name	Document format	Document size [MB]
210_01_WDSS_General_Information	pdf	0.15
210_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]
210_01_Drilling_programme	pdf	1.18
210_02_Drilling_programme_enclosure	pdf	1.01
210_03_Final_Well_Report_by_EXLOG	pdf	7.30
210_04_Well_resume_by_Shell	pdf	1.36
210_05_Well Summary_by_Anchor	pdf	1.58
210_06_Biostratigraphy_appendix_3_by_Core lab	pdf	4.06
210_07_Final_Core_report_core_1-21_by_GECO	pdf	2.90
210_08_Evaluation_of_core_data_by_Geco	pdf	9.86
210_09_Evaluation_of_core_data_b_GECO	pdf	5.69

210_0_Completion_Report	pdf	4.28
210_10_Geological_invest_of_cores_vol-1_by_SHELL	pdf	17.20
210_11_Geological_invest_of_cores_vol-2_by_SHELL	pdf	13.11
210_12_Geological_invest_of_cores_vol-3_by_SHELL	pdf	75.61
210_13_Palynofacies_Jurassic_investigation_by_SHELL	pdf	7.24
210_14_Special_core_analysis_study_by_CORELAB	pdf	2.17
210_15_Special_core_analysis_by_CORELAB	pdf	1.85
210_16_Special_core_description_by_SHELL	pdf	2.09
210_17_Special_core_description_encl_1	pdf	0.15
210_18_Special_core_description_encl_2	pdf	0.15
210_19_Special_core_description_encl_3	pdf	0.14
210_20_Special_core_description_encl_4	pdf	0.16
210_21_Special_core_description_encl_5	pdf	0.15
210_22_Special_core_description_encl_6	pdf	0.12
210_23_Special_core_description_encl_7	pdf	0.15
210_24_Reservoir_fluid_study_Supplementary_Report_by_CORELAB	pdf	0.28
210_25_Well_test_report_by_STATOIL	pdf	1.40
210_26_Well_testing_rep_No_84-2301-10_by_FLOPETROL	pdf	17.02
210_27_Well_testing_rep_No_81-230-23_by_FLOPETROL	pdf	8.22
210_28_Well_testing_rep_No_81-2301-23_by_FLOPETROL	pdf	18.40
210_29_Bottom_hole_pressure_calc_by_FLOPETROL	pdf	1.78
210_30_Final_report_Rock_Mineral_Analysis_GECO	pdf	0.16
210_31_High_acc_pres_temp_measure_by_FLOPETROL	pdf	1.10
210_32_Notes_on_oil_zone_test_by_SHELL	pdf	0.89
210_33_Pressure_survey_report_Run_1_by_Sperry	pdf	2.14
210_34_Pressure_survey_report_Run_2_by_Sperry	pdf	0.91
210_35_Pressure_survey_report_by_Sperry	pdf	1.09
210_36_SDP_Bottom_Hole_Press_ELS_84_24_by_Flopetrol	pdf	5.83
210_37_SDP_Bottom_Hole_Press_ELS_84_25_by_FLOPETROL	pdf	6.03

210_38_SDP_Bottom_Hole_Press_ELS_84_27_by_Flopetrol	pdf	1.21
210_39_SDP_Bottom_Hole_Press_ELS_84_28_by_Flopetrol	pdf	1.13
210_40_Source_rock_evaluation_by_SHELL	pdf	0.42
210_41_Source_rock_evaluation_encl_1	pdf	0.05
210_42_Geochem_analysis_of_crude_oil_by_SHELL	pdf	0.58
210_43_One_well_study_by_STATOIL	pdf	1.66
210_44_One_well_study_encl_1	pdf	0.81
210_45_Partial_Reservoir_Fluid_Study_by_Corelab	pdf	0.20
210_46_Particle_size_analysis_by_Anchor	pdf	0.42
210_47_Quick_look_evaluation_by_STATOIL	pdf	0.67
210_48_Quick_look_evaluation_encl_1	pdf	0.14
210_49_Quick_look_evaluation_encl_2	pdf	0.14
210_50_Quick_look_evaluation_encl_3	pdf	0.14
210_51_Quick_look_evaluation_encl_4	pdf	0.14
210_52_Reservoir_Fluid_Study_by_Corelab	pdf	0.80
210_53_Reservoir_Fluid_Study_by_Corelab	pdf	0.81
210_54_Rock_mineral_analysis_by_Geco	pdf	0.11
210_55_Exploration_drilling_proposal_by_Shell	pdf	0.54
210_56_Exploration_drilling_proposal_encl_1	pdf	0.76
210_57_Exploration_drilling_proposal_encl_2	pdf	0.21
210_58_Exploration_drilling_proposal_encl_3	pdf	0.39
210_59_Exploration_drilling_proposal_encl_4	pdf	10.45
210_60_Exploration_drilling_proposal_encl_5	pdf	12.59
210_61_Exploration_drilling_proposal_encl_6	pdf	21.53
210_62_Exploration_drilling_proposal_encl_7	pdf	20.70
210_63_Exploration_drilling_proposal_encl_8	pdf	0.33

Drill stem tests (DST)

Test number	From depth MD [m]	To depth MD [m]	Choke size [mm]
1.0	1582	1588	0.0

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

Test number	Oil [Sm3/day]	Gas [Sm3/day]	Oil density [g/cm3]	Gas grav. rel.air	GOR [m3/m3]
1.0					

Logs

Log type	Log top depth [m]	Log bottom depth [m]
CBL VDL GR	362	1465
CBL VDL GR	810	1798
DLL MSFL GR	1468	1804
FDC CNL CAL GR	439	821
FDC CNL CAL GR	807	1467
FDC CNL CAL GR	1468	1805
FDC CNL CAL GR	1800	2527
HDT	1468	1805
HDT	1800	2524
HDT.2	1468	1805
HDT.2	1800	2522
ISF BHC GR SP	363	820
ISF BHC GR SP	630	1468
ISF BHC GR SP	1468	1805
ISF BHC GR SP	1800	2526
LDT GR	1468	1806
LSS GR	1468	1805
RFT	1468	1805
TMP	300	1261
TMP	330	1630
TMP	1390	1630
VELOCITY	363	2526

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	443.0	36	446.0	0.00	LOT
CONDUCTOR	30	446.0	36	446.0	0.00	LOT
SURF.COND.	20	810.0	26	820.0	1.55	LOT
INTERM.	13 3/8	1470.0	17 1/2	1480.0	1.60	LOT

INTERM.	9 5/8	1801.0	12 1/4	1812.0	1.69	LOT
OPEN HOLE		2532.0	8 1/2	2532.0	0.00	LOT

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
414	1.03			seawater	
473	1.05	36.0		seawater	
788	1.20	75.0		waterbased	
1270	1.21	54.0		waterbased	
1448	1.25	55.0		waterbased	
1806	1.15	50.0		waterbased	

Thin sections at the Norwegian Offshore Directorate

Depth	Unit
1540.00	[m]
1545.00	[m]
1556.00	[m]
1559.00	[m]
1567.00	[m]
1570.00	[m]
1574.00	[m]
1601.00	[m]
1605.00	[m]
1608.00	[m]
1618.00	[m]
1621.00	[m]
1626.00	[m]

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]
210_Formation_pressure_(Formasjonstrykk)	pdf	0.22