

**General information**

Wellbore name	6407/1-2
Type	EXPLORATION
Purpose	WILDCAT
Status	P&A
Factmaps in new window	link to map
Main area	NORWEGIAN SEA
Field	TYRIHANS
Discovery	6407/1-2 Tyrihans Sør
Well name	6407/1-2
Seismic location	8110 - 427 SP 234
Production licence	073
Drilling operator	Den norske stats oljeselskap a.s
Drill permit	355-L
Drilling facility	DYVI DELTA
Drilling days	184
Entered date	13.11.1982
Completed date	15.05.1983
Release date	15.05.1985
Publication date	13.12.2005
Purpose - planned	WILDCAT
Reentry	NO
Content	GAS/CONDENSATE
Discovery wellbore	YES
1st level with HC, age	MIDDLE JURASSIC
1st level with HC, formation	GARN FM
Kelly bushing elevation [m]	29.0
Water depth [m]	273.0
Total depth (MD) [m RKB]	4560.0
Final vertical depth (TVD) [m RKB]	4558.0
Maximum inclination [°]	5
Bottom hole temperature [°C]	159
Oldest penetrated age	LATE TRIASSIC
Oldest penetrated formation	GREY BEDS (INFORMAL)
Geodetic datum	ED50
NS degrees	64° 47' 50.61" N
EW degrees	7° 2' 23.76" E
NS UTM [m]	7187495.23
EW UTM [m]	406877.13



UTM zone	32
NPDID wellbore	61

Wellbore history

General

The wildcat 6407/1-2 was drilled 43 m NW of well 6407/1-1, which was drilled to 900 m before it was junked due to problems with setting the 20" casing. The objective for both wells was to test for hydrocarbons in Jurassic sandstones. The primary target was Middle Jurassic sand horizons, Early Jurassic sands was secondary target. The well was the first well north of 62 degrees to encounter liquid petroleum.

The well is Type Well for the Kai Formation and Reference Well for the Nordland Group. It is Reference Well for the Lyr Formation, the Fangst Group, and the BÅt Group

Operations and results

Wildcat well 6407/1-2 was spudded with the semi-submersible installation Dyvi Delta on 13 November 1982 and drilled to TD at 4560 m in the Late Triassic Grey Beds. The well was drilled with seawater/gel down to 901 m, with gypsum/lignosulphonate from 901 m to 3568 m, and with Spersene/XP-20/resin from 3568 m to TD. At 1817 m loss of mud to the formation was discovered. A survey showed that this was caused by a collapse of 20" casing from approximately 667 m. It was therefore decided to run the 13 3/8" casing at this point. A total of 164 days were spent on the drilling phase, which was 56 days more than prognosed. 22 days were lost due to bad weather, 17 days due to BOP problems, 4 days working with the collapsed 20" casing, 7 days were spent on fishing when the drill string parted. A further 12 days were spent on excessive reaming in the 12 1/4" hole in the Paleocene and top of the Cretaceous formation, and in the 8 1/2" hole in the Heather formation. The reaming was necessary when running back in hole after several days WOW with the BOP closed and the riser disconnected. The well was drilled 60 meters deeper than prognosed. The testing phase lasted for 21 days, which includes a 7" casing tie back operation of 6 days, which was necessary because of a leak in the 9 5/8" at approximately 1850 m. The budget for the well 6407/1-1 was NOK 100 MM. The total cost of the 6407/1-1 and the 6407/1-2 were NOK 204.5 MM for the drilling phase. The cost of the testing phase was NOK 28.3 MM.

Hydrocarbons were found in the Middle Jurassic sandstone, Garn Formation from 3659 m down to a well-defined gas-water contact at 3716 m. The secondary objective was found to be water wet but hydrocarbon shows were recorded in the Early Jurassic Tilje and Åre Formations. The shows became stronger below 4300 m and downwards, with increasing gas shows towards TD.

Four cores were cut in the Middle Jurassic sequence. RFT pressure points were obtained for both target reservoir sections. A RFT segregated fluid sample was taken at 3665 m in the Garn Formation

The well was permanently abandoned on 15 May 1983 as a gas/condensate discovery

Testing

One drill stem test was performed from the interval 3659 m to 3669 m in the Garn Formation. The test produced 454 Sm³ condensate and 394000 Sm³ gas per day during the main flow, on a 19 mm choke. The gas/condensate ratio was 869 Sm³/Sm³. The test also produced 3% CO₂ and 6 - 7 ppm of H₂S. The reservoir fluid was a gas condensate near the critical point.

**Cuttings at the Norwegian Offshore Directorate**

Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
410.00	4560.00

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
1	3661.0	3678.3	[m]
2	3679.0	3688.5	[m]
3	3688.5	3701.0	[m]
4	3701.5	3719.3	[m]

Total core sample length [m]	57.1
Cores available for sampling?	YES

Core photos

3661-3668m



3668-3675m



3675-3678m



3679-3686m



3686-3688m



3688-3695m



3695-3701m



3701-3708m



3708-3715m



3715-3719m

Palynological slides at the Norwegian Offshore Directorate



Sample depth	Depth unit	Sample type	Laboratory
1975.0	[m]	SWC	LAP
2120.0	[m]	DC	LAP
2130.0	[m]	DC	LAP
2140.0	[m]	DC	LAP
2160.0	[m]	DC	LAP
2180.0	[m]	DC	LAP
2191.5	[m]	SWC	LAP
2200.0	[m]	DC	LAP
2215.0	[m]	SWC	LAP
2220.0	[m]	DC	LAP
2232.0	[m]	SWC	LAP
2240.0	[m]	DC	LAP
2260.0	[m]	DC	LAP
2269.0	[m]	SWC	LAP
2280.0	[m]	DC	LAP
2281.0	[m]	SWC	LAP
2290.2	[m]	SWC	LAP
2300.0	[m]	DC	LAP
2320.0	[m]	DC	LAP
2327.5	[m]	SWC	LAP
2330.0	[m]	DC	LAP
2330.5	[m]	SWC	LAP
2340.0	[m]	DC	LAP
2347.5	[m]	SWC	LAP
2360.0	[m]	DC	LAP
2370.0	[m]	DC	LAP
2380.0	[m]	DC	LAP
2400.0	[m]	DC	LAP
2420.0	[m]	DC	LAP
2440.0	[m]	DC	LAP
2454.1	[m]	SWC	LAP
2460.0	[m]	DC	LAP
2461.3	[m]	SWC	LAP
2480.0	[m]	DC	LAP
2490.9	[m]	SWC	LAP
2500.0	[m]	DC	LAP
2520.0	[m]	DC	LAP
2522.0	[m]	SWC	LAP
2540.0	[m]	DC	LAP



2540.2	[m]	SWC	LAP
2560.0	[m]	DC	LAP
2570.0	[m]	DC	LAP
2580.0	[m]	DC	LAP
2590.0	[m]	DC	LAP
2600.0	[m]	DC	LAP
2601.2	[m]	SWC	LAP
2610.0	[m]	DC	LAP
2620.0	[m]	DC	LAP
2630.0	[m]	DC	LAP
2639.1	[m]	SWC	LAP
2640.0	[m]	DC	LAP
2650.0	[m]	DC	LAP
2660.0	[m]	DC	LAP
2670.0	[m]	DC	LAP
2680.0	[m]	DC	LAP
2687.0	[m]	SWC	LAP
2700.0	[m]	DC	LAP
2710.0	[m]	DC	LAP
2720.0	[m]	DC	LAP
2724.0	[m]	SWC	LAP
2730.0	[m]	DC	LAP
2740.0	[m]	DC	LAP
2747.0	[m]	SWC	LAP
2750.0	[m]	DC	LAP
2760.0	[m]	DC	LAP
2770.0	[m]	DC	LAP
2780.0	[m]	DC	LAP
2782.1	[m]	SWC	LAP
2790.0	[m]	DC	LAP
2800.0	[m]	DC	LAP
2810.0	[m]	DC	LAP
2820.0	[m]	DC	LAP
2831.0	[m]	SWC	LAP
2840.0	[m]	DC	LAP
2860.0	[m]	DC	LAP
2880.0	[m]	DC	LAP
2900.0	[m]	DC	LAP
2905.0	[m]	DC	LAP
2907.5	[m]	SWC	LAP



2910.0 [m]	DC	LAP
2920.0 [m]	DC	LAP
2940.0 [m]	DC	LAP
2950.0 [m]	DC	LAP
2960.0 [m]	DC	LAP
2980.0 [m]	DC	LAP
2990.0 [m]	DC	LAP
3000.0 [m]	DC	LAP
3000.4 [m]	SWC	LAP
3010.0 [m]	DC	LAP
3020.0 [m]	DC	LAP
3030.0 [m]	DC	LAP
3040.0 [m]	DC	LAP
3050.0 [m]	DC	LAP
3060.0 [m]	DC	LAP
3070.0 [m]	DC	LAP
3080.0 [m]	DC	LAP
3083.0 [m]	SWC	LAP
3085.0 [m]	DC	LAP
3092.0 [m]	SWC	LAP
3100.0 [m]	DC	LAP
3105.0 [m]	DC	LAP
3115.0 [m]	DC	LAP
3120.0 [m]	DC	LAP
3140.0 [m]	DC	LAP
3160.0 [m]	DC	LAP
3167.0 [m]	SWC	LAP
3180.0 [m]	DC	LAP
3182.0 [m]	SWC	LAP
3200.0 [m]	DC	LAP
3220.0 [m]	DC	LAP
3240.0 [m]	DC	LAP
3260.0 [m]	DC	LAP
3280.0 [m]	DC	LAP
3300.0 [m]	DC	LAP
3320.0 [m]	DC	LAP
3335.0 [m]	SWC	LAP
3340.0 [m]	DC	LAP
3360.0 [m]	SWC	LAP
3360.0 [m]	DC	LAP



3380.0 [m]	DC	LAP
3391.0 [m]	SWC	LAP
3400.0 [m]	DC	LAP
3404.0 [m]	SWC	LAP
3420.0 [m]	DC	LAP
3430.5 [m]	SWC	LAP
3440.0 [m]	DC	LAP
3446.1 [m]	SWC	LAP
3460.0 [m]	DC	LAP
3480.0 [m]	DC	LAP
3481.9 [m]	SWC	LAP
3487.5 [m]	SWC	LAP
3500.0 [m]	DC	LAP
3500.2 [m]	SWC	LAP
3520.0 [m]	DC	STRATL
3520.0 [m]	DC	LAP
3520.5 [m]	SWC	LAP
3526.0 [m]	SWC	LAP
3530.0 [m]	DC	STRATL
3535.0 [m]	DC	STRATL
3538.5 [m]	SWC	LAP
3540.0 [m]	DC	LAP
3540.0 [m]	DC	STRATL
3546.0 [m]	SWC	LAP
3550.0 [m]	DC	LAP
3550.0 [m]	SWC	LAP
3550.0 [m]	DC	STRATL
3560.0 [m]	DC	STRATL
3560.0 [m]	DC	LAP
3560.5 [m]	SWC	LAP
3564.0 [m]	SWC	LAP
3570.0 [m]	DC	STRATL
3580.0 [m]	DC	STRATL
3580.0 [m]	DC	LAP
3590.0 [m]	DC	STRATL
3600.0 [m]	DC	STRATL
3600.0 [m]	DC	LAP
3610.0 [m]	DC	STRATL
3620.0 [m]	DC	STRATL
3620.0 [m]	DC	LAP



3630.0	[m]	DC	STRATL
3640.0	[m]	DC	STRATL
3640.0	[m]	DC	LAP
3650.0	[m]	DC	LAP
3650.0	[m]	DC	STRATL
3657.0	[m]	DC	STRATL
3660.0	[m]	DC	LAP
3661.0	[m]	DC	LAP
3661.1	[m]	C	LAP
3662.7	[m]	C	RRI
3665.9	[m]	C	LAP
3666.3	[m]	C	LAP
3668.5	[m]	C	RRI
3670.0	[m]	DC	STRATL
3675.3	[m]	C	RRI
3675.4	[m]	C	LAP
3680.0	[m]	DC	LAP
3680.0	[m]	C	RRI
3680.6	[m]	C	STRATLAB
3682.7	[m]	SWC	OD
3683.6	[m]	C	LAP
3686.2	[m]	C	LAP
3686.3	[m]	C	LAP
3690.0	[m]	DC	STRATL
3695.6	[m]	C	OD
3696.7	[m]	C	LAP
3699.3	[m]	C	LAP
3700.0	[m]	DC	LAP
3700.0	[m]	DC	STRATL
3704.5	[m]	SWC	OD
3710.0	[m]	DC	STRATL
3712.4	[m]	C	LAP
3717.0	[m]	DC	STRATL
3719.0	[m]	C	RRI
3719.1	[m]	C	OD
3720.0	[m]	DC	LAP
3722.0	[m]	DC	STRATL
3730.0	[m]	DC	STRATL
3735.0	[m]	DC	RRI
3740.0	[m]	DC	LAP



3740.0	[m]	DC	STRATL
3742.5	[m]	SWC	RRI
3747.5	[m]	SWC	OD
3750.0	[m]	DC	STRATL
3755.0	[m]	DC	RRI
3760.0	[m]	DC	LAP
3760.0	[m]	DC	RRI
3760.0	[m]	DC	STRATL
3767.5	[m]	SWC	RRI
3770.0	[m]	DC	STRATL
3770.0	[m]	DC	RRI
3777.5	[m]	SWC	OD
3780.0	[m]	DC	STRATL
3780.0	[m]	DC	LAP
3785.0	[m]	DC	RRI
3790.0	[m]	DC	LAP
3790.0	[m]	DC	RRI
3790.0	[m]	DC	STRATL
3799.5	[m]	DC	LAP
3800.0	[m]	DC	LAP
3800.0	[m]	DC	STRATL
3805.0	[m]	DC	LAP
3810.0	[m]	DC	LAP
3810.0	[m]	DC	STRATL
3815.0	[m]	DC	LAP
3820.0	[m]	DC	LAP
3820.0	[m]	DC	STRATL
3840.0	[m]	DC	LAP
3860.0	[m]	DC	LAP
3880.0	[m]	DC	LAP
3900.0	[m]	DC	LAP
3920.0	[m]	DC	LAP
3940.0	[m]	DC	LAP
3960.0	[m]	DC	LAP
3980.0	[m]	DC	LAP
3982.0	[m]	SWC	LAP
4000.0	[m]	DC	LAP
4020.0	[m]	DC	LAP
4035.0	[m]	SWC	LAP
4040.0	[m]	DC	LAP



4060.0 [m]	DC	LAP
4067.0 [m]	SWC	LAP
4080.0 [m]	DC	LAP
4102.0 [m]	DC	LAP
4115.0 [m]	SWC	LAP
4120.0 [m]	DC	LAP
4140.0 [m]	DC	LAP
4155.5 [m]	SWC	LAP
4160.0 [m]	DC	LAP
4180.0 [m]	DC	LAP
4194.0 [m]	SWC	LAP
4200.0 [m]	DC	LAP
4220.0 [m]	DC	LAP
4225.0 [m]	SWC	LAP
4240.0 [m]	DC	LAP
4260.0 [m]	DC	LAP
4280.0 [m]	DC	LAP
4295.0 [m]	SWC	LAP
4300.0 [m]	DC	LAP
4320.0 [m]	DC	LAP
4340.0 [m]	DC	LAP
4360.0 [m]	DC	LAP
4380.0 [m]	DC	LAP
4380.0 [m]	SWC	LAP
4400.0 [m]	DC	LAP
4420.0 [m]	DC	LAP
4420.0 [m]	SWC	LAP
4440.0 [m]	DC	LAP
4452.0 [m]	SWC	LAP
4460.0 [m]	DC	LAP
4470.0 [m]	DC	LAP
4480.0 [m]	DC	LAP
4484.0 [m]	DC	LAP
4490.0 [m]	DC	LAP
4500.0 [m]	DC	LAP
4510.0 [m]	DC	LAP
4510.0 [m]	SWC	LAP
4517.0 [m]	DC	LAP
4520.0 [m]	DC	LAP
4530.0 [m]	DC	LAP



4534.0	[m]	SWC	LAP
4535.0	[m]	DC	LAP
4540.0	[m]	DC	LAP
4547.0	[m]	SWC	LAP
4550.0	[m]	DC	LAP
4554.0	[m]	SWC	LAP
4555.0	[m]	DC	LAP
4556.0	[m]	SWC	OD
4560.0	[m]	DC	LAP

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	3659.00	3669.00		06.05.1983 - 16:00	YES

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
302	NORDLAND GP
302	NAUST FM
1419	KAI FM
1690	HORDALAND GP
1690	BRYGGE FM
2189	ROGALAND GP
2189	TARE FM
2253	TANG FM
2320	SHETLAND GP
2320	SPRINGAR FM
2403	NISE FM
2900	KVITNOS FM
3048	CROMER KNOLL GP
3048	LYSING FM
3082	LANGE FM
3510	LYR FM
3526	VIKING GP
3526	SPEKK FM



3575	MELKE FM
3659	FANGST GP
3659	GARN FM
3771	NOT FM
3815	ILE FM
3907	BÅT GP
3907	ROR FM
4050	TILJE FM
4220	ÅRE FM
4548	GREY BEDS (INFORMAL)

Composite logs

Document name	Document format	Document size [MB]
61	pdf	0.85

Geochemical information

Document name	Document format	Document size [MB]
61_1	pdf	1.59
61_2	pdf	0.41
61_3	pdf	1.17
61_4	pdf	0.23
61_5	pdf	1.38
61_6	pdf	4.41
61_7	pdf	0.16
61_8	pdf	1.80
61_9	pdf	1.01

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

Document name	Document format	Document size [MB]
61_01 WDSS General Information	pdf	0.19
61_02 WDSS completion log	pdf	0.42



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

Document name	Document format	Document size [MB]
61_01_6407_01_02_CompletionReport & Completionlog	pdf	57.33
61_02_Analysis_Trace_Fossils	pdf	20.46
61_03_Special_Fluid_Study	pdf	1.56
61_04_Biostratigraphy_Kerogen_Analysis	pdf	4.05
61_05_Biostratigraphy_Kerogen_Analysis_Summary	pdf	0.63
61_06_Carbon_Isotope_Distribution	pdf	1.15
61_07_Compositional_Analysis_DST1	pdf	5.50
61_08_Core_Analysis	pdf	2.67
61_09_Debris_Survey	pdf	7.26
61_10_Discovery_Evaluation_Report	pdf	17.65
61_11_FWR_Exlog	pdf	27.04
61_12_Geochemical_Analyses_Robertson	pdf	0.70
61_13_Organic_Geochemistry	pdf	10.15
61_14_Palynological_Analysis	pdf	0.12
61_15_Palynostratigraphy_Kerogen_Palynofacies_Organic_Maturation_Analysis	pdf	1.98
61_16_Petrophysical_Evaluation	pdf	1.53
61_17_Pressure_Survey_DST_1	pdf	109.48
61_18_Pressure_Temperature_DST	pdf	2.77
61_19_Pressure_Temperature	pdf	6.29
61_20_PVT	pdf	14.63
61_21_QC_Routine_Core_Analysis	pdf	0.56
61_22_RFT_Report	pdf	0.92
61_23_Routine_Core_Analysis_Cores_1-4	pdf	0.87
61_24_Sedimentology_Diagenesis_Mid_Jurassic_Sandstones	pdf	6.12
61_25_Source_Rock_Evaluation	pdf	2.15
61_26_Stable_Isotopes	pdf	1.24
61_27_Supplementary_Geochemical_Data	pdf	2.80
61_28_TBP_Distillation_Condensate_DST_1	pdf	1.16
61_29_Trace_Fossils_in_Cores	pdf	0.22
61_30_VSP_Processing	pdf	237.88

Drill stem tests (DST)





Test number	From depth MD [m]	To depth MD [m]	Choke size [mm]
1.0	3659	3669	19.0

Test number	Final shut-in pressure [MPa]	Final flow pressure [MPa]	Bottom hole pressure [MPa]	Downhole temperature [°C]
1.0				134

Test number	Oil [Sm3/day]	Gas [Sm3/day]	Oil density [g/cm3]	Gas grav. rel.air	GOR [m3/m3]
1.0	454	394000	0.792	0.735	869

Logs

Log type	Log top depth [m]	Log bottom depth [m]
CBL VDL GR	300	1789
CBL VDL GR	1589	3553
CBL VDL GR	3380	3963
CST	1855	2407
CST	2324	3566
CST	2512	3446
CST	3465	3566
CST	3982	4556
DLL NGS	3553	3714
DLWD	2450	3550
GEODIP	3654	3805
GEODIP	3654	3805
GEODIP	3795	3963
HDT	3553	3964
HDT	3970	4558
ISF LSS MSFL GR SP	600	3969
ISF LSS MSFL GR SP NGT	3970	4556
LDL CNL GR	1816	4558
LDL GR	660	1816
NGT	3553	3714
RFT	4102	4556
RFT GR	3660	3952
SHDT	3660	3960



WST VSP	503	4560
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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	400.0	36	401.0	0.00	LOT
SURF.COND.	20	901.0	26	901.0	0.00	LOT
INTERM.	13 3/8	1789.0	17 1/2	1817.0	1.88	LOT
INTERM.	9 5/8	3568.0	12 1/4	3568.0	2.03	LOT
LINER	7	3969.0	8 1/2	3969.0	1.88	LOT
OPEN HOLE		4560.0	7	4560.0	0.00	LOT

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
520	1.09	31.0		seawater	
1100	1.14	36.0		waterbased	
1425	1.14	35.0		waterbased	
1650	1.22	40.0		waterbased	
1980	1.40	44.0		waterbased	
2280	1.66	54.0		waterbased	
3500	1.71	62.0		waterbased	
3630	1.25	55.0		waterbased	
4020	1.18	72.0		waterbased	
4490	1.30	65.0		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]
61 Formation pressure (Formasjonstrykk)	pdf	0.28

