

**General information**

Wellbore name	34/10-2
Type	EXPLORATION
Purpose	WILDCAT
Status	P&A
Factmaps in new window	link to map
Main area	NORTH SEA
Field	GULLFAKS SØR
Discovery	34/10-2 Gullfaks Sør
Well name	34/10-2
Seismic location	ST.32.Sp 510
Production licence	050
Drilling operator	Den norske stats oljeselskap a.s
Drill permit	202-L
Drilling facility	ROSS RIG (1)
Drilling days	91
Entered date	09.09.1978
Completed date	08.12.1978
Release date	08.12.1980
Publication date	05.12.2012
Purpose - planned	WILDCAT
Reentry	NO
Content	OIL/GAS
Discovery wellbore	YES
1st level with HC, age	MIDDLE JURASSIC
1st level with HC, formation	BRENT GP
2nd level with HC, age	EARLY JURASSIC
2nd level with HC, formation	STATFJORD GP
Kelly bushing elevation [m]	25.0
Water depth [m]	133.0
Total depth (MD) [m RKB]	3729.0
Final vertical depth (TVD) [m RKB]	3728.0
Maximum inclination [°]	2.4
Bottom hole temperature [°C]	141
Oldest penetrated age	LATE TRIASSIC
Oldest penetrated formation	LUNDE FM
Geodetic datum	ED50
NS degrees	61° 6' 7.92" N
EW degrees	2° 13' 39.96" E



NS UTM [m]	6774577.40
EW UTM [m]	458365.95
UTM zone	31
NPDID wellbore	425

Wellbore history

General

Well 34/10-2 was drilled on the "Alpha closure" in the northern North Sea, ca 8 km south of the 34/10-1 Gullfaks discovery drilled three months earlier on the "Delta structure". The primary objective of 34/10-2 well was to test sandstones of the Middle Jurassic series. The secondary objectives were sandstones of the Paleocene and Early Jurassic series.

Operations and results

Wildcat well 34/10-2 was spudded with the semi-submersible installation Ross Rig on 9 September 1978 and drilled to TD at 3729 m in the Late Triassic Lunde Formation. No significant problem was encountered during drilling, but close to 15 days were spent as WOW due to severe weather conditions, and final logging at TD suffered from the weather. The well was drilled with spud mud down to 517 m, with gel/lignosulphonate mud from 517 m to 1723 m, and with gel/lignosulphonate/"ADF Chrome Lignite" mud from 1723 m to TD.

Well 34/10-2 proved the presence of gas in sandstones of Middle Jurassic Brent Group and oil in sandstones of the Early Jurassic Statfjord Formation. The Brent Group was hydrocarbon bearing all through from top at 2944 m down to top Dunlin Group (Drake Formation) at 3124 m. A total of 109 m was net pay sandstone with average porosity 20.8% and average water saturation 13.8%. The gas/oil/water contact was not seen. The Statfjord Formation was oil bearing from 3325 m down to ca 3390 m based on the well logs. It contained 31.75 m of net pay oil bearing sandstone with average porosity 15.9% and average water saturation 21.6%.

Shows started at 1640 m. These were described typically as gold yellow fluorescence and fast streaming milky cut on claystones with trace sandstone. These shows continued down to 1845 m. From there and down to top Brent reservoir level only occasional fluorescence in limestone was recorded. Below the OWC in the Statfjord Formation shows on sandstones were recorded down to a depth of 3500 m.

A total of eight cores were cut; two in the Middle Jurassic Ness and Rannoch formations and six in the Early Jurassic Statfjord Formation. An attempt to run the RFT was made but failed, so no pressure points or fluid samples were taken on wire line.

The well was suspended on 8 December 1978 as an oil and gas discovery well.

Testing

Testing was postponed to a later re-entry.

Re-entry

The well was re-entered with the semi-submersible installation Ross Rig on 8 July 1979. The purpose was formation testing and to take fluid samples



No significant problems occurred in the operations

No new formation was drilled.

The RFT was run on wire line and pressure points and fluid samples were taken. Fluid samples were taken at 2964.5 m, 3024 m, 3105 m, and at 3592 m. Based on the pressure data and DST the OWC in the Statfjord Formation was estimated to be at 3385 m.

The well was permanently abandoned on 10 August 1979.

Testing

Five drill stem tests were performed in the well.

DST 1 tested the interval 3385 - 3395 m in the Statfjord Formation. It produced pure water at rates declining from 700 m3 to 570 m3 /day through a 48/64" choke. The bottom hole maximum temperature in the main flow was 130.6 deg C.

DST 2 tested the interval 3355 - 3365 m in the Statfjord Formation. The main flow was shut in too early due to a leak and was partly a failure. The production rate on a 48/64" choke was estimated tentatively to be ca 127 Sm3 oil and 19000 Sm3 gas/day with a GOR of 150 Sm3/Sm3. The oil gravity was 32.2 deg API and the gas gravity was 0.678 (air = 1). The bottom hole maximum temperature before shut-in was 128.9 deg C.

DST 3 tested the interval 3335 - 3345 m in the Statfjord Formation. The first attempt was unsuccessful as the sand screen got plugged. The second attempt, DST 3 A, was run without sand screen. DST 3A produced on average 127 Sm3 oil and 19800 Sm3 gas /day through a 48/64" choke in the final flow. Ca 2% water cut was measured at goos neck. The GOR was ca 155 Sm3/Sm3, the oil gravity was 32 deg API and the gas gravity was 0.696 (air = 1). The bottom hole maximum temperature in the main flow was 125 deg C.

DST 4 tested the interval 3110 - 3115 in the Rannoch Formation. During the final flow the well was produced at a metered gas rate of about 96300 Sm3 /day on a 20/64" choke. Tank measurement indicated a condensate rate of about 12 Sm3/day and a water rate of about 6 m3/day. The gas/condensate ratio was ca 8000 Sm3/Sm3, the oil gravity was 48 deg API, and the gas gravity was 0.652 (air = 1). The bottom hole maximum temperature was 110 deg C.

DST 5 tested the interval 3017 - 3022 m in the Ness Formation. The well produced in the final flow through 2 x 20/64" choke in parallel 733400 Sm3 gas/day with a condensate rate in the range 175 - 240 Sm3 /day and a corresponding gas/condensate ratio of 3100 - 4200 Sm3/Sm3. The oil gravity was 43 deg API and the gas gravity was 0.645 (air = 1). The bottom hole maximum temperature was 115 deg C.

Cuttings at the Norwegian Offshore Directorate

Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
710.00	3730.00

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	3031.0	3041.2	[m]
2	3103.0	3113.6	[m]
3	3338.0	3345.2	[m]
4	3345.2	3361.4	[m]
5	3363.5	3366.3	[m]
6	3366.6	3371.9	[m]
7	3371.9	3382.4	[m]
8	3382.4	3390.1	[m]

Total core sample length [m]	70.5
Cores available for sampling?	YES

Core photos



3031-3033m



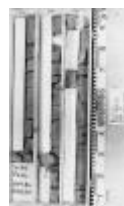
3033-3036m



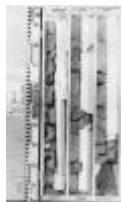
3036-3039m



3039-3041m



3103-3105m



3105-3108m



3108-3111m



3111-3113m



3338-3340m



3334-3340m



3343-3345m



3345-3347m



3347-3350m



3350-3353m



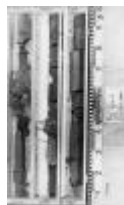
3353-3356m



3356-3358m



3358-3361m



3363-3366m



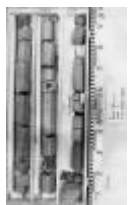
3366-3366m



3366-3369m



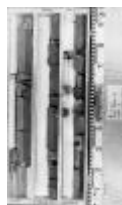
3369-3371m



3371-3374m



3374-3377m



3377-3379m



3379-3382m



3382-3385m



3385-3387m



3387-3390m

Palynological slides at the Norwegian Offshore Directorate

Sample depth	Depth unit	Sample type	Laboratory
2891.0	[m]	DC	GEOCH
2903.0	[m]	DC	GEOCH
2909.0	[m]	DC	GEOCH
2921.0	[m]	DC	GEOCH
2930.0	[m]	DC	GEOCH
2945.0	[m]	DC	GEOCH
2954.0	[m]	DC	GEOCH
3031.0	[m]	C	LAP
3032.9	[m]	C	LAP
3033.8	[m]	C	LAP
3035.9	[m]	C	LAP
3037.2	[m]	C	LAP
3037.5	[m]	C	LAP
3039.6	[m]	C	LAP
3041.1	[m]	C	LAP
3340.2	[m]	C	OD



3342.3	[m]	C	OD
3352.9	[m]	C	OD
3366.2	[m]	C	OD
3375.5	[m]	C	OD
3376.7	[m]	C	OD
3382.4	[m]	C	OD
3384.5	[m]	C	OD
3385.5	[m]	C	OD
3386.9	[m]	C	OD
3387.6	[m]	C	OD
3388.0	[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	TEST2	3353.00	3365.00		22.07.1979 - 00:00	YES
DST	TEST3	3335.00	3345.00		26.07.1979 - 08:00	YES
DST	TEST3A	3335.00	0.00		28.07.1979 - 00:00	YES
DST	TEST4	3110.00	3115.00		02.08.1979 - 13:00	YES
DST	DST5	3018.00	3028.00		05.08.1979 - 07:02	YES

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
158	NORDLAND GP
945	UTSIRA FM
965	HORDALAND GP
1095	NO FORMAL NAME
1140	NO FORMAL NAME
1165	NO FORMAL NAME
1412	NO FORMAL NAME
1440	NO FORMAL NAME
1523	NO FORMAL NAME



1575	NO FORMAL NAME
1597	NO FORMAL NAME
1637	NO FORMAL NAME
1665	NO FORMAL NAME
1795	ROGALAND GP
1795	BALDER FM
1858	LISTA FM
2017	SHETLAND GP
2017	JORSALFARE FM
2625	KYRRE FM
2863	CROMER KNOLL GP
2863	RØDBY FM
2867	SOLA FM
2870	ÅSGARD FM
2882	VIKING GP
2882	DRAUPNE FM
2889	HEATHER FM
2944	BRENT GP
2944	NESS FM
3070	ETIVE FM
3083	RANNOCH FM
3124	DUNLIN GP
3124	DRAKE FM
3172	COOK FM
3200	BURTON FM
3222	AMUNDSEN FM
3325	STATFJORD GP
3325	NANSEN FM
3379	EIRIKSSON FM
3497	RAUDE FM
3540	HEGRE GP
3540	LUNDE FM

Geochemical information

Document name	Document format	Document size [MB]
425_GCH_1	pdf	2.41
425_GCH_2	pdf	5.47
425_GCH_3	pdf	5.33





425_GCH_4	pdf	0.25
425_GCH_5	pdf	1.03

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

Document name	Document format	Document size [MB]
425_01_WDSS_General_Information	pdf	0.22
425_03_WDSS_lithlog	pdf	0.07

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

Document name	Document format	Document size [MB]
425_34_10_2_Aalyse_av_formasjonsvann_analyseresultat	pdf	0.10
425_34_10_2_Analysis_of_oil	pdf	0.55
425_34_10_2_Comparison_of_7_oil_samples	pdf	0.46
425_34_10_2_CompletionReport	pdf	15.95
425_34_10_2_Completion_report	pdf	15.95
425_34_10_2_Core_photos	pdf	206.39
425_34_10_2_GC-MS_Analysis_of_oil	pdf	0.29
425_34_10_2_Hydrocarbon_source_patterns	pdf	2.85
425_34_10_2_Maturity_analysis_on_cool_samples	pdf	0.51
425_34_10_2_Measurement_of_saturation_exponent	pdf	0.99
425_34_10_2_Observasjoner_av_olje_gass_emonulsjon	pdf	2.09
425_34_10_2_Partial_PTV_study_on_RFT_sample	pdf	2.43
425_34_10_2_Pressure_prediction	pdf	38.25
425_34_10_2_PTV_study	pdf	0.18
425_34_10_2_PTV_study_of_recombined_surface_samples	pdf	4.75
425_34_10_2_PTV_study_og_bottom_samples	pdf	1.03
425_34_10_2_Reservoir_fluid_study_for_Statfjord	pdf	0.94
425_34_10_2_RFT_rapport	pdf	1.10
425_34_10_2_Source_rock_evaluation	pdf	6.59
425_34_10_2_Special_core_analysis_report_1	pdf	3.12





425 34 10 2 Transfer rapport RFT samples	pdf	0.10
425 34 10 2 Well summary	pdf	7.36
425 34 10 2 Vaeskeprove fra DST-1 2 3	pdf	0.13
425 34 10 2 Vaeskeprove fra DST-3A 4 5	pdf	0.33

Drill stem tests (DST)

Test number	From depth MD [m]	To depth MD [m]	Choke size [mm]
1.0	3385	3395	19.0
2.0	3355	3365	19.0
3.0	3335	3345	19.0
4.0	3110	3115	7.9
5.0	3017	3022	9.5

Test number	Final shut-in pressure [MPa]	Final flow pressure [MPa]	Bottom hole pressure [MPa]	Downhole temperature [°C]
1.0		4.000		
2.0				129
3.0		1.000		125
4.0		3.500		110
5.0		4.300		115

Test number	Oil [Sm3/day]	Gas [Sm3/day]	Oil density [g/cm3]	Gas grav. rel.air	GOR [m3/m3]
1.0					
2.0	127	19000	0.865	0.678	150
3.0	127	19800	0.865	0.696	155
4.0	12	96300	0.810	0.652	8000
5.0	238	733400	0.810	0.645	3800

Logs

Log type	Log top depth [m]	Log bottom depth [m]
CBL	400	1798
CBL	1991	2698
DLL MSFL GR	2900	3728
FDC CNL GR CAL	508	3729





HDT	2699	3727
HDT	2699	3330
ISF SON GR SP	208	3727
NGS	2923	3532
VELOCITY	850	3720

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	208.0	36	208.0	0.00	LOT
SURF.COND.	20	508.0	26	516.0	0.00	LOT
INTERM.	13 3/8	1802.0	17 1/2	1810.0	0.00	LOT
INTERM.	9 5/8	2799.0	12 1/4	2810.0	0.00	LOT
LINER	7	3725.0	8 1/2	3730.0	0.00	LOT

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
210	1.06	41.0		spud mud	
517	1.13	23.0	35.0	spud mud	
867	1.22	43.0	14.0	waterbased	
1810	1.27	48.0	21.0	waterbased	
2128	1.50	55.0	16.0	waterbased	
2623	1.52	53.0	17.0	waterbased	
2870	1.62	51.0	11.0	waterbased	
3283	1.70	52.0	8.0	waterbased	
3730	1.70	66.0	9.0	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]
425 Formation pressure (Formasjonstrykk)	pdf	0.22

