

**General information**

Wellbore name	34/4-6
Type	EXPLORATION
Purpose	APPRAISAL
Status	P&A
Factmaps in new window	link to map
Main area	NORTH SEA
Field	SNORRE
Discovery	34/4-1 Snorre
Well name	34/4-6
Seismic location	SG 8420 - 198 SP. 525
Production licence	057
Drilling operator	Saga Petroleum ASA
Drill permit	497-L
Drilling facility	VINNI
Drilling days	87
Entered date	31.12.1985
Completed date	27.03.1986
Release date	27.03.1988
Publication date	26.10.2009
Purpose - planned	APPRAISAL
Reentry	NO
Content	OIL
Discovery wellbore	NO
1st level with HC, age	LATE TRIASSIC
1st level with HC, formation	LUNDE FM
Kelly bushing elevation [m]	26.0
Water depth [m]	373.5
Total depth (MD) [m RKB]	3282.0
Final vertical depth (TVD) [m RKB]	3281.0
Maximum inclination [°]	2.2
Bottom hole temperature [°C]	113
Oldest penetrated age	LATE TRIASSIC
Oldest penetrated formation	TEIST FM (INFORMAL)
Geodetic datum	ED50
NS degrees	61° 34' 14.09" N
EW degrees	2° 13' 19.99" E
NS UTM [m]	6826753.59
EW UTM [m]	458688.37



UTM zone	31
NPDID wellbore	875

Wellbore history

General

Well 34/4-6 was drilled in the northern part of the Snorre Field. The main objectives were to test the northern outline of the field and to confirm the oil/water-contact and reservoir characteristics of the Upper Lunde Formation. The stratigraphy and reservoir characteristics of the Middle and Lower Lunde together with the Lomvi Formations were secondary objectives. Prognosed depth was at 3236 m in Triassic rocks.

Operations and results

Appraisal well 34/4-6 was spudded with the semi-submersible installation Vinni on 31 December 1995 and drilled to TD at 3282 m in the Late Triassic Teist Formation. The 26" section was hampered by bad weather and large parts of the period from the evening of 9 January up to 18 January was spent as WOW. When reaching 740 m the bad weather also made it necessary to disconnect the riser from the well head. Technical problems when attempting to re-latch the pin connector back on to the well head resulted in the remaining section down to TD at 920 m in the 26" section being drilled with no returns to the surface. The well was drilled with spud mud down to 530 m, with gel mud from 530 m to 920 m, with gypsum/polymer mud from 920 m to 2345 m, and with gel mud from 2345 m to TD.

Apart from the sandy Utsira Formation of Late - Middle Miocene to Pliocene age (1127.5 - 1239 m) and a sandstone unit within the Hordaland Group of Early Oligocene age (1358.5 - 1387 m), the upper section down to the Base Cretaceous Unconformity proved mainly claystones. No Jurassic rocks were encountered in the well. The Triassic Hegre Group consists of sandstones with minor shales and siltstones down to TD of the well. The target horizon, the Upper Lunde Formation, was encountered at 2576.5 m, 65 m deeper than prognosed. It had a gross thickness of 68.5 m with 39.7 m net sand. Hydrocarbons were encountered in the uppermost part of this formation with an OWC was at 2587 m, determined from RFT pressure points.

The first appearance of shows was seen in the Shetland Group from ca 2090 m. This was seen in silt lenses where pale yellow fluorescence was accompanied by slow to moderate streaming blue white cut reaction. A slight yellow residue was occasionally observed. Entering the main reservoir at 2576.5 m, the shows were as follows in the interval 2576.5 - 2587 m (OWC): 100% yellow brown oil stain, 100% yellow fluorescence with instant to fast streaming blue white cut, leaving a light yellow brown residue upon evaporation. The odour was good. Below the OWC, shows decreased gradually to become extinct below 2624 m.

Six cores were cut totalling 84.5 m. One core was cut in the Shetland Group crossing the border zone into Cromer Knoll Group. The other cores were taken in the Late Lunde Group where hydrocarbons were encountered in the uppermost section. The RFT chambers from this well gave no pressurized fluid samples. An atmospheric RFT sample from 2580 m contained ca 1.6 l oil and ca 2 l water/mud filtrate.

The well was permanently abandoned on 27 March 1986 as an oil appraisal.

Testing



One DST test was performed in the well. This was a combined production/interference test in the Upper Lunde Formation. The well produced from the interval 2577 - 2585 m, with the interval 2592 - 2595 m as an observation interval. The test included three flow periods; 1) Clean-up flow of the lower zone; 2) initial flow of the upper zone; 3) main flow of the upper zone. The two first flows produced only cushion water. The last flow produced 1206 Sm² oil /day with a wellhead pressure of 153.6 bar. The flowing bottom hole pressure was 359.6 bar at 2546.9 m. The gas-oil ratio was measured to 91.3 Sm³ /Sm³ after a four stage separation. The corresponding dead oil density was 824.5 kg/Sm³. Maximum temperature in the test was 99.7 deg C. During flow 3) wellhead samples and samples for recombination from the separator were taken. These samples include the "DST3" samples in the geochemical download report from IKU found further down on this fact page.

Cuttings at the Norwegian Offshore Directorate

Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
530.00	3207.00

Cuttings available for sampling?	NO
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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	2549.5	2553.3	[m]
2	2576.0	2583.0	[m]
3	2589.0	2596.5	[m]
4	2600.0	2612.9	[m]
5	2614.0	2622.4	[m]
6	2642.0	2660.5	[m]

Total core sample length [m]	58.1
Cores available for sampling?	YES

Core photos

2549-2553m



2576-2581m



2581-2583m



2589-2594m



2594-2596m



2600-2605m



2605-2610m



2610-2612m



2614-2619m



2619-2622m



2642-2647m



2647-2652m



2652-2657m



2657-2660m

Palynological slides at the Norwegian Offshore Directorate

Sample depth	Depth unit	Sample type	Laboratory
1853.0	[m]	SWC	R.R.I
1875.0	[m]	SWC	R.R.I
1900.0	[m]	SWC	R.R.I
1925.0	[m]	SWC	R.R.I
1960.0	[m]	SWC	R.R.I
2001.0	[m]	SWC	R.R.I
2025.0	[m]	SWC	R.R.I
2068.0	[m]	SWC	R.R.I
2130.0	[m]	SWC	R.R.I
2225.0	[m]	SWC	R.R.I
2267.0	[m]	SWC	R.R.I
2300.0	[m]	SWC	R.R.I

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	DST1	0.00	0.00	OIL	18.03.1986 - 00:00	YES

**Lithostratigraphy**

Top depth [mMD RKB]	Lithostrat. unit
400	NORDLAND GP
1210	UTSIRA FM
1250	HORDALAND GP
1359	NO FORMAL NAME
1387	NO FORMAL NAME
1658	ROGALAND GP
1658	BALDER FM
1688	LISTA FM
1775	SHETLAND GP
1775	JORSALFARE FM
2056	KYRRE FM
2555	CROMER KNOLL GP
2555	RØDBY FM
2565	MIME FM
2577	HEGRE GP
2577	LUNDE FM
3153	LOMVI FM
3231	TEIST FM

Geochemical information

Document name	Document format	Document size [MB]
875_1	pdf	0.39
875_2	pdf	2.36

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

Document name	Document format	Document size [MB]
875_01_WDSS_General_Information	pdf	0.25
875_02_WDSS_completion_log	pdf	0.28

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





Document name	Document format	Document size [MB]
875_01_34_4_6_Completion_Log	pdf	1.65
875_01_34_4_6_Completion_report	pdf	8.39

Drill stem tests (DST)

Test number	From depth MD [m]	To depth MD [m]	Choke size [mm]
1.0	2592	2595	6.4
1.1	2577	2585	12.7

Test number	Final shut-in pressure [MPa]	Final flow pressure [MPa]	Bottom hole pressure [MPa]	Downhole temperature [°C]
1.0				93
1.1				93

Test number	Oil [Sm3/day]	Gas [Sm3/day]	Oil density [g/cm3]	Gas grav. rel.air	GOR [m3/m3]
1.0					
1.1	1173	72726	0.821	0.770	62

Logs

Log type	Log top depth [m]	Log bottom depth [m]
CBL VDL GR	750	1841
CBL VDL GR	2780	3255
CST	1853	2762
CST	1853	2762
DLL MSFL GR SP	2545	2766
GR	0	530
ISF DDBHC GR	521	917
ISF DDBHC GR	904	1853
ISF LSS GR	1841	2769
ISF LSS GR	2761	3281
LDL CNL GR	2761	3282
LDL CNL NGT GR	1841	2769
LDL GR	521	919





LDL GR	904	1854
MWD	521	919
MWD	904	1854
MWD	1841	2770
MWD	2761	3282
RFT	2578	2747
RFT	2580	2580
RFT	2583	2585
SHDT GR	1841	2770
SHDT GR	2761	3282
VELOCITY	300	3240

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	521.0	36	530.0	0.00	LOT
SURF.COND.	20	904.0	26	920.0	1.63	LOT
INTERM.	13 3/8	1841.0	17 1/2	1856.0	1.80	LOT
INTERM.	9 5/8	2760.0	12 1/4	2770.0	1.99	LOT

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
530	1.06			WATER BASED	03.01.1986
530	1.06			WATER BASED	06.01.1986
530	1.06			WATER BASED	30.12.1985
585	1.07	7.0	16.3	WATER BASED	13.01.1986
740	1.14	6.0	13.5	WATER BASED	13.01.1986
904	1.10	12.0	7.2	WATER BASED	05.02.1986
920	1.10	12.0	7.2	WATER BASED	05.02.1986
920	1.12	7.0	13.9	WATER BASED	13.01.1986
920	1.14	6.0	12.5	WATER BASED	13.01.1986
920	1.12	7.0	14.4	WATER BASED	13.01.1986
920	1.14	5.0	9.6	WATER BASED	14.01.1986
920	1.15	5.0	10.1	WATER BASED	13.01.1986
920	1.15	5.0	10.6	WATER BASED	13.01.1986
920	1.14	6.0	11.1	WATER BASED	19.01.1986



920	1.14	8.0	11.5	WATER BASED	19.01.1986
920	1.14	9.0	10.6	WATER BASED	19.01.1986
920	1.03			WATER BASED	19.01.1986
920	1.14	5.0	12.0	WATER BASED	13.01.1986
920	1.15	5.0	10.1	WATER BASED	19.01.1986
1110	1.11	19.0	10.1	WATER BASED	05.02.1986
1381	1.13	17.0	9.1	WATER BASED	05.02.1986
1791	1.31	20.0	10.6	WATER BASED	05.02.1986
1856	1.48	22.0	8.7	WATER BASED	05.02.1986
1856	1.48	24.0	9.1	WATER BASED	05.02.1986
1856	1.48	25.0	9.6	WATER BASED	05.02.1986
1856	1.48	25.0	10.6	WATER BASED	05.02.1986
1861	1.48	17.0	9.6	WATER BASED	05.02.1986
2127	1.55	19.0	11.5	WATER BASED	05.02.1986
2273	1.65	27.0	12.0	WATER BASED	05.02.1986
2345	1.65	21.0	11.1	WATER BASED	11.02.1986
2443	1.68	21.0	10.1	WATER BASED	11.02.1986
2495	1.68	16.0	8.7	WATER BASED	11.02.1986
2498	1.68	18.0	9.6	WATER BASED	11.02.1986
2549	1.70	19.0	6.8	WATER BASED	11.02.1986
2560	1.70	19.0	6.3	WATER BASED	11.02.1986
2575	1.70	22.0	6.3	WATER BASED	12.02.1986
2575	1.70	23.0	7.2	WATER BASED	17.02.1986
2576	1.70	22.0	6.8	WATER BASED	11.02.1986
2576	1.70	18.0	6.8	WATER BASED	10.03.1986
2576	1.70	18.0	6.8	WATER BASED	17.03.1986
2576	1.70	19.0	6.8	WATER BASED	17.03.1986
2576	1.70	17.0	6.3	WATER BASED	24.03.1986
2576	1.70	19.0	6.8	WATER BASED	24.03.1986
2576	1.70	19.0	7.2	WATER BASED	24.03.1986
2576	1.70	17.0	6.3	WATER BASED	18.03.1986
2576	1.70	18.0	6.8	WATER BASED	24.03.1986
2588	1.70	22.0	6.3	WATER BASED	12.02.1986
2600	1.70	23.0	6.8	WATER BASED	12.02.1986
2632	1.70	22.0	6.8	WATER BASED	17.02.1986
2660	1.70	22.0	7.7	WATER BASED	17.02.1986
2680	1.70	17.0	7.7	WATER BASED	10.03.1986
2700	1.70	18.0	6.8	WATER BASED	10.03.1986
2720	1.70	18.0	6.3	WATER BASED	12.03.1986
2720	1.70	18.0	6.3	WATER BASED	08.03.1986



2720	1.70	18.0	6.3	WATER BASED	17.03.1986
2746	1.70	20.0	7.7	WATER BASED	17.02.1986
2760	1.62	17.0	6.8	WATER BASED	05.03.1986
2760	1.62	21.0	7.2	WATER BASED	28.02.1986
2760	1.62	17.0	7.7	WATER BASED	03.03.1986
2760	1.62	18.0	6.8	WATER BASED	03.03.1986
2760	1.62	19.0	7.7	WATER BASED	04.03.1986
2770	1.62	43.0	8.2	WATER BASED	26.02.1986
2770	1.70	22.0	7.7	WATER BASED	24.02.1986
2770	1.70	27.0	7.7	WATER BASED	24.02.1986
2770	1.70	20.0	7.7	WATER BASED	24.02.1986
2770	1.70	22.0	7.7	WATER BASED	24.02.1986
2770	1.62	26.0	6.8	WATER BASED	26.02.1986
2792	1.62	19.0	6.8	WATER BASED	28.02.1986
3282	1.62	17.0	6.8	WATER BASED	10.03.1986
3282	1.70	18.0	7.2	WATER BASED	10.03.1986

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]
875 Formation pressure (Formasjonstrykk)	pdf	0.22

