



General information





Wellbore name	2/12-1
Type	EXPLORATION
Purpose	WILDCAT
Status	P&A
Factmaps in new window	link to map
Main area	NORTH SEA
Discovery	2/12-1 Mjølner
Well name	2/12-1
Seismic location	NP 85C - 81 SP. 2293
Production licence	113
Drilling operator	Norsk Hydro Produksjon AS
Drill permit	530-L
Drilling facility	TREASURE SCOUT
Drilling days	150
Entered date	14.10.1986
Completed date	12.03.1987
Release date	12.03.1989
Publication date	26.10.2009
Purpose - planned	WILDCAT
Reentry	NO
Content	OIL
Discovery wellbore	YES
1st level with HC, age	LATE JURASSIC
1st level with HC, formation	ULA FM
Kelly bushing elevation [m]	23.0
Water depth [m]	70.0
Total depth (MD) [m RKB]	4795.0
Final vertical depth (TVD) [m RKB]	4793.0
Maximum inclination [°]	4.4
Bottom hole temperature [°C]	151
Oldest penetrated age	EARLY PERMIAN
Oldest penetrated formation	ROTLIEGEND GP
Geodetic datum	ED50
NS degrees	56° 14' 4.07" N
EW degrees	3° 42' 27.5" E
NS UTM [m]	6232538.56
EW UTM [m]	543868.06
UTM zone	31
NPDID wellbore	1014



Wellbore history

General

Well 2/12-1 is located in the Feda Graben in the southern North Sea, ca 1.5 m north of the Danish/Norwegian border. The main objective of the well was to prove the extension of the Danish "Gert" discovery into block 2/12. The primary target was Middle Jurassic sandstones, prognosed at 4826 m. Possible secondary targets were Early Jurassic and Triassic sandstones. Structural closure was not defined at Top Shetland or Base Cretaceous levels, but minor stratigraphic trapping was considered possible in this area. Prognosed TD was 5125 m.

Operations and results

Wildcat well 2/12-1 was spudded with the semi-submersible installation Treasure Scout on 14 October 1986 and drilled to TD at 4795 m in volcanic breccia of the Early Permian Rotliegend Group. Drilling proceeded without significant problems down to 3970 m where gas problems were experienced. The hole was cleaned up, and dual induction/sonic log was run. Due to increasing gas recordings 9 5/8" casing was set at 3978 m. The remaining logging program in this section was therefore not run, and sidewall cores were not taken. At 4705 m a drill- break was experienced. The hole was circulated, tested, and drilled to 4714 m. During logging the tool got stuck and the string was cut. The fish was stuck at 3842 m, and loosening was unsuccessful. 7" liner was set at 3826 m and cemented. During circulation hydrocarbons started to flow in between 9 5/8" shoe and 7" liner. The well was closed and heavy mud was squeezed into the formation. After 3 weeks the fish was pulled out of the hole. The well was drilled with spud mud down to 1015 m, with KCl/polymer mud from 1015 m to 4050 m, and with Lignosulphonate mud from 4050 m to TD

Well 2/12-1 encountered 71 m of oil bearing Late Jurassic Ula Formation sandstone from 4597 - 4668 m. The top of the reservoir was 229 m shallower than originally prognosed. The gross sand interval of 71 m contained 56.6 m net sand. The sandstone was generally clean, very fine to fine grained and well sorted. No Free Water level (FWL) was observed down to the sandstone/shale lower reservoir boundary at 4668 m. The oil gradient is the same as for the Gert-1 well.

Oil shows were reported from carbonates in the Late Cretaceous (at the base of the Hydra Formation) from 3895 to 3917 m, the Early Cretaceous (Åsgard Formation) from 3955 to 3988 m, and the Late Permian Zechstein Group from 4674.5 to 4684.5 m. Petrophysical analysis showed no net pay intervals in the Cretaceous sections but for the Permian limestones, out of a gross total interval of 6.5 m carbonate section a net reservoir interval of 4 m with a net pay of 1.1 m was defined. For this net pay interval an average porosity of 7.8 % and a water saturation of 35 % were calculated. Shows were also reported on claystones, dolomites, limestones, siltstones, and thin sandstone stringers at 3988 - 4610 m in the Farsund and Haugesund Formations.

Three conventional cores were cut over the interval 4633 m to 4673.5 m (driller's depth). Coring started in the Ula Formation consisting of sandstone with basal coal, shale and conglomerate. It continued through 2.5 m of ?Triassic claystone and stopped in late Permian claystones and limestones at 4673.5 m. RFT wire line fluid samples were taken at 4645.4 m (gas and water/mud filtrate) and at 4610.1 (gas, oil, and water/mud filtrate) .

The well was permanently abandoned on 12 March 1987 as an oil and gas discovery.

Testing

Two DST tests were performed in the Ula Formation.



DST 1 was performed from the interval 4630 - 4647 m. It produced 1051 Sm³ oil and 176400 Sm³ gas /day on a 9.54 mm choke. The GOR was 168 Sm³/Sm³, the oil density was 0.828 and the gas gravity was 0.835 (air = 1) with 0.5 % CO₂ and 5 ppm H₂S. The bottom hole temperature, measured at 4642.3 m, was 147.5 deg C.

DST 2 was performed from the interval 4600 - 4612 m. It produced 1629 Sm³ oil and 213600 Sm³ gas /day on a 14.29 mm choke. The GOR was 131 Sm³/Sm³, the oil density was 0.828 and the gas gravity was 0.828 (air = 1) with 1.5 % CO₂ and 0 ppm H₂S. The bottom hole temperature, measured at 4581.92 m, was 148.1 deg C.

Cuttings at the Norwegian Offshore Directorate

Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
1020.00	4795.00

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	4633.0	4650.9	[m]
2	4651.0	4660.5	[m]
3	4662.0	4672.5	[m]

Total core sample length [m]	37.9
Cores available for sampling?	YES

Core photos



4633-4638m



4638-4643m



4643-4648m



4648-4653m



4653-4658m



4658-4664m



4664-4669m



4669-4672m

**Palynological slides at the Norwegian Offshore Directorate**

Sample depth	Depth unit	Sample type	Laboratory
2663.3	[m]	C	HRS
3970.0	[m]	SWC	OD
3996.0	[m]	SWC	RRI
3997.0	[m]	DC	OD
4010.0	[m]	DC	OD
4020.0	[m]	DC	OD
4030.0	[m]	DC	OD
4040.0	[m]	SWC	RRI
4050.0	[m]	DC	OD
4060.0	[m]	DC	OD
4070.0	[m]	DC	OD
4080.0	[m]	DC	OD
4090.0	[m]	DC	OD
4105.0	[m]	SWC	RRI
4120.0	[m]	DC	OD
4135.0	[m]	DC	OD
4150.0	[m]	DC	OD
4172.0	[m]	SWC	RRI
4190.0	[m]	DC	OD
4210.0	[m]	DC	OD
4220.0	[m]	SWC	RRI
4240.0	[m]	DC	OD
4260.0	[m]	DC	OD
4280.0	[m]	DC	OD
4300.0	[m]	DC	OD
4320.0	[m]	DC	OD
4330.0	[m]	DC	OD
4340.0	[m]	DC	OD
4350.0	[m]	DC	OD
4370.0	[m]	DC	OD
4390.0	[m]	DC	OD
4400.0	[m]	DC	OD
4400.0	[m]	SWC	RRI
4420.0	[m]	DC	OD
4420.0	[m]	SWC	RRI



4440.0	[m]	DC	OD
4460.0	[m]	DC	OD
4470.0	[m]	DC	OD
4470.0	[m]	SWC	RRI
4490.0	[m]	DC	OD
4500.0	[m]	DC	OD
4520.0	[m]	DC	OD
4540.0	[m]	DC	OD
4550.0	[m]	DC	OD
4560.0	[m]	DC	OD
4570.0	[m]	DC	OD
4580.0	[m]	DC	OD
4590.0	[m]	DC	OD
4607.0	[m]	DC	OD
4607.0	[m]	SWC	RRI
4627.0	[m]	DC	OD
4628.0	[m]	SWC	RRI
4633.5	[m]	C	OD
4635.6	[m]	C	OD
4638.4	[m]	C	OD
4640.0	[m]	C	OD
4641.0	[m]	C	OD
4643.5	[m]	C	OD
4644.5	[m]	C	OD
4653.3	[m]	C	OD
4654.4	[m]	C	OD
4657.7	[m]	C	OD
4660.0	[m]	C	OD
4660.2	[m]	C	OD
4660.3	[m]	C	OD
4660.4	[m]	C	OD
4663.3	[m]	C	OD
4663.9	[m]	C	OD
4668.1	[m]	DC	HRS
4668.1	[m]	C	HRS
4668.7	[m]	C	OD
4687.0	[m]	SWC	RRI



Test type	Bottle number	Top depth MD [m]	Bottom depth MD [m]	Fluid type	Test time	Samples available
DST	DST1	4630.00	4647.00		22.12.1986 - 00:00	YES
DST	DST2	4600.00	4612.00		18.12.1986 - 00:00	YES

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
93	NORDLAND GP
1594	HORDALAND GP
2985	ROGALAND GP
2985	BALDER FM
2994	SELE FM
3045	LISTA FM
3084	VÅLE FM
3107	SHETLAND GP
3107	EKOFISK FM
3125	TOR FM
3358	HOD FM
3698	BLODØKS FM
3709	HIDRA FM
3917	CROMER KNOLL GP
3917	RØDBY FM
3955	ÅSGARD FM
3988	TYNE GP
3988	FARSUND FM
4365	HAUGESUND FM
4597	VESTLAND GP
4597	ULA FM
4672	NO GROUP DEFINED
4672	SMITH BANK FM
4674	ZECHSTEIN GP
4684	ROTLIEGEND GP

Geochemical information





Document name	Document format	Document size [MB]
1014_1	pdf	0.50
1014_2	pdf	2.06
1014_3	pdf	0.42
1014_4	pdf	11.89
1014_5	pdf	2.48
1014_6	pdf	0.41

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

Document name	Document format	Document size [MB]
1014_01_WDSS_General_Information	pdf	0.39
1014_02_WDSS_completion_log	pdf	0.31

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

Document name	Document format	Document size [MB]
1014_01_2_12_1_Completion_report	pdf	10.63
1014_02_2_12_1_Completion_Log	pdf	3.95

Drill stem tests (DST)

Test number	From depth MD [m]	To depth MD [m]	Choke size [mm]
1.0	4630	4647	9.5
2.0	4600	4612	14.3

Test number	Final shut-in pressure [MPa]	Final flow pressure [MPa]	Bottom hole pressure [MPa]	Downhole temperature [°C]
1.0				
2.0				

Test number	Oil [Sm3/day]	Gas [Sm3/day]	Oil density [g/cm3]	Gas grav. rel.air	GOR [m3/m3]
1.0	1051	176000	0.828	0.835	168





2.0	1629	214000	0.828	0.828	131
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Logs

Log type	Log top depth [m]	Log bottom depth [m]
CBL VDL	1623	4656
CST	3980	4714
DIL BHC LSS SP GR	2885	4797
DLL MSFL SP GR	3976	4713
LDL CNL CAL GR	2867	4716
MWD - GR RES DIR	92	3986
MWD - GR RES DIR	4023	4633
RFT	4528	4651
RFT	4599	4707
RFT	4610	4610
SHDT GR	3976	4717
TEMP ASNT	3000	4658
VSP	1100	4790

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	178.0	36	178.0	0.00	LOT
SURF.COND.	20	998.0	26	1015.0	1.70	LOT
INTERM.	13 3/8	2500.0	17 1/2	2515.0	2.02	LOT
INTERM.	9 5/8	3978.0	12 1/4	3986.0	2.21	LOT
LINER	7	4714.0	8 1/2	4716.0	2.42	LOT
OPEN HOLE		4795.0	6	4795.0	0.00	LOT

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
123	1.03	21.0	5.0	WATER BASED	12.03.1987
178	1.25			WATER	14.10.1986
319	1.05			WATER	16.10.1986
895	1.82	21.0	5.0	WATER	10.03.1987



895	1.82	21.0	5.0	WATER BASED	11.03.1987
944	1.05			WATER	17.10.1986
1015	1.03			WATER	20.10.1986
1015	0.00	10.0	6.0	WATER	20.10.1986
1015	0.00	6.0	9.0	WATER	20.10.1986
1015	0.00	6.0	9.0	WATER	21.10.1986
1348	1.21	26.0	12.0	WATER	22.10.1986
1598	1.60	29.0	17.0	WATER	23.10.1986
1905	1.60	40.0	13.0	WATER	26.10.1986
2000	1.60	49.0	17.0	WATER	26.10.1986
2247	1.60	43.0	17.0	WATER	26.10.1986
2257	1.60	38.0	17.0	WATER	27.10.1986
2387	1.60	40.0	16.0	WATER	28.10.1986
2448	1.60	38.0	16.0	WATER	29.10.1986
2515	1.60	38.0	16.0	WATER	30.10.1986
2515	1.60	40.0	13.0	WATER BASED	02.11.1986
2515	1.60	37.0	12.0	WATER BASED	02.11.1986
2650	1.60	25.0	9.0	WATER BASED	02.11.1986
2874	1.60	34.0	10.0	WATER BASED	03.11.1986
2961	1.60	25.0	10.0	WATER BASED	04.11.1986
3059	1.60	32.0	9.0	WATER BASED	05.11.1986
3123	1.60	30.0	10.0	WATER BASED	06.11.1986
3210	1.60	33.0	10.0	WATER BASED	11.11.1986
3220	1.60	32.0	10.0	WATER BASED	11.11.1986
3233	1.60	32.0	11.0	WATER BASED	11.11.1986
3306	1.60	33.0	12.0	WATER BASED	09.11.1986
3323	1.60	32.0	11.0	WATER BASED	12.11.1986
3416	1.60	32.0	10.0	WATER BASED	13.11.1986
3535	1.60	33.0	12.0	WATER BASED	14.11.1986
3636	1.60	31.0	11.0	WATER BASED	17.11.1986
3678	1.60	31.0	11.0	WATER BASED	17.11.1986
3750	1.82	23.0	6.0	WATER	09.03.1987
3780	0.00			WATER	27.02.1987
3780	2.14	35.0	6.0	WATER	26.02.1987
3780	0.00	55.0	9.0	WATER	02.03.1987
3782	1.60	32.0	11.0	WATER BASED	17.11.1986
3851	1.60	31.0	11.0	WATER BASED	18.11.1986
3874	1.60	30.0	10.0	WATER BASED	19.11.1986
3880	1.60	30.0	10.0	WATER BASED	20.11.1986
3900	1.60	30.0	11.0	WATER BASED	21.11.1986



3901	1.60	30.0	9.0	WATER BASED	24.11.1986
3918	1.60	28.0	9.0	WATER BASED	24.11.1986
3954	1.60	28.0	9.0	WATER BASED	24.11.1986
3960	1.60	28.0	8.0	WATER BASED	25.11.1986
3986	1.66	33.0	8.0	WATER BASED	26.11.1986
3986	1.82	38.0	9.0	WATER BASED	25.11.1986
3986	1.82	37.0	9.0	WATER BASED	30.11.1986
3986	1.82	37.0	8.0	WATER BASED	30.11.1986
3986	1.98	39.0	9.0	WATER BASED	02.12.1986
3986	1.82	37.0	9.0	WATER BASED	27.11.1986
4019	1.98	40.0	8.0	WATER BASED	02.12.1986
4025	1.98	39.0	8.0	WATER BASED	03.12.1986
4050	1.98	40.0	10.0	WATER BASED	04.12.1986
4065	2.02	39.0	10.0	WATER BASED	06.12.1986
4089	2.05	39.0	8.0	WATER BASED	06.12.1986
4155	2.05	38.0	9.0	WATER BASED	06.12.1986
4229	2.05	35.0	8.0	WATER BASED	08.12.1986
4305	2.23	43.0	8.0	WATER	05.03.1987
4305	0.00	50.0	5.0	WATER	09.03.1987
4305	0.00	46.0	5.0	WATER	09.03.1987
4305	0.00	50.0	6.0	WATER	09.03.1987
4308	2.05	36.0	8.0	WATER BASED	09.12.1986
4402	2.05	34.0	8.0	WATER BASED	10.12.1986
4420	2.23	43.0	6.0	WATER	03.03.1987
4420	0.00	60.0	5.0	WATER	05.03.1987
4482	2.07	35.0	8.0	WATER BASED	11.12.1986
4557	2.07	33.0	7.0	WATER BASED	14.12.1986
4567	2.14	33.0	5.0	WATER	25.02.1987
4567	0.00	38.0	5.0	WATER	02.03.1987
4567	0.00	46.0	4.0	WATER	02.03.1987
4609	2.12	33.0	7.0	WATER BASED	14.12.1986
4618	2.14	29.0	7.0	WATER	13.02.1987
4618	0.00	26.0	5.0	WATER	13.02.1987
4618	0.00	29.0	6.0	WATER	18.02.1987
4618	0.00	28.0	6.0	WATER	18.02.1987
4618	0.00	32.0	7.0	WATER	19.02.1987
4618	0.00	27.0	5.0	WATER	20.02.1987
4618	0.00	28.0	5.0	WATER	24.02.1987
4618	0.00	55.0	6.0	WATER	24.02.1987
4618	0.00	36.0	5.0	WATER	24.02.1987



4618	0.00	49.0	5.0	WATER	24.02.1987
4618	0.00	26.0	5.0	WATER	18.02.1987
4625	2.14	30.0	7.0	WATER	11.02.1987
4633	2.12	27.0	5.0	WATER BASED	14.12.1986
4633	2.12	26.0	5.0	WATER BASED	15.12.1986
4633	2.14	27.0	5.0	WATER BASED	16.12.1986
4651	2.14	27.0	5.0	WATER BASED	17.12.1986
4661	2.14	26.0	5.0	WATER BASED	18.12.1986
4668	2.14	28.0	4.0	WATER BASED	20.12.1986
4677	2.14	32.0	5.0	WATER	02.02.1987
4677	0.00	31.0	5.0	WATER	03.02.1987
4677	0.00	30.0	5.0	WATER	04.02.1987
4677	0.00	29.0	5.0	WATER	09.02.1987
4677	0.00	28.0	5.0	WATER	09.02.1987
4677	0.00	27.0	5.0	WATER	09.02.1987
4677	0.00	26.0	7.0	WATER	10.02.1987
4690	2.14	27.0	4.0	WATER BASED	20.12.1986
4714	2.14	29.0	4.0	WATER BASED	23.12.1986
4714	2.14	29.0	4.0	WATER BASED	29.12.1986
4714	2.14	29.0	4.0	WATER BASED	30.12.1986
4714	2.14	25.0	4.0	WATER BASED	30.12.1986
4714	2.14	32.0	14.0	WATER BASED	30.12.1986
4714	2.14	30.0	13.0	WATER BASED	02.01.1987
4714	2.14	30.0	12.0	WATER BASED	02.01.1987
4714	2.14	43.0	16.0	WATER BASED	05.01.1987
4714	2.14	35.0	16.0	WATER BASED	05.01.1987
4714	2.14	34.0	15.0	WATER BASED	05.01.1987
4714	2.14	33.0	9.0	WATER BASED	09.01.1987
4714	0.00	34.0	8.0	WATER	09.01.1987
4714	0.00	32.0	7.0	WATER	12.01.1987
4714	0.00	29.0	7.0	WATER	13.01.1987
4714	0.00	28.0	7.0	WATER	14.01.1987
4714	0.00	29.0	7.0	WATER	15.01.1987
4714	0.00	30.0	7.0	WATER	16.01.1987
4714	0.00	30.0	7.0	WATER	19.01.1987
4714	0.00	26.0	6.0	WATER	19.01.1987
4714	0.00	27.0	6.0	WATER	19.01.1987
4714	0.00	29.0	6.0	WATER	20.01.1987
4714	0.00	26.0	6.0	WATER	21.01.1987
4714	0.00	28.0	6.0	WATER	22.01.1987



4714	0.00	29.0	7.0	WATER	23.01.1987
4714	0.00	32.0	5.0	WATER	26.01.1987
4714	0.00	31.0	5.0	WATER	26.01.1987
4714	0.00	33.0	6.0	WATER	26.01.1987
4714	2.14	28.0	4.0	WATER BASED	23.12.1986
4714	2.14	26.0	3.0	WATER BASED	30.12.1986
4714	2.25	30.0	18.0	WATER BASED	02.01.1987
4714	2.14	35.0	16.0	WATER BASED	06.01.1987
4714	2.14	36.0	17.0	WATER BASED	07.01.1987
4716	2.14	31.0	5.0	WATER	27.01.1987
4721	2.14	31.0	5.0	WATER	28.01.1987
4747	2.14	34.0	5.0	WATER	29.01.1987
4778	2.14	33.0	5.0	WATER	30.01.1987
4795	2.14	34.0	5.0	WATER	02.02.1987

Thin sections at the Norwegian Offshore Directorate

Depth	Unit
4637.00	[m]
4646.00	[m]
4656.00	[m]
4662.00	[m]
4665.00	[m]
4671.00	[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]
1014 Formation pressure (Formasjonstrykk)	pdf	0.21

