

**General information**

Wellbore name	15/9-11
Type	EXPLORATION
Purpose	APPRAISAL
Status	P&A
Factmaps in new window	link to map
Main area	NORTH SEA
Field	SLEIPNER ØST
Discovery	15/9-9 Sleipner Øst
Well name	15/9-11
Seismic location	510 - 325 SP 1369
Production licence	046
Drilling operator	Den norske stats oljeselskap a.s
Drill permit	303-L
Drilling facility	ROSS RIG (1)
Drilling days	97
Entered date	18.09.1981
Completed date	23.12.1981
Release date	23.12.1983
Publication date	27.05.2009
Purpose - planned	APPRAISAL
Reentry	NO
Content	GAS/CONDENSATE
Discovery wellbore	NO
1st level with HC, age	PALEOCENE
1st level with HC, formation	HEIMDAL FM
2nd level with HC, age	MIDDLE JURASSIC
2nd level with HC, formation	HUGIN FM
Kelly bushing elevation [m]	25.0
Water depth [m]	88.0
Total depth (MD) [m RKB]	2950.0
Maximum inclination [°]	2.2
Bottom hole temperature [°C]	107
Oldest penetrated age	TRIASSIC
Oldest penetrated formation	SMITH BANK FM
Geodetic datum	ED50
NS degrees	58° 24' 2.53" N
EW degrees	1° 53' 41.79" E
NS UTM [m]	6474001.57



EW UTM [m]	435410.76
UTM zone	31
NPDID wellbore	329

Wellbore history

**General**

Well 15/11-9 was drilled to appraise the 15/9-9 Sleipner Øst discovery in the south Viking Graben area of the North Sea.

The primary objective was to delineate the hydrocarbon accumulation found in the Heimdal Formation of the 15/9-Gamma structure. The secondary objective was to test for possible hydrocarbons in Triassic sandstones.

The well is Reference well for the Lista Formation, the Meile Member, and the Heimdal Formation

Operations and results

Appraisal well 15/9-11 was spudded with the semi-submersible installation Ross Rig on 18 September 1981 and drilled to TD at 2950 m in the Triassic Hegre Group. A total of 99 days including a strike was spent on this well. Apart from the strike, which amounted to 22 days of lost operation, there were no severe problems during drilling and testing operations. The well was drilled with sea water and bentonite down to 585 m and with gel/lignosulphonate/seawater mud from 585 m to TD.

The well proved gas and condensate in Heimdal formation and verified thereby the results from the 15/9-9 well. The gas- water contact was found at 2442 m. Hydrocarbons were found also in the Jurassic Hugin Formation sandstones with a gas-water contact at 2825 m. The TD for the well was then extended from 2650 to 2950 m. No hydrocarbons were found in Triassic sandstones

Eleven cores were cut in the well. Cores 1 and 2 were cut from 2364 to 2379 m in the Lista Formation. Cores 3 to 11 were cut from 2395 to 2514 m in the Heimdal Formation. The RFT tool was run on wire line and the pressure data supported communication with the 15/9-9 discovery well within the Heimdal Formation, while the Hugin Formation was in a separate pressure regime. Segregated fluid samples were taken at 2387.5 m, in the Heimdal Formation, and at 2812 and 2825.8 to 2826.5 m in the Hugin Formation.

The well was permanently abandoned on 23 December 1981 as a gas/condensate appraisal well.

Testing

Three DST was performed. DST 1 tested the Hugin Formation sandstone from 2789.5 - 2830 m. It produced 566000 Sm³ gas and 243 Sm³ condensate / day through a 15.9 mm choke. The condensate density was 0.75 g/cm³ and the gas gravity was 0.74 (air = 1) with 0.5 - 1% CO₂. The maximum down hole temperature measured in the test was 103.9 deg C.

DST 2 tested the Heimdal Formation sandstone in the interval 2432 - 2440 m. It produced 233785 Sm³ gas, 104 Sm³ condensate and 1085 m³ water/ day through a 12.7 mm choke. The oil density was 0.75 g/cm³ and the gas gravity was 0.72 (air = 1) with 0.1 - 0.5% CO₂. The maximum down hole temperature measured in the test was 93.3 deg C.

DST 3 tested the Heimdal Formation sandstone in the interval 2395 - 2415 m. It produced 570867 Sm³ gas and 266 Sm³ condensate / day through a 19.1 mm choke. The oil density was 0.75 g/cm³ and the gas gravity was 0.734 (air = 1) with 0.1 - 0.5% CO₂. The maximum down hole temperature measured in the test was 92.2 deg C.

Cuttings at the Norwegian Offshore Directorate



Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
170.00	2995.00

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	2364.0	2370.0	[m]
2	2370.0	2374.0	[m]
3	2395.0	2406.0	[m]
4	2406.0	2423.6	[m]
5	2424.0	2429.0	[m]
6	2436.0	2449.0	[m]
7	2449.0	2457.5	[m]
9	2473.0	2491.5	[m]
10	2492.0	2505.1	[m]
11	2506.0	2513.5	[m]

Total core sample length [m]	104.2
Cores available for sampling?	YES

Core photos



2364-2367m



2367-2370m



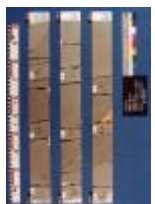
2370-2373m



2373-2374m



2395-2398m



2398-2401m



2401-2404m



2404-2406m



2406-2409m



2409-2412m



2412-2415m



2415-2418m



2418-2421m



2421-2423m



2424-2427m



2427-2429m



2436-2439m



2439-2442m



2442-2445m



2445-2448m



2448-2449m



2449-2452m



2452-2455m



2455-2457m



2473-2476m



2476-2479m



2479-2482m



2482-2485m



2485-2488m



2488-2491m



2491-2492m



2492-2495m



2495-2498m



2498-2501m



2501-2504m



2504-2505m



2506-2509m



2509-2512m



2512-2513m

**Palynological slides at the Norwegian Offshore Directorate**

Sample depth	Depth unit	Sample type	Laboratory
800.0	[m]	DC	FUGRO
810.0	[m]	DC	FUGRO
820.0	[m]	DC	FUGRO
830.0	[m]	DC	FUGRO
840.0	[m]	DC	FUGRO
850.0	[m]	DC	FUGRO
860.0	[m]	DC	FUGRO
870.0	[m]	DC	FUGRO
880.0	[m]	DC	FUGRO
890.0	[m]	DC	FUGRO
900.0	[m]	DC	FUGRO
910.0	[m]	DC	FUGRO
920.0	[m]	DC	FUGRO
930.0	[m]	DC	FUGRO
940.0	[m]	DC	FUGRO
950.0	[m]	DC	FUGRO
960.0	[m]	DC	FUGRO
970.0	[m]	DC	FUGRO
990.0	[m]	DC	FUGRO
1000.0	[m]	DC	FUGRO
1010.0	[m]	DC	FUGRO
1020.0	[m]	DC	FUGRO
1030.0	[m]	DC	FUGRO
1040.0	[m]	DC	FUGRO
1050.0	[m]	DC	FUGRO
1060.0	[m]	DC	FUGRO
1070.0	[m]	DC	FUGRO
1080.0	[m]	DC	FUGRO
1090.0	[m]	DC	FUGRO
1100.0	[m]	DC	FUGRO
2303.0	[m]	DC	
2330.0	[m]	DC	
2360.0	[m]	DC	
2368.9	[m]	C	
2390.0	[m]	C	
2425.9	[m]	C	



2443.9 [m]	C	
2504.6 [m]	C	
2507.5 [m]	C	
2509.0 [m]	C	
2513.3 [m]	C	
2547.0 [m]	C	
2700.0 [m]	C	
2730.0 [m]	C	
2739.0 [m]	DC	SAGA
2742.0 [m]	DC	SAGA
2760.0 [m]	DC	
2760.0 [m]	DC	SAGA
2775.0 [m]	DC	SAGA
2787.0 [m]	DC	SAGA
2790.0 [m]	DC	
2793.0 [m]	DC	SAGA
2808.0 [m]	DC	SAGA
2817.0 [m]	DC	SAGA
2820.0 [m]	DC	
2835.0 [m]	DC	SAGA
2850.0 [m]	DC	
2862.0 [m]	DC	SAGA
2871.0 [m]	DC	SAGA
2880.0 [m]	DC	
2898.0 [m]	DC	SAGA
2910.0 [m]	DC	SAGA
2910.0 [m]	DC	
2922.0 [m]	DC	SAGA
2928.0 [m]	DC	SAGA
2931.0 [m]	DC	SAGA
2946.0 [m]	DC	SAGA
2946.0 [m]	DC	
3563.9 [m]	DC	

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	2797.00	2807.00		01.12.1981 - 21:00	YES
DST	TEST2	2410.00	2432.00		08.12.1980 - 10:30	YES
DST	TEST3	2395.00	2415.00		15.12.1981 - 00:00	YES

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
113	NORDLAND GP
823	UTSIRA FM
1311	HORDALAND GP
2181	ROGALAND GP
2181	BALDER FM
2304	LISTA FM
2387	HEIMDAL FM
2530	SHETLAND GP
2530	EKOFISK FM
2557	JORSALFARE FM
2624	KYRRE FM
2674	BLODØKS FM
2700	HIDRA FM
2705	CROMER KNOLL GP
2705	RØDBY FM
2718	SOLA FM
2725	ÅSGARD FM
2752	VIKING GP
2752	DRAUPNE FM
2766	HEATHER FM
2795	VESTLAND GP
2795	HUGIN FM
2830	SMITH BANK FM

Composite logs





Document name	Document format	Document size [MB]
329	pdf	0.56

Geochemical information

Document name	Document format	Document size [MB]
329_1	pdf	1.53
329_2	pdf	0.28
329_3	pdf	0.48
329_4	pdf	4.92

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

Document name	Document format	Document size [MB]
329_01_WDSS_General_Information	pdf	0.10
329_02_WDSS_completion_log	pdf	0.22

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

Document name	Document format	Document size [MB]
329_00_15_9_11_Biostrat_of_int.2000-2946m	pdf	17.70
329_00_15_9_11_Completion_Log	pdf	1.58
329_00_15_9_11_Completion_Report	pdf	11.13
329_00_15_9_11_Conventional_Core_Analyses	pdf	1.96
329_00_15_9_11_Core_photo_core_1-11	pdf	8.29
329_00_15_9_11_Drilling_fluid_proposal	pdf	0.64
329_00_15_9_11_End_of_well_report	pdf	27.83
329_00_15_9_11_Evaluation_of_core	pdf	1.71
329_00_15_9_11_Evaluation_of_core_data	pdf	0.95
329_00_15_9_11_Geochemistry_Isotopic_ratios	pdf	0.69
329_00_15_9_11_Geochemistry_Report_on_sable_isotopes	pdf	0.48
329_00_15_9_11_Geochemistry_Source_rock_analysis	pdf	13.77





329 00 15 9 11 Geolog progn and drilling progrl	pdf	3.20
329 00 15 9 11 Geolog progn and drilling program encl 01	pdf	0.18
329 00 15 9 11 Geolog progn and drilling program encl 02	pdf	0.79
329 00 15 9 11 High acc.pressure.temp.meas DST2	pdf	2.13
329 00 15 9 11 High acc.pressure.temp.meas DST3	pdf	9.01
329 00 15 9 11 High acc.pressure temp.meas DST1	pdf	2.24
329 00 15 9 11 Petrophysical evaluation	pdf	1.89
329 00 15 9 11 Pressure survey report DST 2 Run 1	pdf	0.42
329 00 15 9 11 Production test no 1,2 3	pdf	5.70
329 00 15 9 11 Repeat formation tester	pdf	1.29
329 00 15 9 11 Rep on well vel.survey 01	pdf	1.44
329 00 15 9 11 Rep on well vel.survey 03	pdf	1.41
329 00 15 9 11 Rep on well vel.survey 04	pdf	0.64
329 00 15 9 11 Rep on well vel.survey and cal.vel.log	pdf	1.26
329 00 15 9 11 Reservoir fluid study	pdf	1.56
329 00 15 9 11 SCAL Comments	pdf	0.29
329 00 15 9 11 Special core analysis	pdf	2.05
329 00 15 9 11 Synthetic seismogram report	pdf	0.02
329 00 15 9 11 Synthetic seismogram report encl 1	pdf	0.72
329 00 15 9 11 Synthetic seismogram report encl 2	pdf	1.45
329 00 15 9 11 Synthetic seismogram report encl 3	pdf	0.50
329 00 15 9 11 Synthetic seismogram report encl 4	pdf	0.46
329 00 15 9 11 Water analysis DST-2	pdf	0.21
329 00 15 9 11 Well summary Sediment petrography	pdf	1.81
329 00 15 9 11 Well testing report DST 1 2 3	pdf	2.82
329 00 15 9 11 Well Test Report DST1,2 3	pdf	3.56
329 00 15 9 11 Well Test Report DST 1,2 3 encl 1	pdf	0.19
329 00 15 9 11 Well Test Report DST 1,2 3 encl 2	pdf	0.10





Drill stem tests (DST)

Test number	From depth MD [m]	To depth MD [m]	Choke size [mm]
1.0	2797	2807	16.7
2.0	2432	2440	12.7
3.0	2395	2415	19.0

Test number	Final shut-in pressure [MPa]	Final flow pressure [MPa]	Bottom hole pressure [MPa]	Downhole temperature [°C]
1.0				
2.0				
3.0				

Test number	Oil [Sm3/day]	Gas [Sm3/day]	Oil density [g/cm3]	Gas grav. rel.air	GOR [m3/m3]
1.0	238	517000	0.750	0.730	2172
2.0	104	234000	0.750	0.720	2248
3.0	266	570000	0.750	0.734	2142

Logs

Log type	Log top depth [m]	Log bottom depth [m]
CBL GR	450	1145
CBL VDL GR	900	2574
CBL VDL GR	2490	2909
CST	2170	2526
CST	2610	2943
DIPMETER	2088	2573
DIPMETER	2576	2855
DLL MSFL SP GR	2340	2540
FDC CNL GR	1159	2947
FDC GR	569	1175
GEODIP	2340	2540
GEODIP	2775	2850
HDT	2100	2849
ISF BHC GR	174	2956



RFT	2349	2517
RFT	2790	2938
VELOCITY	685	2850

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	174.0	36	175.0	0.00	LOT
SURF.COND.	20	569.0	26	585.0	1.54	LOT
INTERM.	13 3/8	1159.0	17 1/2	1176.0	1.77	LOT
INTERM.	9 5/8	2575.0	12 1/4	2590.0	1.85	LOT
LINER	7	2950.0	8 1/2	2950.0	0.00	LOT

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
465	1.10			waterbased	
960	1.13			waterbased	
1176	1.12			waterbased	
1404	1.20			waterbased	
2590	1.23			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]
329 Formation pressure (Formasjonstrykk)	pdf	0.22

