General information

Wellbore name	15/9-13
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	15/9-13
Seismic location	610 - 160 SP 110
Production licence	046
Drilling operator	Den norske stats oljeselskap a.s
Drill permit	319-L
Drilling facility	ROSS RIG (1)
Drilling days	68
Entered date	21.03.1982
Completed date	27.05.1982
Release date	27.05.1984
Publication date	11.03.2015
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]	81.0
Total depth (MD) [m RKB]	3280.0
Final vertical depth (TVD) [m RKB]	3279.0
Maximum inclination [°]	3.7
Bottom hole temperature [°C]	91
Oldest penetrated age	LATE PERMIAN
Oldest penetrated formation	ZECHSTEIN GP
Geodetic datum	ED50
NS degrees	58° 22' 25.96'' N
EW degrees	1° 56' 2.86'' E

NS UTM [m]	6470978.02
EW UTM [m]	437653.70
UTM zone	31
NPDID wellbore	45

Wellbore history

General

Well 15/9-13 was drilled on the Sleipner East Field in the Viking Graben in the North Sea. The objective was to delineate the hydrocarbon accumulation found in the Heimdal Formation of the 15/9 Gamma structure. Secondary objectives were to test possible hydrocarbons in sandstones of Jurassic - Triassic age. The well is reference well for the Utsira and Skade formations.

Operations and results

Appraisal well 15/9-13 was spudded with the semi-submersible installation Ross Rig on 21 March 1982 and drilled to TD at 3280 m in the Permian Zechstein Group. No significant problem was encountered in the operations. The well was drilled with seawater and hi-vis slugs down to 518 m, with gel/lignosulphonate mud from 518 m to 1165 m, gypsum/lignosulphonate mud from 1165 m to 2642 m, and gel/lignosulphonate mud from 2642 m to TD.

The well proved gas and condensate in the Heimdal Formation. Shows on cores indicate that all sandstones in the Heimdal Formation are gas filled to a probable down-to contact in top Shetland Group at 2440 m. Gas and condensate were also encountered in a Jurassic sandstone from 2763 to a probable down-to contact at 2791 m. No hydrocarbons were found in Triassic sandstones. No shows were recorded outside of the hydrocarbon-bearing sections in the well.

Seven cores were cut. Cores 1 - 3 were cut from 2404 m in the Heimdal Formation to 2453.5 m in the Tor Formation with 84 to 100% recovery. Cores 4 - 7 were cut from 2763 m to 2801.6 m in the Hugin Formation with 90 to 100% recovery. Segregated RFT fluid samples were taken at 2400 m, 2437 m, 2765.8 m, and 2766.5 m.

The well was permanently abandoned on 27 May 1984 as a gas/condensate appraisal well.

Testing

Two DST's were performed on this well.

DST 1 tested gas and condensate from 2765 to 2769 m in the Jurassic sand through the 7" liner. During the main flow on a 64/64” choke, the test produced on average 804500 Sm3 gas and 388 Sm3 condensate /day. The GOR was 2073 Sm3/Sm3, the condensate density was 0.783 g/cm3 and the gas gravity was 0.742 (air = 1). The gas contained 0.8 ppm H2S and 1.0 % CO2. The gauge temperature at final build-up was 98.3 °C.

DST 2 tested gas and condensate from 2422 to 2427 m in the Heimdal sand through the 9 5/8" casing. During the clean-up period on a 64/64” choke, the test produced on average 758600 Sm3 gas and 401 Sm3 condensate /day. The GOR was 1891 Sm3/Sm3, the condensate density was 0.76 g/cm3 and the gas gravity was 0.702 (air=1). The gas contained 0.4 ppm H2S and 0.3 % CO2. The gauge temperature at final build-up was 90.3 °C.

Cuttings at the Norwegian Offshore Directorate

Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
180.00	3278.00

Cuttings available for sampling?	YES

Cores at the Norwegian Offshore Directorate

Core sample number	Core sample - top depth	Core sample - bottom depth	Core sample depth - uom
1	2404.0	2420.0	[m]
2	2423.0	2434.5	[m]
3	2435.0	2453.5	[m]
4	2763.0	2772.3	[m]
5	2772.7	2778.0	[m]
6	2778.0	2786.0	[m]
7	2787.0	2799.9	[m]

Total core sample length [m]	81.4
Cores available for sampling?	YES

Core photos


2404-2409m


2409-2414m


2414-2419m


2419-2420m


2423-2428m


2428-2433m


2433-2434m


2435-2440m


2440-2445m


2445-2450m


2450-2453m


2763-2768m


2768-2772m


2792-2797m


2772-2777m


2777-2778m


2778-2783m


2783-2788m


2787-2792m


2792-2797m


2797-2799m

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
920.0	[m]	DC	FUGRO
930.0	[m]	DC	FUGRO
930.0	[m]	DC	FUGRO

940.0	[m]	DC	FUGRO
940.0	[m]	DC	FUGRO
950.0	[m]	DC	FUGRO
950.0	[m]	DC	FUGRO
960.0	[m]	DC	FUGRO
960.0	[m]	DC	FUGRO
970.0	[m]	DC	FUGRO
970.0	[m]	DC	FUGRO
980.0	[m]	DC	FUGRO
980.0	[m]	DC	FUGRO
990.0	[m]	DC	FUGRO
990.0	[m]	DC	FUGRO
1000.0	[m]	DC	FUGRO
1000.0	[m]	DC	FUGRO
1010.0	[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
1170.0	[m]	DC	OD
1170.0	[m]	DC	OD
1190.0	[m]	DC	OD
1190.0	[m]	DC	OD
1250.0	[m]	DC	OD
1250.0	[m]	DC	OD
1280.0	[m]	DC	OD
1280.0	[m]	DC	OD
1300.0	[m]	DC	OD
1300.0	[m]	DC	OD
1310.0	[m]	DC	OD
1310.0	[m]	DC	OD
1320.0	[m]	DC	OD
1320.0	[m]	DC	OD
1330.0	[m]	DC	OD
1330.0	[m]	DC	OD
1340.0	[m]	DC	OD

1360.0	[m]	DC	OD
1370.0	[m]	DC	OD
1400.0	[m]	DC	OD
2215.0	[m]	SWC	STATOIL
2222.0	[m]	SWC	STATOI
2235.0	[m]	SWC	STATOI
2247.0	[m]	SWC	STATOI
2260.0	[m]	SWC	STATOI
2270.0	[m]	SWC	STATOI
2287.0	[m]	SWC	STATOI
2298.0	[m]	SWC	STATOI
2305.0	[m]	SWC	STATOI
2325.0	[m]	SWC	STATOI
2325.0	[m]	SWC	STATOI
2332.0	[m]	SWC	STATOI
2348.0	[m]	DC	
2350.0	[m]	SWC	STATOIL
2364.0	[m]	SWC	STATOI
2376.0	[m]	SWC	STATOI
2378.0	[m]	DC	
2399.0	[m]	SWC	STATOIL
2408.0	[m]	DC	
2453.0	[m]	DC	
2597.0	[m]	DC	
2630.0	[m]	DC	
2660.0	[m]	DC	
2690.0	[m]	DC	
2720.0	[m]	DC	
2747.0	[m]	SWC	RRI
2750.0	[m]	DC	RRI
2756.3	[m]	SWC	
2762.0	[m]	SWC	RRI
2762.9	[m]	SWC	RRI
2769.3	[m]	SWC	RRI
2771.1	[m]	SWC	RRI
2804.0	[m]	DC	
2834.0	[m]	DC	
2864.0	[m]	DC	
2894.0	[m]	DC	
2924.0	[m]	DC	

2954.0	[m]	DC	
2984.0	[m]	DC	
3014.0	[m]	DC	
3044.0	[m]	DC	
3074.0	[m]	DC	
3101.0	[m]	DC	
3134.0	[m]	DC	
3170.0	[m]	DC	
3191.0	[m]	DC	
3221.0	[m]	DC	
3251.0	[m]	DC	
3280.0	[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	2765.00	2769.00		16.05.1982 - 14:00	YES
DST	TEST2	2422.00	2427.00		20.05.1982 - 00:00	YES

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
106	NORDLAND GP
869	UTSIRA FM
1053	UNDIFFERENTIATED
1143	HORDALAND GP
2198	ROGALAND GP
2198	BALDER FM
2246	SELE FM
2330	LISTA FM
2395	HEIMDAL FM
2440	SHETLAND GP
2440	TOR FM
2593	HOD FM
2650	BLODØKS FM
2664	SVARTE FM

2674	CROMER KNOLL GP
2674	RØDBY FM
2690	SOLA FM
2698	ÅSGARD FM
2741	VIKING GP
2741	DRAUPNE FM
2762	HEATHER FM
2764	VESTLAND GP
2764	HUGIN FM
2791	SMITH BANK FM
3256	ZECHSTEIN GP

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

Document name	Document format	Document size [MB]
45_01_WDSS_General_Information	pdf	0.18
45_02_WDSS_completion_log	pdf	0.26

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

Document name	Document format	Document size [MB]
45_15_9_13_Completion_report_and_log	pdf	18.06

Drill stem tests (DST)

Test number	From depth MD [m]	To depth MD [m]	Choke size [mm]
1.0	2765	2769	25.4
2.0	2422	2427	25.4

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	388	804000	0.783	0.742	2073
2.0	401	758000	0.760	0.702	1891

Logs

Log type	Log top depth [m]	Log bottom depth [m]
CBL GR	100	1172
CBL VDL GR	1050	2463
CBL VDL GR	2300	3139
CST	1287	2464
CST	2670	3189
CST	2701	3194
CST	2734	3189
DLL MSFL GR	2800	2950
GEODIP	2800	2950
HDT	2463	3202
ISF BHC GR	172	1191
ISF BHC MSFL GR	1178	3201
LDT CNL GR	1178	3202
LDT GR	498	1191
RFT	2923	3090
VELOCITY	175	3200

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	169.0	36	169.0	0.00	LOT
SURF.COND.	20	502.0	26	517.0	1.44	LOT
INTERM.	13 3/8	1150.0	17 1/2	1165.0	1.76	LOT
INTERM.	9 5/8	2623.0	12 1/4	2642.0	1.83	LOT
LINER	7	3240.0	8 1/2	3280.0	0.00	LOT

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
615	1.08			waterbased	
1215	1.12			waterbased	
1810	1.14			waterbased	
2220	1.11			waterbased	
2340	1.15			waterbased	
2505	1.20			waterbased	
2765	1.31			waterbased	
3080	1.30			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]
45_Formation_pressure_(Formasjonstrykk)	pdf	0.22