Generell informasjon

Brønnbane navn	31/4-7
Type	EXPLORATION
Formål	APPRAISAL
Status	P&A
Faktakart i nytt vindu	lenke til kart
Hovedområde	NORTH SEA
Felt	BRAGE
Funn	31/4-3 Brage
Brønn navn	31/4-7
Seismisk lokalisering	954 - 447 SP. 600
Utvinningstillatelse	055
Boreoperatør	Norsk Hydro Produksjon AS
Boretillatelse	425-L
Boreinnretning	VILDKAT EXPLORER
Boredager	48
Borestart	26.07.1984
Boreslutt	11.09.1984
Frigitt dato	11.09.1986
Publiseringsdato	01.04.2014
Opprinnelig formål	WILDCAT
Gjenåpnet	NO
Innhold	OIL/GAS
Funnbrønnbane	NO
1. nivå med hydrokarboner, alder	MIDDLE JURASSIC
1. nivå med hydrokarboner, formasjon.	FENSFJORD FM
2. nivå med hydrokarboner, alder	EARLY JURASSIC
2. nivå med hydrokarboner, formasjon	STATFJORD GP
Avstand, boredekk - midlere havflate [m]	25.0
Vanndybde ved midlere havflate [m]	136.0
Totalt målt dybde (MD) [m RKB]	2505.0
Totalt vertikalt dybde (TVD) [m RKB]	2504.0
Maks inklinasjon [°]	2.5
Temperatur ved bunn av brønnbanen [°C]	106
Eldste penetrerte alder	LATE TRIASSIC

Eldste penetrerte formasjon	STATFJORD GP
Geodetisk datum	ED50
NS grader	60° 34' 8.21'' N
ØV grader	3° 1' 5.82'' E
NS UTM [m]	6714934.67
ØV UTM [m]	501002.29
UTM sone	31
NPDID for brønnbanen	235

Brønnhistorie

General

Well 31/4-7 was drilled on the southernmost part of the Brage Horst, close to the junction between the Brage/Oseberg fault and the Troll Fault. The primary objective was to test the hydrocarbon potential and the internal stratigraphy on the Brage Horst compartment on the western flank of the Brage Field. Neighbouring well 31/4-2 to the north on the Brage Horst found live oil in two thin sandstones in the Brent Group, while wells 31/4-3, 4, and 5 on the main Brage structure on the Bjørgvin Arch had proved oil in the "Intra-Heather Sandstone Unit II" (Fensfjord Formation). The well was planned to be drilled 50 m into the Statfjord Group at 2765 +/- 50 m.

Operations and results

Wildcat well 31/4-7 was spudded with the semi-submersible installation Vildkat Explorer on 26 July 1984 and drilled to TD at 2505 m in Late Triassic sediments of the Statfjord Group. No significant problem was encountered in the operations. The well was drilled with gel/spud mud down to 1000 m, with KCl/polymer mud from 1000 m to 1816 m, and with a NaCl/polymer mud from 1816 m to TD.

The well encountered hydrocarbon bearing sandstones and siltstones in the Fensfjord Formation and in the Statfjord Group sandstones. The Fensfjord Formation was poorly developed with sandstones grading to siltstones followed by siltstones. It was found gas bearing over the interval 2026 - 2056 m with a calculated net pay of 8 m, an average porosity of 20.5% and an average water saturation of 45%. The Statfjord Group came in at 2384 m and was found oil bearing down to the OWC at 2406 m. It consisted of fine to coarse sandstones. The net pay was calculated to be 12.5 m with a calculated average porosity of 22.2% and an average water saturation of 42.3%.

Five cores were cut in the well, starting at 2045 m in the Fensfjord Formation and stopping at 2150.5 m in Dunlin Group shales. Several attempts were made to obtain a segregated RFT sample in the Fensfjord Formation without success. Oil and gas was recovered in a segregated RFT sample at 2395.7 m in the Statfjord Group.

The well was permanently abandoned on 11 September 1986.

Testing

Two drill stem tests were carried out.

DST 1 tested the interval 2389.9 - 2397.9 m in the Statfjord Formation. It produced 700 Sm3 /day oil and 25000 Sm3 gas /day through a 40/64" choke. The GOR was 36 Sm3/Sm3, the oil density was 0.83 g/cm3 and the gas gravity 0.775 (air = 1) with 2.5 % CO2 and no H2S. Maximum bottom hole temperature at reference depth 2356.5 m was 101.7 deg C.

DST 2 tested the interval 2028.5 - 2039.5 m in the Fensfjord Formation. It produced 26900 Sm3 /day gas with a water cut of 25% through a 36/64" choke. The test also produced some condensate. The gas gravity was 0.77 (air = 1) with trace CO2 and no H2S and the condensate gravity was 57.1 deg API. Maximum bottom hole temperature at reference depth 1991.8 m was 81.1 deg C.

Borekaks i Sokkeldirektoratet

Borekaksprøve, topp dybde [m]	Borekaksprøve, bunn dybde [m]
250.00	2502.00

Borekaks tilgjengelig for prøvetaking?	YES

Borekjerner i Sokkeldirektoratet

Kjerneprøve nummer	Kjerneprøve - topp dybde	Kjerneprøve - bunn dybde	Kjerneprøve dybde - enhet
1	2045.0	2063.0	[m]
2	2064.0	2082.0	[m]
3	2083.0	2111.0	[m]
4	2111.0	2135.0	[m]
5	2139.0	2150.0	[m]

Total kjerneprøve lengde [m]	99.0
Kjerner tilgjengelig for prøvetaking?	YES

Kjernebilder


2045-2049m


2049-2053m


2053-2057m


2057-2061m


2061-2063m


2064-2067m


2068-2072m


2072-2076m


2076-2080m


2080-2082m


2083-2087m


2091-2095m


2095-2099m


2099-2103m


2103-2107m


2107-2111m


2114-2118m


2118-2122m


2122-2126m


2126-2130m


2130-2134m


2134-2138m


2138-2142m


2142-2145m


2146-2150m


2150-2150m

Palynologiske preparater i Sokkeldirektoratet

Prøve dybde	Dybde enhet	Prøve type	Laboratorie
1950.0	[m]	SWC	HYDRO
1960.0	[m]	SWC	HYDRO
1970.0	[m]	C	HYDRO
1975.0	[m]	SWC	HYDRO
1986.0	[m]	SWC	HYDRO
1993.0	[m]	SWC	HYDRO
1995.0	[m]	SWC	HYDRO
2000.0	[m]	SWC	HYDRO
2010.0	[m]	SWC	HYDRO
2020.0	[m]	SWC	HYDRO
2025.0	[m]	SWC	HYDRO
2027.0	[m]	SWC	HYDRO
2030.0	[m]	SWC	HYDRO
2030.0	[m]	C	HYDRO
2037.0	[m]	C	HYDRO
2038.0	[m]	SWC	HYDRO

2041.0	[m]	SWC	HYDRO
2045.0	[m]	C	HYDRO
2045.0	[m]	SWC	HYDRO
2048.0	[m]	C	HYDRO
2051.0	[m]	C	HYDRO
2055.0	[m]	C	HYDRO
2063.8	[m]	C	HYDRO
2065.0	[m]	C	HYDRO
2070.0	[m]	C	HYDRO
2075.0	[m]	C	HYDRO
2080.0	[m]	C	HYDRO
2085.0	[m]	C	HYDRO
2090.0	[m]	C	HYDRO
2096.0	[m]	SWC	HYDRO
2102.0	[m]	SWC	HYDRO
2105.0	[m]	C	HYDRO
2107.0	[m]	C	HYDRO
2109.0	[m]	C	HYDRO
2110.0	[m]	SWC	HYDRO
2110.6	[m]	C	HYDRO
2115.0	[m]	C	HYDRO
2123.0	[m]	C	HYDRO
2130.0	[m]	C	HYDRO
2130.0	[m]	SWC	HYDRO
2135.0	[m]	C	HYDRO
2138.0	[m]	SWC	HYDRO
2140.0	[m]	C	HYDRO
2150.0	[m]	SWC	HYDRO
2160.0	[m]	DC	HYDRO
2170.0	[m]	DC	HYDRO
2180.0	[m]	DC	HYDRO
2190.0	[m]	DC	HYDRO
2200.0	[m]	DC	HYDRO
2211.0	[m]	SWC	HYDRO
2220.0	[m]	DC	HYDRO
2230.0	[m]	DC	HYDRO
2240.0	[m]	DC	HYDRO
2245.0	[m]	SWC	HYDRO
2250.0	[m]	SWC	HYDRO
2260.0	[m]	DC	HYDRO

2275.0	[m]	SWC	HYDRO
2289.0	[m]	SWC	HYDRO
2296.0	[m]	SWC	HYDRO
2308.0	[m]	SWC	HYDRO
2315.0	[m]	DC	HYDRO
2325.0	[m]	SWC	HYDRO
2330.0	[m]	SWC	HYDRO
2340.0	[m]	DC	HYDRO
2350.0	[m]	SWC	HYDRO
2360.0	[m]	DC	HYDRO
2365.0	[m]	SWC	HYDRO
2375.0	[m]	SWC	HYDRO
2383.0	[m]	SWC	HYDRO
2393.0	[m]	SWC	HYDRO
2396.0	[m]	SWC	HYDRO
2400.0	[m]	SWC	HYDRO
2406.0	[m]	SWC	HYDRO
2415.0	[m]	SWC	HYDRO
2420.0	[m]	SWC	HYDRO
2430.0	[m]	DC	HYDRO
2440.0	[m]	DC	HYDRO
2453.0	[m]	SWC	HYDRO
2460.0	[m]	DC	HYDRO
2470.0	[m]	DC	HYDRO
2475.0	[m]	SWC	HYDRO
2480.0	[m]	DC	HYDRO
2490.0	[m]	DC	HYDRO
2500.0	[m]	DC	HYDRO

Oljeprøver i Sokkeldirektoratet

Test type	Flaske nummer	Topp dyp MD [m]	Bunn dyp MD [m]	Væske type	Test tidspunkt	Prøver tilgjengelig
DST	DST1	2398.00	2390.00		31.08.1984 - 00:00	YES
DST	DST2	2039.00	2028.00	CONDENSATE	06.09.1984 - 00:00	YES

Litostratigrafi

Topp Dyb [mMD RKB]	Litostrat. enhet
161	NORDLAND GP
725	UTSIRA FM
965	HORDALAND GP
1769	ROGALAND GP
1769	BALDER FM
1830	SELE FM
1869	LISTA FM
1987	SHETLAND GP
2026	VIKING GP
2026	FENSFJORD FM
2102	DUNLIN GP
2102	DRAKE FM
2236	COOK FM
2283	AMUNDSEN FM
2384	STATFJORD GP

Geokjemisk informasjon

Dokument navn	Dokument format	Dokument størrelse [KB]
235_1	pdf	0.30
235_2	pdf	14.53

Dokumenter - eldre Sokkeldirektoratets WDSS rapporter og andre relaterte dokumenter

Dokument navn	Dokument format	Dokument størrelse [KB]
235_01_WDSS_General_Information	pdf	0.22
235_02_WDSS_completion_log	pdf	0.25

Dokumenter - rapportert av utvinningstillatelsen (frigitt ihht til regelverk)

Dokument navn	Dokument format	Dokument størrelse [KB]
235_31_4_7_COMPLETION_REPORT_AND_LOG	pdf	14.63

Borestrengtester (DST)

Test nummer	Fra dybde MD [m]	Til dybde MD [m]	Reduksjonsventil størrelse [mm]
1.0	2390	2398	15.9
2.0	2029	2040	12.7

Test nummer	Endelig avstengningstrykk [MPa]	Endelig strømningstrykk [MPa]	Bunnhullstrykk [MPa]	Borehullstemperatur [°C]
1.0				
2.0				

Test nummer	Olje produksjon [Sm3/dag]	Gass produksjon [Sm3/dag]	Oljetetthet [g/cm3]	Gasstyngde rel. luft	GOR [m3/m3]
1.0	684	25000	0.830	0.775	37
2.0		26900		0.770	

Logger

Type logg	Topp dyp for logg [m]	Bunn dyp for logg [m]
BHC GR	2000	2080
CBL VDL	500	1800
DLL MSFL GR	1799	2143
DLL MSFL GR	2300	2501
ISF LSS GR SP	247	1793
ISF LSS GR SP	2147	2503
ISF LSS GR SP MSFL	1799	2147
LDT CNL GR	2120	2504
LDT CNL GR NGT	1799	2148
LDT GR	983	1794
RFT	2030	2120
RFT	2030	2490
RFT	2395	2395
SHDT	1925	2505
VSP	600	2505

Foringsrør og formasjonsstyrketester

Type utforing	Utforing diam. [tommer]	Utforing dybde [m]	Brønnbane diam. [tommer]	Brønnbane dyp [m]	LOT/FIT slam eqv. [g/cm3]	Type formasjonstest
CONDUCTOR	30	247.0	36	248.0	0.00	LOT
SURF.COND.	20	984.0	26	1000.0	1.80	LOT
INTERM.	13 3/8	1801.0	17 1/2	1816.0	1.82	LOT
INTERM.	9 5/8	2499.0	12 1/4	2505.0	0.00	LOT

Boreslam

Dybde MD [m]	Egenvekt, slam [g/cm3]	Viskositet, slam [mPa.s]	Flytegrense [Pa]	Type slam	Dato, måling
205	1.18			WATER BASED	11.09.1984
247	1.20	28.0	19.0	WATER BASED	30.07.1984
1000	1.04			WATER BASED	01.08.1984
1000	1.02			WATER BASED	30.07.1984
1000	1.04			WATER BASED	01.08.1984
1000	1.08			WATER BASED	01.08.1984
1000	1.04	40.0	24.0	WATER BASED	30.07.1984
1000	1.02			WATER BASED	30.07.1984
1000	1.08			WATER BASED	01.08.1984
1124	1.15	15.0	14.0	WATER BASED	06.08.1984
1367	1.24	16.0	22.0	WATER BASED	06.08.1984
1671	1.36	18.0	20.0	WATER BASED	06.08.1984
1816	1.40	18.0	22.0	WATER BASED	06.08.1984
1816	1.40			WATER BASED	07.08.1984
1816	1.40	36.0	15.0	WATER BASED	08.08.1984
1816	1.40			WATER BASED	09.08.1984
1816	1.29	16.5	30.0	WATER BASED	13.08.1984
1816	1.40			WATER BASED	07.08.1984
1816	1.29	16.5	30.0	WATER BASED	13.08.1984
1816	1.40	36.0	15.0	WATER BASED	08.08.1984
1816	1.40			WATER BASED	09.08.1984
2045	1.30	11.0	10.0	WATER BASED	13.08.1984
2064	1.30	11.0	13.0	WATER BASED	13.08.1984
2096	1.29	12.0	16.0	WATER BASED	13.08.1984
2139	1.30			WATER BASED	15.08.1984
2139	1.29	26.0	12.0	WATER BASED	14.08.1984
2139	1.30			WATER BASED	15.08.1984
2151	1.30	25.0	13.0	WATER BASED	16.08.1984

2241	1.31	24.0	13.0	WATER BASED	21.08.1984
2369	1.31	25.0	10.0	WATER BASED	21.08.1984
2490	1.32	26.0	16.0	WATER BASED	21.08.1984
2505	1.33	24.0	16.0	WATER BASED	21.08.1984
2505	1.33	28.0	17.0	WATER BASED	22.08.1984
2505	1.33	25.0	14.0	WATER BASED	24.08.1984
2505	1.27	26.0	13.0	WATER BASED	27.08.1984
2505	1.15	18.0	11.0	WATER BASED	27.08.1984
2505	1.15	18.0	13.0	WATER BASED	27.08.1984
2505	1.33	28.0	14.0	WATER BASED	23.08.1984
2505	1.33	25.0	14.0	WATER BASED	24.08.1984
2505	1.15	18.0	13.0	WATER BASED	27.08.1984
2505	1.33	28.0	17.0	WATER BASED	22.08.1984
2505	1.33	28.0	14.0	WATER BASED	23.08.1984
2505	1.27	26.0	13.0	WATER BASED	27.08.1984
2505	1.15	18.0	11.0	WATER BASED	27.08.1984

Trykkplott

Porertrykksdataene kommer fra logging i brønnen hvis ingen annen kilde er oppgitt. I noen brønner der trykk ikke er logget, er det brukt informasjon fra formasjonstester eller brønnspark. Trykkdataene er rapportert inn til Oljedirektoratet og videre prosessert og kvalitetssikret av IHS Markit.

Dokument navn	Dokument format	Dokument størrelse [KB]
235_Formation_pressure_(Formasjonstrykk)	pdf	0.23