Generell informasjon

Brønnbane navn	2/4-17
Type	EXPLORATION
Formål	WILDCAT
Status	P&A
Faktakart i nytt vindu	lenke til kart
Hovedområde	NORTH SEA
Funn	2/4-17 Tjalve
Brønn navn	2/4-17
Seismisk lokalisering	PC 88-0614- SP. 160
Utvinningstillatelse	018
Boreoperatør	Phillips Petroleum Company Norway
Boretillatelse	689-L
Boreinnretning	MÆRSK GUARDIAN
Boredager	224
Borestart	21.07.1991
Boreslutt	29.02.1992
Frigitt dato	01.03.1994
Publiseringsdato	15.02.2006
Opprinnelig formål	WILDCAT
Gjenåpnet	NO
Innhold	GAS/CONDENSATE
Funnbrønnbane	YES
1. nivå med hydrokarboner, alder	LATE JURASSIC
1. nivå med hydrokarboner, formasjon.	ULA FM
Avstand, boredekk - midlere havflate [m]	43.0
Vanndybde ved midlere havflate [m]	68.0
Totalt målt dybde (MD) [m RKB]	5258.0
Totalt vertikalt dybde (TVD) [m RKB]	5255.0
Maks inklinasjon [°]	9.6
Temperatur ved bunn av brønnbanen [°C]	182
Eldste penetrerte alder	EARLY PERMIAN
Eldste penetrerte formasjon	ROTLIEGEND GP
Geodetisk datum	ED50
NS grader	56° 41' 2.6'' N
ØV grader	3° 13' 45.2'' E

NS UTM [m]	6282380.93
ØV UTM [m]	514043.23
UTM sone	31
NPDID for brønnbanen	1792

Brønnhistorie

General

The Exploration well 2/4-17 was drilled on the NW Tor prospect situated in the Production License 018. The objective was to test the Late Jurassic and Early Permian sections in a rotated fault block on a terrace NW of the Tor Field. The block is situated in the Central Trough, which is part of the failed Mesozoic North Sea, rift system. The Central Trough comprises a complex series of narrow discontinuous highs and lows with a NW-SE trend. The most important basins are the Feda Graben, the Breiflab Basin and the Søgne Basin. From the Feda Graben/Breiflab Basin up to the Sørvestlandet High several rotated fault blocks form platforms and small highs, named the Cod Terrace, the Hitra High and the Steinbit Terrace. The NW Tor Prospect is situated on a Terrace between the Hitra High and the Feda Graben.

Operations and results

Wildcat well was spudded with the 3-leg jack up installation on 29 February 1992 and drilled to TD at 5258 m in the Early Permian Rotliegendes Group. Drilling went without problems to 2081m were the well was sidetracked because the string became stuck while taking a survey. While pulling out of the hole, following the cutting core to a depth of 4357.1 m, an influx of gas occurred and the well was shut in. Following a 22 hours well kill operation, the well was brought back under control. A second technical sidetrack was taken at 4724 m due to a twist-off of the bottom hole assembly. The well was drilled with seawater/gel down to 466 m, with KCl mud from 466 m to 2146 m, with Soltex from 2146 m to 2582 m, with Soltex/Drispac from 2582 m to 4151 m, with HTHP mud from 4151 m to 4724 m, and with High Temp mud from 4724 m to TD

To thin hydrocarbon-bearing intervals were present in the Hod Formation. At 4340 m a major hydrocarbon bearing sand of the Late Jurassic Ula Formation was encountered. At 4520 to 5027 m an excellent quality aeolian dune sand of Early Permian age (Rotliegendes Group) was penetrated. The overall RFT pressure gradient in the sand showed water, but results in some intervals (e.g. 4600 m to 4650 m) suggested a different fluid (light hydrocarbons) from that shown by the logs (water). Post well organic geochemical analyses of a siltstone cuttings extract from 5029 m at the base of this unit indicated shows of hydrocarbons different from those of the Ula Formation. Further geochemical analyses of samples from this interval (5006 m to 5118 m) indicated source potential with TOC up to 2.9% and Hydrogen Index up to 190. The maturity level at this depth was measured as %Ro = 1.1 to 1.3, corresponding to the wet gas window. Because the 7" liner shoe was set at 5021 most of these samples must be seen as representative for the formation. The unit from 5027 m to TD was described generally as a "Rotliegendes mixed volcanic unit".

One 60" core was cut in the lower Ula Formation, which consisted of major shallow marine sandstone, with marin silty sandstone in the base grading into thin lagoonal sand/silt/mudstone at the top. RFT pressures were taken during the logging of the 8 1/2 inch hole section. A segregated hydrocarbon sample at 4355 m was successful. However, measurement of the opening pressures revealed that the chambers hardly contained any gas, such that the samples were not representative of the reservoir fluid. Water samples were obtained at 4421 m and 4609 m.

The well was completed on 29 February 1992 as a gas/condensate discovery.

Testing

To DST tests were performed to investigate the to separate sand units. DST 1 in the Permian sandstone-unit (4523 - 4638 m) produced 860 Sm3 water/day. Samples taken from this test had a thin oil film on top of the water. DST 2 in the Upper Jurassic Lower Ula Formation (4341.0 - 4387.5 m) produced 774 Sm3 oil/day and 849510 Sm3 gas/day on a 15.875mm choke with a GOR of 1097 Sm3/ Sm3

Borekaks i Sokkeldirektoratet

Borekaksprøve, topp dybde [m]	Borekaksprøve, bunn dybde [m]
475.50	5257.00

Borekaks tilgjengelig for prøvetaking?	YES

Borekjerner i Sokkeldirektoratet

Kjerneprøve nummer	Kjerneprøve - topp dybde	Kjerneprøve - bunn dybde	Kjerneprøve dybde - enhet
1	14235.0	14292.9	[ft]

Total kjerneprøve lengde [m]	17.6
Kjerner tilgjengelig for prøvetaking?	YES

Kjernebilder


14235-14250ft


14250-14265ft


14265-14280ft


14280-14293ft

Oljeprøver i Sokkeldirektoratet

Test type	Flaske nummer	Topp dyp MD [m]	Bunn dyp MD [m]	Væske type	Test tidspunkt	Prøver tilgjengelig
DST		4340.90	4387.50		19.01.1992 - 20:00	YES

Litostratigrafi

Topp Dyb [mMD RKB]	Litostrat. enhet
110	NORDLAND GP
1774	HORDALAND GP
3050	ROGALAND GP
3050	BALDER FM
3056	SELE FM
3096	LISTA FM
3118	VIDAR FM
3165	LISTA FM
3182	VÅLE FM
3192	SHETLAND GP
3192	EKOFISK FM
3334	TOR FM
3729	HOD FM
4183	CROMER KNOLL GP
4189	TYNE GP
4283	HAUGESUND FM
4340	VESTLAND GP
4340	ULA FM
4389	BRYNE FM
4486	ZECHSTEIN GP
4486	UNDIFFERENTIATED
4518	KUPFERSCHIEFER FM
4520	ROTLIEGEND GP

Spleisede logger

Dokument navn	Dokument format	Dokument størrelse [KB]
1792	pdf	0.80

Geokjemisk informasjon

Dokument navn	Dokument format	Dokument størrelse [KB]
1792_1	pdf	7.00

Dokumenter - eldre Sokkeldirektoratets WDSS rapporter og andre relaterte dokumenter

Dokument navn	Dokument format	Dokument størrelse [KB]
1792_01_WDSS_General_Information	pdf	0.78
1792_02_WDSS_completion_log	pdf	0.29

Dokumenter - rapportert av utvinningstillatelsen (frigitt ihht til regelverk)

Dokument navn	Dokument format	Dokument størrelse [KB]
1792_2_4_17_COMPLETION_REPORT_AND_LOG	pdf	81.35

Borestrengtester (DST)

Test nummer	Fra dybde MD [m]	Til dybde MD [m]	Reduksjonsven til størrelse [mm]
1.0	4523	4638	0.0
2.0	4341	4388	15.9
2.1	4340	4388	0.0
2.2	4341	4388	0.0
2.3	4341	4388	0.0
2.4	4341	4388	0.0
2.5	4341	4388	0.0
2.6	4341	4388	0.0

Test nummer	Endelig avstengningstrykk [MPa]	Endelig strømningstrykk [MPa]	Bunnhullstrykk [MPa]	Borehullstemperatur [°C]
1.0				176
2.0				160
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				

Test nummer	Olje produksjon [Sm3/dag]	Gass produksjon [Sm3/dag]	Oljetetthet [g/cm3]	Gasstyngde rel. luft	GOR [m3/m3]
1.0					
2.0	774	849078	0.799	0.735	1097
2.1	266				
2.2	610				
2.3	597				
2.4					
2.5					
2.6					

Logger

Type logg	Topp dyp for logg [m]	Bunn dyp for logg [m]
CST	0	0
DLL BHC GR	13610	15350
DLL MSFL BHC GR	6766	13628
DLL MSFL BHC GR	16490	17243
DLL MSFL GR GPIT	13610	15350
DLL MSFL NGL	13610	16485
DLL MSFL SLS GR	1508	7034
FMS GR	9950	13640
FMS GR	13610	16485
LDL CNL GR	13610	16498
LDL CNL GR	16490	17257
LDL NGL	16490	17257
MSCT GR	10246	12901
MWD	678	14235
RFTB GR	10239	12898
RFTB GR	14244	14423
RFTB GR	14288	15132
RFTB GR	14835	15384
SDT NGL	13610	16484
SHDT GR	16490	17181
VSP	1700	16350
VSP	3000	13025
VSP	9400	17250

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	204.0	36	205.0	0.00	LOT
INTERM.	20	459.0	30	460.0	1.62	LOT
INTERM.	13 3/8	2133.0	17 1/2	2135.0	1.96	LOT
INTERM.	9 5/8	4146.8	12 1/4	4148.0	2.17	LOT
LINER	7	5021.0	8 1/2	5021.0	2.16	LOT

Boreslam

Dybde MD [m]	Egenvekt, slam [g/cm3]	Viskositet, slam [mPa.s]	Flytegrense [Pa]	Type slam	Dato, måling
192	1.03			WATER BASED	
903	1.18	25.0		WATER BASED	
1305	1.26	23.0		WATER BASED	
1795	1.56	35.0		WATER BASED	
1886	1.62	50.0		WATER BASED	
1936	1.80	14.0		WATER BASED	
1969	1.50	36.0		WATER BASED	
1996	1.62	35.0		WATER BASED	
2081	1.56	36.0		WATER BASED	
2146	1.62	31.0		WATER BASED	
2295	2.12	32.0		WATER BASED	
2295	2.12	33.0		WATER BASED	
2318	1.67	26.0		WATER BASED	
2377	1.80	20.0		WATER BASED	
2530	2.12	32.0		WATER BASED	
2560	1.70	36.0		WATER BASED	
2614	1.70	20.0		WATER BASED	
2848	1.70	24.0		WATER BASED	
2967	1.71	22.0		WATER BASED	
3039	1.73	19.0		WATER BASED	
3172	1.73	28.0		WATER BASED	
3269	1.74	16.0		WATER BASED	
3330	1.74	27.0		WATER BASED	
3384	1.74	20.0		WATER BASED	
3556	1.75	25.0		WATER BASED	
3723	1.77	25.0		WATER BASED	

3767	2.12	31.0		WATER BASED	
3889	1.77	21.0		WATER BASED	
3970	1.77	21.0		WATER BASED	
3970	1.77	21.0		WATER BASED	
4151	1.77	15.0		WATER BASED	
4240	2.12	33.0		WATER BASED	
4245	2.04	28.0		WATER BASED	
4250	2.12	31.0		WATER BASED	
4289	2.06	33.0		WATERBASED	
4307	2.12	37.0		WATER BASED	
4310	2.12	32.0		WATER BASED	
4314	2.06	31.0		WATER BASE	
4339	2.08	34.0		WATER BASED	
4353	2.12	36.0		WATER BASED	
4357	2.10	28.0		WATER BASED	
4421	2.10	33.0		WATER BASED	
4429	2.10	50.0		WATER BASED	
4432	2.10	39.0		WATER BASED	
4439	2.12	28.0		WATER BASED	
4439	2.12	31.0		WATER BASED	
4439	2.12	38.0		WATER BASED	
4495	2.10	36.0		WATER BASED	
4502	2.10	36.0		WATER BASED	
4512	2.10	44.0		WATER BASED	
4521	2.06	47.0		WATER BASED	
4526	2.10	49.0		WATER BASED	
4566	2.10	27.0		WATER BASED	
4623	2.10	58.0		WATER BASED	
4689	2.10	36.0		WATER BASED	
4717	2.10	37.0		WATER BASED	
4724	2.10	32.0		WATER BASED	
4803	2.10	46.0		WATER BASED	
4923	2.10	48.0		WATER BASED	
4962	2.06	40.0		WATER BASED	
5022	2.10	34.0		WATER BASED	
5115	1.98	51.0		WATER BASED	
5135	1.98	39.0		WATER BASED	
5258	2.12	31.0		WATER BASED	

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]
1792_Formation_pressure_(Formasjonstrykk)	pdf	0.23