



Generell informasjon





Faktasider

Brønnbane / Leting

Utskriftstidspunkt: 16.5.2024 - 00:37

Brønnbane navn	2/4-20
Type	EXPLORATION
Formål	WILDCAT
Status	P&A
Pressemelding	lenke til pressemelding
Faktakart i nytt vindu	lenke til kart
Hovedområde	NORTH SEA
Brønn navn	2/4-20
Seismisk lokalisering	Line 7832 Trace 17200 (VGCNS-05 3D)
Utvinningstillatelse	018
Boreoperatør	ConocoPhillips Skandinavia AS
Boretillatelse	1142-L
Boreinnretning	MÆRSK GALLANT
Boredager	175
Borestart	22.09.2007
Boreslutt	14.03.2008
Frigitt dato	14.03.2010
Publiseringsdato	14.03.2010
Opprinnelig formål	WILDCAT
Gjenåpnet	NO
Innhold	DRY
Funnbrønnbane	NO
Avstand, boredekk - midlere havflate [m]	45.0
Vanndybde ved midlere havflate [m]	68.0
Totalt målt dybde (MD) [m RKB]	5719.0
Totalt vertikalt dybde (TVD) [m RKB]	5673.0
Maks inklinasjon [°]	3
Temperatur ved bunn av brønnbanen [°C]	197
Eldste penetrerte alder	EARLY PERMIAN
Eldste penetrerte formasjon	ROTLIEGEND GP
Geodetisk datum	ED50
NS grader	56° 36' 43.17" N
ØV grader	3° 8' 40.08" E
NS UTM [m]	6274345.10
ØV UTM [m]	508867.61
UTM sone	31
NPDID for brønnbanen	5556



Brønnhistorie

General

Well 2/4-20 was drilled in the Feda Graben ca 8 km north of the Ekofisk Field and 5 km east of the Albuskjell Field in the Central Graben of the North Sea. The purpose of the 2/4-20 North Ekofisk exploration well was to test potential reservoirs in the pre-Cretaceous High-Pressure-High-Temperature play at both Jurassic and Permian Rotliegendes levels. The 2/4-17 Tjalve Discovery drilled in 1991 ca 9 km to the north-east of 2/4-20 had proved condensate in deep Oxfordian sand and traces of hydrocarbons in the Rotliegendes Group. The main targets in the well were two Jurassic potential reservoir horizons: a primary target J50 (Oxfordian) sandstone and a secondary target J40 (Callovian) sandstone. In the Permian excellent reservoir sandstones analogous to 2/4-17 were expected to consist of Rotliegendes Group strata, largely of aeolian origin. Planned TD was at 5695 m with an expected TD temperature of 195 deg C.

Operations and results

Wildcat well 2/4-20 was spudded with the jack-up installation Mærsk Galant on 22 November 2007 and drilled to TD at 5719 m in the Early Permian Rotliegendes Group. The 2/4-20 HPHT well was drilled within risked AFE time and cost. The well took a total of 189.1 days (including 7.9 days WOW). The R70 shallow gas reflector (Crenulate Reflector) was drilled at 645 m with 11.0 ppg mud and a gas peak of 4.4% recorded. The section was cased with a 16" liner. At 1786m, a 35 bbl kick of 13.65 ppg intensity was taken in a thin (1.5m thick) sand sitting directly on the Mid Miocene unconformity. The mud weight at the time was 13.0 ppg. The well was killed with 14.0 ppg mud using a modified driller's method. With a maximum measured temperature at TD of 194 deg C, Horner corrected to 197 deg C, this was the hottest well on the Norwegian continental shelf to date.

The well was drilled with seawater/hi-vis sweeps/spud mud down to 479 m, with Versatec OBM from 479 m to 2888 m, with Paratherm OBM from 2888 m to 4766 m, and with WARP OBM from 2888 m to TD. The WARP mud used in the 8 1/2" and 5 3/4" hole sections proved difficult to clean off the cuttings samples. It posed problems for biostratigraphic analyses and proved detrimental to organic geochemical analyses.

The Late Jurassic J60 - J70 Kimmeridge Clay equivalent (Draupne Formation) seen in the 2/4-19 B well was not present in 2/4-20 having been eroded down into the Farsund Formation at crest of structure. A significant thickness of sand was penetrated at a number of stratigraphic levels. The J50 target sands were not developed in the well location. Below this however, was encountered a thick J54 Lower Ula Sandstone sequence (top 5183.5 m); well developed sands of the J40-J22 Bryne Formation (top 5340 m); and a 51m-thick (gross) sandstone/shale unit of undifferentiated Jurassic/Triassic age (top 5453 m). Below the Zechstein evaporites, a sequence of Permian Rotliegendes sandstones was drilled down to the TD of the well.

Jurassic reservoir presence and quality was significantly greater than pre-drill estimates. Jurassic J54 net porosity-metres was seven times greater than the pre-drill P50 prediction with two, thick, stacked shoreface sequences totalling 156.5 m gross being penetrated. The J40 ? J22 fluvio-deltaic Bryne reservoir consisted of 113m gross of interbedded sands, silts and coals. Pre-drill there was estimated to be only a 20% chance of this reservoir being present. The Rotliegendes Auk Formation, penetrated at 5592.5 m, consisted of 99.5 m of an Upper Unit of very tight non-reservoir argillaceous sandstones, underlain by 35 m-thick Lower Unit of better quality sandstones down to TD.

Shows detection was made difficult by the Versatec, Paratherm and WARP oil based mud used as drilling fluids for the entire well below 479 m. The only shows encountered were in the top of the Ekofisk Formation where faint oil shows were observed, and in the



upper part of the Rotliegendes Sandstone where very weak slow white cut fluorescence was noted. White fluorescent fluid inclusions in the Rotliegendes strengthened the evidence for migrated light hydrocarbons in these strata

No sidewall or conventional cores were cut in the well. No wire line fluid samples were taken. Pressure points were recorded with the XPT and MDT tools. In the Rotliegendes sandstone at TD pressures were acquired with the XPT-H tool, run in this well as the first in the world. The number of good pressure points obtained were in general sparse, but showed that the Jurassic and Permian reservoirs sections were in different pressure compartments. The logging programme also included a CMR magnetic resonance run in the 8 1/2" section to explore the poroperm properties of the lower Ula Formation sandstone.

The well was permanently abandoned on 14 March 2008 as a dry well.

Testing

No drill stem test was performed.

Borekaks i Sokkeldirektoratet

Borekaksprøve, topp dybde [m]	Borekaksprøve, bunn dybde [m]
210.00	5719.00

Borekaks tilgjengelig for prøvetaking?	YES
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Litostratigrafi

Topp Dyb [mMD RKB]	Litostrat. enhet
113	NORDLAND GP
1774	HORDALAND GP
3115	ROGALAND GP
3115	BALDER FM
3123	SELE FM
3144	LISTA FM
3254	VÅLE FM
3268	SHETLAND GP
3268	EKOFISK FM
3402	TOR FM
3862	HOD FM
4677	BLODØKS FM



4692	HIDRA FM
4745	CROMER KNOLL GP
4818	TYNE GP
5176	VESTLAND GP
5176	ULA FM
5225	BRYNE FM
5426	SMITH BANK FM
5496	ZECHSTEIN GP
5631	ROTLIEGEND GP

Logger

Type logg	Topp dyp for logg [m]	Bunn dyp for logg [m]
CMR GR	5167	5250
MWD LWD - DGR	479	2888
MWD LWD - DGR EWR PWD	3551	5719
MWD LWD - DWD	113	479
MWD LWD - EWR PWD AGR ALD CTN BA	2888	3551
QAIT QSLT QLDT QCNT QTGC SON GR	100	5433
QAST	1441	5715
QLDT QCNT QTGC	5450	5727
QLDT QCNT QTGC QSLT QSCS	5300	5560
WAIT QSLT QTGC	5440	5727
XPT QTGC	5185	5352
XPT QTGC	5694	5723

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	195.0	36	201.0	0.00	LOT
SURF.COND.	20	473.0	26	479.0	1.51	LOT
INTERM.	16	1451.0	20	1461.0	0.00	LOT
INTERM.	13 5/8	2883.0	17 1/2	2888.0	1.87	LOT
INTERM.	10 3/4	4763.0	12 1/4	4766.0	1.91	LOT
LINER	7	5565.0	8 1/2	5565.0	2.25	LOT
OPEN HOLE		5719.0	5 3/4	5719.0	0.00	LOT



Boreslam

Dybde MD [m]	Egenvekt, slam [g/cm3]	Viskositet, slam [mPa.s]	flytegrense [Pa]	Type slam	Dato, måling
94	1.08	5.0		SPUD MUD	
128	1.05	6.0		WATER BASE	
146	1.13	7.0		WATER BASE	
442	1.39	36.0		OIL BASE	
445	1.57	39.0		OIL BASE	
670	1.70	35.0		OIL BASE	
1082	1.75	41.0		OIL BASE	
1204	1.73	43.0		OIL BASE	
1353	1.38	33.0		OIL BASE	
1402	1.77	51.0		OIL BASE	
1410	1.77	46.0		OIL BASE	
1448	1.38	33.0		OIL BASE	
1667	2.08	60.0		OIL BASE	
4746	1.77	42.0		OIL BASE	
4847	2.12	57.0		OIL BASE	
5002	2.12	59.0		OIL BASE	
5133	2.12	61.0		OIL BASE	
5440	2.12	61.0		HPHT OB WARP	
5608	2.06	55.0		OIL BASE	
5719	2.08	49.0		OIL BASE	