Generell informasjon

Brønnbane navn	6506/9-1
Type	EXPLORATION
Formål	APPRAISAL
Status	P&A
Pressemelding	lenke til pressemelding
Faktakart i nytt vindu	lenke til kart
Hovedområde	NORWEGIAN SEA
Funn	6506/6-1 (Victoria)
Brønn navn	6506/9-1
Seismisk lokalisering	inline 1378-crossline 1641 (MN9602R07)
Utvinningstillatelse	211 B
Boreoperatør	Total E&P Norge AS
Boretillatelse	1214-L
Boreinnretning	WEST PHOENIX
Boredager	239
Borestart	20.01.2009
Boreslutt	15.09.2009
Frigitt dato	15.09.2011
Publiseringsdato	28.09.2011
Opprinnelig formål	APPRAISAL
Gjenåpnet	NO
Innhold	GAS
Funnbrønnbane	NO
1. nivå med hydrokarboner, alder	MIDDLE JURASSIC
1. nivå med hydrokarboner, formasjon.	ILE FM
2. nivå med hydrokarboner, alder	EARLY JURASSIC
2. nivå med hydrokarboner, formasjon	TILJE FM
Avstand, boredekk - midlere havflate [m]	39.0
Vanndybde ved midlere havflate [m]	416.0
Totalt målt dybde (MD) [m RKB]	5664.0
Totalt vertikalt dybde (TVD) [m RKB]	5659.7
Maks inklinasjon [°]	4.3
Temperatur ved bunn av brønnbanen [°C]	205
Eldste penetrerte alder	EARLY JURASSIC

Eldste penetrerte formasjon	ÅRE FM
Geodetisk datum	ED50
NS grader	65° 29' 57.31'' N
ØV grader	6° 56' 12.98'' E
NS UTM [m]	7265844.08
ØV UTM [m]	404541.06
UTM sone	32
NPDID for brønnbanen	5980

Brønnhistorie

General

Well 6506/9‐1 was drilled to further evaluate the Victoria discovery. The discovery was proven by well 6506/6-1 in 2000 in Lower to Middle Jurassic reservoir rocks, and is located about 22 kilometres northwest of the Heidrun field in the Norwegian Sea.

The objective was to reduce uncertainties on fluid contacts, reservoir structure and reservoir quality, to prove well productivity and obtain reliable fluid samples from the Garn, Ile, Tilje and Åre reservoirs of Victoria.

Operations and results

Appraisal well 6506/9‐1 was spudded with the semi-submersible installation West Phoenix on 20 January 2009 and drilled to TD at 5664 m in the Early Jurassic Åre Formation. The well was drilled without significant problems, although wire line logging and sampling at TD was problematic due to high temperatures. The well was drilled with spud mud down to 1510 m, with NABM (non-aqueous based, or oil based mud) from 1510 to 5022 m, and with WARP (Weight Additive Research Project) NABM mud from 5022 m to TD.

All the reservoirs were drilled in the 8 1/2" section, and confirmed to be gas bearing. However, reservoirs characteristics were poor, except in a few metric layers. The Garn Formation (5212 to 5277 m) was composed of very tight sandstones with quartzite cement. Maximum gas shows were 2.2% total gas at 5232 m. In the Ile Formation the gas shows were quite constant along the whole formation with limited values due to the coring operations. Maximum values in porous layers were between 1.35 and 3.52 % total gas. In the Tilje Formation, the overall reservoir characteristics were better with a maximum of 5.84% total gas at 5488m. At the base of the Tilje, below 5534 m, formation gas decreased to less than 1% total gas, linked to reservoir characteristics decrease. The Åre Formation consisted of mainly siltstones

and silty claystones with poor reservoir characteristics in its upper part (maximum 1.68% TG). The lower half of the Åre Formation, composed of very hard poorly sorted sandstones, had very poor reservoir characteristics. Maximum gas show was 3.85% total gas at 5653m.

Petrophysical analysis showed that the Jurassic reservoirs Garn, Ile, Tofte, Tilje and Åre were all gas bearing with a total Net to Gross of 18%, corresponding to 81m of Net. The effective porosity average in the Net interval was 12.4 %. Both Ile and Tilje Formations were encountered in a Gas‐Down‐To/Water‐Up‐To configuration. The Ile Formation has GDT at 5297 m and WUT at 5325 m. The Tilje Formation had GDT at 5515 m and WUT at 5523 m. No oil shows were reported from the well.

Five cores were acquired in the Ile, Tilje and Åre Formations. The Ile Formation (5294 m to 5358 m) was nearly entirely cored. The Tilje Formation (5435 m to 5572 m) was cored from 10 m below the top of Tilje Formation when gas bearing sandstones were confirmed. The Åre Formation (5572 m to well TD) was cored in its upper section, represented mainly by siltstones and silty claystones, with poor reservoir characteristics (maximum 1.68% total gas).

Wire line logging was performed to evaluate the different reservoirs. After one run in 12 1/4" section, a total of 20 runs were performed in the 8 1/2" section for reservoir evaluation, formation pressure measurement and sampling. Due to the high temperature expected at Victoria well TD, a series of special MDT tools, capable to work at 210 deg C, were prepared in the framework of a R&D project between TOTAL and Schlumberger to obtain formation pressure measurements and fluid samples. Although repeated attempts were done, the performances were poor due to low permeability reservoir and tool failures. Fluid samples of questionable quality were obtained at four depths: 5294.8 m (dry gas contaminated by base oil), 5341.7 m (base oil, some gas, and a few ml of water), 5479.0 m (mud, base oil and some gas), and at 5538.5 m (mud filtrate and small volumes of water - no trace of gas)

The well was permanently abandoned on 15 September 2009 as a gas appraisal well.

Testing

The well was perforated in Upper and Middle Tilje (5431 m ? 5515 m) and a successful DST was carried out. The maximum production rate was 180 000 Sm3/day through a 16/64-inch nozzle. On average the well produced ca 170 000 Sm3 gas and 15 - 20 Sm3 water day. The average gas composition roughly recorded during the test was 88% methane, 11% CO2, and ca 30 ppm H2S. No trace of condensate was seen. No temperature measurement is available from the test.

Borekaks i Sokkeldirektoratet

Borekaksprøve, topp dybde [m]	Borekaksprøve, bunn dybde [m]
1510.00	5664.00

Borekaks tilgjengelig for prøvetaking?	YES

Borekjerner i Sokkeldirektoratet

Kjerneprøve nummer	Kjerneprøve - topp dybde	Kjerneprøve - bunn dybde	Kjerneprøve dybde - enhet
1	5289.0	5316.6	[m]
2	5316.6	5353.2	[m]
3	5446.8	5501.7	[m]
4	5502.0	5530.8	[m]
5	5531.0	5613.8	[m]

Total kjerneprøve lengde [m]	230.7
Kjerner tilgjengelig for prøvetaking?	YES

Litostratigrafi

Topp Dyb [mMD RKB]	Litostrat. enhet
455	NORDLAND GP
455	NAUST FM
1566	KAI FM
1909	HORDALAND GP
1909	BRYGGE FM
1983	ROGALAND GP
1983	TARE FM
2059	TANG FM
2119	SHETLAND GP
2119	SPRINGAR FM
2276	NISE FM
2547	KVITNOS FM
3059	CROMER KNOLL GP
3059	LYSING FM
3133	LANGE FM
4548	LYR FM
4575	VIKING GP
4575	SPEKK FM
4650	MELKE FM
5212	FANGST GP
5212	GARN FM
5277	NOT FM
5294	ILE FM
5358	BÅT GP
5358	ROR FM
5385	TOFTE FM
5435	TILJE FM
5572	ÅRE FM

Spleisede logger

Dokument navn	Dokument format	Dokument størrelse [KB]
5980_6506_9_1	pdf	0.81

Borestrengtester (DST)

Test nummer	Fra dybde MD [m]	Til dybde MD [m]	Reduksjonsventil størrelse [mm]
1.0	5431	5515	6.3

Test nummer	Endelig avstengningstrykk [MPa]	Endelig strømningstrykk [MPa]	Bunnhullstrykk [MPa]	Borehullstemperatur [°C]
1.0	27.000		40.000	

Test nummer	Olje produksjon [Sm3/dag]	Gass produksjon [Sm3/dag]	Oljetetthet [g/cm3]	Gasstyngde rel. luft	GOR [m3/m3]
1.0		180000			

Logger

Type logg	Topp dyp for logg [m]	Bunn dyp for logg [m]
CALI	452	4911
LWD - DIR	455	564
LWD - GR RES PWD DIR	564	5664
PO PQ HY PO LFA MS SC PC HTC EDT	5294	5294
PPC HDSI GPIT HLDS HAPS GR ECRI	455	5010
PPC HDSI PPC HNGS RDTC ECRI	5006	5662
PQ HY PO SC MS GR ECRI	5341	5538
PQ HY PO SC MS GR ECRI	5341	5341
QAIT QSLT HTGC ECRI	5006	5663
QAST-VSP	511	5575
QLDT QCNT GR ECRI	5006	5665
QSLT EDTC HTCS ECRI	3535	4989
SC PA PO MS GR ECRI	5479	5539
XPT HGR ECRI	5538	5605
XPT HTGC ECRI	5294	5541

XPT HTGC ECRI	5294	5655

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	558.0	36	564.0	0.00	LOT
SURF.COND.	20	1501.0	26	1510.0	0.00	LOT
INTERM.	13 3/8	3532.0	16	3555.0	0.00	LOT
INTERM.	9 7/8	5009.0	12 1/4	5022.0	1.96	LOT
LINER	7	5562.0	8 1/2	5564.0	0.00	LOT

Boreslam

Dybde MD [m]	Egenvekt, slam [g/cm3]	Viskositet, slam [mPa.s]	Flytegrense [Pa]	Type slam	Dato, måling
495	1.03	10.0		ManualEntry	
665	1.60	51.0		ManualEntry	
1282	1.21	6.0		ManualEntry	
1500	1.30	11.0		ManualEntry	
1510	1.30			ManualEntry	
1884	1.60	46.0		ManualEntry	
2334	1.89	74.0		ManualEntry	
2789	1.60	46.0		ManualEntry	
3355	1.60	39.0		ManualEntry	
3623	1.80	56.0		ManualEntry	
3926	1.80	44.0		ManualEntry	
4139	1.83	49.0		ManualEntry	
4774	1.87	49.0		ManualEntry	
4780	1.74	10.0		ManualEntry	
5022	1.71	47.0		ManualEntry	
5066	1.70	36.0		ManualEntry	
5289	1.70	38.0		ManualEntry	
5308	1.74	10.0		ManualEntry	
5385	1.74	10.0		ManualEntry	
5502	1.70	45.0		ManualEntry	
5560	1.70	64.0		ManualEntry	
5664	1.77	10.0		ManualEntry	