Generell informasjon

Brønnbane navn	6406/2-6
Type	EXPLORATION
Formål	WILDCAT
Status	SUSPENDED
Faktakart i nytt vindu	lenke til kart
Hovedområde	NORWEGIAN SEA
Funn	6406/2-6 Ragnfrid
Brønn navn	6406/2-6
Seismisk lokalisering	HWM94- INLINE 940 & CROSSLINE 1630
Utvinningstillatelse	199
Boreoperatør	Saga Petroleum ASA
Boretillatelse	934-L
Boreinnretning	DEEPSEA BERGEN
Boredager	75
Borestart	25.08.1998
Boreslutt	07.11.1998
Frigitt dato	07.11.2000
Publiseringsdato	18.12.2002
Opprinnelig formål	WILDCAT
Gjenåpnet	NO
Innhold	GAS/CONDENSATE
Funnbrønnbane	YES
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	TOFTE FM
Avstand, boredekk - midlere havflate [m]	23.0
Vanndybde ved midlere havflate [m]	302.0
Totalt målt dybde (MD) [m RKB]	5263.0
Totalt vertikalt dybde (TVD) [m RKB]	5256.8
Maks inklinasjon [°]	11.2
Temperatur ved bunn av brønnbanen [°C]	177
Eldste penetrerte alder	EARLY JURASSIC
Eldste penetrerte formasjon	ÅRE FM

Geodetisk datum	ED50
NS grader	64° 45' 31.34'' N
ØV grader	6° 22' 54.69'' E
NS UTM [m]	7184316.92
ØV UTM [m]	375445.84
UTM sone	32
NPDID for brønnbanen	3407

Brønnhistorie

General

Well 6406/2-6 was the third wildcat drilled in the PL 199 licence. The well was drilled on the southern part of the "C structure" in the southwestern part of block 6406/2, south of the Kristin Field and southwest of the 6406/2-1 Lavrans discovery on Haltenbanken. The C structure is an easterly dipping, rotated fault block, down faulted relative to the Lavrans structure and with structural similarities. The main objective of well 6406/2-6 was to test the hydrocarbon potential of the C structure within the Early and Middle Jurassic Fangst and Båt Group sandstones. Late Cretaceous Lysing and Lange sandstones were secondary targets for the well.

Operations and results

Wildcat well 6406/2-6 was spudded by the semi-submersible installation "Deepsea Bergen" on 25 August 1998 and drilled to 5263 m, 58 m into the Early Jurassic Åre Formation. The well was a "High Pressure High Temperature" well with max down hole temperature of 177 deg C and max pressure gradient of 1.95 g/cc in top Garn Formation (4479 m TVD RKB). Shallow gas was not encountered and operations went without major problems. The well was drilled with seawater and hi-vis pills down to 1413 m, KCl mud with glycol additive (3 - 5 % Glydril MC) from 1413 m to 2760 m, and oil based mud from 2760 m to TD. Hydrocarbons were proven in Ile and Tofte Formations, and there where good hydrocarbon indications in the Garn and Lange Formations. The main result of well 6406/2-6 was the Ragnfrid discovery with gas/condensate in Ile and Tofte Formations as proven by fluid samples and good indications of hydrocarbons in upper part of Garn Formation and in Lower Lange sandstones. No hydrocarbon fluid samples were obtained from the latter units due to poor reservoir quality. The Tilje and Åre Formations appeared to be water bearing in the well position. The Tofte Formation has good to excellent reservoir properties, Ile properties are fair to good, Garn has poor to moderate reservoir properties except for a good zone in the middle part, and the Lange sandy intervals seem to have low permeabilities. One core (27m) was cut in the Garn Formation. Four MDT samples were taken in the hydrocarbon bearing Ile and Tofte Formations. One of these was recovered from 4737.4 m in the Tofte Formation; the other three were recovered from 4622.2 m in the Ile Formation. All four samples were heavily contaminated with oil-based mud. In addition to these, MDT water samples were collected from the Garn, Ile, and Tofte Formations. The well was suspended as a gas and condensate discovery on 7 November 1998.

Testing

No drill stem test was performed

Borekaks i Sokkeldirektoratet

Borekaksprøve, topp dybde [m]	Borekaksprøve, bunn dybde [m]
1420.00	5263.00

Borekaks tilgjengelig for prøvetaking?	YES

Borekjerner i Sokkeldirektoratet

Kjerneprøve nummer	Kjerneprøve - topp dybde	Kjerneprøve - bunn dybde	Kjerneprøve dybde - enhet
1	4504.0	4530.7	[m]

Total kjerneprøve lengde [m]	26.7
Kjerner tilgjengelig for prøvetaking?	YES

Kjernebilder


4504-4509m


4509-4514m


4514-4519m


4519-4524m


4524-4529m


4529-4531m

Palynologiske preparater i Sokkeldirektoratet

Prøve dybde	Dybde enhet	Prøve type	Laboratorie
1470.0	[m]	DC	STRAT
1490.0	[m]	DC	STRAT
1510.0	[m]	DC	STRAT
1530.0	[m]	DC	STRAT

1550.0	[m]	DC	STRAT
1570.0	[m]	DC	STRAT
1590.0	[m]	DC	STRAT
1630.0	[m]	DC	STRAT
1650.0	[m]	DC	STRAT
1670.0	[m]	DC	STRAT
1700.0	[m]	DC	STRAT
1710.0	[m]	DC	STRAT
1730.0	[m]	DC	STRAT
1740.0	[m]	DC	STRAT
1780.0	[m]	DC	STRAT
1800.0	[m]	DC	STRAT
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1890.0	[m]	DC	STRAT
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5263.0	[m]	DC	STRAT

Litostratigrafi

Topp Dyb [mMD RKB]	Litostrat. enhet
325	NORDLAND GP
325	NAUST FM
1586	KAI FM
1978	HORDALAND GP
1978	BRYGGE FM
2508	ROGALAND GP
2508	TARE FM
2577	TANG FM
2636	SHETLAND GP
2636	SPRINGAR FM
2746	NISE FM
2902	KVITNOS FM
3515	CROMER KNOLL GP
3515	LYSING FM

3532	LANGE FM
4422	LYR FM
4432	VIKING GP
4432	SPEKK FM
4433	MELKE FM
4480	FANGST GP
4480	GARN FM
4573	NOT FM
4617	ILE FM
4718	BÅT GP
4718	ROR FM
4725	TOFTE FM
4965	TILJE FM
5204	ÅRE FM

Spleisede logger

Dokument navn	Dokument format	Dokument størrelse [KB]
3407	pdf	0.54

Geokjemisk informasjon

Dokument navn	Dokument format	Dokument størrelse [KB]
3407_1	pdf	1.84
3407_2	pdf	1.85
3407_3	pdf	1.81
3407_4	pdf	0.31

Dokumenter - rapportert av utvinningstillatelsen (frigitt ihht til regelverk)

Dokument navn	Dokument format	Dokument størrelse [KB]
3407_6406_2_6_COMPLETION_REPORT	.pdf	36.16

Logger

Type logg	Topp dyp for logg [m]	Bunn dyp for logg [m]
AIT DSI GR	4408	5261
AIT GR	4406	4877
CMR IPLT	4408	5244
LDT CNT AMS GR	2748	4577
LDT CNT GR	4408	4577
MDT AMS GR	2745	4307
MDT GR	2745	5261
MSCT GR	2748	5251
MWD - RWD GR RES DIR	302	5263
PI DSI LDT AMS GR	1405	2750
PI DSI LDT CNT GR	2745	4416
VSP	4406	5261

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	412.0	36	412.0	0.00	LOT
INTERM.	18 5/8	1408.0	24	1408.0	1.66	LOT
INTERM.	13 3/8	2748.0	17 1/2	2748.0	2.07	LOT
INTERM.	9 5/8	4406.0	12 1/4	4406.0	2.18	LOT
OPEN HOLE		5263.0	8 1/2	5263.0	0.00	LOT

Boreslam

Dybde MD [m]	Egenvekt, slam [g/cm3]	Viskositet, slam [mPa.s]	Flytegrense [Pa]	Type slam	Dato, måling
585	1.20	7.0		WATER BASED	
660	1.20	21.0		WATER BASED	
685	1.03			SPUD MUD	
1413	1.30			WATER BASED	
1418	1.30	28.0		WATER BASED	
2549	1.68	45.0		WATER BASED	
2760	1.68	51.0		WATER BASED	
3236	1.64	43.0		OIL BASED	
3661	1.70	48.0		OIL BASED	
3825	1.74	47.0		OIL BASED	

4053	1.74	49.0		OIL BASED	
4415	1.85	52.0		OIL BASED	
4430	2.04	62.0		OIL BASED	
4504	2.04	58.0		OIL BASED	
4525	2.04	59.0		OIL BASED	
4531	2.04	59.0		OIL BASED	
4575	2.02	58.0		OIL BASED	
4665	2.04	63.0		OIL BASED	
4700	2.04	63.0		OIL BASED	
4872	2.04	62.0		OIL BASED	
4913	2.04	61.0		OIL BASED	
5030	2.04	68.0		OIL BASED	
5086	2.04	72.0		OIL BASED	
5263	2.04	73.0		OIL 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]
3407_Formation_pressure_(Formasjonstrykk)	pdf	0.22