



Generell informasjon

Brønnbane navn	6406/2-5 A
Type	EXPLORATION
Formål	APPRAISAL
Status	P&A
Faktakart i nytt vindu	lenke til kart
Hovedområde	NORWEGIAN SEA
Felt	KRISTIN
Funn	6406/2-3 Kristin
Brønn navn	6406/2-5
Seismisk lokalisering	HWM 94- ROW 2500 & COLUMN 1152
Utvinningstillatelse	199
Boreoperatør	Saga Petroleum ASA
Boretillatelse	908-L
Boreinnretning	DEEPSEA BERGEN
Boredager	145
Borestart	02.10.1997
Boreslutt	23.02.1998
Frigitt dato	23.02.2000
Publiseringsdato	24.09.2002
Opprinnelig formål	APPRAISAL
Gjenåpnet	NO
Innhold	GAS/CONDENSATE
Funnbrønnbane	NO
1. nivå med hydrokarboner, alder	MIDDLE JURASSIC
1. nivå med hydrokarboner, formasjon.	GARN FM
2. nivå med hydrokarboner, alder	MIDDLE JURASSIC
2. nivå med hydrokarboner, formasjon	ILE FM
Avstand, boredekk - midlere havflate [m]	23.0
Vanndybde ved midlere havflate [m]	341.0
Totalt målt dybde (MD) [m RKB]	5600.0
Totalt vertikalt dybde (TVD) [m RKB]	4956.0
Maks inklinasjon [°]	37.5
Temperatur ved bunn av brønnbanen [°C]	175
Eldste penetrerte alder	EARLY JURASSIC



Eldste penetrerte formasjon	ROR FM
Geodetisk datum	ED50
NS grader	64° 55' 53.83" N
ØV grader	6° 26' 58.65" E
NS UTM [m]	7203444.56
ØV UTM [m]	379444.85
UTM sone	32
NPDID for brønnbanen	3213

Brønnhistorie

**General**

Well 6406/2-5 A is a sidetrack well to 6406/2-5, drilled on the Kristin structure in the north-western part of block 6406/2, south-west of the Smørbukk Field and north-west of the Lavrans Field on Haltenbanken. The Kristin structure is a fault bounded horst block, somewhat eroded in the western part. The discovery well 6406/2-3 was drilled high on the structure and tested gas and condensate in a down-to situation in both the Garn and the Ile Formations, while the down flank well 6406/2-5 was water filled. The sidetrack well penetrated the Fangst Group reservoirs in an intermediate position between wells 6406/2-3 and 6406/2-5. The main objective of the sidetrack well was to identify the hydrocarbon water contacts in the Kristin structure and to test the hydrocarbon potential of the Garn and Ile Formations down flank of well 6406/2-3.

Operations and results

Appraisal well 6406/2-5 A was drilled as a deviated well with the semi-submersible drilling installation "Deepsea Bergen". The well was spudded on 29 September 1997 and permanently abandoned on 23 February 1998 after one drill stem test. The sidetrack was kicked off under the 18 5/8" shoe at 1404 m. Two attempts were made to reach the reservoir. The first, 6406/2-5 A, reached 2643 m, but had to be abandoned due to hole instability problems. The second sidetrack, 6406/2-5 A T2, reached the planned TD at 5600 m (4956 m TVD), 27 m TVD into the Upper Ror Formation and approximately 2 km NNW from well 6406/2-5. The well was drilled water based with KCl and glycol (ANCO 208 and Glydrill) from kick-off to 2825 m, and with oil based mud from 2825 m to TD. A total of 146,9 days were used for drilling, coring, logging, performing one DST, and permanently abandon the well. Of this, 30.3 % (or 44,5 days) was non-productive time (NPT). Waiting on weather caused a major part of this (11 days). Well 6406/2-5 A T2 found hydrocarbons, and hydrocarbon-water contacts were successfully penetrated in both the Garn and the Ile Formations. The 6406/2-5 A T2 Garn Formation reservoir parameters were intermediate compared to the good parameters of well 6406/2-3 and the marginal parameters of well 6406/2-5. In particular the permeability values of the three wells show a large range, with the 6406/2-5 AT2 values being intermediate. The Ile Formation reservoir parameters did not differ very much from what was measured in the recent wells, but showed large vertical variation in lithology and reservoir quality. Parts of the Ile Formation show excellent reservoir qualities. Pore pressures of the Jurassic units were very high, reaching a gradient of 1.95 g/cc BMW in upper part of the Garn Formation. A total of 172 meters (7 cores) were cored in the well, of which 98.6 % were recovered. No wire line fluid samples were obtained from this well. The well was plugged and abandoned as a gas/condensate appraisal well.

Testing

The Garn Formation was production tested in the interval 5304.4 - 5334 m (4691.3 - 4717.2 m TVD) with a gas rate of 221 500 Sm³/D and a condensate rate of 274 Sm³/D, giving a GOR of 821 Sm³/Sm³.

Borekaks i Sokkeldirektoratet

Borekaksprøve, topp dybde [m]	Borekaksprøve, bunn dybde [m]
1440.00	5598.00

Borekaks tilgjengelig for prøvetaking?	YES
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Borekjerter i Sokkeldirektoratet



Kjerneprøve nummer	Kjerneprøve - topp dybde	Kjerneprøve - bunn dybde	Kjerneprøve dybde - enhet
1	5307.0	5316.2	[m]
2	5316.2	5326.0	[m]
3	5326.0	5353.7	[m]
4	5354.0	5389.8	[m]
5	5390.5	5429.3	[m]
6	5505.0	5526.7	[m]
7	5527.0	5553.9	[m]

Total kjerneprøve lengde [m]	169.8
Kjerner tilgjengelig for prøvetaking?	YES

Kjernebilder



5307-5312m



5312-5316m



5316-5321m



5321-5326m



5326-5331m



5331-5336m



5336-5341m



5341-5346m



5346-5351m



5351-5354m



5354-5359m



5359-5364m



5364-5369m



5369-5374m



5374-5379m



5379-5384m



5384-5389m



5389-5394m



5394-5399m



5399-5404m



5379-5384m

5384-5389m

5389-5390m

5390-5395m

5395-5400m



5400-5405m

5405-5410m

5410-5415m

5415-5420m

5420-5425m



5425-5429m

5505-5510m

5510-5515m

5515-5520m

5520-5525m



5525-5527m

5527-5532m

5532-5537m

5537-5542m

5542-5547m



5547-5552m

5552-5554m

Litostratigrafi

Topp Dyb [mMD RKB]	Litostrat. enhet
364	NORDLAND GP
364	NAUST FM
1540	KAI FM
2013	HORDALAND GP
2013	BRYGGE FM
2423	ROGALAND GP
2423	TARE FM



2489	TANG FM
2570	SHETLAND GP
2570	SPRINGAR FM
2853	NISE FM
3087	KVITNOS FM
3832	CROMER KNOLL GP
3832	LYSING FM
3852	LANGE FM
5224	LYR FM
5238	VIKING GP
5238	MELKE FM
5305	FANGST GP
5305	GARN FM
5440	NOT FM
5481	ILE FM
5577	BÅT GP
5577	ROR FM

Spleisede logger

Dokument navn	Dokument format	Dokument størrelse [KB]
3213	pdf	0.38

Geokjemisk informasjon

Dokument navn	Dokument format	Dokument størrelse [KB]
3213_1	pdf	1.83
3213_2	pdf	1.96

Dokumenter - rapportert av utvinningstillatelsen (frigitt ihht til regelverk)

Dokument navn	Dokument format	Dokument størrelse [KB]
3213_6406_2_5_A_COMPLETION_REPORT	pdf	49.03





Borestrengtester (DST)

Test nummer	Fra dybde MD [m]	Til dybde MD [m]	Reduksjonsven til størrelse [mm]
1.0	5304	5334	11.1

Test nummer	Endelig avstengningstrykk [MPa]	Endelig strømningstrykk [MPa]	Bunnhullstrykk [MPa]	Borehullstemperatur [°C]
1.0	87.000	38.000		

Test nummer	Olje produksjon [Sm3/dag]	Gass produksjon [Sm3/dag]	Oljetetthet [g/cm3]	Gasstygde rel. luft	GOR [m3/m3]
1.0	274	221500	0.795	0.745	821

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
INTERM.	13 3/8	2818.0	17 1/2	2820.0	2.01	LOT
INTERM.	9 5/8	5133.0	12 1/4	5143.0	2.20	LOT
LINER	7	5600.0	8 1/2	5600.0	0.00	LOT

Boreslam

Dybde MD [m]	Egenvekt, slam [g/cm3]	Viskositet, slam [mPa.s]	Flytegrense [Pa]	Type slam	Dato, måling
1433	1.45	27.0		WATER BASED	
1731	1.67	44.0		WATER BASED	
1731	1.65	36.0		KCL MUD	
1833	1.46	29.0		WATER BASED	
2022	1.65	41.0		WATER BASED	
2181	1.64	40.0		KCL MUD	
2274	1.64	30.0		WATER BASED	
2643	1.67	34.0		WATER BASED	
2643	1.67	36.0		KCL MUD	
2825	1.65	50.0		OIL BASED	
2825	1.68	46.0		KCL MUD	
2825	1.68	46.0		KCL MUD	



3510	1.70	58.0		OIL BASED	
3802	1.73	52.0		OIL BASED	
4003	1.74	53.0		OIL BASED	
4098	1.74	55.0		OIL BASED	
4200	1.74	54.0		OIL BASED	
4379	1.74	56.0		OIL BASED	
4404	1.74	58.0		OIL BASED	
4533	1.75	56.0		OIL BASED	
4690	1.78	53.0		OIL BASED	
4763	1.81	55.0		OIL BASED	
4860	1.82	57.0		OIL BASED	
4949	1.82	63.0		OIL BASED	
5104	1.82	55.0		OIL BASED	
5143	1.82	55.0		OIL BASED	
5149	2.00	74.0		OIL BASED	
5157	2.00	62.0		OIL BASED	
5184	2.00	57.0		OIL BASED	
5218	2.02	60.0		OIL BASED	
5277	2.02	61.0		OIL BASED	
5302	2.04	60.0		OIL BASED	
5325	2.04	67.0		OIL BASED	
5354	2.04	65.0		OIL BASED	
5391	2.04	65.0		OIL BASED	
5429	2.04			OIL BASED	
5491	2.04	71.0		OIL BASED	
5528	2.04	70.0		OIL BASED	
5555	2.04	87.0		OIL BASED	
5600	2.04	87.0		OIL BASED	
5600	2.04	80.0		OIL BASED	
5600	1.24			BRINE	

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]
3213 Formation pressure (Formasjonstrykk)	PDF	0.22

