



Generell informasjon





Faktasider

Brønnbane / Leting

Utskriftstidspunkt: 20.5.2024 - 00:00

Brønnbane navn	6406/2-4 S
Type	EXPLORATION
Formål	APPRAISAL
Status	SUSPENDED
Faktakart i nytt vindu	lenke til kart
Hovedområde	NORWEGIAN SEA
Felt	KRISTIN
Funn	6406/2-1 Lavrans
Brønn navn	6406/2-4
Seismisk lokalisering	HWM 94- INLINE 1500 & CROSSLINE 2063
Utvinningstillatelse	199
Boreoperatør	Saga Petroleum ASA
Boretillatelse	876-L
Boreinnretning	DEEPSEA BERGEN
Boredager	76
Borestart	18.01.1997
Boreslutt	05.04.1997
Frigitt dato	05.04.1999
Publiseringsdato	11.04.2003
Opprinnelig formål	APPRAISAL
Gjenåpnet	NO
Innhold	SHOWS
Funnbrønnbane	NO
Avstand, boredekk - midlere havflate [m]	23.0
Vanndybde ved midlere havflate [m]	273.5
Totalt målt dybde (MD) [m RKB]	4546.0
Totalt vertikalt dybde (TVD) [m RKB]	4457.0
Maks inklinasjon [°]	17.7
Eldste penetrerte alder	MIDDLE JURASSIC
Eldste penetrerte formasjon	MELKE FM
Geodetisk datum	ED50
NS grader	64° 47' 58.34" N
ØV grader	6° 32' 29.26" E
NS UTM [m]	7188560.78
ØV UTM [m]	383212.30
UTM sone	32
NPDID for brønnbanen	3012



Brønnhistorie

General

Appraisal well 6406/2-4 S was drilled on the southern part of the Lavrans structure in the eastern part of block 6406/2, south of the Smørbukk Field and west of the Trestakk Field on Haltenbanken. The Lavrans structure is a rotated fault block west of the Trestakk Fault on the Halten Terrace. The purpose of the well was to appraise the southward extension of hydrocarbons in the Garn, Ile and Tofte Formations in the Lavrans structure, and to test separate closures in the Tilje and Åre formations. In addition, the well was planned to test the productivity improvement achievable by hydraulic stimulation. The well should also penetrate two sandy zones of Turonian (Lysing Formation) and Cenomanian/Albian age (Intra Lange sandstone).

Operations and results

The deviated appraisal well 6406/2-4 S was spudded 18 January 1997 with the semi-submersible installation "Deepsea Bergen". It was drilled to 4546 m (4457 m TVD) in the Melke Formation. Mainly because of the weather conditions (41 days of WOW and weather-related problems) drilling of 6406/2-4 S was significantly delayed. Due to environmental restrictions in the area the well had to be suspended on April 5 1997 before the well targets had been reached. Well 6406/2-4 S R was re-entered 12 November at depth 4534 m (4446 m TVD), below the 9 5/8" casing shoe in the initial well, and drilled to final TD at 5080 m (4969 m TVD) in Early Jurassic Åre Formation sediments. The well bores were drilled with KCl mud / spud mud down to 1110 m, with KCl mud and "ANCO 208" glycol from 1110 m to 2260 m, and with oil based "ANCOVERT" mud from 2260 m to final TD.

Down to Base Cretaceous Unconformity the stratigraphy was as expected, the prognosis matched the experienced stratigraphy well. Below ECU, 154 meters of Upper Jurassic shales were penetrated before the drilling had to be stopped. Prognosed thickness of the Upper Jurassic shales was 44 m TVD. High total gas was observed when drilling through the Cretaceous sandy intervals, the Lysing and Lange Formations, but shows were not described in the cuttings.

Well 6406/2-4 S R proved gas/condensate bearing sandstones in the Garn, Tofte and Tilje formations in hydrocarbon-down-to situations. The well penetrated a large fault within the Garn Formation, so that the Ile Formation along with parts of the Garn, most of the Not, the entire Upper Ror and the upper part of the Tofte Formation were faulted out. This fault came on depth as prognosed, but it had considerably larger throw than expected. In addition to this large fault, two smaller faults were penetrated in the Tilje Formation. The quality of the reservoir formations was somewhat lower than expected due to the tectonic influence. In the Tofte Formation, the proximity to the fault has reduced reservoir quality due to fractures and higher degree of cementation. In the Tilje Formation, the best-developed reservoir zones were either fractured or faulted out. The Garn Formation was intensively brecciated and fractured. Disregarding the faults, thickness of the formations approximates those of the neighbouring wells on Lavrans. The Åre Formation gave some gas readings during drilling but was regarded to be without hydrocarbons. No cores were cut and no wire line samples taken in well bore 6406/2-4 S. In the re-entry a total of ten conventional cores with a total length of 325.1 m were drilled, of which 322.8 m (99.3 %) were recovered. The cores were cut in the Middle Jurassic.

A total of seven fluid samples were acquired in 6406/2-4 S R. Two hydrocarbon samples were taken in the Tofte Formation at 4701 m, four hydrocarbon samples were taken in the Tilje Formation at 4945.2 m and 4881.0 m, and one water sample was acquired in the Tilje Formation at 4835 m. The mud contamination from base oil in the MDT hydrocarbon samples were analysed to be from 25 to 71 % by weight. Well 6406/2-4 S R



was permanently abandoned on 15 February 1999 as a gas and condensate appraisal well.

Testing

The Tilje (4874 m - 4904 m) and Tofte (4684 m - 4704 m) formations were production tested. Test 1 in the Tilje Formation produced 237000 m³ gas/day and 93 m³ condensate/day through a 9.53 mm choke. Test 2 in the Tofte Formation produced 42855 m³ gas/day and 18.1 m³ condensate/day through a 7.94 mm choke. The flow capacity of the test was severely influenced by fractures.

Borekaks i Sokkeldirektoratet

Borekaksprøve, topp dybde [m]	Borekaksprøve, bunn dybde [m]
1120.00	4545.00

Borekaks tilgjengelig for prøvetaking?	YES
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Palynologiske preparater i Sokkeldirektoratet

Prøve dybde	Dybde enhet	Prøve type	Laboratorie
1130.0	[m]	DC	STRAT
1150.0	[m]	DC	STRAT
1170.0	[m]	DC	STRAT
1190.0	[m]	DC	STRAT
1210.0	[m]	DC	STRAT
1230.0	[m]	DC	STRAT
1250.0	[m]	DC	STRAT
1270.0	[m]	DC	STRAT
1290.0	[m]	DC	STRAT
1310.0	[m]	DC	STRAT
1330.0	[m]	DC	STRAT
1350.0	[m]	DC	STRAT
1370.0	[m]	DC	STRAT
1390.0	[m]	DC	STRAT
1410.0	[m]	DC	STRAT
1430.0	[m]	DC	STRAT
1450.0	[m]	DC	STRAT
1470.0	[m]	DC	STRAT
1510.0	[m]	DC	STRAT
1530.0	[m]	DC	STRAT
1570.0	[m]	DC	STRAT
1590.0	[m]	DC	STRAT



1610.0	[m]	DC	STRAT
1630.0	[m]	DC	STRAT
1650.0	[m]	DC	STRAT
1670.0	[m]	DC	STRAT
1690.0	[m]	DC	STRAT
1710.0	[m]	DC	STRAT
1730.0	[m]	DC	STRAT
1750.0	[m]	DC	STRAT
1770.0	[m]	DC	STRAT
1790.0	[m]	DC	STRAT
1810.0	[m]	DC	STRAT
1830.0	[m]	DC	STRAT
1850.0	[m]	DC	STRAT
1870.0	[m]	DC	STRAT
1890.0	[m]	DC	STRAT
1910.0	[m]	DC	STRAT
1930.0	[m]	DC	STRAT
1970.0	[m]	DC	STRAT
2030.0	[m]	DC	STRAT
2050.0	[m]	DC	STRAT
2090.0	[m]	DC	STRAT
2110.0	[m]	DC	STRAT
2130.0	[m]	DC	STRAT
2150.0	[m]	DC	STRAT
2170.0	[m]	DC	STRAT
2190.0	[m]	DC	STRAT
2210.0	[m]	DC	STRAT
2230.0	[m]	DC	STRAT
2250.0	[m]	DC	STRAT
2270.0	[m]	DC	STRAT
2310.0	[m]	DC	STRAT
2370.0	[m]	DC	STRAT
2410.0	[m]	DC	STRAT
2430.0	[m]	DC	STRAT
2450.0	[m]	DC	STRAT
2470.0	[m]	DC	STRAT
2490.0	[m]	DC	STRAT
2510.0	[m]	DC	STRAT
2530.0	[m]	DC	STRAT
2550.0	[m]	DC	STRAT



2585.0	[m]	DC	STRAT
2625.0	[m]	DC	STRAT
2655.0	[m]	DC	STRAT
2675.0	[m]	DC	STRAT
2695.0	[m]	DC	STRAT
2705.0	[m]	DC	STRAT
2735.0	[m]	DC	STRAT
2755.0	[m]	DC	STRAT
2785.0	[m]	DC	STRAT
2810.0	[m]	DC	STRAT
2830.0	[m]	DC	STRAT
2850.0	[m]	DC	STRAT
2870.0	[m]	DC	STRAT
2890.0	[m]	DC	STRAT
2910.0	[m]	DC	STRAT
2930.0	[m]	DC	STRAT
2950.0	[m]	DC	STRAT
2970.0	[m]	DC	STRAT
2990.0	[m]	DC	STRAT
3010.0	[m]	DC	STRAT
3030.0	[m]	DC	STRAT
3050.0	[m]	DC	STRAT
3070.0	[m]	DC	STRAT
3090.0	[m]	DC	STRAT
3110.0	[m]	DC	STRAT
3130.0	[m]	DC	STRAT
3150.0	[m]	DC	STRAT
3170.0	[m]	DC	STRAT
3190.0	[m]	DC	STRAT
3210.0	[m]	DC	STRAT
3230.0	[m]	DC	STRAT
3250.0	[m]	DC	STRAT
3270.0	[m]	DC	STRAT
3290.0	[m]	DC	STRAT
3310.0	[m]	DC	STRAT
3330.0	[m]	DC	STRAT
3350.0	[m]	DC	STRAT
3370.0	[m]	DC	STRAT
3390.0	[m]	DC	STRAT
3410.0	[m]	DC	STRAT



3430.0	[m]	DC	STRAT
3450.0	[m]	DC	STRAT
3470.0	[m]	DC	STRAT
3490.0	[m]	DC	STRAT
3510.0	[m]	DC	STRAT
3520.0	[m]	DC	STRAT
3540.0	[m]	DC	STRAT
3560.0	[m]	DC	STRAT
3580.0	[m]	DC	STRAT
3600.0	[m]	DC	STRAT
3620.0	[m]	DC	STRAT
3640.0	[m]	DC	STRAT
3660.0	[m]	DC	STRAT
3680.0	[m]	DC	STRAT
3700.0	[m]	DC	STRAT
3720.0	[m]	DC	STRAT
3740.0	[m]	DC	STRAT
3760.0	[m]	DC	STRAT
3780.0	[m]	DC	STRAT
3800.0	[m]	DC	STRAT
3810.0	[m]	DC	STRAT
3830.0	[m]	DC	STRAT
3850.0	[m]	DC	STRAT
3870.0	[m]	DC	STRAT
3890.0	[m]	DC	STRAT
3910.0	[m]	DC	STRAT
3930.0	[m]	DC	STRAT
3940.0	[m]	DC	STRAT
3970.0	[m]	DC	STRAT
3990.0	[m]	DC	STRAT
4010.0	[m]	DC	STRAT
4030.0	[m]	DC	STRAT
4050.0	[m]	DC	STRAT
4070.0	[m]	DC	STRAT
4090.0	[m]	DC	STRAT
4110.0	[m]	DC	STRAT
4130.0	[m]	DC	STRAT
4150.0	[m]	DC	STRAT
4170.0	[m]	DC	STRAT
4190.0	[m]	DC	STRAT



4210.0	[m]	DC	STRAT
4230.0	[m]	DC	STRAT
4250.0	[m]	DC	STRAT
4270.0	[m]	DC	STRAT
4300.0	[m]	DC	STRAT
4310.0	[m]	DC	STRAT
4350.0	[m]	DC	STRAT
4370.0	[m]	DC	STRAT
4380.0	[m]	DC	STRAT
4390.0	[m]	DC	STRAT
4400.0	[m]	DC	STRAT
4410.0	[m]	DC	STRAT
4420.0	[m]	DC	STRAT
4430.0	[m]	DC	STRAT
4440.0	[m]	DC	STRAT
4450.0	[m]	DC	STRAT
4470.0	[m]	DC	STRAT
4480.0	[m]	DC	STRAT
4490.0	[m]	DC	STRAT
4500.0	[m]	DC	STRAT
4505.0	[m]	DC	STRAT
4510.0	[m]	DC	STRAT
4520.0	[m]	DC	STRAT
4530.0	[m]	DC	STRAT
4540.0	[m]	DC	STRAT
4543.0	[m]	DC	STRAT
4546.0	[m]	DC	STRAT

Litostratigrafi

Topp Dyb [mMD RKB]	Litostrat. enhet
296	NORDLAND GP
296	NAUST FM
1576	KAI FM
1946	HORDALAND GP
1946	BRYGGE FM
2462	ROGALAND GP
2462	TARE FM
2528	TANG FM



2589	SHETLAND GP
2589	SPRINGAR FM
2725	NISE FM
2913	KVITNOS FM
3485	CROMER KNOLL GP
3485	LYSING FM
3502	LANGE FM
3565	NO FORMAL NAME
3623	LANGE FM
4372	LYR FM
4388	VIKING GP
4388	SPEKK FM
4406	MELKE FM

Geokjemisk informasjon

Dokument navn	Dokument format	Dokument størrelse [KB]
3012_1	pdf	1.99
3012_2	pdf	1.78
3012_3	pdf	1.12

Dokumenter - rapportert av utvinningstillatelsen (frigitt ihht til regelverk)

Dokument navn	Dokument format	Dokument størrelse [KB]
3012_6406_2_4_S_COMPLETION_REPORT	pdf	36.76

Logger

Type logg	Topp dyp for logg [m]	Bunn dyp for logg [m]
DSI GR GPIT AMS	1677	2295
DSI GR GPIT AMS	4040	4485
MWD - DIR	296	374
MWD - GR RES DIR	374	4546
VSP	4040	4485





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	370.0	36	370.0	0.00	LOT
SURF.COND.	18 5/8	1103.0	26	1103.0	1.63	LOT
INTERM.	13 3/8	2252.0	17 1/2	2252.0	1.79	LOT
INTERM.	9 5/8	4546.0	12 1/4	4546.0	0.00	LOT

Boreslam

Dybde MD [m]	Egenvekt, slam [g/cm3]	Viskositet, slam [mPa.s]	Flytegrense [Pa]	Type slam	Dato, måling
0	0.00			OIL BASED	
4620	1.35	26.0		OIL BASED	
4629	1.35	26.0		OIL BASED	
4663	1.37	27.0		OIL BASED	
4672	1.43	34.0		OIL BASED	
4680	1.43	36.0		OIL BASED	
4684	1.25			BRINE	
4688	1.43	39.0		OIL BASED	
4719	1.43	40.0		OIL BASED	
4722	1.43	39.0		OIL BASED	
4803	1.43	40.0		OIL BASED	
4898	1.30			BRINE	
4935	1.43	42.0		OIL BASED	
4970	1.43	40.0		OIL BASED	
5080	1.43	43.0		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]
3012_Formalion_pressure_(Formasjonstrykk)	pdf	0.24

