General information

Wellbore name	6406/2-5
Type	EXPLORATION
Purpose	APPRAISAL
Status	P&A
Factmaps in new window	link to map
Main area	NORWEGIAN SEA
Field	KRISTIN
Discovery	6406/2-3 Kristin
Well name	6406/2-5
Seismic location	HWM94- ROW 2470 & COLUMN 1310
Production licence	199
Drilling operator	Saga Petroleum ASA
Drill permit	894-L
Drilling facility	DEEPSEA BERGEN
Drilling days	119
Entered date	03.06.1997
Completed date	29.09.1997
Release date	29.09.1999
Publication date	24.09.2002
Purpose - planned	APPRAISAL
Reentry	NO
Content	DRY
Discovery wellbore	NO
Kelly bushing elevation [m]	23.0
Water depth [m]	341.0
Total depth (MD) [m RKB]	5439.0
Final vertical depth (TVD) [m RKB]	5438.0
Maximum inclination [°]	2.2
Bottom hole temperature [°C]	190
Oldest penetrated age	EARLY JURASSIC
Oldest penetrated formation	ÅRE FM
Geodetic datum	ED50
NS degrees	64° 55' 53.83'' N
EW degrees	6° 26' 58.65'' E
NS UTM [m]	7203444.56
EW UTM [m]	379444.85
UTM zone	32
NPDID wellbore	3125

Wellbore history

General

Well 6406/2-5 was the second well 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 discovery well 6406/2-3 was drilled high on the structure; it tested gas and condensate in a down-to situation in both the Garn and the Ile Formations. The main objective of well 6406/2-5 was to test the hydrocarbon potential of the Garn and Ile Formations in a down flank position. In addition the well would test a secondary reservoir target of late Jurassic age, the Rogn sandstone, which was predicted based on seismic observations.

Operations and results

Appraisal well 6406/2-5 was drilled with the semi-submersible drilling installation "Deepsea Bergen". The well was spudded on 3 June 1997 and drilled to TD at 5439 m in the Åre Formation. It was drilled with spud mud down to 1407 m, with KCl mud from 1407 m to 2612 m, and with oil based mud from 2612 m to TD. No hydrocarbon bearing formations were encountered in well 6406/2-5. Hydrocarbon shows were observed in both the Garn and Ile Formations, but wire line logs, pressure measurements and fluid samples proved the well to be dry. In the well position the Viking Group consisted of the Spekk and Melke Formation shales, while the Late Jurassic Rogn sandstone was not observed. The Garn Formation in well 6406/2-5 had distinctively reduced permeabilities and slightly reduced porosities compared to the parameters of well 6406/2-3. The low permeabilities of the Garn Formation made it difficult to perform pressure measurements, thus no reliable pressure gradient could be established in the Garn Formation. The Ile Formation reservoir parameters in well 6406/2-5 were similar to what was experienced in well 6406/2-3, with variable, but in parts excellent porosity and permeability values. Water gradients were established based on pressure measurements in the Ile, Tofte, Tilje and Åre Formations. 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. Thirteen cores were cut from the Middle to Lower Jurassic Garn, Not, Ile, Ror, and Tofte Formations. A total of 321,72 meter was cored, of which 98,38 % was recovered. Modular Formation Dynamics Tester (MDT) and RFT water samples were collected from the Garn, Ile, Tofte and Tilje Formations. It was plugged for geological sidetrack on 29 September 1997.

Testing

No drill stem test was performed.

Cuttings at the Norwegian Offshore Directorate

Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
1410.00	5439.00

Cuttings available for sampling?	YES

Cores at the Norwegian Offshore Directorate

Core sample number	Core sample - top depth	Core sample - bottom depth	Core sample depth - uom
1	4795.0	4803.9	[m]
2	4805.0	4833.0	[m]
3	4833.0	4861.2	[m]
4	4861.5	4888.9	[m]
5	4889.5	4918.0	[m]
6	4918.0	4944.9	[m]
7	4945.0	4973.5	[m]
8	4973.5	4991.6	[m]
9	4991.6	5020.0	[m]
10	5019.5	5073.3	[m]
11	5073.5	5105.3	[m]
12	5105.3	5105.4	[m]
13	5105.0	5111.0	[m]

Total core sample length [m]	314.6
Cores available for sampling?	YES

Core photos


4795-4800m


4800-4804m


4805-4810m


4810-4815m


4815-4820m


4820-4825m


4825-4830m


4830-4833m


4833-4838m


4838-4843m


4843-4848m


4848-4853m


4853-4858m


4858-4861m


4861-4866m


4886-4871m


4871-4876m


4876-4881m


4881-4886m


4886-4890m


4889-4894m


4894-4899m


4899-4904m


4904-4909m


4909-4914m


4914-4918m


4918-4923m


4923-4928m


4928-4933m


4933-4938m


4938-4943m


4943-4945m


4945-4950m


4950-4955m


4955-4960m


4960-4965m


4965-4970m


4970-4973m


4973-4978m


4978-4983m


4983-4988m


4988-4991m


4991-4996m


4996-5001m


5001-5006m


5006-5011m


5011-5016m


5016-5020m


5019-5024m


5024-5029m


5029-5034m


5034-5039m


5039-5044m


5044-5049m


5049-5054m


5054-5059m


5059-5064m


5064-5069m


5069-5073m


5073-5078m


5078-5083m


5083-5088m


5088-5093m


5093-5098m


5098-5103m


5103-5105m


5105-5110m


5110-5115m

Palynological slides at the Norwegian Offshore Directorate

Sample depth	Depth unit	Sample type	Laboratory
1410.0	[m]	DC	STRAT
1430.0	[m]	DC	STRAT

1450.0	[m]	DC	STRAT
1470.0	[m]	DC	STRAT
1500.0	[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
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
1760.0	[m]	DC	STRAT
1770.0	[m]	DC	STRAT
1790.0	[m]	DC	STRAT
1820.0	[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
1950.0	[m]	DC	STRAT
1970.0	[m]	DC	STRAT
1990.0	[m]	DC	STRAT
2010.0	[m]	DC	STRAT
2030.0	[m]	DC	STRAT
2050.0	[m]	DC	STRAT
2070.0	[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
2290.0	[m]	DC	STRAT
2310.0	[m]	DC	STRAT
2330.0	[m]	DC	STRAT
2350.0	[m]	DC	STRAT
2370.0	[m]	DC	STRAT
2390.0	[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
2570.0	[m]	DC	STRAT
2590.0	[m]	DC	STRAT
2610.0	[m]	DC	STRAT
2630.0	[m]	DC	STRAT
2650.0	[m]	DC	STRAT
2675.0	[m]	DC	STRAT
2700.0	[m]	DC	STRAT
2710.0	[m]	DC	STRAT
2730.0	[m]	DC	STRAT
2745.0	[m]	DC	STRAT
2770.0	[m]	DC	STRAT
2790.0	[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
3530.0	[m]	C	STRAT
3550.0	[m]	DC	STRAT
3570.0	[m]	DC	STRAT
3590.0	[m]	DC	STRAT
3610.0	[m]	DC	STRAT
3630.0	[m]	DC	STRAT
3650.0	[m]	DC	STRAT
3670.0	[m]	DC	STRAT
3690.0	[m]	DC	STRAT
3710.0	[m]	DC	STRAT
3730.0	[m]	DC	STRAT
3750.0	[m]	DC	STRAT
3770.0	[m]	DC	STRAT
3790.0	[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
3950.0	[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
4290.0	[m]	DC	STRAT
4310.0	[m]	DC	STRAT
4330.0	[m]	DC	STRAT
4350.0	[m]	DC	STRAT
4370.0	[m]	DC	STRAT
4390.0	[m]	DC	STRAT
4410.0	[m]	DC	STRAT
4430.0	[m]	DC	STRAT
4450.0	[m]	DC	STRAT
4470.0	[m]	DC	STRAT
4490.0	[m]	DC	STRAT
4510.0	[m]	DC	STRAT
4530.0	[m]	DC	STRAT
4548.0	[m]	DC	STRAT
4569.0	[m]	DC	STRAT
4605.0	[m]	DC	STRAT
4659.0	[m]	DC	STRAT
4668.0	[m]	DC	STRAT
4677.0	[m]	DC	STRAT

4686.0	[m]	DC	STRAT
4695.0	[m]	DC	STRAT
4705.0	[m]	DC	STRAT
4713.0	[m]	DC	STRAT
4731.0	[m]	DC	STRAT
4749.0	[m]	DC	STRAT
4758.0	[m]	DC	STRAT
4767.0	[m]	DC	STRAT
4776.0	[m]	DC	STRAT
4785.0	[m]	DC	STRAT
4791.0	[m]	DC	STRAT
4857.0	[m]	C	STRAT
4901.0	[m]	C	STRAT
4919.0	[m]	C	STRAT
4928.0	[m]	C	STRAT
4937.0	[m]	C	STRAT
4946.0	[m]	C	STRAT
4955.0	[m]	C	STRAT
4964.0	[m]	C	STRAT
4973.5	[m]	C	STRAT
4995.0	[m]	C	STRAT
5040.6	[m]	C	STRAT
5049.0	[m]	C	STRAT
5058.0	[m]	C	STRAT
5067.0	[m]	C	STRAT
5073.5	[m]	C	STRAT
5082.0	[m]	C	STRAT
5091.0	[m]	C	STRAT
5100.0	[m]	C	STRAT
5105.0	[m]	C	STRAT
5118.0	[m]	DC	STRAT
5175.0	[m]	DC	STRAT
5193.0	[m]	DC	STRAT
5202.0	[m]	DC	STRAT
5211.0	[m]	DC	STRAT
5220.0	[m]	DC	STRAT
5229.0	[m]	DC	STRAT
5238.0	[m]	DC	STRAT
5310.0	[m]	DC	STRAT
5328.0	[m]	DC	STRAT

5382.0	[m]	DC	STRAT
5388.0	[m]	DC	STRAT
5400.0	[m]	DC	STRAT
5409.0	[m]	DC	STRAT
5418.0	[m]	DC	STRAT
5427.0	[m]	DC	STRAT
5436.0	[m]	DC	STRAT
5439.0	[m]	DC	STRAT

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
364	NORDLAND GP
364	NAUST FM
1540	KAI FM
1976	HORDALAND GP
1976	BRYGGE FM
2340	ROGALAND GP
2340	TARE FM
2397	TANG FM
2469	SHETLAND GP
2469	SPRINGAR FM
2674	NISE FM
2867	KVITNOS FM
3480	CROMER KNOLL GP
3480	LYSING FM
3501	LANGE FM
4654	LYR FM
4792	FANGST GP
4792	GARN FM
4912	NOT FM
4950	ILE FM
5043	BÅT GP
5043	ROR FM
5108	TOFTE FM
5207	ROR FM
5210	TILJE FM
5396	ÅRE FM

Composite logs

Document name	Document format	Document size [MB]
3125	pdf	0.78

Geochemical information

Document name	Document format	Document size [MB]
3125_1	pdf	1.90
3125_2	pdf	1.93
3125_3	pdf	1.93
3125_4	pdf	1.92

Documents - reported by the production licence (period for duty of secrecy expired)

Document name	Document format	Document size [MB]
3125_6406_2_5_COMPLETION_LOG	pdf	8.22
3125_6406_2_5_COMPLETION_REPORT	pdf	34.96

Logs

Log type	Log top depth [m]	Log bottom depth [m]
AIT DSI GR	4518	5441
AIT IPLT GR	4916	5102
BGT GPIT AMS GR	2650	4537
BGT GR	4518	5297
CST GR	4539	5295
IPLT CMR	4518	4939
IPLT ECS	4518	5444
IPLT GR	5005	5231
LDT GR	4523	4806
MDT GR	4375	4494
MDT GR	4793	4798
MDT GR	4797	4877
MDT GR	4798	5030

MDT GR	4881	5218
MDT GR	5001	5421
MSCT GR	2670	4515
MWD DPR DIR GR	364	5439
OBDT CNL GR	4518	4944
PI DSI LDT AMS GR	1398	2653
PI DSI LDT CNL AMS GR	2650	4537
PI GR	4885	5106
RFT GR	4877	4877
VSP	3000	5220

Casing and leak-off tests

Casing type	Casing diam. [inch]	Casing depth [m]	Hole diam. [inch]	Hole depth [m]	LOT/FIT mud eqv. [g/cm3]	Formation test type
SURF.COND.	30	451.0	36	450.0	0.00	LOT
INTERM.	18 3/8	1399.0	24	1400.0	1.64	LOT
INTERM.	13 3/8	2650.0	17 1/2	2655.0	2.00	LOT
INTERM.	9 5/8	4523.0	12 1/4	4533.0	2.12	LOT
OPEN HOLE		5439.0	8 1/2	5439.0	0.00	LOT

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
612	1.20	17.0		WATER BASED	
900	1.20	18.0		WATER BASED	
1407	1.30	23.0		WATER BASED	
1653	1.31	17.0		KCL MUD	
2235	1.64	30.0		KCL MUD	
2475	1.67	31.0		KCL MUD	
3112	1.66	50.0		OIL BASED	
3574	1.75	55.0		OIL BASED	
3863	1.76	52.0		OIL BASED	
4168	1.82	49.0		OIL BASED	
4199	1.82	49.0		OIL BASED	
4259	1.82	50.0		OIL BASED	
4316	1.82	52.0		OIL BASED	
4346	1.83	49.0		OIL BASED	

4399	1.82	47.0		OIL BASED	
4440	1.82	47.0		OIL BASED	
4509	1.83	51.0		OIL BASED	
4533	1.83	51.0		OIL BASED	
4538	2.06	89.0		OIL BASED	
4578	2.06	75.0		OIL BASED	
4631	2.06	73.0		OIL BASED	
4687	2.06	59.0		OIL BASED	
4733	2.06	59.0		OIL BASED	
4763	2.08	62.0		OIL BASED	
4775	2.06	59.0		OIL BASED	
4795	2.06	57.0		OIL BASED	
4796	2.04	60.0		OIL BASED	
4862	2.04	56.0		OIL BASED	
4890	2.04	57.0		OIL BASED	
4918	2.04	62.0		OIL BASED	
4944	2.04	53.0		OIL BASED	
4945	2.04	55.0		OIL BASED	
4973	2.04	56.0		OIL BASED	
4992	2.04	58.0		OIL BASED	
5019	2.04	59.0		OIL BASED	
5080	2.04	58.0		OIL BASED	
5105	2.04	62.0		OIL BASED	
5116	2.04	64.0		OIL BASED	
5129	2.02	56.0		OIL BASED	
5129	2.02	58.0		OIL BASED	
5130	2.02	58.0		OIL BASED	
5166	2.02	60.0		OIL BASED	
5221	2.02	65.0		OIL BASED	
5229	2.02	65.0		OIL BASED	
5271	2.02	64.0		OIL BASED	
5314	2.02	58.0		OIL BASED	
5343	2.02	60.0		OIL BASED	
5348	2.04	60.0		OIL BASED	
5393	2.02	60.0		OIL BASED	
5433	2.02	61.0		OIL BASED	
5439	1.86	50.0		OIL BASED	
5973	2.04	58.0		OIL BASED	

Pressure plots

The pore pressure data is sourced from well logs if no other source is specified. In some wells where pore pressure logs do not exist, information from Drill stem tests and kicks have been used. The data has been reported to the NPD, and further processed and quality controlled by IHS Markit.

Document name	Document format	Document size [MB]
3125_Formation_pressure_(Formasjonstrykk)	pdf	0.22