

**General information**

Wellbore name	6406/1-1
Type	EXPLORATION
Purpose	WILDCAT
Status	P&A
Press release	link to press release
Factmaps in new window	link to map
Main area	NORWEGIAN SEA
Field	KRISTIN
Discovery	6406/1-1 (Erlend Nord)
Well name	6406/1-1
Seismic location	HWM94-innlinje 2061 & krysslinje 841
Production licence	257
Drilling operator	Den norske stats oljeselskap a.s
Drill permit	998-L
Drilling facility	TRANSOCEAN ARCTIC
Drilling days	67
Entered date	05.04.2001
Completed date	10.06.2001
Release date	10.06.2003
Publication date	07.11.2005
Purpose - planned	WILDCAT
Reentry	NO
Content	GAS/CONDENSATE
Discovery wellbore	YES
1st level with HC, age	EARLY JURASSIC
1st level with HC, formation	TOFTE FM
Kelly bushing elevation [m]	24.0
Water depth [m]	344.0
Total depth (MD) [m RKB]	5057.0
Final vertical depth (TVD) [m RKB]	5057.0
Maximum inclination [°]	1.4
Bottom hole temperature [°C]	172
Oldest penetrated age	EARLY JURASSIC
Oldest penetrated formation	ÅRE FM
Geodetic datum	ED50
NS degrees	64° 54' 28.39" N
EW degrees	6° 17' 41.75" E
NS UTM [m]	7201105.16



EW UTM [m]	372022.78
UTM zone	32
NPDID wellbore	4262

Wellbore history

General

Well 6406/1-1 was drilled on the Northern segment of the Erlend structure in the Norwegian Sea. The main objective was to test the hydrocarbon potential of the Early Jurassic Tofte and Tilje Formations. Planned TD was 50 m into the Åre Formation.

Operations and results

Wildcat well 6406/1-1 was spudded with the semi-submersible installation Transocean Arctic on 5 April 2001 and drilled to TD at 5057 m in the Early Jurassic sediments of the Åre Formation. The well was drilled using seawater/bentonite to 1443 m, a Glydril mud system through the 17 1/2" section (to 3016 m) and Versapro oil-based mud through the 12 1/4" and 8 1/2" sections to TD.

The well confirmed that the reservoir in this segment is the Tofte and the Tilje formations. The Tofte formation is a dominantly tidal influenced fan/bread delta sandstone unit. The Tilje formation is a more heterogeneous tidal sand/shale formation. Due to almost complete core coverage of the Tofte formation, the petrophysical evaluations are based upon core measurements of porosity and permeability. For the Tilje formation there is no core measurements except some sidewall cores, which gives more uncertainty. Both the Tofte and the Tilje formation have good reservoir quality due to medium to coarse-grained sandstone, extensive chlorite coating and pyrobitumen.

The upper part of Tofte (18m) was found to be gas/condensate filled and the lower part of the Tofte and the Tilje formations were water-bearing. Logs and pressure data gave a gas/water contact (FWL) at 4684.0 m (4659.7 m TVD MSL). Organic geochemical analyses indicated oil stain throughout much of the Tofte sand interval and minor oil stain could also be present in the Tilje and Åre Formation sands. The use of oil-based mud precluded quantification and characterisation of these stains. The well was found thermally immature for hydrocarbon generation to a depth of approximately 3200 m, early mature to approximately 3800 m, mature for oil generation from to approximately 4400 m, and mature for light oil/condensate and wet gas generation below 4400 m. The best source rocks in the well position were found in claystones of the Tilje Formation. These are predominantly gas prone. The Spekk Formation is not present in the well.

Seven conventional cores were cut in the Tofte reservoir from 4666 m in the condensate zone to 4791 m in the water zone. MDT samples were taken in the Tofte Formation at 4679.8 m in the condensate zone, at 4685 m just below the GWC, and at 4780.2 m in the water zone.

The well was permanently abandoned on 10 June 2001 as a gas/condensate discovery well.

Testing

No drill stem test was performed.

Cuttings at the Norwegian Offshore Directorate



Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
1420.00	5057.00

Cuttings available for sampling?	YES
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Cores at the Norwegian Offshore Directorate

Core sample number	Core sample - top depth	Core sample - bottom depth	Core sample depth - uom
1	4680.0	4681.5	[m]
2	4681.5	4684.6	[m]
3	4685.0	4704.2	[m]
4	4704.2	4715.3	[m]
5	4716.0	4745.7	[m]
6	4746.0	4756.6	[m]
7	4756.6	4792.0	[m]

Total core sample length [m]	110.5
Cores available for sampling?	YES

Core photos



4680-4681m



4681-4684m



4685-4690m



4690-4695m



4695-4700m



4700-4704m



4704-4709m



4709-4714m



4714-4715m



4716-4721m





4721-4726m

4726-4731m

4731-4736m

4736-4741m

4741-4745m



4746-4751m



4751-4756m



4756-4757m



4756-4761m



4761-4766m



4766-4771m



4771-4776m



4776-4781m



4781-4786m



4786-4791m



4791-4792m

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
369	NORDLAND GP
369	NAUST FM
1592	KAI FM
2005	HORDALAND GP
2005	BRYGGE FM
2408	ROGALAND GP
2408	TARE FM
2473	TANG FM
2530	SHETLAND GP
2530	SPRINGAR FM
2719	NISE FM
2891	KVITNOS FM
3523	CROMER KNOLL GP



3523	LYSING FM
3541	LANGE FM
3594	NO FORMAL NAME
3659	LANGE FM
4407	NO FORMAL NAME
4599	LANGE FM
4666	BÅT GP
4666	TOFTE FM
4806	TILJE FM
4996	ÅRE FM

Composite logs

Document name	Document format	Document size [MB]
4262	pdf	0.45

Geochemical information

Document name	Document format	Document size [MB]
4262_1	pdf	2.02

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

Document name	Document format	Document size [MB]
4262_6406_1_1_COMPLETION_LOG	.pdf	4.40
4262_6406_1_1_COMPLETION_REPORT	.PDF	48.28

Logs

Log type	Log top depth [m]	Log bottom depth [m]
AIT DSI EMS	4611	5059
IPLT	4611	5059
MDT GR	4665	4674
MDT GR ACTS	4669	5045





MDT GR ACTS	4679	4690
MDT GR ACTS	4679	5048
MSCT GR	4679	5028
MWD - EWR DGR SLD SON	3005	4620
MWD - MPR	4611	5057
MWD - MPR HGR	430	1415
MWD - MPRL	1415	3016
VSP GR	3000	4040
VSP GR	4140	4970

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
CONDUCTOR	30	429.0	36	429.0	0.00	LOT
SURF.COND.	20	1405.0	26	1411.0	1.63	LOT
INTERM.	13 3/8	3008.0	17 1/2	3015.0	1.99	LOT
INTERM.	9 5/8	4611.0	12 1/4	4620.0	2.16	LOT
OPEN HOLE		5057.0	8 1/2	5057.0	0.00	LOT

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
400	1.03			BENTONITE/FW	
439	1.03			BENTONITE/FW	
1087	1.03	14.0		BENTONITE/FW	
1440	1.03	13.0		CMC/SEAWATER	
1922	1.45	16.0		GLYDRILL	
2600	1.64	27.0		GLYDRILL	
2800	1.64	27.0		GLYDRILL	
2860	1.64	28.0		GLYDRILL	
3016	1.64	26.0		GLYDRILL	
3400	1.76	38.0		VERSAPRO	
3850	1.78	38.0		VERSAPRO	
4400	1.87	48.0		VERSAPRO	
4620	1.87	44.0		VERSAPRO	
4685	2.04	51.0		VERSAPRO	
4756	2.04	50.0		VERSAPRO	



5045	2.02	46.0		VERSAPRO	
5057	2.02	49.0		VERSAPRO	

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]
4262 Formation pressure (Formasjonstrykk)	PDF	0.29

