

**General information**

Wellbore name	6706/6-1
Type	EXPLORATION
Purpose	WILDCAT
Status	P&A
Press release	link to press release
Factmaps in new window	link to map
Main area	NORWEGIAN SEA
Discovery	6706/6-1 (Hvitveis)
Well name	6706/6-1
Seismic location	inline 1689-xline 6688 on ES00-01 3D
Production licence	264
Drilling operator	Esso Exploration and Production Norway A/S
Drill permit	1050-L
Drilling facility	WEST NAVIGATOR
Drilling days	45
Entered date	04.05.2003
Completed date	17.06.2003
Release date	17.06.2005
Publication date	17.06.2005
Purpose - planned	WILDCAT
Reentry	NO
Content	GAS
Discovery wellbore	YES
1st level with HC, age	PALEOCENE
1st level with HC, formation	NO FORMAL NAME
Kelly bushing elevation [m]	36.0
Water depth [m]	1298.0
Total depth (MD) [m RKB]	3451.0
Final vertical depth (TVD) [m RKB]	3450.0
Maximum inclination [°]	3
Bottom hole temperature [°C]	84
Oldest penetrated age	PALEOCENE
Oldest penetrated formation	NO FORMAL NAME
Geodetic datum	ED50
NS degrees	67° 33' 34.79" N
EW degrees	6° 41' 18.38" E
NS UTM [m]	7495801.60



EW UTM [m]	401546.00
UTM zone	32
NPDID wellbore	4705

Wellbore history

General

Wildcat well 6706/6-1 is a true frontier well. It was drilled to test the hydrocarbon potential of the Cretaceous Hvitveis prospect at the Naglfar Dome in the Vøring Basin. The objective for Well 6706/6-1 was to test a seismically defined reservoir interval, interpreted to be a Nise Formation Equivalent.

Operations and results

Wildcat well 6706/6-1 was spudded with the dynamically positioned vessel West Navigator in 1298 m water depth on 2 May 2003 and drilled to TD at 3451 m in Paleocene sediments. Drilling started with a 9 7/8" pilot hole to 2050 m with MWD logging. High-risk shallow gas anomaly had been mapped 490 m east of the location. No shallow gas or boulder problems were encountered in the pilot hole. The main hole was drilled from a location ca 100 m south of the pilot hole. A hard crust about 1.5 m below the sea floor caused the bit to skid ca 40 m from the planned position in the first spud. In the second attempt the bit skidded 6 m before it entered the crust. This was within acceptable limits and drilling of the main hole could commence without significant problems. The well was drilled with seawater and hi-vis pills down to 2050 m and with KCl/Glydril mud from 2050 m to TD. First returns were at 2060 m.

Biostratigraphic analyses showed that the entire section from 2060 m (first returns) to 3451 m (TD) was deposited during the *Alisocysta margarita* dinoflagellate zone, representing approximately 4 million years of sedimentation in the late Danian and early Selandian. The two uppermost cuttings samples (2060 m and 2080 m) show well-preserved *Alisocysta margarita* and *Palaeocystodinium bulliforme*, together with reworked Late Cretaceous dinoflagellates. The conventional core and sidewall cores in the lowermost 170 metres of the well contain sparse and very poorly preserved *A. margarita*, *P. bulliforme*, *Deflandrea* spp., and *Senoniasphaera inornata*. The contrast in preservation quality of these Danian - Selandian dinoflagellates in the lower part of the well compared to those at the level of first returns indicate that the lowermost occurrences are *in situ*, since caved specimens would show pristine preservation. Microplankton assemblages in the conventional core and sidewall cores are totally dominated by reworking, mainly Late Cretaceous with some Early Cretaceous and older sources. Mixing of Late Cretaceous bioevents and absence of certain regional Late Cretaceous bioevents is further indication that this well penetrates approximately 1400 metres of a Danian - Selandian mass transport deposit sourced from Late and Early Cretaceous sediments.

Four intervals in the well had higher gas readings ("gas shows") than the general background of 0.7- 1 %: 2340 m to 2360 m (maximum 6 %), 3014 m to 3020 m (maximum 6 %), 3260 m to 3280 m (maximum 8 %), and 3360 m to 3450 m (maximum 2.5 %). A weak oil show was described in a single cuttings sample from 2368 m. A second, weak oil show was described on the core at 3283.55 m. The well discovered a close to normally pressured dry gas accumulation in a reservoir section picked at 3239 m, beginning with thin sandstone stringers interbedded with shale, overlying more massive sandstones at 3251 m. Gas was found down to a free water level at 3266 m.

Geochemical analyses showed that much of the shaley sequences penetrated by the well had good TOC, but with low potential for petroleum generation, probably only gas



prone at best. Thermal maturity reaches beginning of the oil window (%Ro = 0.5) at around 2700 m which is quite shallow considering the 1298 m water depth. At TD vitrinite reflectance is ca 0.75%. Headspace gas analyses largely confirmed the interval with gas shows recorded on the rig. In addition, some possibly migrated condensate-range hydrocarbons were found in cuttings in the interval 3100 m to 3250 m.

One conventional core was cut with 82 % recovery in the interval 3277 m to 3285.5 m. Fluid sampling was done at 3265.5 m with the RCI wire line tool. The samples contained gas and mud filtrate with a thin film of condensate. All samples had dew points higher than the reservoir pressure and were thus not representative for the formation fluid. The reason for this was probably pressure draw down due to a relatively tight formation.

The well was permanently abandoned on 18 June 2003 as a gas discovery.

Testing

No drill stem test was performed.

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Cuttings at the Norwegian Offshore Directorate

Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
2060.00	3450.00

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	3277.0	3283.6	[m]

Total core sample length [m]	6.6
Cores available for sampling?	NO

Palynological slides at the Norwegian Offshore Directorate

Sample depth	Depth unit	Sample type	Laboratory
2060.0	[m]	DC	RRI
2060.0	[m]	DC	OD
2070.0	[m]	DC	OD
2080.0	[m]	DC	OD
2080.0	[m]	DC	RRI
2110.0	[m]	DC	RRI
2120.0	[m]	DC	RRI



2140.0 [m]	DC	OD
2150.0 [m]	DC	RRI
2180.0 [m]	DC	RRI
2200.0 [m]	DC	OD
2230.0 [m]	DC	RRI
2240.0 [m]	DC	RRI
2260.0 [m]	DC	OD
2300.0 [m]	DC	RRI
2321.0 [m]	DC	OD
2330.0 [m]	DC	RRI
2360.0 [m]	DC	RRI
2360.0 [m]	DC	OD
2405.0 [m]	DC	RRI
2447.0 [m]	DC	RRI
2500.0 [m]	DC	RRI
2560.0 [m]	DC	RRI
2630.0 [m]	DC	RRI
2650.0 [m]	DC	RRI
2720.0 [m]	DC	RRI
2790.0 [m]	DC	RRI
2810.0 [m]	DC	RRI
2820.0 [m]	DC	RRI
2890.0 [m]	DC	RRI
2900.0 [m]	DC	RRI
2906.0 [m]	DC	RRI
3016.0 [m]	DC	RRI
3060.0 [m]	DC	RRI
3110.0 [m]	DC	RRI
3160.0 [m]	DC	RRI
3170.0 [m]	DC	RRI
3210.0 [m]	DC	RRI
3237.5 [m]	SWC	RRI
3238.0 [m]	DC	RRI
3243.2 [m]	SWC	RRI
3253.0 [m]	DC	RRI
3254.2 [m]	SWC	RRI
3262.0 [m]	DC	RRI
3262.2 [m]	SWC	RRI
3278.0 [m]	C	OD
3279.7 [m]	C	OD



3279.7	[m]	C	RRI
3279.8	[m]	C	OD
3279.8	[m]	C	OD
3279.8	[m]	C	RRI
3279.9	[m]	C	OD
3280.5	[m]	C	OD
3280.8	[m]	C	OD
3280.9	[m]	C	OD
3280.9	[m]	C	RRI
3281.0	[m]	C	OD
3281.2	[m]	C	RRI
3281.2	[m]	C	OD
3281.3	[m]	C	OD
3282.4	[m]	C	RRI
3282.4	[m]	C	OD
3282.7	[m]	C	RRI
3282.8	[m]	SWC	RRI
3283.0	[m]	C	OD
3286.0	[m]	DC	OD
3304.0	[m]	DC	RRI
3308.5	[m]	SWC	RRI
3309.2	[m]	SWC	RRI
3328.0	[m]	DC	OD
3367.7	[m]	SWC	RRI
3390.0	[m]	DC	OD
3390.5	[m]	SWC	RRI
3407.5	[m]	SWC	RRI
3420.0	[m]	DC	RRI
3450.0	[m]	DC	RRI
3450.0	[m]	DC	OD
3450.0	[m]	DC	OD

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
1334	NORDLAND GP
1334	NAUST FM
1385	KAI FM
1543	HORDALAND GP



1543	BRYGGE FM
1875	ROGALAND GP
1875	TANG FM
3239	NO FORMAL NAME

Composite logs

Document name	Document format	Document size [MB]
4705	pdf	0.29

Geochemical information

Document name	Document format	Document size [MB]
4705_1	pdf	1.95

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

Document name	Document format	Document size [MB]
4705_6706_6_1_COMPLETION_LOG	.PDF	8.54
4705_6706_6_1_COMPLETION_REPORT	.PDF	2.80

Logs

Log type	Log top depth [m]	Log bottom depth [m]
GR CHECKSHOT	2770	3220
GR CN ZDL XMAC ELITE DLL MLL	2042	2770
GR CN ZDL XMAC ELITE DLL MLL	2631	3216
GR MLR XMAC ELITE CHECKSHOT	2500	3445
GR RCI	3243	3430
GR SWC	3231	3435
LWD - CDR ARC APWD DIR	1329	2050
LWD - CDR ARC DIR	2050	2770
LWD - DIR	1331	2050
LWD - PWD CDR ARC DIR	2770	3220





LWD -L PWD CDR ARC RAB ADN CDN D	3220	3450
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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	36	1422.0	42	1428.0	0.00	LOT
SURF.COND.	20	2042.0	28	2050.0	1.27	LOT
INTERM.	13 3/8	3211.0	17	3220.0	1.49	LOT
OPEN HOLE		3451.0	12 1/4	3451.0	0.00	LOT

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
1428	1.05			DUMMY	
2050	0.00			DUMMY	
2770	1.18	15.0		DUMMY	
3220	0.00			DUMMY	
3349	1.28	15.0		DUMMY	

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]
4705 Formation pressure (Formasjonstrykk)	pdf	0.26

