General information

Wellbore name	6407/2-2
Type	EXPLORATION
Purpose	APPRAISAL
Status	P&A
Factmaps in new window	link to map
Main area	NORWEGIAN SEA
Field	ÅSGARD
Discovery	6507/11-1 Midgard
Well name	6407/2-2
Seismic location	line 8271-101 SP 474
Production licence	074
Drilling operator	Saga Petroleum ASA
Drill permit	375-L
Drilling facility	TREASURE SAGA
Drilling days	76
Entered date	17.05.1983
Completed date	31.07.1983
Release date	31.07.1985
Publication date	13.12.2005
Purpose - planned	WILDCAT
Reentry	NO
Content	GAS/CONDENSATE
Discovery wellbore	NO
1st level with HC, age	MIDDLE JURASSIC
1st level with HC, formation	GARN FM
Kelly bushing elevation [m]	26.0
Water depth [m]	258.0
Total depth (MD) [m RKB]	3351.0
Final vertical depth (TVD) [m RKB]	3351.0
Maximum inclination [°]	2
Bottom hole temperature [°C]	112
Oldest penetrated age	LATE TRIASSIC
Oldest penetrated formation	GREY BEDS (INFORMAL)
Geodetic datum	ED50
NS degrees	64° 59' 39.64'' N
EW degrees	7° 31' 53.08'' E
NS UTM [m]	7208809.08
EW UTM [m]	430732.95

UTM zone	32
NPDID wellbore	16

Wellbore history

General

Well 6407/2-2 is located east on the Halten Terrace off shore Mid Norway. The well tested the southern (Gamma) fault compartment of a horst with true vertical closure below the base Cretaceous level. The gas/condensate discovery well 6507/11-1 was located on the northern (Alpha) compartment of the same structure. The primary target of the well was the middle Jurassic sandstone; secondary target was Early Jurassic sandstone.

The well is Reference Well for the Melke Formation.

Operations and results

Wildcat well 6407/2-2 was spudded with the semi-submersible installation Treasure Saga on 17 May 1983 and drilled to TD at 3351 m, 71 m into the Triassic Grey Beds. After drilling the 26" hole the well was observed flowing and the mud weight was corrected. No other major problems occurred during drilling. After having drilled out of 13 3/8" casing shoe a cement plug was set from 1960 m - 1995 m, and one from 340 m - 400 m, due to temporarily plugging and abandonment of the well caused by strike The strike was efficient (no drilling progress was obtained) for 13 days, from June 6th to June 19th. The well was drilled with spud mud down to 865 m, with gypsum/polymer mud from 865 m to 1995 m, and with lignosulphonate mud from 1995 m to TD.

The well proved mainly claystones down to the Middle Jurassic Sandstone. The Cainozoic with a total thickness of 1809 m overlies the Late Cretaceous where the topmost Maastrichtian is missing. Two hundred and forty meter of Late Cretaceous and 81.5 m of Early Cretaceous is preserved, separated by an unconformity ranging in age from Middle Santonian to Albian. High gas readings were experienced in the upper part of the Cretaceous together with heavier hydrocarbons detected for the first time in the well. A study of wire line logs, sidewalls cores and hole response indicate that the gas was overpressured, and trapped in a non-reservoir lithology. Base Cretaceous unconformity was encountered at 2409.5 m. The upper Jurassic was developed with 11.5 m of hot shales Spekk Formation and 39.5 m of silty claystones of the Melke Formation. As in other wells in the area, the Middle Jurassic Sandstone was divided by a shaly interval into an upper unit of very good reservoir properties (Garn Formation) and a lower unit of less good characteristics (Ile Formation). The upper unit was found to be gas bearing with a gas/water contact at 2516.5 m. All potential reservoir sequences below this depth were water bearing. The Åre Formation "Coal Unit" was 383 m thick and consisted of interbedded carbonaceous claystone/shale, fine sand and silt. It contained a total of 50 m of coals and shale layers.

Twelve cores were cut, all in the Middle Jurassic sequence. Segregated FMT samples were collected at 2486 m (gas), 2512.5 m (gas), 2539.5 m (water), and 2546 m (water).

The well was permanently abandoned on 31 July as a gas/condensate appraisal well on the Midgard Discovery.

Testing

One drill stem test was carried out in the interval 2476 m to 2484 m in the gas bearing Middle Jurassic Garn Formation sandstone. The test produced 1000000 Sm3 gas /day on a 60/64" choke. The gas/oil ratio was ca 5900 Sm3/Sm3. The liquid petroleum had a density of 0.756 g/cm3 (55.6 deg API).

Cuttings at the Norwegian Offshore Directorate

Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
400.00	3350.00

Cuttings available for sampling?	NO

Cores at the Norwegian Offshore Directorate

Core sample number	Core sample - top depth	Core sample - bottom depth	Core sample depth - uom
1	2461.3	2471.1	[m]
2	2473.0	2476.2	[m]
3	2479.0	2497.0	[m]
4	2497.0	2499.2	[m]
5	2501.0	2506.4	[m]
6	2508.0	2513.8	[m]
7	2518.0	2527.0	[m]
8	2527.0	2534.4	[m]
9	2536.0	2548.0	[m]
10	2552.0	2559.0	[m]
11	2565.0	2579.7	[m]
12	2582.0	2583.2	[m]

Total core sample length [m]	95.7
Cores available for sampling?	YES

Core photos


2461-2466m


2466-2471m


2473-2476m


2479-2484m


2484-2489m


2489-2494m


2494-2497m


2497-2499m


2501-2506m


2506-2506m


2508-2513m


2513-2514m


2518-2523m


2523-2527m


2527-2532m


2532-2534m


2536-2541m


2541-2546m


2546-2549m


2552-2557m


2557-2559m


2565-2670m


2570-2575m


2575-2579m


2582-2583m

Palynological slides at the Norwegian Offshore Directorate

Sample depth	Depth unit	Sample type	Laboratory
2030.0	[m]	DC	PAS
2087.0	[m]	SWC	PAS
2095.0	[m]	DC	PAS
2100.0	[m]	SWC	PAS
2110.0	[m]	DC	PAS
2131.0	[m]	SWC	PAS
2140.0	[m]	DC	PAS
2153.0	[m]	SWC	PAS
2155.0	[m]	DC	PAS
2175.0	[m]	SWC	PAS
2185.0	[m]	DC	PAS
2208.0	[m]	SWC	PAS
2220.0	[m]	SWC	PAS
2236.0	[m]	SWC	PAS
2242.0	[m]	SWC	PAS
2258.0	[m]	SWC	PAS

2260.0	[m]	DC	PAS
2273.0	[m]	SWC	PAS
2280.9	[m]	DC	PAS
2293.0	[m]	SWC	PAS
2310.0	[m]	SWC	PAS
2326.0	[m]	SWC	PAS
2333.0	[m]	SWC	PAS
2347.0	[m]	SWC	PAS
2350.0	[m]	DC	PAS
2364.0	[m]	SWC	PAS
2375.0	[m]	SWC	PAS
2388.0	[m]	SWC	PAS
2396.0	[m]	DC	PAS
2410.0	[m]	SWC	PAS
2416.0	[m]	SWC	PAS
2418.0	[m]	SWC	PAS
2423.0	[m]	SWC	PAS
2426.0	[m]	SWC	PAS
2431.0	[m]	SWC	PAS
2434.5	[m]	SWC	PAS
2438.5	[m]	SWC	PAS
2444.0	[m]	SWC	PAS
2450.0	[m]	SWC	PAS
2455.5	[m]	SWC	PAS
2461.3	[m]	C	PAS
2466.8	[m]	C	PAS
2482.0	[m]	DC	PAS
2497.0	[m]	DC	PAS
2515.5	[m]	SWC	PAS
2519.8	[m]	C	PAS
2522.3	[m]	C	PAS
2526.5	[m]	C	PAS
2527.8	[m]	C	PAS
2530.2	[m]	C	PAS
2532.0	[m]	C	PAS
2532.3	[m]	C	PAS
2552.4	[m]	C	PAS
2556.5	[m]	C	PAS
2566.0	[m]	C	PAS
2582.0	[m]	C	PAS

2604.5	[m]	SWC	PAS
2618.0	[m]	SWC	PAS
2627.3	[m]	DC	PAS
2642.0	[m]	DC	PAS
2657.0	[m]	DC	PAS
2669.0	[m]	SWC	PAS
2689.0	[m]	SWC	PAS
2705.5	[m]	SWC	PAS
2718.5	[m]	SWC	PAS
2732.0	[m]	DC	PAS
2747.0	[m]	DC	PAS
2762.0	[m]	DC	PAS
2777.0	[m]	DC	PAS
2792.0	[m]	DC	PAS
2810.0	[m]	DC	PAS
2822.0	[m]	DC	PAS
2836.0	[m]	DC	PAS
2852.0	[m]	DC	PAS
2882.0	[m]	DC	PAS
2902.0	[m]	DC	PAS
2917.0	[m]	DC	PAS
2931.0	[m]	SWC	PAS
2937.0	[m]	DC	PAS
2952.0	[m]	DC	PAS
2967.0	[m]	DC	PAS
2982.0	[m]	DC	PAS
3000.0	[m]	SWC	PAS
3012.0	[m]	DC	PAS
3037.0	[m]	SWC	PAS
3050.0	[m]	SWC	PAS
3057.0	[m]	DC	PAS
3072.0	[m]	DC	PAS
3098.0	[m]	SWC	PAS
3117.0	[m]	DC	PAS
3132.0	[m]	DC	PAS
3147.0	[m]	DC	PAS
3167.0	[m]	SWC	PAS
3177.0	[m]	DC	PAS
3195.0	[m]	SWC	PAS
3205.0	[m]	SWC	PAS

3214.0	[m]	SWC	PAS
3240.0	[m]	SWC	PAS
3251.0	[m]	SWC	PAS
3267.0	[m]	DC	PAS
3282.0	[m]	DC	PAS
3307.0	[m]	DC	PAS
3322.0	[m]	DC	PAS
3337.0	[m]	DC	PAS
3350.0	[m]	DC	PAS

Oil samples at the Norwegian Offshore Directorate

Test type	Bottle number	Top depth MD [m]	Bottom depth MD [m]	Fluid type	Test time	Samples available
DST	DST1	2476.00	2484.00	CONDENSATE	25.06.1983 - 03:00	YES

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
284	NORDLAND GP
284	NAUST FM
1384	KAI FM
1555	HORDALAND GP
1555	BRYGGE FM
1955	ROGALAND GP
1955	TARE FM
2035	TANG FM
2088	SHETLAND GP
2088	SPRINGAR FM
2149	NISE FM
2328	CROMER KNOLL GP
2328	LANGE FM
2395	LYR FM
2410	VIKING GP
2410	SPEKK FM
2417	MELKE FM
2461	FANGST GP

2461	GARN FM
2515	NOT FM
2527	ILE FM
2602	BÅT GP
2602	ROR FM
2709	TILJE FM
2892	ÅRE FM
3275	GREY BEDS (INFORMAL)

Composite logs

Document name	Document format	Document size [MB]
16	pdf	0.58

Geochemical information

Document name	Document format	Document size [MB]
16_1	pdf	0.53
16_2	pdf	4.17
16_3	pdf	0.89

Documents - older Norwegian Offshore Directorate WDSS reports and other related documents

Document name	Document format	Document size [MB]
16_01_WDSS_General_Information	pdf	0.19
16_02_WDSS_completion_log	pdf	0.31

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

Document name	Document format	Document size [MB]
16_01_CompletionReport_&_Completionlog	pdf	16.89

Drill stem tests (DST)

Test number	From depth MD [m]	To depth MD [m]	Choke size [mm]
1.0	2476	2484	23.8

Test number	Final shut-in pressure [MPa]	Final flow pressure [MPa]	Bottom hole pressure [MPa]	Downhole temperature [°C]
1.0				

Test number	Oil [Sm3/day]	Gas [Sm3/day]	Oil density [g/cm3]	Gas grav. rel.air	GOR [m3/m3]
1.0	119	994000	0.770	0.690	

Logs

Log type	Log top depth [m]	Log bottom depth [m]
ACBL	1750	2676
CAL	398	865
CDL	398	865
CDL	860	1986
CDL CNL	1954	2697
CDL CNL	2676	3345
COREGUN	430	840
COREGUN	1975	2722
COREGUN	2220	2722
COREGUN	2723	3325
DIFL LS BHC	398	865
DIFL LS BHC	860	1986
DIFL LS BHC	1966	2698
DIFL LS BHC	2676	3346
DLL MLL	1966	2734
FMT	2462	2721
FMT	2512	0
FMT	2800	3315
GR	0	0
HR DIP	2675	3345
HRDIP	1966	2733
SPECTRALOG	1960	2695
TEMP	329	1917

TEMP	334	1975
VELOCITY	398	3346

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	398.0	36	398.0	0.00	LOT
SURF.COND.	20	860.0	26	865.0	1.61	LOT
INTERM.	13 3/8	1966.0	17 1/2	1995.0	1.71	LOT
INTERM.	9 5/8	2676.0	12 1/4	2735.0	0.00	LOT
OPEN HOLE		3351.0	8 1/2	3351.0	0.00	LOT

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
490	1.09	50.0		waterbased	
880	1.11	48.0		waterbased	
1720	1.27	50.0		waterbased	
2000	1.40	46.0		waterbased	
2680	1.48	60.0		waterbased	
2800	1.17	41.0		waterbased	
3250	1.15	44.0		waterbased	

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]
16_Formation_pressure_(Formasjonstrykk)	PDF	0.28