

**General information**

Wellbore name	6406/9-2
Type	EXPLORATION
Purpose	APPRAISAL
Status	P&A
Press release	link to press release
Factmaps in new window	link to map
Main area	NORWEGIAN SEA
Discovery	6406/9-1 Linnorm
Well name	6406/9-2
Seismic location	HW95M in line:4308 TRACE= x-line :2076
Production licence	255
Drilling operator	A/S Norske Shell
Drill permit	1129-L
Drilling facility	WEST ALPHA
Drilling days	147
Entered date	05.02.2007
Completed date	01.07.2007
Release date	01.07.2009
Publication date	28.06.2009
Purpose - planned	APPRAISAL
Reentry	NO
Content	GAS
Discovery wellbore	NO
1st level with HC, age	MIDDLE JURASSIC
1st level with HC, formation	GARN FM
2nd level with HC, age	MIDDLE JURASSIC
2nd level with HC, formation	ILE FM
3rd level with HC, age	EARLY JURASSIC
3rd level with HC, formation	TOFTE FM
Kelly bushing elevation [m]	18.0
Water depth [m]	299.0
Total depth (MD) [m RKB]	5348.0
Final vertical depth (TVD) [m RKB]	5347.0
Maximum inclination [°]	4.7
Bottom hole temperature [°C]	184
Oldest penetrated age	EARLY JURASSIC
Oldest penetrated formation	ÅRE FM
Geodetic datum	ED50



NS degrees	64° 28' 34.83" N
EW degrees	6° 48' 9.46" E
NS UTM [m]	7152101.79
EW UTM [m]	394366.07
UTM zone	32
NPDID wellbore	5454

Wellbore history

**General**

The Onyx South West Appraisal Well 6406/9-2 was drilled to appraise the Onyx South West gas discovery made in 2005. Onyx is situated west of the Draugen and north-west of the Njord Fields in the southern Haltenbanken area. The well was drilled about 3.5 km NNW of the Onyx SW Exploration Well 6406/9-1, which discovered gas in a Lower to Middle Jurassic fault block. The main objective of this well was to decrease the volumetric uncertainty of the Onyx SW gas discovery by penetrating the expected FWL of the Ile Formation and deeper reservoirs at structural spill point.

Operations and results

Well 6406/9-2 was spudded with the semi-submersible installation West Alpha on 5 February 2007 and drilled to TD at 5348 m in Early Jurassic sediments of the Åre Formation. Prior to logging in the 12 1/4" hole there was an incident onboard the rig with fire in the engine room. The well was shut in on the Shear rams and wedge locked. After a full muster was achieved, the fire was put out with Inergen and the situation brought under control. Apart from this there were no serious technical problems in the operations. The well was drilled with spud mud down to 1450 m, with Ultradril KCl/glycol mud from 1450 m to 2410 m, and with oil based Paratherm mud from 2410 m to TD.

Wire line logs were successfully acquired in the 17 1/2" section over the Kai, Brygge and Tare formations, with some noteworthy results. The neutron density indicated exceptionally high porosity in the base of the Kai -approaching 50 %. This is higher than should be normally possible, and implies the rock is not grain supported. The relationship between compressional and shear sonic changes dramatically in the Brygge relative to the Kai and Tare formations.

Top Viking Group was encountered at 4325 m with 70 m Spekk Formation and 242 m of Melke Formation. The Fangst Group was encountered at 4637 m. The Garn formation is not a reservoir in the area. Low reservoir quality heterogeneous sands characterised by cemented streaks and clay layers, were observed in the upper Ile and upper and middle Tilje Formations. The lower part of the middle Tilje appeared to exhibit some higher reservoir quality. Very high reservoir quality was observed in both the Lower Ile and Lower Tilje, which were both cored. The Ile Formation was fully hydrocarbon bearing, with two gas-down to contacts; at 4814 m in the upper Ile and at 4850 m in the lower Ile Formation. There were indications that the Ile contains an intra-formational seal, thereby explaining the two contacts encountered. The upper Tilje and upper part of the middle Tilje Formations were also gas bearing. A gas-down-to contact was observed in the Middle Tilje at 5126 m, with water present in the lower part of the Middle Tilje. The Lower Tilje was water bearing. The Tofte Formation contained both tight (possibly gas bearing) and high quality water bearing sands layers.

Four cores were cut. Core 1 was cut at 4828 - 4857.1 m in lower Ile Formation, core 2 was cut at 5096- 5100.3 m in upper Tilje Formation, core 3 was cut at 5103 - 5134.5 m in middle Tilje Formation, and core 4 was cut at 5209.7 - 5236.9 m in lower Tilje Formation. MDT fluid samples were taken at 4827 m in lower Ile Formation (gas) and 5206 m in lower Tilje Formation (water).

The well was permanently abandoned on 1 July 2007 as a gas appraisal well.

Testing

No drill stem test was performed.

Cuttings at the Norwegian Offshore Directorate



Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
1460.00	5348.00

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	4828.0	4857.1	[m]
2	5096.0	5100.3	[m]
3	5103.0	5134.5	[m]
4	5209.7	5236.8	[m]

Total core sample length [m]	91.9
Cores available for sampling?	YES

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
317	NORDLAND GP
317	NAUST FM
1279	KAI FM
1723	HORDALAND GP
1723	BRYGGE FM
2288	ROGALAND GP
2288	TARE FM
2375	TANG FM
2450	SHETLAND GP
2450	SPRINGAR FM
2557	NISE FM
2776	KVITNOS FM
2946	CROMER KNOLL GP
2946	LYSING FM
3472	LANGE FM
4315	LYR FM
4325	VIKING GP
4325	SPEKK FM
4395	MELKE FM



4637	FANGST GP
4637	GARN FM
4695	NOT FM
4758	ILE FM
4856	BÅT GP
4856	ROR FM
4894	TOFTE FM
4932	ROR FM
5042	TILJE FM
5241	ÅRE FM

Composite logs

Document name	Document format	Document size [MB]
5454	pdf	0.86

Logs

Log type	Log top depth [m]	Log bottom depth [m]
CBL	2517	4446
GPIT PPC DSI PPC PEX ACTS ECRD	1443	2406
IS PPC DSI AIT IPLT GR ACTS ECRD	3507	4430
MDT GR	4070	4098
MDT GR	4070	4098
MDT GR KEH ECRI	4826	5125
MDT GR LEH ECRI	4766	5125
MDT GR LEH ECRI	4766	4850
MDT GR LEH ECRI	4795	5235
MDT GR LEH ECRI	4811	4826
MDT GR LEH ECRI	5206	5206
MWD - GR	317	404
MWD ARC - GR RES APWD	402	5333
QAIT QSLT QLDT QCNT ECS HR LEH	4458	5327
QAIT QSLT QLDT QCNT ECS HR LEH	4458	5327
STETOSCOPE	4754	4789





VSI	1087	4571
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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	30	402.0	36	407.0	0.00	LOT
SURF.COND.	20	1443.0	26	1450.0	1.75	LOT
INTERM.	13 3/8	2404.0	17 1/2	2410.0	1.90	LOT
INTERM.	9 5/8	4456.0	12 1/4	4461.0	0.00	LOT
OPEN HOLE		5348.0	8 1/2	5348.0	0.00	LOT

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
707	1.75	21.0		OTHER	
2353	1.84	53.0		PARATHERM	
4461	1.84	39.0		PARATHERM	
4523	1.84	43.0		PARATHERM	
4640	1.84	39.0		PARATHERM	
4864	1.84	44.0		PARATHERM	
5097	1.84	44.0		PARATHERM	
5103	1.84	44.0		PARATHERM	
5133	1.84	48.0		PARATHERM	
5182	1.84	46.0		PARATHERM	
5239	1.84	51.0		PARATHERM	
5254	1.84	47.0		PARATHERM	
5348	1.85	48.0		PARATHERM	