

**General information**

Wellbore name	15/12-21
Type	EXPLORATION
Purpose	WILDCAT
Status	P&A
Press release	link to press release
Factmaps in new window	link to map
Main area	NORTH SEA
Discovery	15/12-21 (Grevling)
Well name	15/12-21
Seismic location	inline 1112 & xline 3355
Production licence	038
Drilling operator	Talisman Energy Norge AS
Drill permit	1231-L
Drilling facility	MÆRSK GUARDIAN
Drilling days	68
Entered date	15.03.2009
Completed date	21.05.2009
Release date	21.05.2011
Publication date	21.05.2011
Purpose - planned	WILDCAT
Reentry	NO
Content	OIL
Discovery wellbore	YES
1st level with HC, age	MIDDLE JURASSIC
1st level with HC, formation	HUGIN FM
2nd level with HC, age	LATE TRIASSIC
2nd level with HC, formation	SLEIPNER FM
Kelly bushing elevation [m]	42.1
Water depth [m]	86.0
Total depth (MD) [m RKB]	3310.0
Final vertical depth (TVD) [m RKB]	3310.0
Maximum inclination [°]	1
Bottom hole temperature [°C]	124
Oldest penetrated age	LATE TRIASSIC
Oldest penetrated formation	SKAGERRAK FM
Geodetic datum	ED50
NS degrees	58° 13' 40.47" N
EW degrees	1° 52' 56.82" E



NS UTM [m]	6454775.77
EW UTM [m]	434361.34
UTM zone	31
NPDID wellbore	6047

Wellbore history

**General**

The 15/12-21 Grevling well is located on the south-western margin of the Hidra High, approximately 18 km north of the Varg field in the southernmost part of the Viking Graben. The primary objective was to test the Middle Jurassic Hugin and Sleipner formations in a crestal position on the structure. The Triassic Skagerrak Formation was a secondary objective.

Operations and results

A 12 1/4" pilot hole was drilled to 1195 m to check for shallow gas. No shallow gas was encountered. Well 15/12-21 was spudded with the jack-up installation Mærsk Guardian on 15 March 2009 and drilled to TD at 3310 m in the Late Triassic Skagerrak Formation. The well was drilled with Seawater and sweeps down to 221 m, with a water based KCl mud from 221 m to 1193 m, and with Carbosea oil based mud from 1193 m to TD.

The top of the Hugin reservoir was encountered at 3031 m, 15m deeper than prognosis. The Sleipner Formation reservoir came in 21m shallow, at 3059 m, and top the Triassic 11 m shallow, at 3122 m. The Hugin, Sleipner and upper Skagerrak formations all proved to be oil bearing with a total pay of 67 m. No oil water contacts were encountered within the well. However, two vertical pressure barriers were interpreted; a top Sleipner coal at 3059 m (3017 m TVDSS), which separates the Hugin and Sleipner oil-bearing sandstones, and an intra-Triassic shale at 3164 m (3122 m TVDSS), which separates oil bearing Skagerrak sandstones above from water bearing Skagerrak sandstones below. No oil shows were recorded above reservoir level in the well. In the Triassic oil shows were seen down to 3179 m, 15 m below the oil-down to contact in the Skagerrak Formation.

Two cores of a total of 88.26 m were cut. Core 1 was cut from 3047.50 m to 3081.70 m in the Hugin and Sleipner formations, and core 2 was cut from 3106.50 m to 3160.56 m in the Sleipner and Triassic Skagerrak formations. The Cores need to be depth shifted up 6.5 meters to match log data. RCI wire line fluid samples were taken in the Hugin Formation at 3034.5 m (oil), the Sleipner Formation at 3074.4 m (oil), and in the Skagerrak Formation at 3152 m (oil), 3186.8 m (water), and 3222 m (water).

The well was permanently abandoned on 21 May 2009 as an oil discovery.

Testing

Two drill stem tests were performed.

In DST 1 the Sleipner/Skogerrak Formations were perforated in the interval 3099.6 to 3158.17 m. DST1 produced 124 Sm³ oil and 3617 Sm³ gas /day through a 20/64" choke in the main flow. The oil density was 0.861 g/cm³ and the GOR was 29 Sm³/Sm³. The gas gravity was 1.121 (air = 1) with 11 ppm H₂S and 5.5% CO₂. The bottom hole temperature recorded in DST1 was 120 deg C.

In DST 2 the Hugin Formation was perforated in the interval 3030.24 to 3059.04 m. DST2 produced 75 Sm³ oil and 3563 Sm³ gas /day through a 20/64" choke in the main flow. The oil density was 0.861 g/cm³ and the GOR was 47 Sm³/Sm³. The gas gravity was 1.121 (air = 1) with 10 ppm H₂S, and 9.0 % CO₂. The bottom hole temperature recorded in DST2 was 117 deg C.

No water was produced in the tests.

Cuttings at the Norwegian Offshore Directorate



Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
230.00	3310.00

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	3054.0	3088.2	[m]
2	3113.0	3167.1	[m]

Total core sample length [m]	88.3
Cores available for sampling?	YES

Palynological slides at the Norwegian Offshore Directorate

Sample depth	Depth unit	Sample type	Laboratory
2899.0	[m]	DC	APT
2905.0	[m]	DC	APT
2914.0	[m]	DC	APT
2923.0	[m]	DC	APT
2932.0	[m]	DC	APT
2944.0	[m]	DC	APT
2956.0	[m]	DC	APT
2962.0	[m]	DC	APT
2975.0	[m]	DC	APT
2985.0	[m]	DC	APT
2994.0	[m]	DC	APT
3006.0	[m]	DC	APT
3015.0	[m]	DC	APT
3024.0	[m]	DC	APT
3033.0	[m]	DC	APT
3042.0	[m]	DC	APT
3072.0	[m]	C	APT
3085.0	[m]	C	APT
3088.2	[m]	C	APT
3102.0	[m]	DC	APT

**Lithostratigraphy**

Top depth [mMD RKB]	Lithostrat. unit
128	NORDLAND GP
930	UTSIRA FM
1131	HORDALAND GP
2323	ROGALAND GP
2323	BALDER FM
2336	SELE FM
2401	LISTA FM
2487	VÅLE FM
2505	SHETLAND GP
2505	TOR FM
2676	HOD FM
2752	BLODØKS FM
2784	HIDRA FM
2836	CROMER KNOLL GP
2836	RØDBY FM
2858	SOLA FM
2873	ÅSGARD FM
2887	VIKING GP
2887	DRAUPNE FM
2916	HEATHER FM
3031	VESTLAND GP
3031	HUGIN FM
3059	SLEIPNER FM
3122	NO GROUP DEFINED
3122	SKAGERRAK FM

Drill stem tests (DST)

Test number	From depth MD [m]	To depth MD [m]	Choke size [mm]
1.0	3099	3158	8.0
2.0	3030	3059	8.0

Test number	Final shut-in pressure [MPa]	Final flow pressure [MPa]	Bottom hole pressure [MPa]	Downhole temperature [°C]
1.0	3.000		27.000	120
2.0	1.600		26.000	117



Test number	Oil [Sm3/day]	Gas [Sm3/day]	Oil density [g/cm3]	Gas grav. rel.air	GOR [m3/m3]
1.0	161	3847			24
2.0	90	3003			33

Logs

Log type	Log top depth [m]	Log bottom depth [m]
GR GEOWAVE	1583	3304
HDIL XMAC DSL MRCH	2960	3304
MREX ZN CN GR MRCH	2960	3304
MWD LWD - DIR	128	2976
MWD LWD - DIR RES GR PWD DDS	221	1195
MWD LWD - GR RES NEU DEN DIR PWD	2976	3310
RCI GR TTRM MRCH	3034	3282

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	211.0	36	211.0	0.00	LOT
SURF.COND.	13 3/8	1189.0	17 1/2	1192.0	1.88	LOT
INTERM.	9 5/8	2966.0	12 1/4	2976.0	1.98	LOT
LINER	7	3309.0	8 1/2	3310.0	0.00	LOT

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
221	1.08	14.0		AQUADRILL	
490	1.14	12.0		Aquadrill	
830	1.15	11.0		Aquadrill	
1080	1.17	13.0		Aquadrill	
1195	1.16	12.0		Aquadrill	
1195	1.17	13.0		AQUADRILL	
1195	1.16	13.0		Aquadrill	



1196	1.19	13.0		AQUADRILL	
1613	1.47	32.0		Carbo-Sea	
2055	1.42	31.0		CARBOSEA	
2211	1.47	30.0		Carbo-Sea	
2618	1.42	31.0		CARBOSEA	
3310	1.47	36.0		Carbo-Sea	
3344	1.42	32.0		CARBOSEA	
3702	1.42	34.0		CARBOSEA	