

**General information**

Wellbore name	15/5-4
Type	EXPLORATION
Purpose	APPRAISAL
Status	P&A
Factmaps in new window	link to map
Main area	NORTH SEA
Field	ENOCH
Discovery	15/5 Enoch
Well name	15/5-4
Seismic location	NH 9068-109 AND NH 9068-312
Production licence	048
Drilling operator	Norsk Hydro Produksjon AS
Drill permit	682-L
Drilling facility	VILDKAT EXPLORER
Drilling days	28
Entered date	06.06.1991
Completed date	03.07.1991
Release date	03.07.1993
Publication date	03.10.2013
Purpose - planned	APPRAISAL
Reentry	NO
Content	OIL SHOWS
Discovery wellbore	NO
Kelly bushing elevation [m]	25.0
Water depth [m]	120.0
Total depth (MD) [m RKB]	2300.0
Final vertical depth (TVD) [m RKB]	2300.0
Maximum inclination [°]	1.6
Bottom hole temperature [°C]	63
Oldest penetrated age	PALEOCENE
Oldest penetrated formation	HEIMDAL FM
Geodetic datum	ED50
NS degrees	58° 38' 28.53" N
EW degrees	1° 33' 8.87" E
NS UTM [m]	6501162.62
EW UTM [m]	415972.22
UTM zone	31
NPDID wellbore	1762



Wellbore history

General

Well 15/5 4 was drilled on a structure that straddles the border between the U.K. and the Norwegian sector of the North Sea. Hydrocarbons were proven in the structure by three earlier wells drilled in the UK sector (U.K. 16/13a-3, 16/13a-4, and 16/13a-5). Well 16/13a-4 penetrated a gas cap at the top of the structure and an oil column down to base reservoir. The other two wells penetrated an oil zone and a water leg. The objective of well 15/5-4 was to assess the extension of hydrocarbon bearing Sele Formation sand towards the east into PL048. The well position was chosen for possible use as a producer in the event of a positive appraisal. Prognosed total depth was 2300 m.

Operations and results

Appraisal well 15/5-4 was spudded by the semi submersible installation Vildkat Explorer on 6 June 1991 and drilled to TD at 2300 m in rocks of the Paleocene Heimdal Formation. No shallow gas was observed on the predicted sand/gas levels. Drilling proceeded without any significant problems. The well was drilled with spud mud down to 1027 m and with KCl/polymer mud from 1027 m to TD.

Thin sands of the Sele Formation were encountered at 2120 m and had good oil shows. The reservoir thickness was calculated to 7.5 m. The sandstones of the Heimdal Formation were penetrated below the oil/water contact and were totally water wet. Weak oil shows was described on sidewall cores from claystone at 1909 m in the Frigg Formation and sandstone at 2182 m in the Lista Formation.

A total of six cores were cut from 2106 m to 2147 m over the reservoir section. RFT fluid samples were attempted at 2125.1 m, 2125.3 m, 2125.8 m, and 2129.5 m. Sampling suffered from sand plugging and only the samples from run 1C (2129.5 m) contained traces of oil.

The well was permanently abandoned on 3 July 1991 as a well with oil shows.

Testing

One DST test was performed over the interval 2123.4 to 2135.9 m in the Sele Formation. Water was produced, but not to surface.

Cuttings at the Norwegian Offshore Directorate

Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
1040.00	2300.00

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	2106.0	2124.8	[m]
2	2124.0	2129.0	[m]
3	2129.0	2132.0	[m]
4	2132.0	2145.9	[m]

Total core sample length [m]	40.7
Cores available for sampling?	YES

Core photos

2106-2111m



2111-2116m



2116-2121m



2121-2125m



2125-2129m



2129-2134m



2134-2139m



2139-2143m



2143-2145m

Palynological slides at the Norwegian Offshore Directorate

Sample depth	Depth unit	Sample type	Laboratory
1190.0	[m]	DC	RRI
1200.0	[m]	DC	RRI
1220.0	[m]	DC	RRI
1230.0	[m]	DC	RRI
1250.0	[m]	DC	RRI
1260.0	[m]	DC	RRI
1280.0	[m]	DC	RRI
1290.0	[m]	DC	RRI
1310.0	[m]	DC	RRI
1320.0	[m]	DC	RRI
1340.0	[m]	DC	RRI



1350.0	[m]	DC	RRI
1370.0	[m]	DC	RRI
1380.0	[m]	DC	RRI
1501.0	[m]	SWC	NH
1530.0	[m]	SWC	NH
1561.0	[m]	SWC	NH
1580.0	[m]	DC	RRI
1593.0	[m]	SWC	NH
1610.0	[m]	DC	RRI
1630.0	[m]	SWC	NH
1697.0	[m]	SWC	NH
1718.0	[m]	SWC	NH
1738.0	[m]	SWC	NH
1754.0	[m]	SWC	NH
1760.0	[m]	DC	RRI
1778.0	[m]	SWC	NH
1800.0	[m]	SWC	NH
1824.0	[m]	SWC	NH
1850.0	[m]	DC	RRI
1856.0	[m]	SWC	NH
1874.0	[m]	SWC	NH
1909.0	[m]	SWC	NH
1945.0	[m]	DC	RRI
1954.0	[m]	SWC	NH
1975.0	[m]	DC	RRI
1983.0	[m]	SWC	NH
2000.0	[m]	SWC	NH
2020.0	[m]	DC	RRI
2032.0	[m]	SWC	NH
2058.0	[m]	SWC	NH
2071.0	[m]	SWC	NH
2085.0	[m]	SWC	NH
2098.0	[m]	SWC	NH
2115.0	[m]	C	RRI
2120.0	[m]	C	RRI
2124.0	[m]	C	RRI
2129.0	[m]	C	RRI
2134.0	[m]	C	RRI
2136.0	[m]	C	RRI
2139.0	[m]	C	RRI



2145.0 [m]	C	RRI
2157.0 [m]	DC	RRI
2165.0 [m]	DC	RRI
2172.0 [m]	SWC	NH
2182.0 [m]	SWC	NH
2190.0 [m]	DC	RRI
2194.0 [m]	SWC	NH
2205.0 [m]	DC	RRI
2210.0 [m]	DC	RRI
2220.0 [m]	DC	RRI
2225.0 [m]	DC	RRI
2235.0 [m]	DC	RRI
2240.0 [m]	DC	RRI
2250.0 [m]	DC	RRI
2255.0 [m]	DC	RRI
2265.0 [m]	DC	RRI
2270.0 [m]	DC	RRI
2280.0 [m]	DC	RRI
2285.0 [m]	DC	RRI
2295.0 [m]	DC	RRI
2300.0 [m]	DC	RRI

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
145	NORDLAND GP
782	UTSIRA FM
896	HORDALAND GP
1586	FRIGG FM
2072	ROGALAND GP
2072	BALDER FM
2120	SELE FM
2173	LISTA FM
2198	HEIMDAL FM

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





Document name	Document format	Document size [MB]
1762_02_WDSS_completion_log	pdf	0.15

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

Document name	Document format	Document size [MB]
1762_15_5_4_Completion_log	pdf	1.77
1762_15_5_4_Final_Well_report	pdf	2.96

Drill stem tests (DST)

Test number	From depth MD [m]	To depth MD [m]	Choke size [mm]
1.0	2124	2136	25.4

Test number	Final shut-in pressure [MPa]	Final flow pressure [MPa]	Bottom hole pressure [MPa]	Downhole temperature [°C]
1.0				68

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

Logs

Log type	Log top depth [m]	Log bottom depth [m]
CST GR	1501	2194
DIL SDL LDL NGL SP CAL AMS	1007	2254
DLL MSFL GR CAL AMS	2068	2226
FMS4 GR CAL AMS	1007	2229
MWD - GR RES DIR	145	2298
RFT HP GR	1832	2134
RFT HP GR	2125	2143
RFT HP GR	2125	2206
VSP	800	2235



**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	230.0	36	231.0	0.00	LOT
INTERM.	13 3/8	1012.0	17 1/2	1027.0	1.35	LOT
INTERM.	9 5/8	2248.0	12 1/4	2300.0	0.00	LOT

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
186	1.05			WATER BASED	
231	1.05			WATER BASED	
597	1.05			WATER BASED	
1027	1.20			WATER BASED	
1027	1.20			WATER BASED	
1370	1.10	13.0		WATER BASED	
1702	1.18	15.0		WATER BASED	
1911	1.23	19.0		WATER BASED	
2106	1.23	18.0		WATER BASED	
2115	1.25	19.0		WATER BASED	
2129	1.25	17.0		WATER BASED	
2135	1.25	19.0		WATER BASED	
2147	1.26	18.0		WATER BASED	
2294	1.25	20.0		WATER BASED	
2300	1.26	20.0		WATER BASED	

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]
1762_Formalion_pressure_(Formasjonstrykk)	pdf	0.21

