



General information

Wellbore name	6506/9-4 A
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	6506/9-2 S (Fogelberg)
Well name	6506/9-4
Seismic location	CE08M1FB. Inline 2687 Crossline 2602
Production licence	433
Drilling operator	Spirit Energy Norge AS
Drill permit	1694-L
Drilling facility	ISLAND INNOVATOR
Drilling days	78
Entered date	28.04.2018
Completed date	13.07.2018
Plugged and abandon date	14.07.2018
Release date	13.07.2020
Publication date	14.07.2020
Purpose - planned	APPRAISAL
Reentry	NO
Content	GAS
Discovery wellbore	NO
1st level with HC, age	JURASSIC
1st level with HC, formation	GARN FM
2nd level with HC, age	JURASSIC
2nd level with HC, formation	ILE FM
Kelly bushing elevation [m]	30.0
Water depth [m]	301.0
Total depth (MD) [m RKB]	4497.0
Final vertical depth (TVD) [m RKB]	4458.0
Maximum inclination [°]	11.2
Bottom hole temperature [°C]	159
Oldest penetrated age	JURASSIC
Oldest penetrated formation	TOFTE FM
Geodetic datum	ED50
NS degrees	65° 15' 38.11" N



EW degrees	6° 42' 35.62" E
NS UTM [m]	7239619.65
EW UTM [m]	393072.48
UTM zone	32
NPDID wellbore	8411

Wellbore history

General

Well 6506/9-4 A is a geological side-track to well 6506/9-4 S, drilled on The Fogelberg Discovery on a small fault block on the Halten Terrace, north-northwest of the Smørbukk Field and northeast of the Morvin Field. The side-track was drilled up-flank to the crestal part of the structure where future production wells would be located. The primary objective of the side-track was to perform a DST and collect representative fluid samples.

Operations and results

Appraisal well 6506/9-4 A was kicked off in 14" casing at 2201 m on 28 April 2018. It was drilled with the semi-submersible installation Island Innovator to TD at 4497 m (4458 m TVD) m in the Early Jurassic Tofte Formation. Low penetration rate was experienced in the Lange Formation shales in the 12 ¼" section. The well was drilled with RheGuard Prime oil-based mud from kick-off to TD.

The Garn Formation was encountered at 4289.5 m (4254 m TVD), 13.5 m shallower than prognosis and top Ile Formation was picked at 4350.5 m (4313.8 m TVD), 13 m shallower than the prognosis. Approximately 57 m TVD gross sandstone of moderate to high quality was encountered in the Garn Formation and 66 m TVD gross moderate quality sandstone in the Ile Formation. Both formations were gas bearing.

Shows in the form of cut fluorescence was observed in several Intra-Lange sandstones, but not significantly different from the fluorescence caused by the oil-based mud.

Two cores were cut in succession from 4288.9 to 4341 m in the Garn Formation. The core recovery was 80.04% and 98.38% for core 1 and 2, respectively. The core-log depth shifts were +1.8m and +1.1 m for core 1 and 2, respectively. No fluid sample was taken on wire line.

The well was permanently abandoned on 13 July 2018 as a gas appraisal well.

Testing

A drill stem test was conducted from the interval 4290.0 - 4325.0 m (4253.4-4287.4 m TVD) in the Garn Formation. Maximum production rate from the formation was 570 000 Sm³ of gas and 80 Sm³ of condensate per day through a 36/64 inches choke opening. The gas contains 6 ppm H₂S and 4-5% CO₂. The temperature recorded in the test was 153 °C.

Cuttings at the Norwegian Offshore Directorate



Cutting sample, top depth [m]	Cutting samples, bottom depth [m]
2220.00	4497.00

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	4288.9	4310.7	[m]
2	4316.2	4340.6	[m]

Total core sample length [m]	46.2
Cores available for sampling?	YES

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		0.00	0.00			YES
DST		4325.00	4191.60	CONDE NSATE	23.06.2018 - 17:53	YES
MDT		4325.00	4290.00	CONDE NSATE	23.06.2018 - 17:45	YES

Lithostratigraphy

Top depth [mMD RKB]	Lithostrat. unit
331	NORDLAND GP
331	NAUST FM
1465	KAI FM
1895	HORDALAND GP
1895	BRYGGE FM
2042	ROGALAND GP
2042	TARE FM
2124	TANG FM
2163	SHETLAND GP
2163	SPRINGAR FM



2425	NISE FM
2596	KVITNOS FM
3200	CROMER KNOLL GP
3200	LYSING FM
3228	LANGE FM
3924	NO FORMAL NAME
3974	LANGE FM
4035	NO FORMAL NAME
4053	LANGE FM
4133	LYR FM
4149	VIKING GP
4149	SPEKK FM
4153	MELKE FM
4290	FANGST GP
4290	GARN FM
4347	NOT FM
4351	ILE FM
4420	BÅT GP
4420	ROR FM
4471	TOFTE FM

Drill stem tests (DST)

Test number	From depth MD [m]	To depth MD [m]	Choke size [mm]
1.0	4290	4325	14.3

Test number	Final shut-in pressure [MPa]	Final flow pressure [MPa]	Bottom hole pressure [MPa]	Downhole temperature [°C]
1.0				153

Test number	Oil [Sm3/day]	Gas [Sm3/day]	Oil density [g/cm3]	Gas grav. rel.air	GOR [m3/m3]
1.0	80	570000			

Logs



Log type	Log top depth [m]	Log bottom depth [m]
APS LDS ADT HNGS CMR	3103	4499
IBC CBL PMIT	335	2188
LWD - GR RES PWD DI SON NEU DEN	2201	4497
PS LPD XLDP HY PC GR	4299	4399
PS XLDP HY PC GR	4292	4296
QAIO QGEO PPC MSIP GR	3103	4499

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	397.0	36	397.5	0.00	
SURF.COND.	20	1374.5	26	1381.0	1.60	LOT
PILOT HOLE		1381.0	9 7/8	1381.0	0.00	
		2201.0		0.0	1.93	FIT
INTERM.	14	2284.0	17 1/2	2200.0	0.00	
INTERM.	9 7/8	4249.0	12 1/4	4250.0	2.10	LOT
LINER	7	4496.0	8 1/2	4497.0	0.00	

Drilling mud

Depth MD [m]	Mud weight [g/cm3]	Visc. [mPa.s]	Yield point [Pa]	Mud type	Date measured
2211	1.64	42.0		Rheguard	
2525	1.69	53.0		Rheguard	
3469	1.78	64.0		Rheguard	
3577	1.74	56.0		Rheguard	
3754	1.75	63.0		Rheguard	
3936	1.76	63.0		Rheguard	
4150	1.78	66.0		Rheguard	
4250	1.79	64.0		Rheguard	
4288	1.74	56.0		Rheguard	
4314	1.75	54.0		Rheguard	
4497	1.75	58.0		Rheguard	
4497	1.77	69.0		Rheguard	
4497	1.14			Calcium Chloride Brine	



4497	1.75	58.0		Rheguard	
4497	1.50	34.0		Rheguard OBM	
4497	1.29	6.0		WBM	
4497	1.02			WBM	