



Generell informasjon

Brønnbane navn	16/3-8 S
Type	EXPLORATION
Formål	APPRAISAL
Status	P&A
Pressemelding	lenke til pressemelding
Faktakart i nytt vindu	lenke til kart
Hovedområde	NORTH SEA
Felt	JOHAN SVERDRUP
Funn	16/2-6 Johan Sverdrup
Brønn navn	16/3-8
Seismisk lokalisering	LN0902 : inline 2361 & crossline 7384
Utvinningstillatelse	501
Boreoperatør	Lundin Norway AS
Boretillatelse	1492-L
Boreinnretning	BREDFORD DOLPHIN
Boredager	75
Borestart	01.01.2014
Boreslutt	16.03.2014
Frigitt dato	16.03.2016
Publiseringsdato	12.04.2016
Opprinnelig formål	APPRAISAL
Gjenåpnet	NO
Innhold	OIL
Funnbrønnbane	NO
1. nivå med hydrokarboner, alder	LATE JURASSIC
1. nivå med hydrokarboner, formasjon.	INTRA DRAUPNE FM SS
2. nivå med hydrokarboner, alder	PERMIAN
2. nivå med hydrokarboner, formasjon	ZECHSTEIN GP
Avstand, boredekk - midlere havflate [m]	25.0
Vanndybde ved midlere havflate [m]	116.0
Totalt målt dybde (MD) [m RKB]	2109.0
Totalt vertikalt dybde (TVD) [m RKB]	2035.5
Maks inklinasjon [°]	20.5
Temperatur ved bunn av brønnbanen [°C]	88



Eldste penetrerte alder	PERMIAN
Eldste penetrerte formasjon	ROTLIEGEND GP
Geodetisk datum	ED50
NS grader	58° 48' 23.35" N
ØV grader	2° 40' 27.66" E
NS UTM [m]	6518700.07
ØV UTM [m]	481184.90
UTM sone	31
NPDID for brønnbanen	7302

Brønnhistorie

**General**

Well 16/3-8 S was drilled on the Avaldsnes High, in the Eastern part of the Johan Sverdrup Field in the North Sea. The well has a crestal position on this part of the Johan Sverdrup structure. The primary objective was to investigate the reservoir properties of the Zechstein Carbonates, including a designed DST for this purpose. A secondary objective was to determine the presence, thickness and quality of the Late Jurassic Intra Draupne Formation sandstones at this location.

Operations and results

Appraisal well 16/3-8 S was spudded with the semi-submersible installation Bredford Dolphin on 1 January 2014 and drilled to TD at 2109 m in the Permian Rotliegend Group. No significant problem was encountered in the operations. The well was drilled with spud mud down to 607 m and Aquadrill mud from 607 m to TD.

A six-meter thick interval of tight Draupne shale was encountered before entering the Volgian Intra Draupne Formation sandstone reservoir at 1964 m (1897 m TVD). The reservoir section consists of 13 meters of Draupne sandstone with excellent reservoir quality and 66 meters of Zechstein carbonates with variable reservoir quality. The carbonate sequence consists of limestone with limited reservoir quality in the upper part and dolomites with moderate to good reservoir quality in the lower part. The reservoir contained a 53 m TVD oil column. The oil/water contact is interpreted at 2021 m (1950 m TVD) based on the interception of the water gradient and the oil gradient from pressure measurements. Oil shows are described throughout the oil-bearing reservoir and down to a depth of 2035.6 m in the dolomitic limestones.

Four cores were cut in succession from 1965 m in the Draupne Formation, through the Intra Draupne Formation Sandstone and the Smith Bank Formation and down to 2035.6 m in the Zechstein Group carbonates. Recovery was good, between 97.2 and 100%. RCX fluid samples were taken at 1965.6 m (oil), 1977.7 m (oil), 2019.5 m (water and oil), and 2037.8 m (water). Single stage separation to ambient conditions gave a GOR of ca 41 Sm³/Sm³ and an oil density of ca 0.894 g/cm³ for both of the two oil samples.

The well was plugged back and prepared for sidetracking on 16 March 2014. It is classified as an oil appraisal well.

Testing

One production test was performed. The interval 1964.1 - 1979.2 m was perforated and tested. In the main flow, the test produced 803 Sm³ oil and 18900 Sm³ gas through a 52/64" choke. The GOR was 23.5 Sm³/Sm³, the oil gravity was 0.89 g/cm³, and the gas gravity was 0.79 (air = 1). The maximum DST temperature was 82.5 °C.

Borekaks i Sokkeldirektoratet

Borekaksprøve, topp dybde [m]	Borekaksprøve, bunn dybde [m]
600.00	2109.00

Borekaks tilgjengelig for prøvetaking?	YES
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Borekjerne i Sokkeldirektoratet



Kjerneprøve nummer	Kjerneprøve - topp dybde	Kjerneprøve - bunn dybde	Kjerneprøve dybde - enhet
1	1965.0	1981.3	[m]
2	1981.5	2008.3	[m]
3	2008.3	2021.6	[m]
4	2022.0	2035.6	[m]

Total kjerneprøve lengde [m]	69.9
Kjerner tilgjengelig for prøvetaking?	YES

Litostratigrafi

Topp Dyb [mMD RKB]	Litostrat. enhet
141	NORDLAND GP
833	UTSIRA FM
860	UNDIFFERENTIATED
946	HORDALAND GP
946	SKADE FM
1014	NO FORMAL NAME
1394	NO FORMAL NAME
1421	ROGALAND GP
1421	BALDER FM
1450	SELE FM
1466	LISTA FM
1550	VÅLE FM
1570	SHETLAND GP
1570	EKOFISK FM
1578	TOR FM
1641	HOD FM
1767	BLODØKS FM
1795	SVARTE FM
1834	CROMER KNOLL GP
1834	RØDBY FM
1921	SOLA FM
1935	ÅSGARD FM
1959	VIKING GP
1959	DRAUPNE FM
1965	INTRA DRAUPNE FM SS



1978	HEGRE GP
1978	SMITH BANK FM
1993	ZECHSTEIN GP
2058	KUPFERSCHIEFER FM
2060	ROTLIEGEND GP

Borestrengtester (DST)

Test nummer	Fra dybde MD [m]	Til dybde MD [m]	Reduksjonsven til størrelse [mm]
1.0	1964	1979	20.6

Test nummer	Endelig avstengningstrykk [MPa]	Endelig strømningstrykk [MPa]	Bunnhullstrykk [MPa]	Borehullstemperatur [°C]
1.0				

Test nummer	Olje produksjon [Sm3/dag]	Gass produksjon [Sm3/dag]	Oljetetthet [g/cm3]	Gasstyngde rel. luft	GOR [m3/m3]
1.0	779				

Logger

Type logg	Topp dyp for logg [m]	Bunn dyp for logg [m]
DSL ORIT STAR UXPL	1913	2103
FLEX MREX	1913	2107
GR CCL SBT VDL	1799	2009
GR CN ZDL ORIT XMAC RTEX MLL	1901	2107
GR GEW	2027	3031
GR MAXCOR	2027	2056
GR RCX SENTINEL	1965	2058
GR RCX SP RSPS	2019	2035
MWD LWD - ASS ZT OT2 CCN ST	602	1916
MWD LWD - OT ST	141	607
MWD LWD - ZTG OT	1913	1965
ZTG OT ARD2.6 CCN ST	1965	2106



Foringsrør og formasjonsstyrketester

Type utforing	Utforing diam. [tommer]	Utforing dybde [m]	Brønnbane diam. [tommer]	Brønnbane dyp [m]	LOT/FIT slam eqv. [g/cm3]	Type formasjonstest
CONDUCTOR	30	219.7	36	222.0	0.00	
SURF.COND.	20	595.0	26	602.0	1.75	FIT
PILOT HOLE		610.0	9 7/8	610.0	0.00	
PROD.	9 5/8	1912.6	12 1/4	1920.0	1.79	LOT
LINER	7	2107.6	8 1/2	2109.0	0.00	

Boreslam

Dybde MD [m]	Egenvekt, slam [g/cm3]	Viskositet, slam [mPa.s]	Flytegrense [Pa]	Type slam	Dato, måling
442	1.40	23.0		Brine	
602	1.35	20.0		Water Based	
1741	1.16	14.0		Water Based	
1760	1.15	15.0		Water Based	
1920	1.40	23.0		Water Based	
1920	1.41	25.0		Water Based	
1965	1.15	17.0		Water Based	
2008	1.17	18.0		Water Based	
2109	1.15	1.0		Brine	