



Generell informasjon

Brønnbane navn	16/2-11
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	16/2-11
Seismisk lokalisering	LN0902-inline4414 & crossline 3363
Utvinningstillatelse	501
Boreoperatør	Lundin Norway AS
Boretillatelse	1384-L
Boreinnretning	BREDFORD DOLPHIN
Boredager	56
Borestart	03.02.2012
Boreslutt	29.03.2012
Frigitt dato	29.03.2014
Publiseringsdato	29.03.2014
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	MIDDLE JURASSIC
2. nivå med hydrokarboner, formasjon	VESTLAND GP
Avstand, boredekk - midlere havflate [m]	25.0
Vanndybde ved midlere havflate [m]	113.0
Totalt målt dybde (MD) [m RKB]	2126.0
Totalt vertikalt dybde (TVD) [m RKB]	2125.0
Maks inklinasjon [°]	2.7
Temperatur ved bunn av brønnbanen [°C]	87



Eldste penetrerte alder	TRIASSIC
Eldste penetrerte formasjon	SKAGERRAK FM
Geodetisk datum	ED50
NS grader	58° 48' 13.06" N
ØV grader	2° 34' 19.92" E
NS UTM [m]	6518414.99
ØV UTM [m]	475280.98
UTM sone	31
NPDID for brønnbanen	6742

Brønnhistorie

**General**

Well 16/2-11 was drilled to appraise the western part of the Johan Sverdrup (formerly Avaldsnes) discovery on the Utsira High in the North Sea. The primary objective was to prove a 50 to 60 m oil column in Middle - Late Jurassic sandstones. The well would also serve as calibration for seismic interpretation and depth conversion and it would give information about any lateral variation in facies and thickness of the Johan Sverdrup reservoir.

Operations and results

Appraisal well 16/2-11 was spudded with the semisubmersible installation Bredford Dolphin to 2126 m in the Triassic Skagerrak Formation. A 9 7/8" pilot hole was drilled to 756 m to check for shallow gas. No indication of shallow gas was observed. No significant problem was encountered in the operations. The well was drilled with sea water and hi-vis pills down to 756 m and with Performadril Water Based Mud from 756 m to TD.

Top reservoir, Intra-Draupne Formation sandstone, was encountered at 1890 m and Middle Jurassic sandstones, Vestland Group, was encountered at 1910 m. The reservoir was encountered at the prognosed depth and 54 m oil column in an oil-down-to situation was proven. The well also confirmed good reservoir properties, in line with the earlier Johan Sverdrup wells where the Late Jurassic reservoir was also of excellent quality with a high net to gross ratio. A peak of high gamma ray between 1889.3 m and 1890 m, indicated a 0.7 m thick Draupne shale on top of the reservoir, but this could not be confirmed by cuttings samples and adjacent sidewall cores. Oil shows were restricted to the Middle-Late Jurassic reservoir section.

Five cores were cut from 1891.6 m, just below the possible Draupne shale, to 1957.78 m, ca 12 m into the Skagerrak Formation. Overall good recovery was obtained. MDT fluid samples were taken at 1895.61 m (oil), 1918.41 m (oil), 1937.02 m (oil), 1941.75 m (oil), 1951.38 m (water), and at 2059.09 m (water).

The well was permanently abandoned on 29 March 2012 as an oil appraisal well.

Testing

A production test (DST) was run over the interval 1934.5 m to 1943.3 m in the previously untested Middle Jurassic reservoir section to investigate its flow properties. The main flow gave 476 Sm³ oil and 14500 Sm³ gas per day through a restricted 40/64 choke, with good reservoir properties indicating a laterally continuous reservoir. The GOR was 30 Sm³/Sm³, the oil density was 0.89 g/cm³, and the gas gravity was 0.768 (air = 1). The flowing temperature, recorded at depth 1908.2 m, was 79.7 deg C.

Borekaks i Sokkeldirektoratet

Borekaksprøve, topp dybde [m]	Borekaksprøve, bunn dybde [m]
760.00	2126.00

Borekaks tilgjengelig for prøvetaking?	YES
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Borekjerne i Sokkeldirektoratet



Kjerneprøve nummer	Kjerneprøve - topp dybde	Kjerneprøve - bunn dybde	Kjerneprøve dybde - enhet
1	1891.6	1900.8	[m]
2	1900.7	1922.3	[m]
3	1922.3	1929.4	[m]
4	1929.8	1951.4	[m]
5	1952.8	1954.7	[m]

Total kjerneprøve lengde [m]	61.3
Kjerner tilgjengelig for prøvetaking?	YES

Oljeprøver i Sökkeldirektoratet

Test type	Flaske nummer	Topp dyp MD [m]	Bunn dyp MD [m]	Væske type	Test tidspunkt	Prøver tilgjengelig
DST		1943.30	1934.50	OIL	21.03.2012 - 16:40	YES
MDT		0.00	0.00	OIL	05.03.2012 - 00:00	NO

Litostratigrafi

Topp Dyb [mMD RKB]	Litostrat. enhet
138	NORDLAND GP
795	UTSIRA FM
983	HORDALAND GP
983	SKADE FM
1462	ROGALAND GP
1462	BALDER FM
1484	SELE FM
1497	LISTA FM
1570	VÅLE FM
1581	SHETLAND GP
1581	EKOFISK FM
1592	TOR FM
1668	HOD FM
1747	BLODØKS FM
1764	SVARTE FM



1783	CROMER KNOLL GP
1793	RØDBY FM
1868	SOLA FM
1876	ÅSGARD FM
1889	VIKING GP
1889	DRAUPNE FM
1890	INTRA DRAUPNE FM SS
1910	VESTLAND GP
1946	HEGRE GP
1946	SKAGERRAK FM

Borestrengtester (DST)

Test nummer	Fra dybde MD [m]	Til dybde MD [m]	Reduksjonsven til størrelse [mm]
1.0	1935	1943	16.0

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]	Gasstygde rel. luft	GOR [m3/m3]
1.0	430				

Logger

Type logg	Topp dyp for logg [m]	Bunn dyp for logg [m]
CMR GR	1648	2121
FMI MSIP	1648	2126
HRLA PEX ECS HNGS	1648	2107
MDT GR	1739	2061
MRX XPT GR	1665	2080
MSCT GR	1723	2090
MWD - PP ARC SON	139	751
MWD - TELE ARC SON ADN	743	1650
MWD - TELE ECO SON	1882	2121



MWD - TELE GVR ECO SON	1649	1886
VSP GR	136	2115

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	216.0	36	218.0	0.00	LOT
SURF.COND.	13 3/8	744.0	17 1/2	752.0	1.87	LOT
PILOT HOLE		756.0	9 7/8	756.0	0.00	LOT
INTERM.	9 5/8	2097.0	12 1/4	2126.0	1.78	LOT

Boreslam

Dybde MD [m]	Egenvekt, slam [g/cm3]	Viskositet, slam [mPa.s]	Flytegrense [Pa]	Type slam	Dato, måling
1065	1.35	29.0		Water Base	
1656	1.20	25.0		Water Base	
1800	1.20	31.0		Water Base	
2126	1.28	34.0		Water Base	

Trykkplott

Porertrykksdataene kommer fra logging i brønnen hvis ingen annen kilde er oppgitt. I noen brønner der trykk ikke er logget, er det brukt informasjon fra formasjonstester eller brønnspark. Trykkdataene er rapportert inn til Oljedirektoratet og videre prosessert og kvalitetssikret av IHS Markit.

Dokument navn	Dokument format	Dokument størrelse [KB]
6742 Formation pressure (Formasjonstrykk)	pdf	0.23

