Generell informasjon

Brønnbane navn	16/1-10
Type	EXPLORATION
Formål	APPRAISAL
Status	P&A
Pressemelding	lenke til pressemelding
Faktakart i nytt vindu	lenke til kart
Hovedområde	NORTH SEA
Felt	EDVARD GRIEG
Funn	16/1-8 Edvard Grieg
Brønn navn	16/1-10
Seismisk lokalisering	:LMMQ16 innline 36106 &c crossline LMMQ16 128346
Utvinningstillatelse	338
Boreoperatør	Lundin Norway AS
Boretillatelse	1191-L
Boreinnretning	BREDFORD DOLPHIN
Boredager	85
Borestart	13.11.2008
Boreslutt	05.02.2009
Frigitt dato	05.02.2011
Publiseringsdato	05.02.2011
Opprinnelig formål	APPRAISAL
Gjenåpnet	NO
Innhold	OIL
Funnbrønnbane	NO
1. nivå med hydrokarboner, alder	JURASSIC
1. nivå med hydrokarboner, formasjon.	NO GROUP DEFINED
Avstand, boredekk - midlere havflate [m]	25.0
Vanndybde ved midlere havflate [m]	110.0
Totalt målt dybde (MD) [m RKB]	2151.0
Totalt vertikalt dybde (TVD) [m RKB]	2151.0
Maks inklinasjon [°]	1.3
Temperatur ved bunn av brønnbanen [°C]	89
Eldste penetrerte alder	EARLY JURASSIC
Eldste penetrerte formasjon	NO GROUP DEFINED

Geodetisk datum	ED50
NS grader	58° 51' 14.61'' N
ØV grader	2° 16' 30.85'' E
NS UTM [m]	6524177.97
ØV UTM [m]	458183.01
UTM sone	31
NPDID for brønnbanen	5879

Brønnhistorie

General

Well 16/1-10 was drilled on the eastern margin of the South Viking Graben on the south-western part of the Utsira High in the North Sea. It was drilled to confirm the northern extent of the Luno oil discovery in Early Jurassic conglomerates made by well 16/1-8. The oil-water contact at 1965 m TVD RKB should be confirmed and a production test of the clean sand facies and conglomeratic facies should be conducted.

Operations and results

Appraisal well 16/1-10 was spudded with the semi-submersible installation 16/1-10 on 13 November 2008 and drilled to TD at 2151 m in conglomeratic sandstones of Early Jurassic age. As the site survey revealed a number of possible shallow gas zones the well started with a 9 7/8" pilot hole to check for shallow gas down to 400 m, TD of planned 26" section. No gas was seen in this interval. Due to a leak in the 20" casing the casing programme was significantly revised, with 13 3/8" casing set at 589 m, above a potential shallow gas zone at 634 m, and the 12 1/4" hole was drilled down into top Shetland Group. This slimmer-than-planned hole turned out to give easier drilling than in the previous well on the prospect (16/8-1). The amount of down time was however comparatively large, due mainly to wait-on-weather. Additional coring also added to a longer than planned time for this well. The well was drilled with seawater and hi-vis bentonite sweeps down to 411 m, with KCl/glycol enhanced mud from 411 m to 1860 m, and with Performadril water based mud with 5% glycol from 1860 m to TD.

The Utsira, Skade and Grid sandstone formations were penetrated by the well, all water bearing. The top of the Jurassic reservoir sequence was encountered at 1898 m (1872.9 m TVD MSL), 11.4 m TVD deeper than prognosed. The reservoir sequence was composed of oil bearing sandstones and conglomerates with an OWC at 1965 m. No gas cap was observed on the logs or could be inferred from the production testing. The first hydrocarbon shows in well 16/1-10 were observed in the core chips collected in the Shetland Group limestones that overlie the reservoir. Generally good hydrocarbon shows were observed in the reservoir from 1898 m down to 1911 m. From 1911 to 1928 m the hydrocarbon shows became more patchy due to widespread argillaceous infilling of the pore spaces within the sandstone matrix. More consistent shows were present in the interval from 1929 to 1940 m but below this depth only intermittent shows were observed.

A total of 7 cores were cut from 1868 to 1987.5 m. The first two cores were cut entirely within the Shetland Group. The third core penetrated top reservoir at 1898 m. The entire hydrocarbon bearing part of the reservoir interval was cored with the last core penetrating the oil-water contact. Four wire line logging runs were made including one MDT run for samples and pressures. Oil samples were taken at 1899.6 m and 1933.1 m and a water sample was taken at 2024.9 m. Fluid gradients were established for both water and oil zones, indicating an oil-water contact at 1965 m TVD, confirming the contact extrapolated in well 16/1-8.

The well was permanently abandoned on 5 February as an oil appraisal.

Testing

Two Jurassic intervals were production tested. DST 1A was performed in the interval 1919.92 to 1958.11 m in the conglomeratic sandstone facies.

DST 1B was performed in the interval 1897.00 to 1909.79 m in addition to 1919.92 to 1958.11 .The test rate was 338 Sm3 oil per day and 35500 Sm3 gas per day through a 12,7 mm choke.

Maximum temperature recorded in the tests was 82.1 deg C.

Borekaks i Sokkeldirektoratet

Borekaksprøve, topp dybde [m]	Borekaksprøve, bunn dybde [m]
420.00	2151.00

Borekaks tilgjengelig for prøvetaking?	YES

Borekjerner i Sokkeldirektoratet

Kjerneprøve nummer	Kjerneprøve - topp dybde	Kjerneprøve - bunn dybde	Kjerneprøve dybde - enhet
1	1868.0	1873.0	[m]
2	1873.0	1891.0	[m]
3	1891.0	1901.4	[m]
4	1901.5	1911.6	[m]
5	1914.6	1934.0	[m]
6	1934.0	1958.9	[m]
7	1960.5	1987.6	[m]

Total kjerneprøve lengde [m]	114.9
Kjerner tilgjengelig for prøvetaking?	YES

Oljeprøver i Sokkeldirektoratet

Test type	Flaske nummer	Topp dyp MD [m]	Bunn dyp MD [m]	Væske type	Test tidspunkt	Prøver tilgjengelig
DST		0.00	0.00			YES

Litostratigrafi

Topp Dyb [mMD RKB]	Litostrat. enhet
135	NORDLAND GP
756	UTSIRA FM
880	HORDALAND GP
954	SKADE FM
1494	GRID FM

1734	ROGALAND GP
1734	BALDER FM
1744	SELE FM
1772	LISTA FM
1848	VÅLE FM
1860	SHETLAND GP
1860	EKOFISK FM
1890	CROMER KNOLL GP
1898	NO GROUP DEFINED

Spleisede logger

Dokument navn	Dokument format	Dokument størrelse [KB]
5879	pdf	0.28

Geokjemisk informasjon

Dokument navn	Dokument format	Dokument størrelse [KB]
5879_01_16_1_10_gch_transfer_1	txt	0.00
5879_02_16_1_10_gch_results_1	txt	0.60

Borestrengtester (DST)

Test nummer	Fra dybde MD [m]	Til dybde MD [m]	Reduksjonsventil til størrelse [mm]
1.0	1920	1958	25.4
2.0	1897	1910	12.7

Test nummer	Endelig avstengningstrykk [MPa]	Endelig strømningstrykk [MPa]	Bunnhullstrykk [MPa]	Borehullstemperatur [°C]
1.0		16.200		80
2.0	6.000	17.000		82

Test nummer	Olje produksjon [Sm3/dag]	Gass produksjon [Sm3/dag]	Oljetetthet [g/cm3]	Gasstyngde rel. luft	GOR [m3/m3]
1.0	2				
2.0	338	35500			105

Logger

Type logg	Topp dyp for logg [m]	Bunn dyp for logg [m]
CMR ADT ECS HNGS GR ACTS ECRD	1852	2150
FMI PPC MSIP PPC GR ACTS ECRD	1852	2150
HRLA PEX GR ACTS ECRD	1852	2143
MRPO MRPQQ MRPS LFA MRCS GR	1898	2033
MWD LWD - GR REMP	123	1862
MWD LWD - GR REMP DEN NEU AC	1850	2145
PGGT MH 22	1726	1847
USIT CBL GR ACTS CCL ECRD	1680	2100

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	211.0	36	211.0	0.00	LOT
SURF.COND.	20	404.0	26	411.0	1.49	LOT
INTERM.	13 3/8	589.0	17 1/2	595.0	2.05	LOT
INTERM.	9 5/8	1854.0	12 1/4	1860.0	1.38	LOT
LINER	7	2149.0	8 1/2	2151.0	0.00	LOT

Boreslam

Dybde MD [m]	Egenvekt, slam [g/cm3]	Viskositet, slam [mPa.s]	Flytegrense [Pa]	Type slam	Dato, måling
174	1.07			Spud Mud	
212	1.07			Spud Mud	
285	1.17	14.0		Performadril	
411	1.25			Spud Mud	
595	1.17	18.0		KCl/GEM	
1660	1.35	24.0		Performadril	

1872	1.20	32.0		PERFORMADRIL	
1915	1.20	27.0		PERFORMADRIL	
1933	1.20	28.0		PERFORMADRIL	
1983	1.21	31.0		PERFORMADRIL	
2151	1.20			NaCl Brine	
2151	1.21	50.0		PERFORMADRIL	

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]
5879_Formation_pressure_(Formasjonstrykk)	PDF	0.21