Generell informasjon

Brønnbane navn	2/11-4
Type	EXPLORATION
Formål	APPRAISAL
Status	P&A
Faktakart i nytt vindu	lenke til kart
Hovedområde	NORTH SEA
Felt	VALHALL
Funn	2/8-6 Valhall
Brønn navn	2/11-4
Seismisk lokalisering	
Utvinningstillatelse	033
Boreoperatør	Amoco Norway Oil Company
Boretillatelse	188-L
Boreinnretning	DYVI BETA
Boredager	60
Borestart	20.03.1978
Boreslutt	18.05.1978
Frigitt dato	18.05.1980
Publiseringsdato	22.03.2013
Opprinnelig formål	APPRAISAL
Gjenåpnet	NO
Innhold	OIL
Funnbrønnbane	NO
1. nivå med hydrokarboner, alder	LATE CRETACEOUS
1. nivå med hydrokarboner, formasjon.	TOR FM
Avstand, boredekk - midlere havflate [m]	34.0
Vanndybde ved midlere havflate [m]	69.0
Totalt målt dybde (MD) [m RKB]	2858.0
Temperatur ved bunn av brønnbanen [°C]	99
Eldste penetrerte alder	EARLY CRETACEOUS
Eldste penetrerte formasjon	RØDBY FM
Geodetisk datum	ED50
NS grader	56° 14' 50.37'' N
ØV grader	3° 23' 18.92'' E
NS UTM [m]	6233812.77
ØV UTM [m]	524081.55

UTM sone	31
NPDID for brønnbanen	96

Brønnhistorie

General

Well 2/11-4 was drilled on the Lindesnes Ridge in the Southern North Sea. The objective was to delineate the Valhall discovery made by well 2/8-6 in 1975. The target was the Late Cretaceous chalks in the Tor and Hod formations.

Operations and results

Appraisal well 2/11-4 was spudded with the jack-up installation Dyvi Beta on 20 March 1978 and drilled to TD at 2858 m in the Late Cretaceous Rødby Formation. No significant problems were encountered in the operations. The well was drilled with sea water and hi-vis pills down to 390 m, with sea water/gypsum mud from 390 m to 2559 m, and with Magcobar oil based "Oilfaze" mud from 2559 m to TD.

The well penetrated a normal Quaternary and Tertiary sequence. Good oil shows with free oil present in the mud was observed in siltstone and claystone from 1400 to 1800 m in the upper part of the Hordaland Group. Occasional spotty oil shows in claystones and limestones (direct and cut fluorescence) were recorded from 1800 to 2250 m. The Cretaceous Chalk was penetrated at a depth of 2587 meters some 23 meters higher than prognosed. The objective Tor Formation reservoir proved to be hydrocarbon bearing with a gross pay section of 18 meters and oil saturations up to 62%. Hydrocarbon saturation in the Hod Formation was insignificant due to low elevation on the structure. Fair to excellent oil shows were seen in the reservoir section down to 2607 m. Below 2607 m scattered poor shows were seen down to 2619 m.

Coring commenced at 2582.5 meters, 4.5 meters above top Chalk, to ensure recovery from the uppermost part of the pay section. A total of 5 conventional cores were attempted over the interval 2582.5 m to 2619 m. Cores no 1 and 2 had 53 and 10% recoveries, respectively, while core no 3 was a total misrun. Cores 4 and 5 had 100% recoveries. No wire line fluid samples were taken.

The well was permanently abandoned on 18 May 1975 as an oil appraisal well.

Testing

Two drill stem tests were performed.

Test 1 tested the interval 2698 - 2707 m in the 100% water saturated Lower Hod Formation. The well was opened to flow on a 16/64" choke. The Well Head Flowing Pressure (WHFP) dropped from 2400 psig to 50 psig in two minutes and the WHFP stayed in that range for the total flow period of 14 hours and 15 minutes. The average flow rate was 22 m3 water/day measured into the tank. Reservoir temperature at the middle of the perforations (2702.5 m) was reported to be 96 deg C.

Test 2 tested the interval 2588 - 2595 in the oil zone of the Upper Tor Formation. The interval was tested first without stimulation, then with acid stimulation, and finally also with fracturing, with increasing flow rate in that order. The average flow rate at 32/64" choke (maximum flow) after fracturing was 212 Sm3 oil and 32000 Sm3 gas /day, giving a GOR of 150 Sm3/Sm3. The oil gravity in this flow was 28.5 deg API and the gas gravity was 0.730 (air =1).

Borekaks i Sokkeldirektoratet

Borekaksprøve, topp dybde [m]	Borekaksprøve, bunn dybde [m]
160.00	2850.00

Borekaks tilgjengelig for prøvetaking?	YES

Borekjerner i Sokkeldirektoratet

Kjerneprøve nummer	Kjerneprøve - topp dybde	Kjerneprøve - bunn dybde	Kjerneprøve dybde - enhet
1	2580.0	2616.3	[m]

Total kjerneprøve lengde [m]	36.3
Kjerner tilgjengelig for prøvetaking?	YES

Litostratigrafi

Topp Dyb [mMD RKB]	Litostrat. enhet
103	NORDLAND GP
1407	HORDALAND GP
2543	ROGALAND GP
2543	BALDER FM
2550	SELE FM
2565	LISTA FM
2587	SHETLAND GP
2587	TOR FM
2604	HOD FM
2811	BLODØKS FM
2815	HIDRA FM
2840	CROMER KNOLL GP
2840	RØDBY FM

Dokumenter - eldre Sokkeldirektoratets WDSS rapporter og andre relaterte dokumenter

Dokument navn	Dokument format	Dokument størrelse [KB]
96_01_WDSS_General_Information	pdf	0.21
96_03_WDSS_lithlog	pdf	0.05

Dokumenter - rapportert av utvinningstillatelsen (frigitt ihht til regelverk)

Dokument navn	Dokument format	Dokument størrelse [KB]
96_2_11_4_Completionlog	pdf	1.95
96_2_11_4_Final_well_report	pdf	33.35

Borestrengtester (DST)

Test nummer	Fra dybde MD [m]	Til dybde MD [m]	Reduksjonsventil til størrelse [mm]
1.0	2698	2707	99.0
2.0	2588	2595	99.0

Test nummer	Endelig avstengningstrykk [MPa]	Endelig strømningstrykk [MPa]	Bunnhullstrykk [MPa]	Borehullstemperatur [°C]
1.0				
2.0				

Test nummer	Olje produksjon [Sm3/dag]	Gass produksjon [Sm3/dag]	Oljetetthet [g/cm3]	Gasstyngde rel. luft	GOR [m3/m3]
1.0					
2.0	213	32000			

Logger

Type logg	Topp dyp for logg [m]	Bunn dyp for logg [m]
CBL VDL	2410	2728
CBL VDL GR TT	47	2556
CBL VDL GR TT	60	1006
CBL VDL TT	40	2554
CONT-DIP	1280	2557
FDC CNL GR CAL	2556	2857
GR CCL	2327	2730
ISF SON GR	2556	2855
ISF SON SP GR	164	396
ISF SON SP GR	388	1278
ISF SON SP GR	1278	2559
TEMP	2250	2590

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	36	165.0	38	165.0	0.00	LOT
SURF.COND.	20	289.0	26	396.0	1.02	LOT
INTERM.	13 3/8	1279.0	17 1/2	1280.0	1.20	LOT
INTERM.	9 5/8	2556.0	12 1/2	2448.0	1.68	LOT
LINER	7	2750.0	8 1/2	2854.0	0.00	LOT

Boreslam

Dybde MD [m]	Egenvekt, slam [g/cm3]	Viskositet, slam [mPa.s]	Flytegrense [Pa]	Type slam	Dato, måling
396	1.52			seawater	
1281	1.14			seawater	
1409	1.20			seawater	
2556	1.76			water based	
2753	1.77			oil based m	