Generell informasjon

Brønnbane navn	24/9-3
Type	EXPLORATION
Formål	WILDCAT
Status	P&A
Faktakart i nytt vindu	lenke til kart
Hovedområde	NORTH SEA
Funn	24/9-3
Brønn navn	24/9-3
Seismisk lokalisering	C9/19 - 529 SP.345
Utvinningstillatelse	039
Boreoperatør	Conoco Norway Inc.
Boretillatelse	275-L
Boreinnretning	SEDCO 704
Boredager	78
Borestart	28.01.1981
Boreslutt	15.04.1981
Frigitt dato	15.04.1983
Publiseringsdato	29.06.2004
Opprinnelig formål	WILDCAT
Gjenåpnet	NO
Innhold	OIL
Funnbrønnbane	YES
1. nivå med hydrokarboner, alder	EOCENE
1. nivå med hydrokarboner, formasjon.	FRIGG FM
Avstand, boredekk - midlere havflate [m]	26.0
Vanndybde ved midlere havflate [m]	120.0
Totalt målt dybde (MD) [m RKB]	3051.0
Totalt vertikalt dybde (TVD) [m RKB]	3051.0
Temperatur ved bunn av brønnbanen [°C]	75
Eldste penetrerte alder	LATE CRETACEOUS
Eldste penetrerte formasjon	JORSALFARE FM
Geodetisk datum	ED50
NS grader	59° 22' 25.38'' N
ØV grader	1° 46' 27.28'' E
NS UTM [m]	6582460.55

ØV UTM [m]	430341.20
UTM sone	31
NPDID for brønnbanen	346

Brønnhistorie

General

Exploration well 24/9-3 was drilled by Conoco for the Conoco/Statoil/Norsk Hydro/Hudbay PL 039 partnership. The well lies in the west-central part of block 24/9, close to the Norway/UK median line. The location was chosen to test an apparent sand build-up, observable on seismic lines, in the Lower Tertiary part of the section. The sand build-up was thought to correspond to the Lower Eocene Frigg Sand Formation, which forms the reservoir in the Frigg Field.

Operations and results

Well 24/9-3 was spudded with the semi-submersible installation SEDCO 704 on 28 January 1981 and drilled to TD at 3051 m in the Late Cretaceous Jorsalfare Formation. The duration of the well was 81 days, 20 of which were spent testing. A 36" hole was drilled to 207.6 m / 681 ft and 30" casing set to same depth. A 17 1/2" pilot hole was drilled to 518.2 m, logged, and then opened to 26". 20" x-56 casing was set at 503.2 m. A 17 1/2" hole was drilled to 1600.2 m, logged, and 13 3/8" N-80 casing was set at 1587.1 m. A 12 1/4" hole was drilled and cored to 2049.8 m, logged, and 9 5/8" N-80 casing was set then drilled to TD and logged. The well was drilled with spud mud to 518 m, with Dextrid/gel from 518 m to 853 m, with gel/lime from 853 m to 1067 m, with seawater/gel/Dextrid from 1067 m to 1600 m, and with seawater/lime/Dextrid mud from 1600 m to TD.

The Lower Eocene sands (Frigg Formation) were encountered 141 m high to prognosis at 1739 m. This shows that the sands correspond to a higher and less distinct build-up on the seismic. The build-up originally mapped corresponded to the Paleocene Tuff level and contained shales and water-wet Paleocene Sands. A gross interval of 92 m of Early Eocene Sands was penetrated. The uppermost 70 m, from 1739 m, were hydrocarbon bearing down to an OWC at 1809 m, while the lowermost 22 m (1809-1831m) were water bearing. Patchy oil shows were observed down to 1870 m, no shows were recorded below this depth. Core analysis carried out by Geco indicated residual oil saturations of 13.4 % - 32.4 % and that the sands, where present, were of excellent reservoir quality with porosities of up to 39% and permeabilities in the 2-4 Darcy range.

A single RFT result and the results of DST3 in the upper part of the Frigg Formation reservoir (1739.5 m û1747 m) combine to indicate the possibility that a gas zone existed in the interval 1739 m (Top Sand) - 1765m. There is, however, no indication of gas on the logs and the poor results from DST3 suggested that the zone tested was essentially tight.

Bubble point measurements carried out at well site and subsequently confirmed in the laboratory by Flopetrol showed that the crude in the proven oil zone is under saturated. It therefore follows that the gas zone, if present, represents a separate accumulation and is not in pressure contact with the oil zone.

Five cores were cut in the interval 1777.9 m to 1797.7 m in the Early Eocene sands. The core depths were generally ca 5 m deep to logger's depth. Geochemical samples were taken at 30 m intervals from 13 3/8" casing to TD.

The well was permanently abandoned as an oil discovery on 15 April 1981.

Testing

After logging at TD the well was plugged back to 1995.5 m and three zones were tested using prepacked screens and a coiled tubing nitrogen unit for artificial lift. Three drill-stem tests were carried out on the hydrocarbon interval. Tests 1 (1797 m to 1805 m) and 2 (1765.4 m to 1773 m) in the lower part of the reservoir produced 21.5 - 23¦ API oil at rates 39 Sm3 oil/day and 86 Sm3 oil/day, respectively. Test 3 in the uppermost part of the reservoir gave only a small trickle of gas.

Borekaks i Sokkeldirektoratet

Borekaksprøve, topp dybde [m]	Borekaksprøve, bunn dybde [m]
210.00	2959.00

Borekaks tilgjengelig for prøvetaking?	NO

Borekjerner i Sokkeldirektoratet

Kjerneprøve nummer	Kjerneprøve - topp dybde	Kjerneprøve - bunn dybde	Kjerneprøve dybde - enhet
1	1777.9	1780.8	[m]
2	1783.4	1787.0	[m]
3	1788.0	1788.6	[m]
4	1788.9	1794.6	[m]
5	1794.6	1797.2	[m]

Total kjerneprøve lengde [m]	15.5
Kjerner tilgjengelig for prøvetaking?	YES

Kjernebilder


1777-1780m


1780-1780m


1783-1785m


1786-1787m


1787-1788m


1788-1794m


1788-1794m


1788-1794m


1794-1797m

Palynologiske preparater i Sokkeldirektoratet

Prøve dybde	Dybde enhet	Prøve type	Laboratorie
1590.0	[m]	DC	PSER
1611.0	[m]	SWC	PSER
1625.0	[m]	SWC	PSER
1633.0	[m]	DC	PSER
1655.5	[m]	SWC	PSER
1663.0	[m]	DC	PSER
1686.0	[m]	SWC	PSER
1693.0	[m]	DC	PSER
1719.0	[m]	SWC	PSER
1723.0	[m]	DC	PSER
1739.0	[m]	SWC	PSER
1750.0	[m]	DC	PSER
1766.5	[m]	SWC	PSER
1778.0	[m]	SWC	PSER
1779.7	[m]	C	PSER
1783.0	[m]	DC	PSER
1784.3	[m]	C	PSER
1797.0	[m]	C	PSER
1810.0	[m]	SWC	PSER
1844.0	[m]	SWC	PSER
1855.0	[m]	DC	PSER
1867.5	[m]	SWC	PSER
1873.0	[m]	DC	PSER
1894.0	[m]	SWC	PSER
1903.0	[m]	DC	PSER
1921.0	[m]	SWC	PSER
1933.0	[m]	DC	PSER
1948.0	[m]	DC	PSER
1963.0	[m]	DC	PSER
1978.0	[m]	DC	PSER
1993.0	[m]	DC	PSER
1995.0	[m]	SWC	PSER
2008.0	[m]	DC	PSER
2018.0	[m]	SWC	PSER
2023.0	[m]	DC	PSER
2038.0	[m]	DC	PSER
2053.0	[m]	DC	PSER
2068.0	[m]	SWC	PSER
2077.0	[m]	DC	PSER

2098.0	[m]	DC	PSER
2113.0	[m]	DC	PSER
2118.0	[m]	DC	PSER
2128.0	[m]	DC	PSER
2144.0	[m]	SWC	PSER
2158.0	[m]	DC	PSER
2176.0	[m]	DC	PSER
2188.0	[m]	DC	PSER
2203.0	[m]	DC	PSER
2233.0	[m]	DC	PSER
2248.0	[m]	DC	PSER
2263.0	[m]	DC	PSER
2278.0	[m]	DC	PSER
2293.0	[m]	DC	PSER
2308.0	[m]	DC	PSER
2325.0	[m]	SWC	PSER
2329.0	[m]	DC	PSER
2338.0	[m]	DC	PSER
2353.0	[m]	DC	PSER
2368.0	[m]	DC	PSER
2386.0	[m]	DC	PSER
2398.0	[m]	DC	PSER
2413.0	[m]	DC	PSER
2436.0	[m]	SWC	PSER
2443.0	[m]	DC	PSER
2458.0	[m]	DC	PSER
2473.0	[m]	DC	PSER
2491.0	[m]	DC	PSER
2503.0	[m]	DC	PSER
2518.0	[m]	DC	PSER
2533.0	[m]	DC	PSER
2544.0	[m]	DC	PSER
2563.0	[m]	DC	PSER
2578.0	[m]	DC	PSER
2595.0	[m]	SWC	PSER
2608.0	[m]	DC	PSER
2627.0	[m]	SWC	PSER
2638.0	[m]	DC	PSER
2653.0	[m]	DC	PSER
2668.0	[m]	DC	PSER

2683.0	[m]	DC	PSER
2698.0	[m]	DC	PSER
2716.0	[m]	DC	PSER
2737.0	[m]	DC	PSER
2749.0	[m]	SWC	PSER
2761.0	[m]	DC	PSER
2773.0	[m]	DC	PSER
2788.0	[m]	DC	PSER
2803.0	[m]	DC	PSER
2825.0	[m]	SWC	PSER
2830.0	[m]	DC	PSER

Oljeprøver i Sokkeldirektoratet

Test type	Flaske nummer	Topp dyp MD [m]	Bunn dyp MD [m]	Væske type	Test tidspunkt	Prøver tilgjengelig
DST	1	1796.00	1805.00	OIL	21.03.1981 - 00:00	YES
DST		1764.40	1782.20		01.04.1981 - 00:00	YES

Litostratigrafi

Topp Dyb [mMD RKB]	Litostrat. enhet
145	NORDLAND GP
360	UTSIRA FM
640	HORDALAND GP
640	SKADE FM
696	NO FORMAL NAME
1201	GRID FM
1400	NO FORMAL NAME
1739	FRIGG FM
1831	NO FORMAL NAME
1918	ROGALAND GP
1918	BALDER FM
1981	HERMOD FM
2060	SELE FM
2215	HEIMDAL FM
2567	LISTA FM

2757	VÅLE FM
2836	SHETLAND GP
2836	JORSALFARE FM

Spleisede logger

Dokument navn	Dokument format	Dokument størrelse [KB]
346	pdf	0.42

Geokjemisk informasjon

Dokument navn	Dokument format	Dokument størrelse [KB]
346_1_PETROLEUM_GEOCHEMISTRY_REPORT	pdf	0.56

Dokumenter - eldre Sokkeldirektoratets WDSS rapporter og andre relaterte dokumenter

Dokument navn	Dokument format	Dokument størrelse [KB]
346_01_WDSS_General_Information	pdf	0.10
346_02_WDSS_completion_log	pdf	0.25

Dokumenter - rapportert av utvinningstillatelsen (frigitt ihht til regelverk)

Dokument navn	Dokument format	Dokument størrelse [KB]
346_24_9_3_COMPLETION_REPORT_AND_LOG	pdf	54.09

Borestrengtester (DST)

Test nummer	Fra dybde MD [m]	Til dybde MD [m]	Reduksjonsven til størrelse [mm]
1.0	1805	1796	0.0
2.0	1782	1775	50.8
3.0	1747	1739	0.0

Test nummer	Endelig avstengningstrykk [MPa]	Endelig strømningstrykk [MPa]	Bunnhullstrykk [MPa]	Borehullstemperatur [°C]
1.0				
2.0				
3.0				

Test nummer	Olje produksjon [Sm3/dag]	Gass produksjon [Sm3/dag]	Oljetetthet [g/cm3]	Gasstyngde rel. luft	GOR [m3/m3]
1.0	39	1000	0.916	0.650	26
2.0	86	2400	0.925	0.630	28
3.0		1000		0.562	

Logger

Type logg	Topp dyp for logg [m]	Bunn dyp for logg [m]
CBL VDL CNL CCL GR	970	2036
CST	1611	1995
CST	2048	3020
DDBHC GR	1719	1925
DLL MSFL GR SP	1584	2033
FDC CNL GR CAL	1583	3042
HDT CAL	1584	3035
ISF DDBHC GR SP	514	2037
ISF DDBHC GR SP	1916	3041
RFT	1754	1802
VSP	348	3030

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	207.6	36	207.6	0.00	LOT
SURF.COND.	20	503.2	26	518.2	1.38	LOT
INTERM.	13 3/8	1587.1	17 1/2	1600.2	1.64	LOT
INTERM.	9 5/8	3051.0	12 1/4	3051.0	0.00	LOT

Boreslam

Dybde MD [m]	Egenvekt, slam [g/cm3]	Viskositet, slam [mPa.s]	Flytegrense [Pa]	Type slam	Dato, måling
450	1.14	200.0		spud mud	
860	1.04	50.0		water based	
1290	1.11	64.0		water based	
1490	1.11	87.0		water based	
1770	1.23	48.0		water based	
1910	1.32	55.0		water based	
2240	1.31	50.0		water based	
2550	1.25	55.0		water based	
2720	1.25	62.0		water based	
2930	1.20	57.0		water based	

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]
346_Formation_pressure_(Formasjonstrykk)	pdf	0.22