



Generell informasjon

Brønnbane navn	6407/9-4
Type	EXPLORATION
Formål	APPRAISAL
Status	P&A
Faktakart i nytt vindu	lenke til kart
Hovedområde	NORWEGIAN SEA
Felt	DRAUGEN
Funn	6407/9-1 Draugen
Brønn navn	6407/9-4
Seismisk lokalisering	84 - 117 A SP. 630
Utvinningstillatelse	093
Boreoperatør	A/S Norske Shell
Boretillatelse	472-L
Boreinnretning	WEST VENTURE OLD
Boredager	69
Borestart	04.07.1985
Boreslutt	10.09.1985
Frigitt dato	10.09.1987
Publiseringsdato	09.03.2009
Opprinnelig formål	APPRAISAL
Gjenåpnet	NO
Innhold	OIL
Funnbrønnbane	NO
1. nivå med hydrokarboner, alder	LATE JURASSIC
1. nivå med hydrokarboner, formasjon.	ROGN FM
2. nivå med hydrokarboner, alder	MIDDLE JURASSIC
2. nivå med hydrokarboner, formasjon	GARN FM
Avstand, boredekk - midlere havflate [m]	32.0
Vanndybde ved midlere havflate [m]	244.0
Totalt målt dybde (MD) [m RKB]	1820.0
Totalt vertikalt dybde (TVD) [m RKB]	1820.0
Temperatur ved bunn av brønnbanen [°C]	47
Eldste penetrerte alder	EARLY JURASSIC
Eldste penetrerte formasjon	TILJE FM



Geodetisk datum	ED50
NS grader	64° 22' 14" N
ØV grader	7° 43' 21.84" E
NS UTM [m]	7139103.84
ØV UTM [m]	438354.84
UTM sone	32
NPDID for brønnbanen	480

Brønnhistorie

General

Appraisal well 6407/9-4 is the fourth well on the Draugen Field. The main objective was the Late Jurassic Rogn Formation. Wells 6407/9-1, 6407/9-2 and 6407/9-3 had previously encountered under-saturated 40 deg API oil in sandstones of the Late Jurassic Rogn Formation. Net oil sand thicknesses in the three previous wells were 39, 12 and 34 m, respectively. Precise definition of the OWC in well 6407/9-1 was precluded by poor quality lithology at the base of sequence. A clearly defined oil-water contact at 1638.5 m MSL was however encountered in well 6407/9-2. The purpose of this fourth well was to evaluate the reservoir quality and sand development on the north-west flank of the accumulation, and to evaluate the oil deliverability and water injection potential of the reservoir sands.

Operations and results

Well 6407/9-4 was spudded with the semi-submersible installation West Venture on 4 July 1985 and drilled to TD at 1820 m in the Early Jurassic Tilje Formation. No significant problems were encountered while drilling the well. The well was drilled with seawater and bentonite down to 820 m, with KCl/polymer mud from 820 m to 1635 m, and with chalk mud from 1635 m to TD.

Light oil with low gas content was discovered in the Garn Formation, as the Rogn Formation proved to be only 2 m thick. The oil/water contact was found at 1672 m (1639 m MSL), the same contact that had been established in previous wells on the Draugen Field. This indicated communication in the Rogn and Garn Formations between the wells drilled so far on Draugen. No oil shows were recorded above the reservoir. Below OWC oil shows continued down to 1681 m, otherwise no further oil shows were observed.

Five cores were cut from 1666 m to 1711.5 m in the Fangst Group. An RFT segregated fluid sample was taken at 1664.5 m in the upper Garn Formation.

The well was permanently abandoned on 10 September 1985 as an oil appraisal well.

Testing

To Drill Stem Tests were performed. One injection test at 1708 - 1713 m in the water zone, and one production test at 1662 -1667 m in the oil zone. Maximum injection rate in the water test was 2080 m³/day. The oil test produced at maximum 998 Sm³ oil /day on a 64/64" choke. The GOR was ca 35 Sm³/Sm³, the oil density was 0.82, and the gas gravity was 0.82 (air = 1). Temperature measurements in the test gave a reservoir formation temperature of 71.1 deg C (160 deg F).



Borekaks i Sokkeldirektoratet

Borekaksprøve, topp dybde [m]	Borekaksprøve, bunn dybde [m]
390.00	1820.00

Borekaks tilgjengelig for prøvetaking?	YES
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Borekjerne i Sokkeldirektoratet

Kjerneprøve nummer	Kjerneprøve - topp dybde	Kjerneprøve - bunn dybde	Kjerneprøve dybde - enhet
1	1666.0	1671.1	[m]
2	1673.0	1674.7	[m]
3	1676.3	1684.0	[m]
4	1685.7	1695.0	[m]
5	1695.5	1711.0	[m]

Total kjerneprøve lengde [m]	39.4
Kjerner tilgjengelig for prøvetaking?	YES

Kjernebilder



1666-1671m



1671-1671m



1673-1674m



1676-1681m



1681-1684m



1685-1690m



1690-1695m



1695-1700m



1700-1705m



1705-1710m



1710-1711m

Oljeprøver i Sokkeldirektoratet

Test type	Flaske nummer	Topp dyp MD [m]	Bunn dyp MD [m]	Væske type	Test tidspunkt	Prøver tilgjengelig
DST	TEST2A	1662.00	1667.00		16.08.1985 - 23:30	YES

Litostratigrafi

Topp Dyb [mMD RKB]	Litostrat. enhet
277	NORDLAND GP
277	NAUST FM
887	HORDALAND GP
887	BRYGGE FM
1402	ROGALAND GP
1402	TARE FM
1443	TANG FM
1572	SHETLAND GP
1610	CROMER KNOLL GP
1637	VIKING GP
1637	SPEKK FM
1658	ROGN FM
1660	FANGST GP
1660	GARN FM
1702	NOT FM
1748	ILE FM
1767	BÅT GP
1767	ROR FM
1794	TILJE FM



Spleisede logger

Dokument navn	Dokument format	Dokument størrelse [KB]
480	pdf	0.36

Geokjemisk informasjon

Dokument navn	Dokument format	Dokument størrelse [KB]
480_1	pdf	0.14
480_2	pdf	1.19
480_3	pdf	0.37

Dokumenter - eldre Sokkeldirektoratets WDSS rapporter og andre relaterte dokumenter

Dokument navn	Dokument format	Dokument størrelse [KB]
480_01_WDSS_General_Information	pdf	0.30
480_02_WDSS_completion_log	pdf	0.14

Dokumenter - rapportert av utvinningstillatelsen (frigitt ihht til regelverk)

Dokument navn	Dokument format	Dokument størrelse [KB]
480_01_6407_9_4_Completion_Report	pdf	17.79
480_02_6407_9_4_Completion_log	pdf	1.01

Borestrengtester (DST)

Test nummer	Fra dybde MD [m]	Til dybde MD [m]	Reduksjonsven til størrelse [mm]
1.0	1708	1713	0.0
2.0	1662	1668	25.4





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	962		0.820	0.820	36

Logger

Type logg	Topp dyp for logg [m]	Bunn dyp for logg [m]
CBL	1590	1710
CBL VDL	700	1620
CST GR	1258	1753
ISF LSS GR	365	816
ISF LSS GR	805	1626
ISF LSS GR	1622	1816
LDL CNL GR	365	818
LDL CNL GR	805	1628
LDL CNL NGS	1622	1817
MSFL DLL GR	1622	1813
RFT	1664	1664
SHDT	1622	1815
SWC	1666	1710
VSP	365	1818

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	365.5	36	375.0	0.00	LOT
SURF.COND.	20	804.5	26	820.0	1.55	LOT
SURF.COND.	20	805.5	26	820.0	1.55	LOT
INTERM.	13 3/8	1622.0	17 1/2	1635.0	1.81	LOT
INTERM.	9 5/8	1793.0	12 1/4	1820.0	0.00	LOT



Boreslam

Dybde MD [m]	Egenvekt, slam [g/cm3]	Viskositet, slam [mPa.s]	flytegrense [Pa]	Type slam	Dato, måling
295	1.03			WATER BASED	05.07.1985
375	1.03			WATER BASED	09.07.1985
375	0.00			WATER BASED	10.07.1985
417	1.06	11.0	59.0	WATER BASED	10.07.1985
506	1.20			WATER BASED	06.09.1985
745	1.06	41.0	16.0	WATER BASED	12.07.1985
820	1.09	50.0	26.0	WATER BASED	12.07.1985
820	1.10	120.0		WATER BASED	15.07.1985
820	1.03			WATER BASED	15.07.1985
820	1.30			WATER BASED	18.07.1985
820	1.03			WATER BASED	15.07.1985
820	1.03			WATER BASED	16.07.1985
820	1.03			WATER BASED	16.07.1985
820	0.00			WATER BASED	18.07.1985
820	1.10	120.0		WATER BASED	15.07.1985
820	1.30			WATER BASED	18.07.1985
1000	1.35	43.0	21.0	WATER BASED	19.07.1985
1010	1.20			WATER BASED	05.09.1985
1076	1.36	53.0	24.0	water based	22.07.1985
1076	1.36	53.0	24.0	WATER BASED	22.07.1985
1084	1.38	53.0	4.0	WATER BASED	22.07.1985
1408	1.40	50.0	5.0	WATER BASED	22.07.1985
1470	1.20			WATER BASED	04.09.1985
1477	1.15			WATER BASED	03.09.1985
1510	1.40	47.0	5.0	WATER BASED	23.07.1985
1635	1.20			WATER BASED	02.08.1985
1635	1.40	50.0	3.0	WATER BASED	25.07.1985
1635	1.40	50.0	3.0	WATER BASED	23.07.1985
1635	1.40	50.0	3.0	WATER BASED	25.07.1985
1635	1.40	50.0	3.0	WATER BASED	26.07.1985
1635	1.40	50.0	3.0	WATER BASED	26.07.1985
1635	1.20			WATER BASED	02.08.1985
1635	1.15			WATER BASED	20.08.1985
1666	1.19	15.0	20.0	WATER BASED	29.07.1985



1673	1.15			WATER BASED	20.08.1985
1676	1.19	15.0	18.0	WATER BASED	29.07.1985
1683	1.15			WATER BASED	20.08.1985
1683	1.15			WATER BASED	21.08.1985
1683	1.15			WATER BASED	21.08.1985
1683	1.15			WATER BASED	22.08.1985
1683	1.15			WATER BASED	23.08.1985
1683	1.15			WATER BASED	26.08.1985
1683	1.15			WATER BASED	27.08.1985
1683	1.15			WATER BASED	28.08.1985
1683	1.15			WATER BASED	29.08.1985
1683	1.15			WATER BASED	30.08.1985
1683	1.15			WATER BASED	02.09.1985
1700	1.20	45.0	4.0	WATER BASED	31.07.1985
1755	1.15			WATER BASED	19.08.1985
1755	1.15			WATER BASED	20.08.1985
1755	1.15			WATER BASED	19.08.1985
1755	1.15			WATER BASED	09.08.1985
1793	1.13			WATER BASED	09.08.1985
1820	1.20	15.0	19.0	WATER BASED	02.08.1985
1820	1.20	17.0	23.0	WATER BASED	05.08.1985
1820	1.20			WATER BASED	05.08.1985
1820	1.15			WATER BASED	09.08.1985
1820	1.20	44.0	4.0	WATER BASED	31.07.1985
1820	1.20	15.0	19.0	WATER BASED	02.08.1985
1820	1.20	17.0	23.0	WATER BASED	05.08.1985
1820	1.20			WATER BASED	05.08.1985
1820	1.15			WATER BASED	09.08.1985

Tynnslip i Sokkeldirektoratet

Dybde	Enhet
1674.00	[m]
1680.00	[m]
1681.00	[m]
1688.00	[m]
1688.00	[m]
1688.00	[m]
1691.00	[m]
1691.00	[m]



1691.00	[m]
1692.00	[m]
1692.00	[m]
1692.00	[m]
1692.00	[m]

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]
480_Formation_pressure_(Formasjonstrykk)	PDF	0.25

