



Generell informasjon

Brønnbane navn	15/9-5
Type	EXPLORATION
Formål	APPRAISAL
Status	P&A
Faktakart i nytt vindu	lenke til kart
Hovedområde	NORTH SEA
Felt	SLEIPNER VEST
Funn	15/6-3 Sleipner Vest
Brønn navn	15/9-5
Seismisk lokalisering	510-314 SP.735
Utvinningstillatelse	046
Boreoperatør	Den norske stats oljeselskap a.s
Boretillatelse	232-L
Boreinnretning	NORSKALD
Boredager	145
Borestart	19.11.1979
Boreslutt	11.04.1980
Frigitt dato	11.04.1982
Publiseringsdato	08.04.2015
Opprinnelig formål	APPRAISAL
Gjenåpnet	NO
Innhold	GAS/CONDENSATE
Funnbrønnbane	NO
1. nivå med hydrokarboner, alder	MIDDLE JURASSIC
1. nivå med hydrokarboner, formasjon.	HUGIN FM
Avstand, boredekk - midlere havflate [m]	25.0
Vanndybde ved midlere havflate [m]	108.0
Totalt målt dybde (MD) [m RKB]	3946.0
Totalt vertikalt dybde (TVD) [m RKB]	3945.0
Maks inklinasjon [°]	2.25
Temperatur ved bunn av brønnbanen [°C]	131
Eldste penetrerte alder	TRIASSIC
Eldste penetrerte formasjon	SKAGERRAK FM
Geodetisk datum	ED50
NS grader	58° 24' 12.47" N



ØV grader	1° 42' 29.2" E
NS UTM [m]	6474503.53
ØV UTM [m]	424497.43
UTM sone	31
NPDID for brønnbanen	326

Brønnhistorie

General

Well 15/9-5 was drilled in the Sleipner Vest area in the Central Graben of the North Sea. The objective was to test hydrocarbons in Middle Jurassic sandstones in the Beta structure of Sleipner Vest. The well is Reference Well for the Heimdal and Våle formations.

Operations and results

Appraisal well 15/9-5 was spudded with the semi-submersible installation Norskald on 19 November 1979 and drilled to TD at 3946 m in the Triassic Skagerrak Formation. Operations met with many problems, but the well objectives were fulfilled in the end. Excessive drag when pulling core barrel out of reservoir was a severe problem, and consequently frequent reaming and circulating trips was needed. Having finished logging in the 8 1/2" section, and just started testing the BOP stack, one of the riser tension sheaves broke and fell down. Also several problems with the hydraulic BOP control system and the ball joint made nearly 12 days rig repair necessary. After this delay the hole required extensive reaming before the 7" liner could be ran and the final 6" section could be drilled. Testing operations were hampered and delayed by bad weather and test equipment breakdown. The well was drilled with spud mud down to 426 m and with seawater/lignosulphonate mud from 426 m to TD.

The well proved gas in sandstones of Middle Jurassic age from top Hugin Formation at 3526 m down to a true gas/water contact at 3662 m, based on logs and RFT samples. The Sleipner Formation was encountered at 3693 m. Logs and RFT pressure gradient proved Sleipner water filled, and ca 3 bar overpressured compared to the Hugin Formation. Shows were described on cores all through the hydrocarbon bearing reservoir. Abundant spots of fluorescence described on cuttings below ca 2000 m are described as "no shows". According to other comments in the cuttings descriptions the fluorescence may be related to diesel addition to the mud.

Nine cores were cut in the interval 3525 to 3663.6 m. A total of 133 m core (96.8%) was recovered. A FIT fluid sample at 3536 m recovered gas, condensate and mud. An RFT fluid sample was taken at 3540 m.

The well was permanently abandoned on 11 April 1980 as a gas/condensate appraisal well.

Testing

Three Drill Stem Tests were conducted.

DST1 tested the interval 3642 m to 3646.6 m. The final flow was controlled by using two variable chokes mounted in parallel. On the smallest choke size, 2x25/64", the well produced 583000 Sm³ gas and 181 Sm³ condensate /day. The GOR was ca 3200 Sm³/Sm³, the oil density was 45.3 °API, and the gas gravity was 0.774 (air = 1).

DST2 tested the interval 3605 to 3610 m plus 3613 to 3618 m. The final flow was controlled by using two variable chokes mounted in parallel. On the smallest choke size,



2x28.75/64", the well produced 699400 Sm³ gas and 189 Sm³ condensate /day. The GOR was ca 3700 Sm³/Sm³, the oil density was 45.4°API, and the gas gravity was 0.773 (air = 1). The CO₂ content was 9.2%. Maximum temperature during this test was 122.8 °C.

DST3 tested the interval 3536 to 3546 m. The final flow was controlled by using two variable chokes mounted in parallel. The choke size was kept at 2x45.5/64" throughout the whole flow. The well produced 815500 Sm³ gas and 212 Sm³ condensate /day. The GOR was ca 3850 Sm³/Sm³, the oil density was 40 °API, and the gas gravity was 0.771 (air = 1). The CO₂ content was 7.7 %. Maximum temperature during this test was 117.8 °C.

Borekaks i Sokkeldirektoratet

Borekaksprøve, topp dybde [m]	Borekaksprøve, bunn dybde [m]
190.00	3946.00

Borekaks tilgjengelig for prøvetaking?	YES
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Borekjerter i Sokkeldirektoratet

Kjerneprøve nummer	Kjerneprøve - topp dybde	Kjerneprøve - bunn dybde	Kjerneprøve dybde - enhet
1	3525.0	3543.4	[m]
2	3543.4	3547.0	[m]
3	3547.0	3565.4	[m]
4	3565.4	3583.8	[m]
5	3584.1	3600.4	[m]
6	3600.7	3618.9	[m]
7	3619.2	3634.9	[m]
8	3635.4	3643.8	[m]
9	3645.3	3662.3	[m]

Total kjerneprøve lengde [m]	134.4
Kjerter tilgjengelig for prøvetaking?	YES

Kjernebilder



3525-3527m



3527-3530m



3530-3533m



3533-3535m



3535-3538m



3538-3541m



3541-3543m



3543-3546m



3546-3547m



3547-3549m



3549-3552m



3552-3555m



3555-3557m



3557-3560m



3560-3563m



3563-3565m



3565-3568m



3568-3570m



3570-3573m



3573-3576m



3576-3578m



3578-3581m



3581-3583m



3584-3586m



3586-3589m



3589-3592m



3592-3594m



3594-3597m



3597-3600m



3600-3603m



3603-3606m



3606-3608m



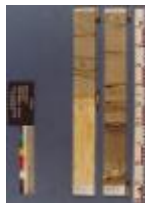
3608-3611m



3611-3614m



3614-3615m



3616-3618m



3619-3621m



3621-3624m



3624-3627m



3627-3630m



3630-3632m



3632-3634m



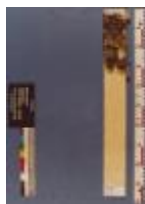
3635-3638m



3638-3640m



3640-3643m



3643-3644m



3645-3648m



3648-3650m



3650-3653m



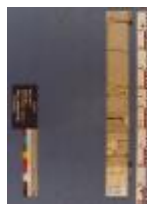
3653-3656m



3656-3658m



3658-3661m



3661-3662m

Palynologiske preparater i Sokkeldirektoratet

Prøve dybde	Dybde enhet	Prøve type	Laboratorie
3430.0	[m]	DC	
3435.0	[m]	DC	
3439.0	[m]	DC	



3469.0	[m]	DC	
3499.0	[m]	DC	
3520.0	[m]	DC	
3528.8	[m]	C	
3555.1	[m]	C	
3573.2	[m]	C	
3577.3	[m]	C	
3596.6	[m]	C	
3598.1	[m]	C	
3607.4	[m]	C	
3615.9	[m]	C	
3623.6	[m]	C	
3634.0	[m]	C	
3636.0	[m]	C	
3643.5	[m]	C	
3650.8	[m]	C	
3691.0	[m]	DC	
3721.0	[m]	DC	
3751.0	[m]	DC	
3781.0	[m]	DC	

Oljeprøver i Sökkeldirektoratet

Test type	Flaske nummer	Topp dyp MD [m]	Bunn dyp MD [m]	Væske type	Test tidspunkt	Prøver tilgjengelig
DST	TEST2	3588.00	3593.00		21.03.1980 - 00:00	YES

Litostratigrafi

Topp Dyb [mMD RKB]	Litostrat. enhet
133	NORDLAND GP
836	UTSIRA FM
1322	HORDALAND GP
1913	FRIGG FM
2290	ROGALAND GP
2290	BALDER FM
2344	SELE FM



2397	LISTA FM
2448	HEIMDAL FM
2736	VÅLE FM
2774	SHETLAND GP
2774	EKOFISK FM
2806	TOR FM
2964	HOD FM
3210	BLODØKS FM
3253	HIDRA FM
3298	CROMER KNOLL GP
3298	RØDBY FM
3331	SOLA FM
3345	ÅSGARD FM
3432	VIKING GP
3432	DRAUPNE FM
3526	VESTLAND GP
3526	HUGIN FM
3693	SLEIPNER FM
3769	SKAGERRAK FM

Dokumenter - eldre Sökkeldirektoratets WDSS rapporter og andre relaterte dokumenter

Dokument navn	Dokument format	Dokument størrelse [KB]
326 01 WDSS General Information	pdf	0.14
326 02 WDSS completion log	pdf	0.25

Dokumenter - rapportert av utvinningstillatelsen (frigitt ihht til regelverk)

Dokument navn	Dokument format	Dokument størrelse [KB]
326 15 9 5 Completion report and log	pdf	21.58

Borestrengtester (DST)

Test nummer	Fra dybde MD [m]	Til dybde MD [m]	Reduksjonsven til størrelse [mm]
1.0	3617	3647	25.0
2.0	3588	3593	0.0





3.0	3511	3521	0.0
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Test nummer	Endelig avstengningstrykk [MPa]	Endelig strømningsstrykk [MPa]	Bunnhullstrykk [MPa]	Borehullstemperatur [°C]
1.0				
2.0				
3.0				

Test nummer	Olje produksjon [Sm3/dag]	Gass produksjon [Sm3/dag]	Oljetetthet [g/cm3]	Gasstygde rel. luft	GOR [m3/m3]
1.0	218	768	0.799	0.768	3
2.0	229	865	0.811	0.886	4
3.0	206	813			4

Logger

Type logg	Topp dyp for logg [m]	Bunn dyp for logg [m]
ARROW PLOT	2827	3951
CBL	400	2825
FDC CNL GR	2827	3949
FDC GR	447	2833
GR CCL	182	2850
HDT	2826	3950
ISF SON GR	182	3949
VELOCITY	475	3940

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	158.0	36	158.0	0.00	LOT
SURF.COND.	20	422.0	26	437.0	1.37	LOT
INTERM.	13 3/8	1232.0	17 1/2	1243.0	1.95	LOT
INTERM.	9 5/8	2792.0	12 1/4	2807.0	1.72	LOT
LINER	7	3663.0	8 1/2	3664.0	1.96	LOT
OPEN HOLE		3921.0	6	3921.0	0.00	LOT



Boreslam

Dybde MD [m]	Egenvekt, slam [g/cm3]	Viskositet, slam [mPa.s]	flytegrense [Pa]	Type slam	Dato, måling
204	1.04	100.0		waterbased	
436	1.09	38.0		waterbased	
795	1.09	36.0		waterbased	
1300	1.20	100.0		waterbased	
3325	1.38	45.0		waterbased	
3580	1.40	50.0		waterbased	
3778	1.35	44.0		waterbased	

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]
326 Formation pressure (Formasjonstrykk)	pdf	0.22

