



Generell informasjon

Brønnbane navn	31/2-6
Type	EXPLORATION
Formål	APPRAISAL
Status	P&A
Faktakart i nytt vindu	lenke til kart
Hovedområde	NORTH SEA
Felt	TROLL
Funn	31/2-1 (Troll Vest)
Brønn navn	31/2-6
Seismisk lokalisering	LINE 79-406 & SP185
Utvinningstillatelse	054
Boreoperatør	A/S Norske Shell
Boretillatelse	296-L
Boreinnretning	BORGNY DOLPHIN
Boredager	89
Borestart	21.07.1981
Boreslutt	17.10.1981
Frigitt dato	17.10.1983
Publiseringsdato	06.06.2006
Opprinnelig formål	APPRAISAL
Gjenåpnet	NO
Innhold	OIL/GAS
Funnbrønnbane	NO
1. nivå med hydrokarboner, alder	LATE JURASSIC
1. nivå med hydrokarboner, formasjon.	SOGNEFJORD FM
Avstand, boredekk - midlere havflate [m]	25.0
Vanndybde ved midlere havflate [m]	343.0
Totalt målt dybde (MD) [m RKB]	1760.0
Totalt vertikalt dybde (TVD) [m RKB]	1754.0
Maks inklinasjon [°]	1.25
Temperatur ved bunn av brønnbanen [°C]	73
Eldste penetrerte alder	MIDDLE JURASSIC
Eldste penetrerte formasjon	FENSFJORD FM
Geodetisk datum	ED50
NS grader	60° 54' 13.57" N



ØV grader	3° 38' 49.53" E
NS UTM [m]	6752401.91
ØV UTM [m]	535105.69
UTM sone	31
NPDID for brønnbanen	399

Brønnhistorie



General

Well 31/2-6 is located in a fault block north-east on the main Troll structure, approximately 8 km NNE of 31/2-3. The main objective of the well was to test the north-eastern margin of the Troll structure and to prove hydrocarbon communication between block 31/2 and 31/3. The well location was picked to test the oil zone in a good sand reservoir. A second objective was to get reliable geologic tie to the seismic reflectors to allow for accurate lateral extrapolation of well data. Planned TD was 2500 m in Triassic sediments.

The well is Reference Well for the Sele Formation.

Operations and results

Appraisal well 31/2-6 was spudded with the semi-submersible installation Borgny Dolphin on and drilled to TD at 1760 m in the Late Jurassic Formation. The 9 5/8" casing collapsed at 771 m and was cut and retrieved from 760 m. As a result of this, well 31/2-6 was not deepened to the Triassic. The well was drilled with seawater gel down to 614 m and with KCl polymer mud from 614 m to TD.

Well 31/2-6 proved a similar hydrocarbon accumulation in this northern fault block area to that of the main field accumulation tested by wells 31/2-1,2,3 and 4. The well encountered the Sognefjord Formation at 1492 m. The Formation held a 79.4 m gross gas column underlain by a 10.3 m oil column. The GOC at 1571.4 m and the OWC was at 1582.2 m. Well 31/2-6 confirmed the overall interpretation of the flatspot as a direct hydrocarbon indicator. Oils shows were recorded on cores from 1504 m to 1601 m. In addition, cuttings gave patchy shows in the interval from 1710 m to 1758 m. Sidewall cores from this interval did not confirm shows in the latter interval.

Coring commenced at 1504.4 m and terminated at 1632.05 m, within the Sognefjord Formation. Thus 127.65 m of core was cut from which 123.65 m (97%) was recovered. An RFT gas sample was taken at 1518 m as a backup until samples could be obtained from the subsequent production test. No sample was attempted in the oil zone because of the badly washed out hole.

The well was permanently abandoned on 17 October 1981 as a gas and oil appraisal.

Testing

Production testing was carried out in both the oil and gas zones. The oil zone from 1576 m to 1579 m produced up to 151 Sm³ bbl/day of 27 °API oil with a GOR of up to 267 Sm³/Sm³. Maximum temperature recorded was 65.6 deg. C. The gas zone from 1518 m to 1537 m produced up to 1699000 Sm³ gas/day with a condensate/gas ratio of ca 0.00002 Sm³/Sm³ (GOR = ca 50000 Sm³/Sm³). The maximum recorded temperature in this test was 62.8 deg. C. The DST temperatures gives a temperature gradient above the Troll reservoir of ca 51 deg C /km, which is unusually high compared to the average for the Norwegian continental shelf.

Borekaks i Sokkeldirektoratet

Borekaksprøve, topp dybde [m]	Borekaksprøve, bunn dybde [m]
480.00	1749.00



Borekaks tilgjengelig for prøvetaking?	YES
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Borekjerne i Sokkeldirektoratet

Kjerneprøve nummer	Kjerneprøve - topp dybde	Kjerneprøve - bunn dybde	Kjerneprøve dybde - enhet
1	1504.4	1514.0	[m]
2	1514.0	1532.5	[m]
3	1532.5	1550.9	[m]
4	1551.0	1555.8	[m]
5	1557.5	1575.8	[m]
6	1576.0	1582.4	[m]
7	1583.9	1602.3	[m]
8	1602.8	1618.7	[m]
9	1618.8	1632.3	[m]

Total kjerneprøve lengde [m]	123.7
Kjerner tilgjengelig for prøvetaking?	YES

Kjernebilder



1504-1509m



1509-1514m



1514-1519m



1519-1524m



1524-1530m



1530-1532m



1532-1537m



1537-1543m



1543-1548m



1548-1550m





1551-1555m

1557-1562m

1562-1568m

1568-1573m

1573-1575m



1576-1581m

1581-1582m

1583-1589m

1589-1594m

1594-1600m



1600-1602m

1602-1608m

1608-1613m

1613-1618m

1618-1624m



1624-1629m

1629-1632m

Palynologiske preparater i Sjøkeldirektoratet

Prøve dybde	Dybde enhet	Prøve type	Laboratorie
610.0	[m]	DC	GEOCH
640.0	[m]	DC	GEOCH
670.0	[m]	DC	GEOCH
700.0	[m]	DC	GEOCH
730.0	[m]	DC	GEOCH
760.0	[m]	DC	GEOCH
790.0	[m]	DC	GEOCH
820.0	[m]	DC	GEOCH
850.0	[m]	DC	GEOCH
880.0	[m]	DC	GEOCH
910.0	[m]	DC	GEOCH
940.0	[m]	DC	GEOCH
970.0	[m]	DC	GEOCH
1000.0	[m]	DC	GEOCH



1030.0	[m]	DC	GEOCH
1060.0	[m]	DC	GEOCH
1090.0	[m]	DC	GEOCH
1120.0	[m]	DC	GEOCH
1150.0	[m]	DC	GEOCH
1180.0	[m]	DC	GEOCH
1212.0	[m]	DC	GEOCH
1242.0	[m]	DC	GEOCH
1272.0	[m]	DC	GEOCH
1302.0	[m]	DC	GEOCH
1326.0	[m]	DC	GEOCH
1353.0	[m]	DC	GEOCH
1380.0	[m]	DC	GEOCH
1407.0	[m]	DC	GEOCH
1434.0	[m]	DC	GROCH
1452.0	[m]	DC	GEOCH
1461.0	[m]	DC	GEOCH
1470.0	[m]	DC	GEOCH
1479.0	[m]	DC	GEOCH
1482.0	[m]	SWC	SHELL
1483.0	[m]	SWC	SHELL
1485.0	[m]	SWC	SHELL
1487.0	[m]	SWC	SHELL
1488.8	[m]	SWC	SHELL
1495.0	[m]	SWC	SHELL
1495.9	[m]	SWC	SHELL
1500.0	[m]	SWC	SHELL
1503.0	[m]	SWC	SHELL
1504.8	[m]	C	SHELL
1507.1	[m]	C	SHELL
1507.9	[m]	C	SHELL
1508.8	[m]	C	SHELL
1509.0	[m]	C	SHELL
1510.7	[m]	C	SHELL
1512.0	[m]	C	SHELL
1512.5	[m]	C	SHELL
1513.3	[m]	C	SHELL
1514.7	[m]	C	SHELL
1515.5	[m]	C	SHELL
1515.8	[m]	C	SHELL



Faktasider

Brønnbane / Leting

Utskriftstidspunkt: 13.5.2024 - 23:33

1528.4	[m]	C	SHELL
1529.1	[m]	C	SHELL
1533.4	[m]	C	SHELL
1534.3	[m]	C	SHELL
1537.0	[m]	C	SHELL
1539.7	[m]	C	SHELL
1540.2	[m]	C	SHELL
1542.0	[m]	C	SHELL
1542.4	[m]	C	SHELL
1555.8	[m]	C	SHELL
1557.9	[m]	C	SHELL
1558.0	[m]	C	SHELL
1558.6	[m]	C	SHELL
1576.9	[m]	C	SHELL
1578.9	[m]	C	SHELL
1582.2	[m]	C	SHELL
1584.5	[m]	C	SHELL
1589.0	[m]	C	SHELL
1591.8	[m]	C	SHELL
1591.8	[m]	C	SHELL
1592.9	[m]	C	SHELL
1594.5	[m]	C	SHELL
1601.1	[m]	C	SHELL
1601.8	[m]	C	SHELL
1601.9	[m]	C	SHELL
1603.4	[m]	C	SHELL
1603.7	[m]	C	SHELL
1604.4	[m]	C	SHELL
1606.0	[m]	C	SHELL
1609.6	[m]	C	SHELL
1609.8	[m]	C	SHELL
1620.1	[m]	C	SHELL
1624.2	[m]	C	SHELL
1625.3	[m]	C	SHELL
1626.2	[m]	C	SHELL
1627.1	[m]	C	SHELL
1634.0	[m]	C	SHELL
1655.0	[m]	C	SHELL
1682.8	[m]	C	SHELL
1703.0	[m]	C	SHELL



1718.0	[m]	C	SHELL
1728.0	[m]	C	SHELL
1740.1	[m]	C	SHELL
1754.0	[m]	C	SHELL

Oljeprøver i Sokkeldirektoratet

Test type	Flaske nummer	Topp dyp MD [m]	Bunn dyp MD [m]	Væske type	Test tidspunkt	Prøver tilgjengelig
DST	TEST1	1576.00	1579.00		20.09.1981 - 00:00	YES
DST	TEST2	1518.00	1536.00		06.10.1981 - 00:00	YES

Litostratigrafi

Topp Dyb [mMD RKB]	Litostrat. enhet
368	NORDLAND GP
600	HORDALAND GP
600	NO FORMAL NAME
698	NO FORMAL NAME
1105	ROGALAND GP
1105	BALDER FM
1167	SELE FM
1225	LISTA FM
1450	VÅLE FM
1464	SHETLAND GP
1464	HARDRÅDE FM
1476	CROMER KNOLL GP
1481	VIKING GP
1481	DRAUPNE FM
1492	SOGNEFJORD FM
1673	FENSFJORD FM

Spleisede logger

Dokument navn	Dokument format	Dokument størrelse [KB]
399	pdf	0.29





Geokjemisk informasjon

Dokument navn	Dokument format	Dokument størrelse [KB]
399_1	pdf	0.60
399_2	pdf	0.54

Dokumenter - eldre Sjøkeldirektoratets WDSS rapporter og andre relaterte dokumenter

Dokument navn	Dokument format	Dokument størrelse [KB]
399_01_WDSS_General_Information	pdf	0.09
399_02_WDSS_completion_log	pdf	0.16

Dokumenter - rapportert av utvinningstillatelsen (frigitt ihht til regelverk)

Dokument navn	Dokument format	Dokument størrelse [KB]
399_01_31_2_6_Drilling_programme	pdf	1.20
399_01_31_2_6_Exploration_well_resume	pdf	33.29
399_01_31_2_6_Well_summary_by_Anchor	pdf	1.55
399_01_Drilling_prospectus	pdf	6.83
399_02_31_2_6_Biostratigraphy_appendix_3	pdf	4.01
399_02_31_2_6_Completion_log	pdf	1.15
399_02_Composite_log	pdf	1.86
399_03_31_2_6_Petrophysical_evaluation_study_encl_01	pdf	1.48
399_03_31_2_6_Petrophysical_evaluation_study_by_Statoil	pdf	1.34
399_03_31_2_6_Petrophysical_invest._of_cores_by_Shell	pdf	1.48
399_03_Drilling_programme	pdf	3.19
399_04_31_2_6_Aut._kornstr.og_sort.analyse_by_Sintef	pdf	1.08
399_04_31_2_6_Conventional_Core_Analysis_core_1-9	pdf	3.19
399_04_31_2_6_Halvaut._kornstr.og_sort.analyse_by_Sintef	pdf	1.00
399_04_31_2_6_Partial_fluid_study_by_Corelabs	pdf	0.25





399 04 31 2 6 Partical fluid study oil zone by Corelabs	pdf	0.15
399 04 31 2 6 Porosity and perm. data by Geolab	pdf	0.96
399 04 31 2 6 Quick sidewall sample desc r	pdf	0.15
399 04 31 2 6 Relative perm.measurement s	pdf	1.09
399 04 31 2 6 Reservoir fluid study by Corelabs	pdf	0.65
399 04 31 2 6 Spec.core analysis measure by Sintef	pdf	1.28
399 04 31 2 6 Special core analysis by Sintef	pdf	0.70
399 04 31 2 6 Special core analysis Cation exch	pdf	2.54
399 04 31 2 6 Special core analysis Cation exch encl 1	pdf	0.16
399 04 31 2 6 Special core analysis Cation exch encl 2	pdf	0.20
399 04 31 2 6 Special core analysis Cation exch encl 3	pdf	0.20
399 04 31 2 6 Special core analysis Cation exch encl 4	pdf	0.21
399 04 31 2 6 Special core analysis Cation exch encl 5	pdf	0.21
399 04 31 2 6 Special core analysis Cation exch encl 6	pdf	0.21
399 04 Drill stem test data	pdf	4.44
399 05 31 2 6 Expl. and positioning test on gas	pdf	0.43
399 05 31 2 6 Gas tests offshore Norway by Thornton	pdf	0.51
399 05 31 2 6 Online TDC report by Geoservices	pdf	1.03
399 05 31 2 6 Overlagringstrykk by Statoil	pdf	0.91
399 05 31 2 6 Pressure survey report test 1 run1 by Sperry	pdf	0.92
399 05 31 2 6 Pressure survey report test 1 run2 by Sperry	pdf	0.61
399 05 31 2 6 Production test programme	pdf	1.79
399 05 31 2 6 Room condition Oil by Sintef	pdf	0.35
399 05 31 2 6 Sieve analysis	pdf	3.29
399 05 31 2 6 Well testing report clean s and gas zone Flopetrol	pdf	13.65





399 05 31 2 6 Well testing report oil zone annexes Flopetrol	pdf	16.00
399 05 31 2 6 Well testing report oil zone Flopetrol	pdf	8.12
399 05 Geological well prognosis and drilling program	pdf	1.20
399 06 31 2 6 Geochem analysis of source rock	pdf	0.24
399 06 31 2 6 Geochem analysis of source rock encl 1	pdf	0.26
399 06 Geological well program	pdf	0.18
399 07 31 2 6 Global interpretation by SLb	pdf	0.38
399 07 Individual well record	pdf	6.86
399 08 Log analysis rapport	pdf	0.10
399 09 Production measurements during the drill stem test	pdf	0.75
399 10 Analysis chart robertson	pdf	10.32
399 11 A study of selected sections from palaeogene	pdf	1.54
399 12 Biostratigraphy and organic geochemistry	pdf	4.82
399 13 geochemical study	pdf	2.13
399 14 Lithological log	pdf	0.49
399 15 Lithology and abundance	pdf	0.21
399 16 Palynological correlations in early cretaceous	pdf	0.44
399 17 Preliminary petroleum geochemistry results	pdf	1.42
399 18 Rapported analyses geochimiques des fluides	pdf	0.28
399 19 Rock eval pyrolysis	pdf	0.71
399 20 The micropalaeontology and stratigraphy	pdf	1.43
399 21 Water analysis	pdf	0.31
399 05 31 2 6 Bronntestrapport by Geco	pdf	2.67
399 05 31 2 6 Bronntestrapport encl 1	pdf	0.45

Borestrengtester (DST)

Test nummer	Fra dybde MD [m]	Til dybde MD [m]	Reduksjonsventil størrelse [mm]
1.0	1576	1579	7.9
2.0	1518	1537	50.8





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]	Gasstygde rel. luft	GOR [m3/m3]
1.0	144	25000	0.888	0.605	175
2.0	40	1699000	0.781	0.602	42475

Logger

Type logg	Topp dyp for logg [m]	Bunn dyp for logg [m]
BGT GR	447	814
BGT GR	447	817
BGT GR	447	817
CBL VDL	370	802
CBL VDL	635	1475
CBL VDL	850	1715
CST	801	1463
DLL MSFL CAL	1476	1756
FDC CNL GR CAL	447	819
FDC CNL GR CAL	801	1471
FDC CNL GR CAL	1476	1757
HDT	1476	1758
ISF BHC GR	447	817
ISF BHC GR	801	1473
ISF BHC GR	1476	1757
LDT	1476	1757
NGT	1476	1757
RFT	13	0
VELOCITY	0	0

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	448.0	36	456.0	0.00	LOT
SURF.COND.	20	800.0	26	820.0	0.00	LOT
INTERM.	13 3/8	1475.0	17 1/2	1485.0	1.62	LOT
INTERM.	9 5/8	1752.0	12 1/4	1760.0	0.00	LOT

Boreslam

Dybde MD [m]	Egenvekt, slam [g/cm3]	Viskositet, slam [mPa.s]	Flytegrense [Pa]	Type slam	Dato, måling
420	0.00			seawater	
820	1.12	50.0		water based	
1485	1.32	50.0		water based	
1532	1.18	52.0		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]
399 Formation pressure (Formasjonstrykk)	PDF	0.15

