

Well no :	2/7-21 S	Operator :	PHILLIPS
Coordinates :	56° 19' 59.63" N 03° 14' 53.75" E	UTM coord. :	624333445 N 51535092 E
Licence no :	18	Permit no :	610
Rig :	ROSS ISLE	Rig type :	SEMI-SUB.
Contractor :	TRANSNOR RIG AS		
Bottom hole temp:	169 °C	Elev. KB :	22 M
Spud. date :	89.06.21	Water depth :	71 M
Compl. date :	90.01.09	Total depth :	5044 M
Spud. class :	APPRAISAL	Form. at TD	
Compl. class :	SUSP.	Prod.form. :	
Seisloca :	NS 210 SP 720		

LICENSEES

0,304000	COFRANORD A/S (NORMINOL)
0,399000	COPAREX NORGE A/S
7,594000	ELF PETROLEUM NORGE A/S.
0,456000	EURAFREP NORGE A/S
30,000000	NORSKE FINA A/S
6,700000	NORSK HYDRO PRODUKSJON A.S
36,960000	PHILLIPS PETROLEUM COMPANY NORWAY
1,000000	DEN NORSKE STATS OLJESELSKAP A.S
3,547000	TOTAL NORGE A.S
13,040000	NORSK AGIP A/S

CASING AND LEAK-OFF TESTS

Type	Casing diam.	Depth below KB	Hole diam.	Hole depth below KB	Lot mud eqv. g/cm3
CONDUCTOR	30	171,0	36	173,0	
INTERM.	20	1056,0	26	1067,0	1,85
INTERM.	13 3/8	2512,0	17 1/2	2523,0	2,08
INTERM.	9 5/8	4221,0	12 1/4	4234,0	2,30
LINER	7	4557,0	8 1/2	4563,0	2,22
LINER	5	5039,0	5 7/8	5039,0	

CONVENTIONAL CORES

Core no.	Intervals cored meters	Recovery	
		M	%
1	4323,9 - 4330,3	6,4	100,0
2	4330,3 - 4348,6	18,3	100,0
3	4348,6 - 4355,6	6,7	95,7
4	4461,4 - 4469,9	8,5	100,0
5	4469,9 - 4481,5	11,6	100,0
6	4569,3 - 4578,7	9,4	100,0
7	4650,8 - 4665,7	14,9	100,0
8	4665,7 - 4669,2	3,5	100,0
9	4682,5 - 4695,3	12,8	100,0
10	4941,4 - 4950,6	9,2	100,0
11	5020,4 - 5038,6	18,2	100,0

MUD

Depth	Mud weight	Visc.	Mud type
128,000	1,02		WATER BASED
350,500	2,12	71,0	WATER BASED
1018,000	1,02		WATER BASED
1067,700	1,33	16,0	WATER BASED
1182,600	1,33	17,0	WATER BASED
1475,200	1,38	18,0	WATER BASED
1475,200	1,38	18,0	WATER BASED
1503,600	1,44	15,0	WATER BASED
1823,600	1,65	23,0	WATER BASED
2023,900	1,64	18,0	WATER BASED
2920,000	1,65	20,0	WATER BASED
3078,500	2,12	69,0	OIL BASED
3105,900	1,68	19,0	WATER BASED
3218,100	1,70	20,0	WATER BASED
3852,700	1,73	14,0	WATER BASED
4031,300	1,75	19,0	WATER BASED
4053,800	2,12	65,0	OIL BASED
4111,800	1,76	16,0	WATER BASED
4212,300	1,75	15,0	WATER BASED
4234,300	1,77	16,0	WATER BASED
4237,300	2,04	40,0	WATER BASED
4311,400	2,12	55,0	OIL BASED
4418,400	2,10	36,0	OIL BASED
4476,600	2,09	31,0	OIL BASED
4525,700	2,12	52,0	OIL BASED
4532,400	2,10	55,0	OIL BASED
4550,700	2,11	38,0	OIL BASED
4559,200	2,11	36,0	OIL BASED
4563,800	2,12	43,0	OIL BASED
4577,500	2,09	47,0	OIL BASED
4583,300	2,04	40,0	OIL BASED
5020,400	2,06	35,0	OIL BASED
5038,600	2,09	35,0	OIL BASED
5042,300	2,04	49,0	WATER BASED
5045,400	2,12	59,0	OIL BASED
7620,000	1,73	15,0	WATER BASED
7924,800	1,77	19,0	WATER BASED
8077,200	1,73	14,0	WATER BASED

DRILL STEM TEST

INTERVALS AND PRESSURES

Test no.	Interval meter	Choke size	Pressure (PSI) WHP	BTHP	FFP
1,0	4575,000 - 4610,000	7,9			
2,1	4446,400 - 4518,700	11,9			
2,2	4446,400 - 4518,700	9,9			
3,1	4308,000 - 4337,600	11,1			

Test no.	Interval meter	Choke size	Pressure (PSI) WHP	BTHP	FFP
3,2	4308,000	- 4337,600	19,0		

Test temperature: N/A

RECOVERY

Test no.	Oil Sm3/d	Gas Sm3/d	Oil grav. g/cm3	Gas grav. rel. air	GOR m3/m3
1,0	107	27	,800	,790	267
2,1	879	272	,810	,790	312
2,2	592	211	,810	,790	357
3,1	760	249	,810	,810	326
3,2	1236	447	,800	,760	362

DRILL BIT CUTTINGS AND WET SAMPLES

Sample type	Interval below KB	Number of samples
WET SAMPLES	1073 - 5038	390
CUTTINGS	1073 - 5038	360

SHALLOW GAS

Interval below KB	Remarks
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AVAILABLE LOGS

Log type	Intervals	1/200	1/500	Div.
CBL VDL GR	3048,0 - 4319,0	X	X	
CBL VDL GR	3169,0 - 4560,0	X	X	
CDM AP / OBDT	4223,0 - 4558,0	X	X	
CDM AP / OBDT AMS	4563,0 - 5043,0	X	X	
DIL LSS GR	1056,0 - 2523,0	X	X	
DIL GR	2411,0 - 4073,0	X	X	
DIL LSS WF GR	4223,0 - 4562,0	X	X	
DIL GR	4563,0 - 5042,0	X	X	
DLL GR MSFL SLS	2511,0 - 4233,0	X	X	
LDL CNL NGS	3210,0 - 4211,0	X	X	
LDL CNL NGS	4223,0 - 4563,0	X	X	
LDL CNL NGS	4563,0 - 5043,0	X	X	
MWD LOG	167,0 - 3702,0		X	
NGS	3210,0 - 4202,0	X	X	
NGS	4223,0 - 4563,0	X	X	

Log type	Intervals	1/200	1/500	Div.
NGS	4563,0 - 5034,0	X	X	
RFT GR	4309,0 - 4545,0	X		
RFT GR	4572,0 - 5036,0			
MUD	1067,0 - 5038,0		X	
VELOCITY	1005,0 - 4678,0		X	
SYNTHETIC SEISMOGRAM	10 cm/s -			2
VSP	10 cm/s, 20 cm/s - 40 cm/s			19

Main operations for well: 2/7-21 S

Main operation: COMPLETION

Sub operation:	Minutes:	Hours:	% of total:
BOP/WELLHEAD EQ	670	11,2	100,00
Total	670	11,2	100,00

Main operation: DRILLING

Sub operation:	Minutes:	Hours:	% of total:
BOP ACTIVITIES	10850	180,8	6,87
BOP/WELLHEAD EQ	3290	54,8	2,08
CASING	28670	477,8	18,14
CIRC/COND	9770	162,8	6,18
DRILL	60170	1002,8	38,08
OTHER	2180	36,3	1,38
PRESS DETECTION	900	15,0	0,57
REAM	1150	19,2	0,73
SURVEY	2060	34,3	1,30
TRIP	36840	614,0	23,31
UNDERREAM	2140	35,7	1,35
Total	158020	2633,7	100,00

Main operation: FORMATION EVAL

Sub operation:	Minutes:	Hours:	% of total:
CIRC SAMPLES	540	9,0	0,63
CIRC/COND	2090	34,8	2,45
CORE	3740	62,3	4,39
DST	22390	373,2	26,29
LOG	10830	180,5	12,71
OTHER	5420	90,3	6,36
RFT/FIT	70	1,2	0,08
TRIP	40100	668,3	47,08
Total	85180	1419,7	100,00

Main operation: INTERRUPTION

Sub operation:	Minutes:	Hours:	% of total:
FISH	7360	122,7	28,32
MAINTAIN/REP	10980	183,0	42,25
OTHER	1930	32,2	7,43
WAIT	4150	69,2	15,97
WELL CONTROL	1570	26,2	6,04
Total	25990	433,2	100,00

Main operation: MOVING

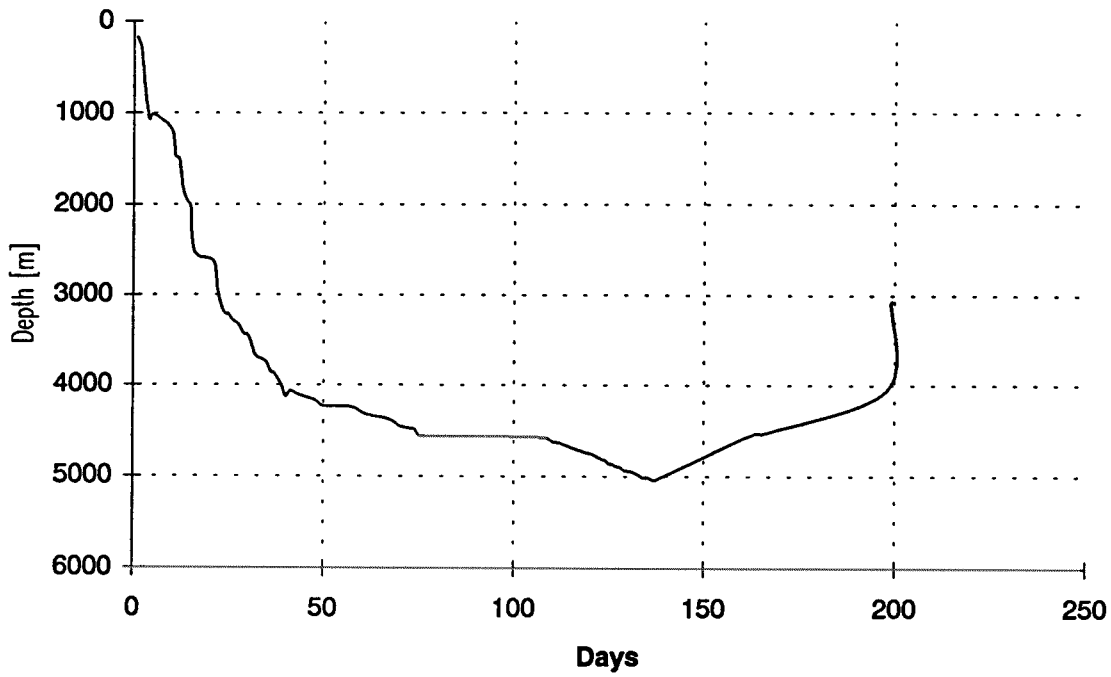
Sub operation:	Minutes:	Hours:	% of total:
ANCHOR	4210	70,2	67,47
POSITION	120	2,0	1,92
TRANSIT	1910	31,8	30,61
Total	6240	104,0	100,00

Main operation: PLUG & ABANDON

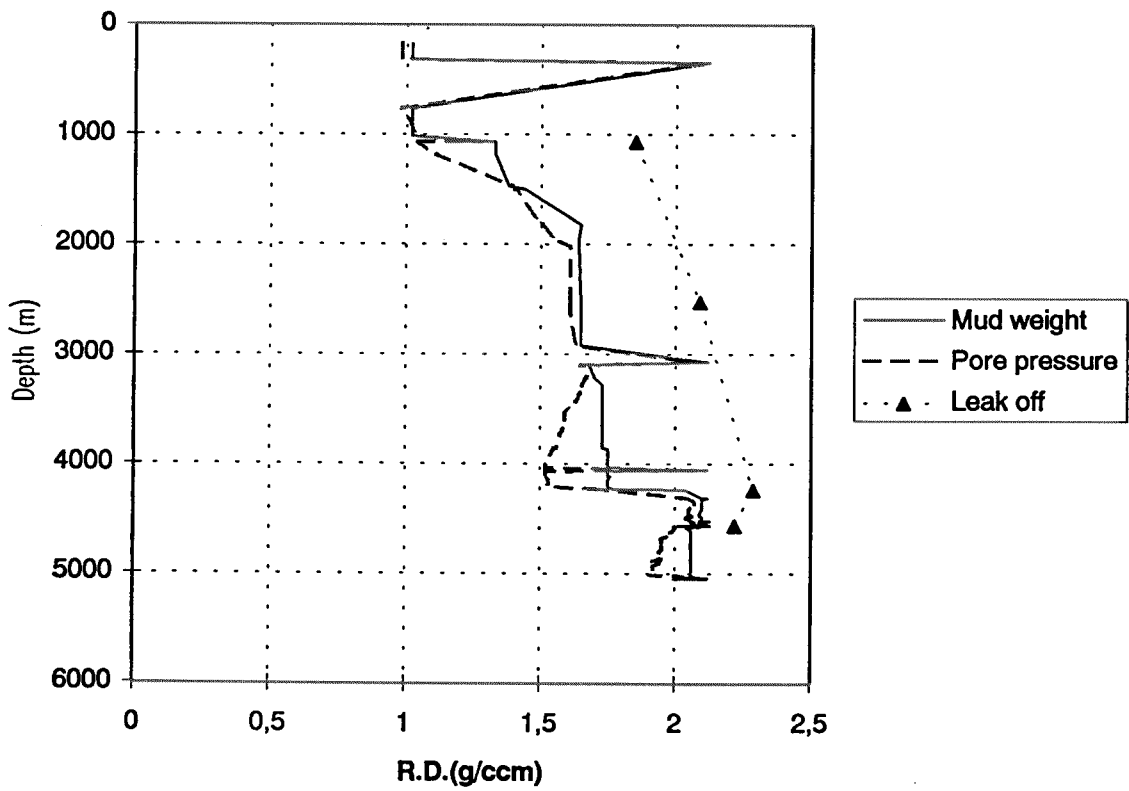
Sub operation:	Minutes:	Hours:	% of total:
CEMENT PLUG	2010	33,5	23,90
CIRC/COND	540	9,0	6,42
EQUIP RECOVERY	360	6,0	4,28
MECHANICAL PLUG	1210	20,2	14,39
OTHER	3570	59,5	42,45
WAIT	720	12,0	8,56
Total	8410	140,2	100,00

Total time used: 4741,8 Hours

Depth vs time for well: 2/7-21 S



Composite plot for well: 2/7-21 S



Well History 2/7-21 S.

General:

The primary objective of well 2/7-21 S, designed to drill on the South Eldfisk area, was to test the Late Jurassic, or may be Permian, sandstones that tested oil in the 2/7-9 and 2/7 20 wells. The 2/7-21 S well is located 1175 m to the south-east of the 2/7-20 well and in the same faultblock. It was anticipated that the proposed location would encounter reservoir quality sands similar in nature, thickness, and depth as in the 2/7-20 well. Closure of the structure is provided by normal down faulting to the North, South and West. Closure to the east is by the Lindesnes Ridge reverse fault. Vertical sealing is provided by the Lower Cretaceous Shales. The objectives for the well was as follows:

- confirm the commerciality of the reservoir sands in the South Eldfisk structure.
- further evaluate the reservoir intervals through coring and testing.

No shallow gas was expected in this area, and no major obstacles other than the high formation pressure in the reservoir have been observed. If successful, the well would constitute a second drainage point for future field development. A program of coring, wireline logging and DST tests was performed in a manner suitable for later re-entry and tie-back to a production installation.

Operations:

Appraisal well 2/7-21 S was spudded by the semi-submersible rig Ross Isle 21 June 1989, and completed 12 January 1990 at a depth of 5038.7 m MD RKB in rocks of probably Devonian age. The well was drilled without any significant problems occurring, except for MWD failures. A total of eleven cores were cut in this well. A total of thirty sidewall cores were fired, whereof fifteen was retrieved. No shallow gas was encountered, except for at 586.7 m RKB, but this sands presented no obstacle to the drilling operations. At 4112 m the drillstring was backed off while pulling out of hole, followed by a successful fishing operation. After DST test no 2 the well was killed with drilling mud causing contamination of DST no 3. Consequently the results of this tests were poorer than expected. Maximum H₂S in the tests were 40 ppm. The well was temporary plugged and abandoned, suitable for later re-entry and possible tie-back to production facilities.

Testing:

Three DST tests were performed in this well:

DST #1 in the interval 4577 to 4612 mMD. Produced 97 Sm³/d accompanied by 20-25 ppm H₂S. The test zone was plugged.

DST #2 in the interval 4446 to 4519 mMD. Produced upto 866 Sm³/d on 11,9 mm choke with GOR of 348 Sm³/Sm³.

DST #3 in the interval 4308 to 4338 mMD. Produced upto 1290 Sm³/d on a 18.4 mm choke with a GOR of 329 Sm³/Sm³.

Geological Tops.

Well:2/7-21 S

	Depth m (RKB).
Nordland Group	93,0
Hordaland Group	1598,0
Rogaland Group	3065,3
Balder Fm	3065,3
Sele Fm	3084,5
Lista Fm	3139,4
Våle Fm	3197,3
Shetland Group	3225,8
Ekofisk Fm	3225,8
Tor Fm	3317,7
Hod Fm	3599,6
Blodøks Fm	4259,0
Hidra Fm	4165,4
Cromer Knoll Group	4202,0
Rodby Fm	4202,0
Sola Fm	4226,3
Tuxen Fm	4234,6
Indeterminate	4299,5
Devonian/ Carbonaceous.	4720,0
T.D.	5044,0