

Well no : 33/09-13S

Operator : STATOIL

Coordinates : 61 27 04.45 N  
01 58 3.00 EUTM coord. : 6813648 N  
444949 E

Licence no : 37

Permit no : 565

Rig : ROSS ISLE

Rig type : SEMI-SUB.

Contractor : ROSS DRILLING CO. A/S

Bottom hole temperature : deg.C

Elev. KB : 22 M

Spud. date : 87.10.14

Water depth : 291 M

Compl. date : 87.12.24

Total depth : 3077 M

Spud. class : APPRAISAL

Form. at TD : E.JURASSIC

Compl. class : P&amp;A. OIL DISCOVERY

Prod. form :

Seisloca :

## LICENSEES

1.042000 AMERADA HESS NORGE A/S  
 1.042000 AMOCO NORWAY OIL COMPANY  
 10.000000 CONOCO NORWAY INC.  
 10.000000 ESSO NORGE A.S  
 15.000000 MOBIL EXPLORATION NORWAY INC.  
 1.875000 SAGA PETROLEUM A.S.  
 10.000000 A/S NORSKE SHELL  
 50.000000 DEN NORSKE STATS OLJESELSKAP A.S  
 1.042000 TEXAS EASTERN NORWEGIAN INC.

## CASING AND LEAK-OFF TESTS

Type	Casing diam.	Depth below KB	Hole diam.	Hole depth below KB	Lot mud eqv. g/cm <sup>3</sup>
CONDUCTOR	30	375.0	36	375.0	.
SURF.COND.	20	394.0	26	422.0	1.27
INTERM.	13 3/8	1300.0	17 1/2	1315.0	1.79
INTERM.	9 5/8	2363.0	12 1/4	2378.0	1.84
LINER	7	3075.0	8 1/2	3077.0	.

## CONVENTIONAL CORES

Core no.	Intervals cored meters	Recovery		Series
		M	%	
1	2732.0 - 2754.3	22.3	100.0	
2	2756.0 - 2783.4	27.4	100.0	
3	2783.4 - 2799.9	16.4	100.0	
4	2801.0 - 2828.3	27.3	100.0	

## MUD PROPERTIES

Depth below KB meter	Mud weight g/cm <sup>3</sup>	Viscosity	Mud type
374.000	1.20	13.0	WATER BASED
394.000	1.22	17.0	WATER BASED

398.000	1.20	12.0	WATER BASED
1315.000	1.22	21.0	WATER BASED
1460.000	1.30	18.0	WATER BASED
2096.000	1.54	24.0	WATER BASED
2097.000	1.60	23.0	WATER BASED
2378.000	1.58	30.0	WATER BASED
2416.000	1.52	33.0	WATER BASED
2536.000	1.51	31.0	WATER BASED
2675.000	1.56	38.0	WATER BASED
3077.000	1.60	23.0	WATER BASED

## DRILL STEM TEST

### INTERVALS AND PRESSURES

Test no	interval meter	Choke size	Pressure (PSI)		
			WHP	BTHP	FFP
1.0	2778.000 - 2787.000	9.5	304.6	5397.7	2999.9
	Test temperature: 93.1 °C				
1.1	2778.000 - 2787.000	9.5	1740.4	5656.7	4639.1
	Test temperature: 93.1 °C				
1.2	2758.000 - 2775.200	14.3	1209.6	5656.7	4167.7
	Test temperature: 93.1 °C				
2.0	2727.000 - 2740.700	9.5	2465.6	5522.6	5593.8
	Test temperature: 93.0 °C				

### RECOVERY

Test no.	Oil Sm <sup>3</sup> /d	Gas Sm <sup>3</sup> /d	Oil grav. g/cm <sup>3</sup>	Gas grav. rel. air	GOR m <sup>3</sup> /m <sup>3</sup>
1.0	122	6960	0.850	0.890	70
1.1	642	33139	0.838	0.830	25
1.2	701	0	0.000	0.000	04
2.0	815	41640	0.839	0.805	17

## DRILL BIT CUTTINGS AND WET SAMPLES

SAMPLE TYPE	INTERVAL BELOW KB	NUMBER OF SAMPLES
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Cutting

Wet Samples	410-3075	330
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## SHALLOW GAS

Interval below KB	REMARKS
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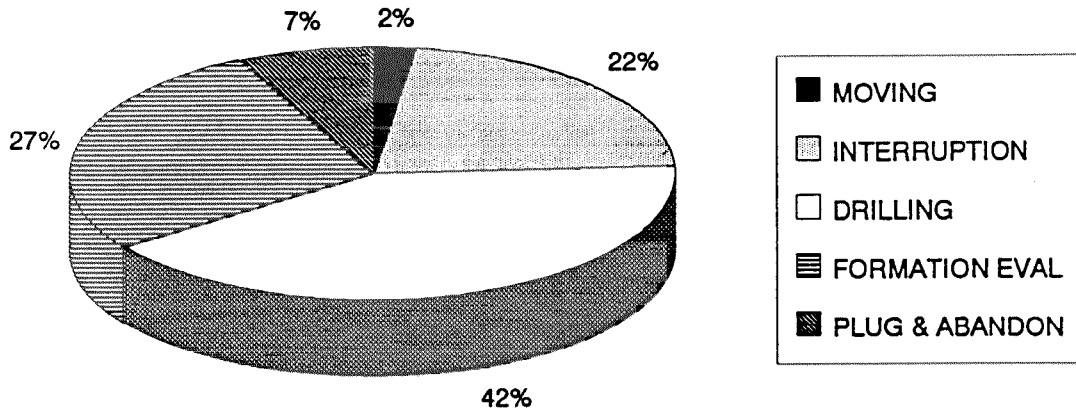
## AVAILABLE LOGS

LOG TYPE	INTERVALS	1/200	1/500	Div.
DIFL BHC AC GR	2362.000 - 3075.000	X	X	
CDL CNL	2680.000 - 3072.000	X	X	

DLL MLL	2720.000 - 2820.000	X	X
SHDT SPECTRA	2680.000 - 3072.000	X	X
SHDT	2710.000 - 3070.000	X	
CDM AP	2710.000 - 3070.000	X	X
FMT HP C.G.	2727.000 - 3054.000		X
AC CBL VDL GR	310.000 - 1303.000	X	
AC CBL	766.000 - 2362.000	X	
AC CBL	2320.000 - 3020.000	X	
MUD	322.000 - 3077.000		X
VELOCITY	2362.000 - 3075.000	1:1000	X
(Airgun well velocity and calibr. log data			1 stk.)
(Display of velocity survey records			4 stk.)
(VSP, interpreters comp. 10cm/s			9 stk.)
(Synthetic seismogram, 10cm/s			5 stk.)
(Two-way travel time, 10cm/s			1 stk.)

# DAILY DRILLING REPORT SYSTEM

MAIN OPERATIONS FOR WELL: 33/09-13 S



Main operation	Minutes	Hrs	% of total
MOVING	2520	42,0	2,40
INTERRUPTION	23080	384,7	21,96
DRILLING	43200	720,0	41,10
FORMATION EVAL	28820	480,3	27,42
PLUG & ABANDON	7500	125,0	7,13
<i>Total</i>	<i>105120</i>	<i>1752,0</i>	<i>100,00</i>

## SUB OPERATIONS FOR WELL: 33/09 – 13 S

### MAIN OPERATION: MOVING

Sub operation	Minutes	Hrs	% of total
ANCHOR	2280	38,0	90,48
TRANSIT	240	4,0	9,52
<i>Total</i>	2520	42,0	100,00

### MAIN OPERATION: INTERRUPTION

Sub operation	Minutes	Hrs	% of total
WAIT	6690	111,5	28,99
MAINTAIN/REP	13710	228,5	59,40
OTHER	250	4,2	1,08
FISH	2430	40,5	10,53
<i>Total</i>	23080	384,7	100,00

### MAIN OPERATION: DRILLING

Sub operation	Minutes	Hrs	% of total
DRILL	16320	272,0	37,78
CIRC/COND	1860	31,0	4,31
SURVEY	30	0,5	0,07
TRIP	9270	154,5	21,46
CASING	8970	149,5	20,76
OTHER	180	3,0	0,42
WAIT	180	3,0	0,42
BOP ACTIVITIES	2790	46,5	6,46
BOP/WELLHEAD EQ	3360	56,0	7,78
REAM	240	4,0	0,56
<i>Total</i>	43200	720,0	100,00

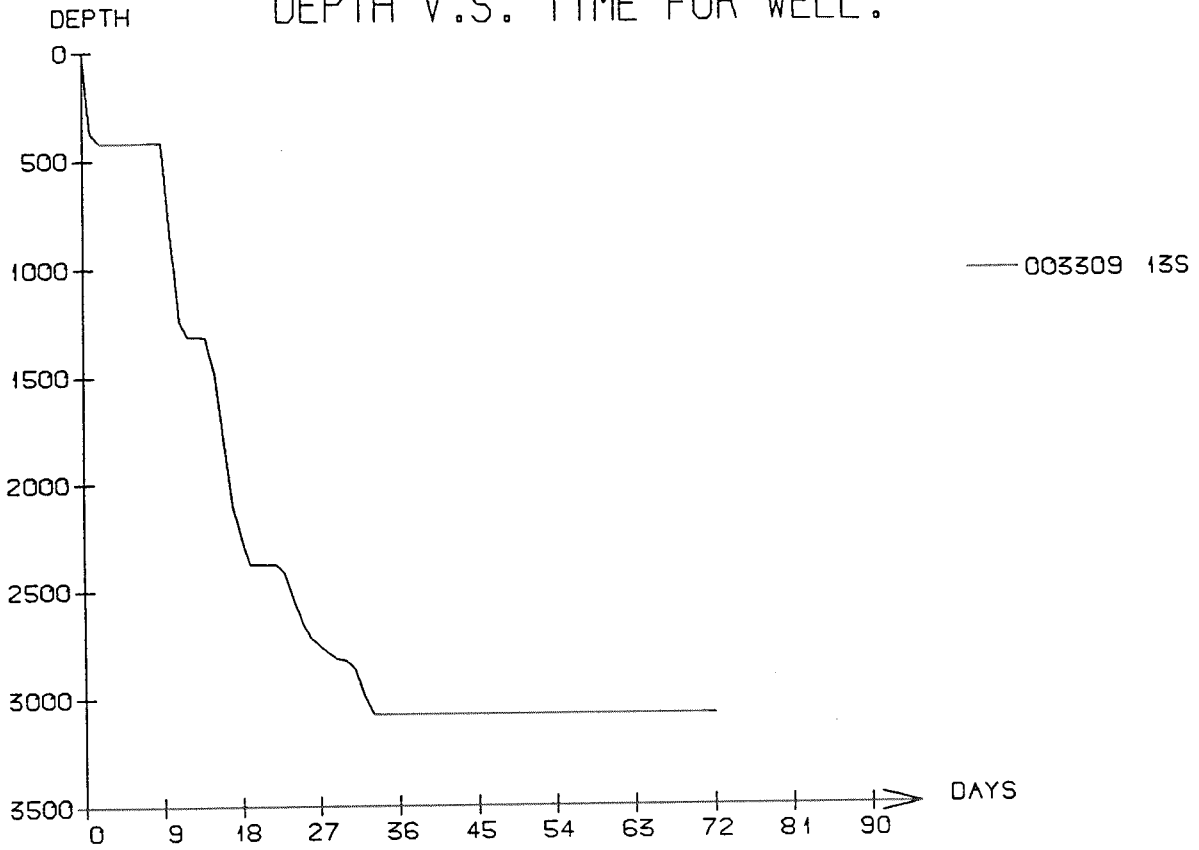
### MAIN OPERATION: FORMATION EVAL

Sub operation	Minutes	Hrs	% of total
RFT/FIT	360	6,0	1,25
TRIP	4980	83,0	17,28
CORE	2190	36,5	7,60
OTHER	240	4,0	0,83
CIRC SAMPLES	150	2,5	0,52
WAIT	240	4,0	0,83
LOG	2690	44,8	9,33
DST	17970	299,5	62,35
<i>Total</i>	28820	480,3	100,00

### MAIN OPERATION: PLUG & ABANDON

Sub operation	Minutes	Hrs	% of total
MECHANICAL PLUG	630	10,5	8,40
TRIP	1980	33,0	26,40
SQUEEZE	720	12,0	9,60
CEMENT PLUG	570	9,5	7,60
CUT	570	9,5	7,60
EQUIP RECOVERY	1020	17,0	13,60
PERFORATE	330	5,5	4,40
OTHER	690	11,5	9,20
CIRC/COND	150	2,5	2,00
WAIT	840	14,0	11,20
<i>Total</i>	7500	125,0	100,00

# DEPTH V.S. TIME FOR WELL :



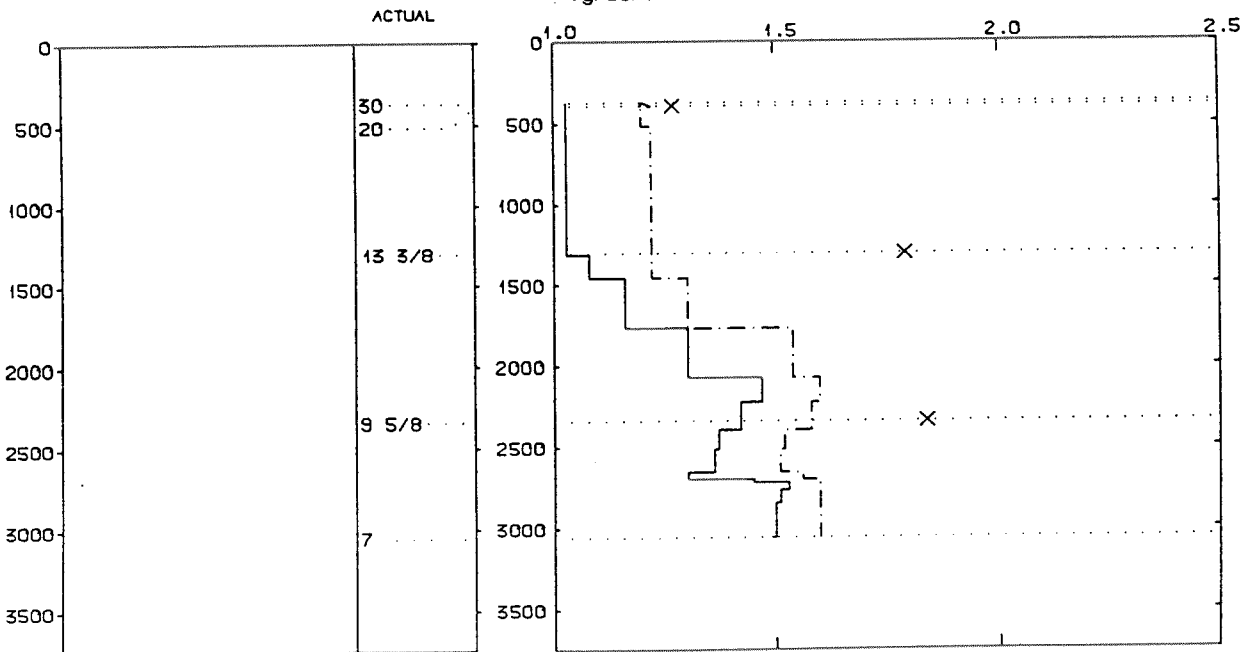
## WELL : 003309 13S PRESSURE COMPOSITE PLOT

DEPTH  
(RKB)  
(METERS TVD)

CASING

PRESSURE GRADIENTS  
(g/ccm)

— PORE PRESSURE (REPORT)  
 - - - MUDWEIGHT (REPORT)  
 X LEAK-OFF (REPORT)



# Well History 33/9-13 S

## GENERAL:

Appraisal well 33/9-13 S was designed to drill on the Statfjord Nord Structure. The primary objectives were as follows:

- 1) Appraise the Brent reservoir and prove oil to the northeast of the 33/9-8 location.
- 2) Obtain maximum structural and reservoir data: Gather reservoir data for the Brent Group in the oil leg.  
Penetrate Brent Group in the truncation zone.  
Spred well control over the Statfjord Nord Structure.

Secondary objective for the well was to explore the Statfjord Formation.

- 1) Penetrate the Statfjord reservoir updip of the 33/9-8 location.
- 2) Obtain additional structural and reservoir data.

## OPERATIONS:

Appraisal well 33/9-13 S was spudded by Ross Offshore semi-submersible rig Ross Isle 14 October 1987 and completed 24 December 1987 at a depth of 3077 m RKB in rocks of Jurassic age. Four cores were cut in the Brent and upper Dunlin Group.

The well location was moved approximately 300 m SSW in order to avoid a potential shallow gas zone at 381 m RKB and deviated back to the original target position. Shallow gas was encountered at 395,5- 399,- 404,5- and 547 m RKB.

Drilling proceeded without any significant problems. The whole Brent Group, consisting mainly of the Rannoch Formation, are oil-bearing.

The well was plugged and abandoned as an oil discovery.

## TESTING:

Two DST tests were performed in the Brent Group, Rannoch Formation.

# GEOLOGICAL TOPS

WELL: 33/9-13 S

	Depth m (RKB)
<i>Nordland Group</i>	385,0
<i>Utsira Fm</i>	957,0
<i>Hordaland Group</i>	1135,0
<i>Rogaland Group</i>	1706,5
<i>Balder Fm</i>	1706,5
<i>Sele Fm</i>	1772,5
<i>Lista Fm</i>	1862,0
<i>Shetland Group</i>	1929,0
<i>Jordsalfare Fm</i>	1929,0
<i>Kyrre Fm</i>	2204,0
<i>Cromer Knoll Group</i>	2702,0
<i>Brent Group</i>	2726,5
<i>Rannock Fm</i>	2726,5
<i>Broom Fm</i>	2810,5
<i>Dunlin Group</i>	2815,0
<i>Drake Fm</i>	2815,0
<i>Cook Fm</i>	2855,0
<i>Amundsen Fm</i>	2918,5
<i>Statfjord Fm</i>	3003,0
<i>TD.</i>	3077,0