

Well no : 6406/08-01

Operator : ELF

Coordinates : 64 21 55.01 N  
06 26 48.16 E

UTM coord. : 7140372 N  
376765 E

Licence no : 131

Permit no : 560

Rig : VINNI

Rig type : SEMI-SUB.

Contractor : SDS DRILLING

Bottom hole temperature : 166 deg.C

Elev. KB : 27 M

Spud. date : 87.09.15

Water depth : 348 M

Compl. date : 88.04.11

Total depth : 4914 M

Spud. class : WILDCAT

Form. at TD : E.JURASSIC

Compl. class : P&A. SHOWS

Prod. form :

Seisloca : HB - 12 - 84 SP. 130

## LICENSEES

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20.000000 ELF AQUITAINE NORGE A/S  
10.000000 ESSO NORGE A.S  
10.000000 PETROBRAS NORGE A/S  
50.000000 DEN NORSKE STATS OLJESELSKAP A.S  
10.000000 SVENSKA PETROLEUM EXPLORATION A/S

## 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	436.0	36	477.0	1.10
SURF.COND.	20	1301.0	26	1316.0	1.50
INTERM.	13 3/8	2635.0	17 1/2	2650.0	1.85
INTERM.	9 5/8	4195.0	12 1/2	4210.0	2.09
INTERM.	7	4640.0	8 1/2	4649.0	2.05
	5	4914.0	6	4914.0	.

## CONVENTIONAL CORES

Core no.	Intervals cored meters	Recovery		Series
		M	%	
1	4370.0 - 4388.5	18.5	100.0	
2	4388.5 - 4416.0	27.5	100.0	MIDDLE JURASSIC
3	4416.0 - 4443.8	27.8	100.0	MIDDLE JURASSIC
4	4443.5 - 4471.5	28.0	100.0	MIDDLE JURASSIC
5	4471.5 - 4499.0	26.9	97.8	MIDDLE JURASSIC
6	4649.0 - 4659.0	9.9	99.0	LOWER JURASSIC

## MUD PROPERTIES

Depth below KB meter	Mud weight g/cm <sup>3</sup>	Viscosity	Mud type
815.000	1.08	26.0	WATER BASED
1805.000	1.30	34.0	WATER BASED
2110.000	1.31	28.0	WATER BASED
2236.000	1.35	36.0	WATER BASED
2444.000	1.40	36.0	WATER BASED
3095.000	1.72	34.0	WATER BASED
3264.000	1.75	38.0	WATER BASED
3355.000	1.74	36.0	WATER BASED
4200.000	1.75	36.0	WATER BASED
4443.000	1.57	36.0	WATER BASED
4443.000	1.65	33.0	WATER BASED
4471.500	1.68	39.0	WATER BASED
4786.000	1.77	34.0	WATER BASED
4901.000	1.78	48.0	WATER BASED
4926.000	1.77	56.0	WATER BASED
4942.000	1.79	43.0	WATER BASED
4914.000	1.84	63.0	WATER BASED

## DRILL STEM TEST

### INTERVALS AND PRESSURES

Test no	interval meter	Choke size	Pressure (PSI)		
			WHP	BTHP	FFP
1.0	4701.000 - 4719.000		TIGHT FORMATION		
2.0	4413.000 - 4453.000	9.5	N/A	N/A	N/A

### 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					
TIGHT FORMATION					
2.0	0	0	0.000	0.000	0

## DRILL BIT CUTTINGS AND WET SAMPLES

SAMPLE TYPE	INTERVAL BELOW KB	NUMBER OF SAMPLES
Cutting	1320-4940	180
Wet Samples	1320-4905	600

## SHALLOW GAS

Interval below KB	REMARKS

# AVAILABLE LOGS

LOG TYPE	INTERVALS	1/200	1/500	Div.
DIFL LS BHC GR AC	371.000 - 1136.000	X	X	
DIFL BHC GR AC	1300.000 - 2647.000	X	X	
DIFL BHC AC GR	2631.000 - 4191.000	X		
DIFL BHC AC GR	2631.000 - 4209.000		X	
DIFL BHC AC GR	4195.000 - 4497.000	X	X	
DIFL LS BHC AC CAL	4195.000 - 4642.000	X	X	
DIFL BHC AC GR	4630.000 - 4911.000	X	X	
BHC AC GR	4195.000 - 4282.000	X		
CDL GR	1300.000 - 2627.000	X	X	
CDL GR	2631.000 - 4191.000	X	X	
CDL CNL GR	4195.000 - 4497.000	X	X	
CNL GR	4335.000 - 4497.000	X	X	
CDL CNL	4360.000 - 4639.000	X	X	
CDL CNL	4630.000 - 4908.000	X	X	
DLL MLL GR	4361.000 - 4643.000	X	X	
MWD	430.000 - 4825.000		X	
FMT HP CRYSTAL GAUGE	4368.000 - 4483.000			
CDM	2632.000 - 4207.000	X		
CDM	4195.000 - 4642.000	X		
CDM	4630.000 - 4908.000	X		
CDM AP	2632.000 - 4207.000	X	X	
CDM AP	4195.000 - 4642.000	X	X	
CDM AP	4630.000 - 4910.000	X	X	
RFT STRAIN GAUGE	4672.000 - 4890.000	X		
RFT S.W.H. GAUGE	4672.000 - 4890.000	X		
AC CBL VDL GR	2580.000 - 4195.000	X		
AC CBL VDL GR	4593.000 - 4892.000	X	X	
AC CBL VDL GR	3998.000 - 4630.000	X		
MUD	375.000 - 4942.000		X	
VELOCITY LOG	371.000 - 4642.000	1:1000	X	
(Synthetic Seismogram, Mairne, 10cm/s			9 stk)	
(V.S.P, Interpreters V.S.P, 10 cm/s			12 stk)	
(V.S.P, Downgoing Wawefield, 10 cm/s			1 stk)	
(Airgun Well Velocity Survey and Calibr. log			1 stk)	
(Two Way Travel Time, 10 cm/s			1 stk)	
Display of Well Velocity Survey Records, 1-6			6 stk)	

**MAIN OPERATIONS FOR WELL: 640608 01****Main operation: COMPLETION**

Sub operations	Minutes	Hrs	% of total
BOP/WELLHEAD EQ	420	7,0	4,49
CIRC/COND	4740	79,0	50,64
COMPL STRING	570	9,5	6,09
OTHER	90	1,5	0,96
PERFORATE	2430	40,5	25,96
WIRE LINE	1110	18,5	11,86
<b>Total</b>	<b>9360</b>	<b>156,0</b>	<b>100,00</b>

**Main operation: DRILLING**

Sub operations	Minutes	Hrs	% of total
BOP ACTIVITIES	3450	57,5	2,82
BOP/WELLHEAD EQ	9330	155,5	7,64
CASING	20610	343,5	16,87
CIRC/COND	4980	83,0	4,08
DRILL	54480	908,0	44,59
HOLE OPEN	4050	67,5	3,31
OTHER	930	15,5	0,76
PRESS DETECTION	150	2,5	0,12
REAM	600	10,0	0,49
SURVEY	1290	21,5	1,06
TRIP	21720	362,0	17,78
UNDERREAM	600	10,0	0,49
<b>Total</b>	<b>122190</b>	<b>2036,5</b>	<b>100,00</b>

**Main operation: FORMATION EVAL**

Sub operations	Minutes	Hrs	% of total
CIRC SAMPLES	1140	19,0	1,72
CIRC/COND	6780	113,0	10,25
CORE	2220	37,0	3,36
DST	24030	400,5	36,33
LOG	12720	212,0	19,23
OTHER	1230	20,5	1,86
TRIP	18030	300,5	27,26
<b>Total</b>	<b>66150</b>	<b>1102,5</b>	<b>100,00</b>

**Main operation: INTERRUPTION**

Sub operations	Minutes	Hrs	% of total
FISH	47700	795,0	59,28
MAINTAIN/REP	7140	119,0	8,87
OTHER	60	1,0	0,07
SIDETRACK	3420	57,0	4,25
WAIT	18090	301,5	22,48
WELL CONTROL	4050	67,5	5,03
<b>Total</b>	<b>80460</b>	<b>1341,0</b>	<b>100,00</b>

**Main operation: MOVING**

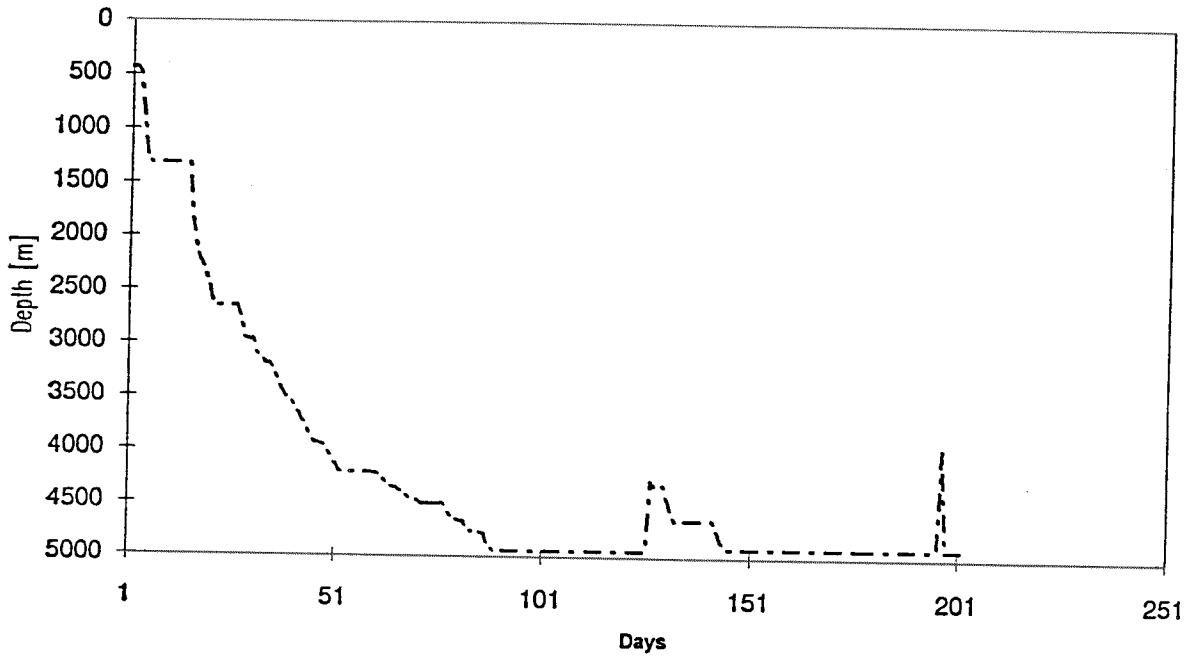
Sub operations	Minutes	Hrs	% of total
ANCHOR	1200	20,0	100,00
<b>Total</b>	<b>1200</b>	<b>20,0</b>	<b>100,00</b>

**Main operation: PLUG & ABANDON**

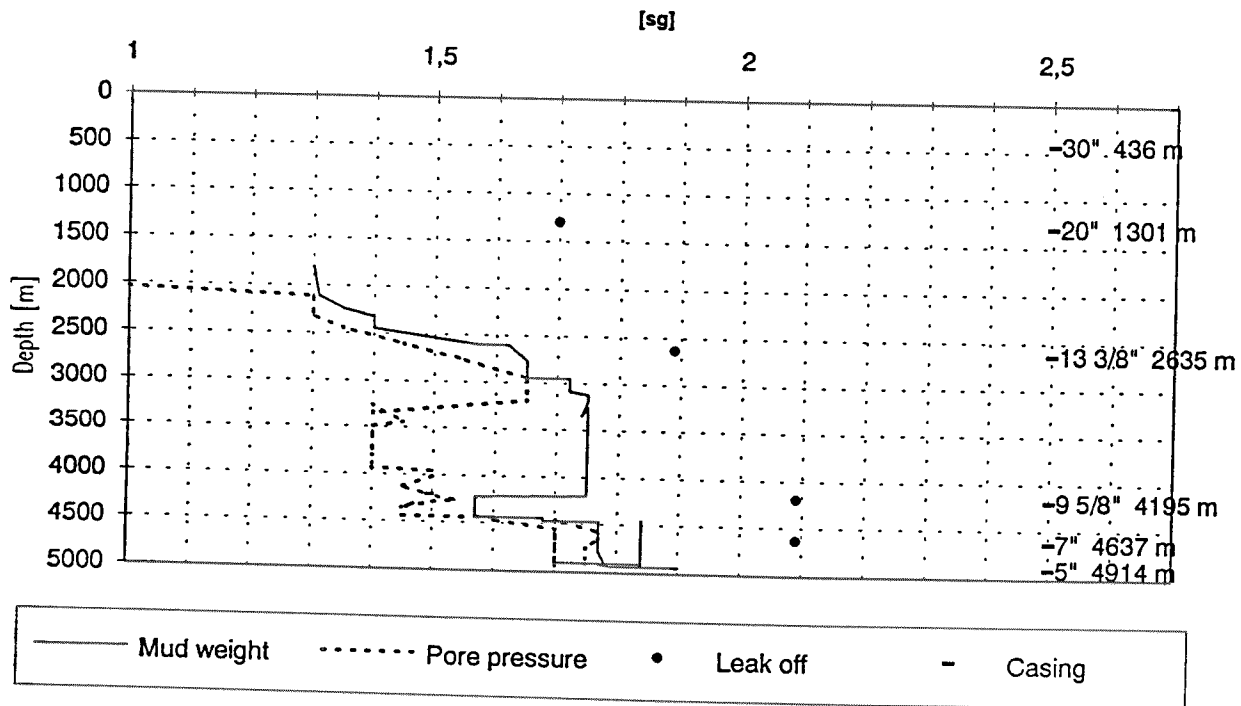
Sub operations	Minutes	Hrs	% of total
CEMENT PLUG	1650	27,5	12,73
CIRC/COND	780	13,0	6,02
CUT	300	5,0	2,31
EQUIP RECOVERY	4140	69,0	31,94
MECHANICAL PLUG	1170	19,5	9,03
OTHER	90	1,5	0,69
PERFORATE	390	6,5	3,01
SQUEEZE	150	2,5	1,16
TRIP	4290	71,5	33,10
<b>Total</b>	<b>12960</b>	<b>216,0</b>	<b>100,00</b>

Total time used 4872 hrs ( 203 days)

Depth v.s. time plot for well: 640608 01



Composite plot for well: 640608 01



# Well History 6406/8-1

## GENERAL:

Well 6406/8-1 was situated in the south-western corner of the Halten Terrace. The main objective of the well was to test for hydrocarbons in the Early and Middle Jurassic: Fangst Group and Ror and Tilje Formations. A secondary objective was the possibility of closure for sandstones and hydrocarbons in the Intra Cretaceous seismic marker.

The main structure in this block is a domal structuration at Base Cretaceous unconformity level with eastward dipping Jurassic beds below, partly truncated by the unconformity and partly by an onlapping basement high.

## OPERATIONS:

Wildcat well 6406/8-1 was spudded 15 September 1987 by Ditlev Simonsen semi-submersible rig Vinni and completed 11 April 1988 at a depth of 4914 m in Early Jurassic.

There was no shallow gas registered in the hole. Drilling proceeded to 4200 m without any significant problem. The pressure build-up started in Paleocene and reached max. of  $1.65 \text{ g/cm}^3$  at 2900 m.

During drilling there were indications of pressure dropping and it could be around  $1.45 \text{ g/cm}^3$  at the top of the reservoir. This was very uncertain because during and after coring there were observed gas in the mud, and there was a weak flow of formation fluid into the hole. The mud was later successively weighted up to  $1.77 \text{ g/cm}^3$ .

There were no Intra-Cretaceous sandstones of any importance, but several thin sandstone-stringers were encountered below approx. 3500 m. There were no signs of hydrocarbons in these stringers.

Top reservoir was encountered at 4367 m, and there was a slight increase in the amount of gas in the mud. Four cores were cut in the interval 4370 - 4499 m. The cores consisted of fine to very fine silica-cemented sandstones with much mica. There were shows, but these were hard to evaluate. It could be residual oil. There were observed gas-bubbles in the cores. The logs were not able to clarify whether the reservoir was hydrocarbon-bearing or not. RFT-tests indicated that most of the formation was tight, and the pressure of the reservoir was not determined.

After coring, when the string was to be put back in the hole, 3000 m of drillstring was lost. After a while it showed impossible to get the fish up. The hole was plugged back to 4195 and sidetracked from 4262 m. The sidetrack was started 14 January 1988.

An intermediate log was run down to 4500 m. During further drilling the MWD failed, there were only drill cuttings to rely on below this depth. Coal in the cuttings from approx. 4900 m indicated top Åre Fm.

At 4914 m the drillstring got stuck again. Earlier results from assumed Åre Fm. indicated a pore pressure of 1.85 g/cm<sup>3</sup>. RFT results indicated the pore pressure in the Tilje Fm. to be 1.75 g/cm<sup>3</sup>. Due to the great pressure difference between the two formations, drilling was impossible. It was decided to approve 4914 m as TD. 5" conductor casing was set at this depth.

Plugged and abandoned as a well with shows.

**TESTING:**

Two DST tests were performed in the well. DST 1 was in the Tilje Fm. in the interval 4701 - 4719.0 m, and DST 2 in the Fangst Group between 4413 - 4453 m.

# GEOLOGICAL TOPS

WELL: 6406/8-1

Depth m (RKB)

<i>Nordland Group</i>	375.0
<i>Naust Fm.</i>	375.0
<i>Kai Fm.</i>	1363.0
<i>Rogaland Group</i>	2597.0
<i>Shetland Group</i>	2752.0
<i>Cromer Knoll Group</i>	3963.0
<i>Lange Fm.</i>	3963.0
<i>Viking Group</i>	4099.0
<i>Melke Fm.</i>	4099.0
<i>Fangst Group</i>	4265.0
<i>Garn Fm.</i>	4265.0
<i>Ile Fm.</i>	4368.0
<i>Båt Group</i>	4494.0
<i>Ror Fm.</i>	4494.0
<i>Tilje Fm.</i>	4668.0
<i>Åre Fm.</i>	4894.0
<i>T.D.</i>	4914.0