ELF NORGE A/S

25/2 - 1

FRIGG EAST

GEOLOGICAL REPORT

WELLFILE

Dec 1973

1. PERTINENT DATA

1.1. General data

Licence	:	026	
Association	:	Norsk Hydro	34,60%
		Elf Norge	29,07%
		Aquitaine Norge	14,53%
		Total Marine Norsk	21,80%
Operator	:	ELF NORGE A/S	
Rig	:	Pentagone 81 (Neptune 7)	
Contractors	:	NEPTUNE	
	:	Mud logging = GEOSERVICES	

Location

Seismic	:	Line 71223, SP 260
Geographic	:	x = 02° 23' 02". 0 E
		y = 59° 55' 30". 2 N

Water depth : 103,5 m

Air Gap : 23,5 m

1.2. Drilling and operations time table

04.08.73 = Spudded
09.08.73 = Start drilling
10.08.73 = 30" casing set at 162 m
12.08.73 = 13" 3/8 casing set at 448 m
22.08.73 = SPE Run 1 = IES - BR.BHC - SWC 1
22+23.08.73 = 9" 5/8 casing set at 1907 m
25.08.73 = SPE - Run 2 = IES - CNL.GR
= HO.DST 1 = 1926 - 1938 m
03.09.73 = Core No. 1 = 1950 - 1968m
04.09.73 = Core No. 2 = 1973 - 1991 m
TD = 2740 m
Logging SPE Run 3 =IES - GR.BHT-CNL-FDC.GR - ML.MLL - DLL - HDT - CBL - SWC 2.
FIT 1 - 2 - 3
Velocity survey

21.09.73 = Completed

./3

1.3. Status

Gas - bearing
Plugged and abandoned

G E O L O G I C A L D A T A A N D R E S U L T S

I OBJECTIVES

The 25/2-1 well is located on the top of the eastern structure on the WSW-ENE trend of the Frigg Field.

The objective of this well was the lower tertiary sands, especially those aged EOCENE, which are equivalent to the gas - bearing sand section in the western Frigg wells.

Their thickness range around 100 m according to the seismic.

Sandy interbeds in the upper part of the cretaceous chalk were considered as an other objective.

II STRATIGRAPHICAL AND STRUCTURAL RESULTS

2.1. Stratigraphy

See the correlation table next page.

STRATIGRAPHICAL UNITS	TOP (below RkB)m	TOP (below m.s.l.)m	THICKNESS meter
PLEISTOCENE TO MIOCENE	127	- 103,5	894
OLIGOCENE	1021	- 997,5	403
UPPER MIDDLE EOCENE	1424	-1400,5	472
LOWER EOCENE Sands {1915 / 2003	1896	-1872,5	250
PALEOCENE TO DANIAN	2146	-2122,5	392
DANIAN	2538	-2514,5	115
MAESTRICHTIAN	2653	-2629,5	> 87
TOTAL DEPTH	2740	-2716,5	

2.2. Structural results

The top of the Frigg sands was found at 1915 m (-1892) i.e. only 8 meters above the average seismical estimate. Therefore, the top of the chalk was anticipated at 2673 m (-2650) and encountered at 2670 m (-2647), the upper part of the Maestrichtian being sandy and toped at 2553 m.

2.3. Reservoir

As expected, the Frigg sand body was found underlaying the Eocene green and brown-red shales.
The net sands are 88 m thick and show excellent reservoir qualities (porosity: 30 to 24%) as shown by cores K1 and K2. The top of the reservoir stands 74 m deeper than in well 25/1-1x.

Other paleocene reservoirs below were of very good quality too.

2.4. Shows and Fluids

2.4.1 EOCENE SANDS - The entrance of reservoir was pointed out by increasing in C1 gas and occurence of C2 and C3. The net pay zone includes 56 m of gas - bearing and 7 m of oil - bearing sand.

The gas/oil interface at 1971 m (-1947) is exactly at the same depth as in Frigg - Field.

Two wire-line tests were located in the gas-zone at 1973 m and 1974 m. The first test was transfered under PVT conditions, but the second one was plugged, certainly by sand.

A Third W.L. test in the transition zone at 1985 m produced some oil with 70% of salt water (35 g/l).

An open hole test was carried out from 1926 to 1938 m just after setting the 9" 5/8 casing at 1907 m in order to check a new type of sandscreen to be used in further development wells.

The gas-flowing yielded 637975 m 3/d with a 3/4" choke.

2.4.2 Only very weak shows were encountered in the Paleocene sand (COD formation) and the Danian and Maestrichtian sands.

All these reservoirs are reputed to be water wet from the logs.

- - -

ELF NORGE A/S

WELL NO. 25/2-1 PROD. EAST

25/2-1

NORWAY
OFFSHORE

COMPOSITE - LOG

DATUM:		
KB TO MSL	(Meters)	30.00 M
KB TO GL	(Meters)	24.00 M
WATER DEPTH	(Meters)	114.00 M
TOTAL DEPTH	(Driller's Depth)	3.500 M
TOTAL DEPTH	(Logger's Depth)	3.504 M
LAST CASING	(Driller's Depth)	9 5/8"
LAST CASING	(Logger's Depth)	3.500 M

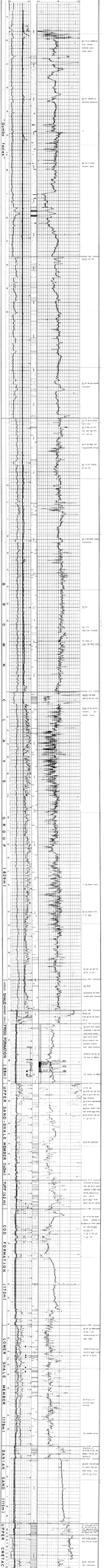
MUDTYPE: SEAWATER/GEL/LIGNOSULPHONATE
DENSITY: 1.03 - 1.05 SG
PH: 9.0 - 10.0
FLUID LOSS: 10 - 15 CC

RIGS: SEDCO 703

DATE: 1.9.1974

Logged from the rest

Logged from the rest


Drilling Time
Gamma Ray
Caliper
Sonic
Density
Neutron
Resistivity
Lithology
Cuttings
Mud Gas
Chromatograph
Hydrocarbons
Drilling Mud
Mud Weight
Viscosity
Chlorides
Temperature
Pressure
Gradient
Formation Strength
Pore Pressure
Fracture Gradient
Hole Stability
Casing Shoe
Cement Bond
Log Quality
Comments
Hole Deviation
Azimuth
Dip Angle
Dip Azimuth
Formation Dip
Structural Dip
Tectonics
Stratigraphy
Formation Tops
Lithostratigraphy
Biostratigraphy
Chronostratigraphy
Depositional Environment
Sedimentary Structures
Porosity
Permeability
Saturation
Reservoir Quality
Completion Data
Production Data
Remarks
Geological Comments
Drilling Comments
Operational Comments
Recommendations
Conclusions
Summary
Appendix
Glossary
Abbreviations
Symbols
Units
Scales
Legend
Index
Table of Contents
Preface
Introduction
Acknowledgements
References
Bibliography
Appendix A
Appendix B
Appendix C
Appendix D
Appendix E
Appendix F
Appendix G
Appendix H
Appendix I
Appendix J
Appendix K
Appendix L
Appendix M
Appendix N
Appendix O
Appendix P
Appendix Q
Appendix R
Appendix S
Appendix T
Appendix U
Appendix V
Appendix W
Appendix X
Appendix Y
Appendix Z
Appendix AA
Appendix BB
Appendix CC
Appendix DD
Appendix EE
Appendix FF
Appendix GG
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Appendix WWWWWWWWWWWWWWWWWWWWWWWWW
Appendix XXXXXXXXXXXXXXXXXXXXXXXXX
Appendix YYYYYYYYYYYYYYYYYYYYYYYYY
Appendix ZZZZZZZZZZZZZZZZZZZZZZZZZ
Appendix AAAAAAAAAAAAAAAAAAAAAAAAAA
Appendix BBBBBBBBBBBBBBBBBBBBBBBBBB
Appendix CCCCCCCCCCCCCCCCCCCCCCCCCC
Appendix DDDDDDDDDDDDDDDDDDDDDDDDDD
Appendix EEEEEEEEEEEEEEEEEEEEEEEEEE
Appendix FFFFFFFFFFFFFFFFFFFFFFFFFF
Appendix GGGGGGGGGGGGGGGGGGGGGGGGGG
Appendix HHHHHHHHHHHHHHHHHHHHHHHHHH
Appendix IIIIIIIIIIIIIIIIIIIIIIIIIIII
Appendix JJJJJJJJJJJJJJJJJJJJJJJJJJ
Appendix KKKKKKKKKKKKKKKKKKKKKKKKKK
Appendix LLLLLLLLLLLLLLLLLLLLLLLLLL
Appendix MMMMMMMMMMMMMMMMMMMMMMMMMM
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Appendix PPPPPPPPPPPPPPPPPPPPPPPPPP
Appendix QQQQQQQQQQQQQQQQQQQQQQQQQQ
Appendix RRRRRRRRRRRRRRRRRRRRRRRRRR
Appendix SSSSSSSSSSSSSSSSSSSSSSSSSS
Appendix TTTTTTTTTTTTTTTTTTTTTTTTTT
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Appendix IIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
Appendix JJJJJJJJJJJJJJJJJJJJJJJJJJJJJ
Appendix KKKKKKKKKKKKKKKKKKKKKKKKKKKKK
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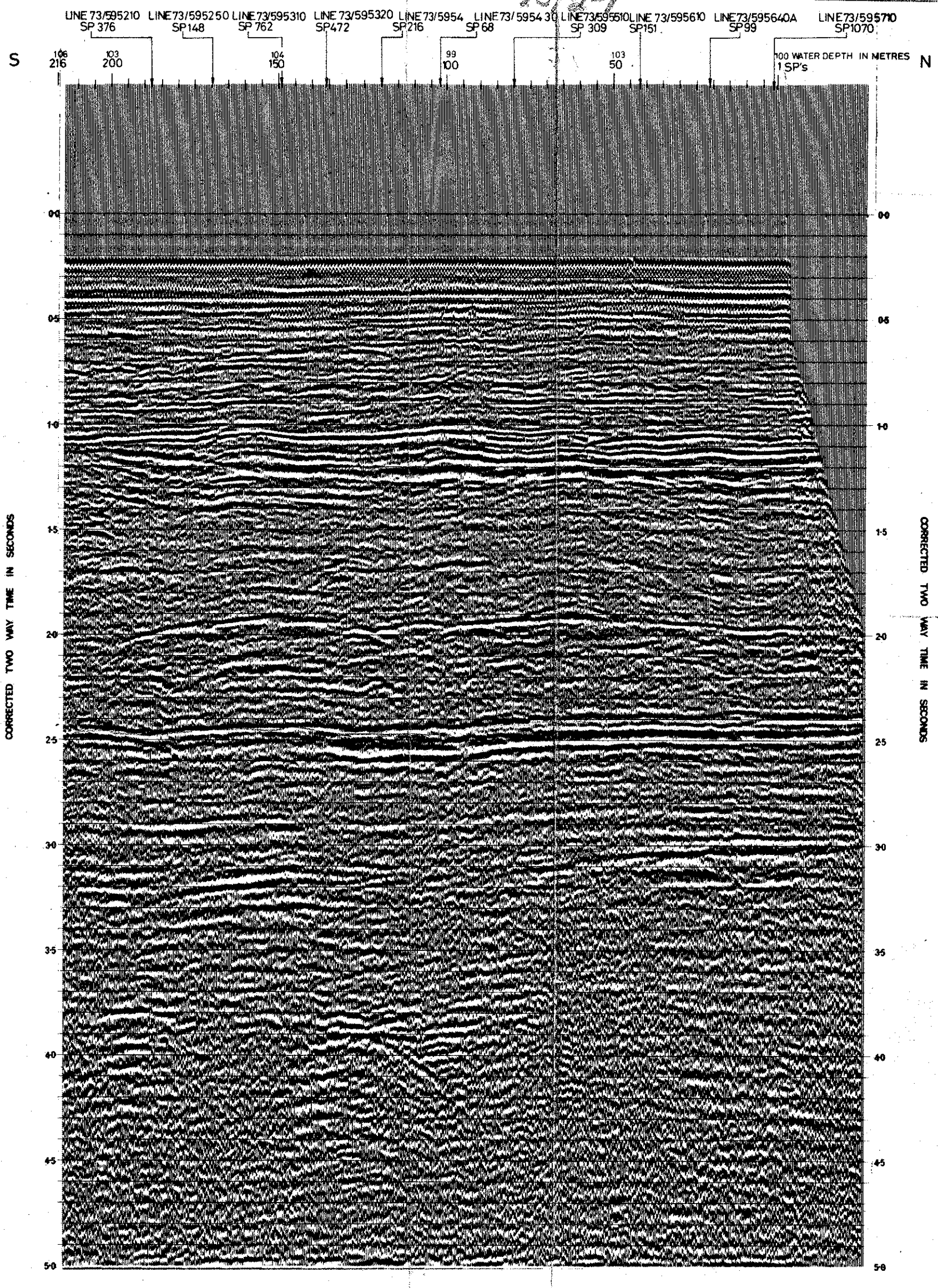
Appendix PPPPPPPPPPPPPPPPPPPPPPPPPPPPP
Appendix QQQQQQQQQQQQQQQQQQQQQQQQQQQQQ
Appendix RRRRRRRRRRRRRRRRRRRRRRRRRRRRR
Appendix SSSSSSSSSSSSSSSSSSSSSSSSSSSSS
Appendix TTTTTTTTTTTTTTTTTTTTTTTTTTTTT
Appendix UUUUUUUUUUUUUUUUUUUUUUUUUUUUU
Appendix VVVVVVVVVVVVVVVVVVVVVVVVVVVVV
Appendix WWWWWWWWWWWWWWWWWWWWWWWWWWWWW
Appendix

SHOT PT 192		SHOT PT 152		SHOT PT 122		SHOT PT 82		SHOT PT 42		SHOT PT 2	
TIME (MS)	V(RMS) (M/S)	TIME (MS)	V(RMS) (M/S)	TIME (MS)	V(RMS) (M/S)	TIME (MS)	V(RMS) (M/S)	TIME (MS)	V(RMS) (M/S)	TIME (MS)	V(RMS) (M/S)
0	1478	0	1478	0	1478	0	1478	0	1478	0	1478
500	1608	500	1594	500	1591	500	1608	500	1615	500	1597
1000	1831	1000	1794	1000	1786	1000	1832	1000	1853	1000	1801
1500	1977	1500	1933	1500	1968	1500	1946	1500	1990	1500	2002
1700	2031	1700	1986	1700	2030	1700	2014	1700	2041	1700	2056
1900	2085	1900	2047	1900	2093	1900	2084	1900	2085	1900	2110
2100	2151	2100	2115	2100	2166	2100	2161	2100	2136	2100	2162
2300	2231	2300	2202	2300	2246	2300	2241	2300	2236	2300	2221
2500	2310	2500	2306	2500	2326	2500	2331	2500	2337	2500	2301
3000	2689	3000	2637	3000	2720	3000	2607	3000	2594	3000	2523
3500	2953	3500	2914	3500	2983	3500	2868	3500	2894	3500	2861
4000	3229	4000	3200	4000	3228	4000	3177	4000	3199	4000	3179
5000	3809	5000	3809	5000	3809	5000	3809	5000	3809	5000	3809

Hz	T.S Sonic	T.S Section	Cycle corr
C_0	0.501	0.521	0
C_{1a}	0.941	0.930	0.026
C_1	0.989	1.015	0.026
C_2	1.162	11.93	0.031

25/12-1



FRIGG GROUP

1973 SEISMIC SURVEY IN NORWEGIAN WATERS

LINE 73/0223

SP's 216-1

SECURITY No. 667016

PARTY SS(M)L 667

DATE RECORDED AUGUST 1973

DATE PROCESSED (FINAL) OCTOBER 1973

TV FILTERED SECTION

PROCESSED THROUGH SEISYSTEM 70

1195

RECORDING PARAMETERS	PROCESSING SEQUENCE
CABLE 0-220-2570m	1 EDIT
FILTER 6-62 Hz.	TRACE SELECTION
SAMPLING INTERVAL 4ms	2 DECONVOLUTION
BINARY GAIN OFS 111	3 CORRECTION
GEOPHONE INTERVAL 50m	4 TRACE EQUALISATION
ENERGY SOURCE AIRGUN	5 STACK 24 FOLD
SHOT INTERVAL 50 m	6 DECONVOLUTION
	7 FILTER
	8 TRACE EQUALISATION

PROCESSING PARAMETERS

SAMPLING INTERVAL 4ms

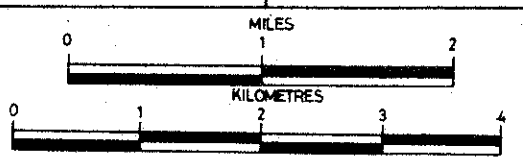
CORRECTION DATUM M.S.L.
CABLE AND GUNS CORRECTED TO DATUM

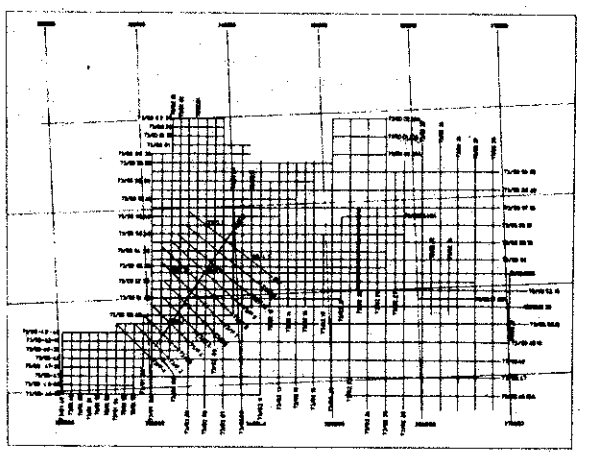
T.V. DECONVOLUTION (operator determined trace by trace)

	OPERATORS	OPERATOR LENGTHS (ms)	DERIVATION WINDOW (ms)	PREDICTIVE GAP (ms)
BEFORE STACK	2	212	TRACE 1 500-3500 TRACE 48 2400-4200	24
AFTER STACK	2	220	200-3000	40

BAND PASS FILTER		CUT-OFF Hz	PASS-BAND Hz		CUT-OFF Hz
APPLICATION TIMES (ms)	0	12	15	60	65
	500	12	15	60	65
	1000-2500	7	10	50	55
	3100	7	10	40	45
	3500-5000	7	10	30	35

SCALE	DISPLAY POLARITY
HORIZONTAL 1:31500	GEOPHONE : COMPRESSION
VERTICAL 10cm = 1.0s ☐ 1:63000 = 2.0s ☐	TAPE : POSITIVE NUMBER
	DISPLAY : WHITE
PREPARED: MARINE PROCESSING GROUP	APPROVED:





COMPAGNIE	SONDAGE:	PERMIS OU CONCESSION	REGION
ELF NORGE	FRIGG EST 1	BLOC 25/12	MER DU NORD NORVEGE

Sigle du puits : 25/2-1

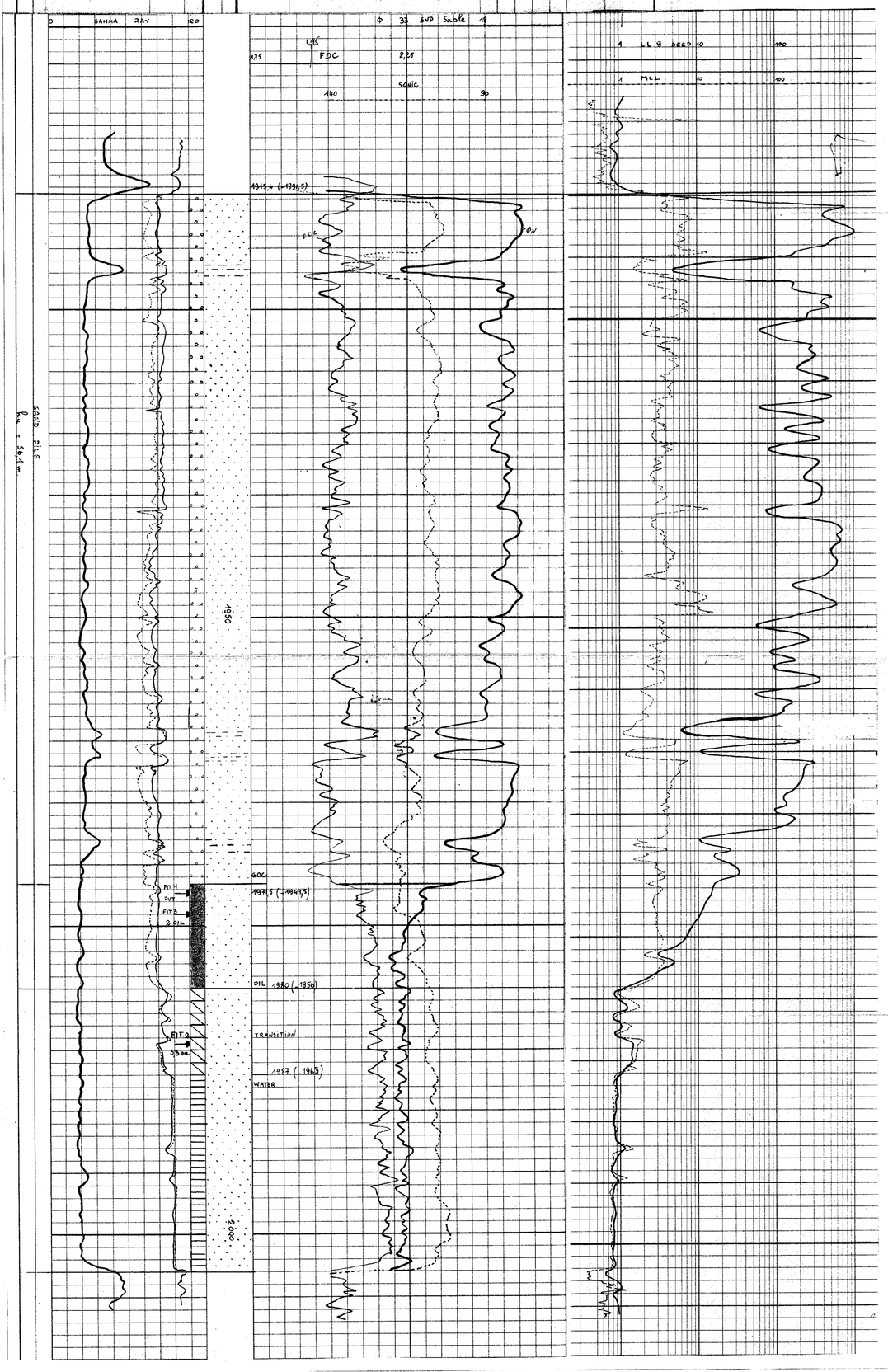
RESERVOIR : PALEOCENE

ECHELLE : 1:200

Coordonnées du sondage :	x = 02° 23' 02" N y = 59° 53' 30" E z_{sol} = -103,5 z_t = 23,5
Origine des profondeurs : sol ou table de rotation	
Appareil de forage :	NEPTUNE 7
Objectif du sondage :	
Société de logging :	SPE
Correction de déviation du trou :	0,5 m. à 1900 m.
Profondeur finale diagraphies :	

AMF Folio n°2 Date 9 Mai 74

ENAP - DEPARTEMENT GISEMENTS N° 2856



Cut : 18 m
Recovered: 16,3 m
Loss: 1,7 m

90,5 %

Company: Elf Norge
Well no : 25/2-1
Core no : 1.

Date: 03.08.73
Depths: 1950 - 1968 m

Depths	% CO_3 Ca	PERM	POROS	SHOWS	DIPS	Log	DESCRIPTION
1950		- excellent reservoir -		+ No fluo, very weak to no cut	None		①
1951				+			Sand, greyish, clean, friable, fine to medium grained, subang. to subround.; very coarse grains disseminated through the whole core.
1952				+			Some scattered greenish and rose minerals.
				+			Muscovite.
1953							Rare clay inclusions, whitish to greenish.
1954							
1955							
1956							
1957							
1958							
1959							

Cut 18 m
Recovered 16,3 m
Loss 1,7 m

90,5 %

Company Elf Norge
Well no 25/2-1
Core no 1.

Date 03.08.73
Depths 1950 - 1968 m

Depths	% CO_3 Co	PERM	POROS	SHOWS	DIPS	Log	DESCRIPTION
1959		excellent porosity and permeability		- HC smell - salty taste - no cut - no fluo -			② White kaolinite inclusion.
1960							Shale beige, thin streaks and laminae.
							Volcanic tuff, grey with white pigments.
1961							
1962							Sand A/A.
1963							While Coring: average penetrating ratio 2 m/h Few minor gas cut.
1964							
1965							
1966							1966,30
1967							
1968							

Cut : 18 m
Recovered: 6,8 m
Loss: 11,2 m

38 %

Company: Elf Norge
Well no: 25/2-1
Core no: 2.

Date: 04.09.73
Depths: 1973-1991m

Depths	% $CaCO_3$	PERM	POROS	SHOWS	DIPS	Log	DESCRIPTION
1973							①
1974							
1975							
1976							
1977							
1978							
1979							
1980							
1981							
1982							

No shows while coring

Cut 18 m
Recovered 6,8 m 38 %
Loss 11,2 m

Company Elf Norge
Well no 25/2-1
Core no 2.

Date 04.09.73
Depths 1973-1991 m

Depths	Co3Co	PERM	POROS	SHOWS	DIPS	Log	DESCRIPTION
1982				Fluo			②
				Cut ccl4			
1983							
1984							G/O ? 1984,2 m
							Sand, brownish down to 1987m, then greyish, fine to medium, mod. sorted, subrounded to subangular grains. Micas and green minerals (Pyroxen, wheathered amphibols?) Few bituminous shale inclusions, and coarse, rounded, milky quartz grains.
1985				bright yellow			
				deep brown			
1986							Oil bleeding.
1987		-excellent reservoir-					O/W 1987m
							At 1986m, shaly, soft pebble, greenish grey, sandy, slightly calcareous and micaceous. Pigmented-looking (reworked tuffs?)
1988				light yellow			
				brown			
1989							Transition zone
1990				yellowish spots			
				light brown			
1991							

SERVICE COMPANY :	SPE
ASKED :	30
RECOVERED :	27
SHOT :	
LOST :	2
FULL BULLET :	

SIDE WALL CORES DESCRIPTION

WELL :	25/2-1	RUN N°	1
LICENCE :	026	PAGE N°	1
		DATE :	22-08-73

Elf NORGE A/S

tr : trace - M : medium - G : good CL

N°	DEPTHS Meters	REC	LITHOLOGY	Fluorescence				CUT
1	1905	0	Lost					
2	1903	1	Shale, soft, light grey, no silty, no calc					
3	1892	1	a/a					
4	1880	1	Shale, brown and green ("apple green")					
5	1865	1	Shale, soft, light grey					
6	1850	1	a/a					
7	1840	1	a/a					
8	1785	1	Shale, light grey, calcareous					
9	1750	1	Shale, grey, no silty, no calc					
10	1715	1	a/a					
11	1655	1	Shale, brownish grey					
12	1595	1	a/a					
13	1545	1	Shale, grey, micromicaceous, w/calcareous joints					
14	1485	1/4	Shale, grey to brownish-grey					
15	1450	1	Shale, grey, micromicaceous					
16	1405	ε	Shale, dark bluish-grey, no calc					
17	1355	1	Shale, dark brownish-grey, slightly calcareous					
18	1300	1	Shale, soft, brown, very calcareous, granular texture					

NONE

SERVICE COMPANY :	SPE
ASKED :	30
RECOVERED :	27
SHOT :	
LOST :	2
FULL BULLET :	

SIDE WALL CORES DESCRIPTION

WELL :	25/2-1	RUN N°	1
LICENCE :	026	PAGE N°	2
		DATE :	22-08-73

Elf NORGE A/S

tr : trace - M : medium - G : good

CL

N°	DEPTHS	REC	LITHOLOGY	Fluorescence				CUT
19	1202	1	Sand, very fine grained, well sorted, subang., w/glauconite					
20	1185	1	Shale, brown, calcareous					
21	1115	ε	Mud cake and shale, green grey, calcareous, granular texture					
22	1087	1	Sand, fine to coarse, subang., w/green grey to brown shaly cement					
23	1035	1	Sand, very fine, angul., green to brown calcareous and shaly cemented. Micas and pyrite.					
24	940	1	Sand, very fine, subrounded, abundant glauconite					
25	905	1	Sand, very fine, subang., with abundant dark brown calcareous, shaly and micromicaceous cement					
26	840	0	Lost					
27	755	1/2	Sand, medium to coarse grained, light brown, slightly calcareous, abundant glauconite					
28	645	1	Sand, fine to medium grained, w/tan shaly and calcareous cement, abundant glauconite					
29	550	1	Sand, fine to coarse, mainly coarse grained, tan shaly cemented					
30	488	1	Sand, badly sorted, mainly medium grained, subrounded to subangular, yellow-green					

SERVICE COMPANY :	SPE
ASKED :	30
RECOVERED :	26
SHOT :	30
LOST :	0
FULL BULLET :	26

SIDE WALL CORES DESCRIPTION

WELL :	25/2-1	RUN N°	2
LICENCE :	026	PAGE N°	1
		DATE :	16-09-73

ELF NORGE A/S

tr : trace - M : medium - G : good V.G.

N°	DEPTHS	REC	LITHOLOGY	Fluorescence				CUT
1	2730	0	Empty bullet					
2	2711	2/3	Shale, hard, grey, very calcareous					
3	2677	1/5	Limestone, mudstone, grey, chalky					
4	2669	1/3	Sandstone, slightly indurated, greyish, fine to coarse grained, w/ shaly and calcareous cement					
5	2662,5	0	Empty bullet					
6	2657	0	Mud cake					
7	2653	4/5	Calcareous shale, medium hard, greenish grey					
8	2639	1/10	Sand, friable, greyish, fine to medium grained, subangular, w/ muscovite and black shale inclusions					
9	2585	2/5	a/a					
10	2560	1/2	a/a					
11	2553	2/3	Shale, soft, dark grey, fissile, w/ subvertical sliken side					
12	2535	1	a/a					
13	2515	2/3	a/a					
14	2490	1/2	a/a					
15	2466	1	a/a w/ micas and bituminous joints					
16	2445	1	as per N° 14 above					
17	2425	1	Shale, dark grey to greenish, nodular texture, brownish shaly joints					
18	2407	1	a/a but doubtful depth					

SERVICE COMPANY :	SPE
ASKED :	30
RECOVERED :	26
SHOT :	30
LOST :	0
FULL BULLET :	26

SIDE WALL CORES DESCRIPTION

WELL :	25/2-1	RUN N°	2
LICENCE :	026	PAGE N°	2
		DATE :	16-09-73

Elf NORGE A/S

tr : trace - M : medium - G : good V. G.

N°	DEPTHS	REC	LITHOLOGY	Fluorescence				CUT
19	2405	1	a/a					
20	2391,5	2/3	a/a					
21	2377	1	Shale, green-grey, slightly micaceous and fissile, with joints and nodules of sandstone fine grained and shaly.					
22	2362	1	Sandstone whitish , very fine, micaceous, w/green-grey shaly laminae.					
23	2353	4/5	Shale, very sandy, muscovite.					
24	2342	1/3	Shale, green-grey, micromicaceous.					
25	2315	0	Empty bullet.					
26	2290	1/3	Sand, white, fine to medium. Some coarse grains and greenish minerals (?)					
27	2257	1	Shale, grey, micromicaceous, rusty inclusions.					
28	2237	2/3	a/a					
29	2229	2/3	Shale grey w/thin green, sandy shale interbeds.					
30	2223	1/2	Sand, white, fine, well sorted.					

SERVICE COMPANY :	SPE
ASKED :	30
RECOVERED :	27
SHOT :	30
LOST :	1
FULL BULLET :	27

SIDE WALL CORES DESCRIPTION

WELL :	25/2-1	RUN N°	3
LICENCE :	026	PAGE N°	1
		DATE :	16-09-73

Elf NORGE A/S

tr : trace - M : medium - G : good Y.G.

N°	DEPTHS	REC	LITHOLOGY	Fluorescence				CUT
1	2455	1	Shale, dark grey, micromicaceous					
2	2395	0	Empty bullet					
3	2359	1/6	Sand, white, fine to medium, rare micas					
4	2320	2/5	a/a					
5	2265	3/5	a/a					
6	2213	1	Shale, grey, slightly calcareous, fissile, rare light grey sandy interbeds					
7	2200	1/2	Sand, white, fine to medium, subangular, rare glauconite					
8	2187	1/10	Shale, dark grey					
9	2180,5	1/5	Shale, white and grey laminae					
10	2165	1/2	Shale, dark grey and slight-grey, pyritic shaly concretions (tuffitic facies). Sliken side					
11	2150	4/5	Shaly and tuffitic concretions. Many quartz and grey limy nodules					
12	2132	1	Sand, white, fine to medium grained, slightly micaceous and shale grey, "tuffitic facies", very sandy					
13	2119,5	1	Shale, hard, light grey with dark grey, fissile, shale interbeds					
14	2103,5	1	Sand, fine, well sorted, subangular w/grey shale inclusions and joints					
15	2090	1	Grey shale and sand, white, fine, well sorted					
16	2075	2/3	Sand white, fine, well sorted					
17	2063,5	1	a/a with abundant green and brown shale inclusions and interbeds					
18	2053	2/3	Sand, whitish, fine to medium					

SIDE WALL CORES DESCRIPTION

SERVICE COMPANY :	SPE
ASKED :	30
RECOVERED :	27
SHOT :	30
LOST :	1
FULL BULLET :	27

WELL : 25/2-1
LICENCE : 026

RUN N° 3
PAGE N° 2
DATE : 16-09-73

Elf NORGE A/S

tr : trace - M : medium - G : good Y.G.

N°	DEPTHS	REC	LITHOLOGY	Fluorescence			CUT
19	2050	0	Empty bullet.				
20	2040	4/5	Sand, greyish, fine to medium grained.				
21	2025,5	4/5	Shale, green-grey, no calc with scattered brown calcareous shale nodules.				
22	2017	1	Shale, red-brown.				
23	2010	1	a/a				
24	2005	1	Shale, greenish, very calcareous. Red-brown shale and white, fine, calcareous sandstone inclusions.				
25	1990	1	Sand, whitish , fine to medium; some coarse quartz HC smell.				
26	1983	4/5	a/a HC smell				
27	1940	1/3	a/a				
28	1921	2/3	Sand, very fine and grey shale laminae.				
29	1913	-	Lost.				
30	1908,5	1	Shale, grey w/nodular texture.				

Coord X: 02° 23' 02.0" Z ground . 103,5 m Y: 59° 55' 30.2" Z RKB. 23,5 m Seismic line 71.223 shot 260 Depths datum: R.K.B. Rig: NEPTUNE 7. (Pentagone 81) Stopped in: Upper Cretaceous	Spudded: 04.08.73 Started drilling: 09.08.73 At TD: 14.09.73 Completed: 21.09.73 TD Driller: 2740 m TD Logger: 2738 m	Well: 25/2-1	Country: Norway OFF-SHORE

OPERATOR: ELF NORGE A/S

LICENCE: 026 OWNED BY: PETRONORD

TARGETS:

Eocene sands.
Sand levels in the Paleoc. and Upper Cretaceous.

RESULTS:

Frigg formation: Sand, gas bearing - Paleocene sands and Upper Cretaceous, water wet -

CASINGS

30"	162 m
13 3/8"	448 m
9 5/8"	1907 m

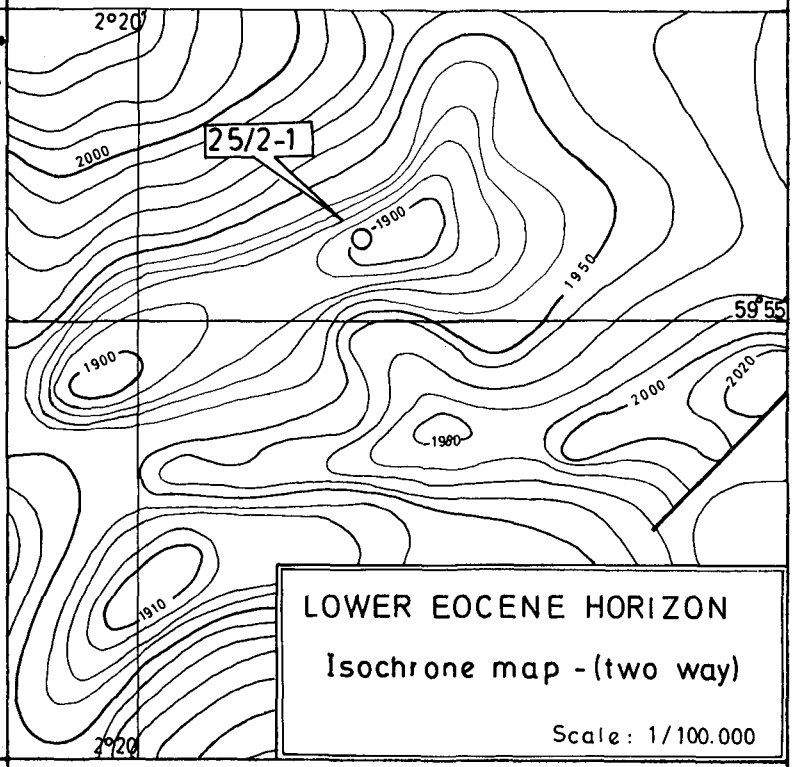
CORES

1	1950 - 1968	90,5%
2	1973 - 1991	38%
SWC1	2730 - 2223	26/30
SWC2	2455 - 1908,5	27/30

SHOWS

Down to 1915 m average C_1 < 1% max. 2,3 at 1990 m

- 1915 - 1971 m
- 1971 - 1978 m
- 1978 - 1986 m
- at 2392 m
  2406 - 2408 m
  2423 - 2430 m



LOWER EOCENE HORIZON
Isochrone map - (two way)
Scale: 1/100.000

TESTS

DST1	1926 / 1938	PF = 196,7 bars at 1908 RKB
	1/4"	106.167 m³/j
	1/2"	445.280 m³/j
	3/4"	637.975 m³/j
FIT 1	1973	PVT transfer
FIT 2	1984	10 l 35°/l (300 - 500 cc oil)
FIT 3	1974	10 l 35°/l (2000 cc oil)

LOGS

IES	1909,5 - 448	1
SLGR	1909 - 448	1
IES	1945,5 - 1904	2
CNL-GR.	1945 - 1904	2
IES	2737,5 - 1904	3
SLGR	2737 - 1904	3
CNL FDCGR	2737 - 1904	1
MLMLL	2737 - 1904	1
DLL	2737 - 1904	1
HDT	2737 - 1904	1
CBL	1904 - 400	1
Veloc. surv.	2720 - 500	

INTERPRETATION

Check by:

elf ERAP DIRECTION EXPLORATION N° 27296 G.D.

Z: RKB 23,5 m
Z: Ground or Sea bottom 103,5 + 23,5 = 127 m

Well: 25/2-1

Depths E	Litho-section	Formations	Stages	Shows	Descriptions. Obs.
					23,5m MSL
200					
400					127m Sea bottom
600			MIOCENE to PLEISTOCENE		
800 / 250					drilling without returns
1000					
1200					
1400					
1600 / 500					
1800					
2000					sd f to crs bad sorted subrd grd, with shell frag. musc. and glauc common. sh drk gry interbed
2200					
2400 / 750					lignite
2600					
2800					
3000					
3200 / 1000					lumachelle
					1021
3400			OLIGOCENE		cly sft gry-brn grnish
3600					sd f to crs interb.
3800					lmst string

Depths	Formations	Stages	Descriptions. Obs.
4000 / 1250	"Gumbo facies"	OLIGOCENE	
4200			sh a.a.
4400			
4600			1424
4800 / 1500			sd/sdst subrd gr light beige calc cmt
5000			clyst, sft, gry, gry brn micromic. sometimes calcareous.
5200			
5400			
5600 / 1750		MIDDLE to UPPER EOCENE	dol and lmst string
5800			
6000			
6200			sh becoming brn beige with apple grn incl., then sh brn rd (1896, 1915)
6400	DST 1, K1+2, FIT 13, FIT 2	FRIGG FORM	sd gryish f md mod sort. subang subrd gr some crs gr tuff levels at 1960,5 and 1986 m.
2000 / 6600	UPPER SAND / SHALE MEMB.	LOWER EOCENE	2003 sh grnish calc, then sh sft brn rd
6800			sd gryish f md moder. sorted and sh gry, grn gry, tr of sh rd brn
7000			2146
	TUFF.		volc. tuffs, sh gry light gry and sdst calc cmt (2188)
7200	COD FORMATION	PALEOCENE	
2250 / 7400			sd f md a.a. scattered crs gr calc stringers interc sh gry tr sh rd and grn
7600			

9% 1907 m

Depths E	Litho-section	Formations	Stages	Shows	Descriptions. Obs.
		COD.F	PALEOCENE		a.a.
7800		LOWER SHALE/SAND MEMBER	DANIAN to	▲	2360 sh drk gry slightly no calc grnish rd brn shaly joints string of sdst f to md calc betw. 2392-2465 m.
8000					
8200 2500					thin lmst or dol. streaks/nod.
8400		DANIAN SAND	DANIAN		2538 2557 altern. sd - sdst sh sd gryish f med. mod. sort. subang subrd gr
8600					
8800			MAESTR.		2653 2670 mrl and sdst f crs calc lmst, mudst/wakest chlky compact sh gry limy
9000 2750	T.D. 2740m				
9200					
9400					
9600					
9800 3000					
10000					
10200					
10400					
10600 3250					
10800					
11000					
11200					
11400					

Z : RKB 23,5 m
Z : Ground or Sea bottom 103 5 + 23,5 = 127 m

Well: 25/2-1

3500 11600 11800 12000 12200 3750 12400 12600 12800 13000 4000 13200 13400 13600 13800 4250 14000 14200 14400 14600 4500 14800 15000 15200

Coord X: 02° 23' 02.0" Z ground . 103,5 m Y: 59° 55' 30.2" Z RKB. 23,5 m Seismic line 71.223 shot 260 Depths datum: R.K.B. Rig: NEPTUNE 7. (Pentagone 81) Stopped in: Upper Cretaceous	Spudded: 04.08.73 Started drilling: 09.08.73 At TD: 14.09.73 Completed: 21.09.73 TD Driller: 2740 m TD Logger: 2738 m	Well: **25/2-1** Country: **Norway** OFF-SHORE

OPERATOR: ELF NORGE A/S — LICENCE: 026 — OWNED BY: PETRONORD

TARGETS:

Eocene sands.
Sand levels in the Paleoc. and Upper Cretaceous.

RESULTS:

Frigg formation: Sand, gas bearing - Paleocene sands and Upper Cretaceous, water wet -

CASINGS

30"	162 m
13 3/8"	448 m
9 5/8"	1907 m

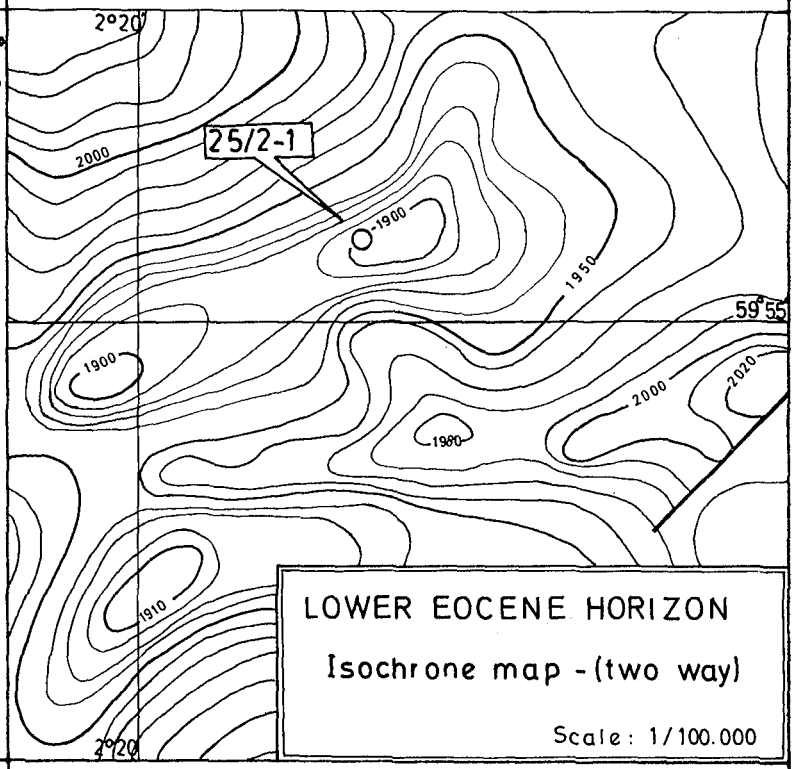
CORES

1	1950 - 1968	90,5%
2	1973 - 1991	38%
SWC_1	2730 - 2223	26/30
SWC_2	2455 - 1908,5	27/30

SHOWS

Down to 1915 m average C_1 <1.% max. 2,3 at 1990 m

- 1915 - 1971 m
- 1971 - 1978 m
- 1978 - 1986 m
- at 2392 m
  2406 - 2408 m
  2423 - 2430 m



LOWER EOCENE HORIZON
Isochrone map - (two way)
Scale: 1/100.000

TESTS

DST_1	1926 / 1938	PF = 196,7 bars at 1908 RKB
	1/4"	106.167 m³/j
	1/2"	445.280 m³/j
	3/4"	637.975 m³/j
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FIT 2	1984	10 l 35°/l (300-500 cc oil)
FIT 3	1974	10 l 35°/l (2000 cc oil)

LOGS

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MLMLL	2737 - 1904	1
DLL	2737 - 1904	1
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CBL	1904 - 400	1
Veloc. surv.	2720 - 500	

INTERPRETATION

Chr. Kvam:
By:

Z: RKB 23,5 m
Z: Ground or Sea bottom 103,5 + 23,5 = 127 m

Well: 25/2-1

Depths E	Litho-section	Formations	Stages	Shows	Descriptions. Obs.
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5400			
5600 / 1750			dol and lmst string
5800			
6000			
6200			sh becoming brn beige with apple grn incl., then sh brn rd
			1896 1915
Co	DST 1 K1+2 FIT 13 FIT 2	LOWER EOCENE	sd gryish f md mod sort. subang subrd gr some crs gr tuff levels at 1960,5 and 1986 m.
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2000 / 6600	UPPER SAND / SHALE MEMB.		2003 sh grnish calc, then sh sft brn rd
6800			sd gryish f md moder. sorted and sh gry, grn gry, tr of sh rd brn
7000 / C1			2146
	TUFF		volc. tuffs, sh gry light gry and sdst calc cmt
			2188
7200	COD FORMATION	PALEOCENE	sd f md a.a. scattered crs gr calc stringers interc sh gry tr sh rd and grn
2250 / 7400			
7600			

9⅝ 1907 m

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Well: 25/2-1

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8400		DANIAN SAND	DANIAN		sd gryish f med. mod. sort. subang subrd gr
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					2653 2670 mrl and sdst f crs calc
8800			MAESTR.		lmst, mudst/wakest chlky compact
9000 2750	T.D. 2740m				sh gry limy
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9800 3000					
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10200					
10400					
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10800					
11000					
11200					
11400					

3500	
11600	
11800	
12000	
12200	
3750	
12400	
12600	
12800	
13000	
4000	
13200	
13400	
13600	
13800	
4250	
14000	
14200	
14400	
14600	
4500	
14800	
15000	
15200	

POSITION MAP

elf

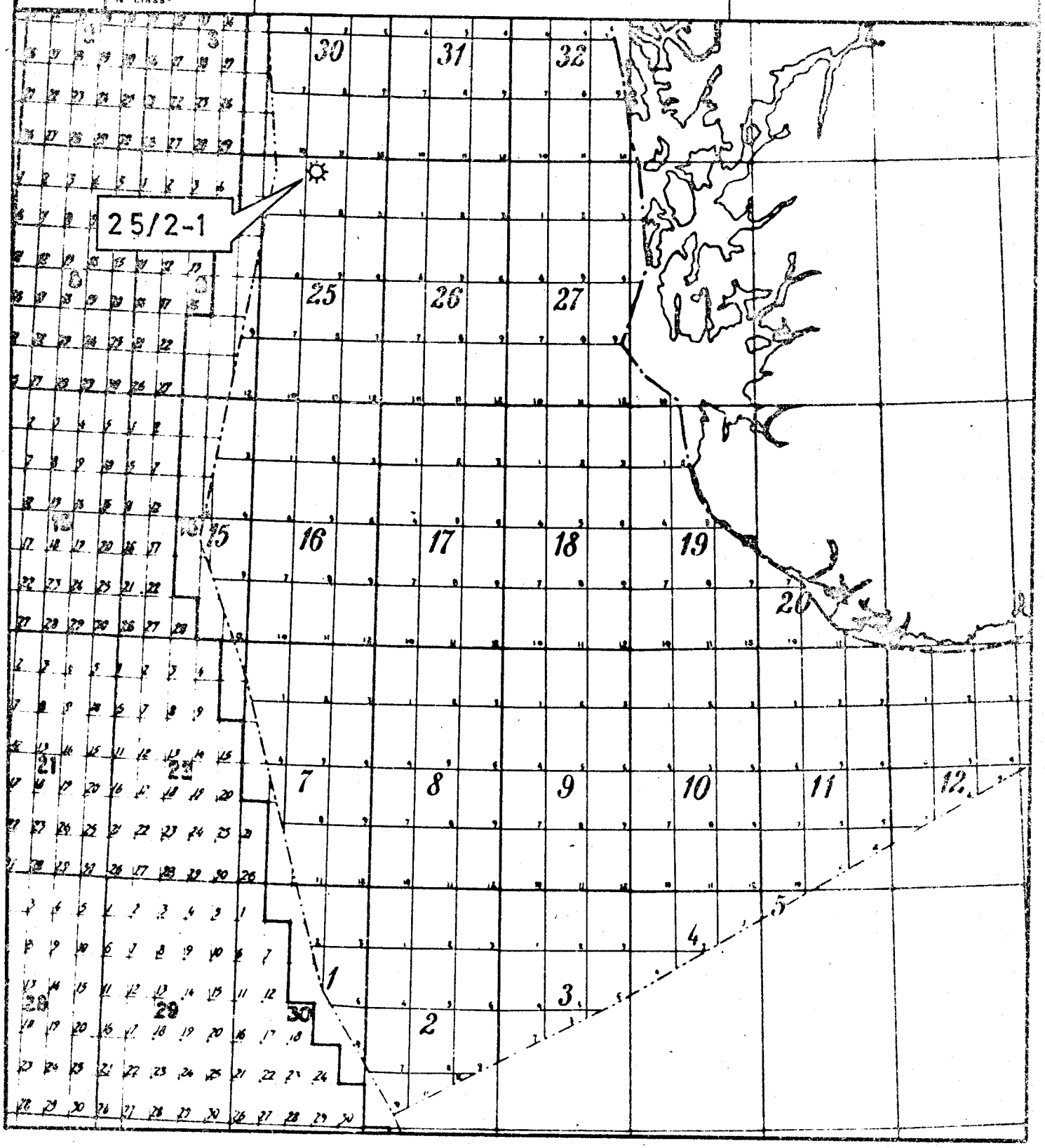
elf NORGE A/S

Echelle : 1/25000000

Date 7.12.73

Auteur

N°classt

25/2-1 - FRIGG EAST.

elf NORGE