

L-98

7253

ELF NORGE A/S

GEOLOGICAL REPORT

25/4-2 well

EAST HEIMDALL

December 1973

I - PERTINENT DATA

1.1. General data

Licence : 036

Association : Norsk Hydro 6,920%

Elf Norge 5,814%

Aquitaine Norge 2,906%

Total Marine Norsk 4,360%

Pan Ocean Oil Norge 36,905%

K/S Femogtyvefire Norge 20,476%

Bow Valley Exploration Norge 15,238%

Sunningdale Oil Norge 7,381%

Operator : ELF NORGE A/S

Rig : Pentagone 81 (Neptune 7)

Contractors : Mud logging = GEOSERVICES

Location

Seismic : Crossing of the lines 59 - 36 and 02 - 19

Geographic : x = 02° 18' 51", 4 E

Y = 59° 35' 46", 5 N

Water depth : 121 m

Air Gap : 23 m

1.2. Drilling and operations time table

18.10.73 = Spudded

22.10.73 = Start drilling

= 30" casing set at 181 m

= 13" 3/8 casing set at 448 m

02.11.73 = SPE Run 1 = IES - SL.BHC - CST 1-2

= 9" 5/8 casing set at 2026 m

15.11.73 = SPE Run 2 = IES - GR.CNL - GR

= Core No. 1 = 2159 - 2172 m (rec. 2166,6 - 2167,4)

26.11.73 = TD = 2775 m (DD)

29.11.73 = SPE Run 3 = IES - DLT - GR.BHC - FDC.CNT.GR -

ML.MLL - HDT - CBL

FIT 1 - 2 - 3 - Velocity survey.

1.3. Status

Oil-bearing

GEOLOGICAL DATA AND RESULTS

I OBJECTIVES

The well 25/4-1x (Heimdall 1) encountered 106 m of gas-bearing sands in the paleocene serie. The aim of the well 25/4-2 was to explore the equivalent sand section on a separate closure east of the Heimdall structure.

II STRATIGRAPHICAL AND STRUCTURAL RESULTS

2.1. Stratigraphy

See the correlation table below showing comparisons with 25/4-1 data.

STRATIGRAPHICAL UNITS		25/4-2 z = 23 m			25/4-1 z = 23 m			25/4-2 25/4-1x
		Top below Rkb.m.	Top below m.s.l.m.	Thickness	Top below Rkb.m.	Top below m.s.l.m.	Thickness	Structur gap
PLEISTOCENE TO MIOCENE		144	-121	768	145	-122	670	+ 1
OLIGOCENE TO EOCENE		912	-889	788	815	-792	807	-97
LOWER EOCENE		1700	-1677	338	1622	-1599	299	-78
PALEOCENE TO DANIAN	Top of tuff	2038	-2015	118,5	1921	-1898	141	-117
	Top of reservoir	2156,5	-2133,5	724 404,5	2062	-2039	169 356	-94,5
	Base of sands	2561	-2538	201	2418	-2395	197	-143
MAESTRICHTIAN		2762	-2739	>13	2615	-2592	244	-147
TOTAL DEPTH		2775	-2752		4060	-4037		

2.2. Structural results

Structural differences are shown by the tabulation on the right column.

Comparisons between actual and expected tops are as follows:

	1 Original picking	2 Optimist picking	3 Actual tops	1/3
Upper Paleocene tuff	-1966	-1966	-2015	-49 m
Reservoir top	-2115	-2063	-2133,5	-18,5m
Upper Cretaceous sands	-2640	-2655	-2700	-60 m

2.3. Reservoir

The paleocene reservoir consists of 404 m of sands which are 48 m thicker than in 25/4-1x well.

The reservoir characteristics are quite the same in both wells. The sands are clean with occurrence of only small shale-sand laminates, and a few carbonaceous stringers (as shown by the recovered fragment of core No. 1).

2.4. Shows and fluids

Small amount of C1 gas was recorded throughout the section from the Miocene to the bottom of the Paleocene.

2.4.1 PALEOCENE

In the oil-bearing zone, the reservoir moreover shows C2 and C3 gas and fairly good oil-shows in cuttings, side-wall cores and K1 fragment.

Three Wire-line tests were undertaken:

1. FIT 1 and 3 shot at 2162,5 m. FIT 1 fluid was transferred under B.H. pressure for PVT studies. FIT 3 stuck 4,15 l of oil, 5,75 l of filtrate + mud and 4,8 cuft of gas.
2. FIT 2 located at 2165,8 m produced 9,9 l of water, filtrate and mud with some traces of oil.

The well 25/4-2 shows an oil accumulation 9 m thick with an oil-water contact at 2165,5 m RKB (-2142,5) which is located 8,5 m higher than in 25/4-1x well.

2.4.2 DANIAN - MAESTRICHTIAN

Other reservoirs are water-wet except a very thin bed of calcareous sand between 2591 and 2597 m bearing some residual oil according to the logs interpretation and where a small C1 kick occurred.

005691-19DES73

Coord X: 02°18'51,4"E Z ground - 121 m Y: 59°35'46,5"N Z RKB. + 23 m Depths datum RKB. Rig: Pentagone 81 - NEPTUNE 7. Stopped in: Maestrichtian.	Spud date: 18. 10. 1973 Started: 22. 10. 1973 At TD: 26. 11. 1973 Completed: PLUGGED 06. 12. 1973 TD Driller: 2775 m TD Logger: 2775,5 m	Well: 25/4-2 Country: NORWAY off shore
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OPERATOR: ELF NORGE A/S LICENCE: 036 OWNED BY: PAN OCEAN

TARGETS: Paleocene sands. Heimdall 1. step-out-well.

RESULTS: Paleocene sands = oil bearing.

CASINGS	CORES		
30" : 181 m 13 3/8" : 468 m 9 5/8" : 2026 m Gas - SHOWS Cl. tr. from the surface. Cl-2-3 from 2155m on the oil bearing zone. Cl. tr. from 2590 to 2597m.	K1 2159 - 2172 m (rec: 2166,6 - 67,40)	6% CST1. 1300 - 2030 2/11 CST2. 495 - 1330 2/11 CST3. 2034 - 2763 29/11	

TESTS		LOGS		INTERPRETATION
FIT1.	ST 20' Chamber full - PVT transfer 2162,5 SIT 10' FSI 3143 PSI 30.11.73	IES 2032 - 468 SLEHC 2029 - 468	2.11	
FIT 2.	ST 13' ● tr. + 991 ⊕ 57 2165,8 SIT 1,5' FSI 3155 PSI 30.11.73	IES 2315,5 - 2126 GR CNL " - " GR. 2026 - 144	15.11	
FIT 3.	ST 15' ⊙ 4,8cbft ● 4,1l 2162,5 SIT 3' FSI 3145 PSI 30.11.73 + 5,75l Filtr. FSI 3145 PSI	IES 2775,5 - 2026 DLT " - " BHCGR " - " FDC " - " CNT " - " GR " - "	29.11	
		MLML " - " HDT " - " CBL 2026 - 144 Seismic survey		



005691 \*19.DES73

Forces til	Saks- ben
Saks nr	Satt

Depth E ↓	Litho- section	Formations	Stages	Shows	Descriptions. Obs.	Z : RKB Z : Ground or Sea bottom - 121	Well: 25/4-2
7800		HEIMDALL	DANIAN TO PALEOCENE	tr.CI.	Sdst A/A w/ more shaly interbeds.	3500	
8000						11600	
8200						11800	
2500						12000	
8400		BASAL SHALE MEM.	DANIAN TO PALEOCENE	tr.CI.	Shale dk gy to gn ,sity mic. hrd or plast. Rd-brwn intbds. Streaks of <u>sdst</u> and <u>sndy lmst.</u>	12200	
8600						3750	
8800						12400	
9000						12600	
2750		MAESTRICHTIAN	DANIAN TO PALEOCENE	tr.CI.	Marl , hrd , pale gy. Marl gy wht and chiky <u>lmst.</u>	12800	
9200	T.D. 2775m					13000	
9400						4000	
9600						13200	
9800						13400	
3000						13600	
10000						13800	
10200						4250	
10400						14000	
10600						14200	
3250						14400	
10800						14600	
11000						4500	
11200						14800	
11400						15000	
						15200	

Cut : 13 m  
 Recovered : 0,8 m  
 Loss : 12,2 m

0,6 %

Company: ELF NORGE  
 Well no : 25/4-2  
 Core no : 1

Date : 6.11.73.  
 Depth: 2159 - 2172 m

Depth	CO <sub>2</sub> CS	TERM	POROS	SHOWN	DIPS	Log	DESCRIPTION
2159							
2160							
2161							
2162							
2163							
2164							
2165							
2166							
2167		md bad reser.		slight fluo and extraction			<p>Sdst, hd and compact, greyish, fn to md, vy bad sorted w some crs qtz grns ang. to subang. calc: cement abundant - micas. (musc.)</p> <p>around 2167,20m crs grns w some small pebbles. part's less cemented at the top and on the last 20 cm.</p>
2168							<p>oil bleeding : 2167,10 - 2167,40 m          direct fluo and extraction CCL<sub>4</sub> : light</p>



Cut : 13m  
Diameter : 0,8m  
L : 2,2m

0,6 %

Company: ELF NORGE  
Well no : 25/4-2  
Core no : 1

Date: 9.11.73.  
Depth: 2159-2172m

Depth	γ <sub>s</sub>	γ <sub>w</sub>	γ <sub>sp</sub>	γ <sub>sp</sub>	Log	DESCRIPTION
2168						
2169						
2170						
2171						
2172						



# POSITION MAP

EIF NORGE A/S

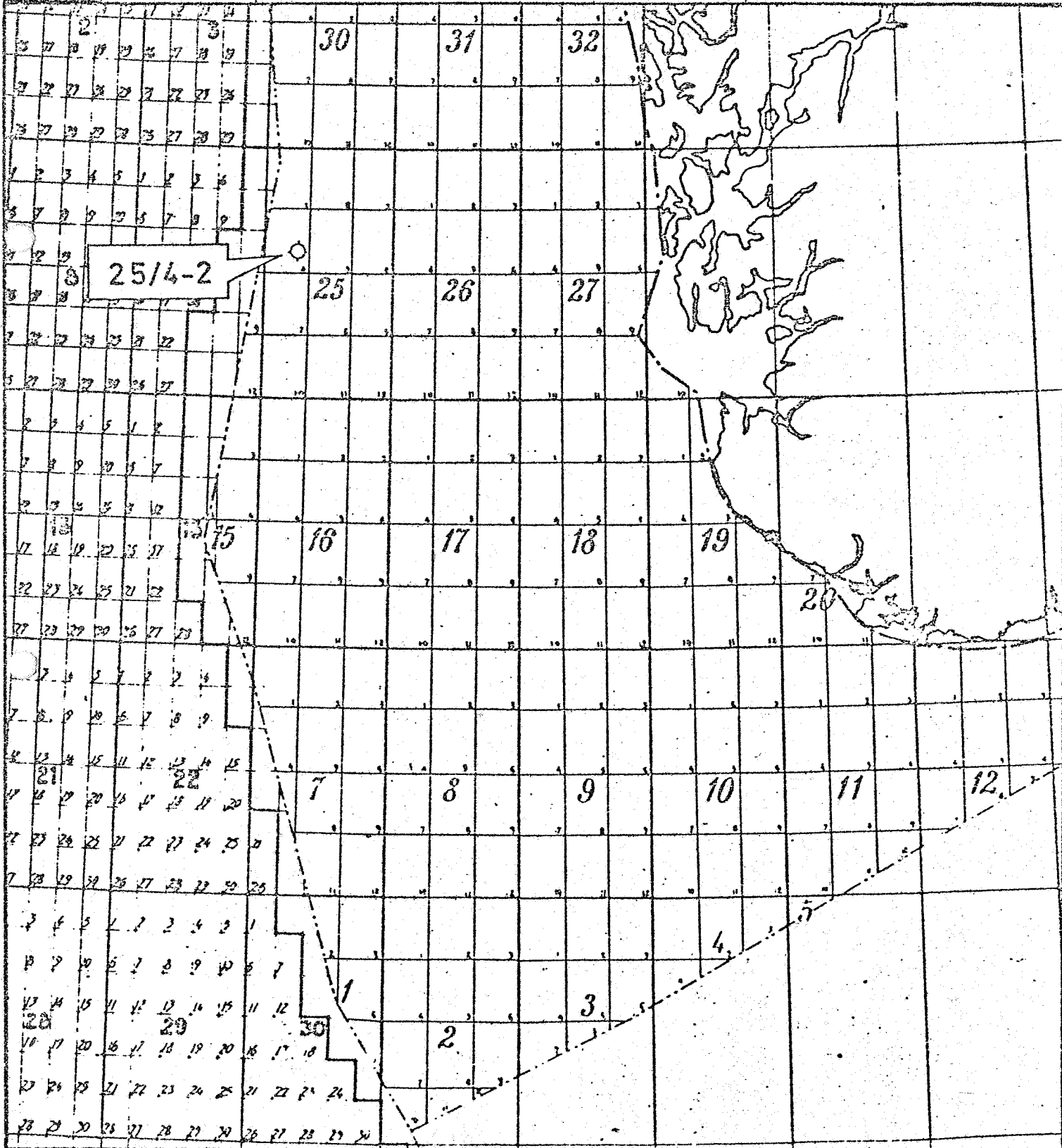
Echelle : 1/25000000

Date

EIF NORGE

Auteur

N° classé



SERVICE COMPANY :	317
ASKED :	30
RECOVERED :	13
SHOT :	30
LOST :	
FULL BULLET :	28
ELF NORGE	

**SIDE WALL CORES DESCRIPTION**

WELL : 25/4-2  
 LICENCE : 036

RUN N° 1  
 PAGE N° 1  
 DATE : 2.11.1973

tr : trace - M : medium - G : good

N°	DEPTHS	REC	LITHOLOGY	Fluorescence	
				↑	CUT
1	2030	G	Sh, alternating gy & bl.gn, hard		
2	2017	"	Sh, brwn, mica		
3	1995	"	Sh gy, mica		
4	1985	"	Sh gy, pigmented, mica		
5	1975	"	Sh gy, brwn, micromica		
6	1955	"	Sh bl-gn, pigmented, soft		
7	1919	"	Sh gy, micromicas, "		
8	1875	"	Sh, gy		
9	1825	"	Sh gy, pigmented, medium hard		
10	1805	X	EMPTY		
11	1780	"	Sh gy, coarse texture, soft		
12	1745	"	Sh gy, pigmented, hard, pyrite grains		
13	1705	"	Sh gy to gy-brown, hard		
14	1685	"	Sh gy, micromica		
15	1650	"	Sh gy gn silty, lmy		
16	1610	"	Sh gy gn, sligty lmy		
17	1600	"	Sh gy, hard		
18	1577	"	Sh gy, hard		

SERVICE COMPANY :  
 ASKED : 30  
 RECOVERED : 30  
 SHOT :  
 LOST :  
 FULL BULLET : 30

SIDE WALL CORES DESCRIPTION

WELL : 25/4-2  
 LICENCE : 036

RUN N° 2  
 PAGE N° 1  
 DATE : 2.11.73

ELF NORGE

tr : trace - M : medium - G : good

N°	DEPTHS	REC	LITHOLOGY	Fluorescence	
				↑	CUT
31	1330	G	Sh gy-brwn, mica, coarse texture, pyrite, hard	↑	
32	1300	"	A/A + Foram.		
33	1275	"	A/A		
34	1255	"	Cly gy-brwn, lmy micromica		
35	1224	"	Cly gy. lmy		
36	1205	"	A/n <sup>o</sup> 5		
37	1177	"	Sd fn gy subang w/subrnd, glauconite		
38	1149	"	Sd fn w/s med, subang w/subrnd, glauconite		
39	1127	"	Sd Fn A/A		
40	1115	"	Sh brwn vy lmy		
41	1075	"	Cly. brwn lmy, pyrite		
42	1055	"	Cly gy-brwn vy. lmy.		
43	1031	"	Cly sdy, lmy, mica, glauconite		
44	1010	"	Sd fn, pale gy, subang, glauconite, mica		
45	995	"	Cly vy lmy, brwn		
46	975	"	A/n <sup>o</sup> 45		
47	950	"	Sd gy-gn, shly, lmg		
48	945	"	Sd vy fn to fn w/s med, gy, subang w/med gr subrnd glauconite + (red minerals)	↓	

SERVICE COMPANY :	
ASKED :	30
RECOVERED :	27
SHOT :	30
LOST :	0
FULL BULLET :	27

**SIDE WALL CORES DESCRIPTION**

WELL :	25/4-2	RUN N° :	3
LICENCE :	036	PAGE N° :	1
		DATE :	1.12.1973

ELF MAPGE

tr : trace - M : medium - G : good

N°	DEPTHS	REC	LITHOLOGY	Fluorescence	
				↑	↓
1	2763	0	Empty		
2	2708		Mrl, pale green, hard	↑	
3	2670		Sh. gy, plast. not calcareous		
4	2646		Sh, gn gy, sndy w/fn mic		
5	2637		Sh, gy, sigty calc, lrge mic, rare sd grns, crs. rna		
6	2631		Sh dk gy, calc, lrge mic	0	
7	2610		Sh gy, and		
8	2599		Sh gn gy, mic		
9	2592		Sdst, gy sft, fn to vfn, bd srted, suband to subana, cmt: lmy & shly, mic		
10	2581		Sh dk gy, not calc		
11	2570	0	Empty		
12	2551		Sdst, whtsh, vfn, bd srted, w/s md. Cmt: lmy	↑	
13	2432		Sdst, wht, vy sft, fn w/s md glauc, cmt: slight lmy	0	
14	2373	0	Empty		
15	2290		Sd, pale gy, md, bd srted, subang	↑	
16	2770		Sd gy wht, md to vfn, sml mic, argilac		
17	2255		Sh gy, md hrd, slty	0	
18	2180		Sd vfn, shly w/plane cross-bed (ripple-marks)		





