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EAN Reservoir Dept



elf norge a/s

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FINAL GEOLOGICAL REPORT

25/4-4

ELF AQUITAINE NORGE A/S
RESERVOIR DEPARTMENT

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FINAL GEOLOGICAL REPORT

25/4-4

Elf Norge A/S
Exploration Department
July, 1975

1. PERTINENT DATA

1.1 General Data

Licence - 036 (Pan Ocean/Petronord)
Operator - Elf Norge A/S
Rig - Odin Drill
Contractors - Oslo Drilling (U.K.) Ltd.
Mud logging: Exploration logging
Location - Geographic: 02° 12' 26.7"
59° 36' 08.6"
Seismic: SP 50, Line 72-X
Water Depth - 116 m
RKB - +25 m

1.2 Drilling and Operation Time Table

16.05.75 - Spudded
17.05.75 - Start drilling, 30" Casing set at 191.3 m
24.05.75 - 18 5/8" Casing set at 201.1 m
26.05.-27.5.75 - 17 1/2" Drilling down to 473 m
28.05.75 - 13 3/8" Casing set at 658.5 m
29.5.-3.6.75 - 12 1/4" Drilling down to 2025
3.-4.06.75 - SPE Run 1 IES, BHC-GR, SWC 1
5.-6.06.75 - 9 5/8" Casing set at 2013 m
6.-7.06.75 - 8 1/2" Drilling to 2142
8.-10.06.75 - Cut Cores 1,2,3,4
15.06.75 - AT T.D: 2681 m
16.-17.06.75 - SPE Run 2 IES, BHC-GR
Run 1 CNL-FDC-GR-CAL, DLL-PS, MLL-ML-CAL,
HDT
18.06.75 - FIT 1,2,3
21.06.75 - 7' liner set to 2252.5
Started on testing period.

1.3 Status

Oil and gas bearing in Heimdall sands
Plugged and abandoned.

2. GEOLOGICAL DATA AND RESULTS

2.1 Objectives

This well was located on the Heimdall structure, north of the 25/4-1, on the north-west flank of the structure. The objective was to check the reservoir extension and characteristics and to sample it.

2.2 Stratigraphical and Structural Results

2.2.1 Stratigraphical Data

See following table and composite log.

STRATIGRAPHICAL UNITS	TOP m (RKB)	TOP m (MSL)	THICKNESS (m)
Pleistocene to Miocene	161,0	-116,0	633,0
Obligocene	774,0	-749,0	453,0
Eocene	1227,0	-1209,0	885,0
Paleocene Tuff zone	2012	-1987	44
to Heimdall sands	2133	-2108	232
Danian Danian sands	2517	-2492	164
Total depth	2681	-2656	

2.2.2 Structural Results

Comparison between expected and actual tops are as follows

Stratigraphical units	Top RKB	Prognosis	Difference
Brown clays	774	860	+86
Tuff	2012	2020	+ 8
Heimdall sands	2133	2130	-3
Upper cretaceous	Not reached at T.D.	2570	>-106

Maestrichian chalk is probably very close to T.D., and has not been reached, due to an increase in the thickness of Danian sands.

2.3 Reservoir, shows and fluid

2.3.1 Heimdall sands

The formation thickness is 232 m, made of sand and shale interbeds. The sand is generally clean, with a few sand-shale laminae.

Coring started at 2142 m to 2170 m, with variable results. The technic used is known as: "Steel sleeve core barrel", the recuperation has been bad, even with that technic, mainly due to the very unconsolidated state of the sand.*

The top of the reservoir is at 2133 m (-2108 m), gas/oil contact at 2172 m (-2147 m), and oil/water contact at 2175 m (-2150), these results are in accordance with what was expected.

Test has been run and will make the object of a special report.

2.3.2 Danian sands

The top of that formation is at 2517 m, the bottom at 2673; The top of maestrichian was not reached. It is composed mainly of sand, fairly sorted, with a few shale and sandstone interbeds.

It is a water bearing reservoir.

2.3.3 Shows

Traces of Cl has been encountered down to bottom of the well, brown clay member excepted.

Fluorescence was visible on the sands in the gas/oil bearing sands in the Heimdall Reservoir

Gas shows were very poor due to the conformation of the B.O.P. stack which needed injection of fresh mud at the bottom of the riser, lowering proportionally the quantity of gas in the mud.

* The core description will be provided later by the laboratory.

Chief Geologist

C.BASTIEN

Well Site Geologists

K.HAVARD

L.LETENDRE

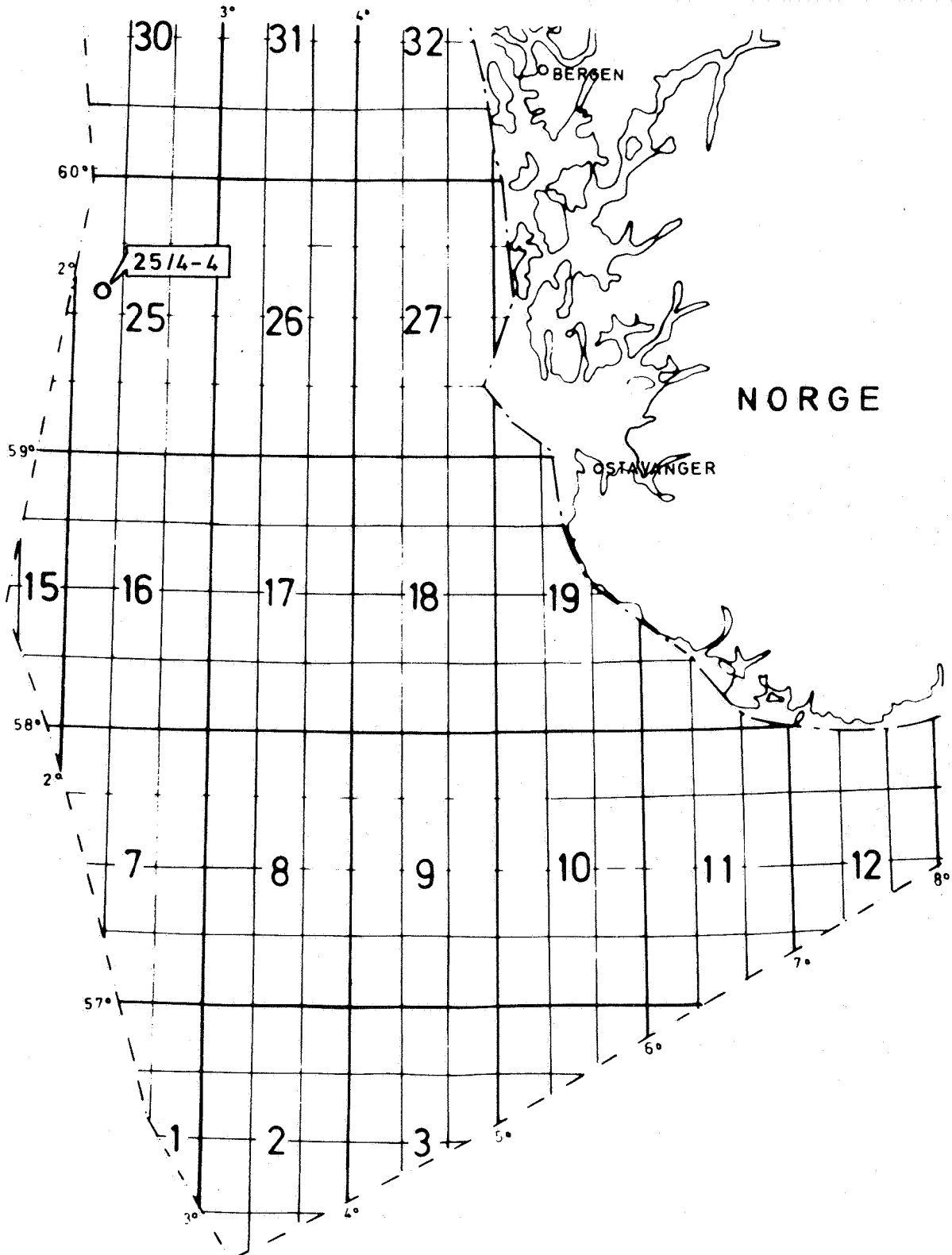


POSITION MAP



WELL 25/4-4
COUNTRY : NORWAY OFFSHORE
COORDINATES: X: 02° 12' 26,7"
Y: 59° 36' 08,6"

Scale: 1/2500.000



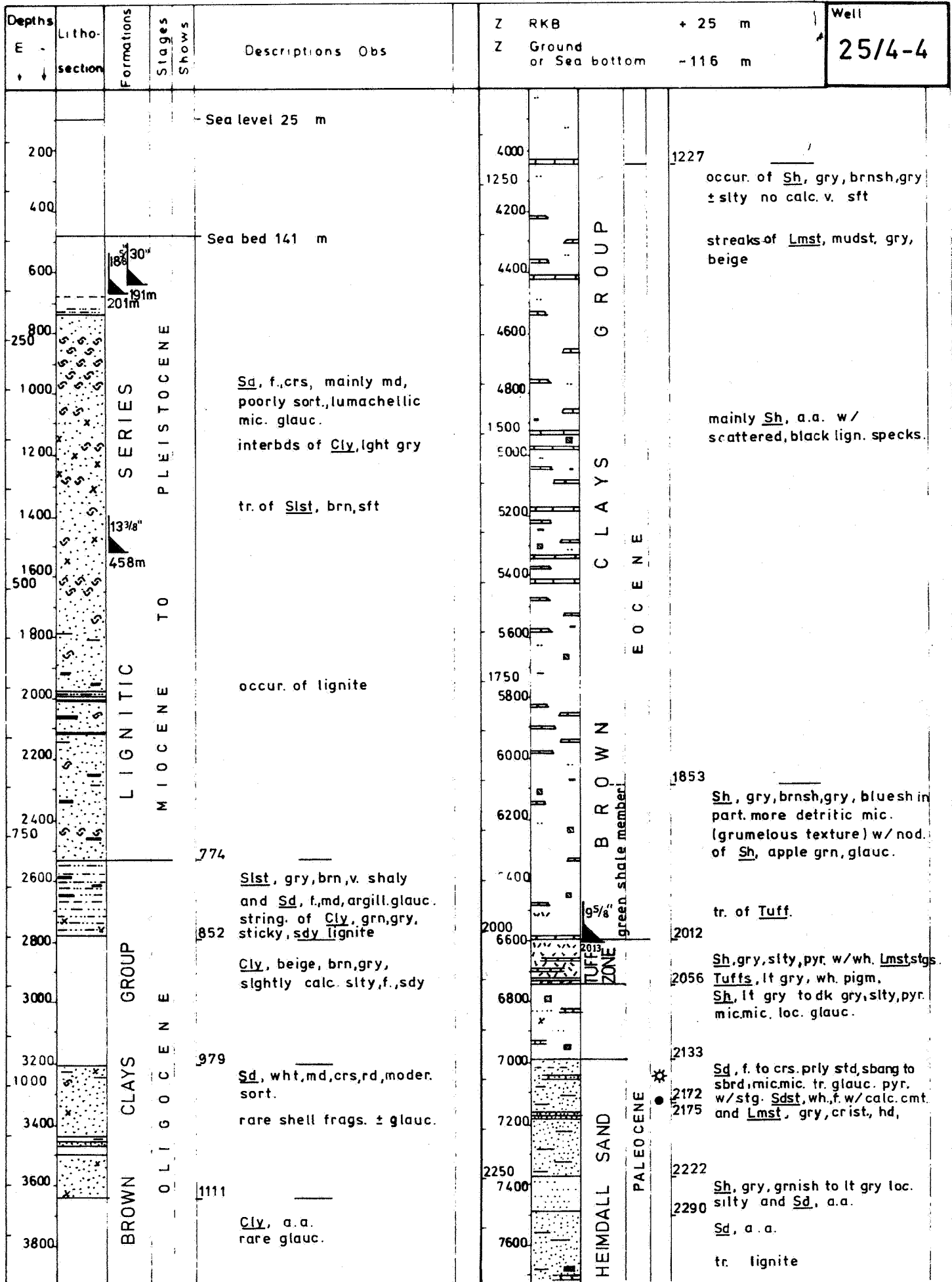
FROM ELECTRICAL LOGS

Coord: x: 02° 12' 26,7" z ground: - 116 m y: 59° 36' 08,6" z RKB: + 25 m Depths datum: R.K.B. Rig: ODIN DRILL Stopped in: LOWER DANIAN MARL / SDST		Spudded: 16.05.1975 Started drilling: 17.05.1975 At TD: 15.06.1975 Completed: 06.1975 TD Driller: 2681 m TD Logger: 2683 m		Well 25/4-4 Country Norway off shore
OPERATOR ELF NORGE A/S		SENCE 036		OWNED BY ROCEAN / PET.
TARGETS Heimdall Paleocene sands		RESULTS OIL / GAS IN HEIMDALL SAND PAYZONE; GAS: 26 m G / O = 2172 (-2050,5) O / W = 2175 (-2053,5)		
CASINGS / RKB		CORES		
30" ▴ 191,3m 18 ⁵ / ₈ " ▴ 201,1m 13 ³ / ₈ " ▴ 458,5m 9 ⁷ / ₈ " ▴ 2013 m	K1 2142 - 2151 100% K2 2151 - 2160 5% K3 2160 - 2161 50% K4 2161 - 2170 30%			
SHOWS				
tr. C ₁ down to 2025 Δ 2133 - 2170 2199 - 2201 ▲ 2151 - 2161 small 2161 - 2170 medium ✱ C ₁ to C ₄ : 2132 - 2142 tr. C ₁ to TD.		SWC ₁ 845 - 2000 28/30 SWC ₂ 2028 - 2674 30/30		
TESTS		LOGS		INTERPRETATION
FIT.1 2173,5 : OIL FIT.2 2171,4 : GAS FIT.3 2190: SALT WATER DST.1. $\frac{2134}{2143}$ Ø 48/64" $\frac{560000 \text{ m}^3/\text{K}}{73 \text{ m}^3/\text{K}}$ PF 3124 psi.	IES 2016 - 459 1 BHC/GR 2016 - (141) 1 TEMP 1986 - 495 1 IES 2682,5 - 2012 2 BHC/GR 2683 - 2012 2 CNL / FDC } 26815 - 2012 1 GR / CAL } DLL / PS 2400 - 2012 1 MLL / ML } 2400 - 2012 1 CAL } HDT 2682,5 - 2012 1	STRATI INFERRED FROM ELECTRICAL LOGS BY CORRELATION WITH THE SURROUNDING WELLS		

Checked: 30.06.75.

By: F.V.

FROM ELECTRICAL LOGS



SERIES
PLEISTOCENE

LIGNITIC
MIOCENE TO

BROWN CLAYS
OLIGOCENE

BROWN SAND
PALEOCENE

GROUP

CLAYS
EOCENE

BROWN
green shale member

TUFF
ZONE

HEMDALL SAND
PALEOCENE



FROM ELECTRICAL LOGS

Depths	Litho- section	Formations	Stages	Shows	Descriptions Obs.	Z RKB + 25	Z Ground or Sea bottom - 116	Well: 25/4-4	
7800		HEIMDALL SD.	DANIAN - PALEOCENE		<u>Sd</u> , wh, v.f. to md, ang., fair sort. <u>Sdst</u> , loc. ind., w/calc., slit, cmt.	3500			
8000				2457			11600		
8200						<u>Sh</u> md gry fiss non. calc. w/stgrs <u>Lmst</u> and <u>Sdst</u> a.a.	11800		
2500				2517			12000		
8400		DANIAN SANDS				<u>Sd</u> , f. to crs., ang. fair std, pyr.	12200		
8600						w/ <u>Sh/Clst</u> , lt gry, sft, slightly calc. and <u>Sdst</u> , a.a.	3750		
8800							12400		
8800		T.D. 2681m				<u>Mrl</u> , lt gry, sft <u>Sdst</u> , wh, qzic, f. to crs, ang, sil- dol. cmt.	12600		
9000							12800		
2750							13000		
9200						4000			
9400						13200			
9600						13400			
9800						13600			
3000						13800			
10000						4250			
10200						14000			
10400						14200			
10600						14400			
3250						14600			
10800						4500			
11000						14800			
11200						15000			
11400						15200			

SIDE WALL CORES DESCRIPTION

SERVICE COMPANY :	ONE
ASKED :	3
RECOVERED :	5
SHOT :	33
LOST :	0
FULL BULLET :	25

WELL :	25/4-4	RUN N°	1
LICERCE :	036	PAGE N°	1
		DATE :	04.06.75

tr : trace - M : medium - G : good

N°	DEPTHS	REC %	L I T H O L O G Y	Fluorescence	
				shale	CUT
1	2000	80	shale indurated grey slightly silty micaceous no calcareous		
2	1985	100	shale indurated bluish grey poorly silty no calcareous		
3	1970	100	shale indurated brownish micaceous		
4	1955	100	shale indurated brownish grey micaceous very silty calcareous		
5	1940	100	shale a.a.		
6	1925	100	shale grey slightly silty micaceous		
7	1895	100	shale brownish grey a.a.		
8	1865	100	shale grey a.a.		
9	1843	100	shale a.a.		
10	1808	100	shale grey slightly silty pyrite rare muscovite black inclusions		
11	1780	100	shale grey trace pyrite		
12	1740	100	shale a.a. with thin whitish inclusions		
13	1710	100	shale as 11		
14	1665	100	shale a.a.		
15	1625	100	shale brownish pyritic wavy laminae thin black spots		
16	1590	100	shale brownish grey slightly silty rare muscovite		
17	1535	100	shale a.a.		
18	1465	100	shale a.a. fissile pyritic fossiliferous prints		

SIDE WALL CORES DESCRIPTION

SERVICE COMPANY: 317

ASKED: 30

RECOVERED: 30

SHOT : 30

LOST : 3

FULL BULLET : 30

WELL : 25/4-4

RUN N° 2

LICENCE : 036

PAGE N° 1

DATE : 20-06-75

tr : trace - M : medium - G : good

N°	DEPTHS	REC	L I T H O L O G Y	Fluorescence	
					CUT
1	2674	100	Marl, green grey, moderately hard, waxy to plastic, slightly silty		
2	2666	60	Marl, light green-grey, a/a, and sandstone, very fine to medium grained, subrounded to rounded with calcareous cement		
3	2607	70	Shale, grey to dark grey, moderately hard, fissile, micromicaceous, slightly calcareous		
4	2588	80	Shale, dark grey, very lightly calcareous, hard, fissile, traces of sandstone as no. 2		
5	2562	60	Sandstone, dark grey, medium hard, micromicaceous, argillaceous cement		
6	2541,5	60	Shale, dark grey to black, hard, fissile, non calcareous		
7	2508	80	Shale a/a		
8	2480	70	Shale a/a		
9	2461	80	Shale a/a, medium hard		
10	2436	50	Sandstone, white to grey, rounded grains, argillaceous cement		
11	2415	80	Shale, green-brown to grey, moderately hard, fissile, non calcareous		
12	2389	20	Sand, fine to medium, white, rounded, slightly indurated		
13	2357	25	Sand a/a		
14	2335	30	Sand a/a		
15	2314	40	Sand a/a		
16	2289	80	Shale, grey to dark grey, moderately hard, fissile, non calcareous with traces of sand a/a on the edges		
17	2270	90	Shale, light grey to grey, moderately hard, non calcareous		
18	2250	80	Shale, light grey, moderately hard, waxy, micromicaceous, very sandy (very fine, rounded)		

