ELF AQUITAINE NORGE A/S
Exploration Division
Ref.no.: 311D/81/44-R
PV/ån

3

WELL 25/4-5

COMPLETION REPORT

PART TWO - ANNEXES

Approved by: S. Guyonnet

Author: P. Verdier

Stavanger, July 1981

Coord x02°11'39"81E Z ground: -121m
Y59°34'04.75"Nz RKB: 25m
Line: 780 206 SP: 250
Depths datum: RKB
Rig: DYVI ALPHA
Stopped in CORMORANT FM.

Spudded: 25.06.1980
Started drilling: 26.06.1980
At T.D: 04.02.1981
Completed: 26.03.1981
T D Driller: 4355 m T.D. Logger: 4354.5 m

Well 25/4-5
Country NORWAY

OPERATOR ELF AQUITANE NORGE A/S
LICENCE 036 OWNED BY PETRONORD PAN OCEAN

TARGETS

JURASSIC SANDSTONES FROM BRENT AND STATFJORD FORMATIONS.

HEIMDALL SANDS APRAISAL

RESULTS

Hydrocarbon shows in Cormorant and Statfjord Fm. tested with water.
Hydrocarbons (4m oil) in Brent Fm.
Positive appraisal in Heimdal Sands.

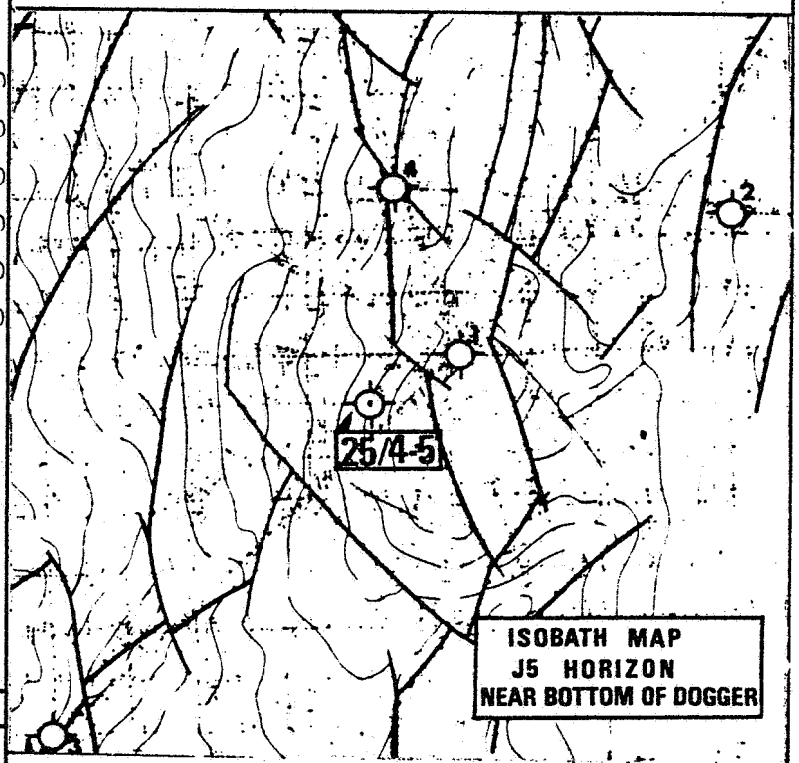
CASINGS

30" : 207 m
20" : 866 m
13 3/8" : 2817 m
9 5/8" : 3590 m
7" L : m

SHOWS

CORES

		rec%
1	2130-2148m	89
2	2148-2154,5m	62
3	2154,5-2158m	100
4	2158-2173m	100
5	2173-2180,6m	100
6	2180,6-2191m	100
7	2191-2199,5m	100
8	2199,5-2217,5m	100
9	2217,5-2235m	80
10	3695-3713m	100
11	3713-3731m	98
12	3954-3971m	94
13	3971-3985m	93
14	3985-3998,5m	100
15	3998,5-4014,8	90
16	4183,5-4198,5	100
17	4140-4158	99



LOGS

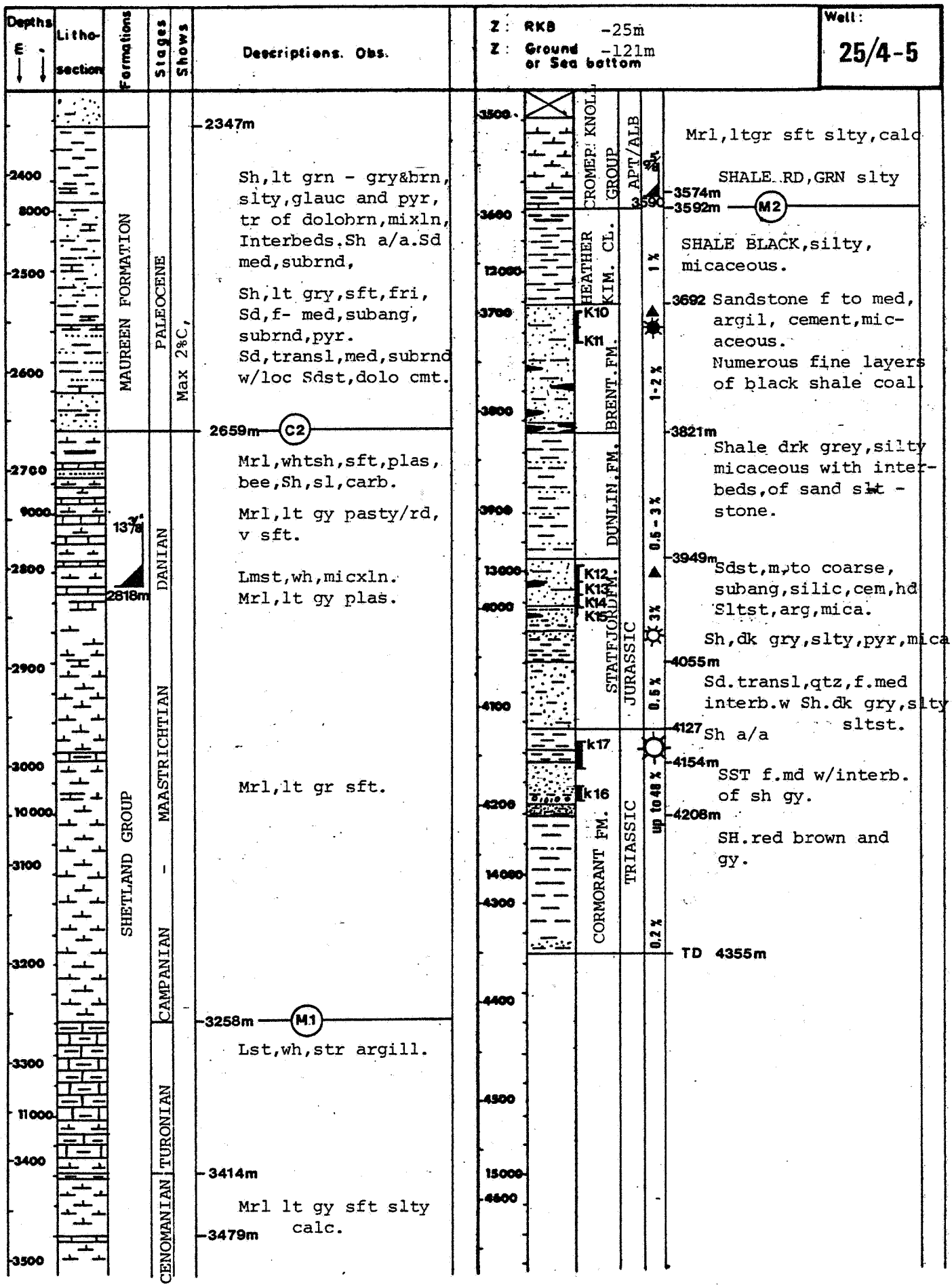
	ISF/BHC/GR 207- 879	1	✓	DLL/MSFL/GR 1950-2235	1
BHC	1400-2062	2	✓	3594-3944	2
GR	1950-2128	3	✓	3830-4140	3
	866-2234	4	✓	3940-4253	4
	866-2820	5	✓		
	2817-3601	6	✓		
	3594-3844	7	✓	HDT	
	3680-4015	8	✓	1950-2821	1
	3680-4140	9	✓	3590-4355	2
	3940-4281	10	✓		
	4055-4355	11	✓	NGT	
CAL	FDC/CNL/GR 866 -2234	1		1950-2820	
LDT/CNT	1950 -2821	2		3590-4355	
FDC/CNL	2817 -36015	3			
	3594 -3884	4			
	3590 -4140	5			
	3940--4281	6			
	4200 -4355	7			

TESTS

7 RFT	PALEOCENE SANDS Shot between 2152.6m and 2181.5m GRADIENT 1.03 BRENT FORMATION	DST 3	STATFJORD FORMATION 3969-3999m. 28.8 m³/d of water(94 G/cc) with dissolved gas. FP ext.9410 Psi.at 3952m.
19 RFT	From 3695 to 3808.5m. GRADIENY 1.70	DST2	4065-4088m. 28.8 m³/d of water(118 G/cc) with dissolved gas.
Fit3	3779.5m 851 of gas + 21 l water.(40 G/cc) STATFJORD FORMATION		FP ext.9420 Psi.at 4053m.
13 RFT	Shot between 3950.5 and 4067m Press.Grad. 1.69	Fit2	At 4072m 22.5 l of water (126 G/cc) CORMORANT FORMATION
		DST1	4155-4170m. 3.4 m³/d water(90 G/cc) with dissolved gas.
		Fit1	FP ext. 9840 Psi.at 4128m. At 4160m.10 l water(34 G/cc) 81 l gas.

Checked P. VERDIER/ S.K.
Date 06.05.81.

Fig. 2.1.

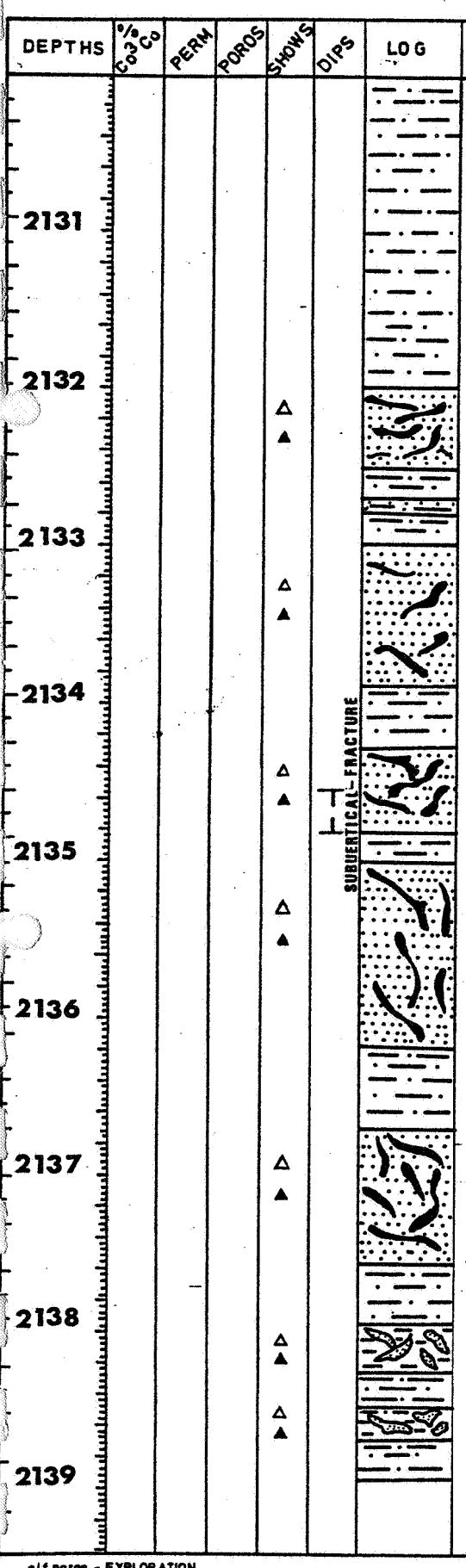

Depths
Litho-section
Formations
Stages
Shows
Descriptions. Obs.
Z: RKB -25m
Z: Ground or Sea bottom -121m
Well: 25/4-5
2347m
Sh,lt grn - gry&brn, slty,glauc and pyr, tr of dolobrn,mixln, Interbeds.Sh a/a.Sd med,subrnd,
Sh,lt gry,sft,fri, Sd,f- med,subang, subrnd,pyr. Sd,transl,med,subrnd w/loc Sdst,dolo cmt.
2659m C2
Mrl,whtsh,sft,plas, bee,Sh,sl,carb.
Mrl,lt gy pasty/rd, v sft.
Lmst,wh,micxln. Mrl,lt gy plas.
Mrl,lt gr sft.
3258m M1
Lst,wh,str argill.
3414m
Mrl lt gy sft slty calc.
3479m
MAUREEN FORMATION
SHETLAND GROUP
PALEOCENE
DANIAN
MAASTRICHTIAN
CAMPANIAN
TURONIAN
CENOMANIAN
Max 2°C,
13⅞"
2818m
CROMER KNOL. GROUP
HEATHER FM.
KIM. CL.
BRENT FM.
DUNLIN FM.
STATFJORD FM.
CORMORANT FM.
JURASSIC
TRIASSIC
APT/ALB
K10
K11
K12
K13
K14
K15
k17
K16
Mrl,ltgr sft slty,calc
SHALE RD,GRN slty
3574m
3590
3592m M2
SHALE BLACK,silty, micaceous.
3692 Sandstone f to med, argil, cement,mic-aceous. Numerous fine layers of black shale coal.
3821m
Shale drk grey,silty micaceous with inter-beds,of sand slt - stone.
3949m
Sdst,m,to coarse, subang,silic,cem,hd Sltst,arg,mica.
Sh,dk gry,slty,pyr,mica.
4055m
Sd.transl,qtz,f.med interb.w Sh.dk gry,slty sltst.
4127 Sh a/a
4154m
SST f.md w/interb. of sh gy.
4208m
SH.red brown and gy.
TD 4355m
1%
1-2%
0.5-3%
3%
0.6%
up to 48%
0.2%

CORE DESCRIPTION

CUT: 18 m
RECOVERED: 16 m 89 %
LOSS: 2 m

COMPANY: E.A.N.
WELL N°: 25/4-5
CORE N°: 1

DATE: 27.08.80.
DEPTHS: 2130-2148 m



DESCIPTION

Shale grey to dark grey, silty and micaceous.

2132

Sandstone. very fine to fine, poorly cemented, with laminations or thin layers of dark grey shale, silty and micaceous.
Cross stratification.
Argillaceous siltstone in places

Direct fluorscene: Yellow
Extraction: Coloration: orange yellow
Fluo: Yellow

2137.60

Shale grey to dark grey, silty and micaceous with in places, laminations, thin layers or inclusion of very fine to fine sandstone, unconsolidated to poorly cemented. Cross stratification.

Direct fluorscene (on sandstone): Yellow
Extraction: Coloration: orange yellow
Fluo: Yellow.

CORE DESCRIPTION

CUT: 18 m
RECOVERED: 16 m 89 %
LOSS: 2 m

COMPANY: E.A.N.
WELL N°: 25/4-5
CORE N°: 1

DATE: 27.08.80.
DEPTHS: 2130 - 2148 m

DEPTHS	% Co_3Co	PERM	POROS	SHOWS	DIPS	LOG	DESCIPTION
2140				△ ▲			(Shale as above)
2141				△ ▲			2140.65 Sandstone very fine to fine moderatly cemented light grey. 2141 Direct fluo: light beige. Extraction: Color: Nil Fluo: Yellowish Shale grey to dark grey with laminations.thin layers or inclusions of very fine to fine Sandstone,light grey,often unconsolidated Cross stratification in places
2142	26						2142.25 Direct fluorscence: Light beige Extraction: Coloration:Nil Fluorscence: Weak yellowish white. 2142.75 Sandstone fine to very fine,light grey,compact, calcareous ove with thin layers,laminations Direct fluorscence: Light beige Extraction: Coloration: Nil Fluorscence: very weak yellowish white
2143							
2144							Shale as above with thin layers;lamination or inclusions of sandstone fine to very fine,light 2144.20 grey,moderatly cemented. (No shows) Sandstone very fine to fine,friable,light grey, very poorly cementd,micaceous. (No shows)
2145							
2146							2146
2147						NO RECOVERY	
2148							

CORE DESCRIPTION

CUT: 6.5 m
RECOVERED: 4 m 62 %
LOSS: 2.5 m

COMPANY: E.A.N.
WELL N°: 25/4-5
CORE N°: 2

DATE: 28.08.80
DEPTHS: 2148-2154.5

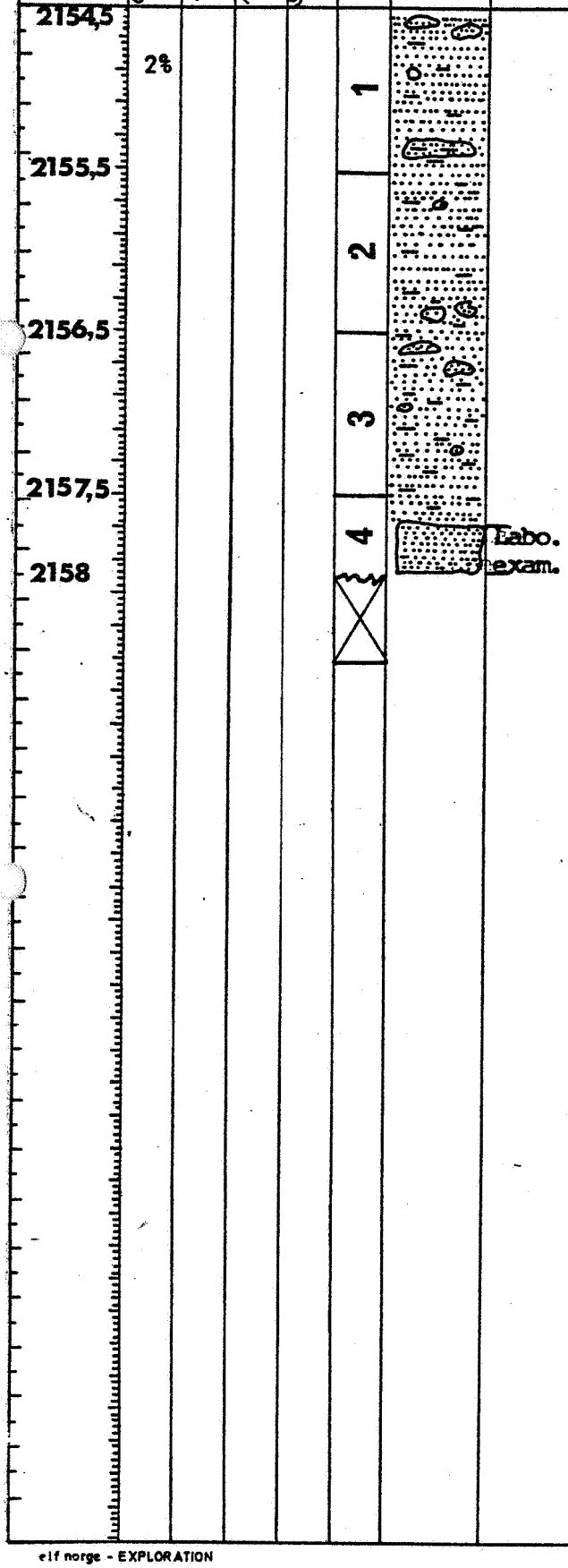
DEPTHS	% Co^3Co	PERM	POROS	SHOWS	DIPS	LOG	DESCIPTION
2149							Sandstone: fine to medium, light grey unconsolidated, subangular to subrounded, highly micaceous, glauconitic in places.
2150				NIL			
2151							
2152							2152 m
2153						NO RECOVERY	
2154							
2154.5							

CORE DESCRIPTION

CUT: 3.50 m
RECOVERED: 3.50 m 100 %
LOSS: /

COMPANY: E.A.N.
WELL N°: 25/4-5
CORE N°: 3

DATE: 28.08.80.
DEPTHS:
2154.5 to 2158 m.



DESCIPTION

SANDSTONE light-grey (translucent after washing) very very slightly argilaceous (v.fn. argilaceous distribution) to SAND
Some rare layers of dark-gray SHALE
very fine to fine angular grains
unconsolided (becoming to SAND after extract of the core).

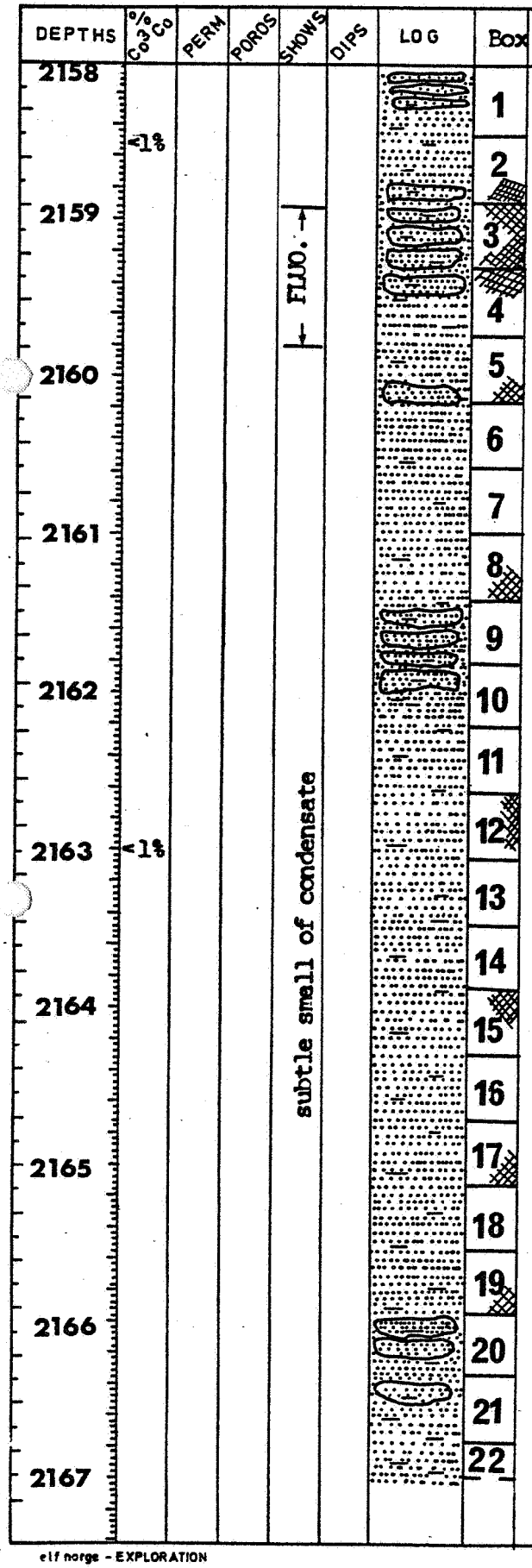
very micaceous: MUSCOVITE finly glauconitic in places.-
Very fine and rare yellow FLUO after CC 14
subtle smell of condensat.-
(no gas during coring).-

CORE DESCRIPTION

CUT: 15 m
RECOVERED: 15 m 100 %
LOSS: /

COMPANY: E.A.N.
WELL N°: 25/4-5
CORE N°: 4

DATE: 29.08.80.
DEPTHS: 2158 - 2173 m



DESCIPTION

SANDSTONE a/a core 3
light grey to translucent v.fn to fn angular grains - very very slightly argilaceous (v.fine argilaceous distribution) unconsolided (becoming to SAND after extract. of the Core.-

very micaceous:MUSCOVITE finly glauconitic in places.-

very fine and rare yellow FLUE,after CC 14 subtle smell of condensate.

(no gas during coring) - M.W. 1.25.-

CORE DESCRIPTION

Sheet 2/2

CUT: 15 m
RECOVERED: 15 m — 100 %
LOSS: /

COMPANY: E.A.N.
WELL N°: 25/4-5
CORE N°: 4

DATE: 29.08.80.
DEPTHS: 2158 - 2173 m

DEPTHS	% CO_3Co	PERM	POROS	SHOWS	DIPS	LOG	Box	DESCIPTION
2168							22	
							23	
							24	
							25	
							26	
2169	<1%						27	SANDSTONE friable v.fine angular micaceous a/a sheet 1.
							28	
2170							29	
							30	
							31	
2171	<1%						32	
							33	
2172							34	
							35	
							36	
2173								

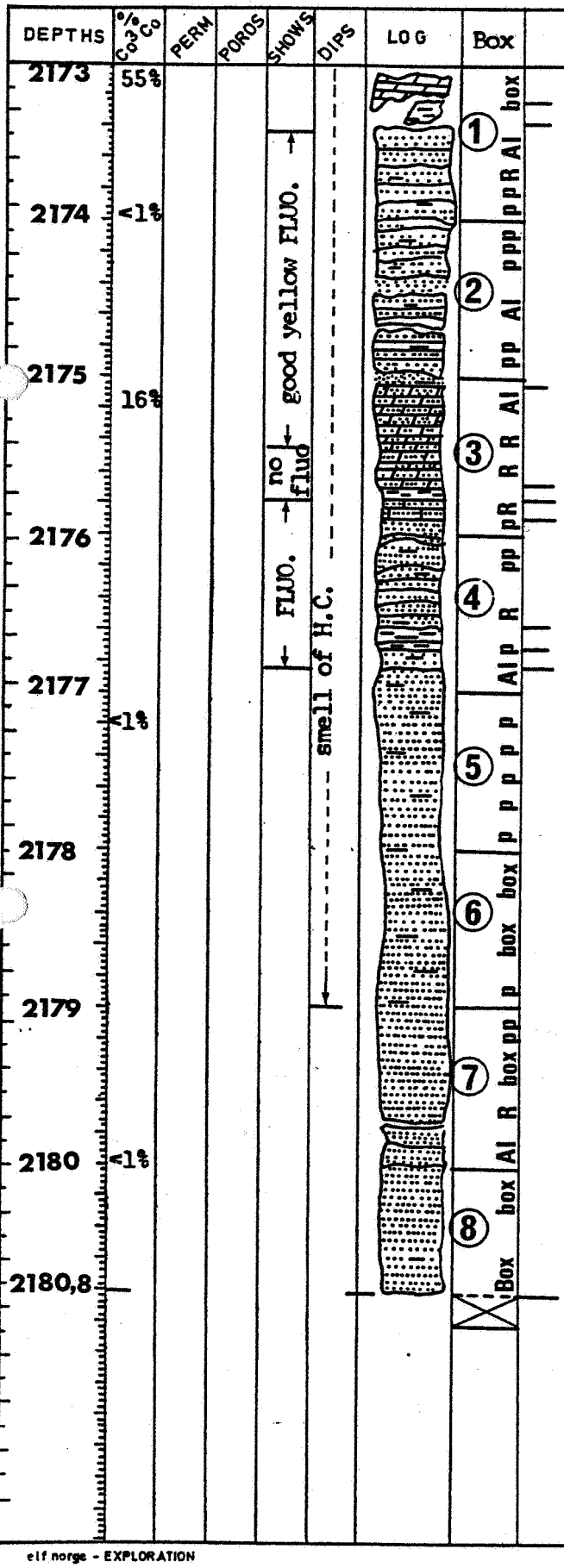
protected sample for analysis.

CORE DESCRIPTION

CUT: 7.80 m
RECOVERED: 7.80 m 100 %
LOSS: /

COMPANY: E.A.N.
WELL N°: 25/4-5
CORE N°: 5

DATE: 29.08.80
DEPTHS: 2173 - 2180.60



DESCIPTION

DOLOMITE cryptox - xlne. grey.bge. compact.tight
SHALE dark-grey.compact.

SANDSTONE a/a Cores 3 - 4 light grey to translucent. after washing but fine to medium. and subangular to subrounded unconsolided,micaceous. v.slightly argilaceous to SAND.

SANDSTONE coarse light grey.hard.compact. v.dolomitic cement. strongly cemented.
SHALE dark-grey to black compact
SANDST. a/a.

SANDSTONE as core 3-4 friable. as box 2.

SHALE dark to blk. micaceous - horizontal bedded.

SANDSTONE friable to SAND v.slightly argilaceous micaceous.

Box : cartoon box
Al : sheet of Aleminium prot.
p : plastic bag.
R : rock

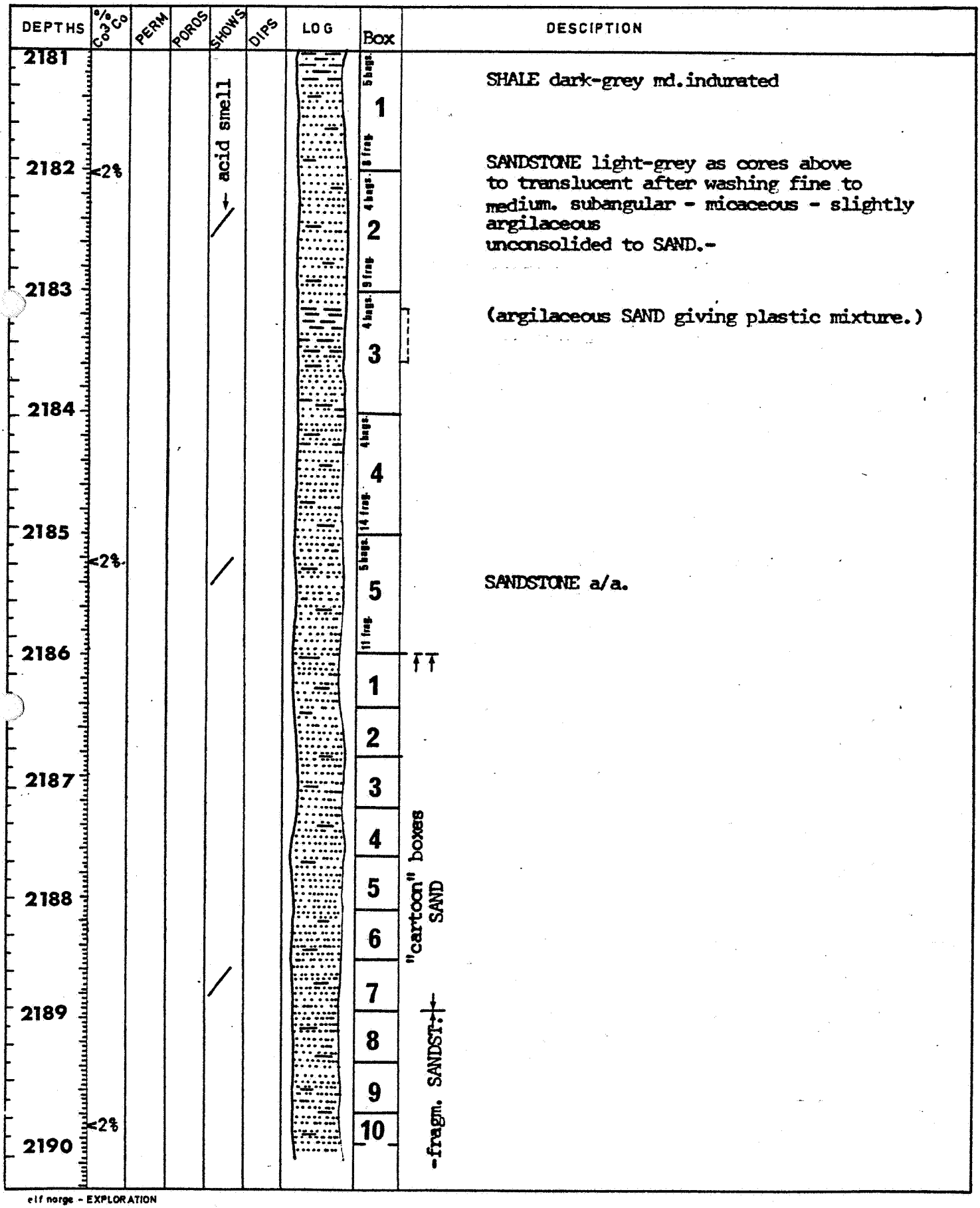
CORE DESCRIPTION

Sheet 1/2

CUT: 10 m
RECOVERED: 10 m 100 %
LOSS:

COMPANY: E.A.N
WELL N°: 25/4-5
CORE N°: 6

DATE: 30.08.80
DEPTHS: 2181 - 2191 m.



elf norge - EXPLORATION

CORE DESCRIPTION

Sheet 2/2

CUT: 10 m
RECOVERED: 10 m 100 %
LOSS:

COMPANY: E.A.N.
WELL N°: 25/4-5
CORE N°: 6

DATE: 30.08.80.
DEPTHS: 2181 - 2191

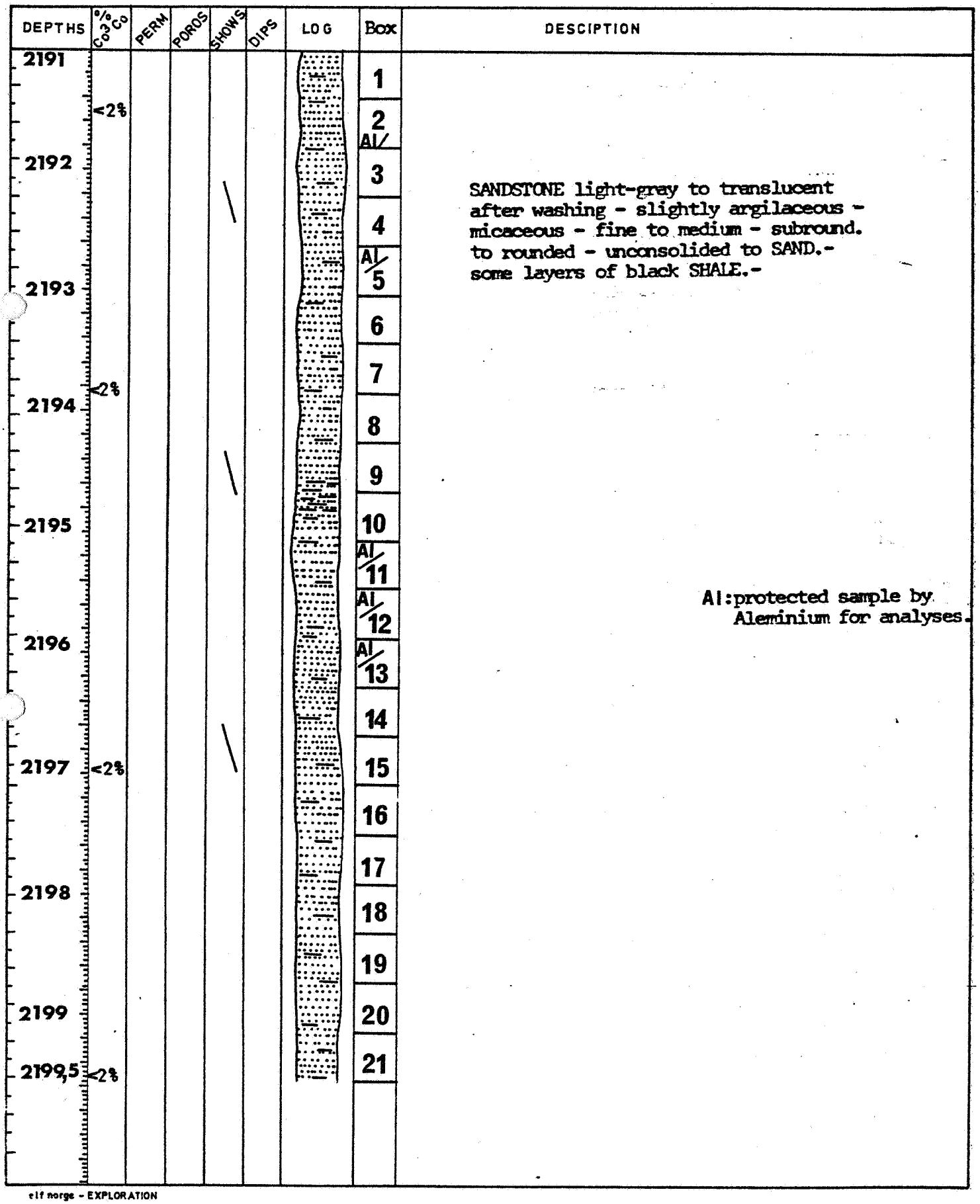
DEPTHS	% Co^3Co	PERM	POROS	SHOWS	DIPS	LOG	Box	DESCIPTION
2190							10	
				/			11	SANDSTONE a/a.
							12	
2191								

CORE DESCRIPTION

CUT: 8.50 m
RECOVERED: 8.50 m 100 %
LOSS: /

COMPANY: E.A.N.
WELL N°: 25/4-5
CORE N°: 7

DATE: 31.08.80
DEPTHS:
2191 - 2199.5



CORE DESCRIPTION

Sheet 1/2

CUT: 18 m
RECOVERED: 18 m 100 %
LOSS: /

COMPANY: E.A.N.
WELL N°: 25/4-5
CORE N°: 8

DATE: 01.09.80
DEPTHS: 2199.50-2217.50

DEPTHS	% CO_3 Co	PERM	POROS	SHOWS	DIPS	LOG		DESCIPTION
2199,5							1	top Ctte.-box 1. Sandstone ± consolided.
2200,5	<1%						(Al)	
							(Al) 2	SANDSTONE translucent - slightly argilaceous - micaceous - fine to medium subrounded to rounded grains. unconsolided to SAND but more consolided that last cores.-
2201,5				/			3	(no fluo - no smell - no gas).-
2202,5							4	
2203,5							5	Al: protected by Aluminium sample for analysis.
2204,5				None			6	
2205,5	<1%						7	
2206,5				/			8	
2207,5							9	
2208,5								

elf norge - EXPLORATION

CORE DESCRIPTION

Sheet 2/2

CUT: 18 m
RECOVERED: 18 m 100 %
LOSS: /

COMPANY: E.A.N.
WELL N°: 25/4-5
CORE N°: 8

DATE: 01.09.80
DEPTHS: 2199.50 - 2217.50

DEPTHS	%Co2/Co	PERM	POROS	SHOWS	DIPS	LOG		DESCIPTION
2208,5							10	
2209,5				/			11	SANDSTONE to SAND a/a.-
2210,5							12	
2211,5							13	
2212,5				None			14	
2213,5							(Al 15	
2214,5							16	
2215,5				/			17	
2216,5							(Al 18	
2217,5								

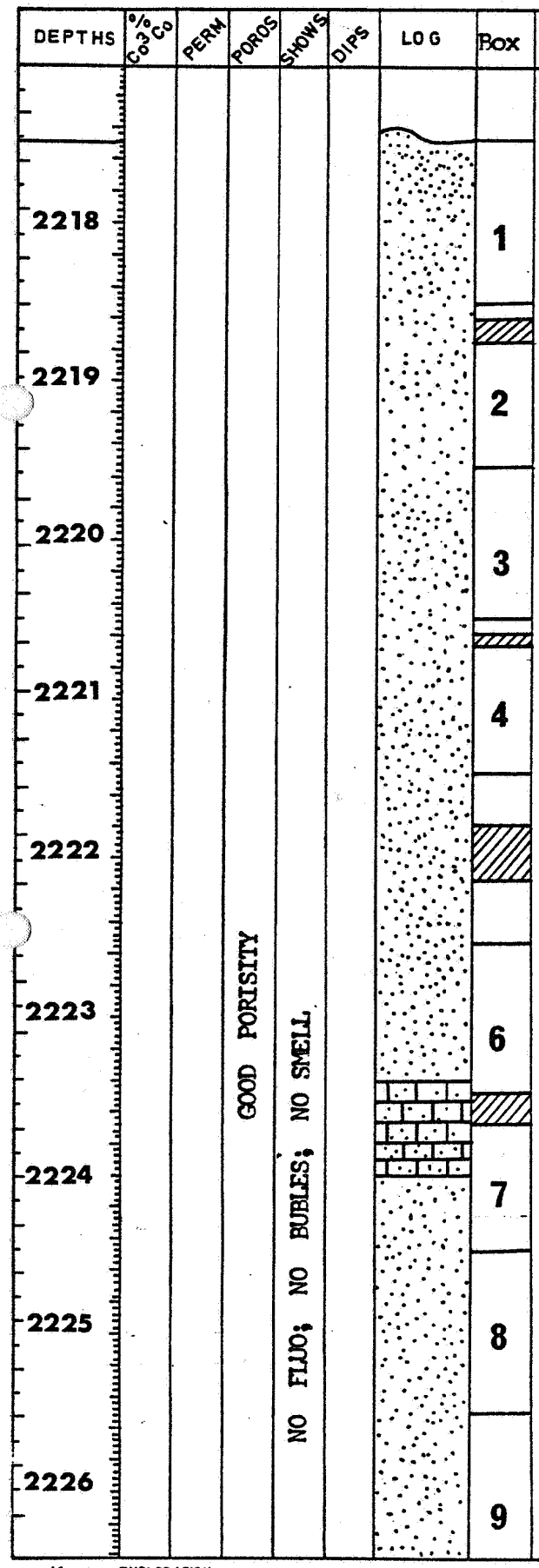
CORE DESCRIPTION

Sheet 1/2.

CUT: 17.5 m
RECOVERED: 14 m 80 %
LOSS: 3.5 m

COMPANY: E.A.N.
WELL N°: 25/4-5
CORE N°: 9

DATE: 02.09.80.
DEPTHS: 2217.5 / 2235



2217.5

2218.5

2219.5

2220.5

2221.5

2222.5

2223.5

2224.5

2225.5

SANDSTONE: Light grey to translucent medium to fine subangular grains with a few rounded coarse grains poorly consolidated micaceous (3%) biotite muskovite very slightly argilaceous finly glauconitic in places

2223.45 - 2224: SANDSTONE, with same elements than before, but very hard: cement calcitic compact.

From 2224.5 m: We recovered only loose sand.

CORE DESCRIPTION

Sheet 2/2

CUT: 17.5 m
RECOVERED: 14 m 80 %
LOSS: 3.5 m

COMPANY: E.A.N.
WELL N°: 25/4-5
CORE N°: 9

DATE: 02.09.80
DEPTHS: 2217.5 m
2235 m

DEPTHS	% Co_3Co	PERM	POROS	SHOWS	DIPS	LOG	DESCIPTION
2227						≠ 10	2226.5
2228						≠ 11	2227.5 Sandstone: same than before, poorly consolidated.
2229						≠ 12	2228.5
2230						≠ 13	2229.5
2231						≠ 14	2230.5
2232							2231.5 m
2233							
2234							
2235							

////// : Selected samples packed in aleminium paper.

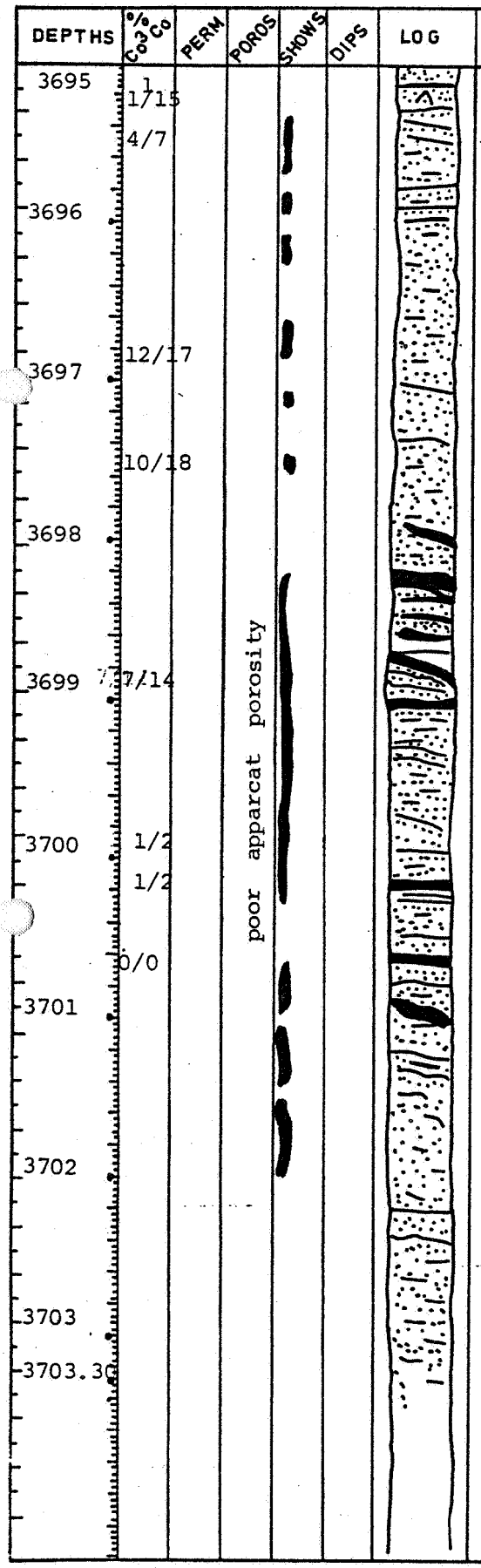
elf norge - EXPLORATION

CORE DESCRIPTION

CUT: 18m
RECOVERED: 18m _____%
LOSS:

COMPANY: E.A.N.
WELL N°: 25/4-5
CORE N°: 10

DATE: 24.11.80
DEPTHS: 3695-3713



DESCIPTION

SILTSTONE, to very fine sandstone, grey-beige fine argillaceous distribution, dolomitic cement in places-

Abundant micas

Some layers millim. to centim. of black indurated clay sometimes oblique.

Glauconite very scattered

Fine levels millmet. of coal tr. Dry asphalte.

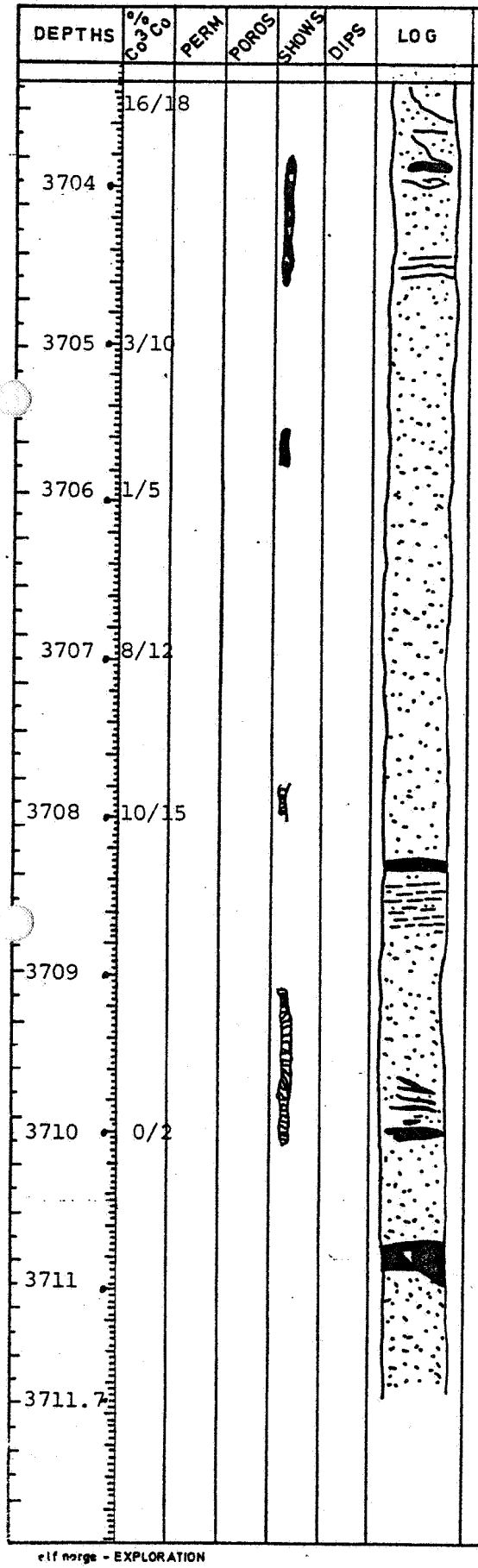
Poor apparente porosity.

CORE DESCRIPTION

CUT: 18
RECOVERED: 18 ____%
LOSS:

COMPANY: E.A.N.
WELL N°: 25/4-5
CORE N°: 10

DATE: 24.11.80.
DEPTHS: 3695-3713



DESCIPTION

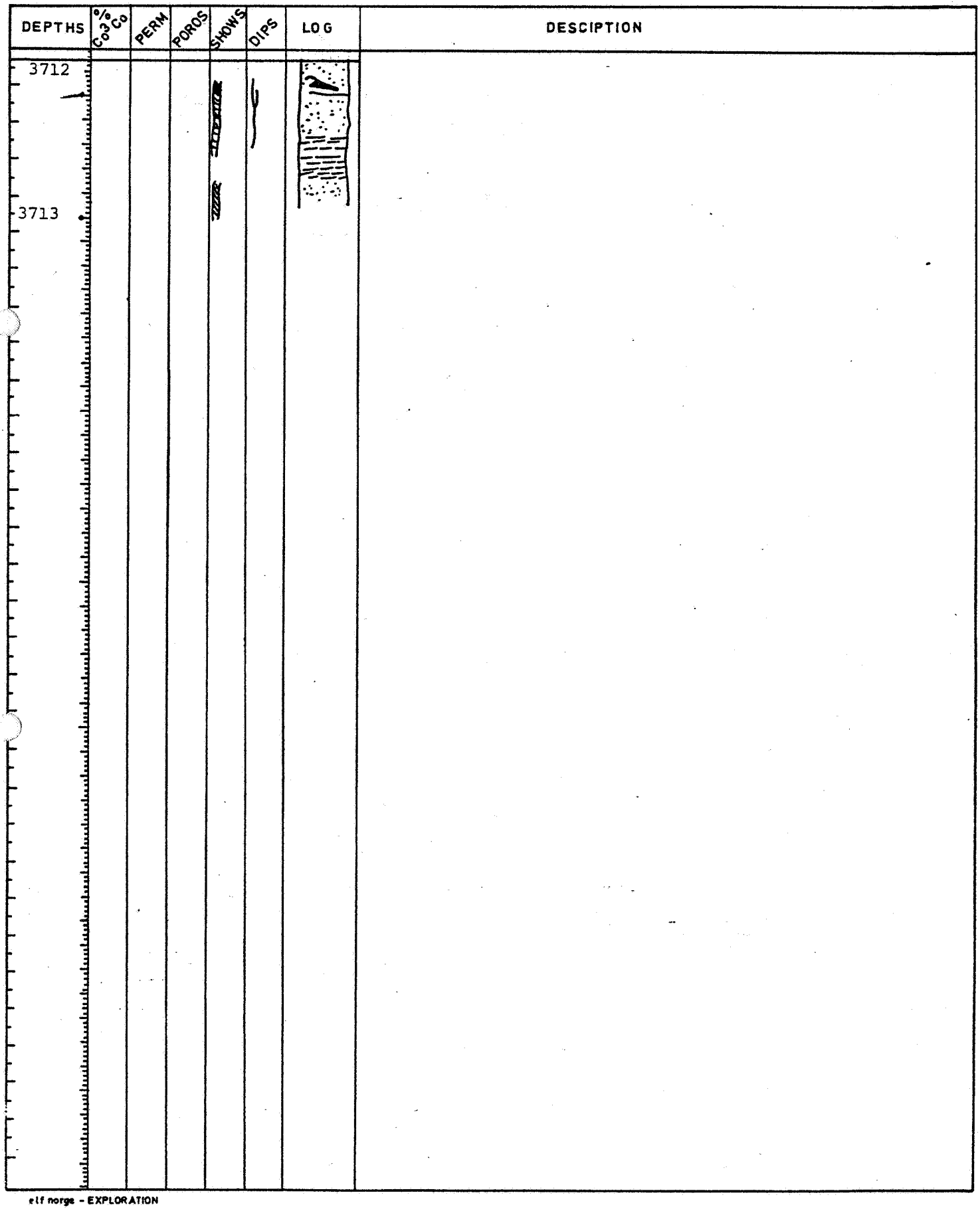
Very abundant bubbles and ligth-yellow to beige-yellow fluo.
As a hole - also brown bluish yellow fluo on numerous places .
(After cleaning brown-bluish-yellow fluo see shows)

CORE DESCRIPTION

CUT: 18
RECOVERED: 18m _____%
LOSS:

COMPANY: E.A.N.
WELL N°: 25/4-5
CORE N°: 10

DATE: 24.11.80.
DEPTHS: 3695-3713



CORE DESCRIPTION

CUT: 18m
RECOVERED: 17.7m _____%
LOSS: 0.3m

COMPANY: E.A.N.
WELL N°: 25/4-5
CORE N°: 11

DATE: 25.11.80.
DEPTHS: 3713-3730.7

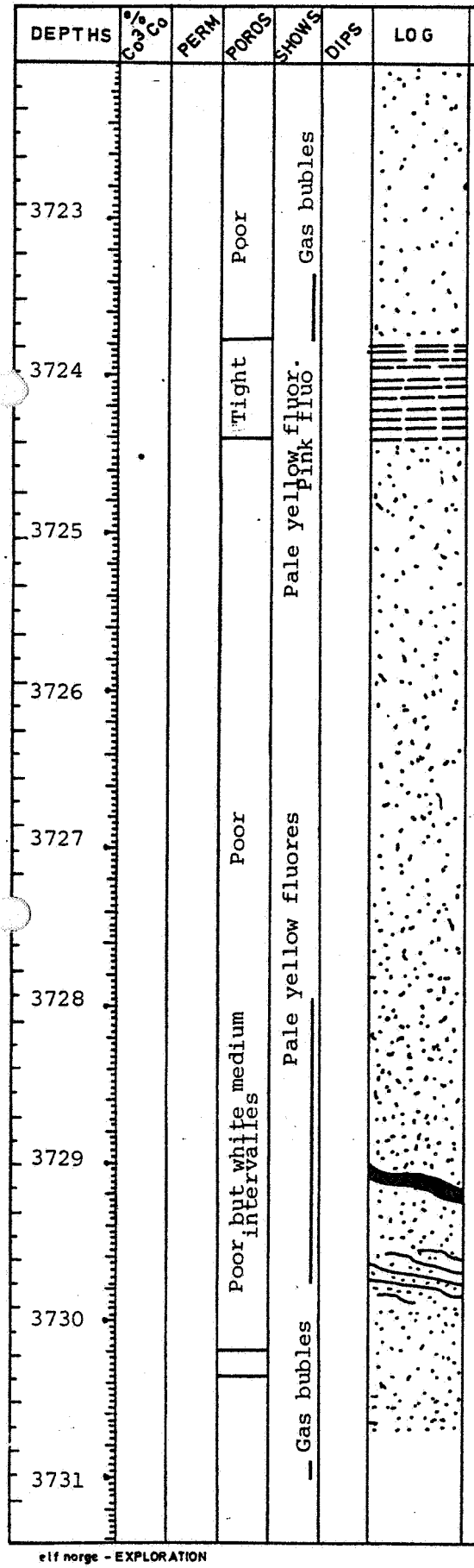
DEPTHS	%CO_3Co	PERM	POROS	SHOWS	DIPS	LOG	DESCIPTION
3713			Tight				Dark Shale,with no aprent porosity,no fluor with a 25cm layer of ligth brown siltstone.
3714							
3715							Brigth black coal (2cm thick)
3716			Poor	Pale yellow fluor			Sandstone,fine to medium size quarts grains, dark grey aspect,durty, well cemented,quartzitic cement,rien in muscovite.Locally calcitic lerent.
3717							
3718			Tight	No direct fluor			Sandstone,fine,ligth brown,white clacitic cement,very compact,very poor porosity.
3719							
3720			Poor	Pale yellow fluo			Sandstone,fine to medium size grains,dark grey aspect,with quartzitic cement,micaceous.
3721							
3722				Oil bledding			

CORE DESCRIPTION

CUT: 18m
RECOVERED: 17.7m _____%
LOSS: 0.30m

COMPANY: E.A.N.
WELL N°: 25/4-5
CORE N°: 11

DATE: 25.11.80
DEPTHS: 3713-3730.7



DESCIPTION

Dark shale, micaceous, white glauconitic sandstone inclusions, and fine fluo.

Sandstone, fine to medium, dark grey aspect, with quartzitic cement, micaceous.

From 3727m, same sandstone than before, but with 20cm thick lighter sandstone, medium to coarse grain quartz, not so well cemented, better porosity, brighter yellow fluo.

Bright light corl (18cm thick)

Ligth brown sandstone (25cm thick) micaceous, very tight, very fine, well cemented.

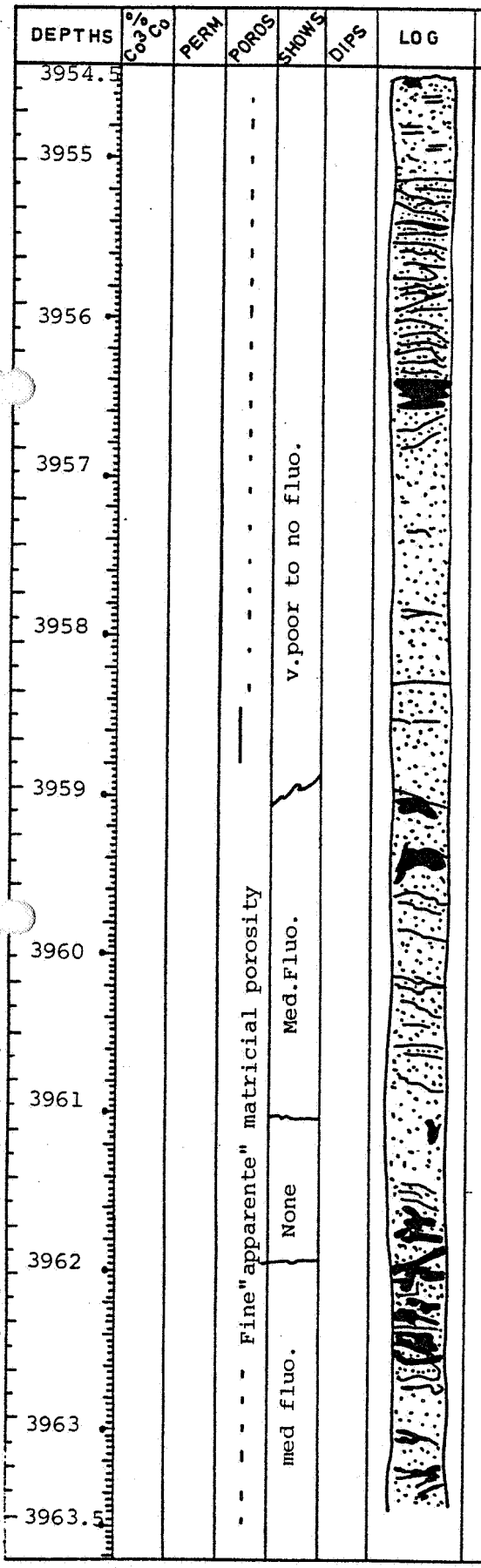
0.30 m missine.

CORE DESCRIPTION

CUT: 17m
RECOVERED: 16m
LOSS: 1m
_____%

COMPANY: E.A.N.
WELL N°: 25/4-5
CORE N°: 12

DATE: 07.12.80
DEPTHS: 3954.50-3971.50



DESCIPTION

Argilaceous part.

Sandstone wh.med.crse in sone places subangul.to angular grains.
Siliceous cmt. but also very finely argilceous. cmt.for the most part-consolidated hard.

Very numerous millimetric stringers of black vrey micaceous shale (± oblique-subhorizon. contorted stringers)
The quarts grains of the sandstone are originally white ,but their colour aspect is brown by hydrocarbon.-Good Fluo.(Brigth yellow)

No bubbles but good ligth yellow fluo,inside the core,(micaceous sandstone)
CCly extact.Good,Brigth bluish-yellow fluo)

(3956.20-3950.20 Sandstone crse.angl.grains.

Sandstone with calcereous cmt.

CORE DESCRIPTION

CUT: 17m
RECOVERED: 16m _____%
LOSS: 1m

COMPANY: E.&.N.
WELL N°: 25/4-5
CORE N°: 12

DATE: 07.12.80.
DEPTHS: 3954.5-3971.5

DEPTHS	% Co_3Co	PERM	POROS	SHOWS	DIPS	LOG	DESCIPTION
3963.5							
3964	0						
3965	40	v.poor Fluo					Sandstone wh.clean-crse.angul.grains level with calcareous cmt.
3966	0						
3967	0	Fine "apparente" matricial porosity		Med.Fluo but good inside the core			Black shale Some pebbles of siltstone grey.
3968	0						
3969							Opened fissures.
3970	0						
3970.5	0			v. good fluo.			
3971							
3971.5							

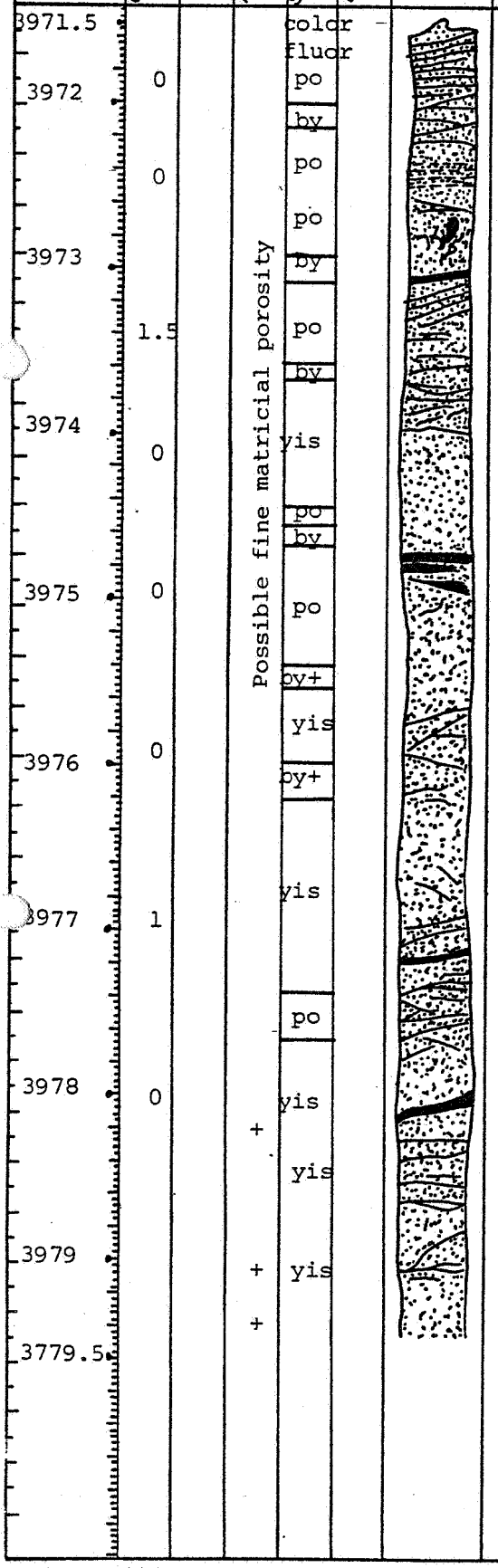
J.M.

CORE DESCRIPTION

CUT: 13.50
RECOVERED: 12.50 93 %
LOSS: 1.00

COMPANY: E.A.N.
WELL N°: 25/4-5
CORE N°: 13

DATE: 07.12.80.
DEPTHS: 3971.50-3985



Alternation of millimetric stringers of black micaceous shale and sandstone white to ligth grey siliceous cmt.micaceous.

At 3972: Some pebbles of siltstone beige v.cpct.
At 3978.75: Some subverticl.fine fissures + coal+pyrite in inclution.

3974m Becoming more really sandstone massive-siliceous cmt.-hard.
Fine size angular grains.

3974.75-3975.9 and 3975.20-3975.30: Black Shale.

3975.Oblique veins of coal+organic matter + micas.muscor.

The color of grains of the sandstone is very probably originally white to transprt. but,their color aspect is bown by v.fine film of H.C.-- Good Fluo.

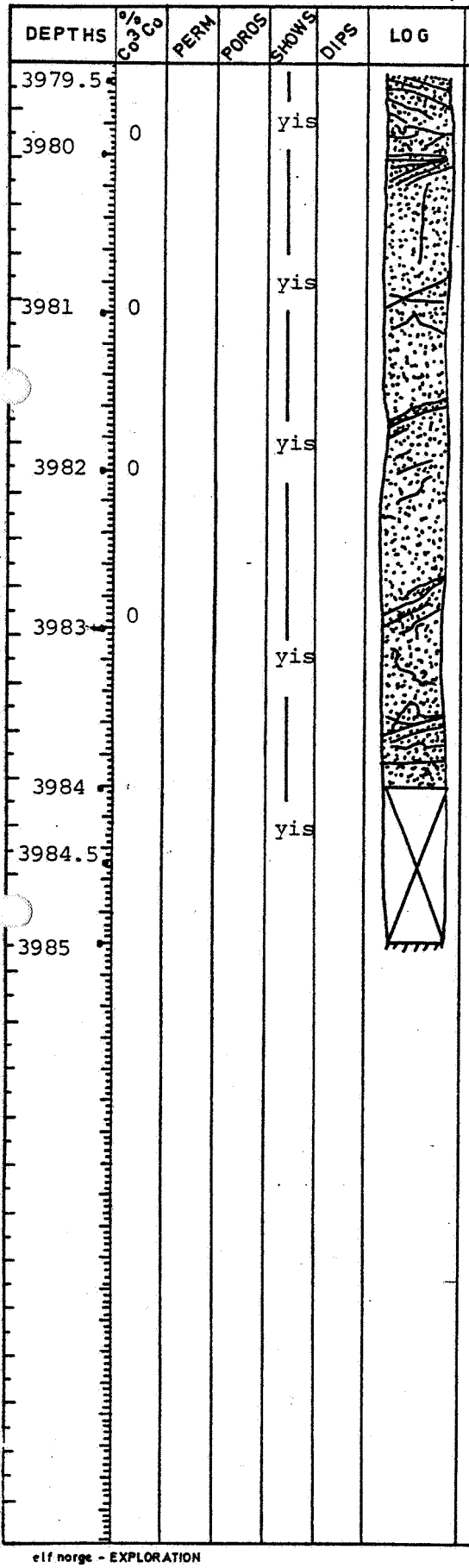
J.M.

CORE DESCRIPTION

CUT: 13.50
RECOVERED: 12.50 93 %
LOSS:

COMPANY: E.A.N.
WELL N°: 25/4-5
CORE N°: 13

DATE: 07.12.80
DEPTHS: 3971.5-3985



DESCIPTION

Sandstone siliceous cmt.massive grains A/s

Sub.vertical argilaceous jiont w/sub. horizont striac.

Fluo: colours:

p.o. : Pink Orange
by : Brigth Yellow
yis. : Brigth Yellow but only inside the core (completly)

+All CCly extract,as a whole core--- yellow ligth blue-yellow Flue.

+Tr. of oil and Fluo(yellow-blue) on the mud, during thr recoverery of core,
Some pebbles on the after 2 times.

J.M.

CORE DESCRIPTION

CUT: 13.50
RECOVERED: 13.50 100 %
LOSS: /

COMPANY: E.A.N.
WELL N°: 25/4-5
CORE N°: 14

DATE: 08.12.80.
DEPTHS: 3985-3998.5

DEPTHS	% Co_3Co	PERM	POROS	SHOWS	DIPS	LOG
3994	0			by		
				yis		
3995	0			by		
3996	0	A/a	A/a			
3997	0					
3998	0					
3998.5	0					

DESCIPTION

Level of siltstone,green-brown,micaceous +pyrite,with abnt.black fibrous vegetal E

Small bubbles on the core at the recov.+ traces-irisation of oil on the mud.

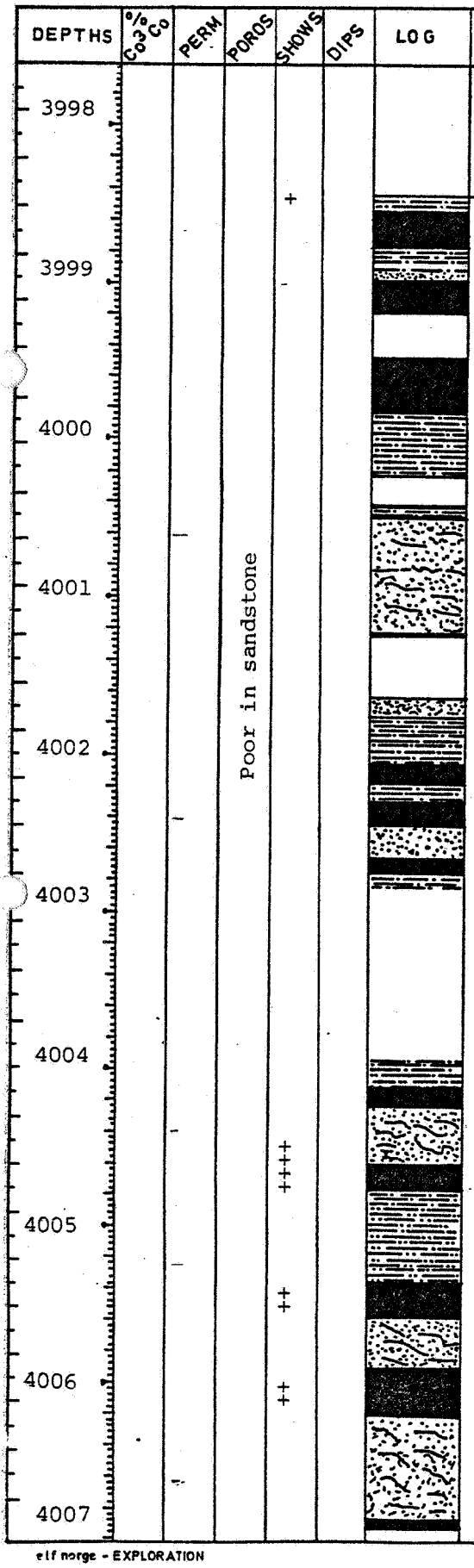
FLUO: color.
p.o. : Pink Orange
by. :Brigth Yellow
yis. :Brigth Yellow but only inside the core(completly).

CORE DESCRIPTION

CUT: 18m
RECOVERED: 16.1m _____%
LOSS: 1.9m

COMPANY: E A N
WELL N°: 25/4-5
CORE N°: 15

DATE: 09.12.80
DEPTHS: 3998.5-4016.5



DESCIPTION

Black shiny brient coal.

Black shale,mica and nodules of pyrite and numerous traces of plants.

Ligth grey to light brown sandstone, subrounded fine to very f.quartz grains, compact,with abondant quartzitic cement, also musovite thin sringers of dark shale.(m.n)

Sandstone (s/a) a lot of centrimetric dark shale intercal.

4004.8 : 2cm thick stringers of pyrite.

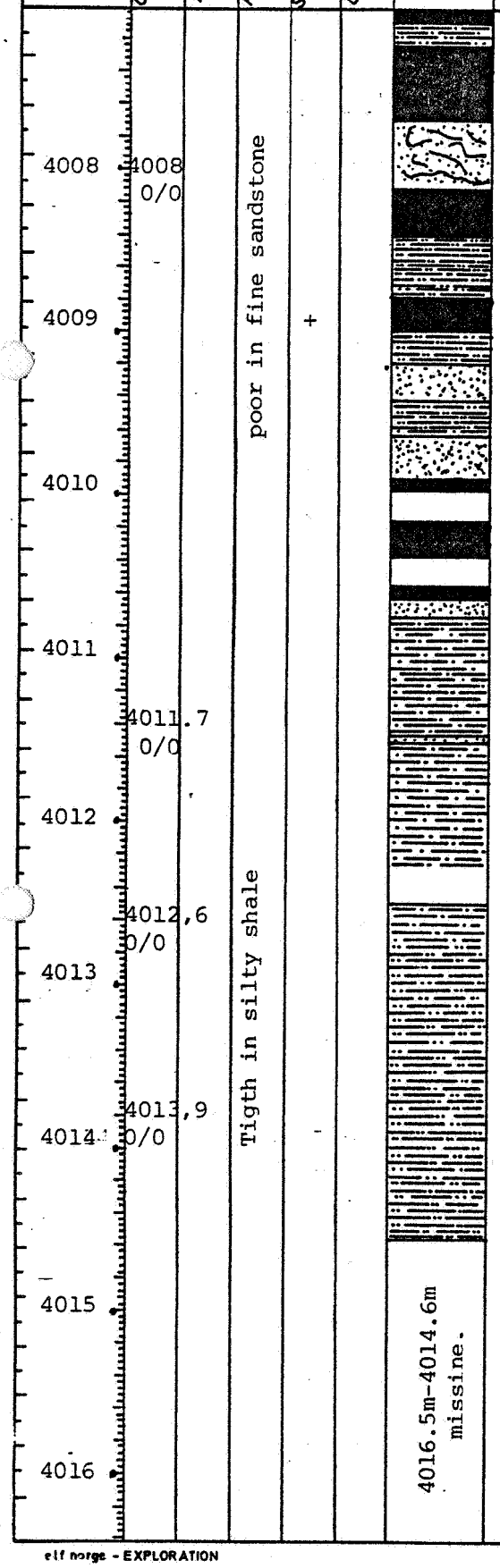
Pyrite in nodules in coal.

CORE DESCRIPTION

CUT: 18m
RECOVERED: 16.1m _____%
LOSS: 1.9m

COMPANY: E.A.N.
WELL N°: 25/4-5
CORE N°: 15

DATE: 09.12.80
DEPTHS: 3998.5m-4016.5m



DESCIPTION

Thin interbedded sandstone and dark shale.

Nodule of pyrite

Nodules of pyite

Dark silty shale with thin stringers of bright coal.

elf norge - EXPLORATION

CORE DESCRIPTION

CUT: 15m in 16 1/2" | COMPANY: E.A.N. | DATE: 15.12.80.
RECOVERED: 15m 100 % | WELL N°: 25/4-5 | DEPTHS: 4183.5m-4198.5m
LOSS: 0 | CORE N°: 16

DEPTHS	%Co3Co	PERM	POROS	SHOWS	DIPS	LOG	DESCIPTION
4183		TOP OF CORE 4183.5					
	14/41			+a few points pale yellow due(ccl			4189.5-4185m: Sandstone from top to bottom
4184m							50cm: Sandstone, fine to medium, subrounded quartz grains. dirty aspect due to a lot of mica (muscovite), well cemented, with a few dark and green spots.
	3/13		Poor				2 stringers, 10cm thick, very clean aspect, ligth beige colour, dolomitic, at 4185.8m: cali: 14/30/41.
4185							
	o/1						80cm.: Sandstone, homecenous, dirty aspect due to mica, well cemented, quartzitic cement.
4186							15cm.: Dolomitic sandstone, light beige, with a few cracks (40°)
	1/3						10cm.: Breccia, grey at the top, gradding to a conglomerat at bottom, green and dark grey.
4187							---
							4185-4190.3
							From top to bottom:
							3cm.: Greenish Clay.
4188							Homcenous red brownish clay, micaceous, numerous slickensides, metalic grey polish given by layer lactice minreal(chlorite)
4189	0/2						At.: 4187.2m: 8cm of green clay
							At.: 4187.5m: over 30cm interval, greenish clay inclusions
4190							---
							4190.3-4193.8
							Bicolour clay
4191							Mainly red brown clay
							Thin alternange greenish clay.
4192	0/1						

CORE DESCRIPTION

CUT: 18 m
RECOVERED: 17.8 m 99 %
LOSS: 0.20 m

COMPANY: ELF NORGE
WELL N°: 25/4-5x
CORE N°: 17

DATE: 22/01/81
DEPTHS: 4140 m - 4158 m

P.H.

DEPTHS | % CO_3Ca | PERM | POROS | SHOWS | DIPS | LOG | DESCIPTION

4141
4142
4143
4144
4145
4146
4147
4148
4149

7/7
0/0
0/0
0/0
0/2
0/0
0/0
0/0

NO PERMEABILITY

NO POROSITY AT ALL

BACKGROUND RECORDED WHILE CORING: LESS THAN 0.02% ; NO DIRECT FLUORES.
VERY PALE YELLOW FLUO WITH CCl_4

VERY POOR POROSITY

small centimetric rounded elements Either black or light grey.

4840 4141.7 m : 10 cm thick intercallations.

SILTSTONE: Bluish greenish.

SANDSTONE: Light brown, very fine, well cemented.

Zone rich in black (organic) material.
Slickenside.

4141.7 - 4144 m :

SILTSTONE only, locally dark green.

4144 - 4145.8 m :
Mainly SILTSTONE light green with. small centimetric
At 4144.5 m: 5 cm of SANDSTONE
At 4144.7 m: 5 cm of CONGLOMERATE
At 4145.25 m: 2 cm of CONGLOMERATE
At 4145.40 m: 10 cm of CONGLOMERATE
At 4145.70 m: 10 cm of CONGLOMERATE

4145.7 m: Top of green SANDSTONE.

Slickensides: Metalic greenish grey polish given by a layer lactice mineral (Chlorite).

elf norge - EXPLORATION

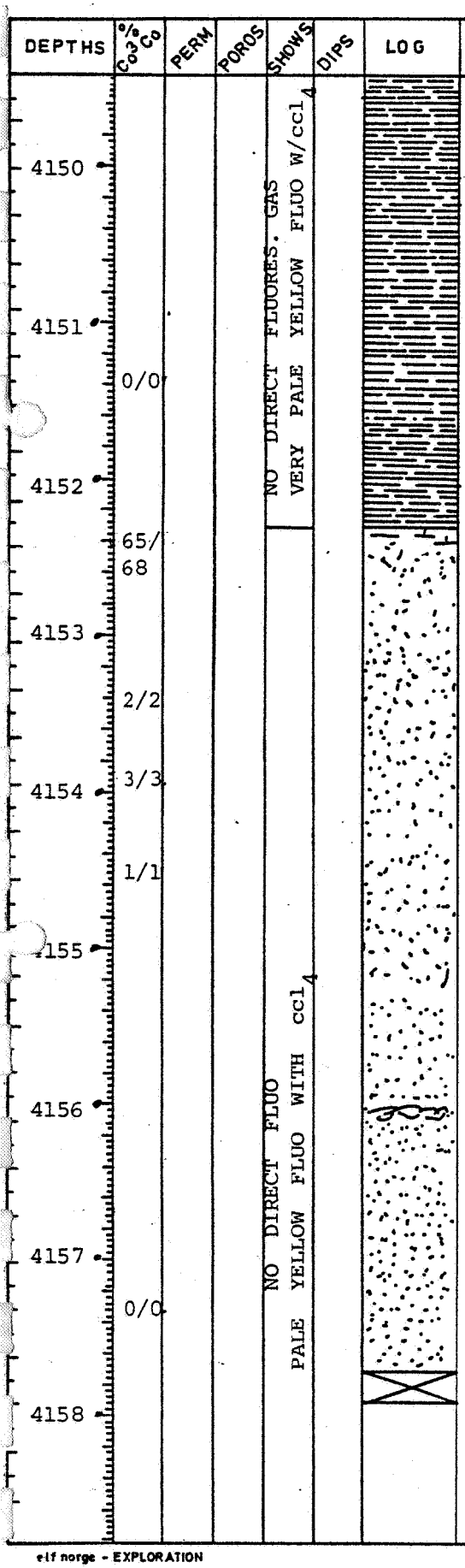
CORE DESCRIPTION

CUT: 18 m
RECOVERED: 17.8 m 99 %
LOSS: 0.20 cm

COMPANY: ELF NORGE
WELL N°: 25/4-5x
CORE N°: 17

DATE: 22/01/81
DEPTHS: 4140 - 4158 m

P.H.



DESCIPTION

Green CLAYSTONE ,very compacted,homogenous.

From 4151 m: Green CLAYSTONE,becoming locally very silty.
Also increase in percentage of dark organic material.

At 4152.2 m: 10 cm thick zone,conglomeratic aspect.

4852.3 m: Top of SANDSTONE, starting with a Limestone layer.

SANDSTONE: Light grey brown subrounded quartz grains,flue.
well cemented,poor porosity.
Locally very micaceous(muscovite)
rare pyrite agreat.

4156 - 4156.1 m: 10 cm thick zone,conglomeratic aspect.

5.7 m of SANDSTONE: Poor porosity reservoir.

elf norge - EXPLORATION

SIDE WALL CORES DESCRIPTION

WELL : 25/4-5	RUN N°: 1	SERVICE COMPANY: Schlumb	
LICENCE : 036	PAGE N°: 1	ASKED: 30	
Norway	DATE : 9/11-80	RECOVERED: 19	
		SHOT : 25	
		LOST : 6	
		FULL BULLET : (partially) 11	

tr : trace - M : medium - G : good

N°	DEPTHS	REC %	LITHOLOGY	Fluorescence CUT
1	3598	75	Shale black v.fuly micaceeous inducated w/some fine black inclusions carbon material	
3	3593	75	Shale dk.gre v.v.fuly micaceous-v.v.slightly dolo.	
4	3587	40	Shale calcerous grey-green, md.soft	
6	3577	40	Marl shaly green-grey - md.soft	
11	3476	75	Marl shaly grey-green - soft	
14	3410	40	Marl shaly grey md. soft	
15	3400	40	MRL shaly light-grey soft, fuly micaceous	
16	3359	50	Marl shaly gre, fuly micaceous, soft	
17	3300	2	Lmst. slightly argillaceous, light grey, md. hard	
22	3280	50	Marl grey md. soft	
23	3257	50	Marl dark grey-green, soft to past	
24	3254	25	Marl light grey-blue	
27	2986	10	Shale marly red-brown	

SIDE WALL CORES DESCRIPTION

WELL : 25/4-5	RUN N° : 1
LICENCE :	PAGE N°: 1
	DATE : 6/2-81

SERVICE COMPANY	Schlumberger
ASKED:	30
RECOVERED :	19
SHOT :	30
LOST :	11
FULL BULLET :	12
EMPTY:	7

tr : trace - M : medium - G : good

N°	DEPTHS	REC %	LITHOLOGY	Fluorescence
1	4351	25	Claystone grey to grey light green, medium hard	N
2	4357	75	Sandstone white to light tan, unconsolidated, not sorted, very fine fine medium angular, argillaceous cement,	N
3	4375	60	Claystone red brown to light green, medium hard	N
4	4164	50	Sandstone grey white to light tan, unconsolidated, not sorted, very fine to fine, fairly argilaceous cemented, some micas	N
5	4127.5	50	Sandstone grey white, unconcolidated, not sorted, very fine to medium, angular, argillaceous cement.	N
6	4122	25	Claystone red brown, medium hard, slightly silty	N
7	4109	25	Sandstone light tan, unconsolidated, not sorted fine to medium and coarse grains, angular, fairly argillaceous cemented	N
8	4104	50	Sandstone white to light tan, unconsolidated, not sorted, very fine to fine grains angular, poorly argillaceous cemented.	white pale
9	4098	50	Sandstone light tan, unconsolidated, not sorted, very fine to medium angular, poorly argillaceous cemented	"
10	4087	40	Sandstone white to light tan, unconsolidated, not sorted, fine to medium grains, angular, poorly argillaceous cemented	"
11	4086.5	50	Sandstone white, unconsolidated, not sorted, very fine to fine, very poorly cemented	"
12	4057	80	Sandstone, iden	"

SIDE WALL CORES DESCRIPTION

WELL : 25/4-5	RUN N° : 2
LICENCE :	PAGE N°: 1
	DATE :

SERVICE COMPANY:	Schl.
ASKED:	30
RECOVERED:	13
SHOT :	30
LOST :	17
FULL BULLET :	8
EMPTY:	5

tr : trace - M : medium - G : good

N°	DEPTHS	REC %	LITHOLOGY	Fluorescence	CUT
13	4339	100	Claystone, dark brown, chocolate, medium hard	N	
14	4338	50	Claystone red brown, medium hard, slightly silty, some inclusions of very fine white sandstone	N	
15	3945	50	Claystone red brown, abundantly silty, some mica.	N	
16	3818	60	Sandstone tan, unconsolidated, not sorted, very fine to medium angular, poorly argillaceous cemented, some mica.	N	
17	3825.5	80	Siltstone tan to grey brown, firm, abundantly argillaceous, abundant mica.	N	
18	3812	80	Sandstone white to light tan, unconsolidated, not sorted, very fine to medium angular, partly argillaceous cemented	N	
19	3798.5	80	Sandstone light tan, unconsolidated, not sorted, very fine to medium angular, poorly argillaceous cemented	N	
20	3783.5	20	Sandstone light tan, unconsolidated, not sorted, very fine to medium, coarse grains, angular, poorly argillaceous cement	N	

SIDE WALL CORES DESCRIPTION

WELL :	25/4-5	RUN N° :	3
LICENCE :	-	PAGE N°:	1
		DATE :	06.02.81

SERVICE COMPANY	Schlumberg.
ASKED:	24
RECOVERED:	12
SHOT :	24
LOST :	12
FULL BULLET :	9
Empty	3

tr : trace - M : medium - G : good

N°	DEPTHS	REC	LITHOLOGY	Fluorescence	CUT
21	3952	30	Sandstone tan to light tan, unconsolated, no sorted, very fine to medium, angular, poorly argillaceous cemented	yellow pale milky	
22	3815	25	Siltstone grey to grey brown, abundantly argillaceous, some fine mica	N	
23	3890	40	Siltstone idem	N	
24	3870	40	Siltstone idem	N	
25	3850	40	Siltstone grey brown, abundantly argillaceous	N	
26	3733	20	Sandstone tan, unconsolidated, not sorted, very fine to medium poorly argillaceous cemented, some mica	white pale	
27	3694	20	Sandstone tan to grey brown, unconsolidated, not sorted, very fine to fine, fairly argillaceous some mica	N	
28	3640	50	Siltstone brown to grey brown, fairly argillaceous some mica	N	
29	3630	50	Siltstone idem abundantly argillaceous	N	

SIDE WALL CORES DESCRIPTION

WELL : 25/4-5	RUN N° : 5	SERVICE COMPANY: Schlumb	
LICENCE :	PAGE N°: 1	ASKED:	30
	DATE : 08.02.81	RECOVERED:	23
		SHOT :	30
		LOST :	7
		FULL BULLET :	13
		Empty	2

tr : trace - M : medium - G : good

N°	DEPTHS	REC %	LITHOLOGY	Fluorescence
1B	4250	50	Claystone red brown, medium hard, slightly silty	N
2B	4225	60	Claystone red brown occerently light green, medium hard, slightly silty	N
3B	4189	25	Sandstone white to light tan, unconsolidated, not sorted, fine to medium grains, angular, poorly argillaceous cemented, some mica	white pale
4B	4188	10	Sandstone idem	"
5B	4174	25	Sandstone white to light tan, unconsolidated, not sorted, very fine to fine, poorly argillaceous cemented ~~Some mica~~	N
6B	4172	50	Sandstone idem	N
7B	4069	50	Sandstone white, unconsolidated, not sorted, very fine to medium, angular, poorly argillaceous cemented	white
8B	4067	50	Sandstone idem	white
9B	3955	50	Sandstone tan, unconsolidated, not sorted, ~~very fine to medium~~ grains, angular, ~~fairly argillaceous cement~~	N
10B	4953	30	Sandstone light tan, unconsolidated, not sorted, very fine to fine medium grained, angular, poorly argillaceous cemented	yello pale/milky
11B	3952	30	Sandstone tan idem	"
12B	3951	50	Sandstone tan idem	"
13B	3950	80	Sandstone tan to light tan, unconsolidated, not sorted, very fine to medium, some coarse, poorly argillaceous cemented	spotted white

SIDE WALL CORES DESCRIPTION

WELL : 25/4-5	RUN N° : 6	SERVICE COMPANY: Schlumb.
LICENCE :	PAGE N°:	ASKED: 24
	DATE : 08.02.81	RECOVERED :
		SHOT :
		LOST :
		FULL BULLET : 8
		EMPTY

tr : trace - M : medium - G : good

N°	DEPTHS	REC	LITHOLOGY	Fluorescence CUT
14B	3823.5	50	80% Coal 20% Sandstone, white, very fine to medium	N
15B	3820.5	25	95% Coal 5% Sandstone white very fine to medium	N
16B	3778.5	30	Sandstone, grey white, unconsolidated, not sorted, very fine to medium poor argillaceous cement, abundantly finely inclusion coal	N
17B	3778	30	Sandstone grey tan, unconsolidated, not sorted, very fine to medium white mineral inclusion? Trace coal, very abundantly micaceous	N
18B	3773	30	Sandstone grey tan, unconsolidated, not sorted, very fine to fine rarely medium, spot of coal, very fine micaceous	N
19B	3748	50	Sandstone light grey, millimeter interbedded, grey tan, fairly argillaceous cemented, some mica	N
20B	3690.5	30	Siltstone grey to grey brown, very fairly argillaceous some fine mica	N
21B	3645	50	Siltstone grey to grey brown, unconsolidated, fairly argillaceous cemented some mica	N

ELF AQUITAINE NORGE A/S
Exploration Division
Ref.no.: 311D/81/44-R
PV/ån

3

WELL 25/4-5

COMPLETION REPORT

Approved by: S. Guyonnet

Author: P. Verdier

Stavanger, July 1981

LIST OF FIGURES:

LIST OF ANNEX:

LIST OF CONTENTS:

S U M M A R Y

The 24/4-5 well was spudded on June 25th and was temporarily abandoned at 1616 m on July 9th due to the crew strike. The strike ended on the 14th of August, and operations resumed the 15th. The 1616 m depth was again reached on August 19th after reaming and conditioning the well, and normal drilling started.

The well reached the TD at 4355 m, February 4th after 226 days (or 169 operating days). The well was stopped in red shales from the Cormorant Formation, Triassic in age.

The well was designed to test the Brent and Statfjord formation, on a seismic structure, in a down faulted pannel; it was also an appraisal well of the Paleocene gas discovery of the Heimdal field.

The main results can be summarized as following:

- The Brent formation is mainly water bearing.

- The Statfjord formation may be hydrocarbon bearing, according to the electrical logs, in the 50 meters from the upper zone; the formation is clearly water bearing in the bottom part.

- An unexpected 50 meter sandstone section in the upper part of Cormorant formation was found with hydrocarbons during drilling.

- 3 DST have been performed over the Cormorant and the Statfjord formation. From these tests the Cormorant sandstones are mainly tight and the Statfjord sandstone are water bearing.

- The very provisional results are as following:

DST 1: 4154 - 4176 m (Cormorant Formation)
Flowing: 4300 liters of water (90 g/cc) and dissolved gas in 31 hours.
Extrapolated pressure: 9500 psi at 4128 m RKB
Calculated K = 0.0004 md.

DST 2: 4065 - 4088 m (Lower Statfjord Formation)
Flowing: 16200 liters of water (118 g/cc) with dissolved gas.
Extrapolated pressure: 9400 psi at 4053 m; K = 0.14 md (computed).

DST 3: 3969 3999 m (upper Statfjord Formation)
Flowing: 17000 liters of water (94 g/cc) with dissolved gas.
Extrapolated pressure: 9430 psi at 3951.7 m; K = 0.14 md (computed).

In the Brent formation, FIT was performed at 3779.5 m (where some oil was recovered with RFT sampling). 21 liters of water (25 g/cc) and 81 liters of gas were recovered.

1 GENERAL DATA

1.1	Country:	Norway	
	Area:	Block 25/4	
	Owner:	Pan Ocean/Petronord Group	
	Operator:	EAN	
	Partners:	Pan Ocean A/S	50.448%
		K/S Femogtyefire Norsk A/S	6.933%
		Bow Valley Eploration Norge A/S	15.238%
		Sunningdale Oil Norge A/S	7.381%
		Norsk Hydro Produksjon A/S	6.920%
		Elf Aquitaine Norge A/S	8.720%
		Total Marine Norsk A/S	4.360%

K/S Femogtyvefire A/S interests are now shared between Saga Petroleum A/S & Co. with 41/43, and Uglands Rederi wth 2/43.

For that part of the concession that concerns Heimdal, the government has exercised their option, and the ownerships are:

Den Norske Stats Oljeselskap	40.000%
Pan Ocean A/S	23.798%
Bow Valley Exploration A/S	8.000%
Elf Aquitaine Norge A/S	9.639%
Sunningdale Oil Norge A/S	3.875%
Saga Petroleum A/S & Co.	3.471%
Norsk Hydro Produksjon A/S	6.228%
Total Marine Norsk A/S	4.820%
A/S Uglands Rederi	0.169%

In the rest of the block the distribution is:

Pan Ocean A/S	46.904%
Bow Valley Exploration Norge A/S	15.238%
Elf Aquitaine Norge A/S	11.083%
Sunningdale Oil Norge A/S	7.381%

	Saga Petroleum A/S & Co.	6.611%
	Norsk Hydro Produksjon A/S	6.920%
	Total Marine Norsk A/S	5.541%
	A/S Uglands Rederi	0.322%
Classification:	Wildcat: Jurassic Formations	
	Appraisal Paleocene sand	
Rig:	Dyvi Alpha	
Contractors:	El-logging: Schlumberger	
	Mud-logging: Geoservices	
	Drilling: Dyvi Drilling	

1.2 Particular Data

Seismic location:	Line 780 206
Coordinates:	02°11´39.81" E
	59°34´ 4.75" N
Water depth:	121 m
RKB elevation:	25 m
Spudded:	25.06.81
At TD:	04.02.81
Completed:	26.03.81

2 WELL HISTORY

Tag sea Bottom at 146 m.

1) Drill with 26" bit + hole opener 36" down to 297.5 m.
   Run 30" casing down to 207 m.

2) Drill with 17 1/2" bit from 207 m down to 880 m.
   Reopen hole to 26"
   Run 20" casing down to 866 m.

3) Drill with 12 1/4" bit from 880 m down to 2130 m.
   2130 - 2157.5 m: 3 cores 12 7/32"
   2157.5 - 2235 m: 6 cores 8 15/32"
   Reopen hole to 12 1/4"
   Drill 2235 - 2822 mm: 12 1/4"
   Reopen hole 2130 - 2822 m: To 17 1/2"
   Run 13 3/8" casing down to 2817 m.
   12 1/4" hole, 9 5/8" casing.

4) Drill with 8 1/2" bit from 3600 m to 4198.5 m
   Stuck in the hole at 4174 while R.I.H.
   Back off at 3891 m.
   Side track from 3769 m
   TD 4355 m
   Run 7" liner (3500 to 4250 m)

3 OBJECTIVES AND MAIN RESULTS

The objectives for the well were to test the Brent and Statfjord formations on a down-thrown panel west of the high drilled by the 25/4-1 well where several Jurassic levels were found hydrocarbon bearing.

The secondary purpose of the well was an appraisal of the Heimdall gas-bearing section; so a set of 9 cores have been taken between 2130 and 2235 m. This has been done in order to get first a better sampling of the different detritic facies, and secondly to have more detailed petrophysical measurememts.

The reservoir was found at the expected depth. 2110 m MSL (Top reservoir 2109.4 m); the 14 meters from the upper part of reservoir are considered as a little degraded; in the 24 meters section down to the GOC (2147.6 m MSL). The sands have the same petrophysical characteristics as in the 25/4-1 similar section.

The Cretaceous section (C2 - M2 seismic interval) was, as expected, 910 m thick; these two seismic markers were properly picked and computed.

The Upper Jurassic shaly section was thicker than expected: 100 meters instead of 25 meters.

The other Jurassic formation have been found with the expected thicknesses

129 m for Brent Formation
129 m for Dunlin Formation
178 m for Statfjord Formation

The Triassic was drilled on about 200 meters
The hydrocarbon potential of the different Jurassic detritic formations have been found disappointing.

- The Brent formation is mainly water bearing.
- The Statfjord formation has to be considered as water bearing as well in the upper part as in the lower part.

The Cormorant formation provided a 50 meters sandstone reservoir, which was drilled with good shows; unfortunately the tests showed that the sandstones have to be considered as tight, producing only very reduced volume of water.

1410 - 1640 m: Clay, silty, very plastic, light grey, bluish to dark brown with black spots. Fine stringers of microcrystalline beige limestone. Traces of sand, fine, translucent and rounded.

1640 - 1994 m: Siltstone, blue grey with black spots, slightly indurated. Occasionally glauconitic grains, few traces of pyrite. Traces of microcrystalline, beige dolomite, and traces of dark shale.
Age: Eocene - Miocene.

4.2.3 Rogaland Group: 1994 - 2659 m

1994 - 2033 m: Balder Formation
Siltstone, grey, brown, soft, pyritic and glauconitic with tuffitic spots. Traces of pale blue shale, sand, limestone and clay, mainly washed out.
Age: Palaeocene.

2033 - 2134.3m: Sele Formation
Siltstone a/a with minor sandstone .
Age: Palaeocene.

2134.3 - 2346m: Heimdall Formation
Sandstone, light grey to translucent, very slightly argillaceous, very micaceous, finely glauconitic, very fine to fine angular grains, some rounded coarse grains, unconsolidated, to sand. Some layers of shale, black and soft.
Age: Palaeocene.

2346 - 2659 m: Maureen Formation.
Interbedded sand, loose grains as above, and shale, light green to grey and brown, silty, glauconitic, pyritic, with traces of brown microcrystalline dolomite and soft, sticky, whitish limestone.
Marl, light grey, soft, friable.
Age: Palaeocene.

4.2.4 Chalk Group: 2659 - 3479 m

2659 - 2691 m: Ekofisk Formation
Marl, whitish and reddish, soft and plastic becoming shale, slightly carbonaceous.
Age: Danian.

2691 - 2953 m: Tor Formation
Two types of marl, one light grey, one reddish, both plastic, and limestone, white, microcrystalline and hard. Traces of dark grey or greenish shale, and calcareous claystone light grey, very soft.
Age: Maastrichtian.

2953 - 3258 m: Flounder Formation
Claystone, light grey, calcareous and claystone, red-orange, soft, shale green-grey and black grey. Poor samples due to diamond-turbo drilling.
Age: Coniacian - Campanian.

3258 - 3376 m: Herring Formation
Claystone to shale a/a.
Age: Turonian.

3376 - 3379 m: Plenus Marl Formation
Claystone to shale a/a.
Age: Turonian.

3379 - 3479 m: Hidra Formation
Shale to claystone, light grey to dark grey, hard.
Marl as above, traces of light brown, and hard limestone.
Age: Cenomanian.

4.2.5 Cromer - Knoll Group: 3479 - 3592 m:

3479 - 3507 m: Rødby Formation
Interbedded and alternating marl, grey, soft, and limestone, white to grey, hard, argillaceous.
Age: Albian.

3507 - 3592 m: Valhall Formation
Shale, marly, soft to moderate indurated, light grey to grey, grading to siltstone, argillaceous, calcareous and micaceous and sandstone, white, medium to fine grained.
Layers of limestone, white to cream, compact.
Age: Aptian

4.2.6 Jurassic Formations: 3592 - 4127 m

3592 - 3619 m: Kimmeridge Clay Formation
Black shale, soft, very finely micaceous.
Age: Portlandian.

3691 - 3692 m: Heather Formation
Shale, dark grey to tan, moderately soft, very pyritic with some layers of limestone, white, moderately hard to hard.
Age: Kimmeridgian - Callovian.

3692 - 3821 m: Brent Formation
Sandstone, beige, very fine to fine, subangular, well cemented, micaceous, medium hard, Stringers of sandstone with calcareous cement. Fine layers of coal.
Age: Bajocian - Bathonian.

3821 - 3949 m: Dunlin Formation
Shale, grey, indurated, silty and micaceous grading to siltstone with layers of sandstone, white, very fine to medium subrounded grains, well cemented.
Age: Liassic.

3949 - 4127 m: Statfjord Formation
Sandstone to 3999 m, white to beige, angular, coarse grains with stringers of compact, hard shale.
3999 - 4063 m: Dark grey shale with layers of black, bright coal. Layers of sand, fine to medium subangular quartz grains.
4063 - 4127 m: Sandstone, medium, subrounded quartz grains, strongly cement, and shale as above.
Age: Liassic.

4.2.6 Cormorant Formation: 4127 - 4355 m

Alternating sand, fine to medium subrounded quartz grains, shale, dark grey, indurated, micaceous, pyritic, and siltstone, fine to light grey, indurated. At 4144 m: Red brown shale.
Age: Late Triassic.

NOTA: The stratigraphy of the main formations will be better defined by palynological and micropaleontological studies. These data are not available yet.

5 STRUCTURAL DATA

5.1 GEOPHYSICAL DATA

The well is located on shot point 250, line 780 206.

Comparison prognosis/well data.

	TIME DEPTHS (ms OWT)			DEPTHS MSL		
Horizons	Prognosis	Well data	Difference in ms	Prognosis	Well data	Difference in m
C1 Tuff	961	964	-3	1935	1968	-33
Top Heimdal sand	1012	1019	-7	2110	2109.3	
C2 Chalk	1179	1195	-16	2640	2666	-26
M1	1353	1363	-10	3280	3237	+43
M2 Kimmerian	1428	1445	-17	3550	3567	-17
J5	1474	1515	-41	3695	3796	-101
Top Triassic	1571	1595	-24	4035	4102	-67

5.2 DIPMETER RESULTS

The dipmeter log analysis in the Jurassic/Triassic section shows that between 3590 and 4220 m, the well goes through a monocline oriented N 10 on the average, sloping 14° westward, without making it possible to bring out a major evolution that would determine a structural axis.

In that zone, we find, between 3800 and 3850 m as well as between 3950 and 4000 m, pluridecametric evolutions oriented N 158 plunging 14° southward and N 123 plunging 14° nortward.

Between 3593 and 3900 m, the deposition of sediments has a SE-NW direction in the N 318 azimuth.

Between 3900 and 4208 m, the deposition of sediments has an EW direction in the N 266 azimuth.

From 4225 m to the bottom, at 4352 m, the well goes through a monocline oriented NS and sloping 12° westeward.

In that zone, some metric evolutions at 4392 and 4338 m could correspond to the occurence of minor undulations N-S oriented.

6 HYDROCARBON SHOWS

- Tertiary and Cretaceous Formations: 146 - 3592 m.

The first shows, weak gas background, was recorded at 1300m in the Hordaland group.

No significant shows were noticed while drilling the Heimdall gas bearing section due to the coring operations.

While drilling the Lower Paleocene and Cretaceous formations, only a weak background of 0.1% C1, with traces of C2, was recorded.

- Jurassic Formations: 3592 - 4127 m.

The first major change appeared near the Top of Jurassic at 3592 m, where

C1 reached up to 8%
C2 reached 0.8%
C3 reached 0.4%
Nc4 reached 0.002%

The gas background was decreased while increasing the mud weight up to 1.88.

In the Upper Jurassic formation, the background gas was about 1%.

The Brent formation was penetrated at 3692 m, with only minor changes in gas shows which increased up to 2% (C1 to C4). While coring the Brent sandstones yellow to pale blue fluorescences have been observed as gas bublings and rare oil bleedings. At 3778 m oil has been observed on mud. While drilling the bottom part of the Brent formation between 3731 and 3821 m, the gas background was about 1% to 2% (C1 - C3); no fluorescence was observed.

During the drilling of the Dunlin shales the background was stabilized at 0.5 - 3.0% (C1 - C3).

The Statfjord formation was penetrated at 3949 m; the top is well marked with an increase of gas from 1% to 3%. While coring, the recorded gas was about 3%; neither gas bubbles nor oil bleeding have been observed while recovering the core. Direct fluorescences (yellow) and cuts (yellow - pale blue) have been observed on the cores.

In the mid-lower part of the Statfjord, only weak gas background was recorded (0.1 - 0.5%).

- The Cormorant formation was penetrated at 4154 m with strong gas shows, up to 14%. In the side tracked hole in the same intervals the gas increased up to 48% (for MW = 1.771). Several strong gas peaks have been recorded in the sandstone layers of the Cormorant formation between 4154 and 4208 m In the red shales the gas background decreased to less than 0.2%.

7 CORING

7.1 CONVENTIONAL CORES (see annexes 3 to 19)

Cores	Depth (m RKB)	Recovery %
K1	2130 - 2148	89
K2	2148 - 2154.5	62
K3	2154.5 - 2158	100
K4	2158 - 2173	100
K5	2173 - 2180.6	100
K6	2180.6 - 2191	100
K7	2191 - 2199.5	100
K8	2199.5 - 2217.5	100
K9	2217.5 - 2235	80
K10	3695 - 3713	100
K11	3713 - 3730.7	98
K12	3954.5 - 3971.5	94
K13	3971.5 - 3985	93
K14	3985 - 3998.5	100
K15	3998.5 - 4014.6	90
K16	4183.5 - 4198.5	100
K17	4140 - 4158	90

7.2 SIDE WALL CORING

30 SWCs were attempted in Tor, Flounder, Herring, Hidra, Rødby, and Valhall formations between 2817 and 3611 m. Only 11 were recovered.

148 SWCs were attempted in Brent, Dunlin, Statfjord and Cormorant formations. Only 50 were recovered.

The descriptions of recovered SWC are annexes 20.

FIG 2: RFT/FIT PRESSURE DATA

	Depths RKB	Depths MSL	Initial Hydro. Pressure	Build up time in mn	Formation pressure psi/kg/cm^2	Pressure gradient
RFT	2152.6	2127.6	4984	2	3155	1.03
"	2163.3	2138.3	4104	3	3154	1.03
"	2167	2142	4121		3154	1.03
"	2171	2146	4121	3	3161	1.03
"	2174	2149	4121	4	3158	1.03
"	2177.5	2152.5	4133	3.5	3163	1.03
"	2181.5	2156.5	4141	3.5		
"	3695	3670	9804		8806/619	1.69
"	3707	3682	9832	3	8892/625	1.70
"	3712.7	3687.7	9848	4		
"	3713	3688	9867	4		
"	3717.5	3692.5	9868	8	8912/627	1.70
"	3723	3698	9876	5	8840/622	1.68
"	3721	3702	9885	2.5	8844/622	1.68
"	3737.3	3712.3	9913	19	8880/624	1.68
"	3745	3721	9933	8	8926/627	1.69
"	3754	3729	9956	3	8881/624	1.67
"	3761	3736	9958	10	9202/647	1.73
"	3771.4	3746.4				
"	3779.8	3754.8	10029	6	9005/633	1.69
FIT 3	3779.5	3754.5			8788/618	1.65
RFT	3779.2	3754.2	10022	5	9003/633	1.69
"	3783.5	3758.5	10052	2	8932/628	1.67
"	3796.5	3771.5	10071	4	8948/629	1.67
"	3803.5	3778.5	10090	2	8966/630	1.67
"	3808.5	3783.5	10105	3	8978/631	1.67
"	3950.5	3925.5	9924	5	9345/657	1.67
"	3953	3928	9935	2	9350/657	1.67
"	3960.3	3935.3	9950	2	9365/658	1.67
"	3967	3942	9966			
"	3969	3944	9974	2	9974/701	1.78
"	3972.5	3947.5	9981	10		
"	3977	3952	9995	4	9995/703	1.78
"	3995	3970	10037	9		
"	3995.8	3970.8	10042	10	10038/706	1.78
"	3996.8	3971.8	10011	55	9358/658	1.66
"	4025	4000	10116			
"	4029	4004	10128	2	10127/712	1.78
FIT 1	4160	4135			8512/598	1.48
RFT	4067	4042	10138	3		
FIT 2	4072	4047	11747	12	10950/770	1.90

9 RESERVOIR AND TEST RESULTS (see fig. 2 - 3)

9.1 HEIMDALL FORMATION 2194.3 - 2347 m

The reservoir is in sand and sandstones, and has been divided into four main zones (to D).

Zone A: 2134.5 - 2148.6 m (RKB). Sandstone layers and shale (core 1). This zone is assumed to be gas bearing.

Zone B: 2148.6 - 2172.6 m (RKB). Unconsolidated sandstone, poorly cemented, highly micaceous (cores 2 to 5). The zone is gas bearing.

Main Parameters

Zone A:	Gross pay:	14.1 m
	Net pay:	4.5 m
	Net/Gross (α)	0.32
	$\bar{\Phi}$:	28.1%
	Sg:	80.37%
	Gross pay:	24 m
	Net pay:	21.3 m
Zone B	Net/Gross (α)	0.89
	$\bar{\Phi}$:	24.77%
	Sg:	80.37%

Average value for the gas zone: (zone B)

$\bar{\phi}$:	25.35%
Sg:	80.37%
α:	0.667

Note: Results in zone A are too optimistic (core measurements are taken without overburden pressure). Results in zone B are too pessimistic due to mica problems. Cuttofs for this zone are taken usually from logs.

ϕ = 13% Vcl = 40% Δt = 77 psu/ft Sw = 58%

Cutoffs for net pay:

$\bar{\Phi}$: 13%
Vcl: 40%
Δt: 77 usec/ft
Sw: 55%

Zone C: 2172.6 - 2179 m (RKB). Sandstone as in zone B core 5, but oil bearing.

Zone D: 2179 - 2347 m (RKB). Sandstone as above cores 6 to 9; water bearing.

9.2 BRENT FORMATION (3692 - 3821 m)

The reservoir is in fine sandstone layers with shale and coal (core no. 10 and 11).

Preliminary results (Cyberlook) (all depths in RKB).

Top of Brent Formation:	3692 m
Top of Brent sandstone:	3695 m
Bottom of Brent sandstone:	3821 m
Gross sand:	126 m
Net oil pay:	Less than 4 m
Porosity on net pay:	15 - 20%
Watersaturation on net pay:	50 - 70%

The reservoir is divided into three different levels:

Level 1: 3695 - 3777.5 m (RKB) in sandstone with residual hydrocarbons.

Level 2: 3777.5 - 3781.5 m (RKB). Oil bearing sandstone.

Level 3: 3781.5 - 3821 m (RKB). Water bearing sandstone layers.

No test (DST) was performed. One FIT of 3779.5 m recovered 22 liters of filtrate and 81 liters of gas. A RFT during drilling got some traces of oil.

9.3 STATFJORD FORMATION (3949 - 4127 m)

In this 178 m thick section, three sandstone reservoirs have to be considered.

The upper level (3949 - 3998 m) has been cored (K12 - K15: From 3945.5 - 3998.5 m); the reservoirs are mainly in sandstone medium becoming siltstone near the bottom.

The mid level (4065 - 4088 m) consists mainly of sandstone fine to very fine.

The lower level (4101 - 4127 m) consists of sandstone fine to very fine.

The petrophysical parameters from CPI and from core analysis are as following:

Main parameters	Upper	Middle	Lower
Top of sand level:	3949	4065.0	4101.0
Bottom of sand level	3998	4088.0	4127.0
Gross pay:	48	22.0	28.0
Net pay:	30	21.0	17.0
Net/Gross ( ):	0.618	0.354	0.654
Porosity:	0.16	0.15	0.16
Water saturation:	0.45	0.60	0.60/1.0
Sg:	0.55	0.55	0.55

The most interesting layer inside upper level:

Top: 3983 m
Bottom: 3998 m
Porosity: 0.18
Water saturation: 0.40
Horizontal permeability: 1.12 md

Several testing operations have been attempted in order to get samples and formation data (fig. 3)

Two DST were performed; the results are summarized as following:

DST 3: 3969 - 3999 m - Upper Level.
Flowing 28 m^3/d of water (NaCl 94 g/cc) and few bubbles of gas.
Formation pressure at 3951.7 m RKB (-3926.7 msl): Extrapolated at 9340 psi (663 kg/cm^2)
Formation pressure gradient: 1.69 MWEQ

DST 2: 4065 - 4088 m - Mid Level.
Flowing 28 m^3/d of water (NaCl 118 g/cc) and a few bubbles of gas.
Formation pressure at 4053 m RKB (-4028 msl): 9400 psi
660.9 kg/cm^2)
Formation pressure gradient: 1.64 MWEQ.

Wireline tests were performed at:

- 4072 m (RKB) 22.5 liters of water (NaCl 36 g/cc [1]) were recovered; the extrapolated formation pressure is estimated 9685 psi.

- 3996.8 m (RKB); 9.8 and 3.8 liters of water (NaCl: 43 g/cc) were recovered; the extrapolated formation pressure is estimated 9420 psi.

9.4 CORMORANT FORMATION (4127 m - TD)

The reservoirs are only located in the upper part of the formation between 4154 and 4207.5 m (RKB). Two cores have been cut: One near the top (Core 17: 4140 - 4158 m), the other near the bottom (core 16: 4183.5 - 4198.5m) The reservoirs consist in fine sandstones with intercalations of red brown shales.

1) The fluids recovered by using FIT tool, presented erroneous for NaCl contents.

The petrophysical parameters from CPI and from core analysis are as following:

Top of Reservoir	4254 m RKB
Bottom of Reservoir:	4207.5 m RKB
Total Gross Pay:	53.5 m
Total Net Pay:	27.5 m
Net/Gross:	0.5
Average porosity:	10 - 12%
Average water saturation:	30 - 40%
Average permeability:	12 md

The reservoirs have been evaluated by one FIT and one DST (run three times over the same interval) (fig. 3).

FIT #1 shot at 4160 m recovered 81 liters of gas and 10 liters of water (NaCl 29 g/cc); the extrapolated formation pressure was estimated at 9475 psi.

DST 1 was performed between 4154 and 4176 m; the test was run three times due to technical problems while the first test and an uncertain flow while running the second test. The final results concerning this zone are as following:

Flowing: 3.3 m^3/d of water (NaCl 90 g/cc) and a volume of gas which could not be measured.

Formation pressure at 4128 m (RKB); each test provided an extrapolated formation pressure:

DST 1: 9500 psi = 668 kg/cm^2
DST 1 bis: 9545 psi = 671.1 kg/cm^2
DST 1 ter: 9625 psi = 671.1 kg/cm^2

The increase of formation pressure must be pointed out, it can be related to pressurization of the tested level while operating.

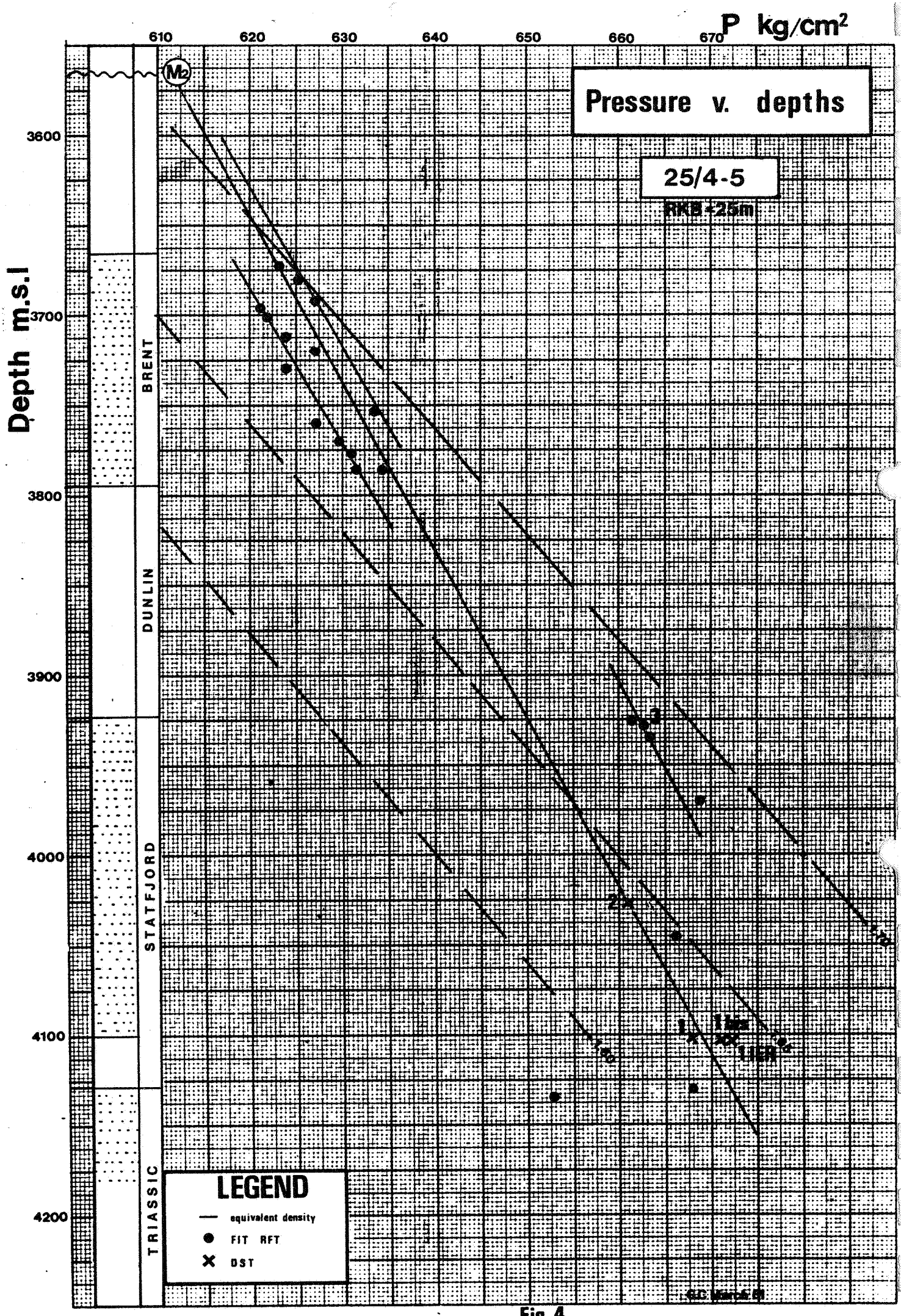

P kg/cm²
610
620
630
640
650
660
670
Pressure v. depths
25/4-5
RKB +25m
Depth m.s.l
3600
3700
3800
3900
4000
4100
4200
M2
BRENT
DUNLIN
STATFJORD
TRIASSIC
LEGEND
equivalent density
FIT RFT
DST

Fig. 4

9.5 COMMENTS ABOUT THE JURASSIC PRESSURE REGIME

The different pressure data recorded in the Jurassic levels have been plotted on a pressure vs depth diagram (fig. 4).

In the Brent, the pressure gradient is about 1.69 near the top of the reservoir.The pressure line fits better with a fluid which density is about 1.05.

In the Statfjord formation, there are two pressure regimes:
- The first near the top of the formation has a 1.69 pressure gradient.
- The second in the lower part has a 1.64 pressure gradient.

An interpolation between the results from tests attempted over both zones, provide peculiar facts; the formation pressures are too close (9430 psi vs 9400 psi) despite the depths of tested levels. Generally this could be an good gas indicator; but both tests provided only water. So at the moment no clear explanation have been given.

In the Cormorant formation, the pressure gradient is about 1.63.

By considering the synthetic pressure vs depth diagram (fig. 4), it is obvious that, from pressure considerations, the average density of the fluid is in range of 1.05, except in the Upper Statfjord, where the pressures are not in accordance with this average line.

10 CONCLUSIONS

The well 25/4-5 was designed in order to test the hydrocarbon potential of the Jurassic formations in a downfaulted pannel; these formations provided and tested hydrocarbon shows in the high pannel while drilling the 25/4-1.

The results of the Jurassic formations are a little disappointing, regarding the hydrocarbon potential.

- The Brent was found over 129 m, but log analysis shows poor hydrocarbon content. Just one 4 meter-thick level provided hydrocarbon shows.

- The Statfjord was found over 178 m; only the 50 m upper part could be interpreted as hydrocarbon bearing; an intermediate level between 4064 and 4098 m, is water bearing.

Analysis of these poor hydrocarbon results has been attempted. They are generally related to sealing problems in the faulted area and pressure problems. Considering the preliminary extrapolated pressures of both sides of the main fault (594 bars in the western part - 554 bars in the eastern part), it seems that there are probably no communications between the panels and so that the fault provides efficient sealing despite the high pressures.

An unexpected results was the development of detritic reservoirs related to the upper part of the Triassic Cormorant Formation. The reservoir is about 50 meters thick but the petrophysical characteristics are very poor (less than 0.1 md). The extension of these reservoirs has to be defined in the western and northern parts.

The 25/4-5 well was also designed as an appraisal well for the Heimdal sands. They have been found at the expected depth; the upper part of the reservoir was found a little degraded. This has introduced a minor decreasing in the hydrocarbon accumulation on the Heimdal field.

These disappointing results will have a strong influx of the exploration in the licence. Mainly concerned are the Jurassic prospects located down faulted versus the Heimdal structural high. The main problem is related to the hydrocarbon migration (or dismigration) in the Jurassic reservoirs. Regarding the pressure results, trapping is obviously possible in both structural kinds. The exploration of the remaining structures (and mainly the deep western structure) is strongly pending on the results of the geochemical studies attempted in order to have better knowledge of the migration problems.

4 STRATIGRAPHY AND LITHOLOGY

NB: The results have to be considered as provisional; neither palynological nor micropaleontological results have been yet given out. The limits of the different formations and the related geological stages have been defined from the logs.

4.1 STRATIGRAPHY (see page 10)

4.2 LITHOLOGY (see composite log, pl. 1)

4.2.1 Nordland Group

207 - 774 m: Sand, translucent, fine grained, rounded to subrounded, slightly glauconitic. Abundant shell frags. Trace of lignite. Trace of silt and sandstone, grey, fine, glauconitic, calc cemented.

774 - 835 m: Sand a/a and clay, grey to blue grey, very soft.
Age: Miocene to Pleistocene.

4.2.2 Hordaland Group: 835 - 1994 m

835 - 920 m: Sand as above and clay, grey to blue-grey, very soft, mainly washed out.

920 - 993 m: Clay, grey green, soft, local silty with traces to layers of sand, very fine grained, rounded to subangular, glauconitic and micaceous.

993 - 1089 m: Sand, medium to coarse grained, subrounded to rounded and translucent with traces to layers of clay as above.

1089 - 1410 m: Clay, grading to claystone, soft to slightly indurated. medium to dark grey, slightly silty to sandy in parts. Layers of sand, very fine to fine, subrounded and with traces of pyrite. Stringers of limestone, microcrystalline, beige to brown.