ELF AQUITAINE NORGE A/S
Exploration Division
Ref.no: 311D/82/69-R
FV/mm

GEOLOGICAL COMPLETION REPORT

WELL 3/7-2

WELL FILE

Approved:
J. DUPUY
Geol. Dpt. Manager

Author:
F. VERROLLES

Stavanger, January 1982

SUMMARY

The 3/7-2 well was drilled between March 30th and June 20th 1981.

The objectives were to test at different levels a sharp structure located on blocks 3/4 (Amoco Group) and 3/7 (Petronord Group), and to do a reconnaissance of the formations below the base of the Zechstein salt (F Horizon).

All the targets above the salt were found water bearing while no reservoir was encountered below the F horizon. The well was bottomed at 4330 m, RKB, in basalt of Rotligendes age.

The Amoco Group shared the cost of the well down to 3207 m (12 1/4" hole, just below top of the Salt) paying 50%. Below the depth the Amoco Group contributed to the deepening of the well by paying a bottom hole contribution of 20%.

LIST OF CONTENTS

LIST OF FIGURES

LIST OF APPENDIXES

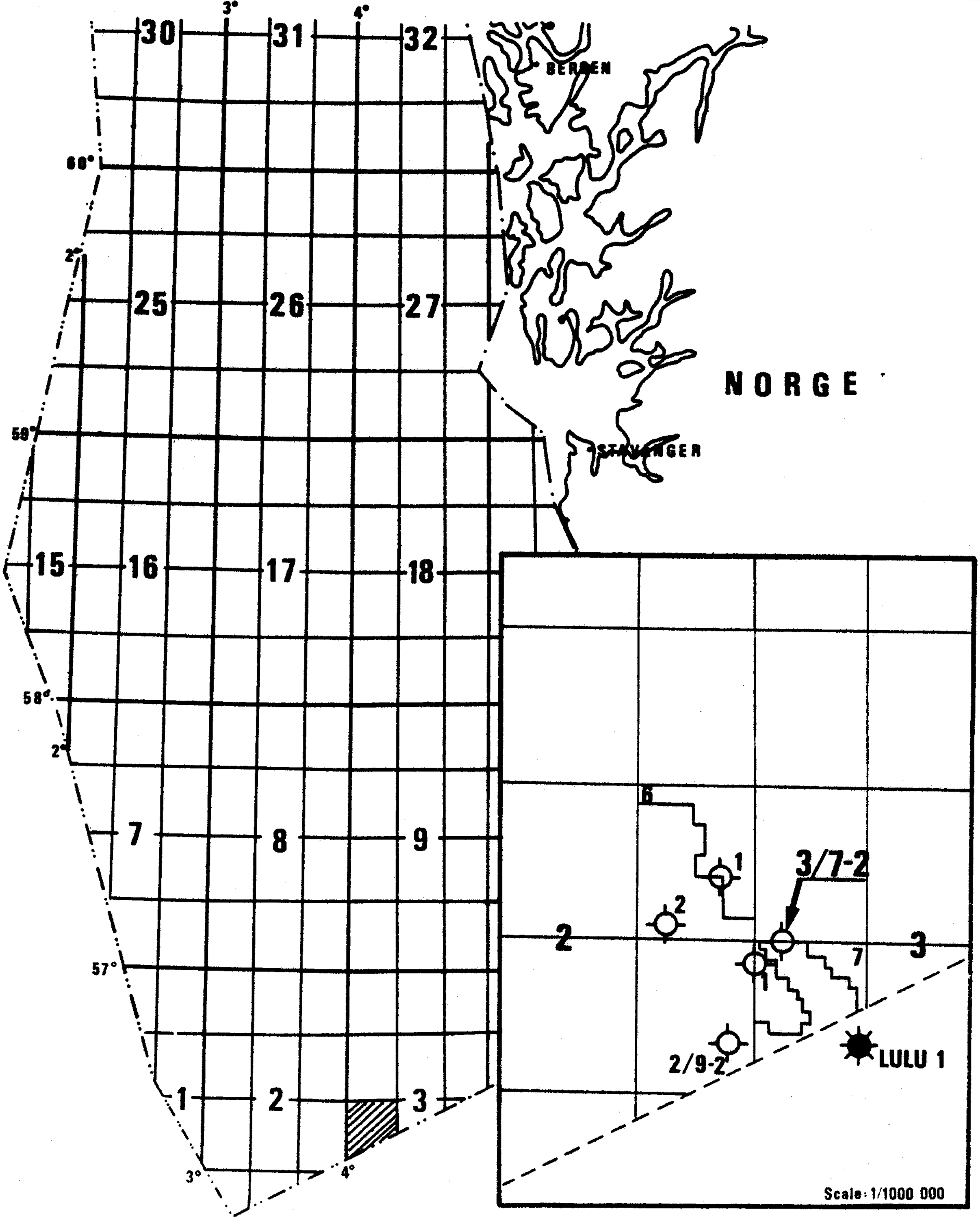
LIST OF PLATES

POSITION MAP

BLOCK	:	3/7
WELL	:	3/7-2
OWNER	:	PETRONORD
	x	04° 04' 08.362 E
	y	56° 29' 58.369 N

Scale: 1/2500 000

Date:



EXPLORATION DIVISION

Fig.1.

1. GENERAL DATA (see fig. 1 and 2)

Country: Norway offshore

Area: Blocks 3/7 and 3/4

Operator: Elf Aquitaine Norge A/S

Owners:	Block 3/7	Petronord Group	
		Elf Aquitaine Norge A/S	43,60%
		Norsk Hydro	34,60%
		Total Marine Norske	21,80%
	Block 3/4	Amoco Group	
		Amoco Norway (operator)	25%
		Noco	25%
		Texas Eastern	25%
		Amerada	25%

Well Classification:	Wildcat
Drilling Rig:	Dyvi Alpha
Coordinates:	Geographical 56°29'58"369N 04°04'08"362E
Seismic location:	Line ANO 7380, shot point 502
Water depth:	52 m
RKB-Sea bottom:	77 m
Rig released from 25/4-5:	26.03.81
Spudded:	30.03.81
At TD (4330 m):	14.06.81
Completed:	20.06.81
Rig released from 3/7-2	20.06.81
Contractors:	Drilling: Dyvi drilling Mud logging: Geoservices El-logging: Schlumberger

1.2 Hole record (all depths are RKB)

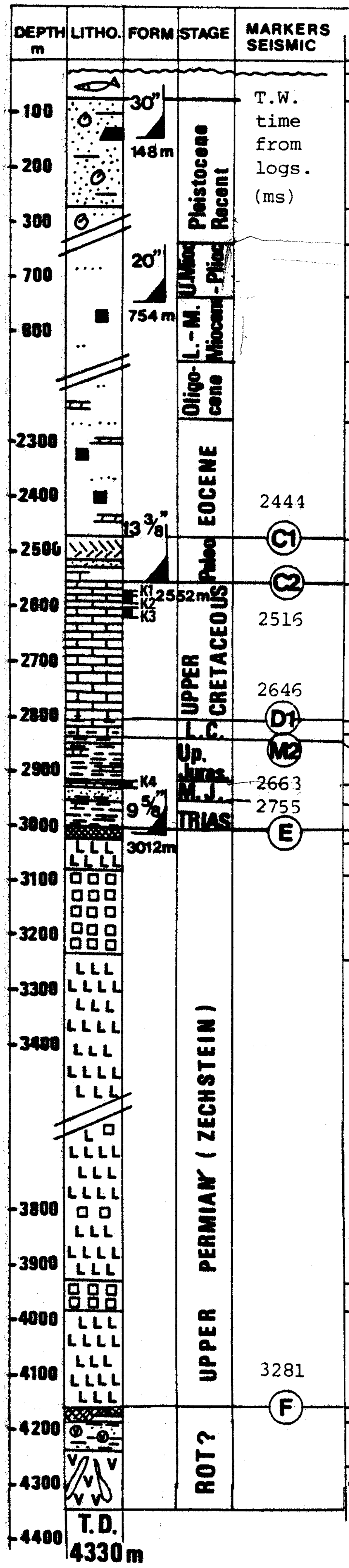
Drilling:	36"	to	148 m
	26"	to	770 m
	17 1/2"	to	2563 m
	12 1/4"	to	3027 m
	8 1/2"	to	4330 m

Casings:
30" casing shoe at 148 m
20" casing shoe at 754 m
13 3/8" casing shoe at 2552 m
9 5/8" casing shoe at 3012 m

The TD (4330 m) was reached in 80 days including 3 days for moving and 1.6 day waiting on weather while moving. Six days were spent for abandonment. The total duration of the 3/7-2 well has been 86 days.

A summary of the well history is found in appendix 9.

All depths quoted in this report are in RKB unless otherwise stated, RKB is 25 m.



25m Sea level

77m Sea bottom

Sand poorly sorted,v.fn-crse.
Shell frgs.lign.

270m Cly,lt,gy-gy,slty,occ.sdy,
abund.,shell fragments,
Grading to Sh.below
578m 1200m,grey to dark grey,
occ.brownish silty,pyr,
mic.with rare stringers
741m of Sand.

1608m

2097m

2473m Sh.a/a and Sh.,v.sft.
brnish. red,Tr. of Tuff. Tr. of
Sd.glauc.occ.Cly wht.v.sft.

2556m Chalk off.wh.argillaceous
with traces of bluish cherts,
Layers of Limestone whitish
chalky.

2799m Alt. of Marl.greenish
brown,calc mod.ind.and
Limestone white mod.hd. to
chalky.

2830m Black Shales grnish.
gr. to black.

2840m Shale light gr.lam.slty.
w/metric,beds of dol.gr.hd.w/comp

2907m Alt of Sdst.l.gr.f.to
med.srnd.friable and Sh.r.br.
slty.

2945m Sh. to Clay l.gr.f.to grnish
lam.occ.silty and calc.

2998m Anhydrite,pinkish wh.,
pasty,sft.

3017m Salt transparent.wh.
halite.

3067m Salt sylvinite.

3217m Salt halite.

3919m Salt sylvinite.

3971m Salt halite.

4149m Anhydrite,white massive,
Dolomite grey,soft,argillaceous
and Shale dark brown.

4165.5m Conglomerate with volcanic
rocks pebbles.

4224m Massive Dolerite(?)
ophitic structure.

Fig.2.

COORD:

x:04°04'08,362"East
y:56°29'58,369"North
W.D.52m Line 7380 SP.502

WELL:
3/7-2

COUNTRY:
Norway

LIC:
023

DEPTH REF: RKB (+25m)

NOTA :

CASINGS

30" at	148m
20" at	754m
13 3/8" at	2552m
9 5/8" at	3012m

TARGETS:

Primary:Danian/
Cretaceous chalk.
-Jurassic sandst.
-Rothliegendes/
Carboneferous.
Secondary:Eocene/
Oligocene sandst.

RESULTS:

- Eocene sands missing.
- Chalk tight and water bearing.
- Jurassic sandstones reduced and water bearing.
- Rothliegendes sandstones not found.
- Well bottomed in volcanic rocks.

OBSERVATIONS:

02.07.81.
M.Schiølde.

2. OBJECTIVES AND MAIN RESULTS (see bore card appendix 1)

2.1 Objectives

The 3/7-2 well was a wildcat designed to test possible hydrocarbon accumulation in:

- Tertiary sands found gas bearing in well 2/3-1
- Danian/Upper Cretaceous limestone (CHALK) hydrocarbon bearing in the Ekofisk Area and in the Danish well Lulu 1.
- Middle Jurassic sandstones which are hydrocarbon bearing in well 2/6-2.
- Rotliegendes sandstones. The TD was planned into the Carboniferous in order to establish the source potential of this formation.

2.2 Main results

The Tertiary Sands are missing. Only 8 meters of sand have been encountered into the Paleocene.

The Chalk is tight and water bearing.

The Jurassic Sandstones are reduced and water bearing.

The Rotliegendes Sandstones were not encountered.

The well was bottomed in volcanics rocks beleived to be Rotliegendes.

2.2.1 Post Cretaceous series (sea bottom to 2559 m)

-The Quarternary and Miocene consists of clay with minor sand and carbonates stringers, but for the first 270 m which are mainly sands.

-The Oligocene-Eocene are dominantly clay and shale with stringers of limestone, dolomite and sands.

-The Upper Paleocene consists of a series shale with layers of tuffaceous material and minor stringer of sand.

-The Danian is represented by a massive sand of 8 meters thickness and by a calcareous shale passing into the Danian Limestone (2559 - 2596 m).

2.2.2 Cretaceous Series

Upper Cretaceous (2596 - 2799 m)

The Upper Cretaceous consists of a white chalky, hard Limestone occasionally argillaceous with chert towards the top of the interval and some stylolites.

Lower Cretaceous (2799 - 2830 m)

The Lower Cretaceous includes Marl and Shale interbedded with for the last 10 meters occurence of block shales similar to the one which will be noticed in the Upper Jurassic.

2.2.3 Jurassic Series (2830 - 2879 m)

Upper Jurassic (2830 - 2879 m)

The Upper Jurassic consists of block shale with intercalations of light grey shale and Dolomite.

Middle Jurassic (2879 - 2945 m)

Alternation of silty micaceous shale and fine argillaceous Sandstones.

2.2.4 Triassic Series (2945 - 2998 m)

Shale light grey to green, occasionally silty and calcareous.

2.2.5 Permian Series (2998 - 4330 m TD)

Zechstein (2998 - 4165,5 m)

Halite with numerous intercallations of sylvinite overlaid by shale and anhydrite and underlaid by anhydrite and dolomite.

Rotliegendes (4165,5 - 4330 m TD)

Shale red brown with pebbles of altered volcanic rocks underlaid by altered basalt.

3. LITHOLOGY (see composite log pl. 1)

The 3/7-2 well lithology is summarized below.

77 (sea bottom) - 270 m	Sand, poorly sorted, very fine, with abundant shell fragments. Rare thin beds of clay, grey to dark grey.
270 - 578 m	Clay, light grey to grey, soft, silty occasionally sandy, abundant shell fragments.
578 - 1200 m	Clay as above with stringers of dolomite, grey to beige, microcrystalline, traces of limestone
1200 - 1390 m	Clay a/a grading to shale, grey, dark grey occasionally greyish brown.
1390 - 2097 m	Shale a/a, locally silty and sandy, locally stringers of sand.
2097 - 2456 m	Shale, dark to light grey brown, pytitic, carbonaceous, slightly micaceous, locally greenish grey clay. Stingers of limestone, sand and dolomite.
<u>Paleocene</u>	
2456 - 2545 m	Shale a/a and shale very soft, brownish red, occasionally whitish, silty, pyritic, occ. glauconitic with Tuff white, greenish. Trans of sand, fine, translucent, subangular.
2545 - 2553 m	Sandstone, translucent, fine, subrounded, well sorted, glauconitic.
2553 - 2559 m	Clay to Marl, whitish, very soft.
2559 - 2577 m	Chalk, very soft, whitish, slightly pinkish, with abundant chert.
2577 - 2596 m	Limestone, whitish, chalky, medium hard to very hard, slightly argillaceous. Stilolites noticed on cores.

Upper Cretaceous	
2596 - 2799 m	Limestone, chalk, whitish, slightly argillaceous with stylolites, occ pyritic, rather soft, becoming harder with depth. Occasionally thin joints of dark green shale.
Lower Cretaceous	
2799 - 2830 m	Alternation of marl greenish grey to pinkish brown, moderately indurated an limestone, white moderately hard, occasionally chalky and/or orgaillaceous.
Jurassic Kimmeridgian	
2830 - 2840 m	Shale, black, greenish grey, dark green, slightly calcareous, pyritic, laminations of black organic matter.
2840 - 2879 m	Shale, a/a and shale light grey, laminated, silty, with metric intercallations of Dolomite, grey, hard,
Callovian	
2879 - 2907 m	Some lithology as above.
Early Bajocian	
2907 - 2945 m	Alternation of sandstone and siltstone, light grey, fine to medium grained, subrounded, friable and shale black to light grey, micaceous, pyritic with black organic matter.
Early Triassic	
2945 - 2998 m	Shale to clay, light grey, occasionally silty and calcareous with intercallations of shale red brick, silty, soft and shale grey greenish, soft, calcareous.

Permian

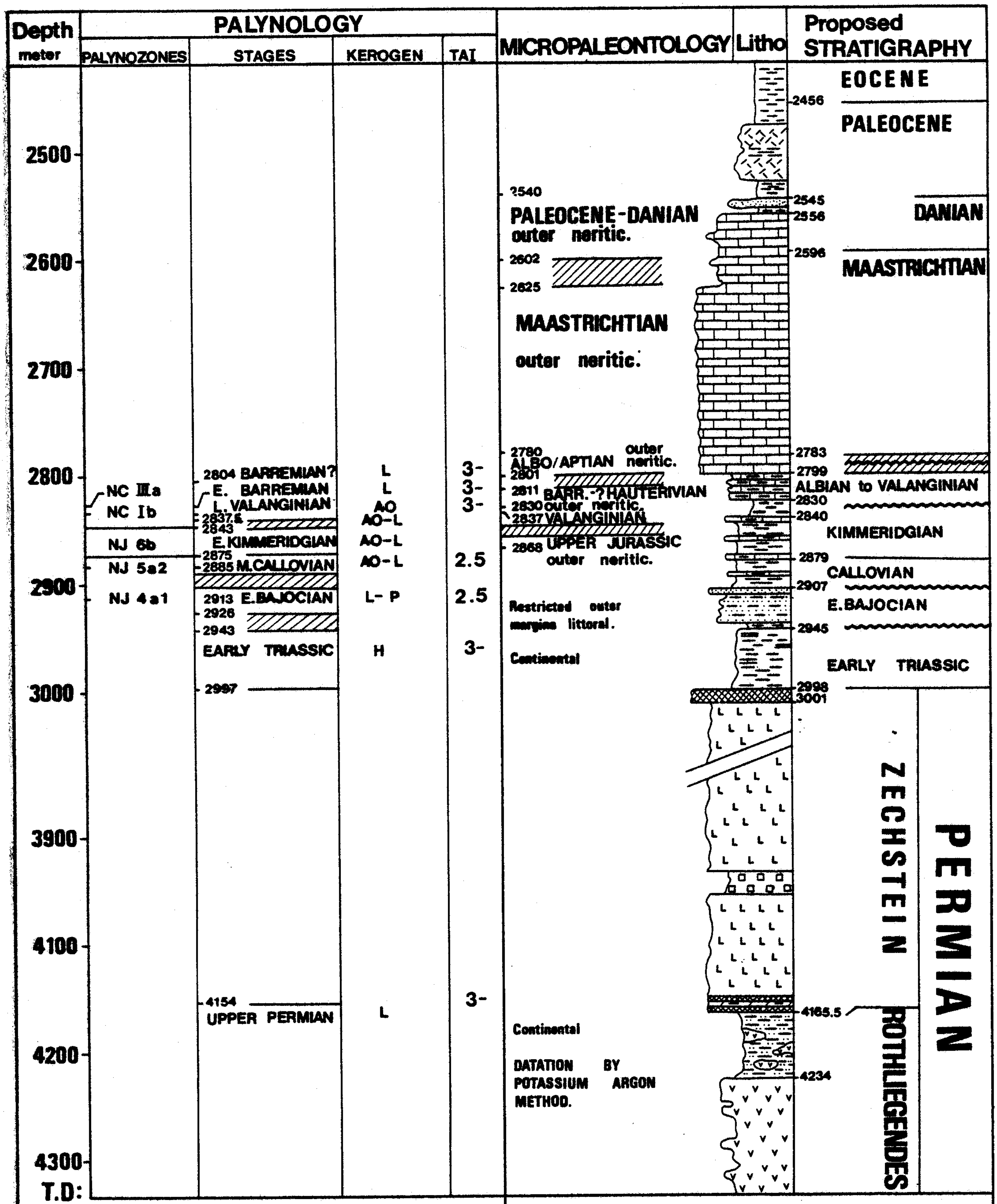
Zechstein

2998 - 3001 m	Shale grey to red anhydritic.
3001 - 3017 m	Anhydrite white to pink
3017 - 4149,5 m	Salt translucent, halite, occasionally brownish, sylvinite. The main sylvinite layers are at the following depths: 3067 - 3217,5; 3392,5 - 3404; 3428,5 - 3446 and 3919 - 3971 m
4149,9 - 4165,5 m	Anhydrite, white, massive and shale grey, dolomitic to dolomite grey argillaceous.

Rotliegendes

4165,5 - 4234 m	Shale red brown, anhydritic, dolomitic, silty soft, with pebbles of altered volcanic rocks and traces of sandstone fine white to pinkish, grading locally to conglomerate.
4234 - 4330 m (TD)	Volcanic rock, red brown to brown, occasionally altered, vugs filled with light green blue mineral described as massive Dolerite with an ophitic texture, abundant plagioclase (altered to sericite and calcite), brown hornblende (altered to ferruginous products).

3/7-2 STRATIGRAPHICAL CONCLUSIONS



3/7-2

PALEOCENE TO ROTHLIEGENDES

Depth datum RKB (= +25m)

F. VERROLLES. FEB. 82.

PALYNOLOGY = J. DUCAZEAUX
MICROPALEONTOLOGY = J.L.VOLAT

KEROGEN

AO = Amorphous organic.
L = Ligneous
P = Plant debris
H = Humic

Fig. 3.

4. STRATIGRAPHY (see fig. 3 appendix 1)

The main formation tops are:

	Depth (m)	
	RKB	MSL
Paleocene	2456	- 2431
Danian Chalk	2559	- 2534
Upper Cretaceous	2596	- 2571
Lower Cretaceous (Barremian)	2799	- 2774
Upper Jurassic	2830	- 2805
Middle Jurassic	2879	- 2854
Triassic	2945	- 2920
Permian	2998	- 2973
Zechstein Anhydrite, Salt	3001	- 2976
Rotliegendes	4165,5	- 4140,5

(A comparison between prognosed and actual depths is found in chapter 7 STRUCTURAL DATA).

Above the Chalk, formation tops are derived from electrical logs interpretation. Below formation tops are partly from logs and partly from biostratigraphic analyses performed by SNEA(P) laboratories.

Below the salt a Rotliegendes age is given derived from datation by the Potassium/Argon method which give 258 million years (Autunian).

The main biostratigraphical results below the Paleocene are found on fig. 3.

Four major stratigraphical breaks can be noticed from the datations:

- Maastrichtian to Albian
- Valanginian to Kimmeridgian
- Callovian to early Bajocian
- Early Bajocian to early Triassic

SEDIMENTOLOGICAL INTERPRETATION - Well 3/7-2.

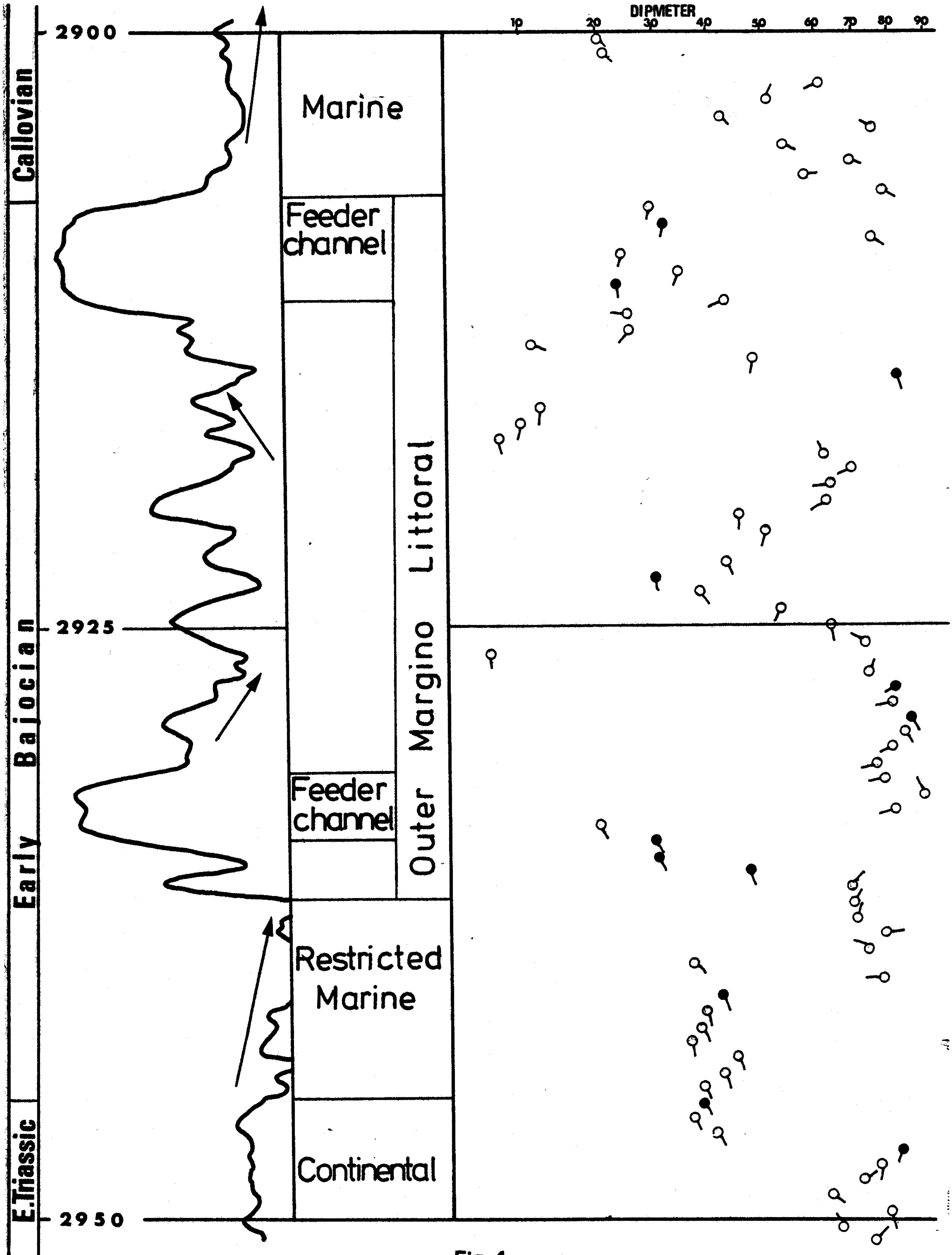


Fig.4.

5. SEDIMENTOLOGY

Middle Jurassic 2879 - 2945 m (see fig. 4)

One core has been cut in this interval (see appendix 5). The upper part of the Middle Jurassic (2879 - 2907 m) consists of shale dark grey slightly calcareous grading to shale light grey, silty with stringers of Dolomite. The middle part (2907 - 2937 m) includes sandstone fine to medium, siltstone and shale, micaceous, silty, pyritic with black organic matter. The lower part (2937 - 2945 m) consists of shale dark grey to light grey silty and micaceous. No coal has been noticed on the whole interval.

The three parts exhibit a large scale thinning upwards sequence with a general increase in the relative amount of fines. Except for the two channels noticed in the middle part.

On the dipmeter transport direction seem to be generally in the South-South East direction but varying from South-West to East. The dips are dispersed in a very wide range from 10 to 85° with two main groups between 30 and 45° and between 70 and 85°.

While in the upper and lower part the marine influence is prevailing, a terrestrial influence is predominant in the middle part.

This suggests a position between a deltaic plain and the basin slope, in the highest part of the slope for the middle part (2907 - 2937 m) of the Middle Jurassic.

Jurassic sandstones of similar age have been encountered on wells 2/6-1, 2/6-2, 2/5-6 and Lulu 1.

-On well 2/6-1, 16 kilometers to the North West, these sandstones are Aalenian. They have been deposited in a lower deltaic plain with numerous coal layers. The upper part exhibits a coarsering sequence which suggests a beach deposit.

-On well 2/6-2, 19 kilometers to the North West, the sandstones are Bogocian-Aalemian. They are believed to be of a coastal depositional origin with redistribution along the shore line. The dolomite crust on top of the sequence may represent a caliche crust attesting of an emergence.

-On well 2/5-6, 27 Kilometers to the North West, the sandstones are Bathonian to early Bajocian (Aalenian). The environment of deposition is lower deltaic plain with distributory channel with rather thick coal layers towards the top and the base.

-On Lulu 1, 22 kilometers to the South East, these sandstones are Callovian to Bajocian. They rest directly on the Permian anhydrite like on 2/6-2. They are of fluvio deltaic origin with some coal layers.

The 3/7-2 sandstones are quite different from the sandstones above mentioned. Therefore the hypothesis of feeder channels can be taken. This means that thicker deposits of sands can be found down slope following the direction of deposition that is to say South eastwards.

6. ORGANIC GEOCHEMISTRY (see fig. 3)

The organic geochemical conlusions are summarized in fig. 4 opposite chapter 4 STRATIGRAPHY.

In lower Cretaceous, Upper Jurassic and Callovian the Kerogen is mainly algal sapropel with a TAI decreasing from 3^- to 2.5 in the Callovian.

In the Middle Jurassic (Bajocian) the Kerogen is mainly ligneous (structural ligneous and plant debris) with a TAI around 2.5.

It can be seen that the Lower Cretaceous, Upper and Middle Jurassic (2799 - 2945 m) Kerogens are in the oil generating maturation zone.

The Triassic (2945 - 2998 m) is very poor in organic matter, which mainly consists of pollens. The TAI is 3+, showing that the maturation is still in the oil window but trending towards the gas/condensate zone.

The Dolomite noticed at the Zechstein base (4153,5 - 4163 m) exhibits a TAI of 3-. This is difficult to understand because the Rotliegendes Basalt has been altered by hydrothermalism during the lower and middle Jurassic. An explanation to this phenomenon has not yet been found.

CURVE T= F (D).

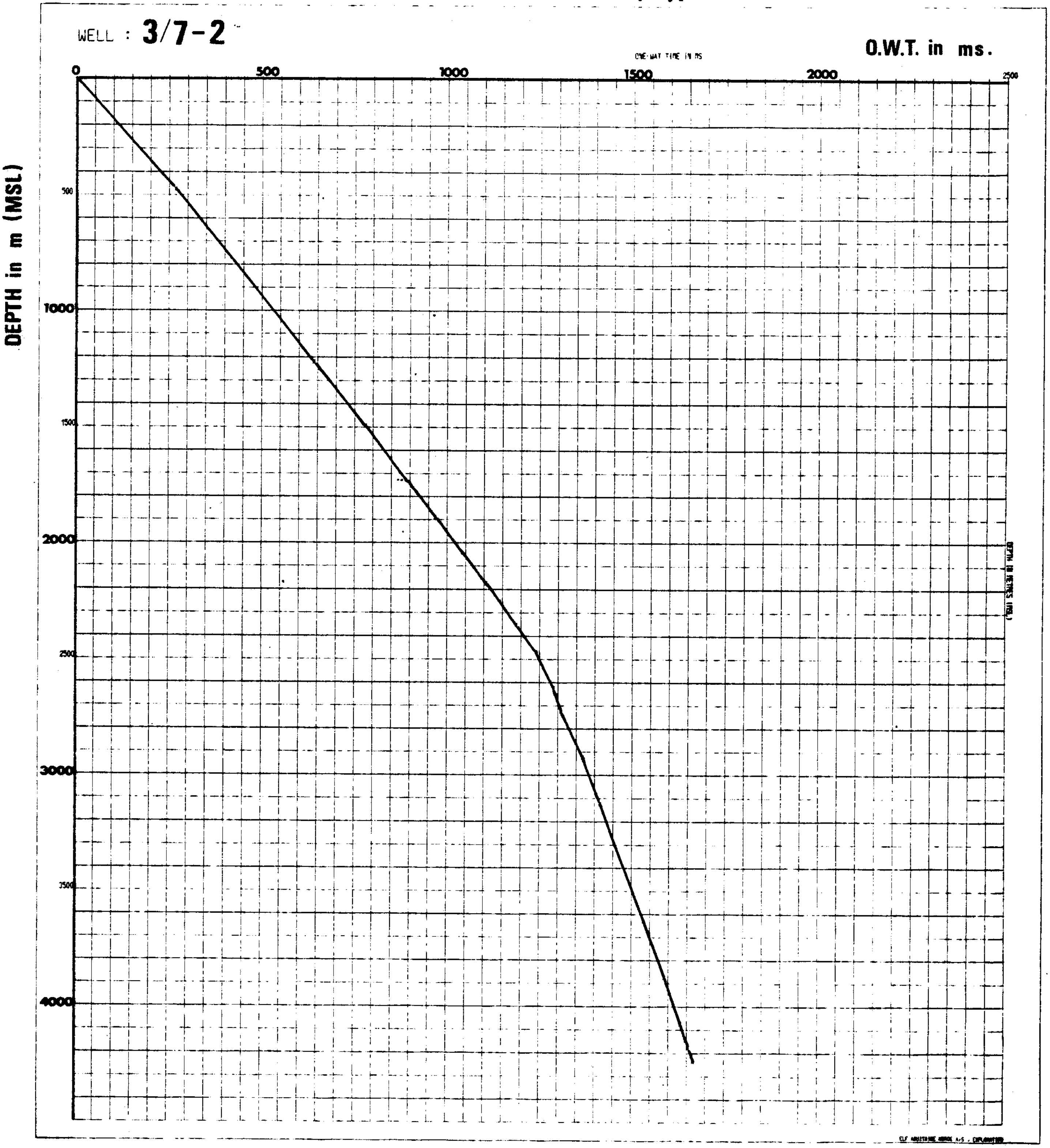


Fig.5.

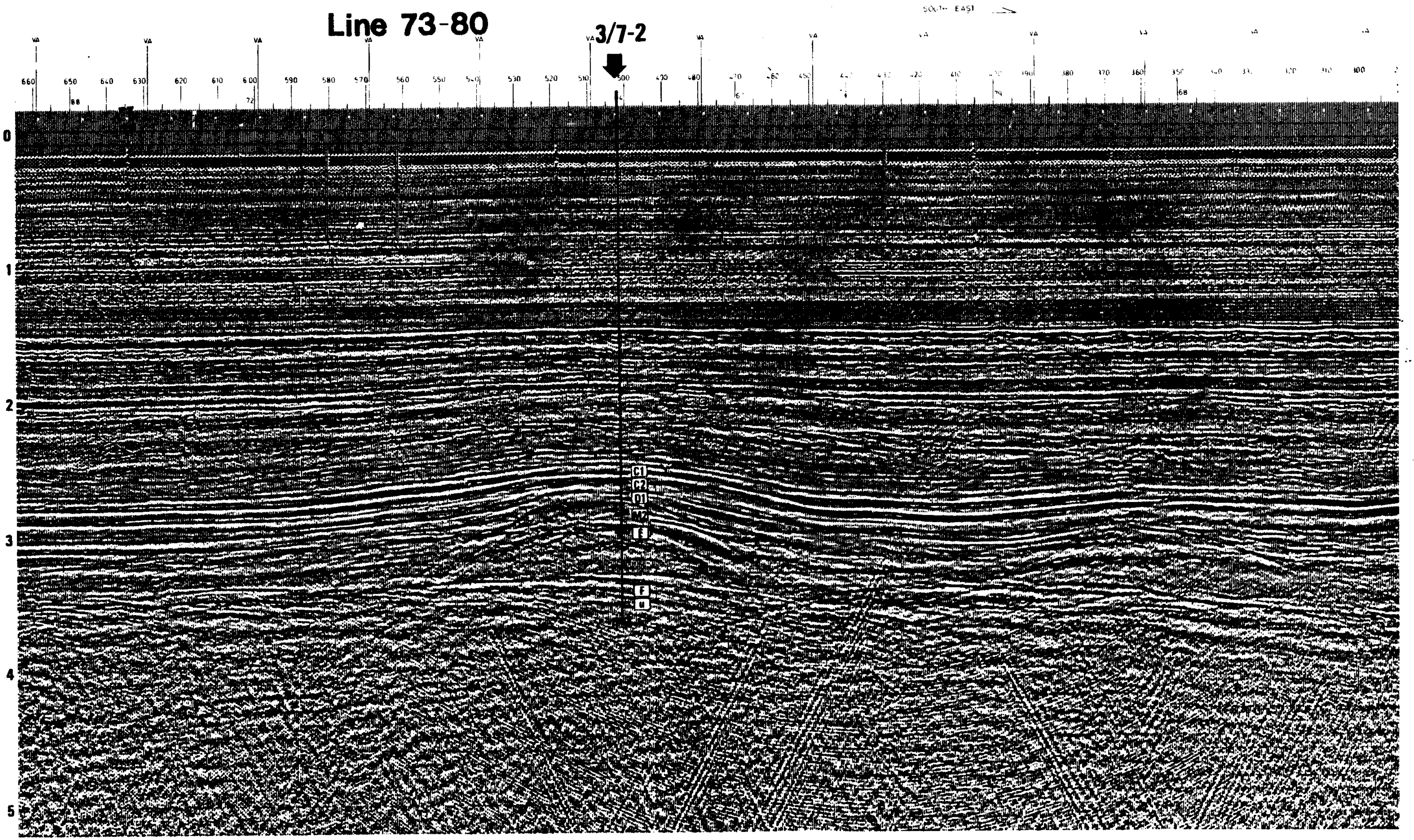

Line 73-80
3/7-2
SOUTH EAST
VA
660
650
640
630
620
610
600
590
580
570
560
550
540
530
520
510
500
490
480
470
460
450
440
430
420
410
400
390
380
370
360
350
340
330
320
310
300
88
72
68
0
1
2
3
4
5
C1
C2
O1
M2
E
F
U

Fig.6.

IX-3-15

BLOCK 3/7

NEW INTERPRETATION OF SALT

Fig.7.

LINE ANO 78-50
S.P. 1 TO 1247

AMOCO

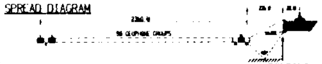
139 DEGREES → ← DIRECTION SHOT

FILTERED STACK

FIELD DATA

DATA SHOT BY	G.S.I. M.V. JONSSON
DATE SHOT	JULY TO AUGUST 1978
RECORDING INSTRUMENTS	DFS V
RECORDING FILTERS	HIGH FILTER AND SLOPE 64 HZ 128 DB/OCT LOW FILTER AND SLOPE 8 HZ 18 DB/OCT
RECORDING POLARITY	A POSITIVE PRESSURE AT THE GEOPHONE PRODUCES A NEGATIVE NUMBER ON TAPE AND A DOWNWARD DEFLECTION ON THE FIELD MONITOR RECORD
DIGITAL TAPE FORMAT	SEG B
RECORD LENGTH / SAMPLE RATE	7 SECONDS AT 4 MILLISECOND SAMPLE RATE
ENERGY SOURCE	AIRGUN 2000 CU IN
GUN DELAY	61 MILLISECONDS
GUN DEPTH	7 METRES AVERAGE
NUMBER OF GUNS	36
GUN TO ANTENNA DISTANCE	23 METRES
SHOTPOINT INTERVAL	26 METRES 1 POP PER SHOTPOINT
SHOTPOINT ANNOTATION	SHOTPOINTS ANNOTATED AT GUN POSITION
CABLE LENGTH	2400 METRE 96 GROUPS
CABLE DEPTH	11 METRES AVERAGE
OFFSET TO NEAR GROUP	236 METRES
COVERAGE	48 FOLD 96 TRACE
PRIMARY NAVIGATION SYSTEM	ARGO
BACKUP NAVIGATION SYSTEM	GEONAV

SPREAD DIAGRAM



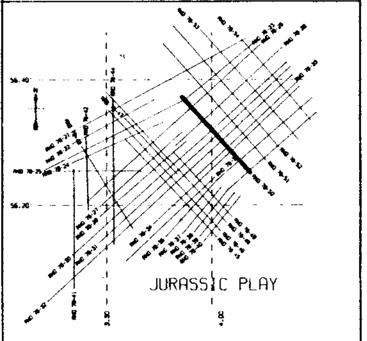
DIGITAL PROCESSING

POLARITY CONVENTION	THE POLARITY OF THE FIELD RECORDING WAS MAINTAINED THROUGHOUT THE PROCESSING AND DISPLAY
RECORD LENGTH	7.0 SECONDS
SAMPLE RATE	4 MILLISECONDS
ADJACENT TRACE SUM	
STATIC CORRECTIONS	SHOT AND STREAMER STATIC AIRGUN DELAY 61 MILLISECONDS
TRUE AMPLITUDE RECOVERY	6.0 DB PER SECOND FROM 0-6.0 SECONDS SPHERICAL DIVERGENCE CORRECTIONS APPLIED
DESIGNATURE DECONVOLUTION	1X176 MSEC FILTER WITH 2ND ZERO CROSSING DESIGN GATES (75 PERCENT OVERLAP) TR1 2300 6000 MSEC TR48 300-6000
TIME VARIANT SCALING	USING 2000 MSEC GATES
VELOCITY INTERPOLATION	USING 7 DEPTH POINT VELPACS
NORMAL MOVEOUT CORRECTIONS	USING ANNOTATED VELOCITIES
FIRST BREAK SUPPRESSION	SEE TAPER ON
COMMON DEPTH POINT STACK	48 FOLD CDP STACK
DECONVOLUTION	2X200 MSEC FILTER WITH 32 MSEC GAP DESIGN GATE 300-6000 MSEC (GATES OVERLAP BY 25 PERCENT)
TIME VARIANT FILTERING	FREQUENCY (HZ) TIME (MSECS) 15 - 60 1000 10 - 50 1500 10 - 60 UNCONFORMITY 250 MSEC 10 - 40 FOLLOWING UNCONFORMITY 8 - 38 UNCONFORMITY +250 MSEC 8 - 30 7000
TIME VARIANT SCALING	USING 6 GATES OF 500 THEN 1500 MSEC STARTING AT 100 MSEC

DISPLAY

HORIZONTAL SCALE	20.0 TR/CM 40.0 TR/KM
VERTICAL SCALE	5.0 CM / SEC
POLARITY	NORMAL
TRACE TYPE . BIAS	WTVAR 10.0 PERCENT
DATUM	SEA LEVEL
DISPLAY UNIT	0.507906 CM

DISPLAY GAIN

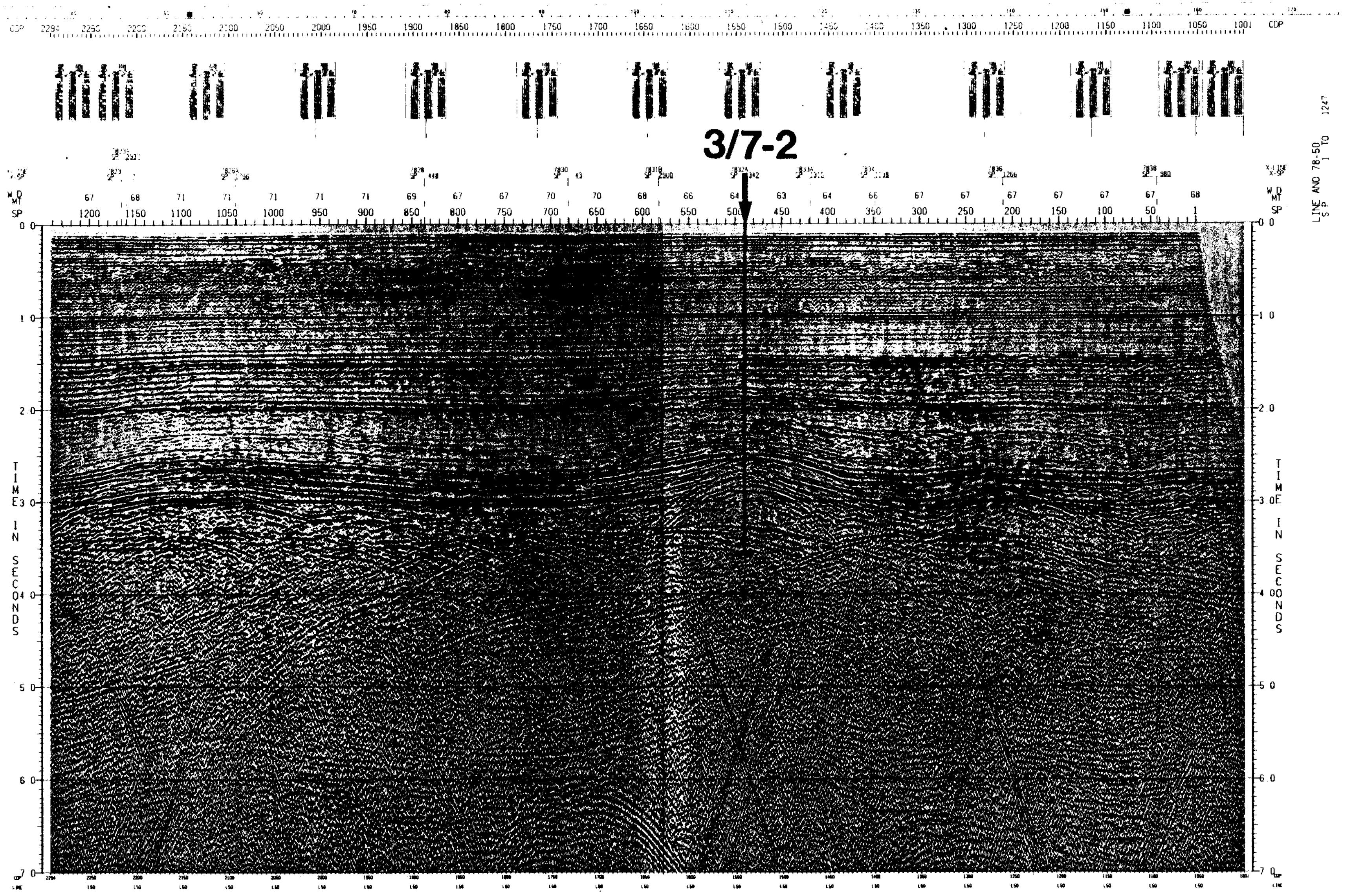


31 DEC 1978
16.46.29

PARTY 6720

GEOPHYSICAL SERVICE INTERNATIONAL
(A DIVISION OF TEXAS INSTRUMENTS LTD)

PROCESSING CHECKED BY -



VSN 616297 BJFTVFB50AAAA031 TVS5249C 0008 FRAME 001 OF 002 31DEC78 16 47 08 SN 616297 BJFTVFB50AAAA031 TVS5249C 0008 FRAME 002 OF 002

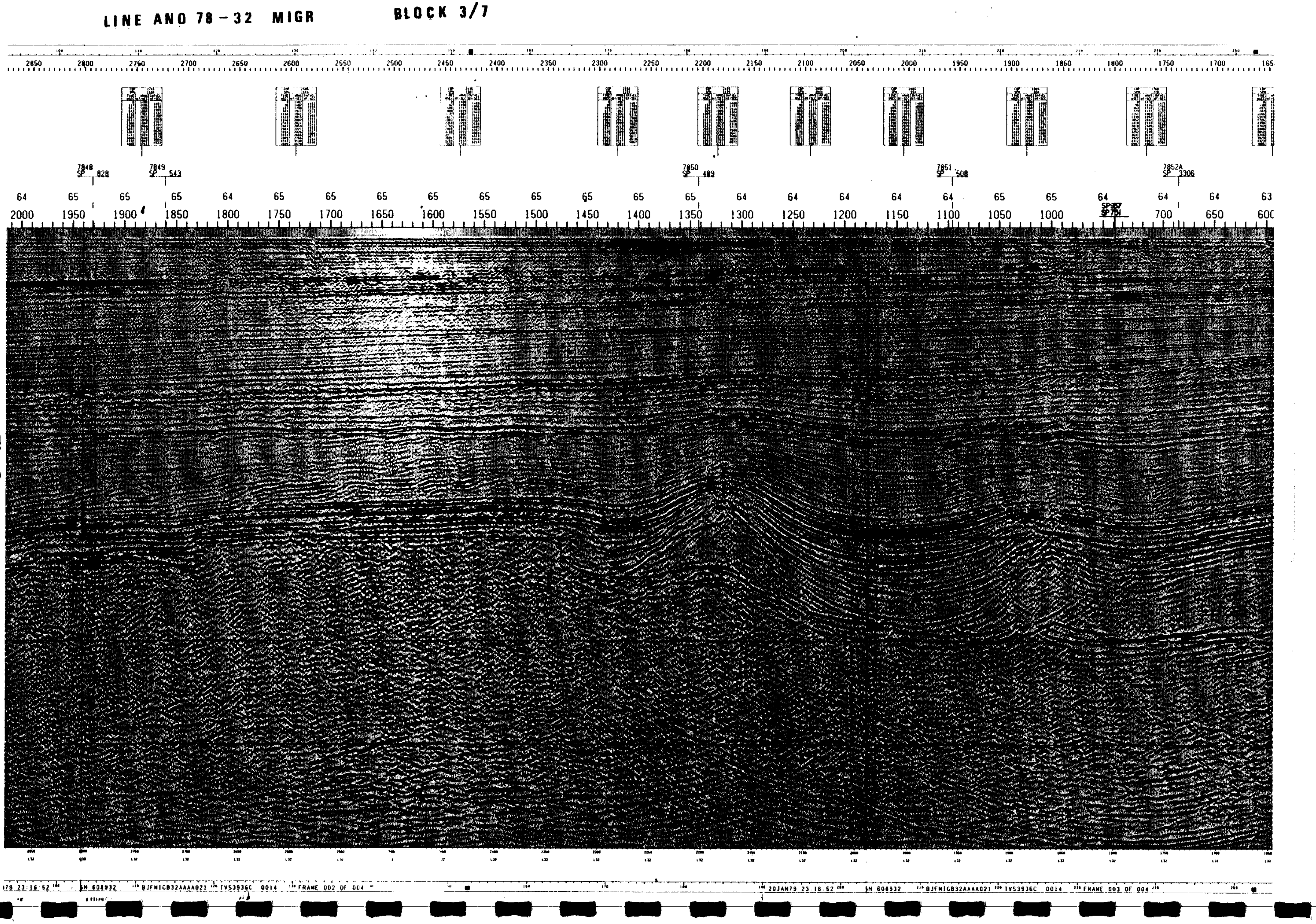

LINE ANO 78 - 32 MIGR
BLOCK 3/7
2850 2800 2750 2700 2650 2600 2550 2500 2450 2400 2350 2300 2250 2200 2150 2100 2050 2000 1950 1900 1850 1800 1750 1700
7848 SP 828
7849 SP 543
7850 SP 489
7851 SP 508
7852A SP 3306
64 65 65 65 64 65 65 65 65 65 65 65 65 65 64 64 64 64 64 65 65 64 64 64 63
2000 1950 1900 1850 1800 1750 1700 1650 1600 1550 1500 1450 1400 1350 1300 1250 1200 1150 1100 1050 1000 700 650
SP 751
SN 608932
BJFMIGB32AAAA021
TVS3936C 0014
FRAME 002 OF 004
20JAN79 23:16:52
FRAME 003 OF 004

Fig.8.

7. STRUCTURAL DATA

7.1 Geophysical results

7.1.1 Well velocity survey and calibrated Sonic Log.

A well velocity survey has been performed on 3/7-2 well. It has been recorded and processed by SSL.

The calibrated sonic has been produced. Fig. 5 shows the T=f(D).

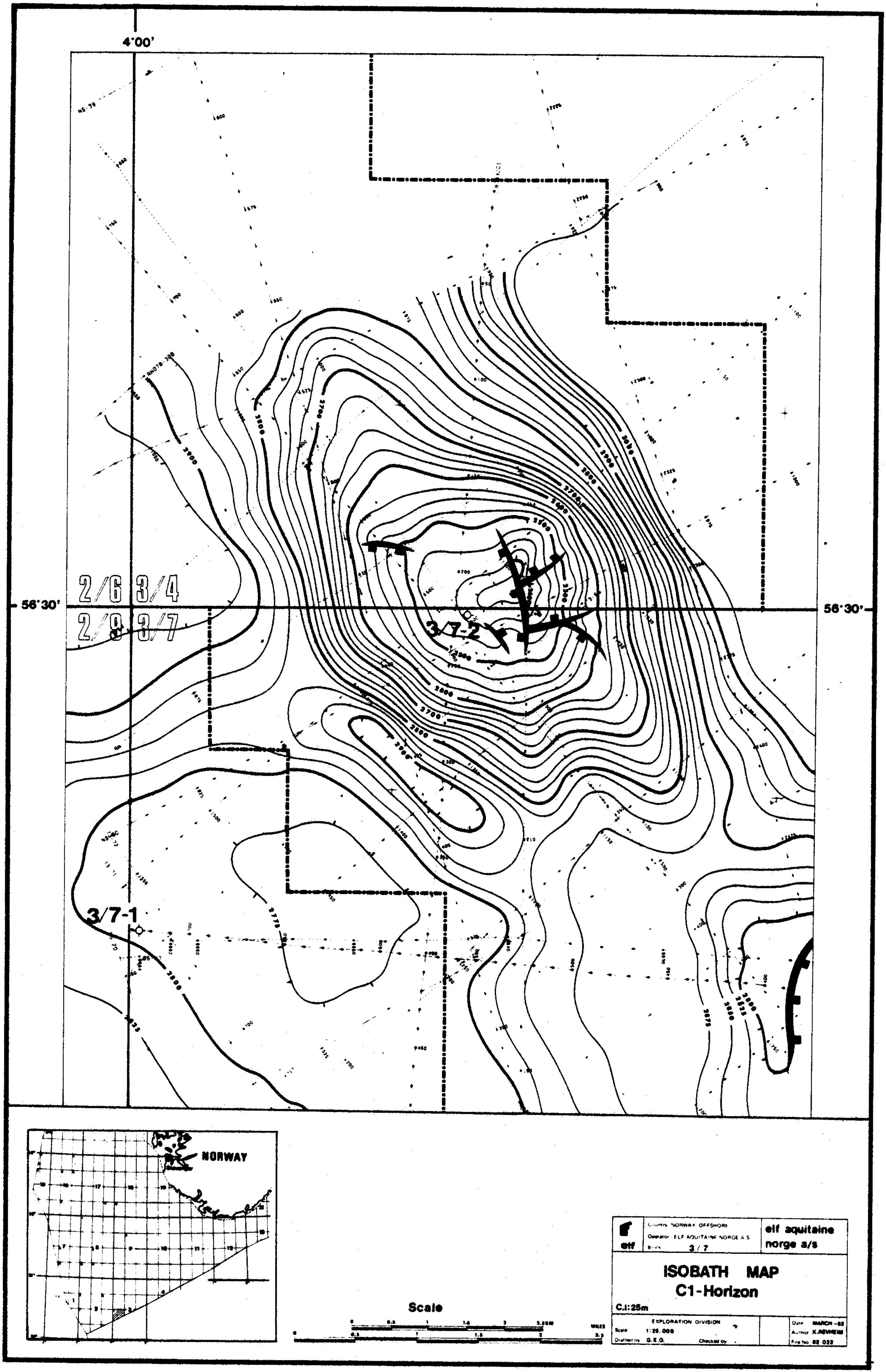
7.1.2 Comparison - Prognosis Versus Results

Line ANO 7380, shot point 502 (see fig. 6 and plate 2)

The table below compares prognosis to calibrated results.

Horizon	Depth MSL (m)		Discrepancy
	Prognosis	Results	(m)
C1. Top of Tuffitic zone	-2460	-2448	-12
C2. Top of Chalk	-2555	-2534	-19
D1. Base of Upper Cretaceous Limestone	-2675	-2774	+99
M2. Kimmerian Unconformity	-2920	-2805	-115
J. Jurassic Sandstones	-	-2882	-
T. Triassic	-	-2920	-
E. Top of Zechstein Anhydrite/ Salt	-3185	-2976	-209
F. Top of Rotliegendes	-3990	-4140,5	+150,5
Corboniferous	-4230	-	-
TD	-4475	-4305	-170

Seismic section were calibrated in wells 2/6-1 and 3/7-1 on seismic lines ANO 73.65 and ANO 73.80 (see fig. 6 and plate 2). These lines were tied to the two recent Amoco lines ANO 7850 (see fig. 7 and plate 3) and 7832 (see fig. 8 and plate 4). The depths have been computed using the velocity analysis developped at shot point 502 on line ANO 7380.



Country NORWAY OFFSHORE
Operator ELF AQUITAINE NORGE A.S
Block 3 / 7

elf aquitaine
norge a/s

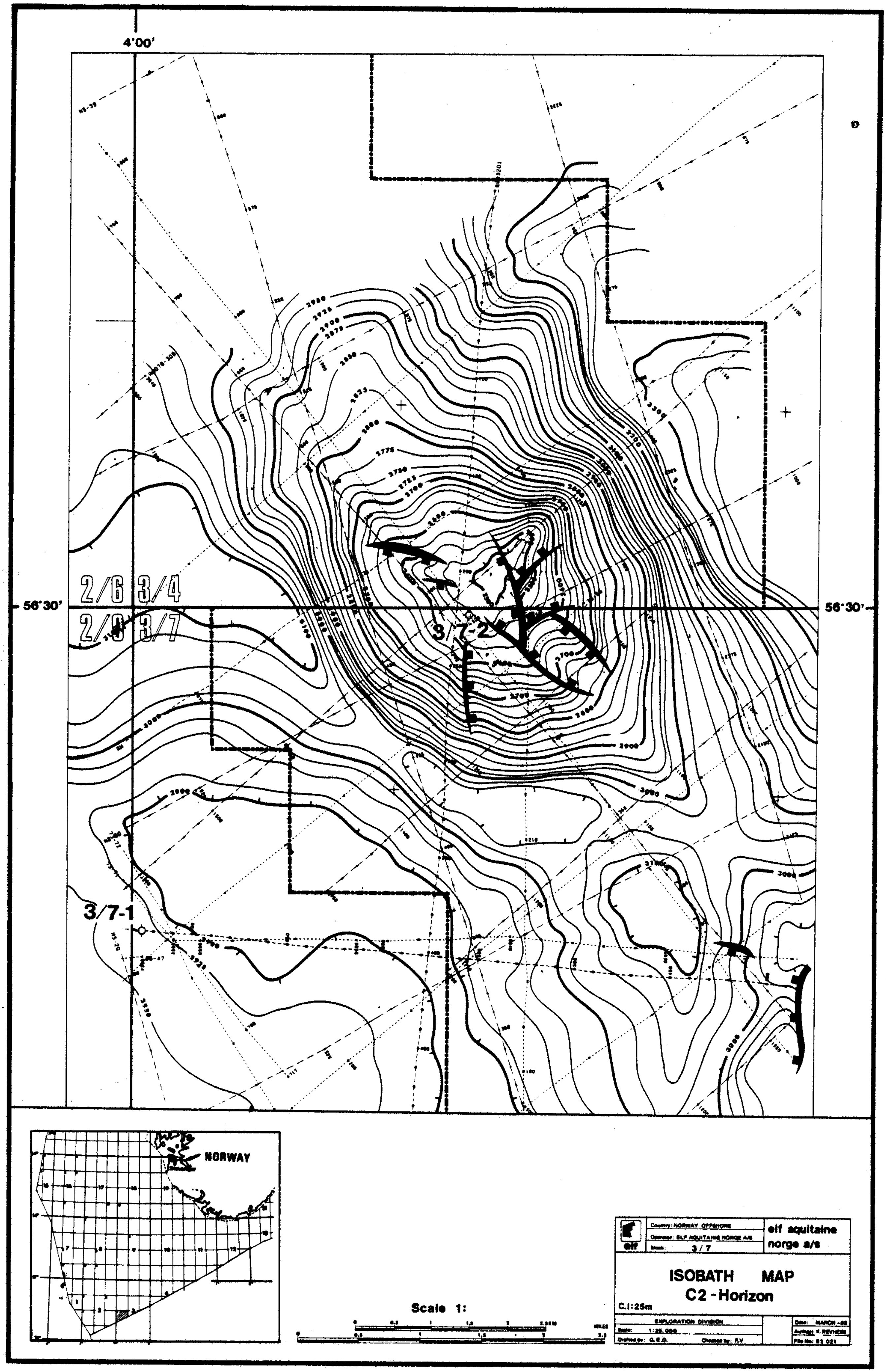
ISOBATH MAP
C1-Horizon

C.I:25m

EXPLORATION DIVISION
Scale 1:25.000
Drafted by G.E.O. Checked by -

Date MARCH -82
Author K.REVHEIM
File No 82 022

Fig. 9.



Country: NORWAY OFFSHORE
Operator: ELF AQUITAINE NORGE A/S
Block: 3 / 7

elf aquitaine
norge a/s

ISOBATH MAP
C2 - Horizon

C.I:25m

EXPLORATION DIVISION
Scale: 1:25.000
Drafted by: G.E.D. Checked by: F.V
Date: MARCH -82
Author: K.REVHEIM
File No: 82 021

Fig.10.

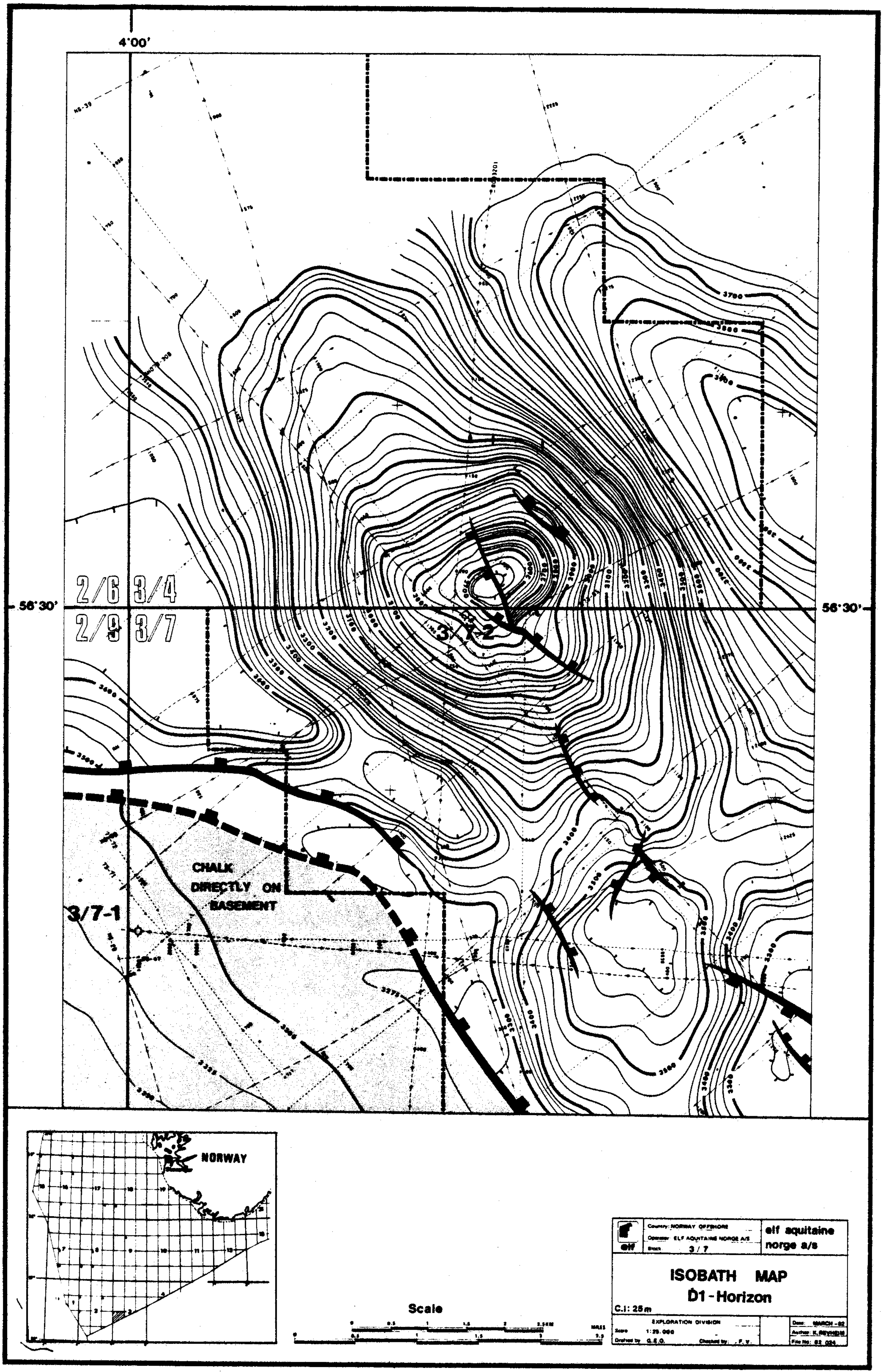
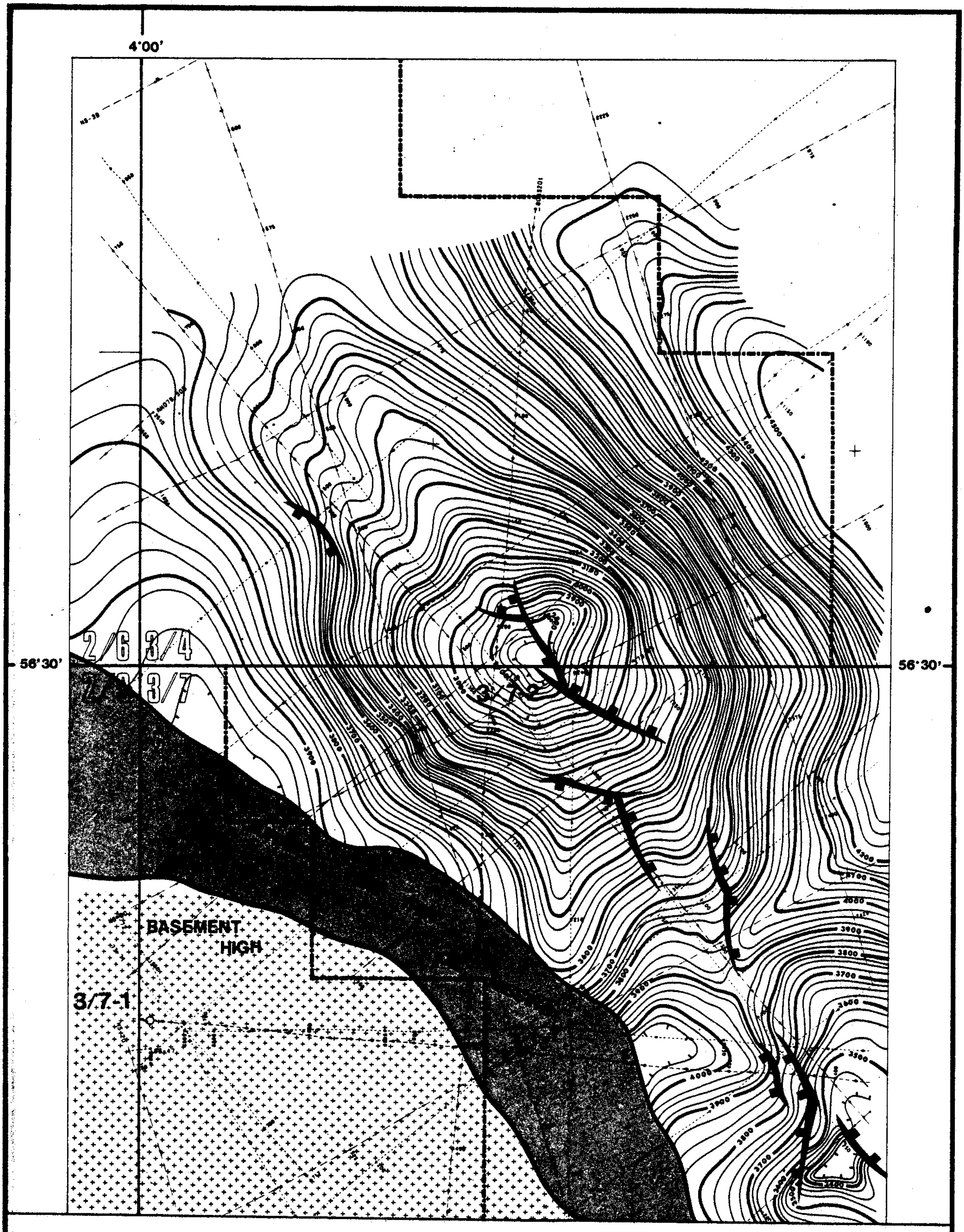
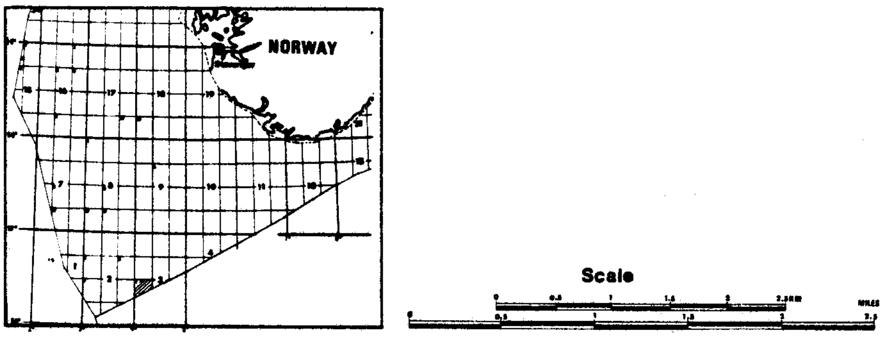

4°00'
56°30'
56°30'
2/6 3/4
2/9 3/7
3/7-2
3/7-1
CHALK DIRECTLY ON BASEMENT
3700
3600
3500
3400
3300
3200
3100
3000
2900
3275
NORWAY
Scale
0 0.5 1 1.5 2 2.5 KM
MILES
Country: NORWAY OFFSHORE
Operator: ELF AQUITAINE NORGE A/S
Block 3 / 7
elf
elf aquitaine
norge a/s
ISOBATH MAP
Ḋ1 - Horizon
C.I: 25 m
EXPLORATION DIVISION
Scale 1:25.000
Drafted by G.E.O.
Checked by: F.V.
Date: MARCH -82
Author: K.REVHEIM
File No: 82 024

Fig.11.





elf	Country: NORWAY OFFSHORE Operator: ELF AQUITAINE NORGE A/S Block: 3 / 7	elf aquitaine norge a/s

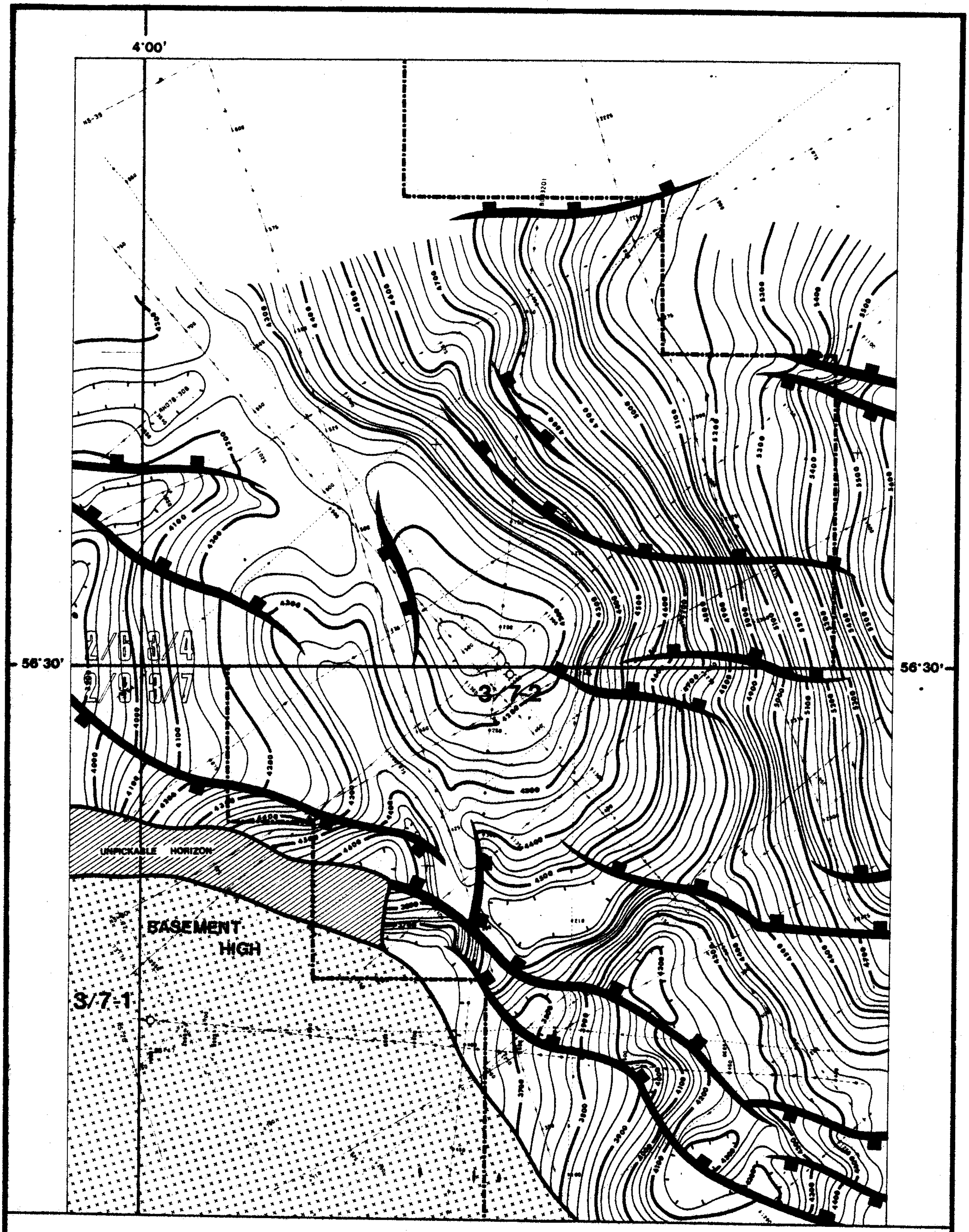
ISOBATH MAP

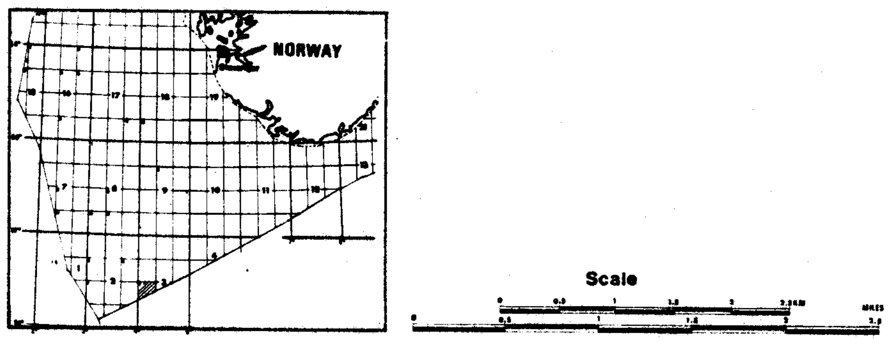
J-Horizon

C.I:25m (TOP OF JURASSIC SANDSTONES)

EXPLORATION DIVISION		Date: MARCH -82
Scale: 1:25.000		Author: JOHANNESEN
Drafted by: G.E.G. Checked by: .F.V.		File No: 82 070

Fig.12.





elf	Country: NORWAY OFFSHORE Operator: ELF AQUITAINE NORGE A/S Block 3 / 7	**elf aquitaine norge a/s**

ISOBATH MAP
F-Horizon

C.I: 25m

EXPLORATION DIVISION Scale: 1:25.000 Drafted by: G.E.O. Checked by: .F.V.		Date MARCH -82 Author K.REVHEIM File No. 82 023

Fig.13.

Revised isobath maps are presented for
-C1. Top of Tuffitic zone (fig. 9, plate 5)
-C2. Top of Chalk (fig. 10, plate 6)
-D1. Base of Upper Cretaceous Limestone (fig. 11, plate 7)
-J. Top of Middle Jurassic Sandstone (fig. 12, plate 8)
-F. Base of Salt (Top of Rotliegendes) (fig 13, plate 9)

7.1.3 Comments

The velocity survey performed at TD has shown that the picking of the seismic horizons was not good at least for the bottom of the Chalk (D1) and the top of Salt (E). The top of Triassic has also been mistaken for the top of Upper Jurassic (M2).

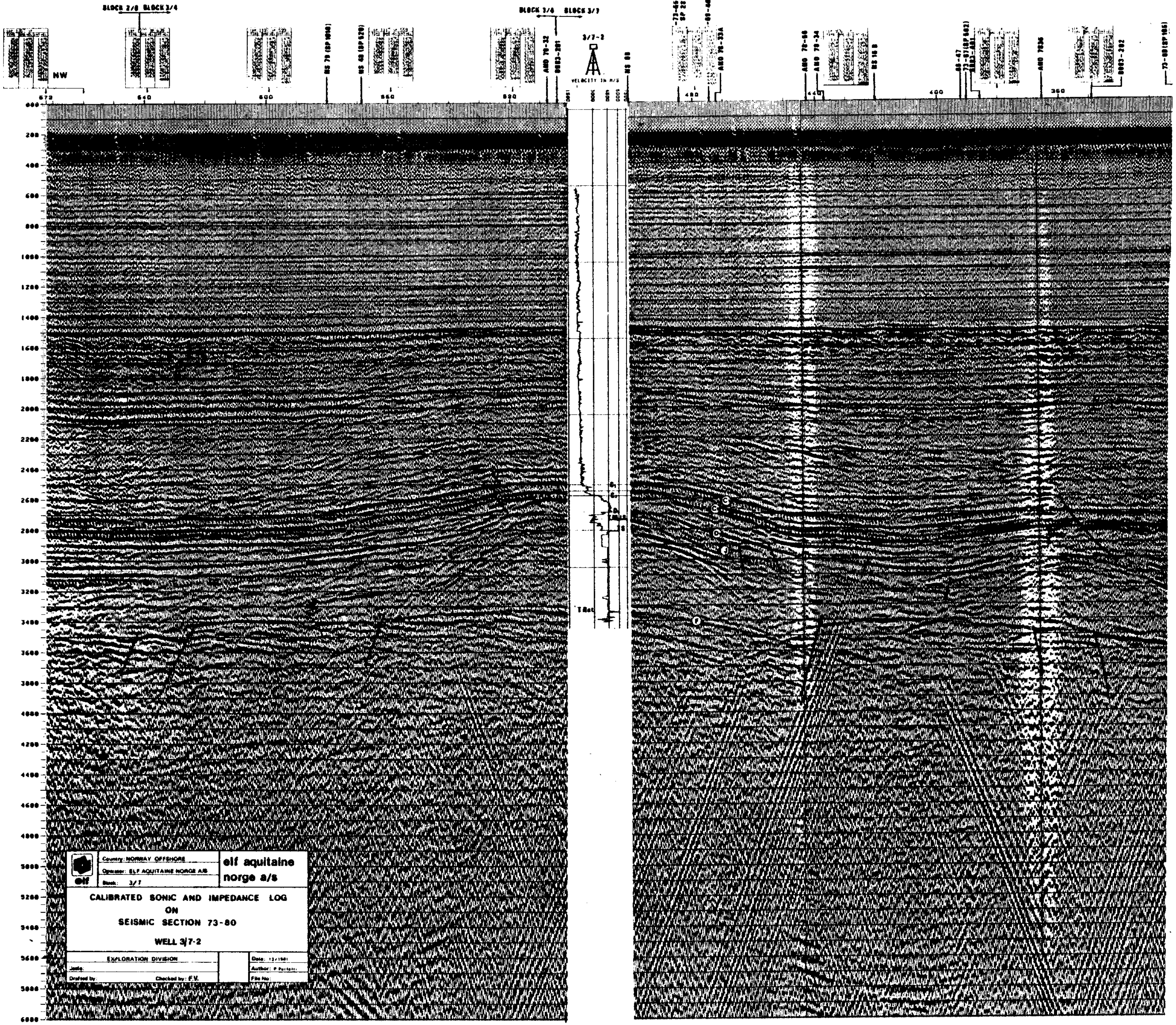
The interval velocities used for the depth prognosis of the well have been confirmed by the velocity survey results. The wrong picking on the seismic can be explained by the poor reflector quality of Lower Cretaceous which contains a lot of marl and limestone stringers. The Jurassic sandstones are not thick enough to provide also a good seismic reflector, while the reflector taken for the top of salt is in fact an intra-saliferous reflector which correspond to a thick layer of potassium salt (see fig. 14, plate 10).

7.2 Dipmeter

7.2.1 Tertiary to top of Chalk

The dipmeter have been recorded below 1800 m. In the tertiary sequence, down to the top of the tuffitic zone (2473 m) scattered dipmeter reading in the 20 to 50° range with highly scattered orimuths, between 90 and 270° are seen. No major structural features are inferred. Structural dips are 10° North at the top of the interval increasing slightly with the depth. Below 2150 m the structural dip has southwards direction with a maximum of 15° around 2400 m.

Fig.14.



Country: NORWAY OFFSHORE
Operator: ELF AQUITAINE NORGE A/S
Block: 3/7

elf aquitaine
norge a/s

CALIBRATED SONIC AND IMPEDANCE LOG
ON
SEISMIC SECTION 73-80

WELL 3/7-2

EXPLORATION DIVISION
Date: 12/1981
Author: P Perlotti
Drafted by:
Checked by: F.V.
File No:

At the top of the Tuff (2473 m) the structural dip is between 5 and 8° South.

The sands encountered between 2545 and 2553 m exhibits a dip of 32-34° with a Southern azimuth at the top and a Northern one to the base. This may represent a slumping of sand on the base of a southerly paleoslope.

7.2.2 Cretaceous

At the top of the Upper Cretaceous green patterns reflect a structural dip of 5° East; Below 2650 m it turns southwards. The blue and red patterns are scattered in value (from 6 to 80° with an average between 30 and 40°) representing mostly sedimentological and possibly minor tectonical features.

In the lower Cretaceous (2779 - 2830) the green patterns show a structural dip of 18° south. No main patterns are noticeable showing a very quiet and flat depositional environment, the structural dip being the result of the rising of the salt.

7.2.3 Jurassic

The upper part (2830 - 2907 m) which corresponds to the Upper Jurassic shale exhibits a regional dip of 20 - 24° South which is most probably the result of the hallokynetic activity.

In the middle Jurassic (2907 - 2945 m) the dips are very scattered in angle (10 to 85°) and in direction (Southwest to East).Two Sand channels (2907 - 2911,5 and 2931 - 2934 m) exhibit red and blue pattern with a dip of 20 to 30° south showing a southwards current direction.

7.2.4 Triassic

In the Triassic sequence, scattered dipmeters reading in the 30 - 80° range with a general southwards tendancy in azimuth do not allow to define any major structural features.

7.2.5 Permian

Some very high dipmeter readings are noticed in the Potassium Salt (Sylvinite) while the Sodium Salt (Halite) is without any dips.

Scattered in direction the dips in the Sylvinite are in the 60 to 70° range.

The basal Anhydrite/Dolomite has a gentle dip of 5° eastwards.

7.2.6 Conclusions

The dip and direction noticed in the Zechstein basal unit is in accordance with the regional shape of the Top of Rotliegendes (F-Horizon) representing the paleoslope from the Mandal high to the Graben to the East on which the salt started to wave (see fig. 13 and plate 9).

Above in the Triassic and Jurassic the dips azimuth are generally South or South East but they are mainly due to the Salt activity. It is difficult to say if the direction of the sediments is also the result of hallokynesis but it is believed that the source is somewhere in the Northern to Western quadrant from well 3/7-2.

The Lower Cretaceous shows that during its deposition the sea bottom was almost flat. The depth of deposition was most probably greater than for the under and overlaying sediments. The salt activity resumed during the Upper Cretaceous generating slumping in the newly deposited sediments. After the deposition of the Chalk, the salt was still rising but very gently.

The change of azimuth of the structural dip in the Tertiary reflects only the position of the well at this level which is almost at the top of the diapir.

In general the very scattered dipmeter reading both in angle and in direction reflect a rather shallow environment. The worm burrows noticed on K3 in the Chalk confirm also this hypothesis.

8. HYDROCARBON SHOWS

8.1 Gas shows (see chromatolog plate 11)

The most important shows have been encountered in the Triassic section down to 1500 m. Then the shows decreased regularly down to the top of Salt. Only C1 have been noticed but in the Jurassic section where traces of C2 and C3 were also recorded.

These gas shows are listed below:

775 - 1000 m	2 to 5% C1
1000 - 1050 m	up to 16% C1
1050 - 1150 m	2 to 5% C1
1150 - 1200 m	up to 24% C1
1200 - 1450 m	2 to 8% C1
1450 - 1500 m	up to 20% C1
1500 - 1850 m	1 to 4% C1
1850 - 2000 m	0,8 to 4& C1
2000 - 2150 m	0,3 to 1,5% C1
2150 - 2400 m	0,1 to 0,7% C1
2400 - 2560 m	0,1 to 0,5% C1
2560 - 2830 m	less than 0,1% C1
2830 - 3000 m	0,1% C1 to C3, rare weak fluorescences
Below 3000 m	No shows

8.2 Oil Shows

Only rare and weak fluorescences and cuts were noticed in the upper Jurassic Shale.

9. CORING

9.1 Conventional Coring

Five cores have been cut, K1, K2, K3 in the Danian/Upper Cretaceous Limestone, K4 in the Middle Jurassic and K5 in the Rotliegendes basalt.

No.	Depth (m)	Cored (m)	Reco-vered (m)	%	Formation
K2	2575,5- 2590	14,5	13,25	91,4	Limestone
K3	2602 - 2620,5	18,5	2,8	15	Limestone
K4	2911 - 2921	10	8	80	Shale, Siltstone, Sandstone
K5	4310 - 4319	9	9	100	Basalt

Core descriptions are found in appendices 2 to 6.

9.2 Sidewall coring

Sidewall cores were taken from 2797 to 4145 m. A total of three runs was performed.

Run no.	Date	Requested	Shot	Recovered	Lost	Misfire
1	14.05.81	30	30	28	2	-
2	13.06.81	30	30	14	8	1
3	14.06.81	30	30	20	8	1

Sidewall core description are found in appendices 7 and 8 (for runs sand 2, while description for run 3 is not yet available because the cores have been sent directly to Boussens from the rig for flash studies.

10. LOGGING

Electrical logging was performed by Schlumberger.

ISF SL

-ISF-SONIC-GR	773 - 148 m
-ISF-SONIC-GR	1850 - 754 m
-ISF-SONIC-GR	2562 - 1800 m
-ISF-SONIC-NGT	3027 - 2554 m
-ISF-SONIC-NGT	4244 - 3010,5 m
-ISF-SONIC-NGT	4324 - 4023 m
-SONIC-GR	4000 - 3001 m
-FDC-GR-CAL	772 - 148 m
-FDC-CNL-GR-CAL	2562 - 753 m
-LDL-CNL-GR-CAL	3026 - 2553 m
-LDL-CNL-GR-CAL	4243,5 - 3011 m
-LDL-CNL-GR-CAL	4301 - 4122 m
-NGS	4244 - 3010 m
-HDT	2560 - 1732 m
-HDT	3026,5 - 2554 m
-HDT	4293 - 3010,5 m
-CBL	2551 - 300 m
-CBL	3012 - 2300 m

Two run of RFT have also been performed.

11. TESTING

Two run of RFT have been performed, the first run being pretests and the second one for sampling.

The pretests were performed at the following depths:

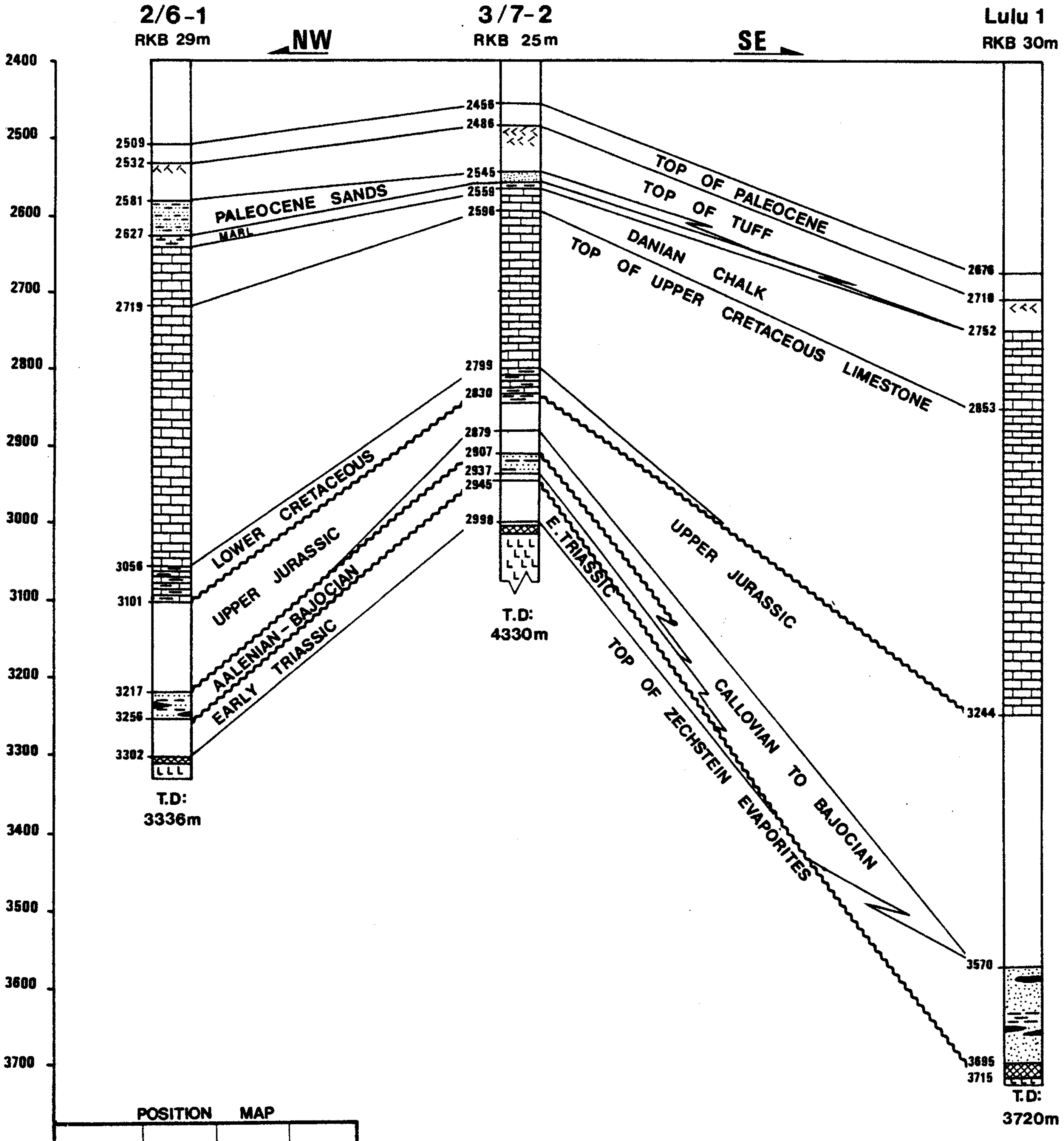
- In the Jurassic at 2933 m, 2912 m (no seal), 2910 m.

- In the Cretaceous at 2600 m (no seal), 2595 m 2598 m (seal failure), 2576 m, 2570 m.

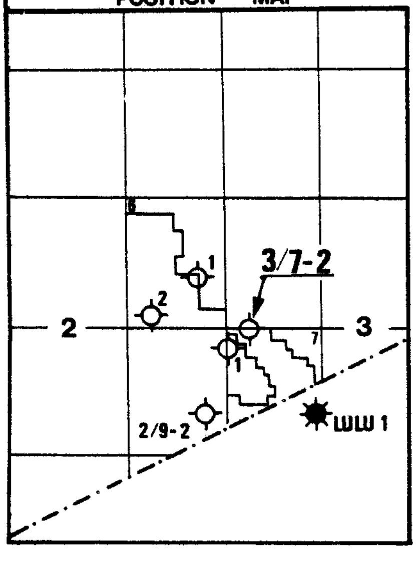
Sampling was performed into the Jurassic at 2909 m. The pressure went up to 6189 psi in 30 minutes. The pressure stabilization being very slow it was decided to open the other chamber. After 9 minutes the formation pressure reaching the mud hydrostatic pressure the tool was closed in order to get a representative sample.

9 liters of salted water (NaCl 115 gr/lt) were recovered, slightly contaminated by the mud lignosulfonates. (The mud salinity was 47 gr NaCl per litre).

The formation pressure gradient has been estimated at 1.49/1.50 mud weight equivalent.



POSITION MAP



Country: NORWAY OFFSHORE
Operator: ELF AQUITAINE NORGE A/S
Block: 3/7

elf aquitaine
norge a/s

CORRELATIONS BELOW THE PALEOCENE

wells 2/6-1, 3/7-2 & Lulu 1.

EXPLORATION DIVISION	FIG.15	Date: FEB.1982.
Scale: vertical: 1/5000		Author: F.VERROLLES
Drafted by: GEO Checked by:		File No:

12. CORRELATIONS (see fig. 15 and table 1)

Correlations are made to the Petronord Well 2/6-1 which lies 16 km north west and the Chevron well Lulu 1 which lies 22 km south east.

The Paleocene interval is thinning from 2/6-1 to Lulu 1. Siltstone are found on well 2/6-1 and Sands on 3/7-2. The lower part where the sands have been found may be missing on Lulu 1 because of the Salt activity. One should have expected a thickening towards Lulu 1 because this well is deeper in the basin. Only hallokynetic activity can explain it.

The Danian Upper Cretaceous Limestone are thickening from 2/6-1 to Lulu 1. The Limestone is a little thinner on 3/7-2 here also because of the Diapir which formed the 3/7-2 structure.

The Lower Cretaceous follows the same trend as it is thinner on 2/6-1 than on 3/7-2. It is missing on Lulu 1 (see line ANO 7380 fig. 6 and plate 2) where the chalk rests directly on Upper Jurassic shales.

The upper Jurassic shale are thinner on 3/7-2 but the general trend is a thickening towards Lulu 1, deeper into the basin.

The Middle Jurassic thickness increases from 2/6-1 to Lulu 1. In age sandstone are older on 2/6-1 (Alemian) than on 3/7-2 where they are Bajocian and than on Lulu 1 where they are Bajocian to Callovian.

The Lower Jurassic is missing on the 3 wells, while a thin Triassic is found on top of the Salt on 2/6-1 and 3/7-1. On Lulu 1 the Middle Jurassic rests directly on the Zechstein evaporites.

Table 1

CORRELATIONS 2/6-2, 3/7-2, LULU 1

	2/6-1		3/7-2		Lulu 1	
	Depth (m) MSL	Thickness (m)	Depth (m) MSL	Thickness (m)	Depth (m) MSL	Thickness (m)
TOP OF TUFF	-2503		-2461		-2680	
		187		73		42
TOP OF CHALK	-2690		-2534		-2722	
		337		240		492
BASE OF CHALK	-3027		-2774		-3214	
		46		31		0
TOP HOT SHALE	-3073		-2805		-3214	
		115		77		326
TOP JURASSIC SANDSTONE	-3188		-2882		-3540	
		39		38		125
TRIASSIC	-3227		-2920		-	
		28		56		0
ZECHSTEIN	-3255		-2976		-3665	

13. CONCLUSIONS

Petroleum Results

The 3/7-2 well has been proved dry. Despite the thermal Alteration Index of 2.5 noticed in the Jurassic, which indicates a maturation stage in the middle of the oil window, only minor gas shows have been encountered. This is to compare with the 2/6-1 well results where also in the Jurassic the TAI was between 2 and 2.5.

Maturation study of organic matter contained in the Upper and Middle Jurassic shales indicates that the oil migration started at the beginning of the Tertiary time.

The structuration started during the Triassic but only slightly. It was still going on during the Jurassic period. It went through a maximum during the early Upper Cretaceous. During the deposition of the chalk, the salt rising was still occuring. After deposition of the chalk was completed the halokenetic activity went through another maximum. The traps were therefore existing when the oil migration started.

The absence of hydrocarbon has therefore to be explained.
Two hypothesis can be taken but they have still to be confirmed by additional studies both geological (sedimentary) and geophysical (structuration and faulting). These two hypothesis are:

- Lateral change of facies isolating the structure from the main hydrocarbon source most probably located in the syncline to the South East.

- Faulting which isolates the structure or creates ways for dismigration.

As expected, the formation pressure started to build up in the Tertiary.

In the Paleocene formation a 8 m thick sand layer (2545 - 2553 m RKB) started to flow water showing a formation pressure gradient in the 1.45 - 1.50 gr/cc range.

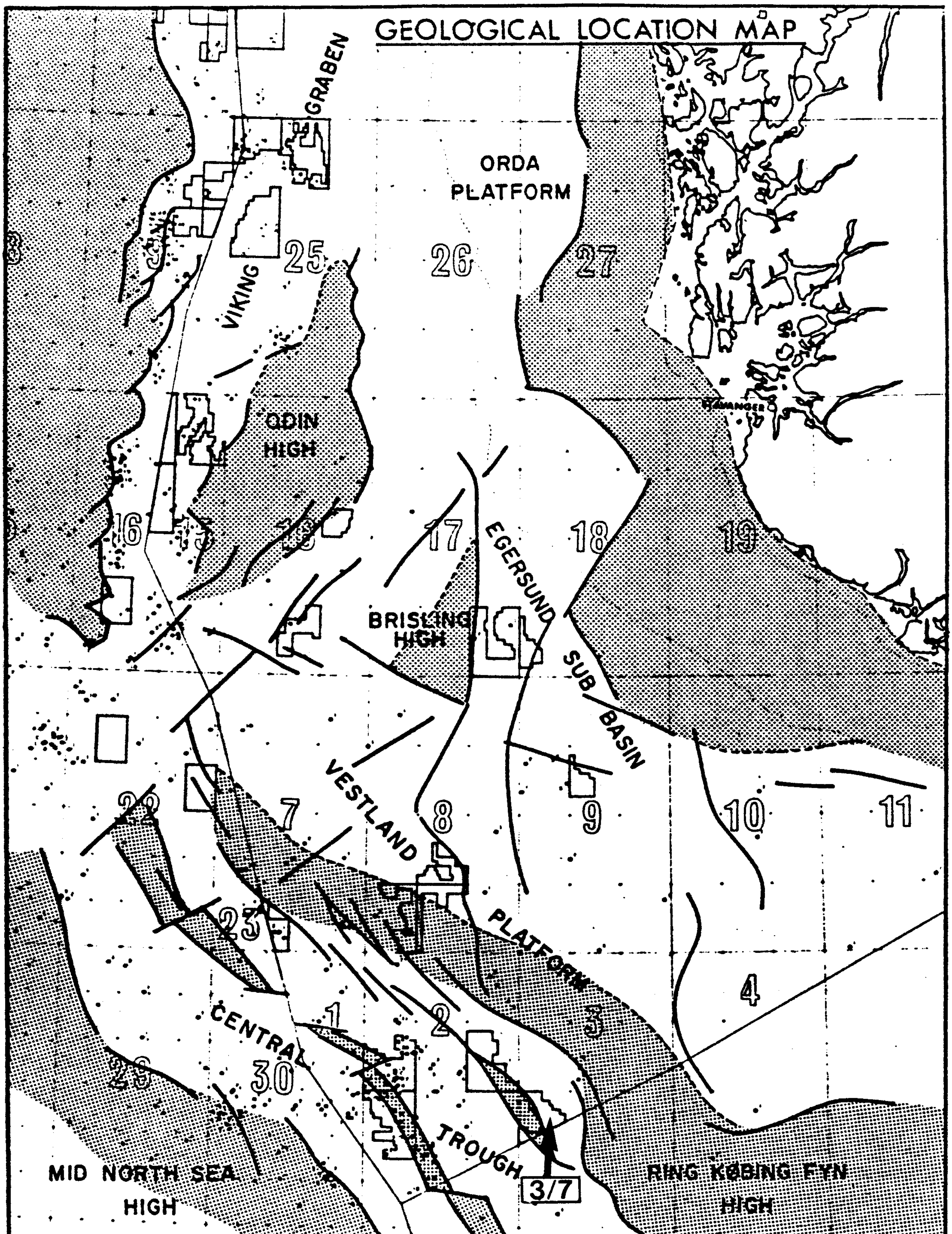

GEOLOGICAL LOCATION MAP
GRABEN
ORDA PLATFORM
VIKING
25
26
27
9
ODIN HIGH
STAVANGER
16
15
18
17
18
19
EGERSUND SUB BASIN
BRISLING HIGH
VESTLAND PLATFORM
22
7
8
9
10
11
23
4
CENTRAL TROUGH
1
2
3
29
30
3/7
MID NORTH SEA HIGH
RING KØBING FYN HIGH
39
37
38
A
SCALE: 1/2 000 000

Fig .16.

From this point the formation pressure remains the same as RFT in the Jurassic (at 2909 m RKB) indicates a formation pressure gradient of 1.50 MWE.

This match perfectly with the results from wells 2/6-1 where a water kick was experienced in the Jurassic sandstones and was controlled with a mud weight of 1.52 and Lulu 1 where the tests in the Cretaceous give a formation pressure gradient just below 1.50 gr/cc and where the Jurassic has most probably the same gradient (test reports have not yet been received and this estimate is provisional for the time being).

Therefore this gradient can be taken for the 3/7 area.

The pressure gradient below the salt is still unknown.

The mud weight had to be raised in the salt only for technical problems and the lack of porous zone in the pre-Zechstein formation made the operator unable to perform any testing.

Regional implications (see fig. 16)

In the light of the 3/7-2 results the potential of the various formations which were the targets of the well, can be summarized as follows:

Tertiary:

The Eocene/Oligocene sands found gas bearing on 2/3-1 well are missing. Their extent seems to be very local. They are most probably not a target to be searched for in the area, they have not been encountered neither on 3/7-2 nor on Lulu 1.

Between 2545 and 2553 m, sands were encountered into the Paleocene, they are water bearing. These sands flowed some water and the formation pressure gradient was estimated to be in the 1.45 to 1.50 sg range. They are missing on 2/6-1 and Lulu 1.

The main clastic source during the Tertiary was the Shetland area and the 3/7 is in a too far distal position to expect to find a good reservoir in this interval.

Danian/Upper Cretaceous:

The chalk has been found water bearing and tight. The average porosity from core analysis is in the 12 to 26% range, confirmed by electric logs interpretation.

The permeability is generally smaller than 0.01 millidarcys.

The Chalk can still be a good prospect in the area. Structuration is not enough to create a good prospect; the explorationist has to look both for the structuration and for the seismic character as proven by Lulu 1. The 3/7-3 well will bring arguments for or against this concept.

Jurassic

Only few meters of sandstones have been encountered. The interval is only 38 m thick with two sandstone layers between 2907 and 2911,5 m and between 2931 and 2934 m. The porosity is between 4 and 16% and the average permeability is 2.6 millidarcys with maximum of 9.8 millidarcys. An RFT at 2909 m recovered 9 liters of salty water (115 gr/l of NaCl). The pore pressure gradient is 1.51 sg.

Preliminary stratigraphic and environmental analysis on Lulu 1 indicate the sands to be in a probable fluvio-deltaic environment. On well 3/7-2 the Jurassic sands are very thin and fine. The reason is most probably the proximity of the Mandal high to the West. At the time of deposition of the Middle Jurassic the ground surface was almost flat in the 3/7-2 area, the well being located between the shore and the bassin slope. As these sands are for the time being interpreted as feeder channels, there is still good chance to find thicker sands in the South.

Pre Zechstein series

The expected sandstones have not been encountered. Instead a conglomerate with abundant dolerite and methamorphic rocks cemented by fine sandstone has been found. The well has been bottomed in a massive dolerite.

Well 3/7-2 is on the fringe of the Mandal high. The source of the Rotliegendes sediments is expected to be the Fenno-Scandian shield. Well 3/5-1 has encountered hundreds meters of Rotliegendes sandstone. They may not have reached the slope of the Mandal high.

The volcanics rocks have been dated by the Potassium Argon method. An age of 258 million years is given (Rotliegendes) with hydrothermal alteration during the Lias and the Dogger. The examination and analysis of fragment of K5 made by the Geological Museum in Oslo show that this dolerite is extrusive. The 3/7-2 well is in a similar position than the 17/4-1 well from the center of the Northern Permian Basin. Therefore by comparison with the southern Permian Basin (Holland) sandstones can still be expected in the center of this northern basin. The main question remains the presence or the lack of the Carboniferous source rock. This has still to be studied.

Study of the results of the 3/7-3 well which has been drilled after the 3/7-2 and the interpretation of the new seismic which will be shot beginning of 1982 may bring an answer to these questions.

PROVISIONAL FROM DAILY REPORTS
and electric logs

Coord X: 04° 04' 08.362"z ground: -52m
Y: 56° 29' 58.369"z RKB: 25m
Line: 73-80 SP: 502

77m
Depths datum: RKB
Rig: DYVI ALPHA
Stopped in: Lower Permian or older

Spudded: 30.03.81
Started drilling: 30.03.81
At T.D: 14.06.81.
Completed: 20.06.81.
T D Driller: 4330m T.D. Logger: 4330m.

Well **3/7-2**

Country **NORWAY off-shore**

OPERATOR ELF AQUITAINE NORGE A/S

LICENCE 023 OWNED BY PETRONORD

TARGETS PRIMARY:
-DANIAN/CRETACEOUS CHALK
-JURASSIC SANDSTONES
-ROTLIEGENDES/CARBONIFEROUS FM.
SECONDARY:
-EOCENE/OLIGOCENE SANDSTONES

RESULTS (Preliminary)

- Eocene sands missing.
- Chalk tight and water bearing.
- Jurrassic sandstones reduced and water bearing
- Rotliegendes sandstones not found.
- Well bottomed in volcanic rocks.

CASINGS

30"	at	148m
20"	at	754m
13 3/8"	at	2552m
9 5/8"	at	3012m

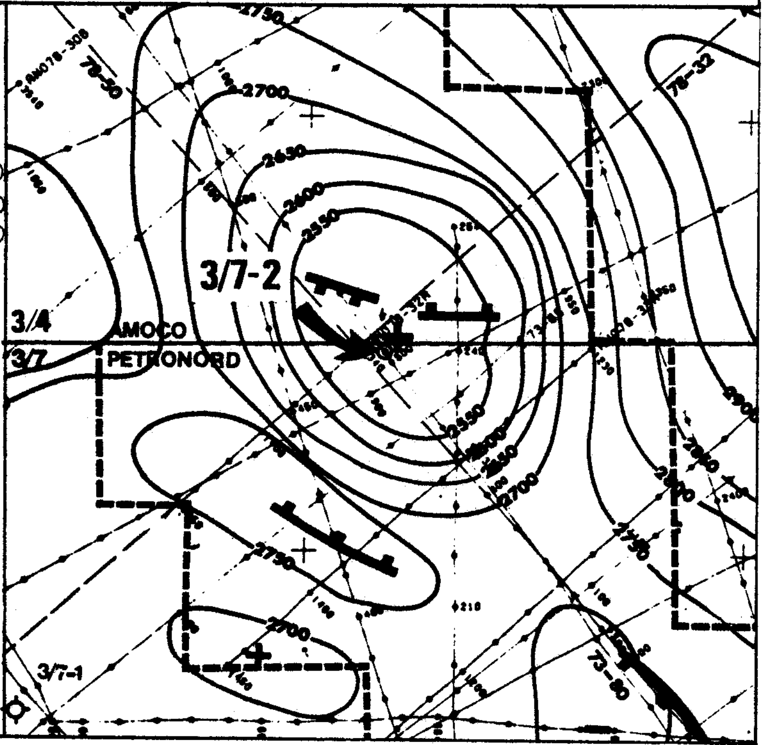
CORES

K1	2570-2575.5	36%
K2	2575,5-2590	91,4%
K3	2602 -2620	15%
K4	2911 -2921	80%
K5	4310 -4319	100%
CST1	2797 -2997	28/30
"2	4154,5-4287	14/30
"3	4245 -3215	20/30

SHOWS

Down to 2000m
C1 only 1 to 5%
16% C1 at 1025m
24% C1 at 1175m
20% C1 at 1500m
-From 2000 to 2559m
C1 only o.1 to 1%
-From 2559 to 2830m
C1 <o,1%
-From 2830 to 2998m
C1 to C3.0.1% max
rare very weak fluors
-Below 2998
No shows.

ISOBATH MAP - C2 HORIZON.



LOGS

ISF/ Sonic	770 - 148 GR up to 80 m.	1	ISF/ Sonic	4000 - 3001	5
			CBL	2551 - 300	1
FDC/ GR	770 - 148	1	ISF sonic	4244 - 3010.5	6
ISF/ Sonic	2563 - 754	2/3	FDC/ CNL/GR	4243.5 -3011	4
FDC/ GR	2563 - 753	2	ISF/ sonic	4324 - 4023	7
HDT	2560 - 1732 Deviation up to 750 m.	1	FDC/ CNL/GR	4301 - 4122	5
			HDT	4293 -3010.5	3
ISF/ Sonic	3027 - 2554	4	NGS	4244 -3010	
LDT-CNL-GR	3026 - 2553	3	CBL	3012 -2300	2
HDT	2554 - 3926.5	2			

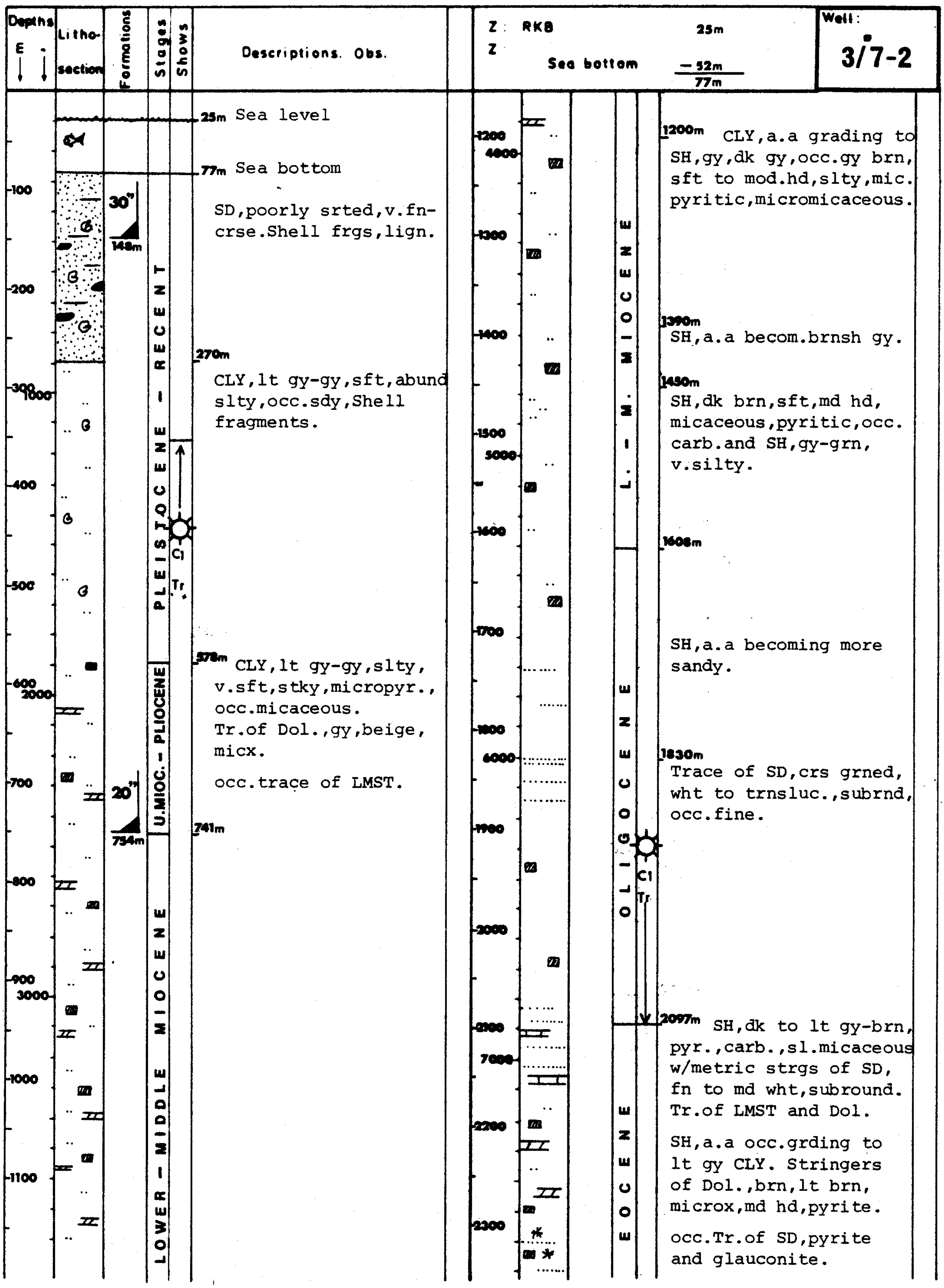
TESTS

RFT	9 shots 2554-3027.
2933m	FP=6243psi
2912m	No seal.
2910m	FP=6207psi
2909m	FP=6206psi,≃91 of salt water(115g/l)
2600m	No seal.
2598m	No seal.
2595m	Tight formation.
2576m	" " .
2570m	No seal.

APPENDIX 1

Checked F. VERROLLES
Date 24 06 81

PROVISIONAL FROM DAILY REPORTS



25m Sea level

77m Sea bottom

SD,poorly srted,v.fn-crse.Shell frgs,lign.

270m CLY,lt gy-gy,sft,abund slty,occ.sdy,Shell fragments.

578m CLY,lt gy-gy,slty, v.sft,stky,micropyr., occ.micaceous. Tr.of Dol.,gy,beige, micx.

occ.trace of LMST.

741m

1200m CLY,a.a grading to SH,gy,dk gy,occ.gy brn, sft to mod.hd,slty,mic. pyritic,micromicaceous.

1390m SH,a.a becom.brnsh gy.

1450m SH,dk brn,sft,md hd, micaceous,pyritic,occ. carb.and SH,gy-grn, v.silty.

1608m

SH,a.a becoming more sandy.

1830m Trace of SD,crs grned, wht to trnsluc.,subrnd, occ.fine.

2097m SH,dk to lt gy-brn, pyr.,carb.,sl.micaceous w/metric strgs of SD, fn to md wht,subround. Tr.of LMST and Dol.

SH,a.a occ.grding to lt gy CLY. Stringers of Dol.,brn,lt brn, microx,md hd,pyrite.

occ.Tr.of SD,pyrite and glauconite.

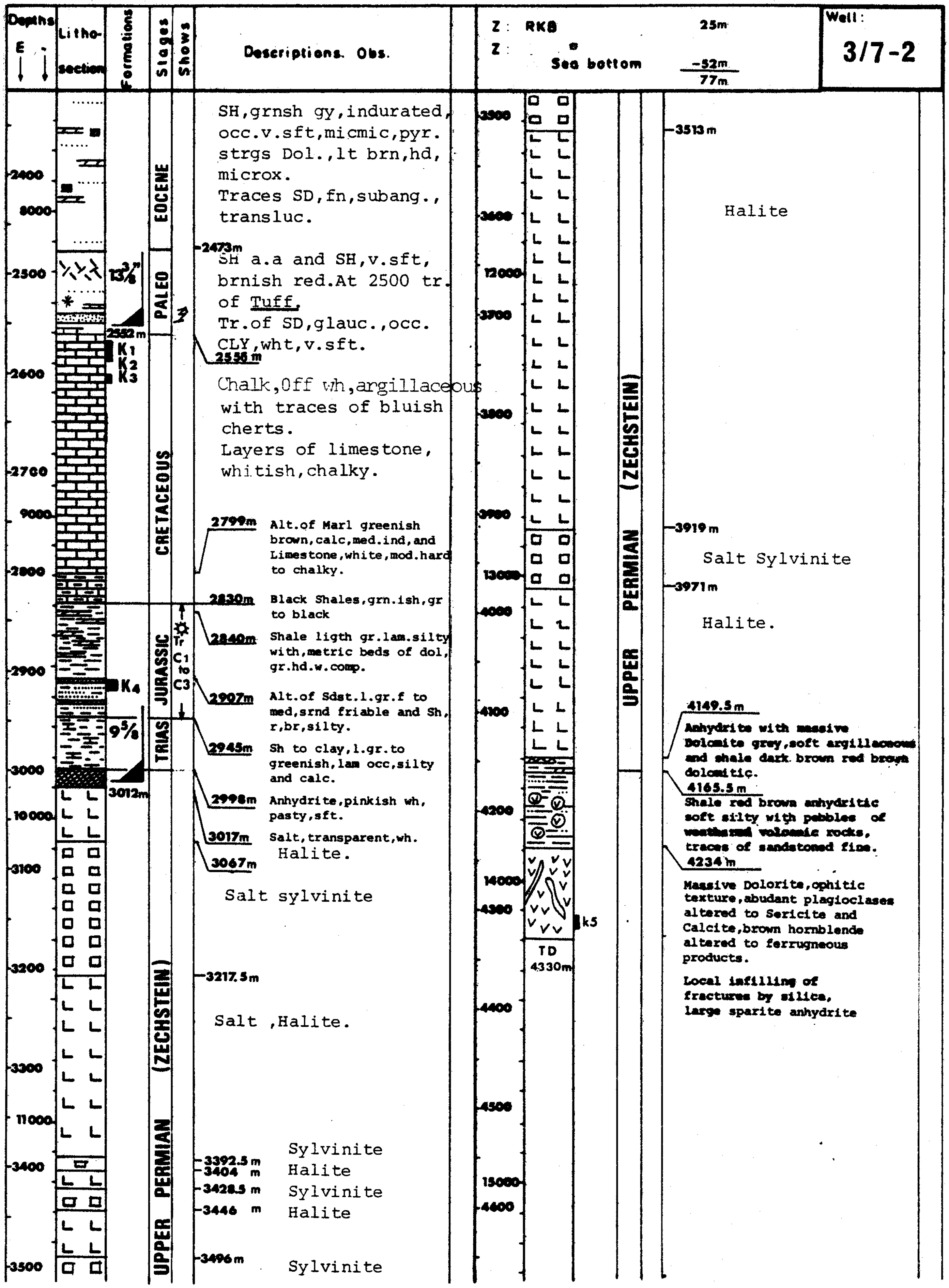
PROVISIONAL FROM DAILY REPORTS

Well: **3/7-2**

Z : RKB 25m

Z : Sea bottom -52m

77m



SH,grnsh gy,indurated, occ.v.sft,micmic,pyr. strgs Dol.,lt brn,hd, microx.
Traces SD,fn,subang., transluc.

2473m

SH a.a and SH,v.sft, brnish red.At 2500 tr. of <u>Tuff</u>.
Tr.of SD,glauc.,occ. CLY,wht,v.sft.

2556 m

Chalk,Off wh,argillaceous with traces of bluish cherts.
Layers of limestone, whitish,chalky.

2799m Alt.of Marl greenish brown,calc,med.ind,and Limestone,white,mod.hard to chalky.

2830m Black Shales,grn.ish,gr to black

2840m Shale ligth gr.lam.silty with,metric beds of dol, gr.hd.w.comp.

2907m Alt.of Sdst.l.gr.f to med,srnd friable and Sh, r,br,silty.

2945m Sh to clay,l.gr.to greenish,lam occ,silty and calc.

2998m Anhydrite,pinkish wh, pasty,sft.

3017m Salt,transparent,wh.
Halite.

3067m

Salt sylvinite

-3217.5m

Salt ,Halite.

-3392.5 m Sylvinite

-3404 m Halite

-3428.5 m Sylvinite

-3446 m Halite

-3496 m Sylvinite

-3513 m

Halite

-3919 m

Salt Sylvinite

-3971 m

Halite.

4149.5 m

Anhydrite with massive Dolomite grey,soft argillaceous and shale dark brown red brown dolomitic.

4165.5 m

Shale red brown anhydritic soft silty with pebbles of weathered volcanic rocks, traces of sandstoned fine.

4234 m

Massive Dolorite,ophitic texture,abudant plagioclases altered to Sericite and Calcite,brown hornblende altered to ferrugneous products.

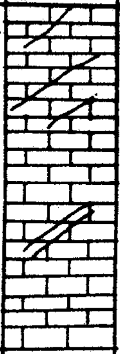
Local infilling of fractures by silica, large sparite anhydrite

CORE DESCRIPTION

CUT: 5.5m
RECOVERED: 2m 36 %
LOSS: 3.5m

COMPANY: E.A.N.
WELL N° 3/7-2
CORE N°: 1

DATE: 01-05-81
DEPTHS: 2570m-2575.5

DEPTHS	% $CaCO_3$	PERM	POROS	SHOWS	DIPS	LOG	DESCIPTION
2570		NO EVIDENT PERMEABILITY	VERY POOR POROSITY	NO DIRECT FLUID	45°		ABUNDANT CALCITE FILLED FRACTURES
	91						
	92						CHALKY LIMESTONE, WHITISH TO TAN, MEDIUM HARD, WITH NUMEROUS SHALY PARTINGS, MEDIUM GREY TO GREENISH GREY (FLASER CHALK) TRACE OF PYRITE.
2571	85						
	87						
	84						
2572	97						INTERVAL : 2570.2 - 2570.7m A FEW MILLIMETRIC LAYERS OF DARK SHALE.

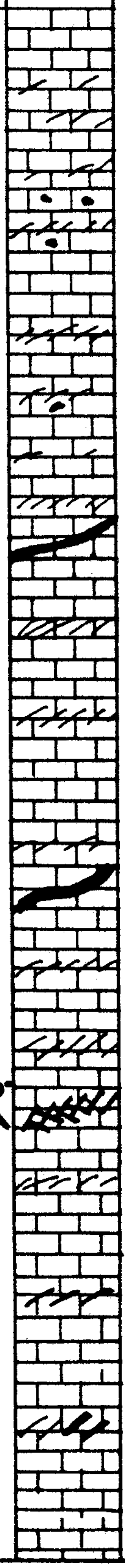
CORE DESCRIPTION

CUT: 14.5m
RECOVERED: 13.25m 91.4 %
LOSS: 1.25m

COMPANY: E.A.N.
WELL N°: 3/7-2
CORE N°: 2 sheet 1

DATE: 01.05.81.
DEPTHS: 2575.5-2590

DEPTHS	% CaCO3	PERM	POROS	SHOWS	DIPS	LOG	DESCIPTION
	89	NO EVIDENT PERMEABILITY	VERY POOR POROSITY	NO DIRECT FLUO : 2580-2575.5 NO GAS SHOW WHILE CORING	A FEW FINE HORIZONTAL SHALY LEVELS 30°		
2576							
	63						
	81						
7577							ʃʃ
	72						LIMESTONE, WHITISH, CHALKY (MUDSTONE), SLIGHTLY ARGILACEOUS WITH A FEW MICRO JOINTS FILLED WITH CALCITE.
	83						NUMEROUS SHALY PARTINGS, GREENISH BLUE, LUSTREOUS ASPECT, GIVING LOCALLY A GREENISH COLOR TO THE LIMESTONE, "FLASER CHALK".
2578							
	78						
	86						ʃʃ
2579							
	66						
	68						PYRITE IN NODULES AND IN JOINTS.
2580							
	83						
	82						
2581							
	88						
	92						AT: 2582.1m
2582							THIN BRECCIATED ZONE, FRACTURES FILLED WITH CALCITE AND PYRITE (DIPS 30 to 45%)
	90						
	88						
2583							
	92						BIOTURBATION IS ~~FREQUENTLY~~ MASKED BY COMPACTION/ PRESSURE SOLUTION PHENOMENA.
2584							
	97						



CORE DESCRIPTION

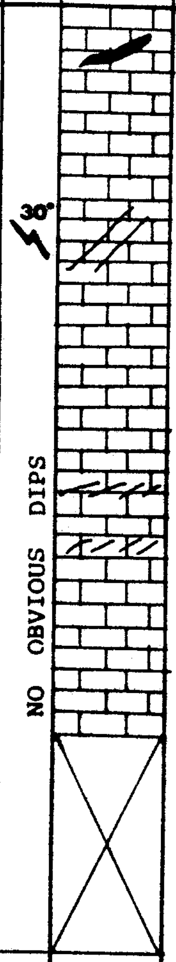
CUT: 14.5m
RECOVERED: 13.25m 91.4%
LOSS: 1.25m

COMPANY: E.A.N.
WELL N°: 3/7-2
CORE N°: 2 sheet 2

DATE: 01.05.81.
DEPTHS: 2575.5-2590

DEPTHS	% $CaCO_3$	PERM	POROS	SHOWS	DIPS	DESCIPTION
2585	87					
	84					
2586	82				30°	CALCITE FILLED FRACTURES(Dipping 30%)
2587	88	NO EVIDENT PERMEABILITY	VERY POOR POROSITY	NO DIRECT FLUID	NO OBVIOUS DIPS	
	90					
2588	86					
	83					LIMSTONE CONCRETIONS,BIOTURBATION.
2589						
2590						

LOG



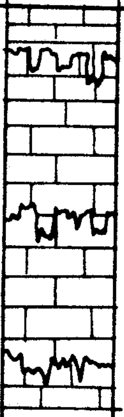
elf norge - EXPLORATION

CORE DESCRIPTION

CUT: 18.5m
RECOVERED: 2.8m 15 %
LOSS: 15.7m

COMPANY: E.A.N.
WELL N°: 3/7-2
CORE N°: 3

DATE: 02-05-81.
DEPTHS: 2602-2620.5m

DEPTHS	% Co_3Co	PERM	POROS	SHOWS	DIPS	LOG	DESCIPTION
2602 2603 2604 2604.8			POOR POROSITY	NO SHOWS	LOC MICROFRACTURES UP TO 70°		LIMESTONE,lt gy to tan,mudstone,chalky,abundant stylolite with dark brnish cly residue, local burrows.
2605						LOST 15,7 m of CORE 3	

elf norge - EXPLORATION

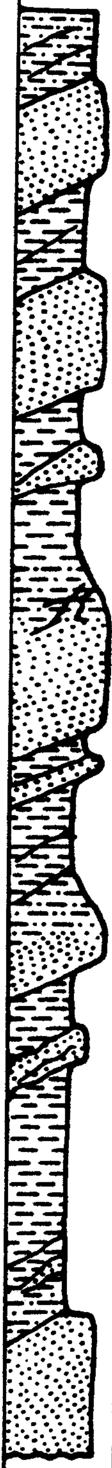
APPENDIX 4

CORE DESCRIPTION

CUT: 10m
RECOVERED: 8m   80 %
LOSS: 2m

COMPANY: E.A.N.
WELL Nº: 3/7-2
CORE Nº: 4

DATE: 09-05-81.
DEPTHS: 2911-2921m

DEPTHS	% Co_3Ca	PERM	POROS	SHOWS	DIPS	LOG	DESCIPTION
2911 2912 2913 2914 2915 2916 2917 2918 2919 2920	0 0 0 0 0 0 0 0 0 0 0		NO VISIBLE POROSITY	NO GAS - NO FLUO.	FROM 20° to 40°		ALTERNATING: SILTSTONE.Grey green W/inclusions of organic matter. SANDSTONE.White translucent,v fine to fine,micaceous, friable to poorly consdidated. SHALE.Light grey,silty,micaceous,w/slicken slides and fractures filled with shales.

elf norge - EXPLORATION

APPENDIX 5

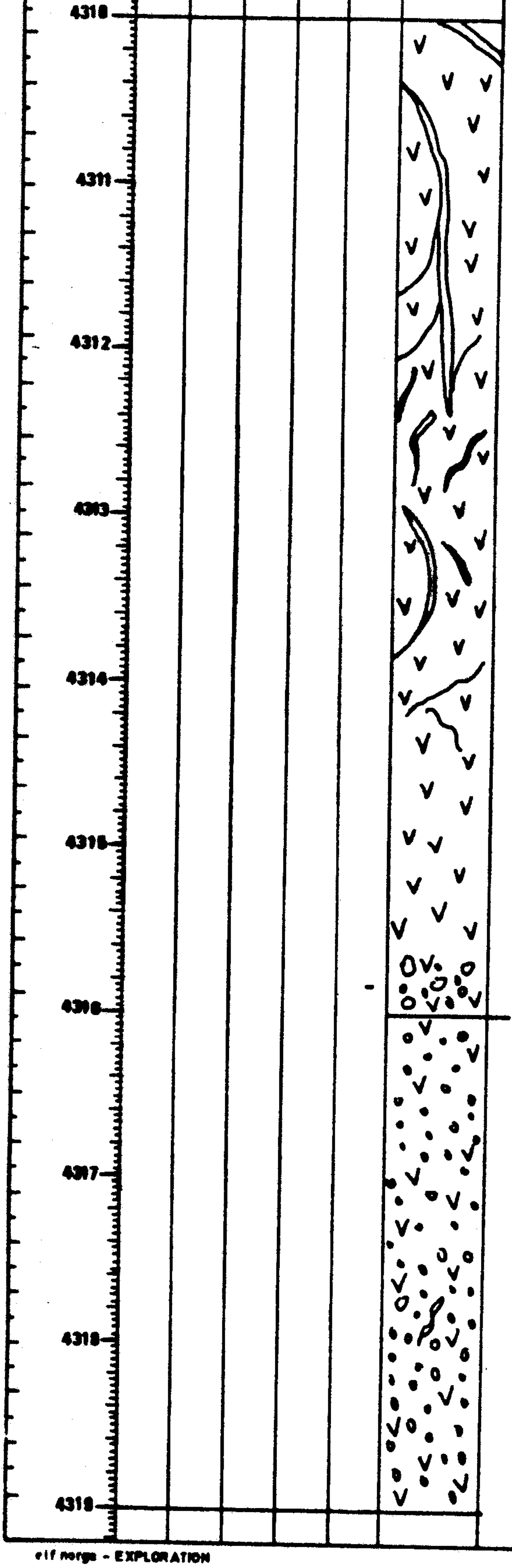
CORE DESCRIPTION

CUT: 9m
RECOVERED: 9m
100 %
LOSS: nul

COMPANY: EAN
WELL N°: 3/7-2
CORE N°: 5

DATE: 11/6/81
DEPTHS: 4310-4319m

DEPTHS	% Co_3Co	PERM	POROS	SHOWS	DIPS	LOG	DESCIPTION



VOLCANIC ROCK,effusive,black,homogeneous, without apparent bedding - TYPE BASALT.
-Small spherical inclusions(mm) filled with green or blue-green mineral,soft.
-Fractures(cm) filled with volcanic breccia, white mineral,occasionally green or reddish mineral.

A/A with mm to cm vugs.

Vugular volcanic rock,red to brown-red with similar inclusions becoming brown-black.

elf norge - EXPLORATION

SIDE WALL CORES DESCRIPTION

WELL : 3/7-2
LICENCE : Norway

RUN N° : 1
PAGE N°: 1
DATE : 13.06.81

SERVICE COMPANY: EAN-SPE
ASKED: 30
RECOVERED: 14
SHOT : 29
LOST : 8
FULL BULLET : 14

MD

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

N°	DEPTHS	REC %	LITHOLOGY	Fluorescence	CUT
1	4287	0	EMPTY		
2	4283	/	LOST		
3	4282	/	LOST		
4	4270	/	LOST		
5	4261	/	LOST		
6	4257	/	LOST		
7	4248	20	Red brown friable, microxx rock w/incl. of soft green mnl - Volcanic	/	
8	4237	/	LOST		
9	4235	/	LOST		
10	4233	20	Very altered microxx rock, brown, friable w/calcite, white - volcanic		
11	4232	25	very altered granitic rock: Quartz feldsp and :aminated, distorted black mica,calcite	/	
12	4230	0	EMPTY		
13	4229	40	CGL, well rounded, volcanic elements, cmt dk brown w/reduced parts of vf coarse sediments.	/	
14	4228	25	Very alteredcrystal rock,quartz + feldsp. + dark minerals dark grey, calcitic	/	
15	4223	0	EMPTY		
16	4218	40	CGL (one 2 cm well rounded of volcanic same as no. 7, very altered, calcitic	/	
17	4210	25	CGL of volcanic elements, well rounded a/a, very altered, calcitic	/	
18	4205	50	Crystall. vein in volcano-sedimentary deposits, very altered, red brown.	/	
19	4200	/	LOST		

APPENDIX 7

SERVICE COMPANY: EAN
ASKED: 30
RECOVERED: 28
SHOT : 30
LOST : 2
FULL BULLET : 28
Recovery: 26

SIDE WALL CORES DESCRIPTION

WELL : 3/7-2
LICENCE :
RUN N° : 1
PAGE N°: 2
DATE : 14/5-81

tr : trace - M : medium - G : good

N°	DEPTHS	REC	LITHOLOGY	Fluorescence	CUT
19	2880	70	Black shale A/A	No	
20	2843	70	Black shale A/A	"	
21	2833.5	60	Black shale, with laminate of pyrite	"	
22	2837	10	Black shale A/A without pyrite, very slightly calc.	"	
23	2932.0	100	Shale greenish grey, soft, slightly calcareous	"	
24	2937.5	100	Shale greenish grey, slightly calcareous	"	
25	2927	10	Shale, greenish grey, slightly silty, glauconitic and dolomitis	"	
26	2822	0	LOST		
27	2814	10	Shale, brownish red, medium indurated, calcareous	"	
28	2804	30	Shale, greenish grey, medium indurated, calcareous	"	
29	2801	100	Shale, brown red, very slightly silty, soft	"	
30	2797	-	Mud cake		

SIDE WALL CORES DESCRIPTION

WELL : 3/7-2 Norway
LICENCE :

RUN N° : 2
PAGE N°: 1
DATE : 10.05.81

SERVICE COMPANY: EAN
ASKED: 30
RECOVERED: 28
SHOT : 30
LOST : 2
FULL BULLET : 28
Recovery: 26

M. Dumeunier

tr : trace - M : medium - G : good

N°	DEPTHS	REC %	LITHOLOGY	Fluorescence	tr	M	G	CUT
1	2997	50	Shale, light grey -greenish, silty and calcareous	No				
2	2995.5	40	Clay, brown-red	"				
3	2990	25	Shale, light grey to greenish, laminated, slightly calcareous	"				
4	2980	-	Mud cake	"				
5	2970	25	Shale, light grey, laminated silty	"				
6	2960	20	Shale AA	"				
7	2548	20	Sandstone, light grey, very fine, friable	"				
8	2943	70	Shale, grey greenish, with pyrite	"				
9	2938	70	Claystone, silty, grey to green	"				
10	2933.5	50	Sandstone, grey, fine to medium, subrounded, friable	"				
11	2932.5	40	Sandstone, light grey, AA	"				
12	2926.5	70	Shale, brown red, silty	"				
13	2922	30	Sandstone, grey, very fine, friable, subrounded	"				
14	2908	70	Sandstone, light brown, fine, friable, subrounded	"				
15	2904.5	-	LOST					
16	2894	80	Black shale	"				
17	2885	80	Black shale A/A	"				
18	2875	80	Black shale A/A	"				

APPENDIX 8

SIDE WALL CORES DESCRIPTION

WELL : 3/7-2
LICENCE : NORWAY
RUN N° : 2
PAGE N° : 2
DATE : 13.06.81

SERVICE COMPANY EAN-SPE
ASKED : 30
RECOVERED : 14
SHOT : 29
LOST : 8
FULL BULLET : 14

MD

tr : trace - M : medium - G : good

N°	DEPTHS	REC	LITHOLOGY	Fluorescence	CUT
20	4195	0	EMPTY		
21	4190	50	Same as no.7, altered + small wh. incl (of coarse)	/	
22	4182	75	CGL same as no. 13, many well rounded volcanic elements, red brown, creme, altered	/	
23	4276	25	CGL same as no. 17 + soft blue green mnl	/	
24	4171	20	CGL same as no. 17	/	
25	4170	0	EMPTY		
26	4169	0	EMPTY		
27	4168	15	Microcrystalline black, volcanic rock, altered	/	
28	4166	15	Alternated volcanic rocks	/	
29	4159	0	EMPTY		
30	4154.5	/	Misfired		

Appendix 9

3/7-2
WELL HISTORY SUMMARY

The well started on block 25/4 when the Dyvi Alpha with all anchors racked, was ready for tow on February 26th 1981.

It was spudded at 06.00 hrs on March 30th 1981. Below are listed the main points of the 3/7-2 well history.

03.04.81: Drilled 17 1/2" hole down to 770 m. Run ISF/SONIC/GR and FDC/GR.
Enlarged hole to 26".
08.04.81: Ran 20" casing shoe at 754 m.
10.04.81: Leak off test at 775 m is 1.48 equivalent density.
Drilling 17 1/2" hole. Thight hole, swabing are encountered for each survey below 1200 m.
23.04.81: A drilling break is experienced at 2534 m (driller depth). A flow check at 2553 m shows a weak flow which was controlled by raising the mud weight to 1.46 sg. Mud salinity increased from 35 gr/lt Nacl to 54 gr/lt. Drilling resumed and was stopped at 2563 m. Three days were necessary to run the electric logs because of continuous slight flow.
28.04.81: Ran 13 3/8" casing. Shoe at 2552 m
29.04.81: Leak off test at 2568 m is 1.82 equivalent density.
30.04.81: Core no. 1, 2570 - 2575,5 m. Recovered 36%.
01.05.81: Core no. 2, 2575,5 - 2590 m. Recovered 91,4%.
02.05.81: Core no. 3, 2602 - 2620 m. Recovered 15%.
09.05.81: Core no. 4, 2911 - 2921 m. Recovered 80%.
12.05.81: Top of Zechstein is reached at 3001 m.
13.05.81: Drilling is stopped at 3027 m and electric logs are run.
15.05.81: 9 5/8" casing is set at 3012 m.
18.05.81: Prior to drill out the casing shoe the mud is displaced with a salt saturated mud including also potassium and magnesium salts with a density of 1.57 sg.

19.05.81: Leak off test at 3032 m is 2.05 equivalent density. While drilling the 8 1/2" hole in salt, mud weight was increased slowly to get 1.70 gr/cc at 4000 m. Deviation problems were experienced in salt. The deviation reached a maximum of 9 1/2° at 3659 m then was reduced to 2 1/2° at 4004 m.

30.05.81: Intermediate SONIC/GR is run at 4004 m.

06.06.81: Electric logs are run at 4240.5 m.

11.06.81: At 4316 m drilling is stopped for core no. 5 (4310 - 4319 recovered 100%) and electric logs are run.

14.06.81: TD is reached at 4330 m. Velocity survey is performed.

20.06.81: The well is plugged and abandonned and the rig Dyvi Alpha leaves the location at 16.00 hrs on Saturday 20.06.81.

The 3/7-2 well lasted a total of 86 days including 4 days for rig move and waiting on weather prior to start drilling, 77 days for drilling operation and 5 days for abandonment.

	YEAR	LICENCE	OWNER	OPERATOR	FIELD
	1981	023	PETRONORD	EAN	

OWNER	WELL	OPERATOR
PETRONORD	**3/7-2**	**EAN**

PL.1

COMPOSITE LOG

1981

3/7-2

EAN

AREA : **NORWAY**
off-shore

scale 1/500

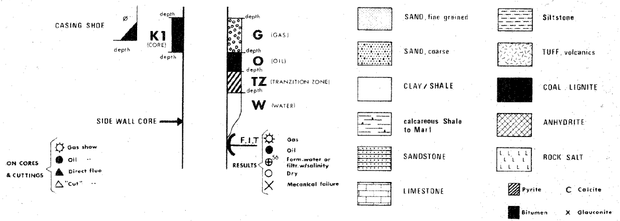
Coordinates	x 56° 29′ 58.369″N y 04° 04′ 08.362″E	Date spudded :	1981 March 30th
		Started drilling :	1981 March 30th
Water depth :	52m RKB 25m	At T.D. :	1981 June 16 th
Rig :	DYVI ALPHA	T.D. (driller) :	4330 m
Contractor :	DYVI DRILLING	T.D. (logger) :	NA
Mud logging :	GEOSERVICES	COMPLETED	1981 June 20th

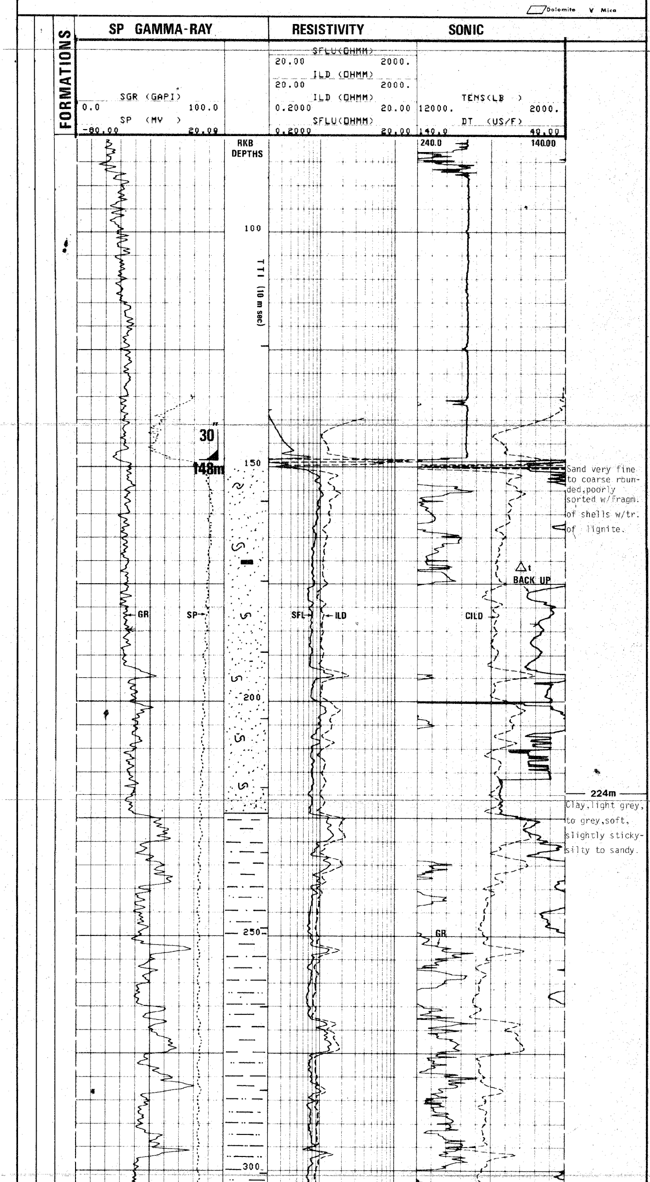
Well-site geologists : CL.GUEDON G. CAILLET J. MARION PH. FORNAGE

Approved by : F. VERROLLES date : July 1981

Status : P. A.

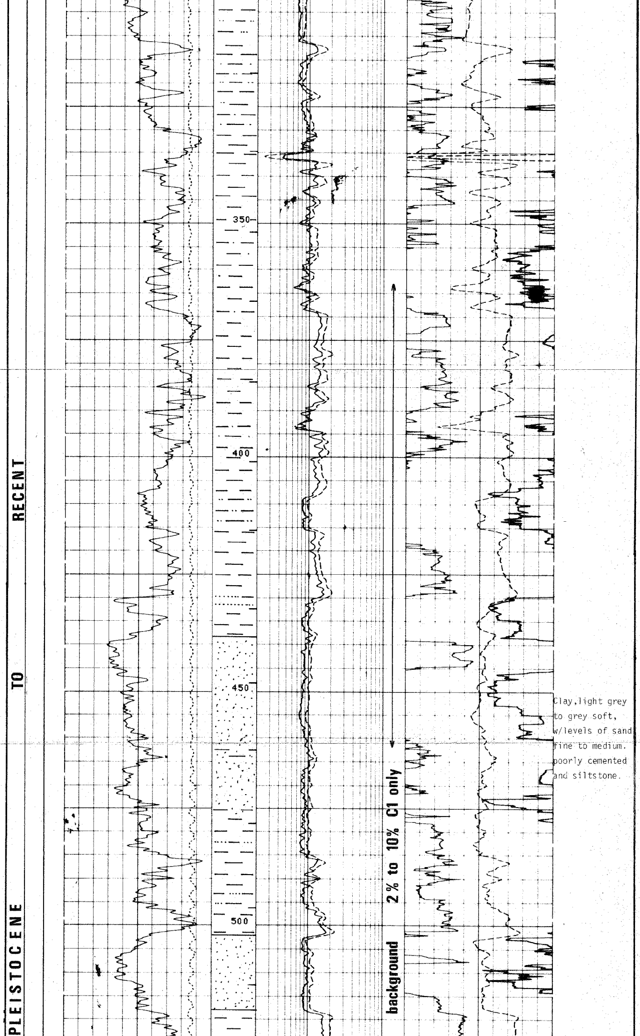
LEGEND



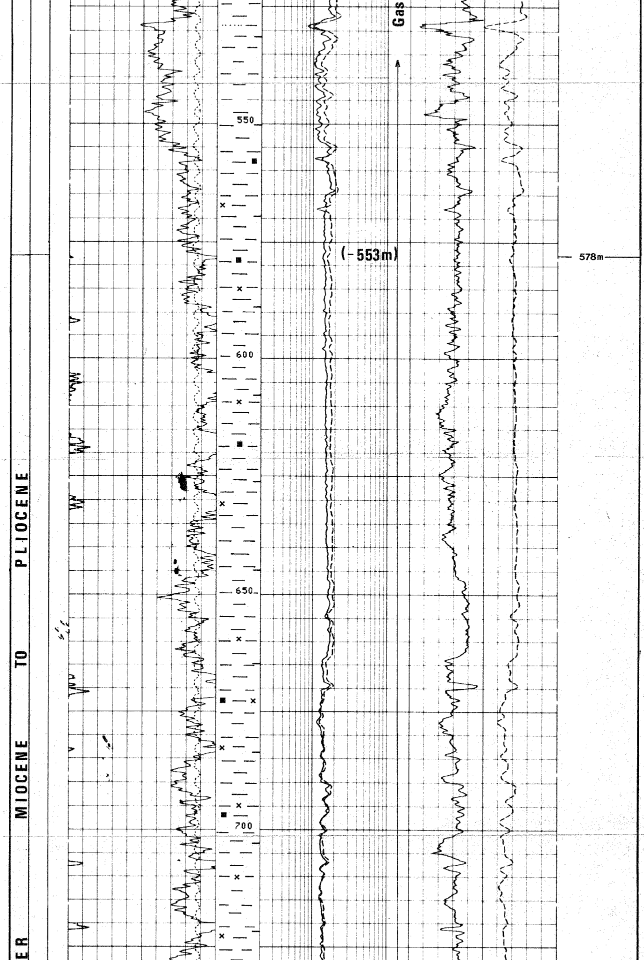


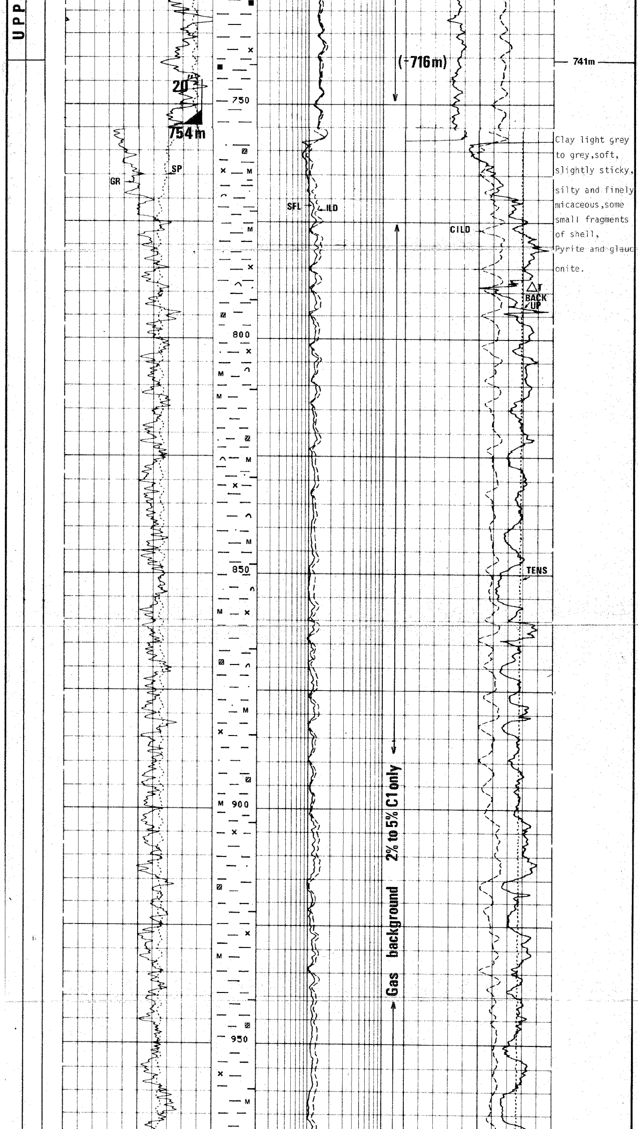
Sand very fine to coarse rounded,poorly sorted w/Fragm. of shells w/tr. of lignite.

Clay,light grey, to grey,soft, slightly sticky-silty to sandy.

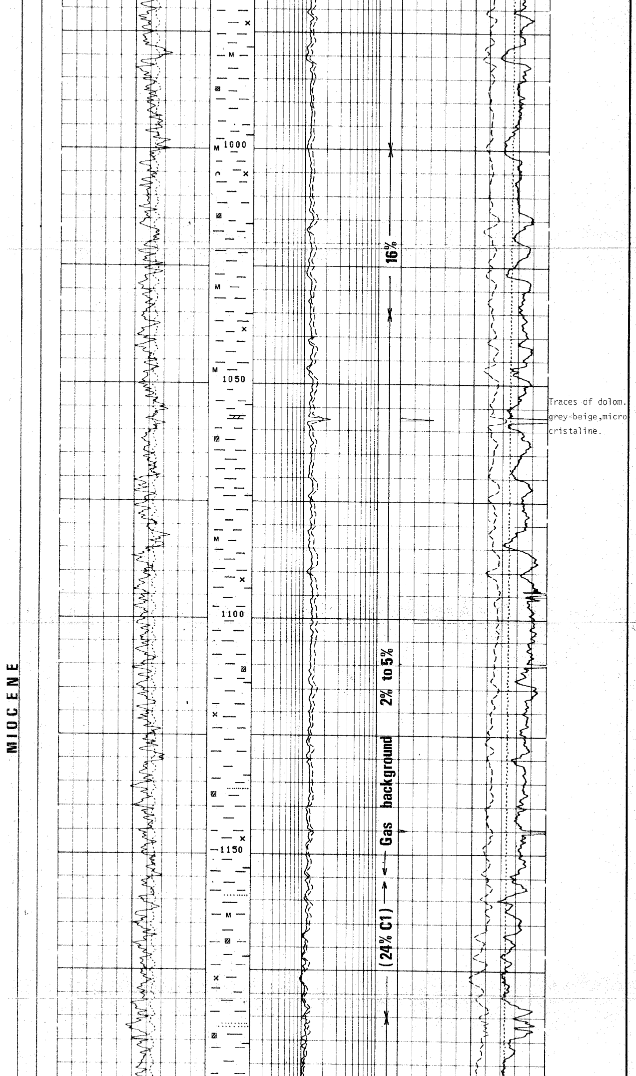


Clay, light grey
to grey soft,
w/levels of sand
fine to medium.
poorly cemented
and siltstone.

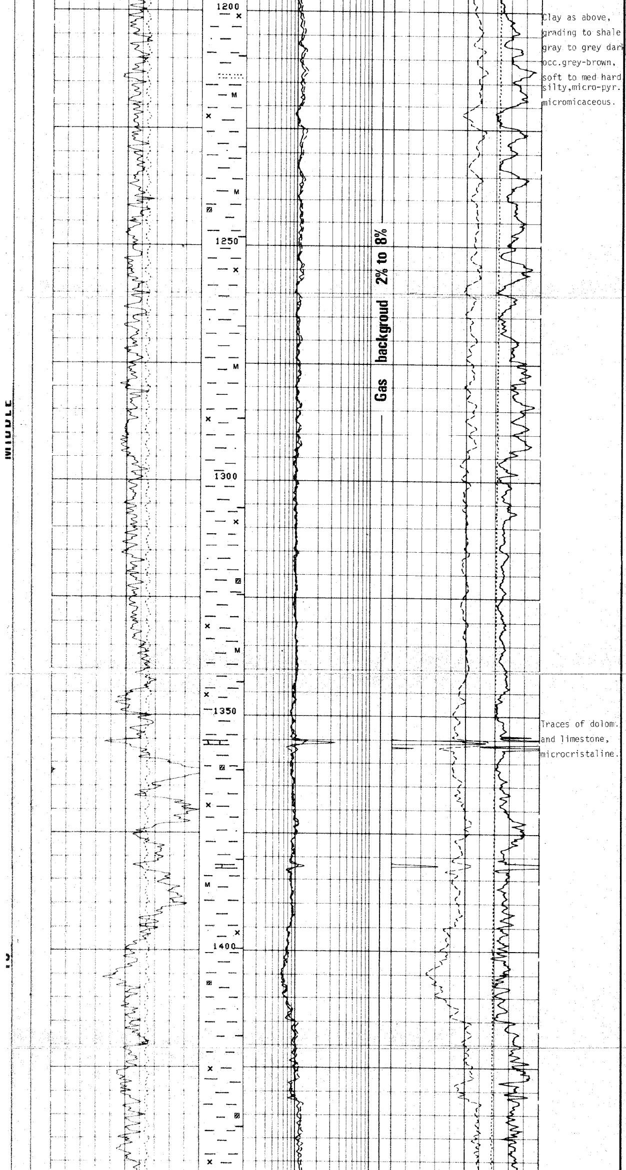




Clay light grey to grey, soft, slightly sticky, silty and finely micaceous, some small fragments of shell, Pyrite and glauconite.

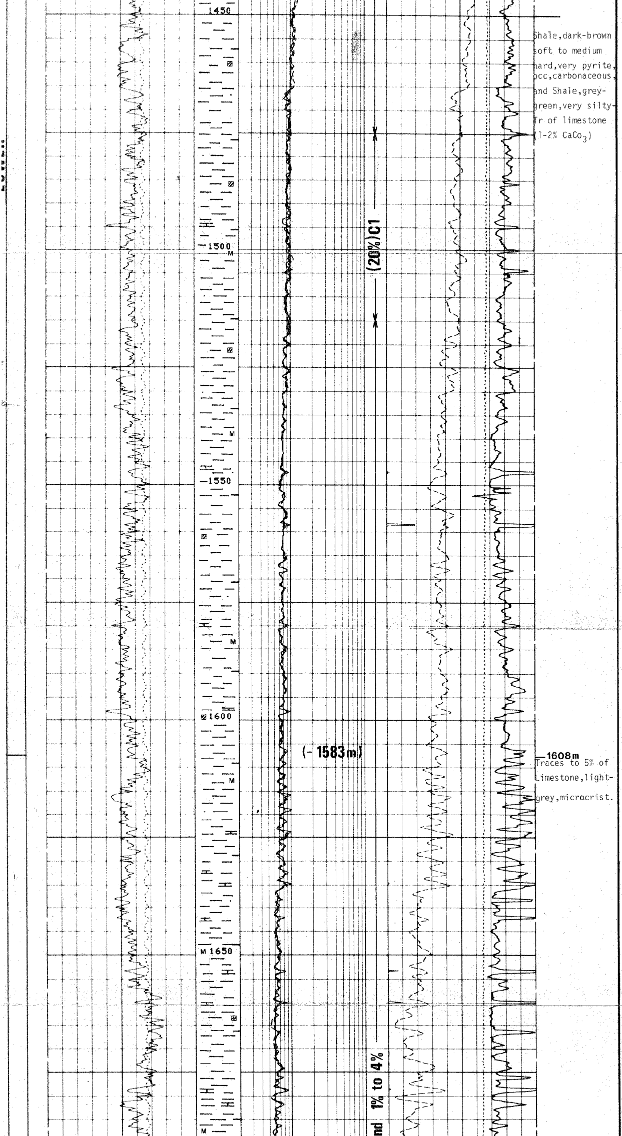


Traces of dolom. grey-beige,micro cristaline.



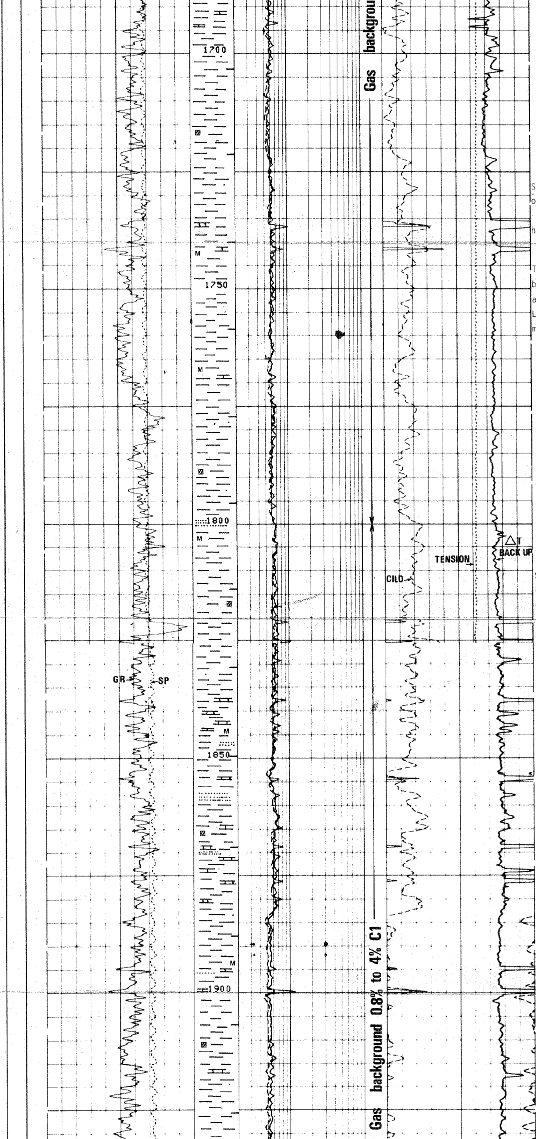
Clay as above, grading to shale gray to grey dark occ.grey-brown, soft to med hard silty,micro-pyr. micromicaceous.

Traces of dolom. and limestone, microcristaline.



Shale,dark-brown
soft to medium
hard,very pyrite,
occ,carbonaceous,
and Shale,grey-
green,very silty-
Tr of limestone
(1-2% $CaCo_3$)

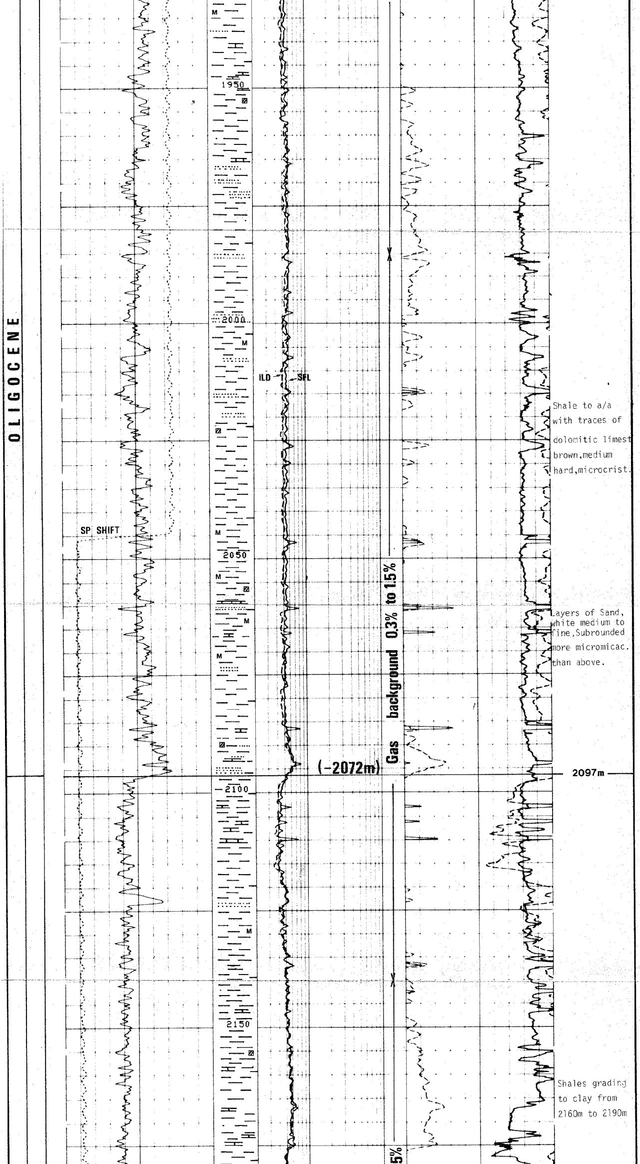
—1608m
Traces to 5% of
Limestone,light-
grey,microcrist.



Shale a/a and 5% of Sandy limest. white, medium hard, to friable.

Traces of dolom. brown, microcrist and stringers of Limestone white, medium hard.

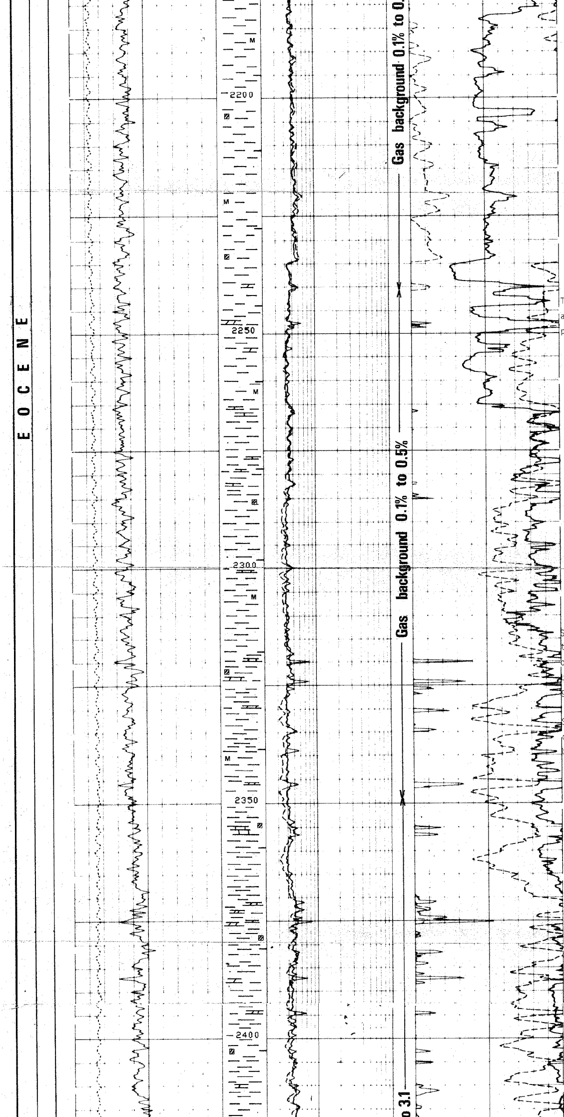
Shale a/a and few Sand, white to fine, subrnd.



Shale to a/a with traces of dolomitic limest brown,medium hard,microcrist.

Layers of Sand, white medium to fine,Subrounded more micromicac. than above.

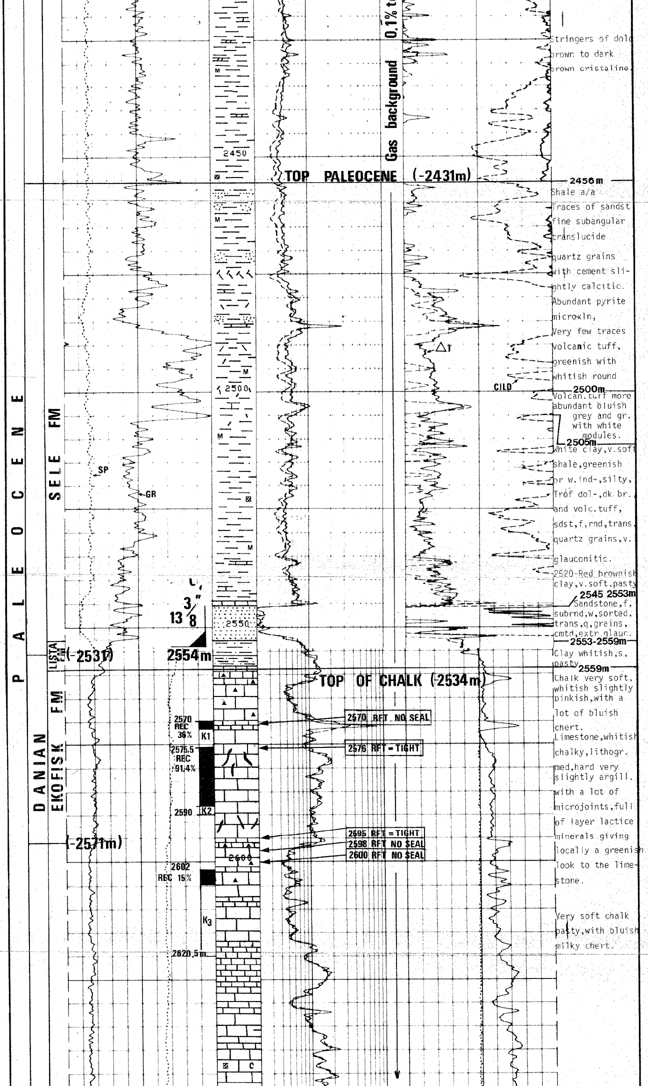
Shales grading to clay from 2160m to 2190m



Tr of calcite and Sand a/a and pyrite.

Shale a/a grey to greenish grey often well comp. but sometimes grading to clay.

Stringers of dolomite light brown,microcrist



Stringers of dolo brown to dark brown cristaline.

2456m

Shale a/a

Traces of sandst fine subangular translucide quartz grains with cement slightly calcitic.

Abundant pyrite microxln,

Very few traces volcanic tuff, greenish with whitish round

2500m

Volcan.tuff more abundant bluish grey and gr. with white modules.

2505m

White clay,v.soft shale,greenish or w.ind-,silty, Trof dol-,dk br. and volc.tuff, sdst,f,rnd,trans quartz grains,v. glauconitic.

2520-Red brownish clay,v.soft,pasty

2545 2553m

Sandstone,f, subrnd,w,sorted, trans,q,grains, cmtd,extr.glauc.

2553-2559m

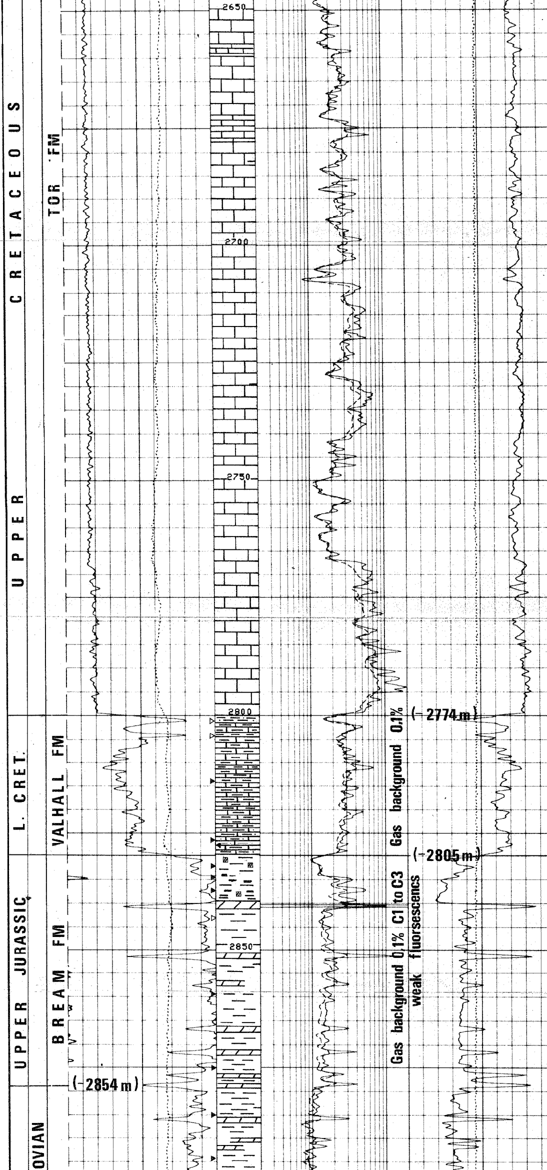
Clay whitish,s, pasty

2559m

Chalk very soft, whitish slightly pinkish,with a lot of bluish chert.

Limestone,whitish chalky,lithogr. med,hard very slightly argill. with a lot of microjoints,full of layer lactice minerals giving locally a greenish look to the limestone.

Very soft chalk pasty,with bluish milky chert.



Chalky Limestone whitish, very slightly argill. with stylolitic joints.
Traces of pyrite and calcite.

Limestone becoming less chalky and harder.

Limestone whitish tan, very clean, locally chalky, soft to med hard locally contain small quartz grains, hard.

Traces of pyrite and green shales (in tectonic-joints)

2799m

Alternations of Marl and shale, greenish grey to pinkish brown calcareous, med. indurated, and limestone, white, med, hd to chalky

Limestone, white, med, hard to chal chalky and marl to shale, grey-green, rdish brn.

2830m

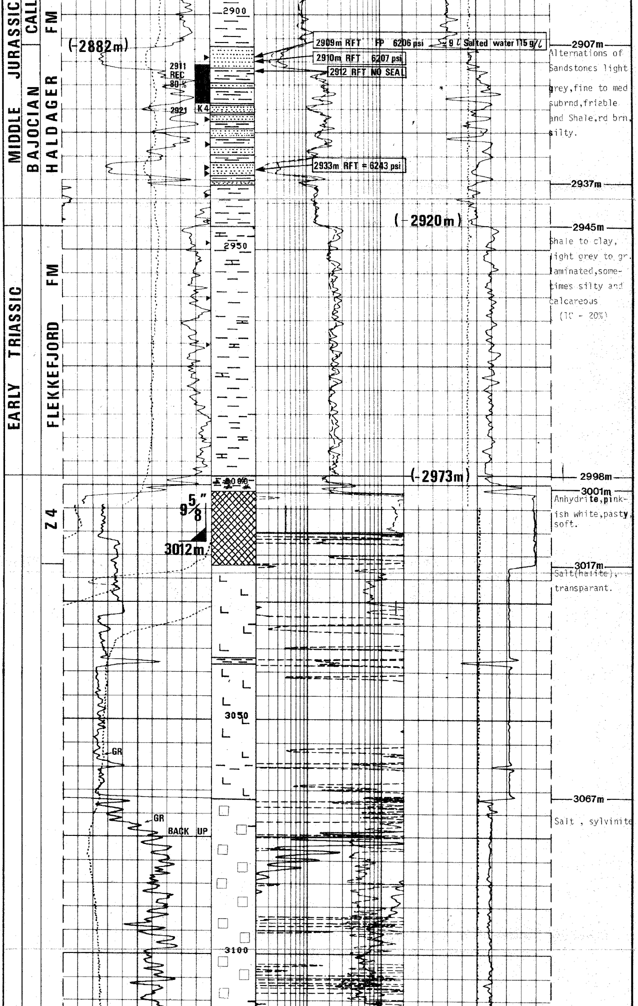
to light, brn

Black shales, greenish grey to black, slightly,

2840m

calcareous with **lamination** of pyrite and prob. coal.

Shale light grey lamina-ted, silty and metric intercalation of dolomite, grey, hard, well compac-cted.



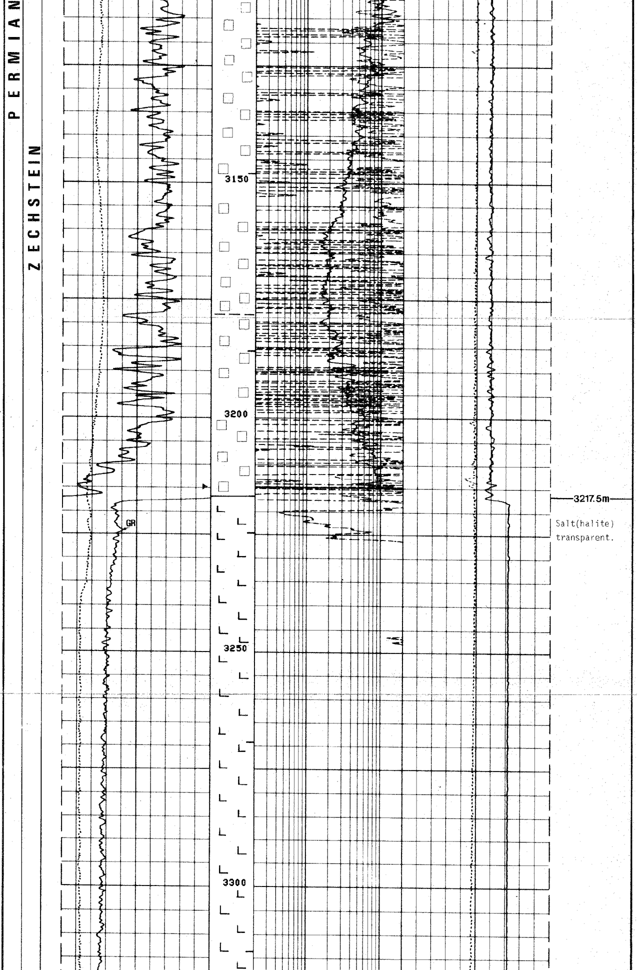
2907m Alternations of Sandstones light grey, fine to med subrnd, friable and Shale, rd brn, silty.

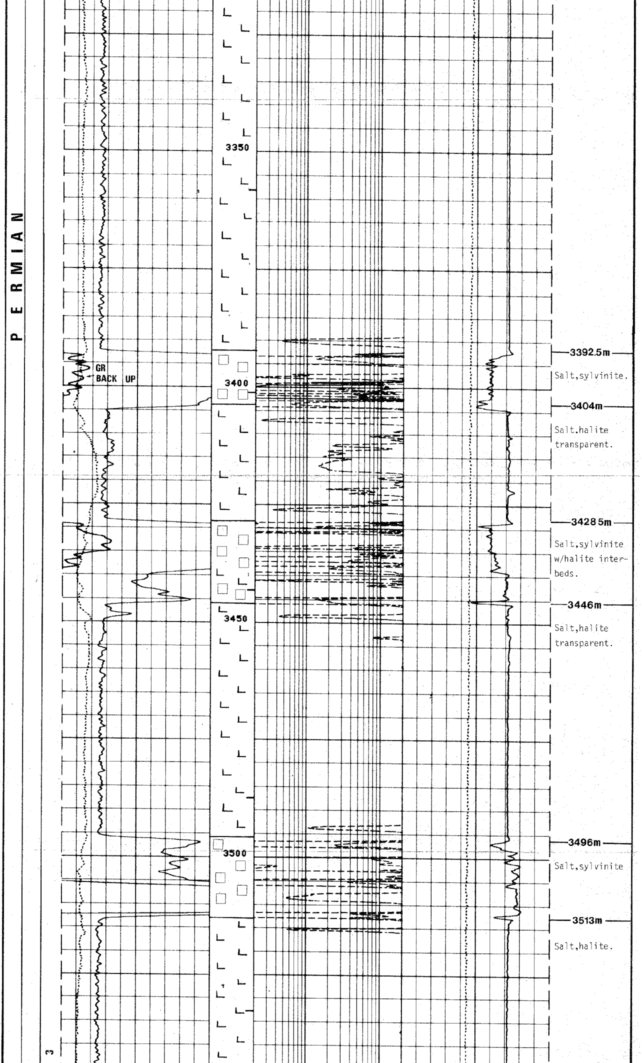
2945m Shale to clay, light grey to gr. laminated, sometimes silty and calcareous (10 - 20%)

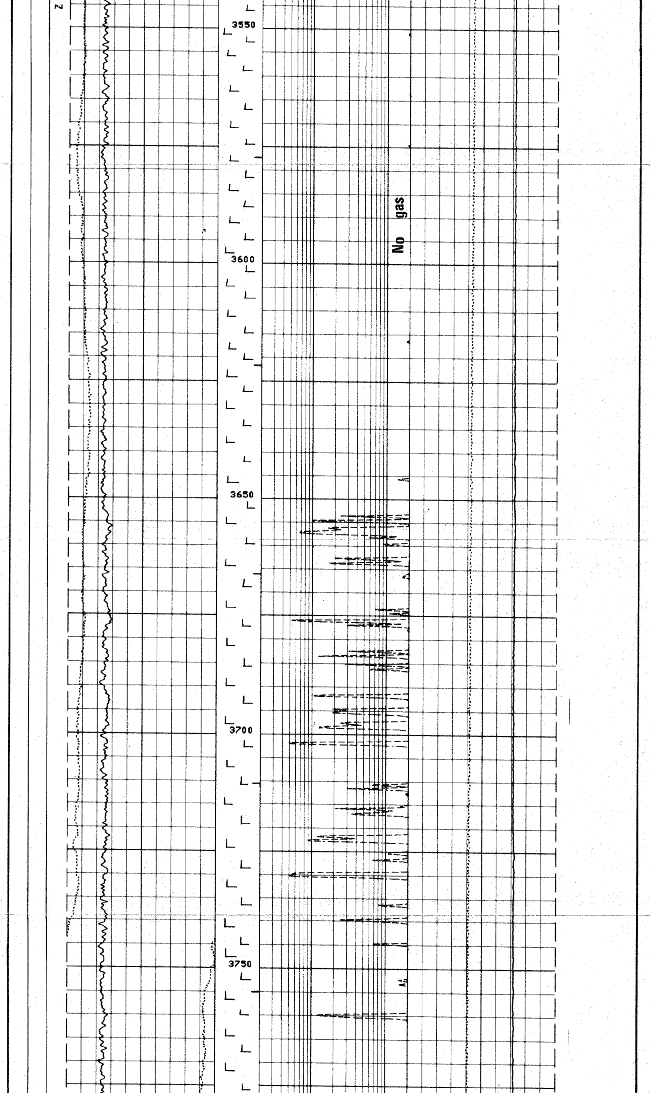
3001m Anhydrite, pinkish white, pasty, soft.

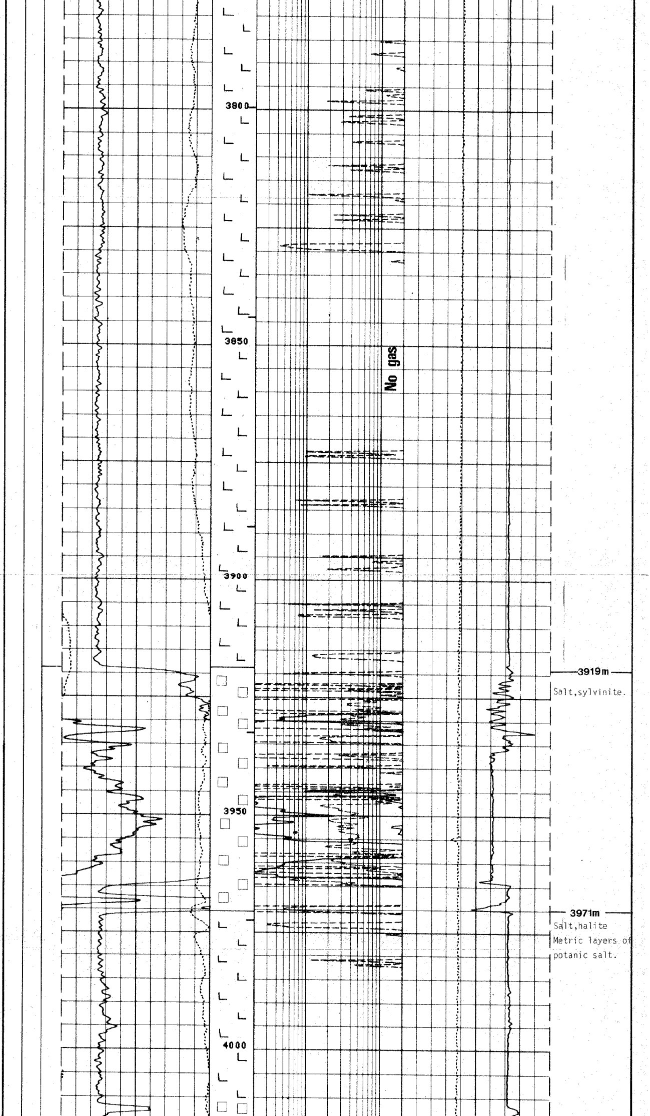
3017m Salt (halite), transparant.

3067m Salt, sylvinite









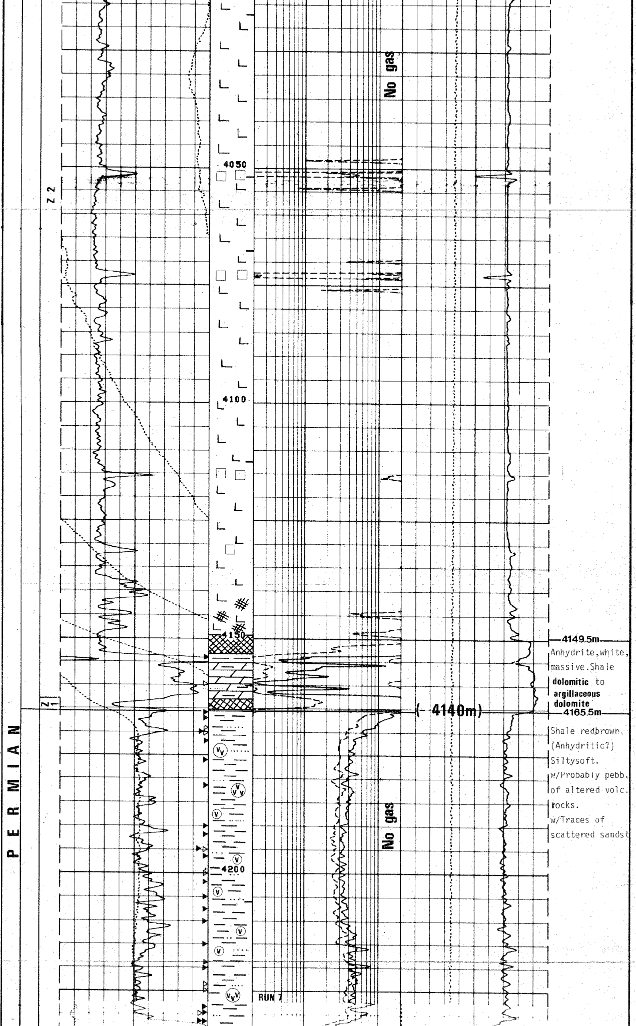
3919m

Salt,sylvinite.

3971m

Salt,halite

Metric layers of potanic salt.

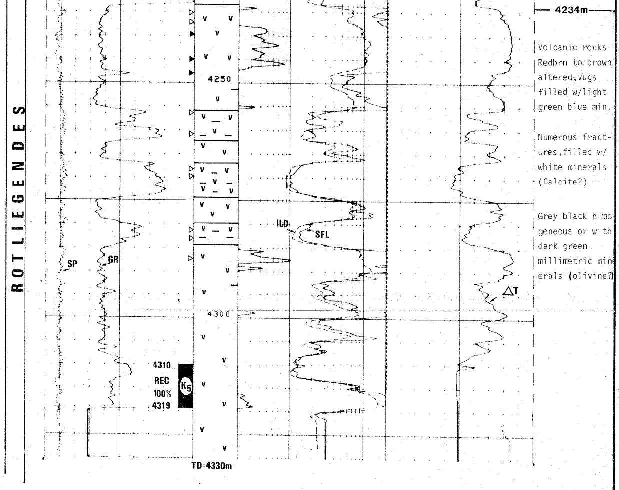


4149.5m

Anhydrite,white, massive.Shale **dolomitic** to **argillaceous dolomite**

4165.5m

Shale redbrown. (Anhydritic?) Siltysoft. w/Probably pebb. of altered volc. rocks. w/Traces of scattered sandst



3/7-2 : LOGGING

	ISF/SONIC/GR		FDC/GR/CAL		HDT		CBL
1	773 - 148	1	772 - 148(no CNL)	1	2560 - 1732	1	2551 - 300
2	2562 - 1800m	2	2562 - 753	2	3026.5 2554	2	3012 - 2300
3	1850 - 754m	3	3026 - 2553 (b)	3	4293 - 3010.5		
4	3027 - 2554m (a)	4	4243.5 3011 (b)				
5	4000 - 3001m (c)	5	4301 - 4122 (b)				NGS
6	4244 - 3010,5(a)					1	
7	4324 - 4023 (a)					2	4244 - 3010
(a) (c)	NGT Instead of GR BHC/GR	(b)	LDL/CNL/GR/CAL.				RFT.9 Shots.

RFT : 9 SHOTS WERE ATTEMPTED

DEPTH	HYDROSTATIC PRESSURE	FORMATION PRESSURE	GRADIENT	
2570m	5630 PSI	NO SEAL		
2576m	5639 "	TIGHT		
2595m	5680 "	"		
2598m	5690 "	NO SEAL		
2600m	5681 "	"		
2909m	6366 "	6206 PSI/436.34 Kg/cm^2	1.51	SAMPLING: RECOVERED 9liters OF WATER ((SALINITY:115 G/CC)
2910m	6352 "	62071 PSI/436.4 Kg/cm^2	1.51	
2912m	6348 "	NO SEAL		
2933m	6390 "	6243 PSI/438.9 Kg/cm^2	1.51	

CORING :

CORE # 1	2570 - 2575.5m	RECOVERED 2m OF 5.5m(**36%**) CHALKY,WITTISH TO TAN,MEDIUM HARD W/ARGILLACEOUS PEBBLES.
CORE # 2	2575.5 2590m	RECOVERED **13.25** OF 14.5m (**91.4%**) CHALKY LIMESTONE,WITTISH TO CREAM, MEDIUM HARD, NO SHOW.
CORE # 3	2602 - 2620.5	RECOVERED 2.8m OF 18.5 (15 %) LIMESTONE WITTISH,CHALKY, W/NUMEROUS HYLOLITES, NO SHOW.
CORE # 4	2911 - 2921m	RECOVERED 8m OF 10m (80%) ALTERNATING SHALE DARK GREY,TO BLACK, MICROPYRITIC. SHALE,LIGHT GREY SOFT,SILTSTONE AND SANDSTONE, WHITE GREY,CLEAR, FINE TO MEDIUM POORLY SORTED,POORLY. NO SHOW.
CORE # 5	4310 - 4319m	RECOVERED 9m OF 9m, VOLCANIC ROCKS-BASALTIC FACIES-ALTERED RED BROWN AND BLACK DARK GREY HOMOGENEOUS W/VUGS FILLED W/SEVERAL MINERALS.

elf aquitaine

Norway

DIRECTION GENERALE DES PRODUCTIONS

DIRECTION EXPLORATION

C.Palacios
c.7527

PL.1

- 3/7-2 -

ORGANIC MATTER
PETROLOGY

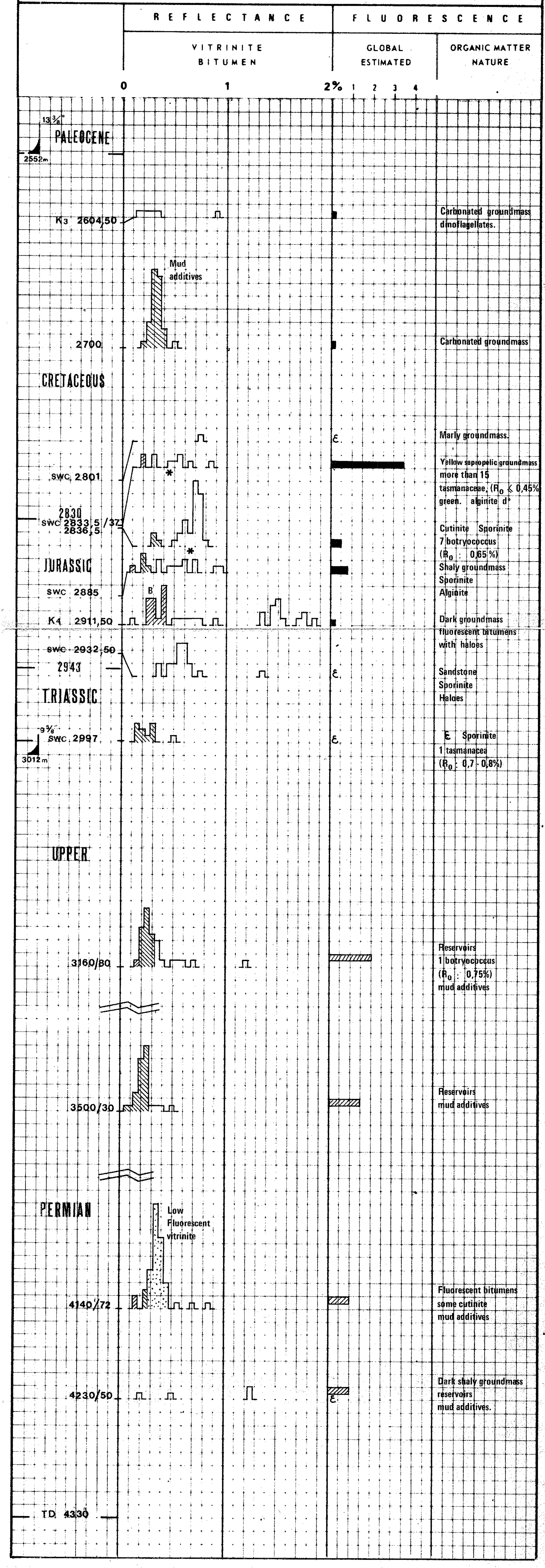
REFLECTANCE
(measurements)

☐ Vitrinite
▨ Bitumens
░ Fluorescent vitrinit

FLUORESCENCE
(global amount estimated)

* : R_o equivalent

■ Fluorescent macerals
▨ Hydrocarbon traces in reservoirs
▧ Mud products



Carbonated groundmass
dinoflagellates.

Carbonated groundmass

Marly groundmass.

Yellow sapropelic groundmass
more than 15
tasmanaceae, ($R_o \leqslant 0,45\%$
green. alginite d°

Cutinite Sporinite
7 botryococcus
(R_o : 0,65 %)
Shaly groundmass
Sporinite
Alginite

Dark groundmass
fluorescent bitumens
with haloes

Sandstone
Sporinite
Haloes

ε Sporinite
1 tasmanacea
(R_o : 0,7 - 0,8%)

Reservoirs
1 botryococcus
(R_o : 0,75%)
mud additives

Reservoirs
mud additives

Fluorescent bitumens
some cutinite
mud additives

Dark shaly groundmass
reservoirs
mud additives.

Plate: 2

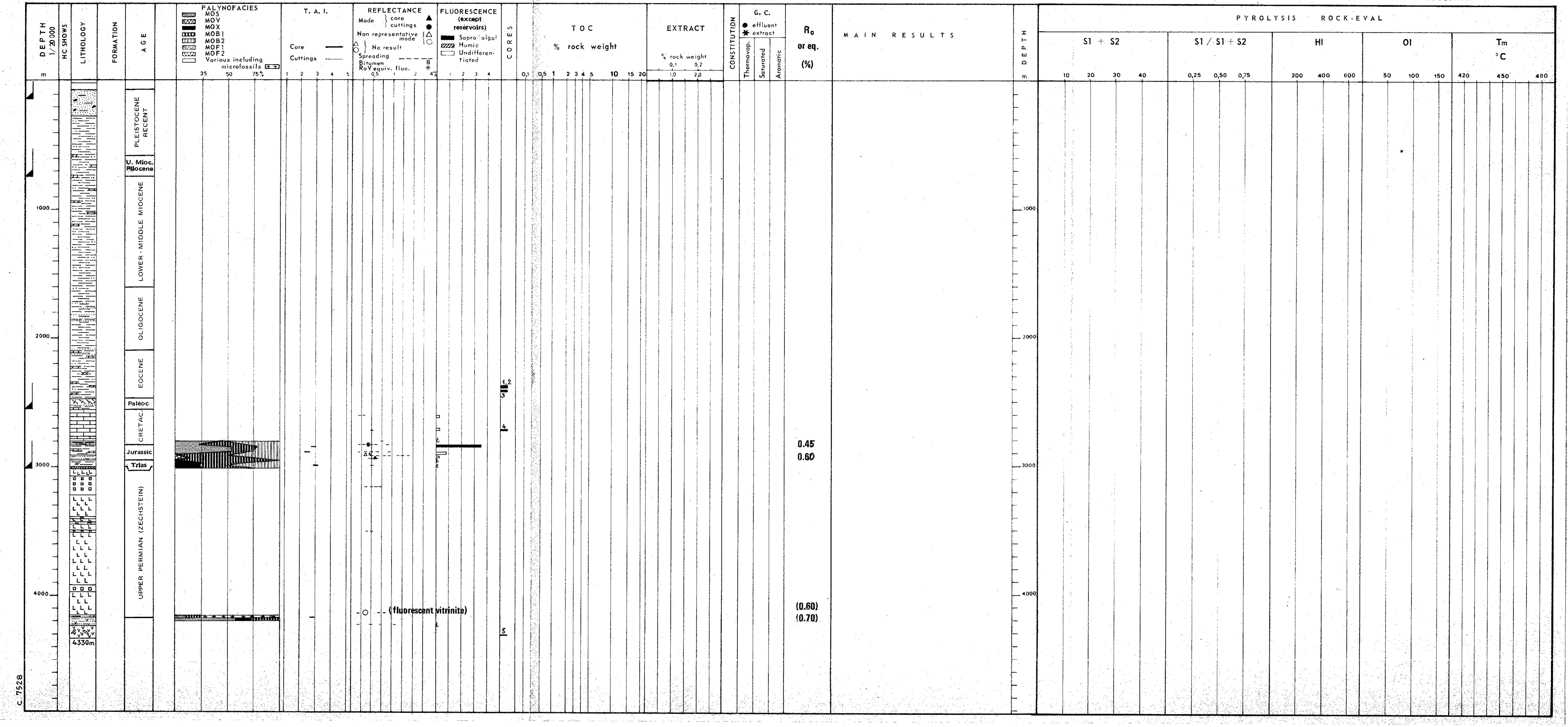
ORGANIC MATTER STUDY

SYNTHESIS OF RESULTS

WELL : 3/7-2
COUNTRY : NORVEGE

DATE JUILLET 1982

SNEA(P)
DEPARTEMENT LABORATOIRE DE GEOLOGIE
DE BOUSSENS



LINE 73-80

PL.2.

Line No 73 - 80
SP's 1 Through 832
Prospect NORWEGIAN WATERS
Location NORTH SEA
Datum SEA LEVEL

AMOCO NORWAY

PROCESSED BY
GEOCOM
LONDON

RECORDED BY
GECO

FIELD RECORDING DATA
Recorded ☐ Analog ■ Digital
Energy Source ☐ Explosives ■ AIRGUN
Instrument Series DFS IV
Sweep ____ to ____ Length ____ Sec
Type Amplitude Control ☐ AGC ☐ Ganged AGC ☐ Binary gain
Sample Rate 4 ms Length 6.0 Sec ☐ Program Gain
Recording Filter 4 to 62 Hz

CABLE LAYOUT & LINE DIAGRAM
250 2400
SP 48 1
SP832
W E
N S
SP1
Traces Recorded 48
Geophones/Trace 30
SP Interval 50m
Group Interval 50 m

DIGITAL PROCESSING DATA
FINAL STACK DBS, DAS

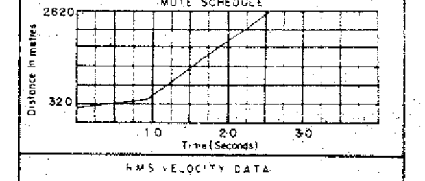
____ Analog Input SR ____ ms
1 Digital Input SR 4 ms
____ Vertical Stack ____ Sums/S.P.
____ VIBROSEIS* Correlation
____ Elev. Statics Ve : ____ ft/Sec
____ Velocity Analysis
____ Auto Trim Statics (Window) ____ to ____ Sec
____ Single Coverage Processing
5 Common Reflection Point Stacking 2400 %
8 Trace Equalization Gate 600 ms
____ Digital Migration
7 Digital Frequency Filtering
☐ Band Pass Operator Length ____ ms
☐ Time - varying DYNAFIL

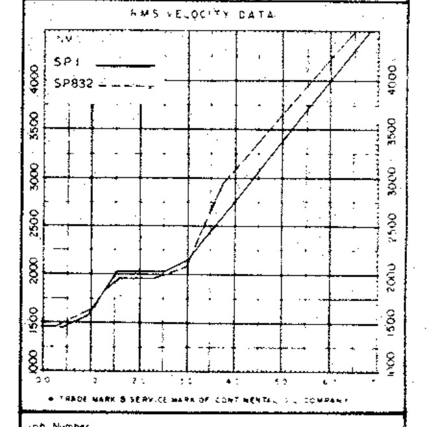
Frequency
Record Time (Seconds)

3 Deconvolution ☐ Time-varying Operator Length 80 ms
Tr 48

2 Additional Processing, STATIC CORRECTION FOR CABLE AND AIRGUN DEPTH
6 DECONVOLUTION AFTER STACK 240ms OPERATOR 2 GATES

DISPLAY DATA
Date APRIL 1974 Horizontal Scale 8 Traces/cm
Vertical Scale 10 cm/Sec





* TRADE MARK & SERVICE MARK OF CONTINENTAL OIL COMPANY

Job Number ____
Final Quality Control Check By ____

LINE ANO 78-50
S.P. 1 TO 1247
FILTERED STACK

PL.3.

LINE ANO 78-50
S.P. 1 TO 420

AMOCO

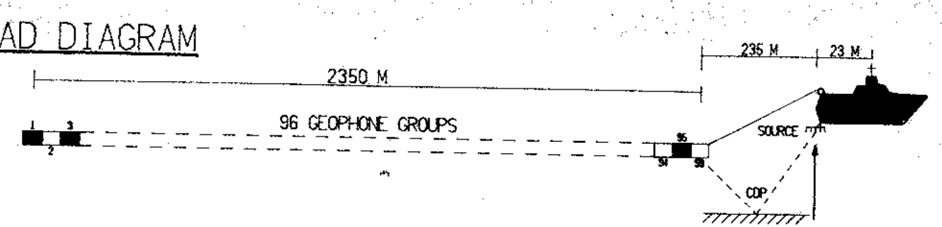
139 DEGREES → ← DIRECTION SHOT

FILTERED STACK

FIELD DATA

DATA SHOT BY	- G.S.I. M.V.JONSSON
DATE SHOT	- JULY TO AUGUST 1978
RECORDING INSTRUMENTS	- DFS V
RECORDING FILTERS	- HIGH FILTER AND SLOPE 64 HZ 128 DB/OCT LOW FILTER AND SLOPE 8 HZ 18 DB/OCT
RECORDING POLARITY	- A POSITIVE PRESSURE AT THE GEOPHONE PRODUCES A NEGATIVE NUMBER ON TAPE AND A DOWNWARD DEFLECTION ON THE FIELD MONITOR RECORD.
DIGITAL TAPE FORMAT	- SEG B
RECORD LENGTH / SAMPLE RATE	- 7 SECONDS AT 4 MILLISECOND SAMPLE RATE
ENERGY SOURCE	- AIRGUN 2000 CU.IN.
GUN DELAY	- 51 MILLISECONDS
GUN DEPTH	- 7 METRES AVERAGE
NUMBER OF GUNS	- 36
GUN TO ANTENNA DISTANCE	- 23 METRES
SHOTPOINT INTERVAL	- 25 METRES. 1 POP PER SHOTPOINT
SHOTPOINT ANNOTATION	- SHOTPOINTS ANNOTATED AT GUN POSITION
CABLE LENGTH	- 2400 METRE. 96 GROUPS
CABLE DEPTH	- 11 METRES AVERAGE
OFFSET TO NEAR GROUP	- 235 METRES
COVERAGE	- 48 FOLD. 96 TRACE
PRIMARY NAVIGATION SYSTEM	- ARGO
BACKUP NAVIGATION SYSTEM	- GEONAV

SPREAD DIAGRAM



DIGITAL PROCESSING

POLARITY CONVENTION	- THE POLARITY OF THE FIELD RECORDING WAS MAINTAINED THROUGHOUT THE PROCESSING AND DISPLAY
RECORD LENGTH	- 7.0 SECONDS
SAMPLE RATE	- 4 MILLISECONDS
ADJACENT TRACE SUM	
STATIC CORRECTIONS	- SHOT AND STREAMER STATIC AIRGUN DELAY 51 MILLISECONDS
TRUE AMPLITUDE RECOVERY	- 6.0 DB PER SECOND FROM 0-5.0 SECONDS SPHERICAL DIVERGENCE CORRECTIONS APPLIED
DESIGNATURE	
DECONVOLUTION	- 1X176 MSEC FILTER WITH 2ND ZERO CROSSING DESIGN GATES (25 PERCENT OVERLAP) TR1 2300-6000 MSEC TR48 300-6000
TIME VARIANT SCALING	- USING 2000 MSEC GATES
VELOCITY INTERPRETATION	- USING 7 DEPTH POINT VELPACS
NORMAL MOVEOUT CORRECTIONS	- USING ANNOTATED VELOCITIES
FIRST BREAK SUPPRESSION	- SEE TAPER ON
COMMON DEPTH POINT STACK	- 48 FOLD CDP STACK
DECONVOLUTION	- 2X200 MSEC FILTER WITH 32 MSEC GAP DESIGN GATE 300-6000 MSEC (GATES OVERLAP BY 25 PERCENT)
TIME VARIANT FILTERING	- FREQUENCY (HZ) TIME (MSECS)

FREQUENCY (HZ)	TIME (MSECS)
15 - 50	1000
10 - 50	1500
10 - 50	UNCONFORMITY -250 MSEC
10 - 40	FOLLOWING UNCONFORMITY
8 - 30	UNCONFORMITY +250 MSEC
8 - 30	7000

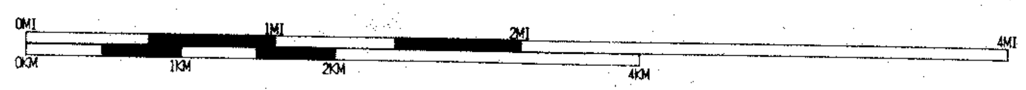
TIME VARIANT SCALING	- USING 4 GATES OF 500 THEN 1500 MSEC STARTING AT 100 MSEC

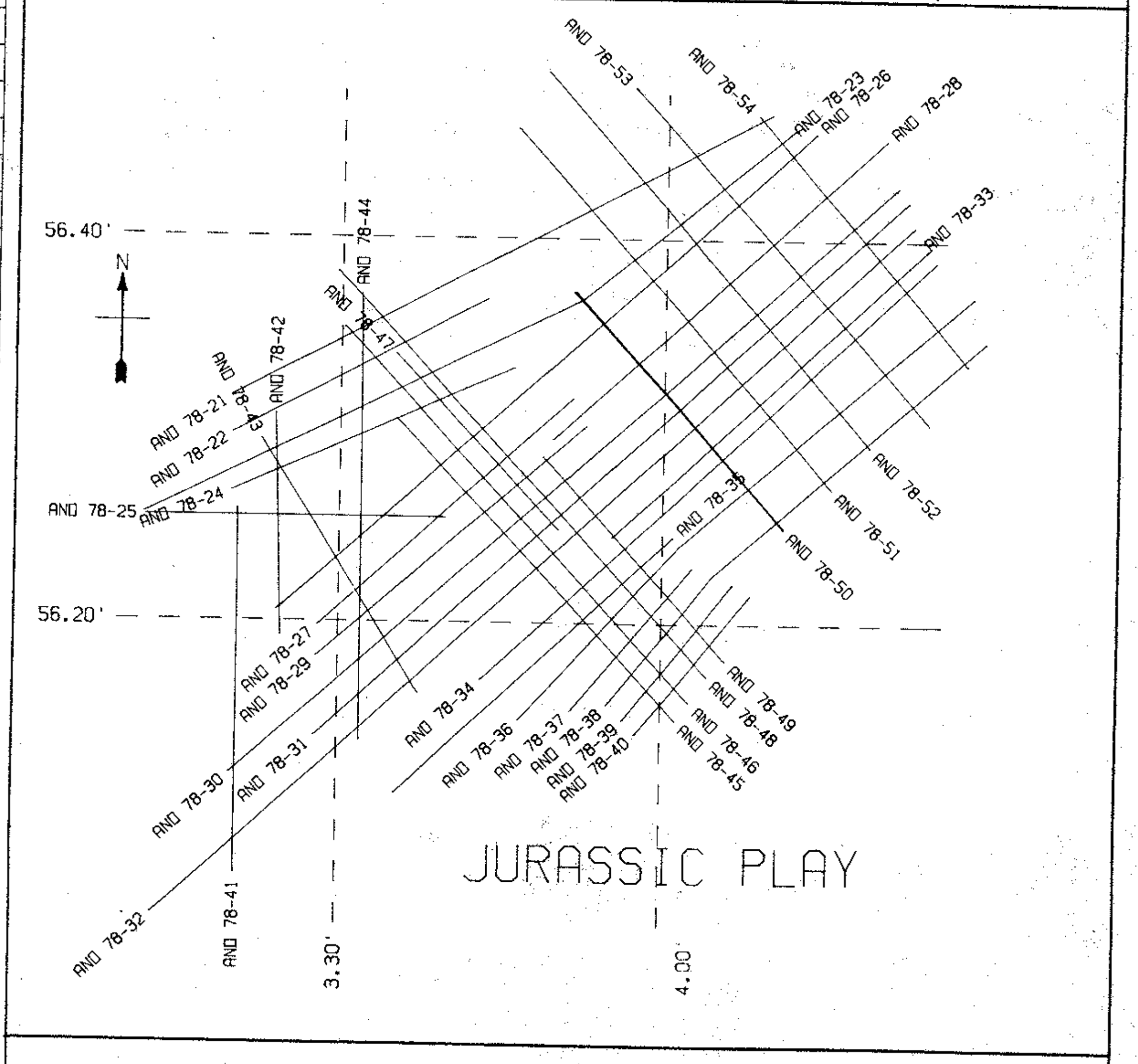
DISPLAY

HORIZONTAL SCALE	- 20.0 TR/CM 40.0 TR/KM
VERTICAL SCALE	- 5.0 CM / SEC
POLARITY	- NORMAL
TRACE TYPE , BIAS	- WTVAR , 10.0 PERCENT
DATUM	- SEA LEVEL
DISPLAY UNIT	- 0.507905 CM

DISPLAY GAIN

INPUT	
CDP	ALL
GAIN DB	TIME MSEC
-83.0	0





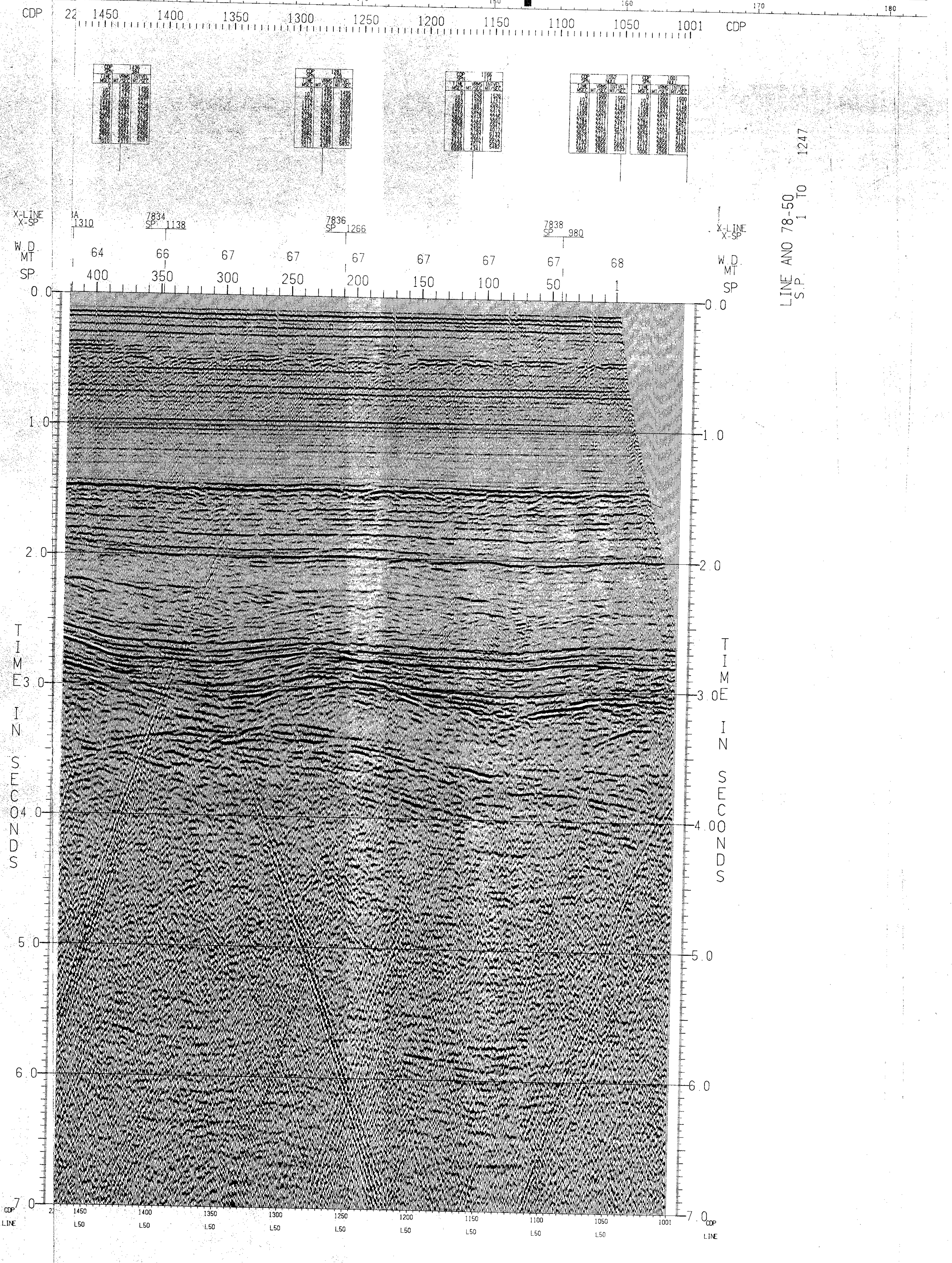
JURASSIC PLAY

31 DEC 1978
16:46:29

PARTY 6720

GEOPHYSICAL SERVICE INTERNATIONAL
(A DIVISION OF TEXAS INSTRUMENTS LTD)

PROCESSING CHECKED BY -



VSN 616297 BJFTVFB50AAAA031 TVS5249C 0008 FRAME 001 OF TVS5249C 0008 FRAME 002 OF 002

IX 13-B

[redacted]

LINE ANO 78-32
S.P. 910 TO .2100
FILTERED STACK

PL.4.

LINE ANO 78-32
S.P. 910 TO 2100

AMOCO

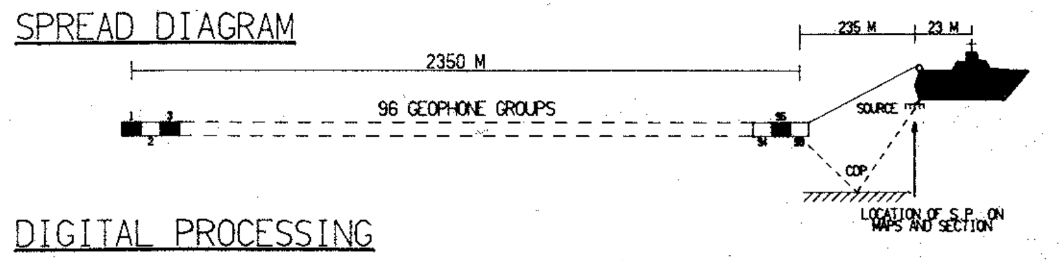
48 DEGREES → ← DIRECTION SHOT

FILTERED STACK

FIELD DATA

DATA SHOT BY	- G.S.I. M.V.JONSSON
DATE SHOT	- JULY TO AUGUST 1978
RECORDING INSTRUMENTS	- DFS V
RECORDING FILTERS	- HIGH FILTER AND SLOPE 64 HZ 128 DB/OCT LOW FILTER AND SLOPE 8 HZ 18 DB/OCT
RECORDING POLARITY	- A POSITIVE PRESSURE AT THE GEOPHONE PRODUCES A NEGATIVE NUMBER ON TAPE AND A DOWNWARD DEFLECTION ON THE FIELD MONITOR RECORD
DIGITAL TAPE FORMAT	- SEG B
RECORD LENGTH / SAMPLE RATE	- 7 SECONDS AT 4 MILLISECOND SAMPLE RATE
ENERGY SOURCE	- AIRGUN 2000 CU.IN.
GUN DELAY	- 51 MILLISECONDS
GUN DEPTH	- 7 METRES AVERAGE
NUMBER OF GUNS	- 36
GUN TO ANTENNA DISTANCE	- 23 METRES
SHOTPOINT INTERVAL	- 25 METRES, 1 POP PER SHOTPOINT
SHOTPOINT ANNOTATION	- SHOTPOINTS ANNOTATED AT GUN POSITION
CABLE LENGTH	- 2400 METRE, 96 GROUPS
CABLE DEPTH	- 11 METRES AVERAGE
OFFSET TO NEAR GROUP	- 235 METRES
COVERAGE	- 48 FOLD, 96 TRACE
PRIMARY NAVIGATION SYSTEM	- ARGO
BACKUP NAVIGATION SYSTEM	- GEONAV

SPREAD DIAGRAM



DIGITAL PROCESSING

POLARITY CONVENTION	- THE POLARITY OF THE FIELD RECORDING WAS MAINTAINED THROUGHOUT THE PROCESSING AND DISPLAY
RECORD LENGTH	- 7.0 SECONDS
SAMPLE RATE	- 4 MILLISECONDS
ADJACENT TRACE SUM	
STATIC CORRECTIONS	- SHOT AND STREAMER STATIC AIRGUN DELAY 51 MILLISECONDS
TRUE AMPLITUDE RECOVERY	- 6.0 DB PER SECOND FROM 0-5.0 SECONDS SPHERICAL DIVERGENCE CORRECTIONS APPLIED
DESIGNATURE	
DECONVOLUTION	- 1X176 MSEC FILTER WITH 2ND ZERO CROSSING DESIGN GATES (25 PERCENT OVERLAP) TR1 2300-6000 MSEC TR48 300-6000
TIME VARIANT SCALING	- USING 2000 MSEC GATES
VELOCITY INTERPRETATION	- USING 7 DEPTH POINT VELPACS
NORMAL MOVEOUT CORRECTIONS	- USING ANNOTATED VELOCITIES
FIRST BREAK SUPPRESSION	- SEE TAPER ON
COMMON DEPTH POINT STACK	- 48 FOLD CDP STACK
DECONVOLUTION	- 2X200 MSEC FILTER WITH 32 MSEC GAP DESIGN GATE 300-6000 MSEC (GATES OVERLAP BY 25 PERCENT)
TIME VARIANT FILTERING	- FREQUENCY (HZ) TIME (MSECS)

FREQUENCY (HZ)	TIME (MSECS)
15 - 50	1000
10 - 50	1500
10 - 50	UNCONFORMITY -250 MSEC
10 - 40	FOLLOWING UNCONFORMITY
8 - 30	UNCONFORMITY +250 MSEC
8 - 30	7000

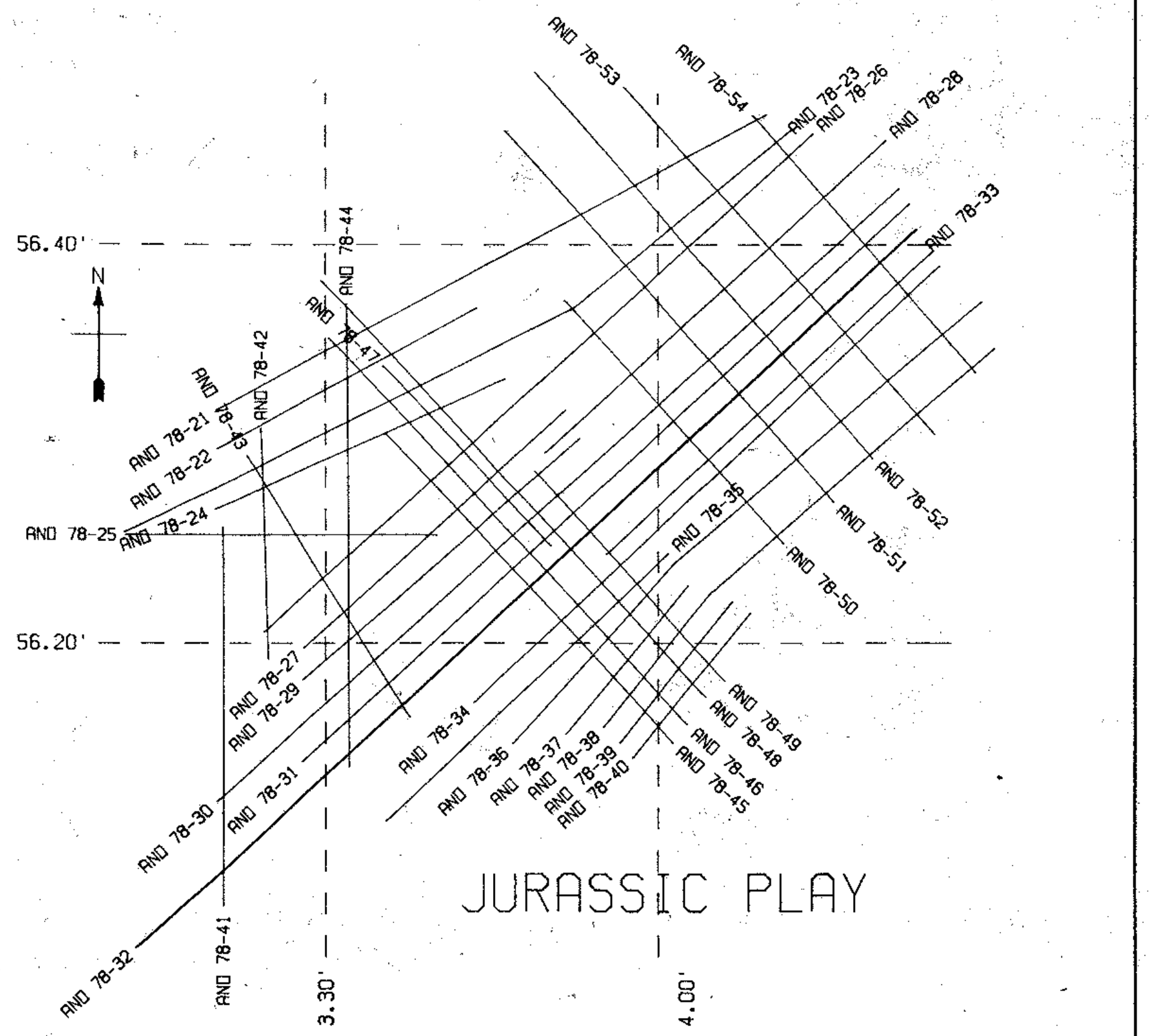
TIME VARIANT SCALING - USING 4 GATES OF 500 THEN 1500 MSEC STARTING AT 100 MSEC

DISPLAY

HORIZONTAL SCALE	- 20.0 TR/CM 40.0 TR/KM
VERTICAL SCALE	- 5.0 CM / SEC
POLARITY	- NORMAL
TRACE TYPE , BIAS	- WTVAR , 10.0 PERCENT
DATUM	- SEA LEVEL
DISPLAY UNIT	- 0.507905 CM

DISPLAY GAIN

INPUT	
CDP	ALL
GAIN DB	TIME MSEC
-83.0	0



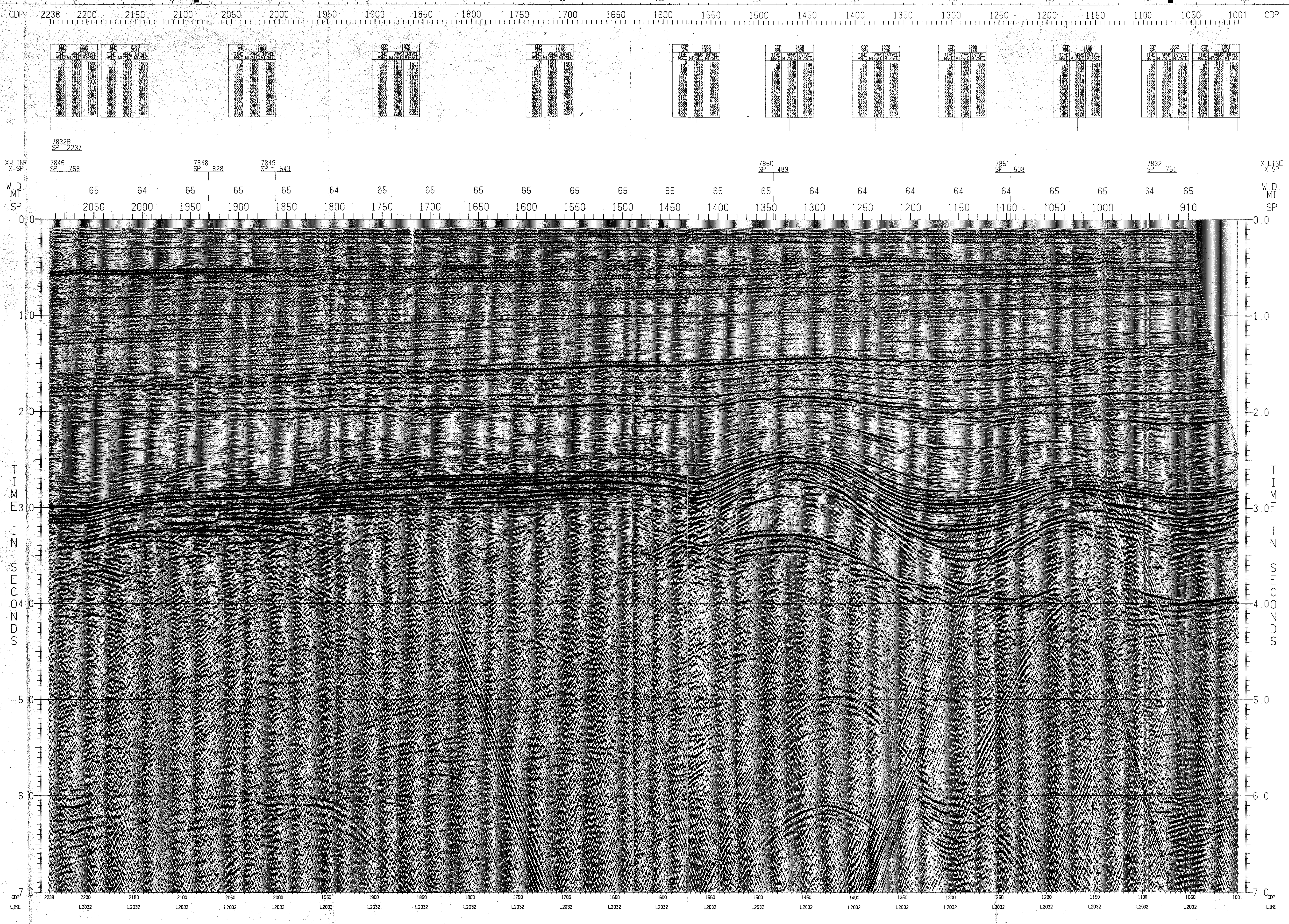
JURASSIC PLAY

31 DEC 1978
16:11:49

PARTY 6720

GEOPHYSICAL SERVICE INTERNATIONAL
(A DIVISION OF TEXAS INSTRUMENTS LTD)

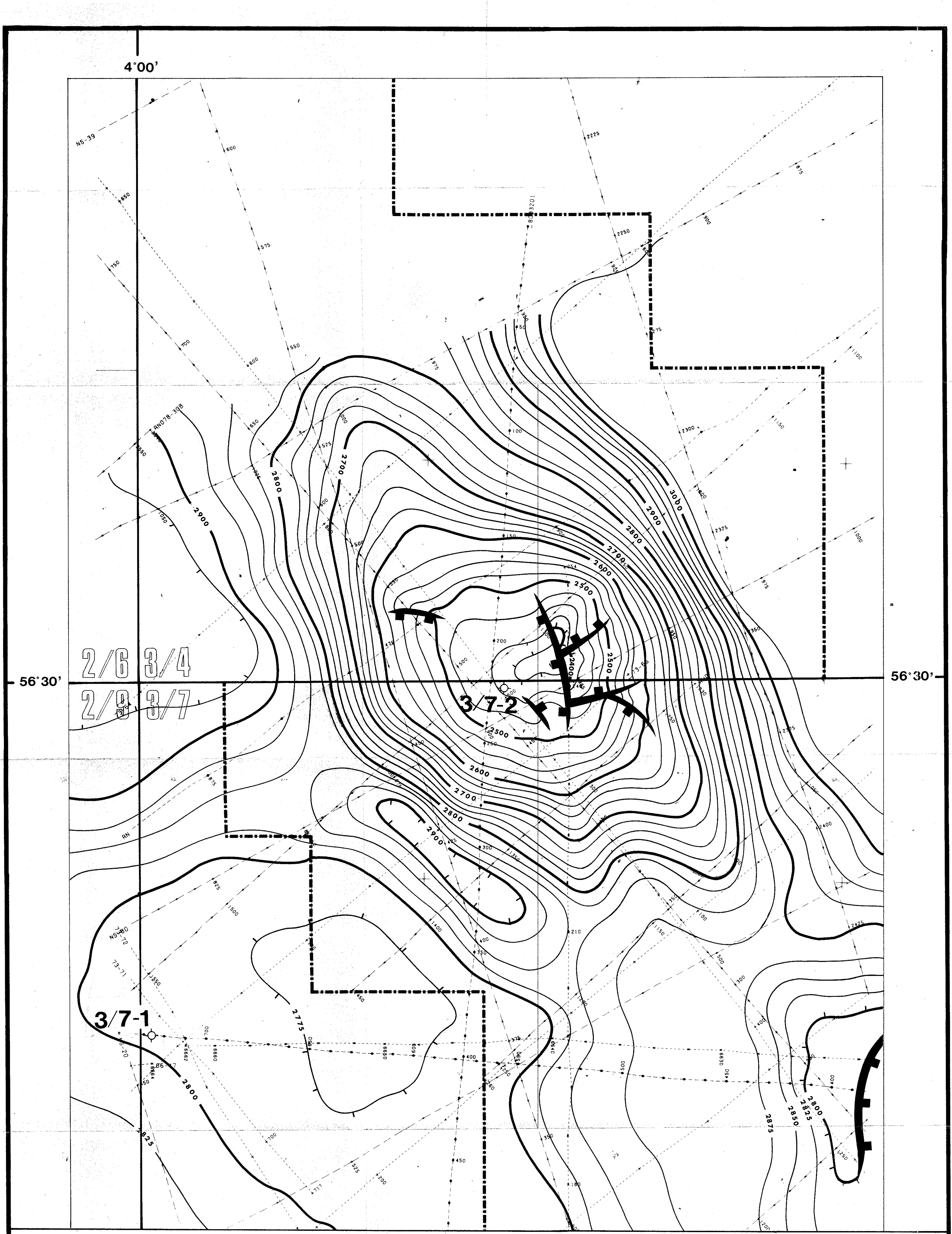
PROCESSING CHECKED BY - J. Harvey.

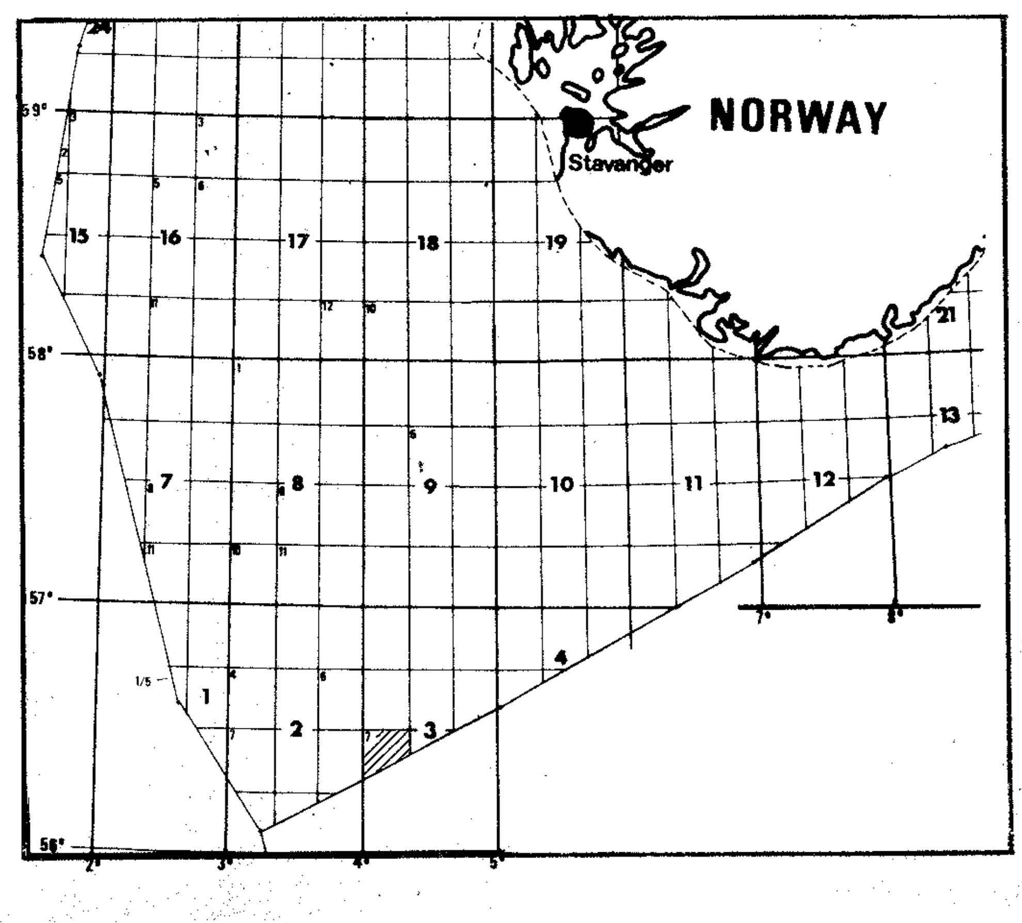


LINE ANO 78-32
S.P. 910 TO 2100

VSN 603610 BJFTVFB2032AA030 TVS5249C 0008 FRAME 001 OF 002

31DEC78 16:15:01 SN 603610 BJFTVFB2032AA030 TVS5249C 0008 FRAME 002 OF 002





Scale 1:25.000

Country: NORWAY OFFSHORE
Operator: ELF AQUITAINE NORGE A/S
Block: 3 / 7

elf aquitaine
norge a/s

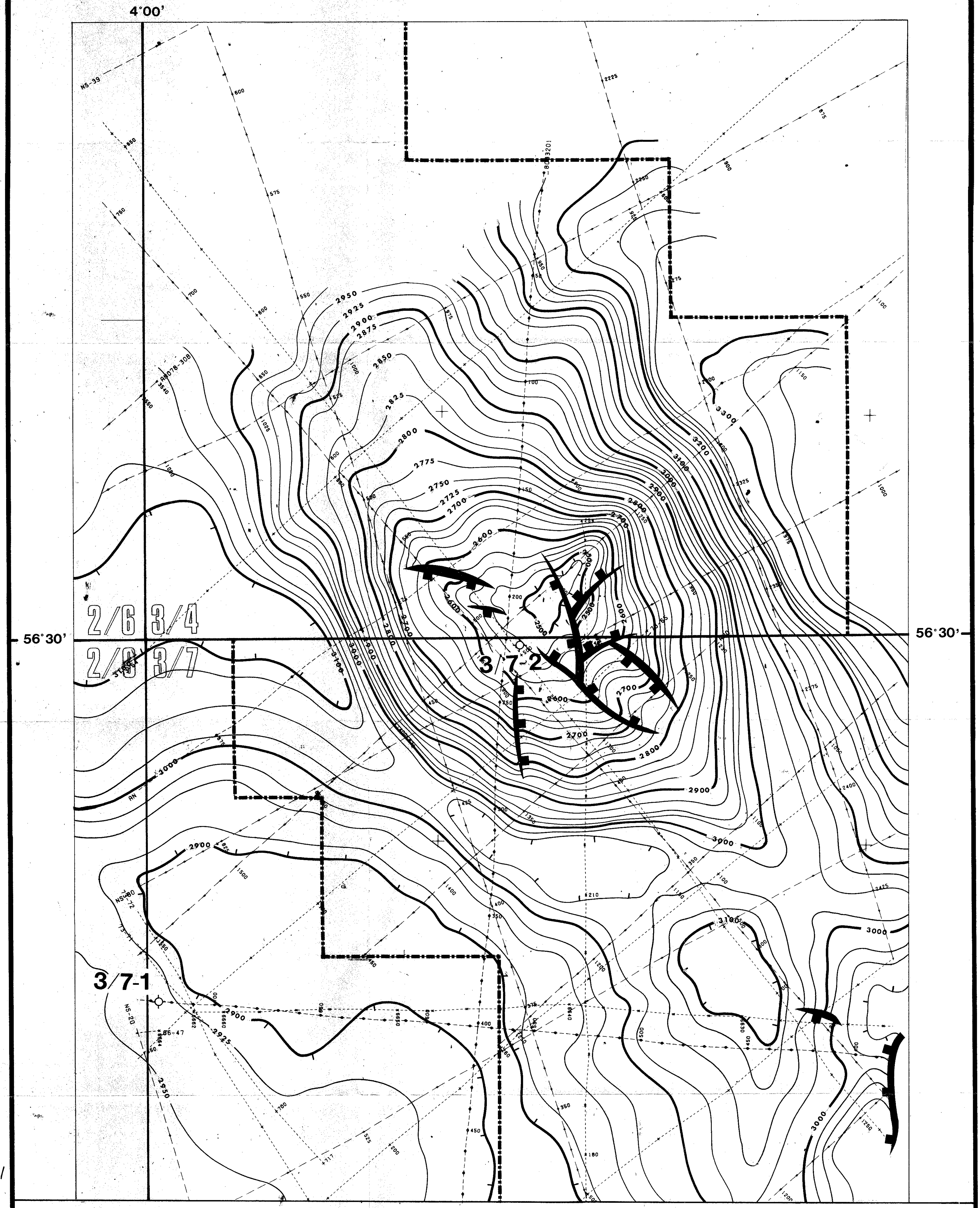
ISOBATH MAP
C1-Horizon

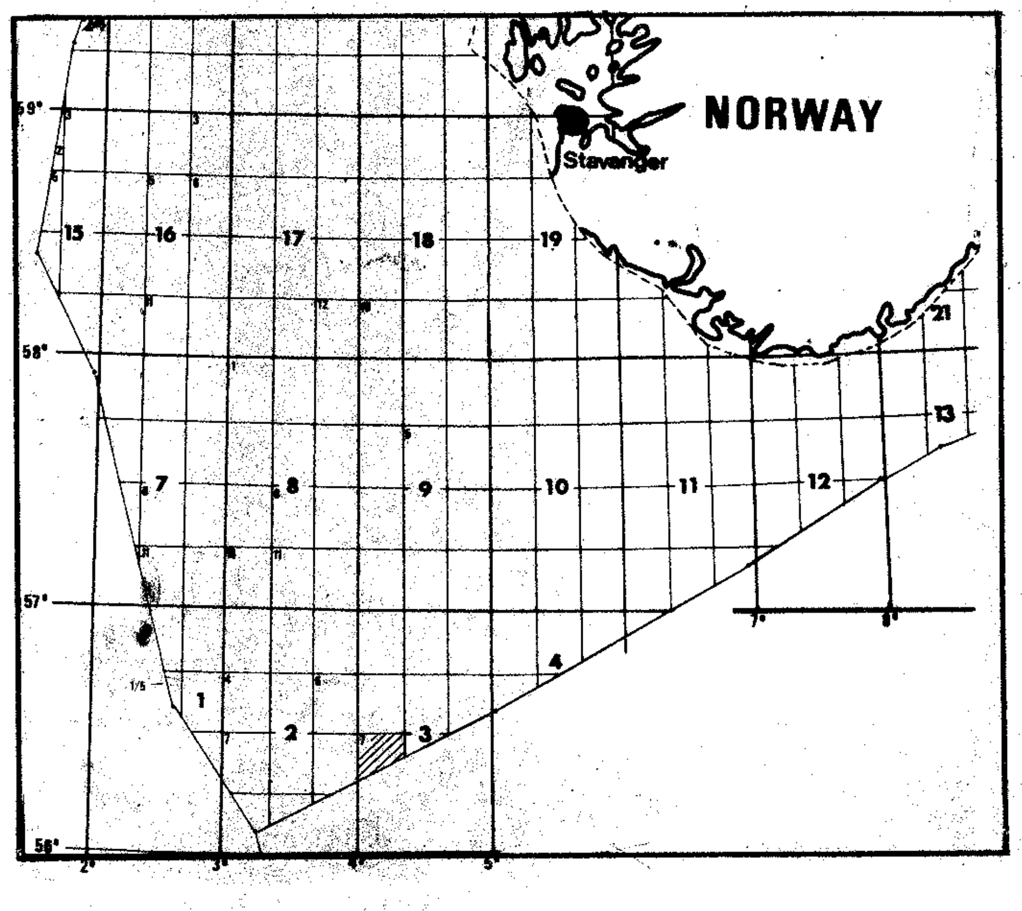
C.I:25m

EXPLORATION DIVISION
Scale: 1:25.000
Drafted by: G.E.O.
Checked by:

PL.5

Date: MARCH -82
Author: K.REVHEIM
File No: 82 022





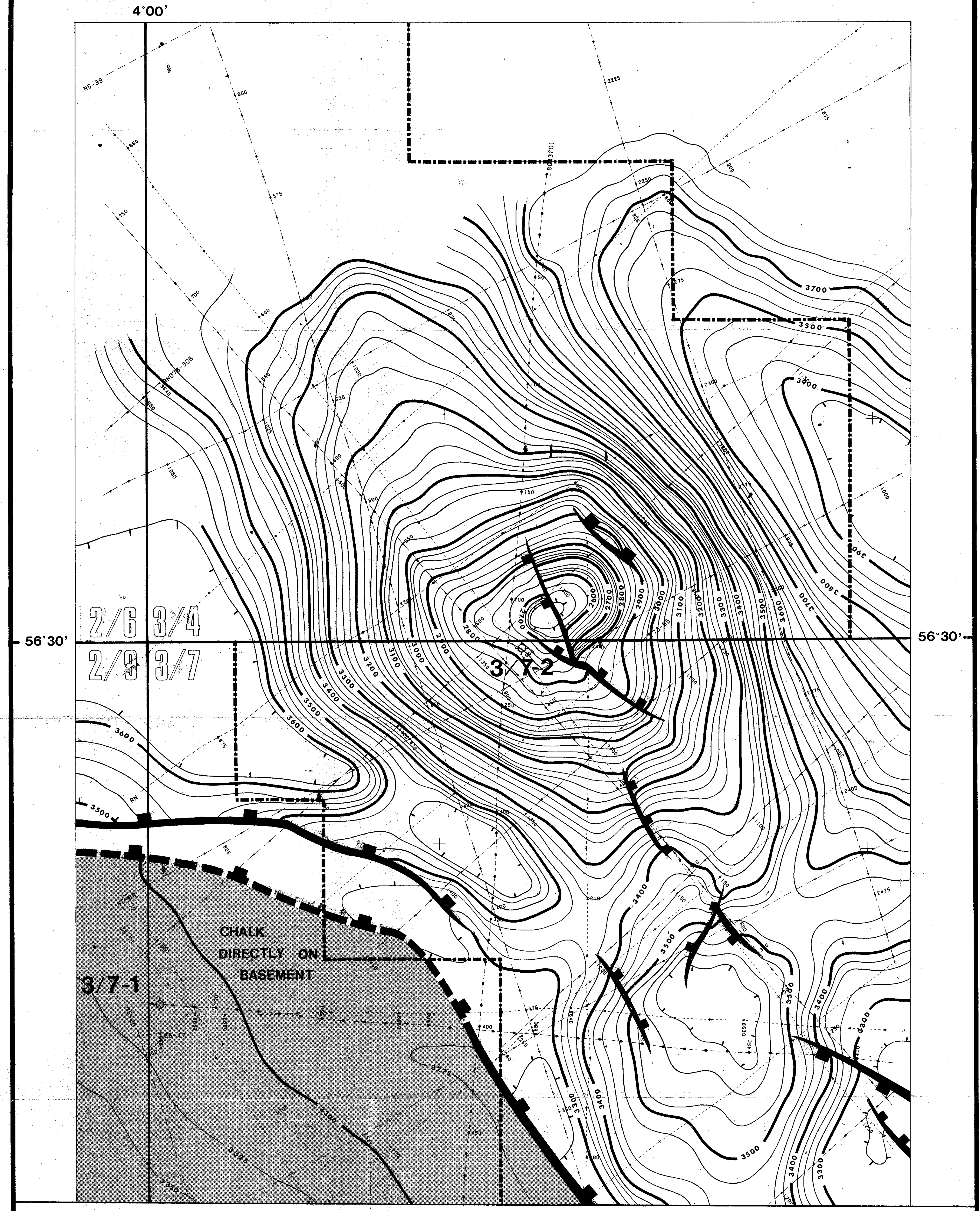
Scale 1:25.000

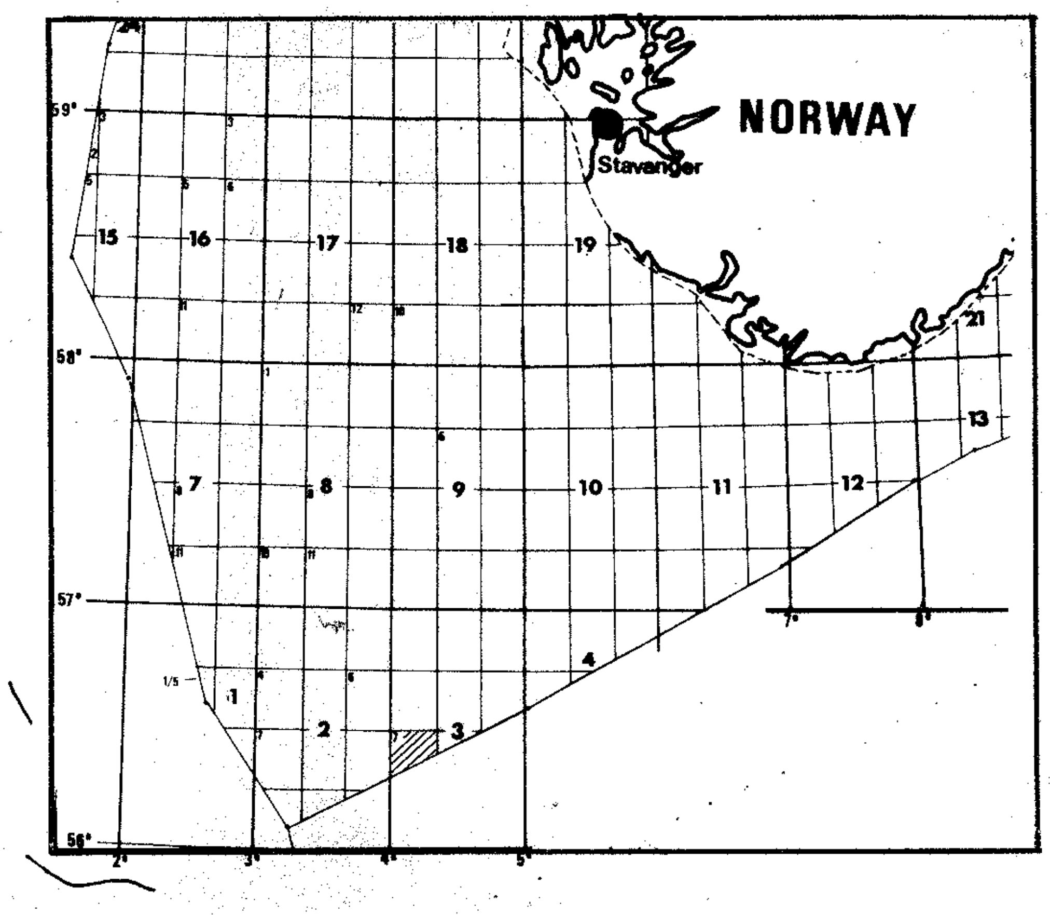
elf	Country: NORWAY OFFSHORE Operator: ELF AQUITAINE NORGE A/S Block: 3 / 7	elf aquitaine norge a/s

ISOBATH MAP
C2 - Horizon

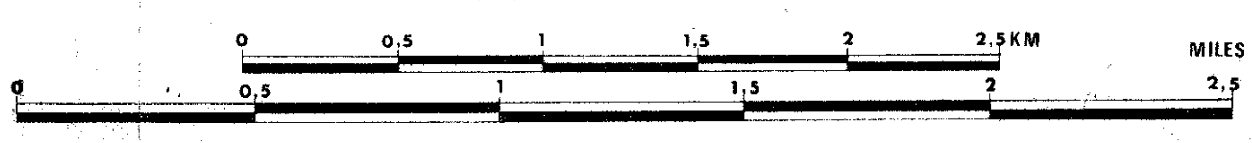
C.I:25m

EXPLORATION DIVISION	PL.6.	Date: MARCH -82
Scale: 1:25.000		Author: K.REVHEIM
Drafted by: G.E.O. Checked by: F.V		File No: 82 021





Scale 1:25.000

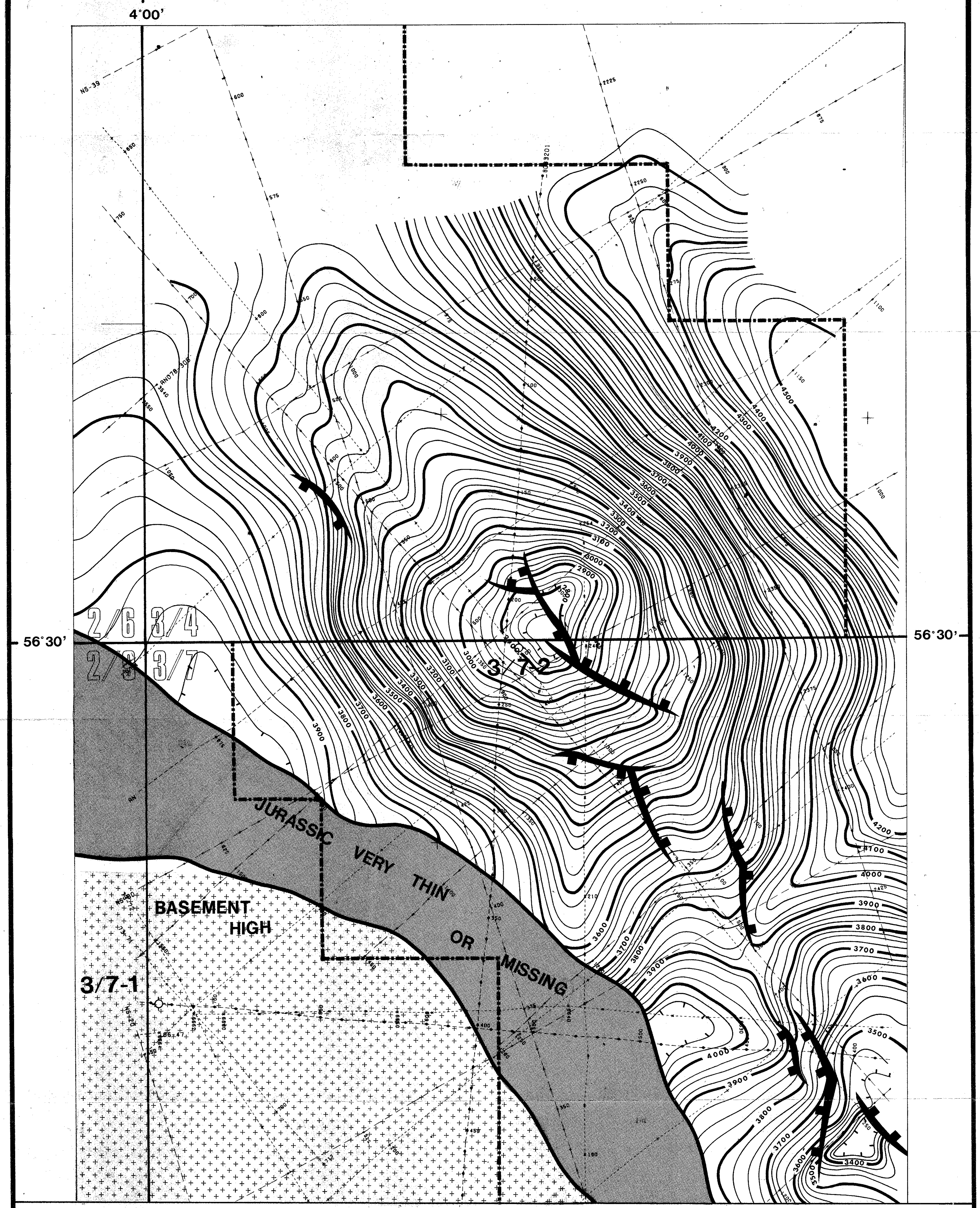


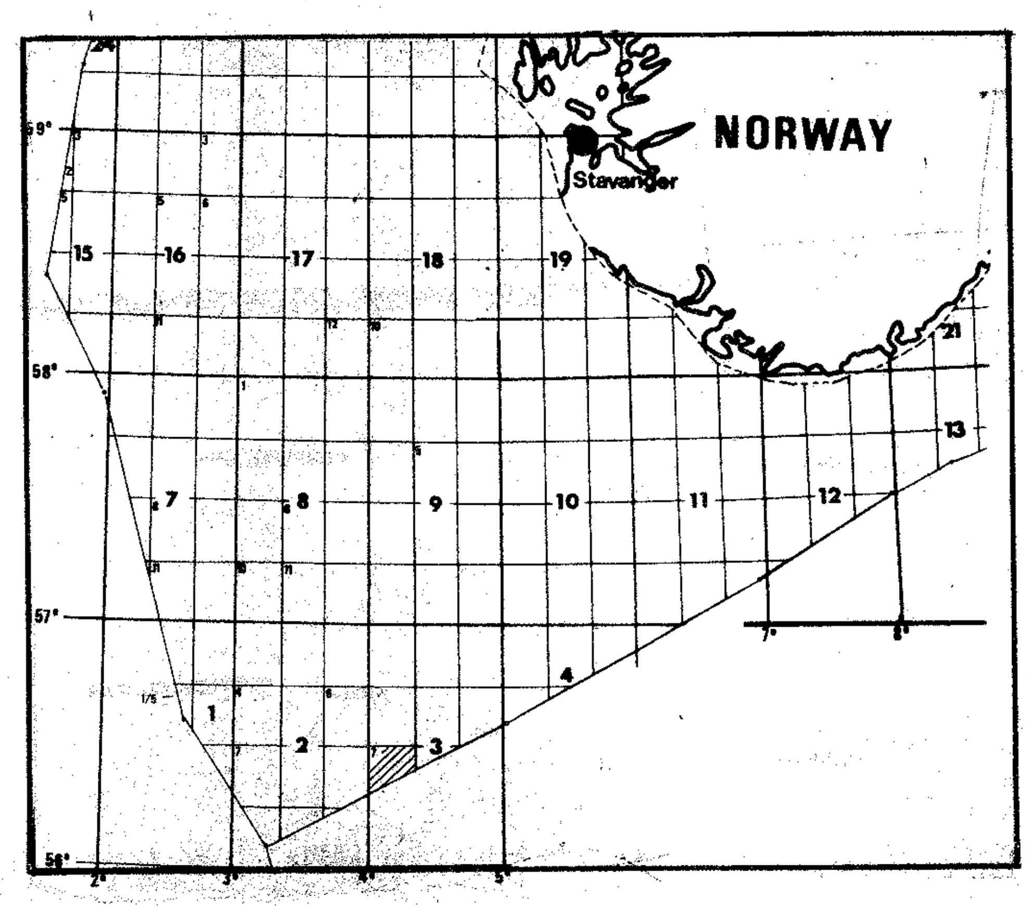
elf	Country: NORWAY OFFSHORE Operator: ELF AQUITAINE NORGE A/S Block: 3 / 7	elf aquitaine norge a/s

ISOBATH MAP
D1 - Horizon

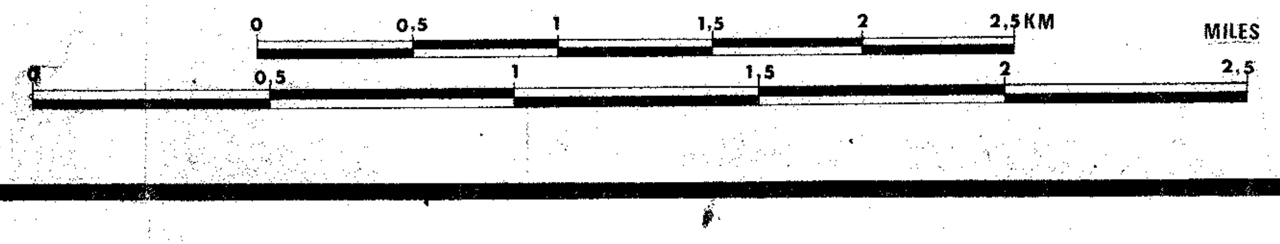
C.I: 25m

EXPLORATION DIVISION		PL.7.	Date: MARCH -82
Scale: 1:25.000			Author: K.REVHEIM
Drafted by: G.E.O.	Checked by: F.V.		File No: 82 024





Scale 1:25.000



elf

Country: NORWAY OFFSHORE
Operator: ELF AQUITAINE NORGE A/S
Block: 3 / 7

elf aquitaine norge a/s

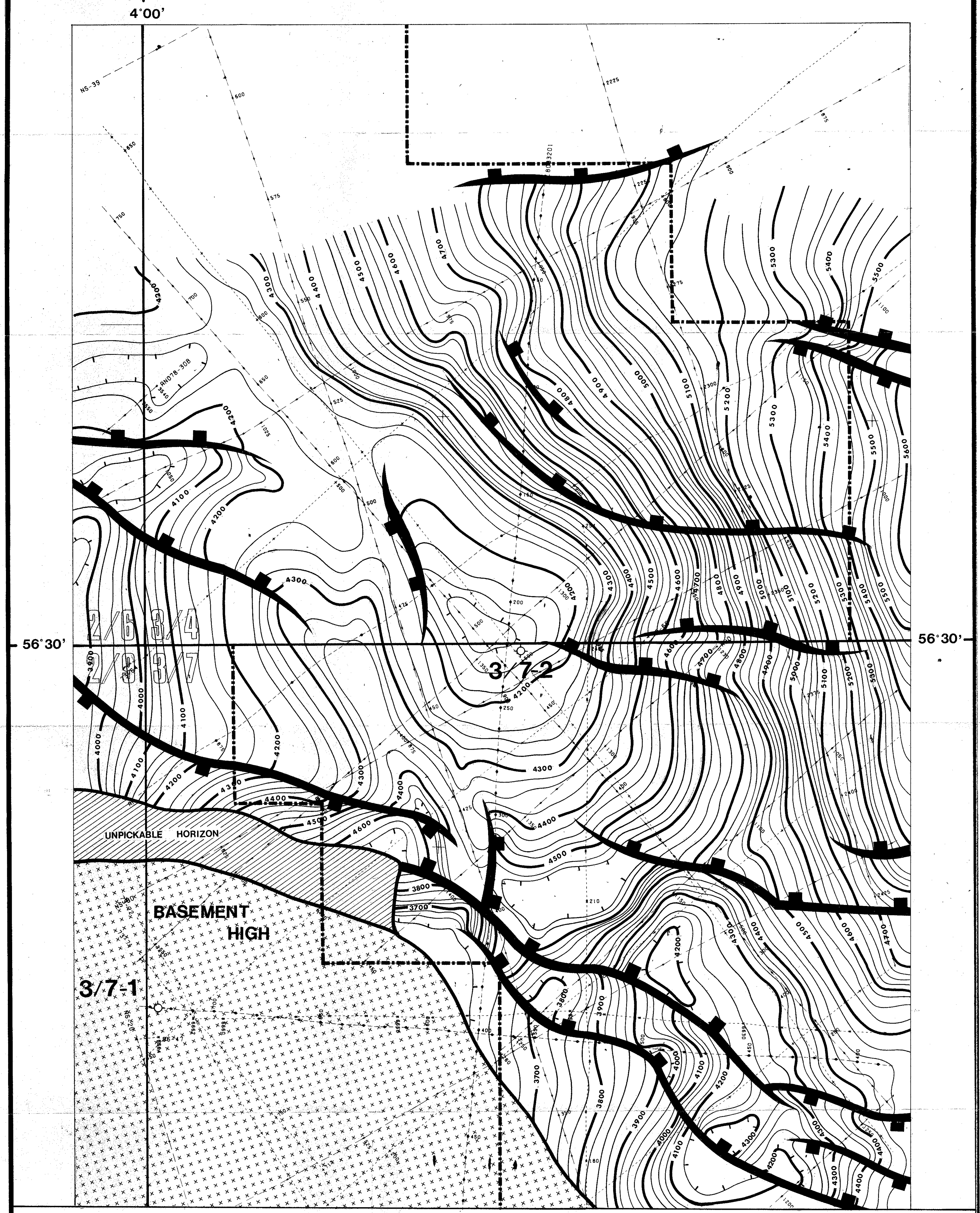
ISOBATH MAP
J-Horizon

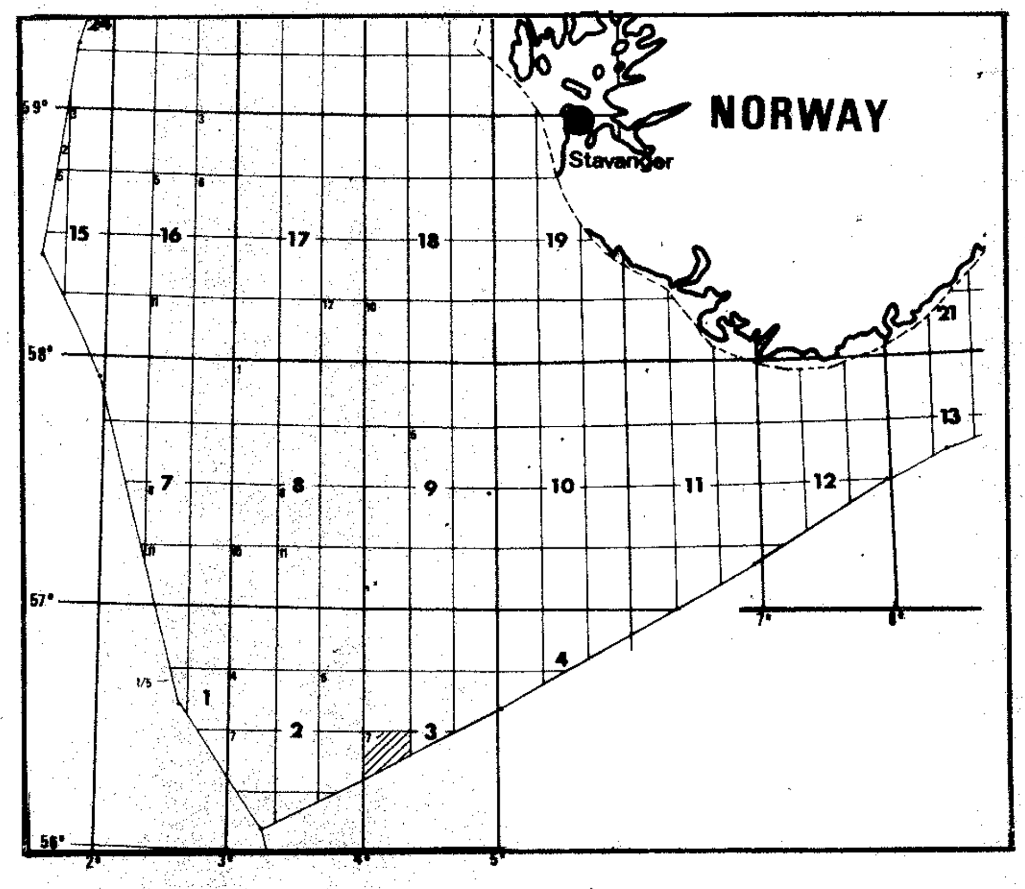
C.I:25m (TOP OF JURASSIC SANDSTONES)

EXPLORATION DIVISION
Scale: 1:25.000
Drafted by: G.E.O. Checked by: F.V.

PL.8.

Date: MARCH -82
Author: JOHANNESEN
File No: 82 070





Scale 1:25.000

0 0,5 1 1,5 2 2,5KM

MILES 0 0,5 1 1,5 2 2,5

Country: NORWAY OFFSHORE
Operator: ELF AQUITAINE NORGE A/S
Block: 3 / 7

elf aquitaine
norge a/s

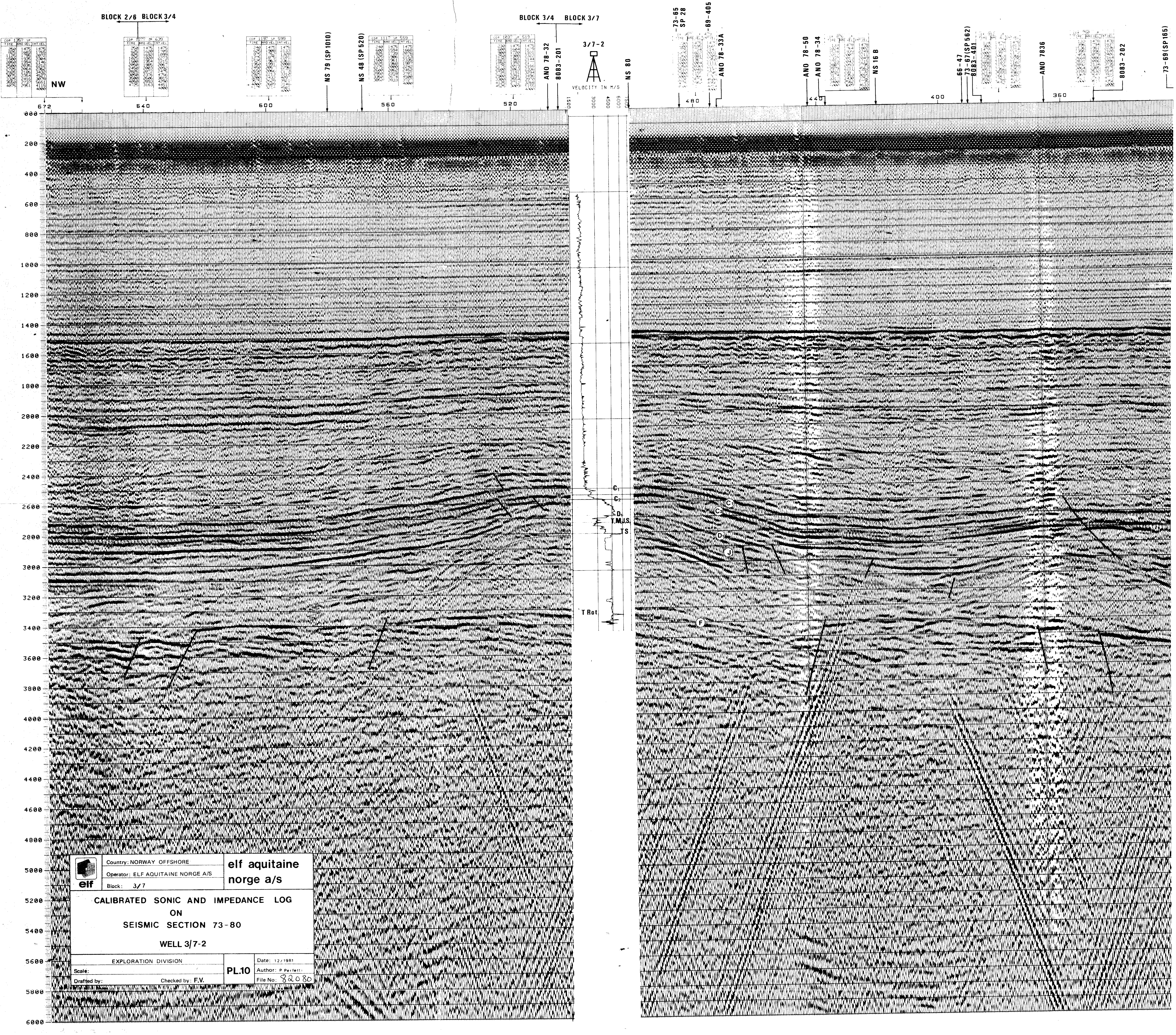
ISOBATH MAP
F-Horizon

C.I: 25m

EXPLORATION DIVISION
Scale: 1:25.000
Drafted by: G.E.O. Checked by: F.V.

PL.9

Date: MARCH -82
Author: K.REVHEIM
File No: 82023



elf

Country: NORWAY OFFSHORE
Operator: ELF AQUITAINE NORGE A/S
Block: 3/7

elf aquitaine
norge a/s

CALIBRATED SONIC AND IMPEDANCE LOG
ON
SEISMIC SECTION 73-80

WELL 3/7-2

EXPLORATION DIVISION
Scale:
Drafted by: Checked by: F.V.

PL.10

Date: 12/1981
Author: P Perfetti
File No: 82080

CHROMATOLOG 3/7-2

PL.11