

File



C O N F I D E N T I A L

WELL COMPLETION REPORT

PHILLIPS 2/4-3X

file →

PRODUCTION LICENCE 018

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PHILLIPS 2/4-3X

PRODUCTION LICENCE 018

C O N T E N T S

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SUMMARY

Well: Phillips 2/4-3X
 Classification: Field Appraisal
 Area: Field 2, Block 4, Production Licence 018
 Contractor: ODECO Norway Inc. "Ocean Viking".
 Location: Lat: 56° 30' 47.895" North
 Long: 03° 12' 39.476" East
 Water Depth: 71 meters (233 feet)
 Rotary Kelly Bushing: 27 meters (89 feet) above mean sea level.
 Objective: To test the ³²²Tertiary and Mesozoic.
 Results: Tested oil and gas from Danian limestone.
 Status: Temporarily suspended well.
 Total Depth: 3425 meters (11,234 feet RKB).

DRILLING HISTORYDates of Operations

Spud: 2nd June, 1970
 At Total Depth: 3rd July, 1970.
 Completed: 1st August, 1970. (suspended).

Details of Operations- Casing Program -

30 inch set at 135 meters (442 feet) RKB in 36 inch hole with 1075 sacks cement.

20 inch set at 598 meters (1961 feet) RKB in 26 inch hole with 2980 sacks cement.

13 $\frac{3}{8}$ inch set at 1639 meters (5377 feet) RKB in 17 $\frac{1}{2}$ inch hole with 3400 sacks cement.

9 $\frac{5}{8}$ inch set at 3094 meters (10,149 feet) RKB in 12 $\frac{1}{4}$ inch hole with 2280 sacks cement.

7 inch liner set at 3424 meters (11,232 feet) RKB in 8 $\frac{1}{2}$ inch hole with 300 sacks cement.

- Mud Program -

<u>Depth</u>	<u>Weight (ppg)</u>	<u>Viscosity</u>	<u>PV</u>	<u>Yp</u>	<u>Water Loss</u>
0 - 2041'	8.6	120	(See water, spotted high viscosity mud as needed).		
2041'-5400'	12.9 to 14.0	45	27	11	5.6
5400'-10,205'	14.3	49	26	16	3.6
10205-11234	14.3	44	31	11	3.8

- Logging Program -

<u>Schlumberger Tools</u>	<u>Run</u>	<u>Interval Feet</u>
Induction Electric	1	1964 - 5403
	2	5380 - 10184
	3	10149 - 11238
Sonic/Gamma Ray-Caliper	1	1962 - 5403 (GR from 300)
	2	5380 - 10176
	3	10149 - 11233
Sonic Amplitude	1	10149 - 11235
Gamma Ray - Neutron	1	9850 - 11198
Laterolog	1	10149 - 11243
Neutron Porosity	1	10149 - 11244
Microlaterolog-Microlog	1	10149 - 11244
	2	9000 - 10188
Formation Density	1	10149 - 11244
	2	1964 - 5396
Continuous Directional	1	5380 - 10176
	2	9850 - 11186
Cement Bond Log	1	1964 - 5406
Caliper Log	1	

- Hole Deviation -

Maximum deviation from vertical is $1\frac{1}{2}^{\circ}$ at 7332 feet.

- Stuck Pipe -

No stuck pipe problems were encountered in the drilling of the well.

- Lost Circulation -

No lost circulation problems occurred.

- Coring -

Three cores were cut in the Danian - Upper Cretaceous limestone as follows:

Core No. 1	from 10,520'	to 10,523'	recovered 2.2 feet (67%)
Core No. 2	" 10,647'	to 10,649'	" 1.2 feet (58%)
Core No. 3	" 10,790'	to 10,820'	" 26 feet (87%)

- Testing -

Eight drillstem tests through perforations in the 7 inch liner were carried out with the following results:

DST No. 1 10,740' to 10,770'

<u>Operations</u>	<u>Time</u>	<u>Choke</u>	<u>BHP psia</u>
IFP	10 mins.	1"	4980
ISIP	2 hr. 30 mins.	-	7169
FFP1	8 hr. 20 mins.	1"	4585
FSIP	10 hrs.	-	7066
FFP2	2 hr. 30 mins.	1"	4650

Recovered water at rate of 250 BPD.

DST No. 2 10,650' to 10,680'

<u>Operations</u>	<u>Time</u>	<u>Choke</u>	<u>BHP psia</u>
IFP	10 mins.	1"	4762
ISIP	28 mins.	-	4762
FFP	1 hr. 47 mins.	1"	4854

Recovered 100 feet gas cut mud.

DST No. 3 10,606' to 10,618'

<u>Operations</u>	<u>Time</u>	<u>Choke</u>	<u>BHP psia</u>
IFP	10 mins.	1"	4795
ISIP	2 hr. 30 mins.	-	7121
FFP	9 hrs.	1"	4437
FSIP	10 hrs.	-	7060

Recovered water at rate of 30 BPD.

Resistivity 0.376 to 60°F
(appears to be contaminated formation water)

DST No. 4 10,561' to 10,581'

<u>Operation</u>	<u>Time</u>	<u>Choke</u>	<u>BHP psia</u>
IFP	1 hr. 56 mins.	2 - $\frac{3}{4}$ "	1411
FFP	10 hrs.	2 - $\frac{3}{4}$ "	2259
FSIP	10 hrs.	-	7083

Recovered - 1040 BOPD, Gravity 34.2° API, 961.9 MCFGPD
925 GOR

DST No. 5A 10,420' - 10,500'

<u>Operation</u>	<u>Time</u>	<u>Choke</u>	<u>BHP psia</u>
IFP	10 mins.	1"	4826
ISIP	2 hrs. 30 mins.	-	7143
FFP1	10 hrs.	11.5/64"	6552
FSIP	10 hrs. 10 mins.	-	7095
FFP2	3 hrs. 30 mins.	10/64"	6638
FFP3	6 hrs. 20 mins.	2 - $\frac{3}{4}$ "	3334

Recovered - 2719 BOPD, Gravity 35.3° API, 2.744 MMCFPD
1009 GOR.

DST No. 6 10,375' to 10,390'

<u>Operation</u>	<u>Time</u>	<u>Choke</u>	<u>BHP psia</u>
IFP	18 hrs. 30 mins.	open	4664
FSIP	10 hrs.	-	6844

Recovered - Reversed out $\frac{1}{4}$ bbl. oil, 2 bbls, oil and gas
cut mud.

DST No. 7 10,260' to 10,340'

<u>Operation</u>	<u>Time</u>	<u>Choke</u>	<u>BHP psia</u>
IFP	10 mins.	1"	4650
ISIP	2 hrs. 30 mins.	-	7093
FFP	15 hrs. 41 mins.	2 - $\frac{3}{4}$ "	1398
FSIP	10 hrs.	-	6772

Recovered - 686 BOPD, Gravity 35° API, 969 MCFPD.
1412 GOR.

DST No. 8 10,260' to 10,340'; 10,375' to 10,390';
10,420' to 10,500'.

<u>Operation</u>	<u>Time</u>	<u>Choke</u>	<u>BHP psia</u>
FFP1	6 hrs. 30 mins.	10.5/64"	N.R.
FFP2	3 hrs. 15 mins.	10.5/64"	6585

<u>Operation</u>	<u>Time</u>	<u>Choke</u>	<u>BHP psia</u>
FSIP	10 hrs.	-	7074
FFP3	10 hrs.	2 - $\frac{3}{4}$ "	4366

Recovered - 3779 BOPD, Gravity 35.6° API, 4.010 MMCFPD
1023 GOR.

- Plugging and Abandonment -

Set cement retainer at 10,710 feet and squeezed perforations 10,740 to 10,770 feet with 50 sacks of cement. Set bridge plugs at 10,635; 10,581 and 10,530 feet. Laid plug from 10,500 to 10,260 feet with 60 sacks of cement.

Set bridge plugs at 9937 feet and 5000 feet. Laid plug from 5000 to 4700 feet with 105 sacks cement. Laid plug from 1500 to 1000 feet with 180 sacks cement. Ran corrosion cap and suspended well.

GEOLOGY

Objectives

The objective of the 2/4-3X well was to test the Tertiary and the top of the Upper Cretaceous.

Stratigraphy

<u>Stratigraphic Units</u>	<u>Depth</u>		<u>Thickness</u>
	<u>RKB</u>	<u>MSL</u>	
QUATERNARY			
Recent	322'	-233'	
Pleistocene			1931'
TERTIARY			
Upper Pliocene			
Lower Pliocene	2253'	-2164'	392'
Upper Miocene	2645'	-2556'	147'
Middle Miocene	2792'	-2703'	2532'
Lower Miocene-Burdigalian	5324'	-5235'	373'
-Aquitanian	5697'	-5608'	155'
Oligocene	5852'	-5763'	2338'
Eocene	8190'	-8101'	1572'
Upper Paleocene	9762'	-9673'	419'
Lower Paleocene-Danian	10181'	-10092'	511'
CRETACEOUS			
Maestrichtian-?Campanian	10692'	-10603'	542+'
Total Depth	<u>11234'</u>	<u>-11145'</u>	

Lithology

QUATERNARY

Recent-Pleistocene: Interval Sea Floor to 2040'. Thickness 1931'. This section drilled without returns.

TERTIARY

Upper Pliocene: Interval 2040' - 2253'. Thickness 213+'. First samples collected were from this age. The interval is composed of light grey, soft, gummy, pyritic clay.

Lower Pliocene: Interval 2253' - 2645'. Thickness 392'. This interval is composed of slightly sandy, pyritic clays.

Upper Miocene: Interval 2645' - 2792'. Thickness 147'. Light grey, soft, gummy, slightly calcareous clays predominate throughout this interval.

Middle Miocene: Interval 2792' - 5324'. Thickness 2532'. This interval is composed of grey, soft, plastic, slightly sandy, pyritic clay.

Lower Miocene Burdigalian: Interval 5324' - 5697'. Thickness 373'. This interval is composed predominantly of light grey, soft, slightly calcareous clay and shale with intercalations of light grey limestone and dolomite.

Lower Miocene Aquitanian: Interval 5697' - 5852'. Thickness 155'. Alternations of light grey, soft, glauconitic clay and grey-brown splintery shale occur in this interval.

Oligocene: Interval 5852' - 8190'. Thickness 2338'. The lithology of this unit is predominantly grey-brown, slightly silty and pyritic shales. Occasional thin beds of light brown dolomite and some light grey, very fine grained sandstones occur.

Eocene: Interval 8190' - 9762'. Thickness 1572'. This interval is mainly composed of light grey shale. Thin intercalations of light brown dolomite occur.

Upper Paleocene: Interval 9762' - 10,181'. Thickness 419'. The upper part of this interval down to 9812 feet is composed of light grey, fine grained sandstone with light grey shale. The rest of the section is composed of grey-green and dark red shale with some thin beds of sandstone as in the upper part.

Lower Paleocene-Danian: Interval 10,181' - 10,692'. Thickness 511'. The top 41 feet of this interval is composed of light brown, soft marl. The rest of the interval is composed of light grey to tan limestone with scattered chert.

UPPER CRETACEOUS

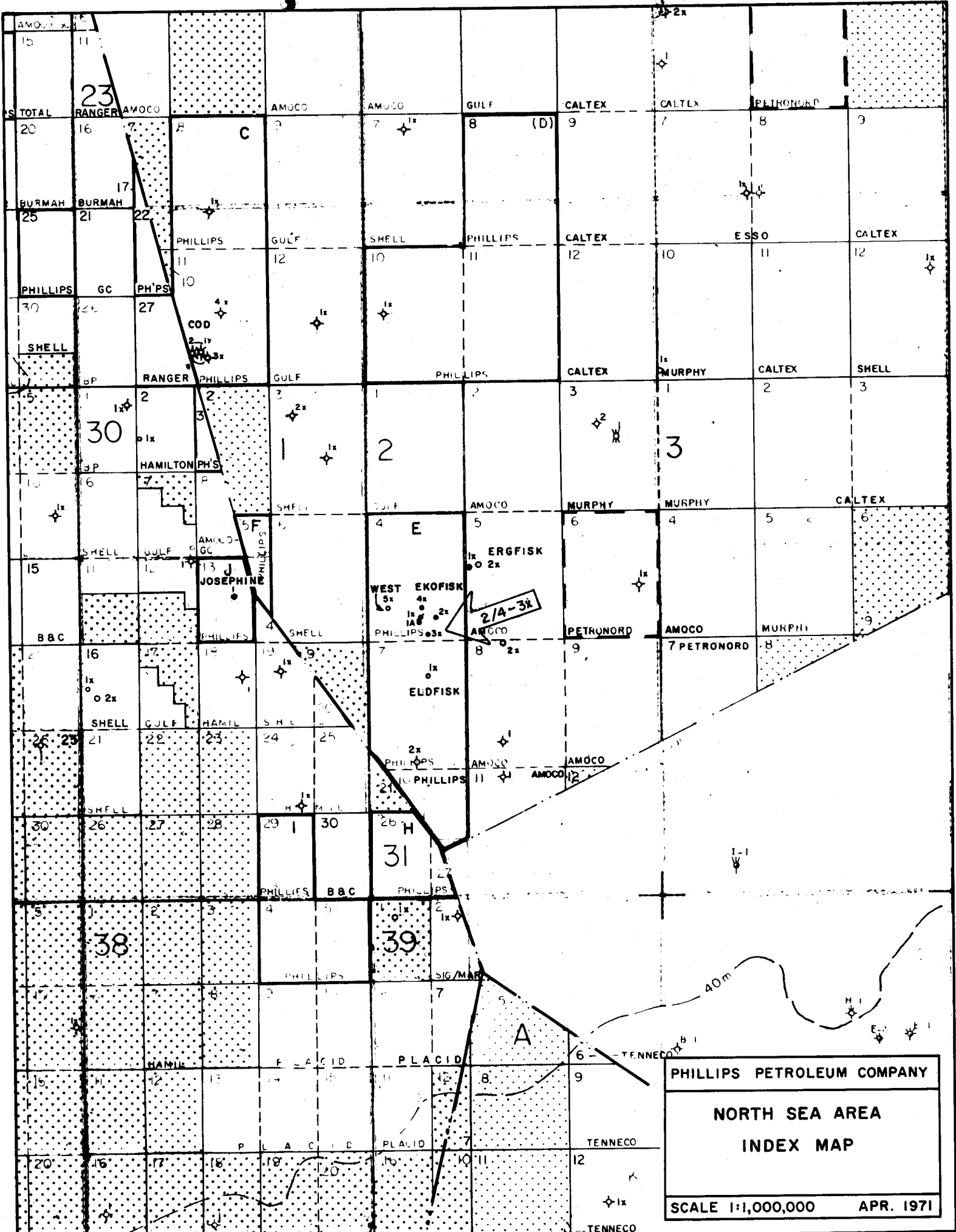
Maestrichtian-?Campanian: Interval 10,692' - 11,234'. Thickness 542+'. This interval is composed of light brown

to white, cryptocrystalline limestone. The limestone is more chalky near total depth.

EXPLORATION RECORD

Lease Norwegian North Sea Block 2/4 Prod. Lic. 018 Well 2/4-3X

Formation name	Top	Base	Remarks
<u>Tertiary</u>	NS	10,692	
Pliocene	NS	2,645	
Miocene	2645	5,852	
Upper	2645	2,792	
Middle	2792	5,324	
Lower	5324	5,852	
Burdigalian	5324	5,697	
Aquitanian	5697	5,852	
Oligocene	5852	8,190	
Eocene	8190	9,762	
Paleocene	9762	10,692	
Paleocene ss	9762	9,812	
Danian	10,181	10,692	
Marl	10,181	10,222	
Limestone	10,222	10,692	
<u>Cretaceous</u>	10,692	-	
Upper	10,692	-	



PHILLIPS PETROLEUM COMPANY
 NORTH SEA AREA
 INDEX MAP
 SCALE 1:1,000,000 APR. 1971

DATE 29 June 1970

PHILLIPS PETROLEUM CO.

CORE NO. 1

TEST AREA

CORE DESCRIPTION

SHEET NO. 1

WELL NO. 2/4-3X

RECOVERY 2' 2" of 3' (67%)

SCALE 1:100

3 inches = 25 feet

GEOLOGIST E.L. BENBIT

LITHOLOGICAL SYMBOLS AS ON 1500 SCALE GEOLOGICAL LOG

FORM	DEPTH IN FEET <u>10520</u>	LOG	S C A L E	DESCRIPTION	REMARKS
			fl.	Lst, lt. gray, lt. bn, crypto. xln, hd., wfn. blk. stolytes w/ sh. partings, black	

DATE 29 July 1940

PHILLIPS PETROLEUM CO.

CORE NO. 2

TEST AREA

CORE DESCRIPTION

SHEET NO. 1

WELL NO. 2


RECOVERED 1'2" of 2' (58%)

SCALE 1 100

3 inches = 25 feet

GEOLOGIST F.W. Volz

LITHOLOGICAL SYMBOLS AS ON 1500 SCALE GEOLOGICAL LOG

FORM	DEPTH IN FEET	LOG	SHOWS	DESCRIPTION	REMARKS
	10647'			LST, lt.-dk. gry. crypto-micro. xln. v. hd., silic., scattered pin point yel. fluor, poor poros. + perm.	Poor show
	49'				

DATE 1 JULY 1970

PHILLIPS PETROLEUM CO.

CORE NO. 3

TEST AREA

CORE DESCRIPTION

SHEET NO. 1

WELL NO. 2/4-3X

SCALE 1 100
3 inches = 25 feet

Recovered 26' of 30' (86.7%)

LITHOLOGICAL SYMBOLS AS ON 1500 SCALE GEOLOGICAL LOG

GEOLOGIST F.W. Vollenmeider

DEPTH IN FEET 10790	LOG	SACS	DESCRIPTION	REMARKS
800'			<p>LST, lt. grey-white, crypt. xln. - dense, hard, occ. brittle, occ. chky, abund. stylolites, sme. cone in cone structures, occ. subvent. fract., poor porosity; tite sme stylolites impregnated w/ bituminous-like substance - does not floor; scattered pin point and patchy dull yel. floor, slow milky cut on conch. smpl.</p>	<p>No bleeding gas or oil Poor show</p>
10820'				

2/4-3

CORE ANALYSIS RESULTS

Company PHILLIPS PETROLEUM COMPANY Formation _____ File UKCA 306
 Well 2/4-3 Core Type _____ Date Report 1.9.70
 Field Ekofisk Drilling Fluid _____ Analysts RFB
 County North Sea State Norway Elev. _____ Location _____

Lithological Abbreviations

SAND - SD DOLOMITE - DOL ANHYDRITE - ANHY SANDY - SDY FINE - FN CRYSTALLINE - XLN BROWN - BRN FRACTURED - FRAC SLIGHTLY - SL/
 SHALE - SH CHERT - CH CONGLOMERATE - CONS SHALY - SHY MEDIUM - MED GRAIN - GRN GRAY - GR LAMINATION - LAM VERY - V/
 LIME - LM GYPSUM - GYP FOSSILIFEROUS - FOSS LIMY - LMY COARSE - CSE GRANULAR - GRNL VUGGY - VGY STYLOLITIC - STY WITH - W/

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCYs		POROSITY PER CENT	RESIDUAL SATURATION PER CENT PORE		SAMPLE DESCRIPTION AND REMARKS
		XXXXXX	XXXXXX		OIL	TOTAL WATER	
		Ka	Kl				
1	10520	0.05	0.03	13.2			Ls, wh-lt gy, stylolitic, chert nod.
2	21	0.20	0.12	17.9			A.A, sol, channels, pyritic.
3	22			17.8			A.A, frac, fissures.
4	10647	<0.01	<0.01	8.9			Pure ls, lt gy.
5	48	<0.01	<0.01	8.5			A.A.
6	10790	1.3	0.9	22.4			Ls, lt gy-wh, stylolitic
7	91	0.21	0.13	23.0			A.A.
8	92	0.30	0.19	23.9			A.A.
9	93	0.12	0.07	23.9			A.A.
10	94	0.06	0.03	22.1			A.A.
11	95	0.18	0.11	23.0			A.A.
12	96	0.32	0.20	21.8			A.A.
13	97	1.1	0.8	24.0			Ls, lt gy- wh stylolitic.
14	98	20.0	14.0	23.0			A.A, frac.
15	99	0.3	0.19	21.8			A.A, stylolitic.
16	10800	0.45	0.29	23.6			Ls, lt gy-wh.
17	01	0.31	0.19	26.5			A.A.
18	02	0.21	0.13	24.6			A.A.
19	03	0.22	0.13	23.8			A.A, stylolitic.
20	04	0.27	0.17	25.7			Ls, lt gy-wh.
21	05	0.50	0.32	26.0			A.A.
22	06	0.42	0.27	25.1			A.A.
23	07	0.54	0.35	25.0			A.A.
24	08	0.62	0.41	22.5			A.A, stylolitic.
25	09	0.19	0.12	22.6			Ls, lt gy-wh.
26	10810	0.25	0.16	23.1			A.A, stylolitic.

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CORE LABORATORIES, INC.
 Petroleum Reservoir Engineering
 DALLAS, TEXAS

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 Well 2/4-3

CORE ANALYSIS RESULTS

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCYs	POROSITY PER CENT	RESIDUAL SATURATION PER CENT PORE		SAMPLE DESCRIPTION AND REMARKS
				OIL	TOTAL WATER	
		Ka	Kl			
27	10811	3.7	2.7	23.2		Ls,lt gy-wh, stylolitic.
28	12	0.28	0.17	22.5		Ls,lt gy-wh.
29	13	0.29	0.18	22.0		A.A.
30	14	0.21	0.13	20.5		A.A.
31	10815	0.35	0.22	21.8		A.A.

ROBERTSON RESEARCH COMPANY LIMITED

OILFIELDS REPORT NO. 385

THE MICROPALAEONTOLOGY AND STRATIGRAPHY

OF THE PHILLIPS (NORWAY) 2/4-3X

NORTH SEA WELL

by

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Project No. 701/2435

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August, 1970.

C O N T E N T S

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Enclosures

Micropalaeontological Analysis Charts Nos. 1 - 10.

Biostratigraphic chart showing the distribution of the diagnostic Caenozoic and Mesozoic Foraminifera in the Phillips (Norway) 2/4-3X Well. (2 Sheets)

INTRODUCTION

This report summarises the results of the micropalaeontological and stratigraphical analyses which have been carried out under Project No. ARP 701/2435 on material received from the interval 2060' - 11230' of the Phillips (Norway) 2/4-3X North Sea Well.

This exploration well was the fourth drilled in Block 2/4 of the Norwegian North Sea Concession Area.

A relatively complete Tertiary sequence is encountered in this well overlying Chalk of Danian and Upper Cretaceous age. The well reached T.D. in Chalk of Maestrichtian - ?Campanian age.

We wish to acknowledge the continued co-operation and assistance received from the various members of the Phillips Petroleum Company with whom we have been associated during the course of this work.

A summary of the sequence penetrated in this well follows overleaf, in Table I.

II

SUCCESSION

TABLE I

<u>UNIT</u>	<u>INTERVAL</u>	<u>THICKNESS</u>	<u>STAGE</u>	<u>SYSTEM/SUBSYSTEM</u>
A	2060' - 2220'	+ 160'	Scaldisian	Upper Pliocene
B	2260' - 2540'	+ 280'	Upper Diestian	Lower Pliocene
C	2580' - 2620'	+ 40'	Diestian	?Lower Pliocene - ?Upper Miocene
D	2660' - 2820'	+ 160'	Lower Diestian	Upper Miocene
E	2860' - 5250'	+ 2390'	-	Middle Miocene
F	5280'	-	-	Middle-Lower Miocene
G	5310' - 5700'	+ 390'	Burdigalian)
H	5740' - 5840'	+ 100'	Aquitanian)Lower Miocene)
I	5860' - 8070'	+ 2210'	-	Oligocene
J	8110' - 8150'	+ 40'	-	?Oligocene - ?Eocene
K	8190' - 9090'	+ 900'	-	Upper - Middle Eocene
L	9130' - 9700'	+ 570'	-	Lower Eocene - Palaeocene
M	9740' - 10020'	+ 280'	-	Palaeocene
N	10040' - 10170'	+ 130'	?Danian	?Lower Palaeocene
O	10190' - 10690'	+ 500'	Danian	Lower Palaeocene
P	10710' - 11230'	+ 520'	Maestrichtian - ?Campanian	Upper Cretaceous

III

MATERIALS AND METHODS

Under Project No. ARP 701/2435 a total of 307 ditch cutting samples, together with 14 core chips, were analysed using standard micropalaeontological techniques.

A summary of the information obtained from these samples was forwarded in a series of telex and telephone communications. These contain the framework of factual information on which this report is based. The prepared samples and recorded information are now filed and curated in the confidential records section of these laboratories. The methods of treating and assessing the age of the samples are similar to those mentioned in earlier Oilfields Reports.

IV

TERTIARY

(a) Pliocene

UNIT A. INTERVAL 2060' - 2220'; Scaldisian, Upper Pliocene

General Lithology

This unit consists of pyritic clays containing small amounts of shell fragments and fine to coarse-grained, rounded, unconsolidated sand. Shell fragments are absent below 2140'.

Micropalaeontology and Stratigraphical Conclusions

This interval is characterised by moderate faunas composed predominantly of species of the genera Cassidulina, Nonion and Cibicides. The occurrence of Cassidulina laevigata, Cassidulina oblonga, Cibicides lobatulus var. grossa, Cibicides scaldisiensis and Nonion affine would suggest that the unit is Scaldisian, i.e. Upper Pliocene, in age.

UNIT B. INTERVAL 2260' - 2540'; Upper Diestian, Lower Pliocene

General Lithology

Slightly sandy, pyritic clays characterise this interval. Lignite which may be an additive is present in the clays down to 2420' and shell fragments occur in small amounts locally. Glauconite is present in trace amounts between 2340' and 2360'.

Micropalaeontology and Stratigraphical Conclusions

The incoming of Bulimina elongata var. subulata at the top of the interval, closely followed by Elphidium antoninum, indicates that Upper Diestian, i.e. Lower Pliocene, deposits have been encountered. Species of Cassidulina and Nonion continue to dominate the microfauna, although Bulimina spp. and Elphidium spp. also become more common. Reworked

Upper Cretaceous forms are recorded from within the unit.

(b) Pliocene-Miocene

UNIT C. INTERVAL 2580' - 2620'; Diestian, ?Lower Pliocene - ?Upper Miocene

General Lithology

The two samples from this unit consist of clays which contain small amounts of pyritised sand. Lignite is present at the base of the interval but may be an additive.

Micropalaeontology and Stratigraphical Conclusions

Although the microfauna of this interval is predominantly Lower Pliocene in aspect the appearance of brown-stained specimens of Glandulina aequalis at 2580' could suggest that rocks of Upper Miocene age are present. Because of the conflicting evidence an age determination of ?Lower Pliocene - ?Upper Miocene has been assigned to the unit.

(c) Miocene

UNIT D. INTERVAL 2660' - 2820'; Lower Diestian, Upper Miocene

General Lithology

Slightly sandy, pyritic clays predominate throughout this interval, but traces of buff, earthy dolomite occur at 2740'. A slight increase in the sand fraction occurs at 2780' and green and white, fine to medium, quartz grains are present with dark grey, earthy pellets.

Micropalaeontology and Stratigraphical Conclusions

The incoming of Cibicides cf. pseudoungerianus and Pyrgo cf. fornasinii at the top of this interval, together with the later appearance of Sigmolima celata, Bolivina beyrichi and Rotalia beccarii var, indicates that deposits of Lower Diestian, Upper Miocene, age have been penetrated. The moderate to good faunas of the interval are dominated by Cassidulina spp. and Bulimina spp.,

with species of Cibicides becoming more common towards the bottom of this section.

UNIT E. INTERVAL 2860' - 5250'; Middle Miocene

The upper part of this interval, from 2860' - 3750', comprises a thick sequence of slightly sandy, pyritic clays containing localised occurrences of shell fragments. Between 3775' and 4780' the sequence consists of brown and light grey, friable shales with sporadic developments of brown, microcrystalline limestone and tan to buff ironstone. In the lower part of the section, below 4780', light grey shale increases in amount and bright red haematite grains occur in the sandstone fraction.

Micropalaeontology and Stratigraphical Conclusions

The microfaunas from this interval have enabled an age determination of Middle Miocene to be assigned. In addition, it has been possible to further divide the section into the following sub-units:-

INTERVAL 2860' - 3825'

The incoming of Loxostomum sinuosum at 2860' marks the top of the Middle Miocene. This foraminifera is rare in the upper part of the interval, but does become very common below 3220'. Poor faunas are recorded above 3240', however, below this level a rich Middle Miocene microfauna is developed, including planktonic forms and rare specimens of Uvigerina hosiusi; Uvigerina asperula is very common at 3620'.

INTERVAL 3875' - 4430'

This interval is characterised by the dominance of Uvigerina hosiusi; moderate faunas occur in the upper part of the interval but become impoverished in the lower part where planktonic species increase in importance.

INTERVAL 4460' - 5160'

A further increase in the proportion of planktonic species occurs at 4460' and the dominance of planktonic types is maintained throughout the interval. In addition to the continued occurrence of such forms as Globigerina praebulloides praebulloides and Globigerina cf. angustiumbilocata, new planktonic species appear, including Globorotalia acostaensis and Globigerina cf. nepenthes.

INTERVAL 5220' - 5250'

The incoming of radiolaria at 5220' marks the top of this interval of the Middle Miocene. The sample at 5250' has large numbers of well preserved radiolaria and also numerous, small planktonic foraminifera.

UNIT F. INTERVAL 5280'; Middle - Lower Miocene

General Lithology

The one sample representing this unit consists of clay associated with light grey, friable shale.

Micropalaeontology and Stratigraphical Conclusions

The appearance of Globorotalia cf. scitula scitula at 5280' may suggest that Lower Miocene deposits have been encountered. This planktonic species is a long ranging form in a world-wide sense, but appears to be restricted to the Lower Miocene in North Sea deposits. No further evidence is forthcoming and, as the fauna continues to demonstrate Middle Miocene affinities, a determination of Middle-Lower Miocene has been assigned to this interval.

UNIT G. INTERVAL 5310' - 5700'; Burdigalian, Lower Miocene

General Lithology

The upper part of this unit, from 5310' to 5460', consists of light greenish-grey, friable, slightly calcareous shales which are associated with pyrite and small amounts of light grey to brown, microcrystalline to finely sucrosic dolomite between 5310' and 5400'. The lower part of the interval,

from 5480' to 5700' consists of brown, brownish-buff, light grey and light green shales containing local intercalations of pale greenish-buff, calcareous siltstone. The samples at 5420', 5440' and 5540' are contaminated with cement.

Micropalaeontology and Stratigraphical Conclusions

Definite Lower Miocene deposits are encountered at 5310' and are indicated by the incoming of Globorotalia cf. fohsi barisanensis and Ehrenbergina serrata. These two species are normally taken to indicate the Burdigalian stage of the Lower Miocene.

The moderate faunas of this interval are composed of small planktonic foraminifera with subordinate numbers of arenaceous forms. Below 5460', the arenaceous forms become more common and predominate in a few of the samples.

UNIT H. INTERVAL 5740' - 5840'; Aquitanian, Lower Miocene

General Lithology

This unit consists of a uniform sequence of brown and brownish-buff shale with subordinate amounts of pale green and light grey shales.

Micropalaeontology and Stratigraphical Conclusions

At 5740', the first specimens of Globigerinoides bisphericus, and Globorotalia cf. scitula praescitula are noted. These forms indicate that Unit H corresponds to the Aquitanian stage of the Lower Miocene. The upper part of the interval is characterised by moderate to rich faunas dominated by planktonic foraminifera, including common Globorotalids. The sample at 5820' contains large numbers of well preserved radiolaria together with abundant Globigerinoides spp.

(d) Oligocene

UNIT I. INTERVAL 5860' - 8070'; Oligocene

General Lithology

The upper part of this interval, between 5860' and 5940', is similar in lithology to that of the overlying section and consists of pale brown, brownish-buff and light green shales. From 5960' to 6140', dark brown and buff-brown shales occur which contain pyrite and shell fragments (gastropods and lammellibranchs). Between 6160' and 6140', olive green, cryptocrystalline dolomite and buff, cryptocrystalline, finely sucrosic dolomite is present in subordinate amounts within a dominantly brown shale sequence. From 6700' to 6860' thin intercalations of buff to cream, marly limestone are associated with the brown shales. Between 6940' and 7300', the carbonate intercalations become more dolomitic and are brown to light grey in colour. Dark grey to black, carbonaceous shales occur from 7340' to 7950' together with occasional thin beds of brown, microcrystalline dolomite and tan ironstone. The basal part of this unit i.e. 7990' to 8070' consists of light grey and brown shales associated with minor amounts of ironstone and brown dolomite.

Micropalaeontology and Stratigraphical Conclusions

The appearance of a new assemblage at 5860' containing such forms as Asterigerina gürichi, Globorotalia cf. munda and Globigerina tripartita suggests that Oligocene sediments have been encountered. The upper part of the unit i.e. 5860' - 6440', are dominated by planktonic species, particularly by members of the Globigerina ouachitaensis group. A single specimen of ?Rotaliatina sp. (which may be a broken specimen of R. bulimoides) is recorded at 6440'. Below this depth, i.e. 6460' - 8070', arenaceous foraminifera increase in numbers and soon become the dominant type.

(e) Oligocene - Eocene

UNIT J. INTERVAL 8110' - 8150'; ?Oligocene - ?Eocene

General Lithology

Brown and light grey shales with small amounts of brown dolomite form the bulk of this unit.

Micropalaeontology and Stratigraphical Conclusions

The incoming of Trochammina cf. globigeriniformis at 8110' could be taken to indicate sediments of Eocene age. However, the remainder of the assemblage retains Oligocene affinities so that an age determination of ?Oligocene - ?Eocene is proposed for this interval.

(f) Eocene

UNIT K. INTERVAL 8190' - 9090'; Upper - Middle Eocene

General Lithology

The upper part of this unit, from 8190' to 8470', consists of brown and light grey shales with thin intercalations of brown dolomite. The dolomite is locally sphaerosideritic and light greenish-brown in colour. Occasional thin developments of tan to buff ironstone also occur in this section. Between 8510' and 8900' light grey shale predominates, but contains intercalations of buff to tan limestone. In the lower part of the unit, from 8920' to 9090', the light grey shales are pyritic and occur with subordinate amounts of buff, granular limestone and traces of brown, microcrystalline dolomite.

Micropalaeontology and Stratigraphical Conclusions

A new assemblage, containing Bathysiphon eocenicus, Truncorotaloides pseudodubia, Globigerina cf. linaperta and Globorotalia cf. cerroazulensis appears at 8190' and indicates that definite Eocene deposits have been penetrated. This assemblage would also indicate that deposits belong

to the Upper - Middle Eocene.

(g) Eocene - Palaeocene

UNIT L. INTERVAL 9130' - 9700'; Lower Eocene - Palaeocene

General Lithology

This unit consists predominantly of pale grey, locally pyritic shales. Thin beds of buff limestone are common in the upper part of the interval between 9130' and 9280' while brown to greenish-brown, locally sphaerosideritic, sandy dolomites occur sporadically in the lower part of the section.

Micropalaeontology and Stratigraphical Conclusions

At 9130' large, green-stained radiolaria are first encountered, suggesting that this unit is Lower Eocene - Palaeocene in age. The occurrence of Haplophragmoides cf. obliquicameratus in the same sample would tend to support the above determination. Green-stained, arenaceous foraminifera are first noted at the top of this interval.

(h) Palaeocene

UNIT M. INTERVAL 9740' - 10020'; Palaeocene

General Lithology

This unit may be divided into two lithological subdivisions. The upper part of this unit, from 9740' - 9950', consists essentially of medium and light grey, laminated shales. Small amounts of buff, granular limestone and light grey dolomite occur in the upper part of the section and a single occurrence of glauconitic sandstone is present at 9860'; pyrite occurs locally. Light grey, silty and slightly carbonaceous shales are present at 9900' and the incoming of pale green and red shales is noted at 9950'. A little buff, platy limestone occurs in the lowermost sample at 10020'.

Micropalaeontology and Stratigraphical Conclusions

An influx of small, green-stained specimens of Globigerina triloculinoides occurs at the top of this interval, suggesting that it is Palaeocene in age. Arenaceous forms continue to be the dominant elements of the assemblages recorded from this unit.

UNIT N. INTERVAL 10040' - 10170'; ?Danian - ?Lower Palaeocene

General Lithology

This unit is composed of pale green and red shales together with small amounts of buff, platy limestone and white chalk.

Micropalaeontology and Stratigraphical Conclusions

The incoming of small quantities of white chalk may indicate that the Danian has been penetrated. Although no Danian foraminifera occur, several forms become white-stained within the interval, including specimens of Globigerina triloculinoides which are found at 10080'. In view of the above evidence, this unit is suggested to be ?Danian in age.

UNIT O. INTERVAL 10190' - 10690'; Danian, Lower Palaeocene

General Lithology

The upper part of this unit, i.e. 10190' - 10240', consists of pale green, grey and red shales. Traces of light grey, fine-grained, glauconitic sandstone occur at the top of this section.

The lower part of the unit, from 10260' to 10690', consists of buff, chalky limestones which contain buff chert down to 10525'. Buff and white chalk containing localised developments of light grey chert occur from 10530' to 10690'. Red and pale green shales occur locally throughout the interval, particularly at 10525', but may be due to caving.

Micropalaeontology and Stratigraphical Conclusions

At 10190', a new assemblage appears and includes creamy-coloured

specimens of Globigerina pseudobulloides, Globoconusa aff. daubjergensis, Lamarckiana cf. paleocenica and Gavelinella cf. danica. This assemblage indicates that Danian deposits have been encountered at this level although good Danian Chalk does not appear until 10260'. Reworked Upper Cretaceous foraminifera first occur at 10320' but do not become frequent until 10430'. A core-piece was examined at 10649' which yielded a poor fauna of probable Danian age.

CRETACEOUS

UNIT P. INTERVAL 10700' - 11230'; Maestrichtian - ?Campanian,

Upper CretaceousGeneral Lithology

White chalk predominates throughout the unit and traces of light grey chert occur locally. The chalk has in places a very pale pinkish colouration, but this is believed to be due to additives rather than an indication of true pink chalk.

Micropalaeontology and Stratigraphical Conclusions

The incoming of numerous, creamy, well preserved specimens of Pseudotextularia elegans elegans, together with a few specimens of Pseudotextularia elegans fructicosa at 10710' suggests that chalk of Maestrichtian, i.e. Upper Cretaceous, age has been encountered. Specimens of Globotruncana contusa also occur at the top of this interval and support this determination. A good Maestrichtian fauna is developed below 10710' and includes Rugoglobigerina rugosa rugosa, Bolivinoidea draco draco, Bolivina incrassata gigantea and Stensioina pommerana. The occurrence of ?Globotruncana cf. linneiana tricarinata at 10920' could signify that Campanian Chalk is also present. Further evidence is provided by the presence of Rugoglobigerina rugosa cf. rotundata, which normally occurs in Lower Maestrichtian - Upper Campanian beds of the North Sea. In view of this evidence, the presence of Campanian Chalk cannot be ruled out and a determination of Maestrichtian - ?Campanian is proposed.

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INTER-OFFICE CORRESPONDENCE
STAVANGER OFFICE

September 17, 1971

2/4 - 3X *Completion*

1) ~~Basson~~
2) ~~HAPP L~~ *file*

11:25 Pressure up service line to determine if McEvoy valve on production line is opened or closed. (HOWCO)

11:30 Pressure on service line 1000 psi w/ 2.3 bbls. of water.

12:15 Pressure on service line 600 psi, production line atmosphere.

12:20 Bleed service line to atmosphere.

13:20 Diver opened McEvoy valve on production line.

13:30 Start pumping 130 bbls. of dye water around tree for pressure test.

14:15-14:35 Pressure both line to 4500 psi w/ 3 bbls. of water.

15:00 Pressure on both lines 4000 psi.

15:30 " " " " 3950 "

15:45 " " " " 3950 ", start bleed to atmosphere.

16:00 Pressure at atmosphere, advise "Choctaw" diver going down.

16:30 Start to re-pressure lines w/ HOWCO unit.

16:35 Pressure on both lines 4050 psi w/ 3 bbls. of water.

16:50 Diver close McEvoy valves on both lines and hook up hose to build up pressure on well head loop from "Choctaw"

17:00 Pressure on both lines 4050 psi.

17:15 " " " " 4050 " , "Choctaw" started pumping.

17:30 Pressure on service line 4125 psi, production line 4100 psi.

17:45 " " " " 4300 " " " 4150 " .

18:00 " " " " 4475 " " " 4200 " .

"Choctaw" reports 4600 psi on well head loop.

18:15 Pressure on service line 4925 psi, production line 4225 psi.

18:30 " " " " 5200 psi, " " 4225 " .

18:45 " " " " 5300 " " " 4225 " .

19:00 Start HOWCO unit to pressure both lines on "Gulftide" side of closed McEvoy valves.

19:25 Pressure on service line 6100 psi, production line 6250 psi.

19:30 "Choctaw" reports 6050 psi on well head loop.

19:45-24:00 Pressure on service line 6100 psi, production line 6250 psi.
"Choctaw" reports test successful, bleed both lines to atmosphere

PRC



INTER-OFFICE CORRESPONDENCE
STAVANGER OFFICE

September 18, 1971

2/4 - 3X

00:01-02:30 Awaiting word from "Choctaw".
02:30 Pressure up Koomey unit 3000 psi system, OK.
02:35-03:30 Pressure up Koomey unit 6000 psi system, blew "O" ring
out of radial piston pump. Start repairs on pump.
03:35-06:35 Blew "O" ring and repair three more times.
06:35-08:50 Remove radial piston pump from 2/4-1AX and install same
2/4-3X.
08:50-10:00 Test 6000 psi system within Koomey unit proper.
10:00-11:30 Open 6000 psi system to closed needle valves on well head.
Pressure stabilized OK, diver inspected and reported no
leaks visible.
11:30-11:40 Bleed 6000 psi system to atmosphere. Diver has both
McEvoy valves fully opened.
12:00-12:50 Pump 300 bbl. sea water flush through service line around
tree back through production line and overboard. Operate
choke valve to check adjustability, choke OK. Diver
reported both needle valves at well head on DHSV connection
were open (not closed as s/b). Sea water flush complete at
this time using both HOWCO pumps at max. rate.
14:00 Start pumping 90 bbls. of methanol into service line, line
volumn calculated to be 165 bbls.
14:10 Pressure up 6000 psi system on Koomey unit and stabilize.
14:50 Complete pumping methanol around tree.
14:55 Close all valves on production line at header.
15:13-15:16 Pressure up both lines to 4500 psi w/3.2 bbls. methanol.
15:20 Open SWV and wait ten minutes.
15:30 Open PWV " " " " .
15:40 Open MV " " " " .
15:50-15:53 Pressure on service line 3900, production line 3900 psi.
Re-pressure both lines w/methanol to 4500 psi.
15:55 Open DHSV pilot on Koomey unit.
16:01 DHSV opened, pressure dropped to 4020 (DWT). at 16:07 hrs.
16:15 Start methanol injection pumps into both lines.
Open well on 8/64" choke to starboard burner to displace
water from production line.
16:19 Open choke to 12/64".
16:30 Open choke to 16/64".
16:40 Open choke to 20/64".



INTER-OFFICE CORRESPONDENCE
STAVANGER OFFICE

September 18, 1971

- 2 -

2/4 - 3X

16:40 When choke was moved to 20/64" position, well stopped flowing. Pressure on production line 4020 psi. Close manual SD valve.

16:49 Pump 10 bbls. methanol into service line through kill header, no change in pressure on production. (line)

17:00 Close PWV and pump into production line with methanol through kill header to 4500psi. Open PWV, pressure dropped to 4020. Well head OK, something wrong at header. Close choke.

17:30 Open manual SD valve. Could not control well w/choke, well wide open to burner line with choke in closed position

17:30:09 M. G. Adams close manual SD valve. (Or maybe sooner)

17:40-19:00 Remove choke body, found choke discs installed incorrectly causing damage to positioning pin in choke body. Left all well head valves as is.

19:30 Start removing choke body from 2/4-4AX line at header.

20:00-24:00 Take 2/4-3X choke body to "Choctaw" machine shop, repair by drilling out pin in housing of body and installing new pin, return with choke body to "Gulftide".



PHILLIPS PETROLEUM COMPANY-NORWAY

UTENLANDSK AKSJESELSKAP

P.O. BOX 72 - STAVANGER, NORWAY - PHONE 41 340, 41 391 - CABLE: PHILLSTAV - TELEX: 33081

September 19, 1971

2/4 - 3X

01:00 Complete installing 4AX choke body in 3X line at header. SWV, PWV, MV & DHSV still open on well.

01:20 Light pilot on starboard burner.

01:43 Open manual SD valve, choke holding OK. Start methanol injection pumps into both lines, pressure on both lines 4020 psi. Temp. U/94, D/74°F. (Coffee break)

02:08 Open well on 16/64" choke through starboard burner, temp. U/85 D/74°F.

02:30-03:00 Choke 16/64", temp. U/89, D/75°F. Close SWV and bleed service line to 600 psi., and open annulus valve.

03:08 Annulus pressure 510 psi.

03:45 Header 4000 psi, annulus 560 psi, U/82 D/72°F.

03:50-04:20 Change orifice plates 1st. stage & 2nd. stage separators. Open choke to 24/64".

04:30 Switch to 1st. stage separator 2/4/64".
Header 4000 psi, annulus 650 psi, U/71 D/ 58°F, choke 24/64"

05:30	"	3310	"	"	1000	"	U/70 D/ 61°F	"	32/64"
06:00	"	3275	"	"	1350	"	U/72 D/ 54 "	"	40/64"
06:30	"	3275	"	"	1875	"	U/106 D/87 "	"	48/64"
07:00	"	3275	"	"	2450	"	U/106 D/87 "	"	64/64"
08:00	"	1079	"	"	3000	"	U/ 130 D/118	"	88/64"

09:00 Annulus pressure bled down to 1900 psi. Annulus pressure slowly increased through the day.

24:00 Annulus pressure stabilized 2950 psi. Open service wing valve, FTP stabilized at 1700 psi.



CEMENTING REPORT

Date June 5 Well 2/4-3X Field Ekofisk Area N. Sea Country Norway

Mud Weight 14.3 Viscosity 45 Water Loss 3.4

Flow Line Temperature of Mud _____

Temperature Survey by _____

Weight of Cement Slurry 15.6 ppg

Slurry Volume Cu.ft. 351 cu.ft.

Volume left in Casing Cu.ft. 8 cu.ft.

Calipered Hole Volume to T.O.C. 31.4 Bbls. Actual T.O.C. _____

Time

Casing Started in Hole 04:30 a.m. Casing Landed 13:30

Circulation started 13:30 Casing Movement started _____

Cement mixing started 14:20 SPM or RPM 4 Bpm Stroke Length 4"

Cement mixing finished 14:35 Displacement started 14:37

Displacement ended 16:00 Casing Movement ended _____

Displacement

Pump used to Pump Plug B.J. Service Liner Size and Stroke 1-4"x4"
1-4½"x4"

Cycles per Min. 4 Bpm Volume per Pump Cycle _____

Cycles required to displace Plug 223 Bbls Minutes to displace Plug 60

Pressure left on Plug 1500 hrs WOC _____ Before Drill out _____

Remarks of Casing & Cement Job _____

Personnel on Job M. Evje-Olsen



CASING SETTING REPORT

Date June 5 Well 2/4-3X Field Ekofisk Area North Sea Country Norway
Water Depth 232 RKB to Seabed 302
RKB to top of Casing Hanger 9898
Bit Size 8 1/2 Mud Weight 14.3 Viscosity 45 Water Loss 3.6
Caliper Survey from 11244 to 10149

Table with 2 columns: Description and Length. Includes entries for Baker shoe, N-80 casing, Baker float collar, and Brown landing collar.

Table with 5 columns: Size Casing, No., Weight, Grade, Thread. Contains one row of data for 7" casing.

Table with 2 columns: Description and Length. Includes entries for Brown liner hanger, running tools, and casing set RKB.

Make B.J. Type 20 Centralizer Casing Accessories
Location String

Attach copy of all casing tallies

Personnel on Job M. Evje-Olsen



CASING SETTING REPORT

10

Date 6/27/70 Well 2/4 3-X Field Ekofisk Area N. Sea Country Norway

Water Depth 233' RKB to Seabed 322'

RKB to top of Casing Hanger 305'

Bit Size 12 1/4 Mud Weight 14.3 Viscosity 49 Water Loss 4.6

Caliper Survey UKN. from _____ to _____

Casing ran & landed (Bottom to Top)

	Length
Size <u>9 5/8"</u> Make <u>Baker</u> Type <u>D. Float</u> Shoe Model <u>"G"</u>	<u>2.50</u>
Size <u>9 5/8"</u> Weight/ft <u>47</u> Grade <u>N-80</u> Thread <u>Butt.</u> Casing	<u>37.56</u>
Size <u>9 5/8"</u> Make <u>Baker</u> Type <u>Diff.</u> Float Mod. <u>"G"</u>	<u>1.90</u>

Size Casing	No.	Weight	Grade	Thread	
<u>9 5/8"</u>	<u>257</u>	<u>47</u>	<u>N-80</u>	<u>Buttress</u>	<u>9795 .36</u>

Size <u>9 5/8</u> Make <u>Nat.</u> Type _____ Sub Sea Wellhead <u>dc.</u>	<u>7.00</u>
Landing String with Running Tools Size <u>7 3/4</u> Weight _____	<u>306 .00</u>
Total Length of String	<u>10.151.12</u>
Less above RKB	<u>2.00</u>
<u>CASING SET RKB</u>	<u>10.149.12</u>
Less Shoe & Shoe Jts.	<u>40.06</u>
Depth of Float Collar RKB	<u>10.109.06</u>
Less Landing String & Float Collar	
Total Casing left in well w/Shoe Jts.	<u>10.149.12</u>

Make B. J. Type Centra. Casing Accessories
Location String 10.142, 10.071, 9995, 5311, 54 5232 & 772 RKB

Attach copy of all casing tallies

Personnel on Job Rolls



Date 10 26 1970

From Stock @ Rig

To 2-4 3-X (Downhole)

Pur. Ord. No. _____ M. T. No. _____

Car Initial and No. _____ S. O. No. _____

Hauled by _____ Truck No. _____

Description CSG, 9 5/8" 47 N-80

Buttress Thrd. Lt. 55 Rye. 3

S. C. No. _____ Cond. 1

L-100 300

	LENGTH		LENGTH		LENGTH		LENGTH		LENGTH	
1	37	56	38	89	38	55	38	17	38	16
2	37	40	38	86	38	22	38	59	38	57
3	39	12	37	92	38	29	38	08	37	51
4	38	64	38	32	35	97	38	46	38	28
5	37	85	38	67	38	30	38	23	34	33
6	36	05	38	16	37	96	37	62	38	56
7	37	82	39	06	36	70	38	26	38	57
8	38	32	38	50	34	19	37	28	39	13
9	38	90	38	09	37	49	37	42	39	08
10	38	18	38	37	37	95	38	75	38	28
11	36	82	38	76	37	98	38	53	37	15
12	38	19	37	58	38	18	38	43	39	70
13	38	44	38	57	37	28	38	90	38	40
14	38	31	38	12	38	24	38	83	38	60
15	38	08	37	86	38	87	38	75	37	29
16	36	79	37	52	37	82	38	01	37	79
17	37	64	36	65	38	63	38	29	38	—
18	38	62	38	64	38	20	37	74	38	60
19	38	53	38	96	37	49	38	30	38	64
20	37	32	38	93	38	53	38	18	38	95
	58	58	766	43	754	84	764	82	763	89

TOTAL 100 JTS. 2808.56 FEET

Tallied by Rollis

Date 6 26 1970From Stock @ RigTo 2/4 3-X (DOWNHOLE)

Pur. Ord. No. _____ M. T. No. _____

Car Initial and No. _____ S. O. No. _____

Hauled by _____ Truck No. _____

Description Csg., 9 5/8" 47" N-80Buttress Thrd. Lt & C Rse. 3 S.S.S. C. No. _____ Cond. 1

	LENGTH		LENGTH		LENGTH		LENGTH		LENGTH	
1	36	51	39	47	38	12	37	86	36	35
2	37	26	38	46	37	52	38	15	38	31
3	38	16	38	89	39	10	38	04	38	36
4	38	55	38	25	38	67	37	78	38	31
5	37	81	38	71	39	39	39	08	39	11
6	38	42	38	61	39	47	38	44	38	66
7	37	37	38	55	37	50	37	40	38	93
8	36	11	37	84	37	59	36	08	38	19
9	38	29	38	49	38	31	34	11	38	28
10	38	60	35	85	37	57	37	66	38	91
11	38	31	34	60	38	67	38	32	38	97
12	38	17	38	28	38	84	38	43	39	26
13	38	54	37	09	38	40	37	15	37	50
14	38	55	38	10	38	29	36	91	39	22
15	38	78	38	26	37	32	37	82	38	31
16	39	25	38	-	38	85	37	73	38	37
17	36	57	38	18	38	09	37	01	38	77
18	37	61	39	08	38	44	37	73	39	15
19	39	11	38	41	37	52	38	72	38	66
20	38	46	38	72	38	13	37	22	38	34
21	60	43	761	84	767	19	751	64	770	46

TOTAL 100 JTS. 3811.56 FEETTallied by Rollis



Date 6-27 1970

From 2/4 3-4 EXCESS STOCK

To Phillips Base Wbso.

Pur. Ord. No. _____ M. T. No. _____

Car Initial and No. _____ S. O. No. _____

Hauled by _____ Truck No. _____

Description Csg., 9 3/8" 47" N-80

Buttress Linc. SS. Rge. 3

S. C. No. _____ Cond. 1

	LENGTH	LENGTH	LENGTH	LENGTH	LENGTH
1	37	60			
2	38	75			
3	37	10			
4	38	58			
5	39	52			
6	38	45			
7	38	32			
8	38	24			
9	38	35			
10	38	-			
11	38	85			
12					
13					
14					
15					
16					
17					
18					
19					
20					
	21	76			

TOTAL 11 JTS. 421.76 FEET

Tallied by Rolls

Date 0-26-1970From Stock @ RigTo 2/9 3-X (Downhole)

Pur. Ord. No. _____ M. T. No. _____

Car Initial _____

and No. _____ S. O. No. _____

Hauled by _____ Truck No. _____

Description CSS, 9 5/8" 47 # N-80Buttress L & C S.S. Rge. 3S. C. No. _____ Cond. 1

	LENGTH		LENGTH		LENGTH		LENGTH		LENGTH	
1	38	10	38	73	35	69				
2	37	84	37	56	38	87				
3	39	05	38	46	35	57				
4	38	40	37	58	38	60				
5	38	26	39	04	38	60				
6	38	97	38	66	35	25				
7	38	60	38	22	37	45				
8	37	82	38	54	37	54				
9	36	86	37	31	37	84				
10	37	93	37	39	38	05				
11	38	52	37	58	39	20				
12	39	43	38	62	38	54				
13	38	24	38	74	37	90				
14	38	21	38	36	38	11				
15	38	95	35	65	37	03				
16	39	31	38	16	37	99				
17	39	53	38	74	38	90				
18	37	33	37	55	38	59				
19	38	36	36	35						
20	38	55	38	04						
21	38	26	76	08	684	46				

TOTAL 58 JTS. 22/2.80

FEET

Tallied by Kallis



CEMENTING REPORT

Date 6/27/70 Well 2/4 3-X Field EkOfisk Area N. Sea Country Norway

Mud Weight 14.3 Viscosity 49 Water Loss 4.6

Flow Line Temperature of Mud 70

Temperature Survey by Circ. cmt.

Weight of Cement Slurry 14.1 & 15.5

Slurry Volume Cu.ft. 3185

Volume left in Casing ~~ft.~~ 71'

Calipered Hole Volume to T.O.C. UKN: dkf. Actual T.O.C. Circ. cmt.

Time

Casing Started in Hole 1400 Casing Landed 0300

Circulation started 0300 Casing Movement started 0300

Cement mixing started 0510 SPM or RPM 2000 Stroke Length 4"

Cement mixing finished 0620 Displacement started 0630

Displacement ended 0800 Casing Movement ended 0735

Displacement

Pump used to Pump Plug U1350-Rig Liner Size and Stroke 6 3/4 X 18

Cycles per Min. 50 Volume per Pump Cycle .224

Cycles required to displace Plug 3213 Minutes to displace Plug 90

Pressure left on Plug 500 hrs WOC 0 Before Drill out 15
Released press. valves held ok.

Remarks of Casing & Cement Job Circ. an est. 75 sxs. cmt. while flushing riser.



CASING SETTING REPORT

10

Date 6-14-70 Well 2/4 3-X Field Ekko Fisk Area N. Sea Country Norway
 Water Depth 233 RKB to Seabed 322
 RKB to top of Casing Hanger (20") 301
 Bit Size 17 1/2 Mud Weight 14.3 Viscosity 45 Water Loss 3.8
 Caliper Survey Schl. from 5408 to 1964

Casing ran & landed (Bottom to Top)				Length
Size	<u>13 3/8</u>	Make <u>Baker</u>	Type <u>Model "G" Shoe (Diff)</u>	<u>2.72</u>
1jt. Size	<u>13 3/8</u>	Weight/ft <u>68</u>	Grade <u>J-55</u> Thread <u>8Rd.</u> Casing	<u>39.30</u>
Size	<u>13 3/8</u>	Make <u>Baker</u>	Type <u>Mod. "G"</u> Float <u>Diff. collar</u>	<u>2.00</u>

Size Casing	No.	Weight	Grade	Thread	
<u>13 3/8</u>	<u>133</u>	<u>68</u>	<u>J-55</u>	<u>8Rd.</u>	<u>5026 .04</u>

Size <u>13 5/8</u> Make <u>Nat.</u> Type	Sub Sea Wellhead	<u>7.93</u>
Landing String with Running Tools Size <u>7 3/4</u> Weight <u>25,000</u>		<u>310.52</u>
2-stds. Dcs., 1 std. DP, 1 DP sub & bumper sub.	Total Length of String	<u>5388.51</u>
	Less above RKB	<u>12.00</u>
	CASING SET RKB	<u>5376.51</u>
	Less Shoe & Shoe Jt#.	<u>42002</u>
	Depth of Float Collar RKB	<u>5334.49</u>
	Less Landing String & Float Collar	<u>303.00</u> <u>5031.49</u>
	Total Casing left in well → w/Shoe Jt#.	<u>5070.79</u>

Make BJ Type Centrs. Casing Accessories
 Location String 5366, 5294, 5220, 1930, 1873 & 414

Attach copy of all casing tallies

Personnel on Job _____



CEMENTING REPORT

10

Date 6-14-70 Well 2/4 3-X Field Ekko Risk Area N. Sea Country Norway

Mud Weight 14.3 Viscosity 45 Water Loss 3.8

Flow Line Temperature of Mud 68° F

Temperature Survey by Circ. cmt.

Weight of Cement Slurry 14.2 & 15.2

Slurry Volume Cu.ft. 4966 (890.5bbls.)

Volume left in Casing Cu.ft. Shoe jt.

Calipered Hole Volume to T.O.C. _____ Actual T.O.C. circ. cmt.

Time

Casing Started in Hole 0600 Casing Landed 1430

Circulation started 1430 Casing Movement started 1430

Cement mixing started 1610 ~~SPM~~ or RPM 2000 Stroke Length 4"

Cement mixing finished 1800 Displacement started 1808

Displacement ended 1902 Casing Movement ended 1830

Displacement

Pump used to Pump Plug D1350-7 Rig _____ Liner Size and Stroke 6 3/4 X 18

Cycles per Min. 15 to 75 Volume per Pump Cycle .224bbls.

Cycles required to displace Plug 3363 Minutes to displace Plug 54

~~Pressure-left-on~~ ^{Bumped} Plug w/500lbs. ~~hrs WOC~~ ^{Released press. Valve held OK.} 0 ~~Before-Drill-out~~

Remarks of Casing & Cement Job No hole trouble while running casing. The

Diff. fillup collar worked fine. Displacement calculation was 3358 cycles.

bumped plug w/500lbs.-H/1/2 Held press. for 15 mins. Released press. & back press.

valve held ok. Circ. an ~~est.~~ est. 50 sks. cmt. while displacing mud riser.

Flushed out mud riser, BOP stack, choke & kill lines w/ water.

Personnel on Job _____