William R. Walton
Geological Research
Director

Amoco Production Company
4502 East 41st Street
P O Box 591
Tulsa, Oklahoma 74102

March 8, 1972

Re: Paleontological age and environmental determination, Amoco 2/11-1; Phillips 2/7-1x, North Sea

File: Technical Service 5728IC
Job 9713

Mr. K. D. Soule
Amoco Norway Oil Company
Fr. Nansens Plass 6
Oslo 1, Norway

Dear Sir:

We have completed our preliminary comparison of the Amoco 2/11-1 and Phillips 2/7-1x wells on the basis of micropaleontology, and Rusty Haller's interpretations are attached. In view of the paucity of forams in the Jurassic portion of both wells, we have initiated palynological analyses, which we hope will strengthen our control. A summary report integrating all lines of faunal and floral evidence will be prepared when the study is complete.

Very truly yours,

William R. Walton

Attachments

cc: Chief Geologist AIOC, Chicago

Conclusions

1. Calcareous sands and carbonates below 12,681' in Phillips Norway 2/7-1x are apparent facies equivalent of limestones and dolomitic sands below 11,663' in Amoco Norway 2/11-1.

2. The main Jurassic sandy sequence in the Phillips well at about 13,900-14,300' is correlative of the approximate interval 12,700-13,100' in the Amoco well.

3. Two Lower Cretaceous foraminiferal assemblages (Albian-Aptian and Barremian-Hauterivian) are correlative between the two wells.

4. One Upper Jurassic (Kimmeridgian-Oxfordian) radiolarian-sponge spicule assemblage is correlative between the two wells.

5. The top of the Upper Jurassic in the Amoco well occurs at 11,444'; the top of the Upper Jurassic in the Phillips well is at 12,153'; neither depth involves a change from those recorded on the composite logs. Neither well appears to have reached the base of the Upper Jurassic.

6. The Upper Jurassic (11,444-15,392' in the Amoco well; 12,153-15,000' in the Phillips well) is apparently partly nonmarine with streaks of shallow epicontinental sea-radiolarian deposits. The presence of highly carbonaceous and coaly streaks support an interpretation of nonmarine for certain intervals.

7. Comparable Upper Jurassic age sequences have been recorded:

   a. Total U.K. 12/23/1 well Moray Firth area, Scotland

   b. Outcrops of Moray Firth area (fide Gordon, 1967)

   c. Outcrops in northern Norway and Spitsbergen (fide Stugard, 1971)

8. Upper Jurassic marine microfaunas in the two wells belong to the boreal realm, Norwegian Basin province. The Norwegian Basin was separated from the English Basin by the Mid North Sea High during the Upper Jurassic.

Recommendations

1. I recommend that AIOC send a field party to collect outcrop samples from the Upper Jurassic of the island of Andoya, northern Norway and from Spitsbergen in anticipation of offshore drilling there. These samples would initiate paleontology, palynology, and organic diagenesis studies in that area.

2. I suggest that we send the radiolarian microfaunas (about six species) from the Jurassic of the two wells to a radiolarian expert such as Wm. R. Riedel or Emile A. Pessagno for more precise age determination.

SUCCESSION

2/7-1 X

TABLE 1

UNIT	INTERVAL	THICKNESS	STAGE	SYSTEM/SUBSYSTEM
A	2000' - 2100'	+ 100'	Scaldisian	Upper Pliocene
B	2150' - 2450'	± 300'	Upper Diestian	Lower Pliocene
C	2500' - 3050'	± 550'	Lower Diestian	Upper Miocene
D	3100' - 5130'	± 2030'	-	Middle Miocene
E	5175' - 5560'	± 385'	Burdigalian	Lower Miocene
F	5580' - 5780'	± 200'	Aquitanian	
G	5800' - 7670'	± 1870'	-	Oligocene
H	7690' - 8350'	± 660'	-	?Oligocene - Eocene
I	8370' - 8725'	± 355'	-	Eocene
J	8755' - 9235'	± 480'	-	Lower Eocene - Palaeocene
K	9250' - 9525'	± 275'	-	Palaeocene
L	9540' - 9600'	± 60'	?Danian	?Lower Palaeocene
M	9615' - 9877'	± 262'	Danian	Lower Palaeocene
N	9880' - 9955'	± 75'	Maestrichtian	Upper Cretaceous
	9960' - 10200'	± 240'	?Campanian-Coniacian	
	10220' - 10640'	± 420'	Coniacian-Turonian	
	10660' - 10860'	± 200'	Turonian	
	10880' - 11200'	± 320'	Cenomanian	
O	11220' - 11460'	± 240'	Albian - ?Aptian	Lower Cretaceous
	11480' - 11520'	± 40'	Aptian-Barremian	
	11540' - 11780'	± 240'	Barremian-Hauterivian	
	11800' - 12000'	± 200'	Hauterivian	

UNIT	INTERVAL	THICKNESS	STAGE	SYSTEM/SUBSYSTEM
P	12160' - 12655'	± 495'	?Kimmeridgian	?Upper Jurassic
Q	12670' - 15000'	+ 2330'	Kimmeridgian- Upper Oxfordian	Upper Jurassic

APR 1977

RH

310 951+
815 +? 859296+
16.01
859296 MHSWOK G
330008 AMOCO N

TO: MR. J.J. WILLIAMS
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ERICO
ENGLAND

DATE: APRIL 14,1977
FILE: NO-200-400 (2/11-1)-TH

FOR YOUR INFORMATION THE REQUESTED SAMPLES FROM OUR WELL 2/11-1 WERE SENT TO YOU YESTERDAY APRIL 13TH, 1977.

AIR WAY BILL: 117-41873510
FLIGHT: SK 515
ARRIVAL LONDON: 13 APRIL AT 1750 HOURS

REGARDS

R.F.P. HARDMAN
AMOCO NORWAY OIL COMPANY

NNNN

✠
859296 MHSWOK G
330008 AMOCO N

NORTH SEA

Stratigraphic Summary No. 24 (Preliminary)

AMOCO NORWAY 2/11/1 Well

Abstract.

The stratigraphic section in the Amoco Norway 2/11/1 well may be summarized as follows; depths are those indicated on the Sonic-Gamma Ray Log:

312-2340'	Quaternary (Pleistocene and Holocene)
2340-2936'	Pliocene
2936-4836'	Miocene
4836-5356'	Oligocene
5356-5700'	Upper Eocene
5700-7293'	Middle and Lower Eocene
7293-8581'	Paleocene
8581-8715'	Upper Cretaceous (upper Maastrichtian)
8715-9362'	Upper Cretaceous (lower Santonian, Coniacian?, and Turonian?)
9362-9473'	Upper Cretaceous (Cenomanian)
9473-9766'	Lower Cretaceous(Albian and Aptian)
9766-	Lower Cretaceous and Jurassic

A very good lithologic-paleontologic correlation exists between the Amoco Norway 2/8/1 and 2/11/1 wells which indicates that Stratigraphic Summary No. 20 (Amoco Norway 2/8/1) needs no correction in light of the excessive hole trouble on that well.

In the 2/11/1 the major zone of interest appears to be chalks of Maastrichtian age, the samples being saturated with oil.

INTRODUCTION

This memorandum deals with the gross aspects of the microfaunas and lithologies in the Amoco Norway 2/11/1 well (Lat. 56° 14'16.978" N, Long. 03°27'07.051"E; K.B. 90'; G.L. -222'). The well was drilled in mid 1969 by Amoco Norway Oil Co. with Amerada, Texas Eastern, and the Norwegian Oil Consortium as participants.

STRATIGRAPHY AND LITHOLOGY

A résumé of significant lithologic-paleontologic details follows:

312-2340' Quaternary (Pleistocene and Holocene).

Samples from 1260-2176' show gray clays with traces of silts and fine sands. Lenses of pelecypods occur as do streaks of peat. A basal lithologic unit exists here as it does in the 2/8/1 well and consists of abundant mollusks with traces of barnacles and other macrofossils, depths being here 2176-2340'.

Microfaunas characteristic of the Pleistocene contain Buccella frigida, Cassidulina carinata, Rotalia beccarii, Elphidiella arctica vars., and numerous other species of Elphidium.

2340-2936' Pliocene.

Lithologies are mainly gray clays with traces of silt. Mica becomes a common constituent in the residues. Microfaunas are characterized by numerous elphidiums with the addition of Bulimina elongata, "Nonion affinis", Cibicides lobatulus, and others.

2936-4836' Miocene.

The sequence has a relatively uniform lithology, being in essence gray or brownish-gray clays. In the residues, minor variations are as follows:

2936-3150' grayish clays
3150-3510' as above plus traces of pyrite
3510-4620' grayish clays with traces of bituminous matter and occasional traces of dolomite
4620-4836' grayish clays with traces of pyrite and glauconite

The section 2936-3950' has an abundant microfauna with the upper part characterized by Rotalia beccarii var. globosa, Sigmoilopsis agglutinans, Elphidium incertum, Loxostomoides lammersi, Martinottiella communis, Nonion boueanum, Eponides umbonatus, Textularia gramen, Uvigerina hosiusi, and many others. Below 3950' the samples contain a poor indigenous microfauna with a few species of arenaceous foraminifers including Glomospira charoides.

4836-5356' Oligocene.

Lithologies between 4836-4930' appear to be mainly gray clays; below 4930', the lithologies have a peculiar texture (comparable to 2/8/1) being essentially brown and grayish shales, possibly with a large percentage of volcanic ash. Streaks of foraminifers, radiolarians, and diatoms are present. Of the foraminifers, Siphonina fimbriata, Uvigerina sp. A, Ceratobulimina contraria, and Asterigerina gürichi are important.

5356-5700' Upper Eocene.

As above, the section is a series of brownish and grayish shales. The top is marked by the Globorotalia centralis, Globorotalia cocoaensis, and Uvigerina cf. U. farinosa microfauna; this highly diagnostic fauna grades into a section containing an arenaceous fauna with poorly preserved representatives of Cyclammina spp., etc.

5700-7293' Middle and Lower Eocene.

Lithologies are dominantly medium to dark brown shales and clays grading to grayish and greenish shales at approximately 6700'. Lenses of glauconitic shales and dolomites are common.

The microfauna is mainly an arenaceous one with abundant specimens of Cyclammina cancellata, Cyclammina spp., Bathysiphon eocenica, Spirosigmoilinella cf. S. compressa, Pelosina cf. P. caudata, Ammodiscus incertus, Rhabdammina eocenica, Glomospira charoides, Eggerella aff. E. bradyi, Verneuilina subeocaena, Haplophragmoides cf. H. eggeri, and others. Thin zones of diatom molds are also present and contain Coscinodiscus sp. 1, Coscinodiscus sp. 2, and other distinctive forms.

7293-8581' Paleocene.

Grayish and greenish shales and clays are the dominant lithologies in the section 7293-8300'; they contain numerous lenses of light brown dolomite.

As in the 2/8/1 well, the top of the Paleocene is marked by an abundant arenaceous microfauna with the diagnostic species Spiroplectammina spectabilis. Below 7400' the microfauna becomes poor with a few thin zones of foraminifers (rare Allomorphina halli, Bathysiphon sp., etc.) and radiolarians (Phacodiscus? sp.).

Below 8300' the wide variety of lithologies includes gray, green, red, brown, purple, and black shales and clays and streaks of glauconitic silts and very fine-grained sands. Lenses of light brownish dolomites are also present.

One zone, approximately 8430-60', contains a characteristic 'Danian' microfauna with Globigerina triloculinoides and G. daubjergensis.

8581-8715' upper Maastrichtian.

The samples 8580-8700' showed a powdery chalk saturated with oil; little or no chert was present. A microfauna diagnostic of Maastrichtian, probably upper Maastrichtian, was present and included the following: Globotruncana contusa, G. calciformis(?), Pseudotextularia elegans, Bolivinoides draco, Bolivina incrassata, Osangularia lens, Gyroidinoides octocamerata, and Ruguglobigerina spp.
A major stratigraphic break with the unit below is indicated by lithologies and by the paleontology; either a large hiatus (perhaps angular unconformity) or a fault appears to be present.

8715-9362' lower Santonian, Coniacian?, and Turonian?

Only the samples 8730-8800' are currently available for inspection. These showed limy chalks with interbedded greenish and grayish shales. Santonian-Coniacian microfaunas are abundant and characterized by Globotruncana lapparenti var. bulloides, G. lapparenti var. lapparenti, and Heterohelix planata. Abundant radiolarians are also present.
The basal Turonian "Actinocamax plenus marls" appears to be present on the Sonic-Gamma Ray log 9354-9362'.

9362-9473' Cenomanian.

Samples currently are not available for inspection; geologic tops are from the Sonic-Gamma Ray log.

9473-9766' Albian and Aptian.

Samples were present below 9540'; they showed gray, green, and reddish shales with traces of glauconite and pseudo-oolites. An abundant microfauna is present with Hedbergella brittonensis, H. delrioensis, Gaudryina dividens, Glomospira saturniformis, Valvulineria loetterlei, and others.

9766- Lower Cretaceous and Jurassic.

Samples from 9766-10,000' were examined; definitive analysis is pending, but suggests a probable lower Cretaceous age. Two samples from the interval 11,700-750 indicate a probable Jurassic (perhaps middle Jurassic) age.

C. R. Haller
1 Sept. 69

Amoco Production Company
4502 East 41st Street
P O Box 591
Tulsa, Oklahoma 74102

Research Center
918-627-3400

William R. Walton
Geological Research
Director

AMOCO NORWAY OIL COMPANY
16 JUNI 1972

	Info	Action	Return	Initial
K.D.S.	1	1	2	
E C S				
V L P				
C K C				
R L D				
B E S	2			1
C L [illegible]				
I S				
V R P				
P J				
FILE		3	2	2

2/11-1

June 13, 1972

K. D. Soule
Amoco Norway Oil Company
Storegaten 32
Oslo 1, Norway

Dear Sir:

Re: Status of Palynological
Technical Service

This is a routine report on the status of Technical Service requests which are more than 90 days old.

At present, we have one Technical Service request from your office for a comparison of portions of the 2/11-1 and the 2/7-1X wells. This was originally postponed to await results of a paleontologic study. We now have processed all of the necessary samples and they will be analyzed in the near future. A report of results will then be forthcoming.

Very truly yours,

William R Walton

CFU:mjh

cc: Exploration Manager/Amoco Europe
K. A. Shepard

2/11-1

March 8, 1972

File: 322

Mr. Peter Norton,
Amoco Europe Incorporated,
46/47 Pall Mall,
LONDON. S.W.1

Dear Sir:

As per our telephone conversation of March 7th, I will mention in writing a few suggested items that you might take up with George Verville at the Tulsa Research Lab.

1. Please check with him to see if he has any data completed on the correlations between the 2/11-1 and the 2/7-1 that might help us to determine if the Jurassic interval in the 2/7-1 that contains the sands has an age equivalent in the 2/11-1.

2. You might ask his opinion as to whether any of the specialists in Tertiary Palynology in Amoco Production would be able to help us with our problems in detailed correlations within the Lower Eocene-Paleocene section of the northern North Sea.

3. You might discuss with him the detailed correlation of the Danian Chalk section by Nannoplankton and whatever to see if he is still willing to take on this project for us. As you and I have discussed, I am thinking in terms of the wells in Torfelt, the 2/8-2, and the 2/11-1 and of course the 2/5-3 and 2/8-3 when they are drilled.

If you get time, you might look up Eric Michaelis, who is the new head of the Sedimentary Petrology Group and who has done considerable work on deep water sand deposits and turbidites, among other things. If you get to talk to Eric, please say hello to him for me.

Yours very truly,

Bill E. Shaw

BES/je

10 8+
846 +? ✠
16700 amoco n29 408452166+
rca0959/20
amoco prod res

16700 amoco n

Paleo & Tulsa Lab

oslo february 20, 1973

2/11-1 144

attn: mr. william r. walton
==========

re our telex of february 8, we have sent by air mail samples from 9100 - 9700' in the phillips 2/7-3. in addition to determining if the maestrichtian is in fact missing from this well we would like to know if part of the danian of the 2/7-3 is correlative with the chalk in the interval 8580 - 8700' in the amoco 2/11-1. robertson research now indicates that this interval in the 2/11-1 is danian with reworked maestrichtian. sullivan examined the 2/11-1 for tech service 5124 pc.

we can send additional samples from the 2/11-1 if necessary, and we are sending you a preliminary report and two telexes from robertson research concerning these wells.

k d soule
/bes

✠✠
co prod res

16700 amoco n

2/7-3x well

9410 - 9520 . campanian to santonian - ?coniacian

2/8-3x well

9120 - 9320 maastrichtian
9340 - 9460 not younger than lower maastrichtian

2/11-1 well

8640 - 8670 ?maastrichtian (assuming abundant danian forms have caved) nb. see below
8700 - 8760 santonian - ?coniacian

further work on interval 8490 - 8620' from 2/11-1 well indicates that

8490 - 8535 barren
8560 - 8580 rare palaeogene forms

the interval 8600 : 8620 contains danian forms with a considerable numbr of maastrichtian species stop the dominance of danian forms, the presence of maastrichtian nannoplankton throughout and the absence of an exclusively danian assemblage suggests that the maastrichtian species have in fact been reworked into the danian stop this would also apply to the interval 8640 - 8670 which was previously questionably assigned to the maastrichtian stop an alternative but less likely suggestion is that there is a thin veneer of danian at the top of the chalk which has caved into the underlying maastrichtian stop

thin section examination of core samples 9440', 9460', 9465' and 9480' from the 2/7-3x well did not produce any evidence of reworking stop

we will extend our examination of 2/7-3 x well up to 9200' as requested and will telex the results as soon as possible stop

2/7-3x samples were sent

Comm to Tulsa Robertson

2/11-1

Amoco Production Company
4502 East 41st Street
P.O. Box 591
Tulsa, Oklahoma 74102
Research Center

AMOCO NORWAY OIL COMPANY
10 JAN. 1972

			Return	Initial
R. W. C.				
E. C. S.				
V. L. P.				
C. K. D.				
R. L. D.				
B. E. S.	1			
C. L. R.				
I. S.				
W. R. P.				✓
FILE	3 ##			

January 6, 1972

Mr. R. W. Craig
Amoco Norway Oil Company
6 Fridtjof Nansens Plass
Oslo, Norway

Dear Sir:

In response to your request for age dating and environmental interpretation in the Amoco 2/11-1 and Phillips 2/7-1X wells, we have initiated an evaluation of the micropaleontology. The previous work done by C. R. Haller on the 2/11-1 will be compared by graphic correlation techniques to the results reported by Robertson Research for the Phillips well. These may be supplemented by additional analyses of samples as necessary. Meanwhile, we will postpone any palynologic analyses until completion of the micropaleontology. Palynology will then be used only as it is deemed necessary.

Very truly yours,

William R Walton

William R. Walton

CFU:mjh

cc: K. D. Soule/London
S. A. Antoniuk/Chicago

Amoco Norway Oil Company
Fridtjof Nansens plass 6
Oslo, Norway
423205/425638

November 17, 1971

File: ~~400~~

Subject: Request for Standard Paleontologic and Palynologic Tech Service

2/11-1

Amoco Production Co.,
Research Department,
4502 East 41st Street,
Tulsa,
Oklahoma,
U.S.A.

Attn: Dr. W. R. Walton

Dear Sir,

We are forwarding to you, by air freight, from our Stavanger Office, unwashed 10 ft. samples for the interval 9400 to 15,392 ft. from the Amoco 2/11-1 well. We will also send a cut of washed samples for the Phillips 2/7-1x from 10,800 ft. to 15,000 ft. These samples cover the intervals tentatively identified as Lower Cretaceous and Upper Jurassic. We are interested in precise age dating and an environmental interpretation if possible. We particularly want to know if the age equivalents of the hydrocarbon bearing sands below about 12,800 ft. in the 2/7-1x are present in the 2/11-1.

For your information we are enclosing copies of two preliminary paleontologic reports on the 2/11-1, a report on the micro-paleontology and stratigraphy of the 2/7-1x, and a composite log of each well.

As per the discussion between Mr. Shaw and Mr. Verville in Chicago, this will not be a high priority project. We would, however, like an estimate of when we may expect information from these wells.

Very truly yours,

R. W. Craig

BES/pg

c.c. K. D. Soule

Amoco Production Company
4502 East 41st Street
P.O. Box 591
Tulsa, Oklahoma 74102

May 18, 1971

Re: Nannoplankton analysis for Danian in the Amoco Norway 2/11-1
North Sea

File: Technical Service File No. 5124PC

K. D. Soule
Amoco Europe, Incorporated
46-47 Pall Mall
London S.W.1, England

Dear Sir:

Attached is a memorandum by Frank R. Sullivan reporting results of analysis of ditch samples for calcareous nannoplankton from the subject well. There is weak evidence to conclude that Danian rocks occur in the 8580 to 8600' interval.

This work represents a portion of the subject Technical Service request. Work on the Amoco Norway 2/5-1 is in progress.

Very truly yours,

William R. Walton

WRW:skw

cc: R. W. Craig

AMOCO

Amoco Production Company

May 14, 1971

Re: Nannoplankton analysis for Danian in the Amoco Norway 2/11-1, North Sea

File: Technical Service File No. 5124PC

MEMORANDUM
Charles F. Upshaw
Research Center

The following ditch samples from the Amoco Norway 2/11-1, North Sea well have been examined for calcareous nannoplankton to establish presence or absence of a Danian interval in this well.

Footage	Age
8070-8100 Gray sh.	Barren
8190-8200 Gray sh.	Barren
8190-8200 Brown sh.	Barren
8280-8310 Gray sh.	Barren
8370-8400 Gray sh.	Barren
8580-8600 Gray & Brown sh.	Barren
8580-8600 Chalk	Maestrichtian with weak Danian
8670-8700 Chalk	Maestrichtian

Sample 8580-8600 consisted of about 1/3rd shale and 2/3rds chalk. Sample 8670-8700 consisted of about 1/10th shale and 9/10ths chalk. The presence of a weak Danian flora mixed with a strong Maestrichtian flora in the chalk portion of sample 8580-8600 suggests that the Danian is represented in the uppermost chalk of this 20' interval.

Coccolith preservation in these samples is very poor. A check list of species encountered is attached.

Frank R. Sullivan

FRS:skw

PAN AMERICAN PETROLEUM CORP.
RESEARCH CENTER

CALCAREOUS NANNOPLANKTON CHECK LIST

■ ABUNDANT
● COMMON
O FEW
X RARE
R RARE - DANIAN

LOCALITY: 5953 AMOCO NORWAY 2/11-1, NORTH SEA.
SERIES:
STAGE:
FORMATION:
SAMPLE NUMBER: 8355–8600 | 8670–8700
SPECIES

SPECIES	PRES.	8355–8600	8670–8700
		VP	VP
ARKHANGELSKIELLA CYMBIFORMIS		■	■
BIANTHOLITHUS SPARSUS			
BRAARUDOSPHAERA BIGELOWI			X
COCCOLITHUS BARNESAE			●
" DANICUS		R	
" HELIS		R	
CRETARHABDUS ANTHOPHORUS			
" SPLENDENS			
" CRENULATUS		O	O
CYCLOCOCCOLITHUS SP.			
CYCLOLITHUS ROBUSTUS			
DEFLANDRIUS CRETACEUS		O	O
" INTERCISUS		O	
" SPINOSUS		O	O
DISCOLITHUS NUMEROSA			
KAMPTNERIUS MAGNIFICUS		O	O
aff. "			X
MARKALIUS INVERSUS		R	
MICRORHABDULUS DECORATUS		X	X
PARHABDOLITHUS GRANULATUS			
THORACOSPHAERA OPERCULATA		O	X
ZYGODISCUS PSEUDANTHOPHORUS			
" SIGMOIDES		R	R
ZYGOLITHUS CONCINNUS		R	
ZYGRHABLITHUS TURRISEIFFELI		O	O
MICULA STAUROPHORA		O	X

ROBERTSON RESEARCH INTERNATIONAL LIMITED

MEMORANDUM NO. 1647

INTERIM REPORT ON A COMPARATIVE STUDY OF THE CALCAREOUS NANNOFLORAS FROM SELECTED INTERVALS OF THE 2/7-3X, 2/11-1 AND 2/8-3 NORWEGIAN NORTH SEA WELLS.

Project No. RRI/IIB/723/232

This report provides a brief summary of the results obtained so far from a nannoplankton study of the intervals 9410' - 9520' of the Phillips Norway 2/7-3X Well, 8630' - 8720' of the Amoco Norway 2/11-1 Well and 9120' - 9460' of the Amoco Norway 2/8-3 Well. The study has now been extended into the Palaeocene of the Amoco Norway 2/11-1 Well.

The entire interval of the Phillips well was cored, while ditch cuttings were available for the relevant intervals of the Amoco Norway wells. Samples from Core Slicer IV (9137' - 9140') of the 2/8-3 Well have previously been analysed for calcareous nannoplankton. Slides were prepared from the samples selected for nannofossil study by the standard "smear" technique.

PHILLIPS NORWAY 2/7-3X WELL

Cores 3 and 4 cover the interval analysed for nannoplankton content. Rich and fairly diverse nannofloras are encountered, including such species as Glaukolithus diplogrammus, Zygodiscus biperforatus, Tetralithus ovalis, Arkhangelskiella cymbiformis and Rucinolithus hayi, whose concurrent ranges suggest a Santonian to Campanian, or possibly Coniacian age for this interval.

AMOCO NORWAY 2/11-1 WELL

The interval may be subdivided on nannofossil content into two units. The two samples of the upper section (8640' - 8670') contain a rich nannoflora consisting predominantly of Tertiary (particularly Danian) forms, with relatively rare Cretaceous specimens. However, the predominance in the latter of Arkhangelskiella cymbiformis allows a tentative Maastrichtian age dating to be given to this sequence, on the assumption that the Danian forms have caved rather than that the Maastrichtian specimens have been reworked into Danian deposits.

The two samples of the lower unit (8700' - 8760') contain a far smaller proportion of caved Tertiary specimens - the relatively distinct lithology of the sequence facilitated the selection of in situ particles from the ditch cuttings for slide preparation. Arkhangelskiella cymbiformis is much reduced in numbers, compared with the overlying unit, while the presence of Zygodiscus biperforatus and Staurolithites matalosus indicates that the sequence is Santonian, possibly Coniacian in age.

AMOCO NORWAY 2/8-3 WELL

This interval may also be subdivided on nannoplankton assemblages into two parts. The upper sequence (Core Slicer IV 9137' - 9140'; five ditch cuttings selected at regular intervals from 9160' - 9320') contains undoubted Maastrichtian nannofloras, dominated by Arkhangelskiella cymbiformis associated with such characteristic Maastrichtian species as Zygodiscus spiralis and Nephrolithus frequens.

The lower section (five ditch cuttings from 9340' - 9460') contains a rich and diverse nannofossil association with insignificant numbers of Arkhangelskiella cymbiformis, associated with Glaukolithus diplogrammus, Tranolithus orionatus and questionable specimens of Zygodiscus biperforatus and Arkhangelskiella costata.

On the basis of positively identified nannoplankton species, a Lower Maastrichtian age can be assigned to this sequence.

A preliminary investigation of the ditch cutting sample at 9540' reveals a similar nannoflora to that of the lower part of the interval studied, except for the presence of good examples of Zygodiscus biperforatus, a species which ranges no higher than the Campanian and may be found as low as Coniacian.

PJB/JWC/KMH.

Encl. 4

2/11-1 Well

AMOCO NETHERLANDS PETROLEUM CO.

TOLSTEEGSINGEL 2a – UTRECHT
TEL. (030) 11446 CABLE: AMONED TELEX: AMONED UT 47385

September 1, 1969.

Mr.R K.Turner,
Amoco Norway Oil Co.,
6 Fritjof Nansens Plass,
Oslo. Norway.

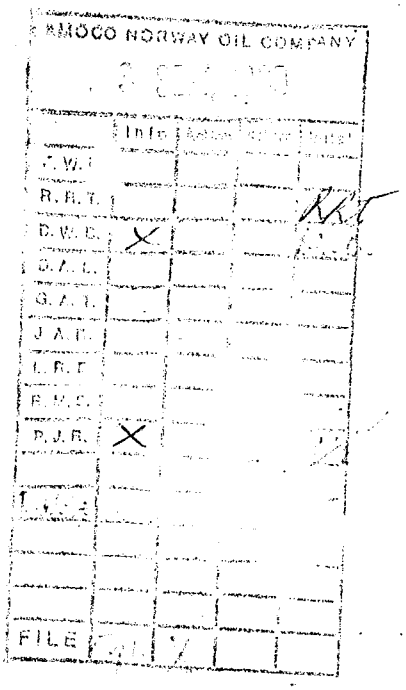
Dear Sir,

Enclosed please find one copy of the progress report on your 2/11/1 well.

Very truly yours,

C.R.Haller

cc: R.L.Blanton
Encl.



Valley Dept

EXPL FILE

CONFIDENTIAL

November 10, 1969
PR - 226

Mr. K.G. Reed
Amerada Petroleum Corp.

Mr. J.W. Cooke
Texas Eastern Transmission Corp.

Mr. C.W. Carstens
Norwegian Oil Consortium A/S

Mr. Ian Macartney
Amoco Europe, Inc. EU-158

Re: Amoco-NOCO Well 2/11-1
- Palaeontology

Gentlemen:

Enclosed is a Robertson Research Company Limited report of stratigraphical determinations for the interval 11,950 feet to 15,380 feet in the subject well.

Yours very truly

P.J. Reader

Encl.

cc: Mr. C.R. Haller
Amoco Netherlands Petroleum Co.

PJR/amr

ROBERTSON RESEARCH COMPANY LIMITED

DIRECTORS: DR. W. F. ROBERTSON J. C. ROBERTSON, D.L. DR. R. H. CUMMINGS DR. W. W. BROWN

LLANDDULAS
ABERGELE
DENBIGHSHIRE

TELEPHONE LLANDDULAS 424-5
STD 0492-66-424

CABLES RESEARCH ABERGELE

TELEX 61216

4th November, 1969.

Mr. R.R. Turner,
Amoco Norway Oil Company,
6 Fridtjof Nansens Plass,
Oslo,
NORWAY.

Dear Mr. Turner,

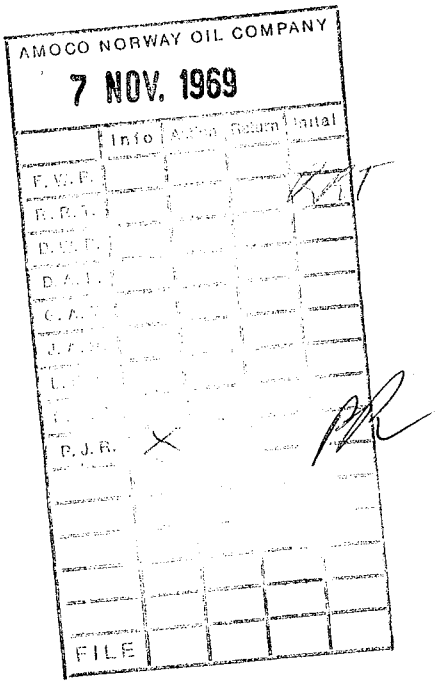
We enclose 5 copies of our final report on the interval 11950' - 15380' from the 2/11-1X Well.

Should you have any comments or criticisms on this memorandum we should be pleased to hear them.

Yours sincerely,

John Church.

J.W. CHURCH



ROBERTSON RESEARCH COMPANY LIMITED

MEMORANDUM NO. 771

MICROPALAEONTOLOGY AND STRATIGRAPHICAL CONCLUSIONS OF THE INTERVAL 11950' - 15380' FROM THE 2/11-1X NORTH SEA WELL OF AMOCO NORWAY OIL COMPANY

A total of 37 ditch cuttings and ten core samples were received under Project No. ARP 690/468 from the 2/11-1X Norwegian North Sea Well during the period 20th August to 24th September. The 47 samples received comprise the following:-

Ditch Cuttings Samples

11950'	A4	14940'
11980'	B4	14960'
12000'	W3	15000'
12020'	X3	15020'
12040'	Y3	15040'
12060'	Z3	
12070'		15260'
12090'	14480'	15280'
12110'	14500'	15300'
12140'	14520'	15320'
12160'	14540'	15340'
12165'	14560'	15360'
12180'		15380'
12200'		

Core Samples

12680'	12705'
12685'	12710'
12690'	12715'
12695'	12720'
12700'	12723'

These samples were examined by standard micropalaeontological palynological, and lithological techniques and the results communicated by telephone or telex. In many instances, where requested, the determinations were transmitted within twenty four hours of receipt of the samples.

The processed material and recorded information are now filed in the confidential records section of these laboratories.

We wish to acknowledge the co-operation and assistance received from all members of the staff of Amoco Norway Oil Company with whom we have been associated during the course of this work.

INTERVAL 11950' - 15380'; Kimmeridgian

General Lithology

The uppermost part of the interval (11950' - 11980') is made up of light greenish grey, calcareous shales.

The remaining part of the sequence, from 11980'to 15380', consists predominantly of dark greyish brown to black, slightly micaceous, poorly fissile shales. They contain some thin, irregular, discontinuous laminae and lenses of light grey siltstone and a few highly carbonaceous laminae occur at 12680'. Slickensides are noted at 12705' and 12715'.

Between 12180' - 12200', A4 - Z3, and 14940' - 14960' thin intercalations of light grey to buff-coloured, occasionally sandy limestones occur. Below 15260' traces of light greenish dolomitic limestones are found. Sandstones are rare, but thin developments are present from

12020' to 12060', where they are light greenish grey in colour.

Traces of pyrite occur throughout the interval.

Micropalaeontology and Stratigraphical Conclusions

A very sparse microfauna and microflora have been recovered from this interval. The most salient feature of these samples is the presence, often in considerable numbers, of Radiolaria. Many of these Radiolaria, particularly in the interval 11950' - 12200', are well preserved and it is unfortunate in this respect that the core samples yield only a meagre and poorly preserved assemblage. The occurrence of this group of fossils, which consist of the forms Lithostrobus spp., ?Cenosphaera sp. and Tricolocapsa sp., suggests that this interval is of Kimmeridgian age for we have often encountered these forms in rocks of a similar age in the North Sea. Although it is possible that these beds may range into the Portlandian, the presence of Gonyaulax cf. longicornis in the meagre microflora of occasional bisaccate pollen grains and rare indeterminate fragments of dinoflagellates, tentatively supports a Kimmeridgian conclusion whilst the dark greyish-brown to black shales also suggests an Upper Jurassic, ?Kimmeridgian type of lithology. Rare specimens of long ranging foraminifera - Eoguttulina cf. liassica, Lenticulina cf. muensteri and Pseudoglandulina sp. also occur.

The appearance of a solitary specimen of Cytheropteron aff. decoratum at 15260' may suggest a Lower Kimmeridgian - Upper Oxfordian age for at least this sample and in turn tentatively supports the Kimmeridgian age determination for the whole of this interval.

JWC/AER
4.11.69.

William R. Walton
Geological Research
Director

Amoco Production Company
4502 East 41st Street
P.O. Box 591
Tulsa, Oklahoma 74102

March 8, 1972

Re: Paleontological age and environmental determination, Amoco 2/11-1; Phillips 2/7-1x, North Sea

File: Technical Service 5728IC
Job 9713

Mr. K. D. Soule
Amoco Norway Oil Company
Fr. Nansens Plass 6
Oslo 1, Norway

Dear Sir:

We have completed our preliminary comparison of the Amoco 2/11-1 and Phillips 2/7-1x wells on the basis of micropaleontology, and Rusty Haller's interpretations are attached. In view of the paucity of forams in the Jurassic portion of both wells, we have initiated palynological analyses, which we hope will strengthen our control. A summary report integrating all lines of faunal and floral evidence will be prepared when the study is complete.

Very truly yours,

William R. Walton

Attachments

cc: Chief Geologist AIOC,Chicago

Conclusions

1. Calcareous sands and carbonates below 12,681' in Phillips Norway 2/7-1x are apparent facies equivalent of limestones and dolomitic sands below 11,663' in Amoco Norway 2/11-1.

2. The main Jurassic sandy sequence in the Phillips well at about 13,900-14,300' is correlative of the approximate interval 12,700-13,100' in the Amoco well.

3. Two Lower Cretaceous foraminiferal assemblages (Albian-Aptian and Barremian-Hauterivian) are correlative between the two wells.

4. One Upper Jurassic (Kimmeridgian-Oxfordian) radiolarian-sponge spicule assemblage is correlative between the two wells.

5. The top of the Upper Jurassic in the Amoco well occurs at 11,444'; the top of the Upper Jurassic in the Phillips well is at 12,153'; neither depth involves a change from those recorded on the composite logs. Neither well appears to have reached the base of the Upper Jurassic.

6. The Upper Jurassic (11,444-15,392' in the Amoco well; 12,153-15,000' in the Phillips well) is apparently partly nonmarine with streaks of shallow epicontinental sea-radiolarian deposits. The presence of highly carbonaceous and coaly streaks support an interpretation of nonmarine for certain intervals.

7. Comparable Upper Jurassic age sequences have been recorded:

   a. Total U.K. 12/23/1 well Moray Firth area, Scotland

   b. Outcrops of Moray Firth area (fide Gordon, 1967)

   c. Outcrops in northern Norway and Spitsbergen (fide Stugard, 1971)

8. Upper Jurassic marine microfaunas in the two wells belong to the boreal realm, Norwegian Basin province. The Norwegian Basin was separated from the English Basin by the Mid North Sea High during the Upper Jurassic.

Recommendations

1. I recommend that AIOC send a field party to collect outcrop samples from the Upper Jurassic of the island of Andoya, northern Norway and from Spitsbergen in anticipation of offshore drilling there. These samples would initiate paleontology, palynology, and organic diagenesis studies in that area.

2. I suggest that we send the radiolarian microfaunas (about six species) from the Jurassic of the two wells to a radiolarian expert such as Wm. R. Riedel or Emile A. Pessagno for more precise age determination.

INCORPORATED IN THE STATE OF DELAWARE.
UNITED STATES OF AMERICA. WITH LIMITED LIABILITY

CABLE: CORELAB - DALLAS
CORELABOR - LONDON
TEL.: 407 4561

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

REPLY TO:-
22 LEATHERMARKET STREET
LONDON, S.E.1, ENGLAND

CONFIDENTIAL

15th October 1969.

HYDROCARBON ANALYSIS OF GAS SAMPLE G-4

COMPANY: Amoco Norway Oil Co.
WELL: 2/11-1
AREA: North Sea
COUNTRY: Norway
FILE: UKCA 228

COMPONENT	MOL PER CENT	GPM
Hydrogen	NA	
Helium	NA	
Hydrogen Sulfide	NIL	
Carbon Monoxide	NIL	
Carbon Dioxide	Trace	
Nitrogen	5.22	
Methane	74.41	
Ethane	9.22	2.35
Propane	7.05	1.94
Iso-Butane	0.89	0.29
n-Butane	1.84	0.58
Iso-Pentane	0.53	0.19
n-Pentane	0.55	0.20
Hexanes	0.12	0.05
Heptanes Plus	0.17	0.08
	100.00	5.68

Calculated Gas Gravity = 0.7568

Calculated Gross Heating Value = 1240 BTU per cubic foot of Dry Gas at 14.696 psi and 60°F.

Collected at _____ psi and _____ °F.

G&G file

CONFIDENTIAL

October 23, 1969
PR-201
Well 2/11-1, Logs.

Mr. R. M. Snyder
Amoco Norway Oil Company
Norsco Base
4056 TANANGER

Dear Sir:

Please have Schlumberger make the following 2/11-1 logprints and forward them to us:

	Date	Run	Interval Top	Bottom	Scale
Borehole Compensated Sonic Log Gamma Ray	7-20	1	1197	5632	1:500
Compensated Formation Density Log	7-20	1	1197	5639	1:500
Induction Electric Log	7-20	1	1197	5646	1:500

We are sending you today the films of the last two of the above mentioned logs under separate cover and with registered mail.

Yours very truly,

R. R. Turner

TS/rp

c GRG file.

October 22, 1969

PR-200

Mr. C.R. Haller
Amoco Netherlands Petroleum Co.
Tolsteegsingle 2 A
Utrecht
Holland

Re: Well 2/11-1 Logs

Dear Sir:

Please find enclosed prints of run nos. 3 and 4 of the Borehole Compensated Sonic Log - Gamma Ray in 1:500 scale. The runs cover the intervals 11,262' - 14,206' and 13,950' - 15,39o'.

Yours very truly

R.R. Turner

IS/amr

16.05 ✠
16700 amoco n
amocoex ldn

to: r.u
e e e e .

File 2/11-1
(2) G+G

✠✠
16700 amoco n
amocoex ldn

to: r.turner attn d. danz. oslo l-829-mm 13/10/69

robertson have no palaed above 11950 report should be mailed
october 20th.

m. mason

time sent 4.00 ibw
✠
16700 amoco nxzcorrection shud read : no palaeo +++
✠
16700 amoco n
amocoex ldn

2/11-1
GGG file

beklager denne ventingen det er sammenbrudd
og veil ved alle linjer på sentralen
kom tilbake om ca 15 min takk

16.45 ✠
16700 amoco n
research lndls 61216 29 9 69

attention mr turner

samples 15260 - 15380 from the 2/11-1 wek eee well appear
to be of kimmeridgian age.

research lnduls
✠
16700 amoco nt

GOG
EXPL. ~~WELL~~ FILE
2/11-1

oslo, september 11, 1969
eu-198-t-pjr
attn mr macartney

re well 2/11-1. since current available information will not allow us to project a total depth for the well which assures reaching either the top of the zechstein or the base of the zechstein we plan to program for drilling beyond 16000 feet and will set 7 inch casing, probably a liner, at approximately 15,500 feet unless a definitive formation change is encountered. as of september 11 sixty rig days have been required and we estimate an additional 8 days to 15,500. approved monies on well authorization allow 85 rig days. we would appreciate your advising if we should not plan to at least penetrate a complete section of mesozoic.

turner
16700 amoco n

FILE UNDER
ALL
COPY - ACCOUNTS

15.38 ✠
16700 amoco n
33000 amoco n
358/ld
sept 10th 1969

D.W.D.
C.R.

att: gr. d.w.danz

1 set core - chips will be sent from stavanger to amsterdam to-morrow sept 11, 1969 on sk-545, awb 117-7260250, arriving in amsterdam at 1350.
mr r.c.haller is informed.

dale

end

✠
16700 amoco n
33000 amoco n
em

MAKE NOW FILE COPIES FOR: ZH + (ROBERTSON RESEARCH LAB.) 2/11-1 O+G

16.45 ✠
16700 amoco n
research lnduls 61216 8 9 69

attention mr r turner

we have received samples a4, b4, w3, x3 and z2eee z 3 ✓ from the z/11-1 well. these samples are provisionally considered to be of kimmeridgian age.

sample y3 also received.

AV (TOP)

research lnduls
✠
16700 amoco n

17.25 ✠
16700 amoco n
amocoeurop ldn

for mr. d. danz 8th september 1969

aeu-661-mlh

robertson research company request that relative depth of samples be supplied for material sent from the 2/11-1 well.

i. macartney+++

sent 1725/08
✠
16700 amoco n
amocoeurop ldn

15.48 ✠
16700 amoco n
research lnduls

61216 9.9.69

attention mr rouble

following consignment of samples received from 2/11-1 well:

1 box of ditch cuttings received at stanstead 20.8.69.
1 large core box with large core pieces received at stanstead
w 27.8.69
1 parcel of ditch cuttings received via great yarmouth
6.9.69

no small box containing core chips received.

✠
16700 amoco n
research lnduls

19 Aug 69

Samples from Robertson

Code	Depth
A -	12,165
B -	11,950
C -	11,980
D -	12,000
E -	12,020
F -	12,040
G -	12,060
H -	12,070
I -	12,090
K -	12,110
L -	12,140
M -	12,160
N -	12,180
O -	12,200

Well 2/11-1 Exploration file

303 912+ 110

03 +? 47335+ +15 4703

08.58

amoned ut

33000 amoco n

346/la august 19, 1969

attn: dr r c natter

4 core boxes containing samples sent on awb 117-7260231, sas flight sk 545 today august 19th 1969.

please contact mr mel harper in london as soon as you have any information on the analysis or these samples.

snyder ++

amoned utud

33000 amoco n

FILE UNDER
11-2/11-1
P Reader PR
C R
EXPL. FILE

MISSING
8807 - 9540

17,550

12,953

101

12,351

F 15

Robertson Res. 2 is on the phone right now

17.14
16700 amoco n
research lnduls 61216 20 8 69

attention r turner

samples b, f, k, and p ee and o from 2/11-1 well have been examined palynologically, no diagnostic miospores other than t.ee forms suggesting a lower cretaceous - jurassic age are present.
work is still in progress.

TIME: 1030 (21 Aug)

TELEPHONE CONVERSATION WITH MR CHURCH (ROBERTSON RES. CAR). INDICATES NO ZECHSTEIN AND ALMOST CERTAIN UPPER JURASSIC FROM 11,950 - 12,200 FT.

CR.

research lnduls

16700 amoco n

CORE ANALYSES OF SIDEWALL CORES
TAKEN FROM TWO ZONES OF INTEREST
FROM AMOCO NORWAY OIL CO'S NO. 2/11-1

Age	Depth feet	Porosity %	Oil / Sat. % of Pore Space	Water Saturation % of Pore Space	Permeability (Md.) By Air	Permeability (Md.) By Liquid
Basal Tertiary Siltstone	8512	10.5	2.9	22.8	15.5	12.5
	8528	7.3	8.2	43.8	0.07	0.04
Upper Cretaceous Chalk (Upper Part)	8658	7.7	5.2	31.0	0.60	0.39
	8668	6.0	10.0	34.8	8.8	6.8

Lithological Description of Sidewall Core Samples
Taken From Hydrocarbon Bearing Zones Between
(8500 to 8668')

8500 - Po r sample(probably Shale or Clay)

8502 - Shale - slate grey, sli. soft, non-calcareous.

8504 - Shale - grey, non-calcareous, fairly soft, with very thin bands of siltstone, grey, very argill. No visible staining or porosity, but very dull fluor. along bands(siltstone)

8506 - Siltstone - lt. grey, very argill(approaching shale), very sli. calcareous. No visible porosity or stain.

8508 - Siltstone(as abv) with dark grey shale partings, exhibiting good sedimentary banding, with very dull fluor. along some "bands". Porosity very poor.

8510 - Siltstone - grey, calcareous, very argill. with shale partings. Fair to dull fluor along some bands(siltstone) No visible porosity, or stain.

8512 - Siltstone (as abv) approaching shale, no visible staining, or porosity, and very sli. dull fluor along some bands.

8514 - Siltstone(approaching a very fine grn'd to silt size sand), very argill., and very calcareous. No visible staining, fluor., or cut. Poor intergranular porosity.

8516 - Banded drk grey shale and grey very argillaceous siltstone (as above) very dull fluor along some bands.

8518 - Siltstone (as above). No visible fluor.

8520 - Siltstone - grey, very argillaceous with thin bands of shale (as above), with continued very dull fluor along some bands.

8522 - Siltstone (as abv) very argillaceous with trace of fossil amber. No visible stain, porosity or fluor.

8524 - Banded siltstone and grey shale(as abv). No visible porosity, or stain, but very dull fluor in bands(siltstone).

8526 - Siltstone - slate grey, very argillaceous approaching silty shale, with very sli. dull fluor along some bands.

8528 - Siltstone - drk grey, very argillaceous, non-calcareous, good sedimentary banding, with very drk grey shale partings. Some dull fluor along bands.

8530 - Bands of very thin siltstone and shale(as above) with continued very sli. dull fluor along some bands.

8532 - Siltstone - slate grey, very argillaceous, non-calc., with trace of fluor along bands.

8534 - Siltstone - (as abv) also approaching sli. silty shale No visible porosity or stain, and no fluor.

8536 - Shale (as abv) sli. silty, exhibiting good banding.

8538 - Siltstone - drk grey, very argillaceous, non-calc., with good sedimentary banding noted.

8540 - Siltstone (as abv) with grey shale partings(banded). No visible porosity, stain and very dull fluor along bands.

8542 - Shale - dark olive greenish grey, sli. soft, non-calc.

8544 - Siltstone - grey, very argillaceous(approaching shale) very sli. calc., very poor porosity and no stain.

8546 - Sandstone - lt. grey, silt to very fine grained, uniformly textured, very argillaceous and exhibits excellent sedimentary banding. Some dull fluor along some bands.

8548 - Shale - dark olive grn-grey, sli. soft, non-calc, micro/ pyritic. No fluor.

8560 - Shale - olive green(sli. pale apple grn), non-calc, micro/pyritic.

8649 - LOST

8658 - Chalk - cream, silt size, uniformly textured, pure, soft, excellent fluor, good cut yet very lightly stained.

8660 - Chalk (same as abv) excellecnt fluor, good cut but very light stain. Probably good porosity(25-30%), but permeablity questionable.

8668 - Chalk (same as above).

File Under
2/11-1

August 14, 1969

Mr. R. Haller
Amoco Netherlands Petroleum Company
Tolsteegsingle 2 A
Utrecht
Holland

Dear Sir:

As per your request, we are sending you the following electric logs and core descriptions.

1. Lithological descriptions of cores No. 2 & 3 taken from the Rotliegendes Formation in our 7/3-1 wildcat well.

2. Sonic Log-Gamma Ray from 7/3-1 (8800' - 15020').

3. Sonic Log-Gamma Ray from 2/11-1 (300 - 5642) and (5641 - 11299).

Yours very truly

R.R. Turner

Encl.

CR/amr

2/11-1
C. 66

F.W. Popp

D.W. Danz

Wellsite Geologist Schedule - 2/11-1 Well.

The following is a tentative wellsite geologist schedule for the drilling of the 2/11-1. Due to vacation scheduling a third geologist will be needed for the wellsite assignment during the periods indicated by (*).

	ORION				OSLO OFFICE			
	18 July	-	25 July	(RUBLE)	25 July	-	5 Aug	
	25 July	-	5 Aug	(MASON)	5 Aug	-	12 Aug	
	5 Aug	-	12 Aug	(RUBLE)	12 Aug	-	22 Aug	
	12 Aug	-	22 Aug	(MASON)	29 Aug	-	15 Sept	(Holiday)
	22 Aug	-	29 Aug	(RUBLE)	29 Aug	-	5 Sept	
*	29 Aug	-	5 Sept	(?)	5 Sept	-	16 Sept	
	5 Sept	-	16 Sept	(RUBLE)	22 Sept	-	27 Oct	(Holiday)
	16 Sept	-	23 Sept	(MASON)	23 Sept	-	30 Sept	
*	23 Sept	-	30 Sept	(?)	30 Sept	-	7 Oct	
	30 Sept	-	7 Oct	(MASON)	7 Oct	-	14 Oct	
*	7 Oct	-	14 Oct	(?)	14 Oct	-	21 Oct	
	14 Oct	-	21 Oct	(MASON)	21 Oct	-	28 Oct	

Original signed by

D. W. Danz

D.W. Danz

DWD/sec.

cc: Mr. M. Mason
Mr. C. Ruble

2/11-1

Decca Coordinates

as rec'd by phone 12-6-69

report in mail 13th.

56° 14' 16.225" N.

03° 27' 04.019" E.

12-6-69

S. Leo. D.

water depth = 22'

May 27, 1969

PR-102

Re: Authorization - Well 2/11-1.

Mr. K.G. Reed
Amerada Petroleum Corporation

Mr. J.W. Cooke
Texas Eastern Transmission Corp.

Mr. B.J. Bommen
Norwegian Oil Consortium

Gentlemen:

We are requesting your approval to drill exploratory well 2/11 contingent on final awarding of block 2/11 to the Amoco-Noco Group. An authorization for expenditure is attached for your approval.

We have also attached a proposed drilling and completion program, a geological memorandum and a seismic display panel which illustrates the proposed location and the expected geological horizons.

Our current approved budget has $ 4,787,000 for exploratory well expenditures during the current year. Well 7/3-1 has an authorized expenditure of $ 2,336,200 and sufficient monies remain in the budget to cover the estimated $ 2,339,000 for well 2/11-1.

Please sign and return one copy of the attached well authorization to indicate your approval.

Yours very truly,

Original signed by
F. W. Popp
F.W. Popp

cc. Mr. R.R. Aune

b.n.- Reference our letter of May 8, 1969
File: PR-84/EU-28.

PJR/bls

Expl.

AMOCO NORWAY OIL COMPANY

(FOREIGN CORPORATION)

6 FRIDTJOF NANSENS PLASS

TELEPHONES: 42 32 05 - 42 56 38 OSLO - NORWAY CABLE: AMERINTOIL - OSLO

May 8, 1969

PR-84/EU-28

Re: Form 850,
Well 2/11-1

Mr. R.R. Aune
Amoco Europe Inc.
46/47 Pall Mall
London S.W.1.

Dear Sir:

We are forwarding herewith for your approval and further handling a form 850 to drill well 2/11-1 in the Norwegian offshore area. This 850 is accompanied by the proposed drilling and completion program, a geological memorandum and a seismic panel display which illustrates the proposed location and the expected geologic horizons.

We do not yet have the production license for Block 2/11 and consequently all approvals and authorizations for drilling well 2/11-1 would be considered contingent on the award of this block. However, as the completion of well 7/3-1 could coincide with the award date, we consider it adviseable that we have the prior approval for well 2/11-1 in hand. You are aware that after the General Office approval is obtained, we must then obtain approval from our associates.

For your information, there are adequate monies available in the Amoco-Noco group budget for the drilling of this well. However, the Amoco Norway budget may require a supplement as shown below.

	Amoco Noco Group		Amoco Norway	
Well	Authorization (gross)	Budget (gross)	Well Authorization net per 850	Net AIOC Approval
7/3-1	2,336,200	2,348,000	661,850	523,000 2nd qtr
2/11-1	2,339,000	2,439,000	650,750	612,000 3rd qtr
Total	4,675,200	4,787,000	1,312,600	1,135,000

Gross $ 112,000 under

Net $ 178,000 over for two wells.

We consequently are advising you of the probable need to request AIOC for a budget supplement. We are delaying an official request until the completion of 7/3-1 as it is currently running under the 850 forecast and a more realistic estimate of our requirements will then be possible.

The primary reason for the discrepancy in the Amoco Norway budget was that the $ 523,000 figure was proposed for a 11,000' well in block 3/7 (not acquired) rather than the actual 14,700' well in block 7/3.

Since we intend to use the attached form 850 for the other operators approval, the approved AIOC net budget figure has not been shown.

Yours very truly,

F.W. Popp

Encl.

cc. Mr. C.V. Walton w/attach

FWP/bls

FORM 850 3-65

AMOCO NORWAY OIL COMPANY
(NAME OF COMPANY)

WELL AUTHORIZATION

OPERATOR Amoco Norway Oil Co. BUDGET ITEM NUMBER _____

☒ DRILL ☐ RECOMPLETE ☐ REPAIR ☐ DEVELOPMENT WELL
☐ MULTIPLE COMPLETIONS ☐ CANCEL ☐ SUPPLEMENT NO. _____ ☒ EXPLORATORY WELL

WELL NAME 2/11 WELL NO. 1 FIELD Wildcat
COUNTRY Norway PROVINCE North Sea AREA License
LOCATION Shot point 860 Line 67-6 Latitude 56° 14' 09" North
Longitude 03° 27' 05" East
DEPTH 15,000 FORMATION Rotliegendes P.L. OUTLET _____ ESTIMATED PROD./DAY _____
LOCATION MEETS ☐ GOVERNMENTAL REGULATIONS ☐ EXCEPTION REQUIRED SPACING PATTERN-ACRES/WELL _____
COMPANY'S WORKING INTEREST 25%* COMPANY'S NET INTEREST _____ OTHER INTEREST (DESCRIBE) Amerada 25%,
Texas Eastern 25%, NOCO* 25% - But cost carried 15% 8515' to T.D.
CONTRACT EXPIRATION DATE _____ MUST COMMENCE ☐ OPERATIONS ☐ DRILLING BY _____ 19__
QUARTER TO START _____ QUARTER TO COMPLETE _____ APPROXIMATE MOBILIZATION TIME 6 days
EST. ULT. RECOVERY _____ BBLS _____ MMCF MONTHS TO PAY OUT _____ ROI _____

SHOW DATA ON OFFSET OR NEARBY WELLS IF AUTHORIZATION COVERS DRILLING OF A DEVELOPMENT WELL

COMPANY, AREA, AND WELL				
PAY. THICKNESS, & PROD. INTERVAL				
	POTENTIAL	LATEST TEST	POTENTIAL	LATEST TEST
DATE				
PROD. – OIL – WATER – GAS				
HOURS – CHOKE – GAS/OIL RATIO				
PRODUCING METHOD AND PRESSURES				
CUMULATIVE ☐ OIL-BBLS ☐ GAS-MMCF				

	GROSS AMOUNT
DRILLING INTANGIBLES	
DRILLING COST 15,000 FEET @ $ 10,800 PER FOOT Rig day for 85 days	$ 918,000
DAY WORK Boats (3) 85 days	190,000
CORING 10,000 SURVEYS 73,000 MUD 150,000 STIMULATION 20,000 PERF. 10,000	263,000
ROADS AND BRIDGES – DREDGING AND GRADING – FUEL AND WATER 42,500	42,500
CAMP EXPENSE 8500 MOBILIZATION 170,000 OTHER 412,000 see below**	590,500
TOTAL DRILLING INTANGIBLES	2,004,000
Miscellaneous	100,000
WELL EQUIPMENT – TANGIBLES	
CASING AND TUBING	205,000
WELLHEAD, ETC.	30,000
TOTAL WELL EQUIPMENT – TANGIBLES	235,000

	NET AMOUNT	TOTAL
TOTAL THIS AUTHORIZATION 36", 20", 13-3/8", 9-5/8" 7"	$ 650,750	$2,339,000
BUDGET ESTIMATE		
PREVIOUSLY AUTHORIZED		
TOTAL PREVIOUSLY AUTHORIZED PLUS THIS SUPPLEMENT		

REMARKS** Other Costs

Helicopter	150,000	Comp. Supv.	60,000
Divers	57,000	Loc.Survey	15,000
Cementing	40,000	Bits	66,000
Test Tools	10,000		
Radio & Forecast	14,000		

* NOCO participation in 2/11-
well cost.

25% to 8515'	254,750
10% 8515 to T.D.	132,000
ESTIMATED NOCO NET	386,750
3 other Operators NET TO EACH	650,750

☐ AUTHORIZED ☒ RECOMMENDED _____ DATE 2/[illegible]/69

☐ AUTHORIZED ☐ RECOMMENDED ☐ REJECTED _____ DATE

GENERAL OFFICE APPROVALS

PROD. DEPT. _____ DATE _____ EXPLOR. DEPT. _____ DATE _____

_____ DATE _____ _____ DATE _____

ACTION BY BOARD OF DIRECTORS _____ DATE _____

DRILLING AND COMPLETION PROGRAM

AMOCO NORWAY OIL COMPANY

DATE 30 April 1969

WELL NAME Block 2/11 WELL NO. 1 FIELD Wildcat

COUNTRY Norway PROVINCE North Sea AREA License

LOCATION Shot Point 860 line 67-6, Lat. 56° 14' 09" N, Long. 03° 27' 05" E.

OBJECT Exploratory test of Permian Rotliegendes and younger horizons

METHOD OF DRILLING TYPE TOOLS	DEPTH INTERVAL
Rotary	0 - TD

SPECIAL SURVEYS TYPE	DEPTH INTERVAL, ETC.
Induction Electric -SP	1200-TD(3)
Sonic-Gamma Ray	0-TD(1)
Formation Density-GR-Caliper	1200-TD
Epithermal Neutron-GR	5300-TD(2)
Laterolog	5300-TD(2)(3
Microlaterolog	5300-TD(2)(3
Dipmeter	5300-TD
Seismic Reference Velocity Survey	TD
Mud Log	480-TD

SPECIAL TEST TYPE	DEPTH INTERVAL, ETC.
Wire Line Formation Tester	As required and if hole conditions allow
Open hole D.S.T.	

REMARKS

(1) G.R. log in pipe to surface

(2) Evaluation logs over zones of interest.

(3) With Inv. Emul. mud use Dual.-Induction

APPROXIMATE DEPTHS OF GEOLOGICAL MARKERS

ESTIMATED ELEVATION RDB + 100' Water Depth 228'

Top MARKER	K. DEPTH B	Sub SEA ELEVATION
Eocene	5300	5200
U.Cretaceous	8900	8800
L.Cretaceous	9200	9100
Triassic	9800	9700
Perm. Zechstein	10300	10200
Perm. Rotliegendes	14100	14000

TOTAL DEPTH 15000' Subsea

* POSSIBLE PAY ✲ PROBABLE COMPLETION INTERVAL

DRILL CUTTING SAMPLES FREQUENCY	DEPTH INTERVAL
30'	480-1200
20'	1200-5300
10'	5300-TD

DRILLING TIME FREQUENCY	DEPTH INTERVAL
5'	0-TD

REMARKS

Sample interval subject to change by well site geologist. Government requires 30' washed samples. Catch 3 sets of washed and 2 sets of un-washed samples.

MUD PROGRAM

APPROXIMATE INTERVAL	TYPE MUD	WEIGHT #/GAL	VISCOSITY SEC. API	W. L. CC/30M	OTHER SPECIFICATIONS
0-480	Sea Water-Gel	8.6-9.0	70-90	-	-
480-5300	Sea Water, Inhib Lignosulfonate	9.0-10.0	50-60	6-12	4-6% Diesel
5300-10300	"	11.0-11.5(1)	40-50	3-6	2-3% Diesel
10300-TD	Inv.Emul. or Sat.Salt(2)	11.5-14.5(1)	40-50	2-5	3-4% Diesel

REMARKS

(1) Mud will be weighted higher if hole conditions warrant

(2) Salt saturation of system or conversion to inverted emulsion to be done prior to drilling out casing shoe at 10,300 feet.

CASING PROGRAM RDB

CASING STRING	EST. DEPTH	CASING SIZE*	HOLE SIZE*	SX. CEMENT	TYPE CEMENT	DESCRIPTION OF LANDING POINT, ETC.
CONDUCTOR	480	36	36-26		Drive Pipe	-
SURFACE	1200	20	26	1800	Class A+$CaCl_2$	-
INTERMEDIATE	5300	13-3/8	17-1/2(1)	2400	Class A+gel	-
OIL STRING	10300	9-5/8	12-1/4	1800	Class B retarded	Top Zechstein
LINER CASING	15000	7	8-1/2	800	Class B retarded(2)	Rotliegendes

REMARKS

(1) Drill 12-1/4" hole - log- open hole to 17-1/2"

(2) Salt saturated if set through Zechstein

* NORMAL. THE TUBULAR GOODS ALLOCATION LETTER SPECIFIES CASING SIZES TO BE USED. HOLE SIZES WILL BE GOVERNED BY CONTRACT.

CORING PROGRAM

Side wall cores and conventional cores will be taken at selected intervals of interest.

COMPLETION PROGRAM

Testing program dependent on evaluation of data. Upon completion of testing, the well bore will be plugged for permanent abandonment and marine conductors removed.

GENERAL REMARKS

PREPARED BY | APPROVED: | APPROVED:

Expl. File

FORM. 892 -N

AMOCO NORWAY OIL COMPANY

MEMORANDUM

To: Mr. F.W. Popp Date: May 7, 1969

From: Mr. D.W. Danz Reference: EXPL/5

Subject: Amoco Norway Drilling Location --- Well No. 2/11-1

I. Location: AMOCO-NOCO Group License (applied for)
Block 2/11
Seismic Line' SSL 67-6, Shotpoint 860
Coordinates:
56° 14' 09" North
03° 27' 05" East
Approximately 350 kilometers (210 miles) southwest of Tananger, Norway.

II. Water Depth: 228 feet (SSL fathometer data)

III. Total Depth: 15,000 feet sub-sea.

IV. Objective: To adequately test any indicated potential pay zone(s) while drilling to the total depth, currently calculated to be in the lower Permian Rotliegendes formation.

V. Structure: The structure to be tested is sometimes referred to as the "2/8 structure" because approximately 65 % of its area is contained in the 2/8 block of AMOCO-NOCO License 006. It has been previously described in relation to the 2/8-1 exploratory test and a proposed 2/8-2 test. Briefly, it is a large anticlinal structure located along the axis of the Tertiary basin. It was primarily formed by a Zechstein salt diapir in combination with pre-Zechstein faulting. On the "B" seismic horizon (base Tertiary) the vertical closure is 900 feet and the areal closure is 32,000 acres.

VI. Reference: Display Panel (December 1967) for 2/8-1 with revision (May 1969) for 2/11-1.
(Copy attached.)

Original signed by
D. W. Danz

D.W. Danz

Attachment

DWD/amr

AMOCO NORWAY OIL COMPANY

(FOREIGN CORPORATION)

6 FRIDTJOF NANSENS PLASS

TELEPHONES: 42 32 05 - 42 56 38 OSLO - NORWAY CABLE: AMERINTOIL - OSLO

May 8, 1969

PR-84/EU-28

Re: Form 850,
Well 2/11-1

Mr. R.R. Aune
Amoco Europe Inc.
46/47 Pall Mall
London S.W.1.

Dear Sir:

We are forwarding herewith for your approval and further handling a form 850 to drill well 2/11-1 in the Norwegian offshore area. This 850 is accompanied by the proposed drilling and completion program, a geological memorandum and a seismic panel display which illustrates the proposed location and the expected geologic horizons.

We do not yet have the production license for Block 2/11 and consequently all approvals and authorizations for drilling well 2/11-1 would be considered contingent on the award of this block. However, as the completion of well 7/3-1 could coincide with the award date, we consider it adviseable that we have the prior approval for well 2/11-1 in hand. You are aware that after the General Office approval is obtained, we must then obtain approval from our associates.

For your information, there are adequate monies available in the Amoco-Noco group budget for the drilling of this well. However, the Amoco Norway budget may require a supplement as shown below.

	Amoco Noco Group		Amoco Norway	
Well	Authorization (gross)	Budget (gross)	Well Authorization net per 850	Net AIOC Approval
7/3-1	2,336,200	2,348,000	661,850	523,000
2/11-1	2,339,000	2,439,000	650,750	612,000
Total	4,675,200	4,787,000	1,312,600	1,135,000

Gross $ 112,000 under

Net $ 178,000 over for two wells.

We consequently are advising you of the probable need to request AIOC for a budget supplement. We are delaying an official request until the completion of 7/3-1 as it is currently running under the 850 forecast and a more realistic estimate of our requirements will then be possible.

The primary reason for the discrepancy in the Amoco Norway budget was that the $ 523,000 figure was proposed for a 11,000' well in block 3/7 (not acquired) rather than the actual 14,700' well in block 7/3.

Since we intend to use the attached form 850 for the other operators approval, the approved AIOC net budget figure has not been shown.

Yours very truly,

F.W. Popp

Encl.

cc. Mr. C.V. Walton w/attach

FWP/bls

AMOCO NORWAY OIL COMPANY

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Encl.

cc. Mr. C.V. Walton w/attach

FWP/bls

ORM 850 3-65

AMOCO NORWAY OIL COMPANY
(NAME OF COMPANY)

WELL AUTHORIZATION

PERATOR Amoco Norway Oil Co. BUDGET ITEM NUMBER

☒ DRILL ☐ RECOMPLETE ☐ REPAIR ☐ DEVELOPMENT WELL
☐ MULTIPLE COMPLETIONS ☐ CANCEL ☐ SUPPLEMENT NO. ☒ EXPLORATORY WELL

'ELL NAME 2/11 WELL NO. 1 FIELD Wildcat
OUNTRY Norway PROVINCE North Sea AREA License
OCATION Shot point 860 Line 67-6 Latitude 56° 14' 09" North
Longitude 03° 27' 05" East
EPTH 15,000 FORMATION Rotliegendes P.L. OUTLET ESTIMATED PROD./DAY
OCATION MEETS ☐ GOVERNMENTAL REGULATIONS ☐ EXCEPTION REQUIRED SPACING PATTERN-ACRES/WELL
OMPANY'S WORKING INTEREST 25%* COMPANY'S NET INTEREST OTHER INTEREST (DESCRIBE) Amerada 25%,
Texas Eastern 25%, NOCO * 25% - But cost carried 15% 8515' to T.D.
ONTRACT EXPIRATION DATE MUST COMMENCE ☐ OPERATIONS ☐ DRILLING BY 19
UARTER TO START QUARTER TO COMPLETE APPROXIMATE MOBILIZATION TIME 6 days
ST. ULT. RECOVERY BBLS MMCF MONTHS TO PAY OUT ROI

SHOW DATA ON OFFSET OR NEARBY WELLS IF AUTHORIZATION COVERS DRILLING OF A DEVELOPMENT WELL

OMPANY, AREA, AND WELL				
AY. THICKNESS, & PROD. INTERVAL				
	POTENTIAL	LATEST TEST	POTENTIAL	LATEST TEST
ATE				
ROD. - OIL - WATER - GAS				
OURS - CHOKE - GAS/OIL RATIO				
RODUCING METHOD AND PRESSURES				
UMULATIVE ☐ OIL-BBLS ☐ GAS-MMCF				

	GROSS AMOUNT
RILLING INTANGIBLES	
DRILLING COST 15,000 FEET @ $ 10,800 PER FOOT Rig day for 85 days	$ 918,000
DAY WORK Boats (3) 85 days	190,000
CORING 10,000 SURVEYS 73,000 MUD 150,000 STIMULATION 20,000 PERF. 10,000	263,000
ROADS AND BRIDGES - DREDGING AND GRADING - FUEL AND WATER 42,500	42,500
CAMP EXPENSE 8500 MOBILIZATION 170,000 OTHER 412,000 see below**	590,500
TOTAL DRILLING INTANGIBLES	2,004,000
Miscellaneous	100,000
ELL EQUIPMENT - TANGIBLES	
CASING AND TUBING	205,000
WELLHEAD, ETC.	30,000
TOTAL WELL EQUIPMENT - TANGIBLES	235,000

	NET AMOUNT	TOTAL
TOTAL THIS AUTHORIZATION 36", 20", 13-3/8", 9-5/8" 7"	$ 650,750	$2,339,000
BUDGET ESTIMATE		
REVIOUSLY AUTHORIZED		
OTAL PREVIOUSLY AUTHORIZED PLUS THIS SUPPLEMENT		

EMARKS** Other Costs

Helicopter	150,000	Comp. Supv.	60,000
Divers	57,000	Loc.Survey	15,000
Cementing	40,000	Bits	66,000
Test Tools	10,000		
Radio & Forecast	14,000		

* NOCO participation in 2/11-
well cost.

25% to 8515'	254,750
10% 8515 to T.D.	132,000
ESTIMATED NOCO NET	386,750
3 other Operators NET TO EACH	650,750

☐ AUTHORIZED ☒ RECOMMENDED — DATE 2/11/64

☐ AUTHORIZED ☐ RECOMMENDED ☐ REJECTED — DATE

GENERAL OFFICE APPROVALS

PROD. DEPT. — DATE — EXPLOR. DEPT. — DATE

DATE — DATE — DATE

ACTION BY BOARD OF DIRECTORS — DATE

ORM 850 3-65

AMOCO NORWAY OIL COMPANY
(NAME OF COMPANY)

WELL AUTHORIZATION

PERATOR Amoco Norway Oil Co. BUDGET ITEM NUMBER

☒ DRILL ☐ RECOMPLETE ☐ REPAIR ☐ DEVELOPMENT WELL

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Longitude 03° 27' 05" East

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ST. ULT. RECOVERY BBLS MMCF MONTHS TO PAY OUT ROI

SHOW DATA ON OFFSET OR NEARBY WELLS IF AUTHORIZATION COVERS DRILLING OF A DEVELOPMENT WELL

OMPANY, AREA, AND WELL				
AY. THICKNESS, & PROD. INTERVAL				
	POTENTIAL	LATEST TEST	POTENTIAL	LATEST TEST
ATE				
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RILLING INTANGIBLES	GROSS AMOUNT
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REVIOUSLY AUTHORIZED		
OTAL PREVIOUSLY AUTHORIZED PLUS THIS SUPPLEMENT		

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☐ AUTHORIZED ☒ RECOMMENDED

DATE 2/10/64

☐ AUTHORIZED ☐ RECOMMENDED ☐ REJECTED

DATE

GENERAL OFFICE APPROVALS

PROD. DEPT. DATE EXPLOR. DEPT. DATE

DATE DATE

ACTION BY BOARD OF DIRECTORS DATE

ORM 850 3-65

AMOCO NORWAY OIL COMPANY
(NAME OF COMPANY)

WELL AUTHORIZATION

PERATOR Amoco Norway Oil Co. BUDGET ITEM NUMBER _____

☒ DRILL ☐ RECOMPLETE ☐ REPAIR ☐ DEVELOPMENT WELL
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DATE 2/11/69

☐ AUTHORIZED ☐ RECOMMENDED ☐ REJECTED
DATE

GENERAL OFFICE APPROVALS
PROD. DEPT. DATE EXPLOR. DEPT. DATE
DATE DATE

ACTION BY BOARD OF DIRECTORS DATE

DRILLING AND COMPLETION PROGRAM

AMOCO NORWAY OIL COMPANY

DATE 30 April 1969

WELL NAME Block 2/11 WELL NO. 1 FIELD Wildcat

COUNTRY Norway PROVINCE North Sea AREA License

LOCATION Shot Point 860 line 67-6, Lat. 56° 14' 09" N, Long. 03° 27' 05" E.

OBJECT Exploratory test of Permian Rotliegendes and younger horizons

METHOD OF DRILLING TYPE TOOLS	DEPTH INTERVAL
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SPECIAL SURVEYS TYPE	DEPTH INTERVAL, ETC.
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Sonic-Gamma Ray	0-TD(1)
Formation Density-GR-Caliper	1200-TD
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Laterolog	5300-TD(2)(3
Microlaterolog	5300-TD(2)(3
Dipmeter	5300-TD
Seismic Reference Velocity Survey	TD
Mud Log	480-TD

REMARKS

SPECIAL TEST TYPE	DEPTH INTERVAL, ETC.
Wire Line Formation Tester	As required and if hole conditions allow
Open hole D.S.T.	

REMARKS

(1) G.R. log in pipe to surface
(2) Evaluation logs over zones of interest.
(3) With Inv. Emul. mud use Dual.-Induction

APPROXIMATE DEPTHS OF GEOLOGICAL MARKERS

ESTIMATED ELEVATION RDB + 100' Water Depth 228'

Top MARKER	K. DEPTH B	Sub ELEVATION Sea
Eocene	5300	5200
U.Cretaceous	8900	8800
L.Cretaceous	9200	9100
Triassic	9800	9700
Perm. Zechstein	10300	10200
Perm. Rotliegendes	14100	14000

TOTAL DEPTH 15000' Subsea

* POSSIBLE PAY # PROBABLE COMPLETION INTERVAL

DRILL CUTTING SAMPLES FREQUENCY	DEPTH INTERVAL
30'	480-1200
20'	1200-5300
10'	5300-TD

DRILLING TIME FREQUENCY	DEPTH INTERVAL
5'	0-TD

REMARKS

Sample interval subject to change by well site geologist. Government requires 30' washed samples. Catch 3 sets of washed and 2 sets of un-washed samples.

MUD PROGRAM

APPROXIMATE INTERVAL	TYPE MUD	WEIGHT #/GAL	VISCOSITY SEC. API	W. L. CC/30M	OTHER SPECIFICATIONS
0-480	Sea Water-Gel	8.6-9.0	70-90	-	-
480-5300	Sea Water, Inhib Lignosulfonate	9.0-10.0	50-60	6-12	4-6% Diesel
5300-10300	"	11.0-11.5(1)	40-50	3-6	2-3% Diesel
10300-TD	Inv.Emul. or Sat.Salt(2)	11.5-14.5(1)	40-50	2-5	3-4% Diesel

REMARKS

(1) Mud will be weighted higher if hole conditions warrant

(2) Salt saturation of system or conversion to inverted emulsion to be done prior to drilling out casing shoe at 10,300 feet.

CASING PROGRAM RDB

CASING STRING	EST. DEPTH	CASING SIZE*	HOLE SIZE*	SX. CEMENT	TYPE CEMENT	DESCRIPTION OF LANDING POINT, ETC.
CONDUCTOR	480	36	36-26		Drive Pipe	-
SURFACE	1200	20	26	1800	Class A+$CaCl_2$	-
INTERMEDIATE	5300	13-3/8	17-1/2(1)	2400	Class A+gel	-
OIL STRING	10300	9-5/8	12-1/4	1800	Class B retarded	Top Zechstein
LINER CASING	15000	7	8-1/2	800	Class B retarded(2)	Rotliegendes

REMARKS

(1) Drill 12-1/4" hole - log- open hole to 17-1/2"

(2) Salt saturated if set through Zechstein

* NORMAL. THE TUBULAR GOODS ALLOCATION LETTER SPECIFIES CASING SIZES TO BE USED. HOLE SIZES WILL BE GOVERNED BY CONTRACT.

CORING PROGRAM

Side wall cores and conventional cores will be taken at selected intervals of interest.

COMPLETION PROGRAM

Testing program dependent on evaluation of data. Upon completion of testing, the well bore will be plugged for permanent abandonment and marine conductors removed.

GENERAL REMARKS

FORM. 592 -N

AMOCO NORWAY OIL COMPANY

MEMORANDUM

To: Mr. F.W. Popp **Date:** May 7, 1969

From: Mr. D.W. Danz **Reference:** EXPL/5

Subject: Amoco Norway Drilling Location --- Well No. 2/11-1

I. Location: AMOCO-NOCO Group License (applied for)
Block 2/11
Seismic Line' SSL 67-6, Shotpoint 860
Coordinates:
56° 14' 09" North
03° 27' 05" East
Approximately 350 kilometers (210 miles) southwest of Tananger, Norway.

II. Water Depth: 228 feet (SSL fathometer data)

III. Total Depth: 15,000 feet sub-sea.

IV. Objective: To adequately test any indicated potential pay zone(s) while drilling to the total depth, currently calculated to be in the lower Permian Rotliegendes formation.

V. Structure: The structure to be tested is sometimes referred to as the "2/8 structure" because approximately 65 % of its area is contained in the 2/8 block of AMOCO-NOCO License 006. It has been previously described in relation to the 2/8-1 exploratory test and a proposed 2/8-2 test. Briefly, it is a large anticlinal structure located along the axis of the Tertiary basin. It was primarily formed by a Zechstein salt diapir in combination with pre-Zechstein faulting. On the "B" seismic horizon (base Tertiary) the vertical closure is 900 feet and the areal closure is 32,000 acres.

VI. Reference: Display Panel (December 1967) for 2/8-1 with revision (May 1969) for 2/11-1.
(Copy attached.)

D.W. Danz

Attachment

DWD/amr

Mr. F. W. Popp

Mr. D. W. Danz

May 7, 1969

EXPL/5

Amoco Norway Drilling Location ---- Well No. 2/11-1.

I. Location: AMOCO-NOCO Group License (applied for)
Block 2/11
Seismic Line, SSL 67-6, Shotpoint 860
Coordinates:
56° 14' 09" North
03° 27' 05" East
Approximately 350 kilometers (210 miles) southwest of Tananger, Norway.

II. Water Depth: 228 feet (SSL fathometer data)

III. Total Depth: 15,000 feet sub-sea.

IV. Objective: To adequately test any indicated potential pay zone(s) while drilling to the total depth, currently calculated to be in the lower Permian, Rotliegendes formation.

V. Structure: The structure to be tested is sometimes referred to as the "2/8 structure" because approximately 65 % of its area is contained in the 2/8 block of AMOCO-NOCO License 006. It has been previously described in relation to the 2/8-1 exploraty test and a proposed 2/8-2 test. Briefly, it is a large anticlinal structure located along the axis of the Tertiary basin. It was primarily formed by a Zechstein salt diapir in combination with pre-Zechstein faulting. On the "B" seismic horizon (base Tertiary) the vertical closure is 900 feet and the areal closure is 32,000 acres.

VI Reference: Display Panel (December 1967) for 2/8-1, with revision (May 1969) for 2/11-1.

D. W. Danz

DWD/sec

Memorandum paper

To: Mr. F.W. Popp

Date: ~~April 30~~ May 7, 1969

From: Mr. D.W. Danz

Reference: EXPL/5
Well No.

Subject: Amoco Norway Drilling Location ---2/11-1

I Location: AMOCO-NOCO Group License (applied for)
Block 2/11
Seismic Line, SSL 67-6, Shotpoint 860
Coordinates:

56° 14' 09" North
03° 27' 05" East

Approximately 350 kilometers (210 ~~mts~~ miles)
southwest of Tanager, Norway.

II Water Depth: 288 feet (SSL fathometer data)

III Total Depth: 15,000 feet sub-sea.

IV Objective: To adequately test any indicated potential pay zone(s) while drilling to the total depth, currently calculated to be in the lower Permian, Rotliegendes formation.

V Structure: The structure to be tested is sometimes referred to as the "2/8 structure" because approximately 65% of its area is contained in the 2/8 block of AMOCO-NOCO License 006. It has been previously described in relation to the 2/8-1 exploratory test and a proposed 2/8-2 test. Briefly, it is a large anticlinal structure located along the axis of the Tertiary basin. It was primarily formed by a Zechstein salt diapir in combination with pre-Zechstein faulting. On the "B" seismic horizon (base Tertiary) the vertical closure is 900 feet and the areal closure is 32,000 acres.

VI Reference: Display Panel (December 1967) for 2/8-1, with revision (May 1969) for 2/11-1.

D.W. Danz

DWD/.....

FORM. 502 -N

AMOCO NORWAY OIL COMPANY

MEMORANDUM

To: Mr. F.W. Popp **Date:** March 19, 1969

From: Mr. D.W. Danz **Reference:**

Subject: Amoco Norway Drilling Location --- Well No. 7/3-1

I. Location: AMOCO-NOCO Group License 005
Block 7/3
Seismic Line SSL 66-14, Shotpoint 2092
Coordinates: 57° 50' 32" North
02° 45' 00" East
Approximately 235 kilometers (140 miles) southwest of Tananger, Norway.

II. Water Depth: 228 feet (SSL fathometer data)

III. Total Depth: 14,700 feet sub-sea.

IV. Objective: 1) To adequately test, for possible hydrocarbon accumulation, the lower Permian Rotliegendes formation and/or other pre-Zechstein formations within the programed T.D.

2) To adequately test any indicated potential pay zone encountered while drilling to the primary objective.

V. Structure: ("E" Seismic Horizon) Base Zechstein
Vertical Closure: 1,500 feet
Horizontal Closure: 80,000 acres

VI. References: 1) Display Panel (March, 1969) for subject well, 7/3-1

2) Seismic Report w/maps by S. McColl, Feb.'67.

VII. Discussion:

The subject exploratory test, 7/3-1, is located, primarily to test the pre-Zechstein sedimentary section, currently thought to include the lower Permian Rotliegendes formation in this area. The structural configuration at this depth is indicated on the seismic map insert ("E" horizon) of the referenced "display panel". The broad "E" structure is fault-controlled on the west by a north-south trending major fault having an indicated maximum throw of over 2,000 feet at the "E" horizon. Structural closure is considered reliable in all directions although somewhat complicated by faulting in the north.

The "display panel" contains west-east seismic sections from SSL Lines 66-07 and 66-09 showing good evidence for the N-S major fault. Character of the "E" reflection in this area is good and the "E" Horizon interpretation is therefore considered to be reliable. The seismic section of north-south SSL Line 66-14 shows the location of the subject test, 7/3-1. It also shows the faulted structural closure to the north as well as a "cut" of the south end of the major fault. Again, "E" reflection character is good, correlations across fault cuts are reliable. Depth computations are based on velocity analyses and resulting interval velocity functions.

The secondary objectives are potential pay zones in the upper Permian and post-Permian formations. No structural closure is indicated at the 7/3-1 location on the mapped seismic horizons in this interval. However, possible hydrocarbon accumulations in these zones cannot be precluded.

No known adequate test of the Rotliegendes formation has been made in the Norwegian offshore area. The Phillips 16/11 test, 27 kilometers north-northwest, was D&A at a T.D. of 10,005 feet in the Zechstein salt following mechanical difficulties. The Shell 17/10-1, 32 kilometers northeast, was D&A at a T.D. of 11,779 feet in the Zechstein salt.

The proposed exploratory test, 7/3-1, is considered to be in an excellent location for the desired test of the Rotliegendes formation in the Norwegian offshore area. The objective depth is reasonable compared to deeper portions of the Tertiary basin and the structure, as mapped, should provide the necessary entrapment of potential hydrocarbons.

D.W. Danz

DWD/amr

DRILLING AND COMPLETION PROGRAM
AMOCO NORWAY OIL COMPANY

FILE NO.
DATE 30 April 1969

WELL NAME Block 2/11 WELL NO. 1 FIELD Wildcat

COUNTRY Norway PROVINCE North Sea AREA License

LOCATION Shot Point 860 line 67-6, Lat. 56° 14' 09" N, Long. 03° 27' 05" E.

OBJECT Exploratory test of Permian Rotliegendes and younger horizons

METHOD OF DRILLING TYPE TOOLS	DEPTH INTERVAL
Rotary	0 - TD

SPECIAL SURVEYS TYPE	DEPTH INTERVAL, ETC.
Induction Electric -SP	1200-TD
Sonic-Gamma Ray	0-TD (1)
Formation Density-GR-Caliper	1200-TD
Epithermal Neutron-GR	5300-TD (2)
Laterolog	5300-TD (2)
REMARKS	
Microlaterolog	5300-TD (2)
Dipmeter	5300-TD
Seismic Reference Velocity Survey	TD
Mud Log	480-TD

SPECIAL TEST TYPE	DEPTH INTERVAL, ETC.
Wire Line Formation Tester	As required and if hole conditions allow
Open hole D.S.T.	

REMARKS
(1) G.R. log in pipe to surface
(2) Evaluation logs over zones of interest.

APPROXIMATE DEPTHS OF GEOLOGICAL MARKERS

ESTIMATED ELEVATION RDB + 100' Water Depth 228'

Top MARKER	K. DEPTH B	Sub ELEVATION Sea
Eocene	5300	5200
U.Cretaceous	8900	8800
L.Cretaceous	9200	9100
Triassic	9800	9700
Perm. Zechstein	10300	10200
Perm. Rotliegendes	14100	14000

TOTAL DEPTH 15000' Subsea

* POSSIBLE PAY # PROBABLE COMPLETION INTERVAL

DRILL CUTTING SAMPLES FREQUENCY	DEPTH INTERVAL
30'	480-1200
20'	1200-5300
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DRILLING TIME FREQUENCY	DEPTH INTERVAL
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REMARKS
Sample interval subject to change by well site geologist. Government requires 30' washed samples. Catch 3 sets of washed and 2 sets of un-washed samples.

MUD PROGRAM

APPROXIMATE INTERVAL	TYPE MUD	WEIGHT #/GAL	VISCOSITY SEC. API	W. L. CC/30M	OTHER SPECIFICATIONS
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5300-10300	"	11.0-11.5 (1)	40-50	3-6	2-3% Diesel
10300-TD	Inv.Emul. or Sat.Salt (2)	11.5-14.5 (1)	40-50	2-5	3-4% Diesel

REMARKS
(1) Mud will be weighted higher if hole conditions warrant
(2) Salt saturation of system or conversion to inverted emulsion to be done prior to drilling out casing shoe at 10,300 feet.

CASING PROGRAM RDB

CASING STRING	EST DEPTH	CASING SIZE*	HOLE SIZE*	SX. CEMENT	TYPE CEMENT	DESCRIPTION OF LANDING POINT, ETC.
CONDUCTOR	480	36	36-26	Drive Pipe		-
SURFACE	1200	20	26	1800	Class A+$CaCl_2$	-
INTERMEDIATE	5300	13-3/8	17-1/2 (1)	2400	Class A+gel	-
OIL STRING	10300	9-5/8	12-1/4	1800	Class B retarded	Top Zechstein
LINER CASING	15000	7	8-1/2	800	Class B retarded (2)	Rotliegendes

REMARKS
(1) Drill 12-1/4" hole - log- open hole to 17-1/2"
(2) Salt saturated if set through Zechstein

* NORMAL THE TUBULAR GOODS ALLOCATION LETTER SPECIFIES CASING SIZES TO BE USED. HOLE SIZES WILL BE GOVERNED BY CONTRACT.

CORING PROGRAM

Side wall cores and conventional cores will be taken at selected intervals of interest.

COMPLETION PROGRAM

Testing program dependent on evaluation of data. Upon completion of testing, the well bore will be plugged for permanent abandonment and marine conductors removed.

Expl. Copy

GENERAL REMARKS

9-4-69

Amoco Norway Well No. 2/11-1

Location: Seismic line SSh 67-6, Shotpoint 860

Coordinates: 56° 14' 09" North
03° 27' 05" East

Water Depth = 228 feet

T.D. 15,000 feet

	Sub-sea
Top Eocene	5200'
" Upper Cretaceous	8800'
" lower Cretaceous	9100'
" Triassic	9700'
" Perm. Zechstein	10,200'
" Perm. Rotliegendes	14,000'

D. W. D.