



May 17, 1993

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NOT TO BE FILED

INTER-OFFICE CORRESPONDENCE / SUBJECT:

Transmittal of: Biostratigraphy and  
Paleoenvironmental Interpretation of the  
2/4-8X and 2/4-7X wells, Tor Field, North Sea

Exploration Report No. 14913  
Job No. NE0214

TO: N. Marshall  
B212  
Stavanger, Norway

FROM: C. R. Young (#1RK)CR.Y, L. C. Yang-Logan (#0UI) *LCYL*  
256 GB, Ext. 9501 151 GB, Ext. 6243

Please find enclosed 12 copies of the captioned report. Nannoplankton and Micropaleontology indicate Core from the 9,795 - 10,635 ft. interval of the 2/4 8X well penetrated sediments ranging in age from late Danian-early Thanetian (late NP 4-NP 5) to late Santonian-early Campanian (KPN 16-20). Micropaleontology indicates cutting samples from the 9,300 - 11,440 ft. interval of the 2/4-7X well penetrated sediments ranging in age from early Eocene to Maastrichtian. These interpretations are based on reevaluation of range chart data obtained from Robertson Research reports on the cited wells.

This final report supplements and replaces all previous interim FAX, PROFS, and phone reports regarding the 2/4 8X and 7X wells. This report comprises part of the reevaluation project of ten Robertson Research reports.

cc: M. N. McElroy (r) Exploration Records (RC), w/encl.  
*WDB* W. D. Byrd (r) D. R. Logan, w/encl. *WDB*  
N. P. Frey (r) K. Vagle w/encl.  
Exploration Records (RC), w/encl.

**BIOSTRATIGRAPHY  
AND  
PALEOENVIRONMENTAL INTERPRETATION  
OF THE  
2/4-8X AND 2/4-7X WELLS, TOR FIELD, NORTH  
SEA**

**Exploration Report No. 14913  
Job No. NE0214**

by

**DUPLICATE  
DO NOT FILE**

**NANNOFOSSILS - C. R. Young  
MICROPALEONTOLOGY - L. C. Yang-Logan**

**PHILLIPS PETROLEUM COMPANY  
RESEARCH AND SERVICES DIVISION  
GEOLOGY BRANCH  
BARTLESVILLE, OK 74004**

**MAY, 1993**

**BIOSTRATIGRAPHY**  
**AND**  
**PALEOENVIRONMENTAL INTERPRETATION**  
**OF THE**  
**2/4-8X WELL, TOR FIELD, NORTH SEA**  
**(RRI REPORT)**

**SUMMARY**

1. The following biostratigraphic zonation (nannoplankton and micropaleontology, Figure 1.) are present in the 9,795-10,635 ft. interval of the 2/4-8X well.
2. These interpretations are based on range chart data obtained primarily from Robertson Research Report #2395, 1978 on the 2/4-8X well.
3. The range chart data was based on core pieces; the sample depths are listed in the individual section(s) of the report and/or the Appendix.
4. We have placed boundaries at the lowest possible range to maintain consistency. For example; a boundary that occurs between 100 ft. and 200 ft. is placed at 200 ft., rather than 150 ft. (RRI follows the latter procedure). The former procedure is preferable when dealing with discontinuous and unevenly spaced data. It is up to the explorationist-exploitationist to adjust the boundary so it accurately reflects other geotechnical data.

COPY OF COPIES  
**BIOSTRAT & PALEOENV. SUMMARY**  
 2/4-8X NORTH SEA  
 NORWAY

DEPTH 1"=100'	micropaleontology		
	NANNO AGE	ENVIRONMENT	AGES
9795	8795 L NP 4/NP 5 (L. DAN.-E. THANAT.)	9795 -----ON (UB)	9795
8900	8885 E NP 4 (DANIAN)	8885 -----ON-UB	DAN IN P2 NSP1B R RWK AT 9925'
10000	10005 NP 3 (DANIAN)	9985 -----ON-UB LOW 02 AT 10123'	9985 DAN P1 NSP1A
	10035 NP 2 (DANIAN)		
	10065 NP 1 (DANIAN)		
10100	10115 BARREN	-----ON	10135
10200	10145	-----ON-UB	10135 MAA FCN21
10300	KPN 21A/26 (L. CAMP.-L. MAARST.)	10265 -----MN	10204
10400		10445 -----ON-UB	MAA FCN20
10500			
10600	10595 KPN 16/20 (L. SANT.-E. CAMP.)		
10635			

**NANNOPLANKTON BIOSTRATIGRAPHY**  
**AND**  
**PALEOENVIRONMENTAL INTERPRETATION**

The following nannoplankton zones are present in the 9,795-10,635 ft. interval of the 2/4-8X well. These interpretations are based upon range chart data obtained from the 2/4-8X RRI report.

<b>List of Samples Depth (Ft., MCD)</b>	<b>Age and Nannoplankton Zone by Sample (NP&amp;KPN)</b>	<b>Summary of Age and Nannoplankton Zones (NP&amp;KPN)</b>
9,795	L.Danian-E.Thanetian NP 4-NP 5	L.Danian-E.Thanetian NP 4-NP 5
9,885	Danian-E. NP 4	Danian-E. NP 4
9,913	Danian-E. NP 4	
9,925	Danian-E. NP 4	
10,005	Danian-NP 3	Danian-NP 3
10,035	Danian-NP 2	Danian-NP 2
10,065	Danian-NP 1	Danian NP 1
10,105	Danian-NP 1	
10,145	L.Camp.-L.Maast. 21a-26	L.Camp.-L. Maast.  21a-26
10,204	L.Camp.-L.Maast. 21a-26	
10,305	L.Camp.-L.Maast. 21a-26	
10,365	L.Camp.-L.Maast. 21a-26	
10,445	L.Camp.-L.Maast. 21a-26	
10,565	L.Camp.-L.Maast.  21a-26	
10,635	L.Sant.-E.Camp.-16-20	L.Sant.-E.Camp.-16-20

## DISCUSSION

### Interpretive Biostratigraphy-Paleoecologic Interpretation

- The E. NP 4/L. NP 4-NP 5 boundary occurs between core samples 9,855 and 9,795 ft.
- The NP 3/E. NP 4 boundary occurs between core samples 10,005 and 9,925 ft.
- The NP 2/NP 3 boundary occurs between core samples 10,035 and 10,005 ft.
- The NP 1/NP 2 boundary occurs between core samples 10,065 and 10,035 ft.
- The Cretaceous-Tertiary (K/T) boundary occurs between core samples 10,145 and 10,105 ft.
- The KPN 16-20/21a-26 boundary occurs between core samples 10,635 and 10,565 ft. It was arbitrarily placed at 10,595 ft. for legibility on the Biostrat. & Paleoenv. Summary chart.
- All samples examined were deposited under marine conditions.

## REFERENCES

- Martini, E., 1971. Standard Tertiary and Quaternary Calcareous Nannoplankton Zonation. In: A. Farinacci (ed.), Proceedings II Planktonic Conference, Roma, 1970, 2 pp. 739-785.
- Perch-Nielsen, K., 1986. Cenozoic Calcareous Nannofossils. In: H. M. Bolli et al (eds.), Plankton Stratigraphy, Cambridge University Press, pp. 427-554.
- \_\_\_\_\_, 1986. Mesozoic Calcareous Nannofossils. In: H. M. Bolli et al (eds.), Plankton Stratigraphy, Cambridge University Press, pp. 329-426.

MICROPALEONTOLOGY  
AND  
PALEOENVIRONMENTAL INTERPRETATION

DISCUSSION

The ages are listed by sequence of Stage, Standard Planktonic Foraminiferal Zones (Blow, 1969, Beggren and Van Couvering, 1974), and North Sea Zonations (King, 1989). "R" indicates presence of radiolarians on Figure 1.

Paleoenvironmental interpretations (Figure 1) derived from micropaleontology are abbreviated and listed below:

- RWK = reworked Cret. fauna
- MN = middle neritic depositional environment
- ON = outer neritic depositional environment
- UB = upper bathyal depositional environment
- Low O<sub>2</sub> = low oxygen conditions



## REFERENCES

- Carton, M., 1986. Cretaceous Planktonic Foraminifera (in) H. M. Bolli, et al (eds.), Plankton Stratigraphy. Cambridge University Press, pp. 17-86.
- Gradstein, F.M., et al, 1992. Cenozoic foraminiferal and dinoflagellate cyst biostratigraphy of the Central North Sea. *Micropaleont.* , v.38, n.2, pp. 101-137.
- King, C., 1989. Cenozoic of the North Sea (in) Jenkins, D.C. and Murray, J. W., (eds.), Stratigraphical Atlas of Fossil Foraminifera, Second Edition. Ellis Horwood Ltd, pp. 418-489.
- King, C. et al ,1989. Cretaceous of the North Sea (in) Jenkins, D.C. and Murray, J. W., (eds.), Stratigraphical Atlas of Fossil Foraminifera, Second Edition. Ellis Horwood Ltd, pp. 372-417.
- Toumarkine, M. and Luterbacher, H. 1986. Cretaceous Planktonic Foraminifera (in) H. M. Bolli, et al (eds.), Plankton Stratigraphy. Cambridge University Press, pp. 87-154.

APPENDIX

Core Pieces-Depths in feet from 2/4-8X

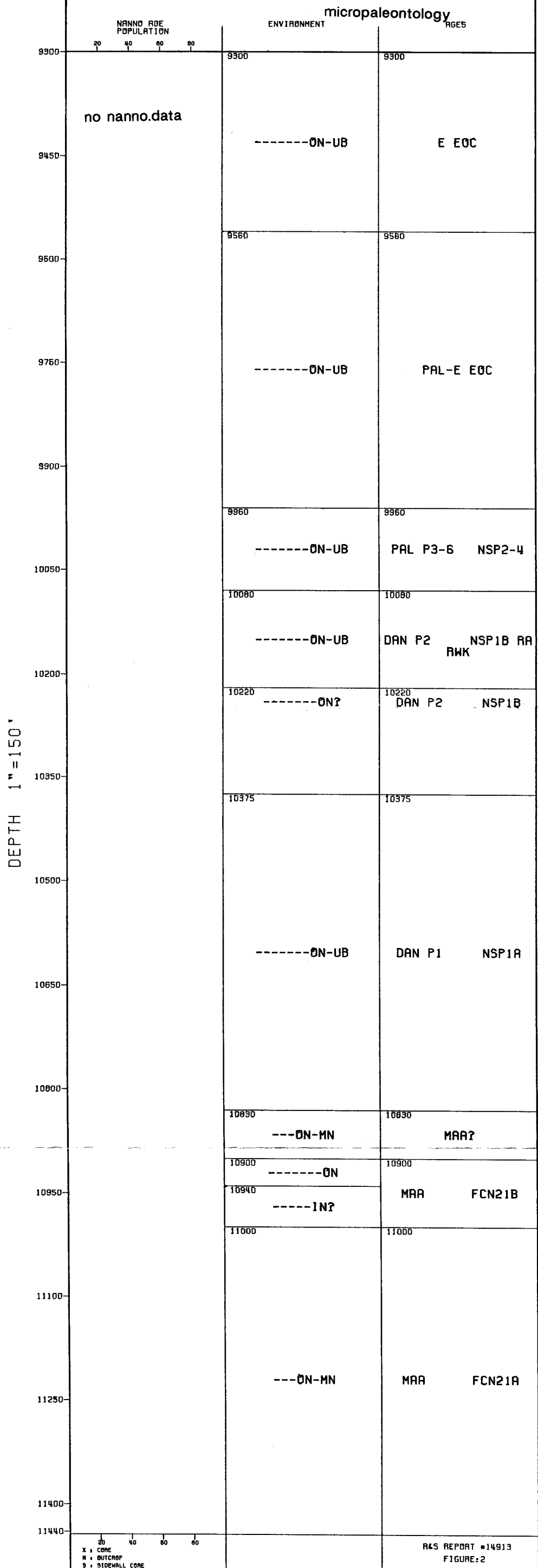
9,795  
9,825  
9,855  
9,885  
9,913  
9,926  
9,945  
9,965  
9,985  
10,005  
10,023  
10,035  
10,045  
10,063  
10,085  
10,105  
10,115  
10,125  
10,135  
10,145  
10,155  
10,165  
10,185  
10,204  
10,265  
10,285  
10,305  
10,325  
10,345  
10,365  
10,385  
10,445  
10,475  
10,505  
10,535  
10,565  
10,595  
10,635

**BIOSTRATIGRAPHY**  
**AND**  
**PALEOENVIRONMENTAL INTERPRETATION**  
**OF THE**  
**2/4-7X WELL, TOR FIELD, NORTH SEA**  
**(RRI REPORT)**

**SUMMARY**

1. The following zonations and paleoenvironmental interpretations (micropaleontology only) are present in the 9,300 - 11,440 ft. interval of the 2/4-7X well (Figure 2). Nannoplankton data is not available in this well.
2. This interpretation is based on range chart data obtained from the 2/4-7X Robertson Research Report No. 530, 1971.
3. Less precise age and paleoenvironmental determinations are possible in this well due to the data being from ditch cuttings.
4. Reworked species occur from 10,080-10,220 ft.

COPY OF COPIES  
 BIOSTRAT & PALEOENV. SUMMARY  
 2/4-7X NORTH SEA  
 NORWAY



DEPTH 1" = 150'

X : CORE  
 M : OUTCROP  
 S : SIDEWALL CORE

R4S REPORT #14913  
 FIGURE:2

**MICROPALAEONTOLOGY**  
**AND**  
**PALEOENVIRONMENTAL INTERPRETATION**

**DISCUSSION**

Micropaleontology ages are listed by sequence of Stage, Standard Planktonic Foraminiferal Zones (Blow, 1969 and Beggren and Van Couvering, 1974), and North Sea Zonations (King, 1989). "RA" indicates presence of radiolarians.

Paleoenvironmental interpretation (Figure 2) derived from micropaleontology are abbreviated and listed below:

IN	= inner neritic depositional environment
MN	= middle neritic depositional environment
ON	= outer neritic depositional environment
UB	= upper bathyal depositional environment
RWK	= reworked Cret. fauna

The fauna listed in RR Report No. 530 is less abundant than that of 2/4-8X Well. This could be attributed to a different paleoenvironmental setting or sample quality. Reworked species are present from 10,080 - 10,220 ft. The foraminiferal zones (P1 and P2) in the 2/4-8X core samples are inconsistent with the same foraminiferal zones determined from ditch samples from that well. The same inaccuracies might be expected in this well, were there both cuttings and core samples.

## REFERENCES

- Carton, M., 1986. Cretaceous Planktonic Foraminifera (in) H. M. Bolli, et al, (eds.), Plankton Stratigraphy. Cambridge University Press, pp. 17-86.
- Gradstein, F. M., et al, 1992. Cenozoic foraminiferal and dinoflagellate cyst biostratigraphy of the Central North Sea. *Micropaleont.*, v. 38, n. 2, pp. 101-137.
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- \_\_\_\_\_, et al, 1989. Cretaceous of the North Sea (in) Jenkins, D. C. and Murray, J. W., Stratigraphical Atlas of Fossil Foraminifera, Second Edition. Ellis Horwood Ltd, pp. 372-417.
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