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Phillips Petroleum Co Norway
4056, Stavanger
Norway

January 10, 1974

Attention Mr Basim Ziara

Dear Sirs,

Please find enclosed two copies of the Computer Processed Interpretation made on your well EKOFISK 2/4-3X.

We first processed with $Rw = .018$ as you requested. However, below 10900' we found $Sw = 88\%$ for 300' which seemed unlikely. After discussions between yourselves and our Stavanger office we decided to use $Rw = .026$.

Two copies of the CERT tape on this well are being prepared and will be forwarded to you and to PHILLIPS London next week.

If you have any questions regarding this interpretation, please call us or our Stavanger office.

Yours truly,



A. BAUDOT
Manager Log Interpretation Center

H.
PF/cp

8

ROBERTSON RESEARCH COMPANY LIMITED

OILFIELDS REPORT NO. 353

THE MICROPALAEONTOLOGY AND STRATIGRAPHY

OF THE PHILLIPS (NORWAY) 2/4-1AX

NORTH SEA WELL

by

J. W. CHURCH

C. W. HASKINS

R. V. HUGHES

Project No. ARP 690/610

Prepared for:

Phillips Petroleum Company,
Akersgaten 45,
Oslo 1,
NORWAY.

February, 1970.

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Micropalaeontological Analysis Charts Nos. 1 - 9

Biostratigraphic Chart showing the distribution
of the diagnostic Caenozoic and Mesozoic
Foraminifera and Ostracoda in the 2/4-1AX
North Sea Well.

INTRODUCTION

This report summarises the results of the micropalaeontological and stratigraphical analyses which have been carried out under Project No. ARP 690/610 on material received from the interval 2360' - 10840' of the Phillips (Norway) 2/4-1AX North Sea Well.

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

A relatively complete Tertiary sequence was encountered with chalk of Danian age present at the base. The well reached T.D. in Upper Cretaceous strata.

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

A summary of the sequence penetrated in this well can be seen 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 | 2360' - 2740' | + 380' | Upper Diestian | Lower Pliocene |
| B | 2760' - 3100' | + 340' | Lower Diestian | Upper Miocene |
| C | 3140' - 5240' | +2100' | - | Middle Miocene |
| D | 5260' - 5400' | + 140' | - | Middle - Lower Miocene |
| E | 5420' - 5940' | + 520' | Burdigalian |) Lower Miocene |
| F | 5960' - 6300' | + 340' | Aquitanian | |
| G | 6320' - 8710' | +2390' | - | Oligocene |
| H | 8740' - 8880' | + 140' | - | ?Upper - ?Middle Eocene |
| I | 8910' - 9500' | + 590' | - | Lower Eocene - Palaeocene |
| J | 9520' - 9920' | + 400' | - | Palaeocene |
| K | 9940' - 9960' | + 20' | ?Danian |) Lower Palaeocene |
| L | 9980' - 10660' | + 680' | Danian | |
| M | 10713' - 10810' | + 97' | Danian - Maestrichtian | Palaeocene - Upper Cretaceous |
| N | 10820' - 10840' | + 20' | Maestrichtian | Upper Cretaceous |

III

MATERIALS AND METHODS

Under Project No. ARP 690/610 a total of 335 ditch cutting samples, together with core chips from Core 1 and all Cores 2 - 8 were analysed utilising 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 2360' - 2740'; Upper Diestian, Lower Pliocene

General Lithology

This unit consists dominantly of soft, medium-grey clays together with trace amounts of colourless to white, fine-grained, angular sands. Small amounts of pyrites occur at 2500'. Traces of ironstone fragments are present locally throughout the interval.

Micropalaeontology and Stratigraphical Conclusions

Impoverished microfaunas are recorded from this interval which are dominated by species belonging to the genera Cassidulina, Nonion and Cibicides. The presence of such forms as Bulimina elongata var. tenera, Bulimina elongata var. subulata and Elphidium antoninum would suggest that the unit is of Lower Pliocene (Upper Diestian) age.

(b) Miocene

UNIT B, INTERVAL 2760' - 3100'; Lower Diestian, Upper Miocene

General Lithology

This unit is lithologically similar to the interval above, and consists of soft, medium grey clays, with localised intercalations of colourless to white, fine-grained, subangular sands. Trace amounts of thin-shelled lamellibranch fragments are present in the interval from 2780' - 2860'. Fragments of ironstone occur rarely between 3020' and 3080'.

Micropalaeontology and Stratigraphical Conclusions

A change in the microfaunal content of the samples is noted at 2760' with moderate faunas containing such forms as Cibicides peelensis, Cibicides pseudoungerianus, Bolivina beyrichi and Dentalina soluta being noted. These forms would indicate that the Lower Diestian stage of the Upper Miocene has been encountered. Moderate faunas dominated by species of Bulimina and Cassidulina are noted throughout this interval except between 2920' - 3000' where the faunas become impoverished. Reworked, red-stained, Oligocene-Miocene foraminifera are seen at 2760', 2920' and 3060'.

UNIT C, INTERVAL 3140' - 5240'; Middle Miocene

General Lithology

This interval consists predominantly of light to medium greyish brown, shaly mudstones and shales. Localised developments of greyish-brown limestone occur from 3720' - 3980' and 4830' - 4980'. Traces of pyrites and fine-grained sands are associated with the mudstones and shales between 3140' and 3700'. Below 5220' small amounts of light grey, sucrosic dolomite are also present.

Micropalaeontology and Stratigraphical Conclusions

This interval has been assigned to the Middle Miocene in the basis of the microfaunas present. It has been possible to further subdivide this section as follows:

INTERVAL 3140' - 3740'

The top of the Middle Miocene is marked by the incoming of such forms as Cancris auriculus and Loxostomum sinuosum closely followed by Globigerina angustum-bilicata.

The upper section of this interval (3140' - 3340') contains only moderate to poor microfaunas which, however, become much richer below

3340'. An increase in the numbers of Uvigerina asperula is noted at 3360', while below 3400' rare specimens of Uvigerina hosiusi are recorded.

Planktonic foraminifera become common towards the base of this section.

INTERVAL 3760' - 4820'

At 3760' the fauna contains frequent specimens of Uvigerina hosiusi and this form remains a noticeable component of the fauna throughout the remainder of the interval. Rich faunas are again noted at the top of this interval but become more impoverished below 3920'.

INTERVAL 4530' - 5200'

Impoverished faunas are present throughout this interval which are essentially similar to those noted above with the addition of arenaceous foraminifera. These latter forms may signify a deeper environment of deposition than existed for the overlying interval.

INTERVAL 5220' - 5240'

A marked change in the faunal assemblage was noted in these two samples with moderate to rich microfaunas containing common specimens of small planktonic foraminifera and Radiolaria.

UNIT D, INTERVAL 5260' - 5400'; Lower - Middle Miocene

General Lithology

This interval consists of light grey to medium greyish-brown, shaly mudstones and shales, which are associated with moderate amounts of light grey, sucrosic dolomite between 5260' and 5340'.

Micropalaeontology and Stratigraphical Conclusions

Moderate faunas are encountered at the top of this interval, but tend to become impoverished with depth. The forms present are similar to those noted in the overlying unit and would suggest a Middle Miocene age. However, a few specimens of Globorotalia scitula scitula are recorded.

This species, although it is a relatively long-ranging form, can be taken in this area of the North Sea as an indicator of the Lower Miocene. Due, therefore, to the lack of conclusive evidence a Lower - Middle Miocene age has been assigned the unit.

UNIT E, INTERVAL 5420' - 5940'; Burdigalian, Lower Miocene

General Lithology

The samples received from this interval comprise ditch cuttings from 5420' - 5460' and 5520' - 5940' and cores from 5461' - 5509'. The cores consist of olive-green, calcareous, shaly mudstones and dark greyish green to dark green, micaceous shales. The ditch cuttings consist of dark greyish-green to dark greyish-brown shales and shaly mudstones together with occasional thin intercalations of dolomites and limestones. The dolomites are greenish-grey, occasionally brown in colour and cryptocrystalline to sucrosic. The limestones are generally buff and microcrystalline.

Micropalaeontology and Stratigraphical Conclusions

Definite Lower Miocene foraminifera are noted at the top of this unit with the occurrence of Globorotalia cf. fohsi barisanensis, Ehrenbergina serrata and Uvigerina tenuipustulata. These forms usually are taken as being indicative of the Burdigalian stage of the Lower Miocene.

Moderate faunas are recorded throughout the bulk of this interval which are composed mainly of planktonic species together with subordinate amounts of arenaceous forms. Below 5820' specimens and species of Globigerinoides are very common, while at 5880' Sphaeroidinellopsis seminulina seminulina is first noted.

UNIT F, INTERVAL 5960' - 6300'; Aquitanian, Lower Miocene

General Lithology

This unit is lithologically similar to the interval above and consists essentially of dark greyish-green to dark greyish-brown, slightly micaceous shales and shaly mudstones. Small amounts of greenish-grey and brown, cryptocrystalline dolomite and buff, microcrystalline limestone are present locally.

Micropalaeontology and Stratigraphical Conclusions

Moderate faunas consisting mainly of planktonic foraminifera together with subordinate amounts of arenaceous foraminifera are noted within this interval. The presence in the upper part of the sequence of Globorotalia scitula cf. praescitula and low forms of Globigerinoides trilobus trilobus would signify that this interval is equivalent to the Aquitanian stage of the Lower Miocene.

(c) Oligocene

UNIT G, INTERVAL 6320' - 8710'; Oligocene

General Lithology

This unit is similar in lithology to the interval above, and comprises light greyish-green to dark brown, shaly mudstones and shales, together with small amounts of buff limestone and grey, green and brown dolomite.

Micropalaeontology and Stratigraphical Conclusions

Moderate to poor, essentially arenaceous, microfaunas are recorded throughout this interval. The top of the unit is marked by the incoming of Asterigerina glurichi, Loxostomum cf. digitale, Cibicides ungerianus and Catapsydrax unicavus which are indicative of the Oligocene. Sigmoilina tenuis and Sigmoilina schlumbergeri display a marked increase in numbers

below 6980', while Glomospira charoides is again noted at 7200' and becomes a common component of the faunas below 7760'.

At 8560' the presence of fairly numerous specimens of Gyroidina girardana and the incoming of Rotaliatina bulimoides may signify that the section below this depth is of Middle Oligocene age, while that above belongs to the Upper Oligocene.

(d) Eocene

UNIT H, INTERVAL 8740' - 8880'; ?Upper - ?Middle Eocene

General Lithology

This unit is similar in lithology to the interval above, and comprises light greyish-green to dark brown, shaly mudstones and shales, together with small amounts of buff limestone and grey, green and brown dolomite.

Micropalaeontology and Stratigraphical Conclusions

Moderately rich arenaceous faunas are still in evidence within this unit. The incoming of Trochammina globigeriniformis and Bathysiphon eocenicus at the top of the interval together with the subsequent appearance of Globorotalia aff. centralis and Globorotalia cf. cerroazuelensis would signify that Eocene deposits have been encountered which possibly are of Middle - Upper Eocene age.

(e) Eocene - Palaeocene

UNIT I, INTERVAL 8910' - 9500'; Lower Eocene - Palaeocene

General Lithology

This interval is made up predominantly of shales and shaly mudstones, together with local developments of limestones and dolomites.

The mudstones and shales are generally light greenish-grey in colour, above 9380', but below this depth they become light to dark green and buff

and are also slightly pyritic.

The limestones are essentially cream to light grey in colour and are dolomitic at 8970' and from 9180' - 9220'. Petrographic examination reveals the presence of some spherical bodies in the dolomites which may possibly resemble ooliths.

Micropalaeontology and Stratigraphical Conclusions

Large Radiolaria are recorded for the first time at the top of this interval. In this particular area of the North Sea these forms are usually taken to be indicative of Lower Eocene - Palaeocene deposits. Further evidence for this age occurs below 9180' where such forms as Spiroplectamina spectabilis and Globigerina triangularis occur in association with a marked increase in the numbers of the aforementioned Radiolaria.

The faunas throughout this interval are essentially moderate to poor and of an arenaceous aspect.

(f) Palaeocene

UNIT J, INTERVAL 9520' - 9920'; Palaeocene

General Lithology

This unit consists dominantly of light greenish-grey, dark grey and purple, slightly calcareous shales and shaly mudstones. The shales are also silty and slightly pyritic down to 9640'. Small amounts of cream to buff dolomite and small sideritic nodules occur locally. Traces of white, fine-grained, glauconitic sandstone are present throughout the interval.

Micropalaeontology and Stratigraphical Conclusions

Globigerina triloculinoides, Coscinodiscus sp. and Cyclammina incisa mark the top of this unit and their presence would suggest that

this interval is of Palaeocene age.

Arenaceous foraminifera dominate the faunas which are either moderate or poor.

UNIT K, INTERVAL 9940' - 9960'; ?Danian, ?Lower Palaeocene

General Lithology

This interval consists predominantly of light greenish-grey, dark grey and purple, slightly calcareous shales and shaly mudstones. Trace amounts of buff dolomite with small sideritic nodules are also present throughout the interval.

Micropalaeontology and Stratigraphical Conclusions

Although no white chalk is seen in this interval the presence of rare specimens of Globorotalia cf. compressa and Globigerina pseudobulloides may suggest a possible Danian age for this unit.

UNIT L, INTERVAL 9980' - 10660'; Danian, Lower Palaeocene

General Lithology

The samples received from this interval comprise ditch cuttings from 9980' - 10000' and 10060' - 10469' and cores from 10010' - 10017' and 10496' - 10660'.

The ditch cuttings are composed dominantly of white to buff, brittle, chalky limestones, together with small amounts of white to light grey, translucent chert from 10170' - 10446'. Moderate amounts of dark grey shales occur in the uppermost sample, i.e. at 9980'. Dark grey, light grey-green and purple, slightly calcareous shales are also present in the samples from 10435' - 10464'. It is possible that some of the shales have caved.

No anhydrite, as reported by the logs received from Phillips, was seen in the samples from 10435' - 10464'.

The core samples between 10010' and 10017' comprise cream to buff, chalky limestones. The core samples from 10496' - 10660' consist of white to buff, moderately fractured, chalky limestones. Stylolites are common features throughout the chalky limestones.

Micropalaeontology and Stratigraphical Conclusions

The incoming of white chalk together with such forms as Osangularia lens, Allomorphina halli, Anomalinoides velascoensis and white-stained planktonic foraminifera would indicate that this interval is of Danian age and equivalent to the Danian Chalk of Denmark.

Although cores were received from much of this interval they generally yielded only poor faunas. Reworked Upper Cretaceous foraminifera are recorded from the sample at 10080' and rich reworked faunas are seen below 10235'.

Full petrographic details and suggested environments for the chalk section from this well can be seen in our Oilfields Report No. 326.

TERTIARY - CRETACEOUSUNIT M, INTERVAL 10713' - 10810'; Danian - Maestrichtian, Lower Palaeocene -
Upper CretaceousGeneral Lithology

The samples received from this interval consist of core samples from 10713' - 10755' and ditch cuttings from 10780' - 10810'. The cores are composed of white, chalky limestones with stylolites. The ditch cuttings are made up of hard, platy, white, chalky limestones.

Micropalaeontology and Stratigraphical Conclusions

Highly impoverished microfaunas were recovered from the cores and ditch cuttings received from this interval. No forms of Danian age were noted, but a few questionable Cretaceous forms were recorded. If the latter are in situ then the Tertiary - Cretaceous boundary lies at the top of this interval. However, the possibility also exists that these forms have been reworked into Palaeocene succession. Therefore it has only been possible to assign a Danian - Maestrichtian age to this unit.

VI

CRETACEOUS

UNIT N, INTERVAL 10810' - 10840'; Maestrichtian, Upper Cretaceous

General Lithology

This unit is composed of white to cream, platy to soft, chalky limestones.

Micropalaeontology and Stratigraphical Conclusions

A very rich assemblage of Maestrichtian age has been recovered from this section and includes such characteristic species as Globotruncana contusa, Pseudotextularia elegans elegans and Pseudotextularia elegans fructicosa. The fact that many of these forms are stained yellow, however, would strongly suggest that they may be present due to reworking.

VII

BIBLIOGRAPHY

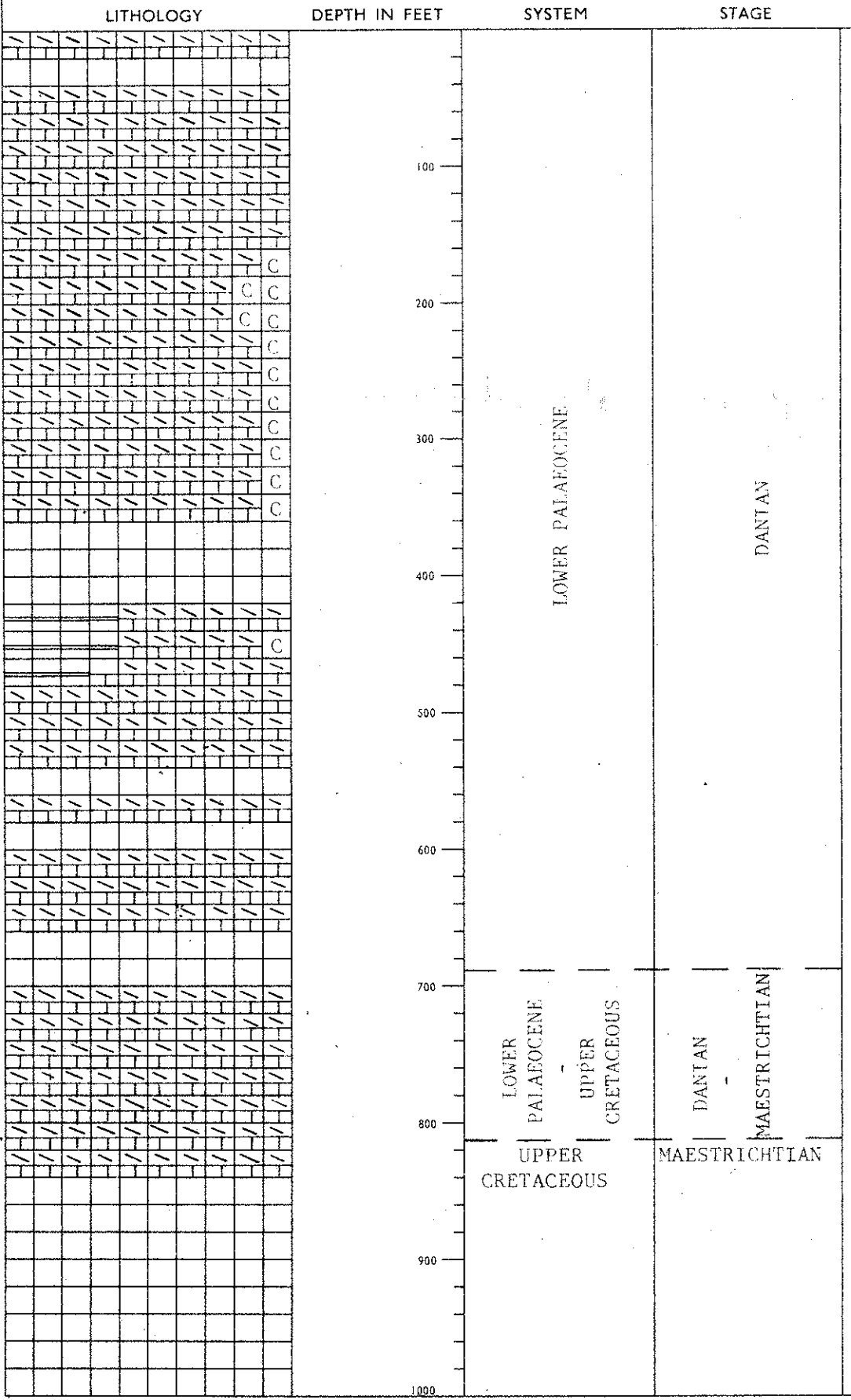
- BANDY O.L. 1967 Cretaceous Planktonic Foraminiferal Zonation. *Micropaleontology*, Vol. 13, No. 1.
- BARTENSTEIN, H. et al 1962 Leitfossilien der Mikropaläontologie Gebrüder Borntraeger, Berlin.
- BATJES, D.A.J. 1958 Foraminifera of the Oligocene of Belgium. *Inst. Roy. des Sciences Nat. de Belgique*, Mem. No. 143.
- CHATWIN, C.P. 1961 East Anglia and adjoining areas. *Handbook of British Regional Geology*.
- DAM, A.T. 1944 Die Strat-gliederung des Niederländischen Paläozäns und Eozäns nach Foraminifera. *Med. Geol. Sticht. Ser. C-V-No. 3*.
- DAM, A.T. & REINHOLD, Th. 1941 Die Stratigraphische Gliederung des Niederländischen Plio-Pleistozäns nach Foraminiferen. *Med. Geol. Sticht. Ser. C-V-No. 1*.
- DAM, A.T. & REINHOLD, Th.. 1942 Die Stratigraphische Gliederung des Niederländischen Oligo-Miozäns nach Foraminifera. *Med. Geol. Sticht. Ser. C-V-No. 2*.
- GROSSHEIDE, K. & TRUNKO, L. 1965 Die Foraminiferen des Doberges bei Blünde und von Astrup. *Beih. geol. Jb. Vol. 60*.
- HAYNES, J. 1956 Certain small British Paleocene Foraminifera. Pt. 1. *Cont. Cush. Found. For. Res. Vol. VII, Pt. 3*.
- HAYNES, J. & WOOD, A. 1957 Certain smaller British Paleocene Foraminifera. Pt. II: Cibicides and its allies. *Cont. Cush. Found. For. Res. Vol. VIII, Pt. 2*.
- HAYNES, J. 1958 Certain smaller British Paleocene Foraminifera. Pt. III: Polymorphinidae. *Cont. Cush. Found. For. Res. Vol. IX, Pt. 1*.

- HAYNES, J. 1958 Certain smaller British Paleocene Foraminifera. Pt. IV: Arenacea, Lagenidea, Buliminidea and Chilostomellidae. Cont. Cush. Found. For. Res. Vol. IX, Pt. 3.
- HAYNES, J. 1958 Certain smaller British Paleocene Foraminifera. Pt. V: Distribution. Cont. Cush. Found. For. Res. Vol. IX, Pt. 4.
- HOFKER, J. 1957 Foraminiferen der Oberkreide von Nordwestdeutschland und Holland. Geol. Jahrb. beih No. 27.
- HOFKER, J. 1966 Maestrichtian, Danian and Paleocene Foraminifera. Palaeontographica Suppl. 10.
- KAASSCHIETER, J.P.H. 1961 Foraminifera of the Eocene of Belgium. Inst. Roy. des Sciences Nat de Belgique, Mem. No. 147.
- KEIJ, A.J. 1957 Eocene and Oligocene Ostracoda of Belgium. Inst. Roy. des. Sciences Nat. de Belgique, Mem. No. 136.
- KEIZER, J. & LETSCH, W.J. 1963 Geology of the Tertiary of the Netherlands. Verhandelingen Vol. 2. Pt. 2. (Trans. Jubilee Convention Pt. 2.)
- SORGENFREI, Th. & BUCH, A. 1964 Deep Tests in Denmark 1935 - 1959. Geol. Surv., of Denmark, III Series No. 36.
- TROELSEN, J.C. 1957 Some Planktonic Foraminifera of the type Danian and their stratigraphic importance. Studies in Foraminifera. U.S. Nat. Mus. Bull. 215.
- VOORTHUYSEN, J.H. van 1950 The quantitative distribution of the Plio-Pleistocene Foraminifera of a boring at the Hague (Netherlands). Med. Geol. Sticht. N.S. 4.
- VOORTHUYSEN, J.H. van 1950 The quantitative distribution of the Pleistocene, Pliocene and Miocene Foraminifera of boring Zaandam (Netherlands). Med. Geol. Sticht. N.S.4.
- VOORTHUYSEN, J.H. van & PANNEKOEK, A.J. 1950 La distribution verticale quantitative des foraminifères du Diestien, du Scaldisien et du Poederlien au Kruisschans, près d'Anvers. Bull. de la Soc. Belge de Geol.

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MICROPALAEONTOLOGICAL ANALYSIS CHART

DATE: 2.1.70 ANALYST: JWC, RVH, CWH LOCATION: Norwegian North Sea Well 2/4-1AX
 FOR: Phillips Petroleum Limited, Norway CHART No. G 10000' - 10840'

LITHOLOGY
 [] LIMESTONE [] SILTSTONE [S] SALT * Reworked Upper Cretaceous forms
 [] DOLOMITE [] SANDSTONE [] COAL
 [] OOLITIC LIMESTONE [] CONGLOMERATE [C] CHERT
 [] CLAY [] GYPSUM [] White Chalky Limestone
 [] SHALE [] VOLCANICS
 [] SILTY/SANDY SHALE [X] INTRUSIVES



| MICROFOSSILS | |
|--------------|---|
| + | <i>Globigerina trilobulinoidea</i> |
| + | <i>Globigerina pseudobulloides</i> |
| + | <i>Robulus turbinatus</i> |
| + | <i>Valvulineria laevis</i> |
| + | <i>Gavelinopsis nobilis</i> |
| + | <i>Anomalinoidea velascoensis</i> |
| + | <i>Borochia bullata</i> |
| + | <i>Chrysalogonium cf. eximium</i> |
| + | <i>Parahystrichia coarctata</i> |
| + | <i>Spirillectamina spectabilis</i> |
| + | <i>Cyclamina incisa</i> |
| + | <i>Ossangularia lens</i> |
| + | <i>Bolivinoidea draco draco</i> * |
| + | <i>Pseudotextularia elegans elegans</i> * |
| + | <i>Globulina laetima</i> |
| + | <i>Lasena bipida</i> |
| + | <i>Allorophina paleocenica</i> |
| + | <i>Gavelinella bullata</i> |
| + | <i>Caudryna faulsi</i> |
| + | <i>Dentalina nasuta</i> |
| + | <i>Gavelinopsis voltziana</i> * |
| + | <i>Rugosolobigerina rugosa rugosa</i> * |
| + | <i>Bolivina incrassata cf. gigantea</i> * |
| + | <i>Tritaxillina laevigata</i> * |
| + | <i>Globotruncana cf. marginata</i> * |
| + | <i>Stansioina pomperana</i> * |
| + | <i>Pullenia sphaeroides</i> |
| + | <i>Pseudotextularia elegans fruticosa</i> * |
| + | <i>Gavelinella vombensis</i> * |
| + | <i>Globotruncana cf. sansseri</i> * |
| + | <i>Heterohelix costulata</i> * |
| + | <i>Heterohelix globulosa</i> * |
| + | <i>Pullenia cretacea</i> * |
| + | <i>Globotruncana cf. linneciana bulloides</i> * |
| + | <i>Pracbulimina carseyae</i> * |
| + | <i>Allorophina halli</i> |
| + | <i>Lasena gracilicosta</i> |
| + | <i>Gibicides sp.</i> |
| + | <i>Cyroidinoides nitida</i> * |
| + | <i>Globotruncana linneciana tricarinata</i> * |
| + | <i>Globotruncana contusa contusa</i> * |
| + | <i>Globotruncana marginata</i> * |
| + | <i>Globotruncana sp.</i> * |
| + | <i>Anomalinoidea hyphalus</i> * |
| + | <i>Globotruncana linneciana linneciana</i> * |
| + | <i>Bulimina sp.</i> |
| + | <i>Sponides lunata</i> |
| + | <i>Rarecia fallax</i> |
| + | <i>Globotruncana arca</i> * |
| + | <i>Globotruncana linneciana cf. coronata</i> * |
| + | <i>Sigmollina sp.</i> * |
| + | <i>Gavelinella sp.</i> * |
| + | <i>Cyroidina sp.</i> |
| + | <i>Gibicides cf. bosqueti</i> |
| + | <i>Bulimina cf. midwayensis</i> |
| + | <i>Heterohelix cf. pulchra</i> * |
| + | <i>Globigerina sp.</i> |
| + | <i>Rugosolobigerina sp.</i> |
| + | <i>Gavelinella sp.</i> |
| + | <i>Gibicides sp.</i> |
| + | <i>Rugosolobigerina rugosa cf. rotundata</i> |
| + | <i>Gavelinella cf. vombensis</i> |
| + | <i>Heterohelix sp.</i> |
| + | <i>Lenticulina cf. pseudovortex</i> |
| + | <i>Bolivinoidea draco draco</i> |
| + | <i>Pullenia cretacea</i> |
| + | <i>Rugosolobigerina rugosa rugosa</i> |
| + | <i>Ataxophragmium trochoides</i> |
| + | <i>Hedbergella cf. planispira</i> |
| + | <i>Cyroidinoides nitida</i> |
| + | <i>Bolivina incrassata cf. gigantea</i> |
| + | <i>Gavelinopsis cf. voltziana</i> |
| + | <i>Gavelinella sp.</i> |
| + | Sponge Spicules |

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MICROPALAEONTOLOGICAL ANALYSIS CHART

DATE 12.12.69 ANALYST RVH, CWH LOCATION Norwegian North Sea Well 2/4-1AX
 FOR Phillips Petroleum Limited, Norway CHART No. 8
 9000' - 10000'

- LIMESTONE
- DOLOMITE
- OOLITIC LIMESTONE
- CLAY
- SHALE
- SILTY/SANDY SHALE
- SILTSTONE
- SANDSTONE
- CONGLOMERATE
- GYPSUM
- VOLCANICS
- INTRUSIVES
- SALT
- COAL
- CHERT
- White Chalky Limestone
- Pyrites

FORAMINIFERA

OTHER FOSSILS

| LITHOLOGY | DEPTH IN FEET | SYSTEM | STAGE | ZONE | MICROFOSSILS | OTHER FOSSILS |
|--|---------------|--------------------|----------|------|---|---------------|
| <div style="display: flex; justify-content: space-between;"> <div style="width: 40%;"> <p>PALAEOCENE - LOWER EOCENE</p> </div> <div style="width: 40%;"> <p>PALAEOCENE</p> </div> </div> | 0 | | | | Glomospira charoides | |
| | 10 | | | | Cyclammina sp.1 | |
| | 20 | | | | Cyclammina sp.2 | |
| | 30 | | | | Bathysiphon eocenicus | |
| | 40 | | | | Recurvoides sp. | |
| | 50 | | | | Haplophragmoides carinatum | |
| | 60 | | | | Haplophragmoides cf. obliquicameratus | |
| | 70 | | | | Trochammina globigeriniformis | |
| | 80 | | | | Trochammina globigeriniformis var. altiformis | |
| | 90 | | | | Ammodiscus incertus | |
| | 100 | | | | Sigmoilina schlumbergeri | |
| | 110 | | | | Sigmoilina tenuis | |
| | 120 | | | | Hormosira sp. | |
| | 130 | | | | Cyclammina placenta | |
| | 140 | | | | Rhabdammina sp. | |
| | 150 | | | | Trochammina pentagona | |
| | 160 | | | | Spiroplectammina spectabilis | |
| | 170 | | | | Globigerina triangularis | |
| | 180 | | | | Cibicides propius | |
| | 190 | | | | Cribrostomoides sp.2 | |
| | 200 | | | | Globigerina triloculinoides | |
| | 210 | | | | Coccolinodiscus sp. | |
| | 220 | | | | Cyclammina incisa | |
| | 230 | | | | Cyclammina challinori | |
| | 240 | | | | Eponides aff. toulimini | |
| | 250 | | | | Rosalina aff. mimiconcina | |
| | 260 | | | | Glandulina laevigata | |
| | 270 | | | | Gyrodina cf. danvillensis | |
| | 280 | | | | Nonion affine | |
| | 290 | | | | Nonion applinae | |
| | 300 | | | | Globototalia cf. compressa | |
| | 310 | | | | Globigerina pseudobulloidis | |
| | 320 | | | | Osangularia lens | |
| | 330 | | | | Gavelinonion nobilis | |
| | 340 | | | | Allomorphina halli | |
| | 350 | | | | Anomalinoidea velascoensis | |
| | 360 | | | | Dorothia bulletta | |
| | 370 | | | | Pullenia quinqueloba | |
| | 380 | | | | | |
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| | 980 | | | | | |
| | 990 | | | | | |
| 1000 | | ? LOWER PALAEOCENE | ? DANIAN | | | |
| | | LOWER PALAEOCENE | DANIAN | | | |

ROBERTSON RESEARCH COMPANY LIMITED

MICROPALAEONTOLOGICAL ANALYSIS CHART

DATE: 1.12.69 ANALYST: RVH, CWH LOCATION: Norwegian North Sea Well 2/4-1AX
 FOR: Phillips Petroleum Limited, Norway CHART No. 6
 7000' - 8000'

- | | | |
|--|---------------------------------------|----------------------------------|
| <input type="checkbox"/> LIMESTONE | <input type="checkbox"/> SILTSTONE | <input type="checkbox"/> S SALT |
| <input type="checkbox"/> DOLOMITE | <input type="checkbox"/> SANDSTONE | <input type="checkbox"/> COAL |
| <input type="checkbox"/> EOLITIC LIMESTONE | <input type="checkbox"/> CONGLOMERATE | <input type="checkbox"/> C CHERT |
| <input type="checkbox"/> CLAY | <input type="checkbox"/> GYPSUM | <input type="checkbox"/> |
| <input type="checkbox"/> SHALE | <input type="checkbox"/> VOLCANICS | <input type="checkbox"/> |
| <input type="checkbox"/> SILTY/SANDY SHALE | <input type="checkbox"/> INTRUSIVES | <input type="checkbox"/> |

| LITHOLOGY | DEPTH IN FEET | SYSTEM | STAGE | ZONE | MICROFOSSILS |
|-----------|---------------|--------|-------|------|---|
| | | | | | Cyclammina placenta |
| | | | | | Cyclammina sp. |
| | | | | | Haplophragmoides cf. narivaensis |
| | | | | | Ammodiscus incertus |
| | | | | | Sigmollina schlumbergeri |
| | | | | | Sigmollina tenuis |
| | | | | | Coccolithus sp. |
| | | | | | Globigerina praebulloides praebulloides |
| | | | | | Globigerina aneustriumbilicata |
| | | | | | Lagena laevigata |
| | | | | | Cibicides tenellus |
| | | | | | Rathysiphon dubia |
| | | | | | Recurviroides sp. |
| | | | | | Bulimina elongata |
| | | | | | Nonion affibe |
| | | | | | Guttulina problema |
| | | | | | Gyroidina girardana |
| | | | | | Uvigerina tenuipustulata |
| | | | | | Quinqueloculina seminulum |
| | | | | | Sphaeroidina variabilis |
| | | | | | Pullenia sphaeroides |
| | | | | | Hormosira sp. |
| | | | | | Haplophragmoides carinatum |
| | | | | | Gravelina cf. narivaensis |
| | | | | | Glomospira charoides |
| | | | | | Asterigerina glrichi |
| | | | | | Globigerina concinna |
| | | | | | Ammodiscus dominicensis |
| | | | | | Glandulina laevigata |
| | | | | | Cribrostomoides sp.1 |
| | | | | | Pelosina sp. |
| | | | | | Frochammina inflata |
| | | | | | Catapsydrax unicus |
| | | | | | Echinocythereis scabra |

OLIGOCENE

ROBERTSON RESEARCH COMPANY LIMITED

MICROPALAEONTOLOGICAL ANALYSIS CHART

DATE: 21.11.69 ANALYST: RVH, CWH. LOCATION: Norwegian North Sea Well 2/4-1AX

FOR: Phillips Petroleum Limited, Norway CHART NO. 5

6000' - 7000'

LIMESTONE SILTSTONE S SALT

DOLOMITE SANDSTONE COAL

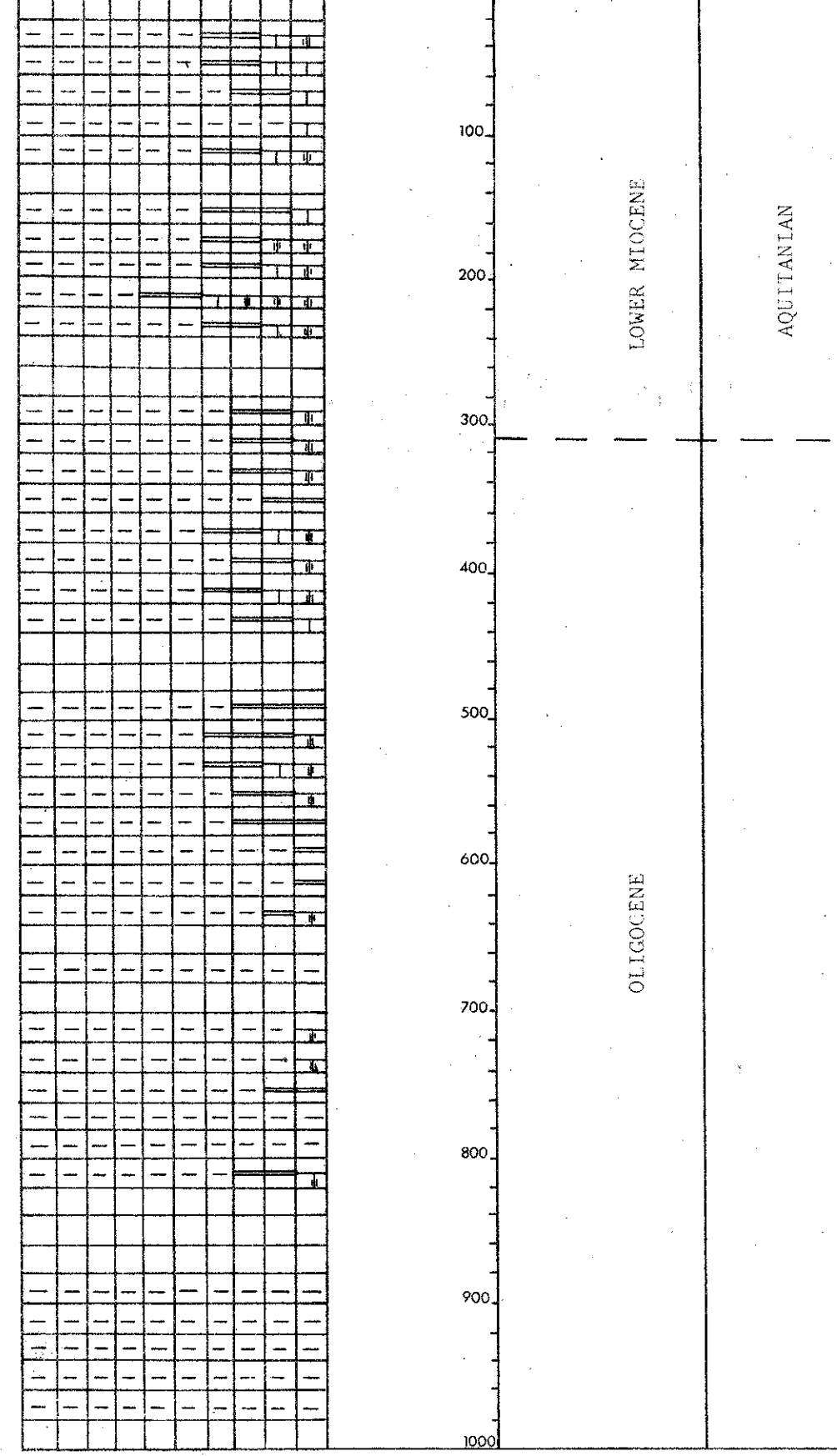
OOLITIC LIMESTONE CONGLOMERATE CHERT

CLAY GYPSUM

SHALE VOLCANICS

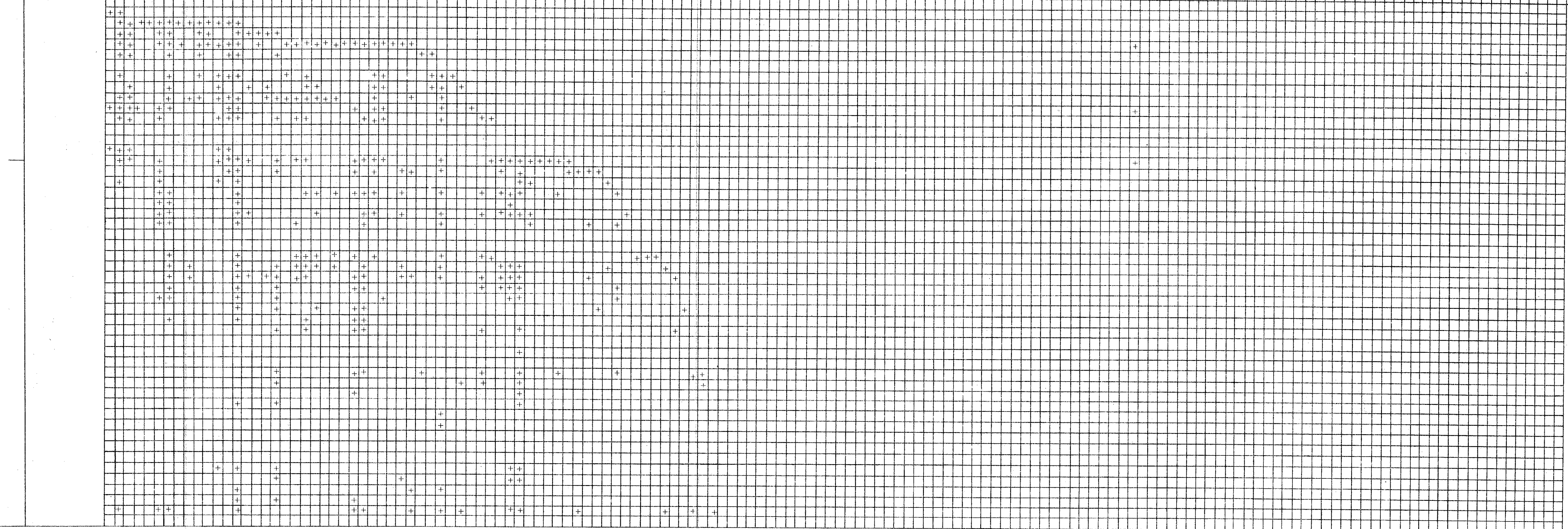
SILTY/SANDY SHALE INTRUSIVES

LITHOLOGY DEPTH IN FEET SYSTEM STAGE ZONE



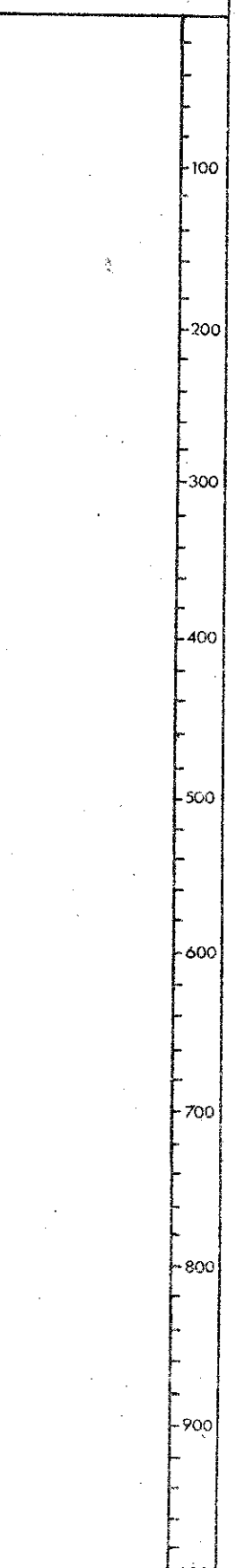
MICROFOSSILS

Sphaeroidinellopsis seminulina, seminulina
 Globotralia obesa
 Globoserinoides trilobus, trilobus
 Globoserinoides sacculifera
 Globotralia mayeri
 Nonion affine
 Globoseriala praebulloides, praebulloides
 Chlostellina cylindroides
 Lenticulina aradis
 Asterigerina staeschei
 Bulimina elongata var. subulata
 Globotralia scitula cf. praescitula
 Cyclanina sp.
 Glomospira charoides
 Cancriis auriculos
 Epistominella elegans
 Bathysiphon dubia
 Listerella communis
 Gyrogonia girardana
 Eponides umbonatus
 Lenticulina elongata
 Pullenia sphaeroides
 Pullenia baeriana
 Kriehle cf. papillosa
 Cyclanina placenta
 Haplophragmoides sp.
 Globoseriala concinna
 Ivigerina tenuipustulata
 Glanbulina laevigata
 Homosira sp.
 Cossinodiscus sp.
 Cuttullina problema
 Sphaeroidina bulloides
 Globoseriala angustimbricata
 Glanbulina acumbilis
 Sigallina tenuis
 Angulogerina gracilis var. tenuistriata
 Ammodiscus incertus
 Siphonotularia labiata
 Gravellina marivaensis
 Recurvoides sp.
 Haplophragmoides cf. narivaensis
 Asterigerina gurichi
 Loxostomum cf. digitale
 Bulimina aff. kasselensis
 Cibicides ungerianus
 Sphaeroidina variabilis
 Paracyprioides rarefistulosa
 Catacyprax unicus
 Sigallina miocenica
 Ivigerina rugulosa
 Cibicides tenellus
 Pseudocyclanina cf. chitina
 Krithe pernoidea
 Pullenia quinqueloba
 Prondicularia sp.
 Cribrostomoides sp.1
 Quinqueloculina buchiana
 Laena laevigata
 Sigallina schlumbergeri
 Alabamina cf. wollerstorffi
 Trochammina inflata



OTHER FOSSILS

Radiolaria



ROBERTSON RESEARCH COMPANY LIMITED

MICROPALAEONTOLOGICAL ANALYSIS CHART

DATE: 24.10.69 ANALYST: RVH, CWH LOCATION: Norwegian North Sea Well 2/4-1AX
 FOR: Phillips Petroleum Limited, Norway CHART No. 4
 5000' - 6000'

- LITHOLOGY**
- LIMESTONE
 - DOLOMITE
 - OOLITIC LIMESTONE
 - CLAY
 - SHALE
 - SILTY/SANDY SHALE
 - SILTSTONE
 - SANDSTONE
 - CONGLOMERATE
 - GYPSUM
 - VOLCANICS
 - INTRUSIVES
 - SALT
 - COAL
 - CHERT

| DEPTH IN FEET | SYSTEM | STAGE | ZONE |
|---------------|----------------|-------------|------|
| 0 - 100 | MIDDLE MIOCENE | | |
| 100 - 350 | LOWER MIOCENE | | |
| 350 - 400 | | | |
| 400 - 900 | LOWER MIOCENE | BURDIGALIAN | |
| 900 - 1000 | | AQUITANIAN | |

MICROFOSSILS

| FORAMINIFERA AND OSTRACODA | OTHER FOSSILS |
|---|---|
| <ul style="list-style-type: none"> <input type="checkbox"/> Gyrogonia girardana <input type="checkbox"/> Globigerina bulloides <input type="checkbox"/> Cassidulina laevigata <input type="checkbox"/> Rotalia beccarii var. <input type="checkbox"/> Cibicides aknerianus <input type="checkbox"/> Globigerina angustilumbata <input type="checkbox"/> Eponides inflatum <input type="checkbox"/> Nonion bougainvillense <input type="checkbox"/> Cyclammina sp. <input type="checkbox"/> Bathysiphon dubia <input type="checkbox"/> Globorotalia mayeri <input type="checkbox"/> Lagena laevigata <input type="checkbox"/> Globospira cf. charoides <input type="checkbox"/> Nonion granosum <input type="checkbox"/> Globigerina praebulloides praebulloides <input type="checkbox"/> Bulimina elongata var. subulata <input type="checkbox"/> Eponides umbonatus <input type="checkbox"/> Pullenia sphaeroides <input type="checkbox"/> Ammodiscus incertus <input type="checkbox"/> Uvigerina hostusii <input type="checkbox"/> Globigerina foliata <input type="checkbox"/> Globigerina juvenilis <input type="checkbox"/> Histerella communis <input type="checkbox"/> Nonion soldanii <input type="checkbox"/> Nonion affine <input type="checkbox"/> Globorotalia obesa <input type="checkbox"/> Sphaeroidina bulloides <input type="checkbox"/> Sigammina micenica <input type="checkbox"/> Bolivina floridana var. imposita <input type="checkbox"/> Cassidulina subglobosa <input type="checkbox"/> Globigerina bradyi <input type="checkbox"/> Globorotalia scitula scitula <input type="checkbox"/> Uvigerina canariensis <input type="checkbox"/> Globigerina concinna <input type="checkbox"/> Caneris auriculus <input type="checkbox"/> Angulogerina gracilis var. tenuistriata <input type="checkbox"/> Uvigerina asperula <input type="checkbox"/> Cyclammina placenta <input type="checkbox"/> Bulimina elongata <input type="checkbox"/> Hormosira sp. <input type="checkbox"/> Lenticulina grandis <input type="checkbox"/> Siphonina sp. <input type="checkbox"/> Guttulina problema <input type="checkbox"/> Uvigerina tenuipustulata <input type="checkbox"/> Ehrenbergina serrata <input type="checkbox"/> Globorotalia cf. fohsi barisanensis <input type="checkbox"/> Orbulina suturalis <input type="checkbox"/> Pullenia quinqueloba <input type="checkbox"/> Glandulina laevigata <input type="checkbox"/> Sigammina celata <input type="checkbox"/> Glandulina aquabilis <input type="checkbox"/> Pararotalia sp. <input type="checkbox"/> Globigerina venezuelana <input type="checkbox"/> Globorotalia cf. subquadrata <input type="checkbox"/> Chilostomella cylindroides <input type="checkbox"/> Globigerinoides trilobus trilobus <input type="checkbox"/> Virgulina pertusa <input type="checkbox"/> Globigerinoides sacculifera <input type="checkbox"/> Globigerinoides trilobus immaturus <input type="checkbox"/> Pristionna elegans <input type="checkbox"/> Sphaeroidinella seminulina seminulina <input type="checkbox"/> Monstrabilia sp. <input type="checkbox"/> Cytheridea mulleri <input type="checkbox"/> Globorotalia scitula cf. praescitula | <ul style="list-style-type: none"> <input type="checkbox"/> Radiolaria |

ROBERTSON RESEARCH COMPANY LIMITED

MICROPALAEONTOLOGICAL ANALYSIS CHART

DATE: 24.10.69 ANALYST: RVH, CWH LOCATION: Norwegian North Sea Well 2/4-1AX
 FOR: Phillips Petroleum Limited, Norway CHART No. 3
 4000' - 5000'

- LIMESTONE
- DOLOMITE
- OOLITIC LIMESTONE
- CLAY
- SHALE
- SILTY/SANDY SHALE
- SILTSTONE
- SANDSTONE
- CONGLOMERATE
- GYPSUM
- VOLCANICS
- INTRUSIVES
- SALT
- COAL
- CHERT

FORAMINIFERA AND OSTRACODA

| LITHOLOGY | DEPTH IN FEET | SYSTEM | STAGE | ZONE | MICROFOSSILS |
|-----------|---------------|----------------|-------|------|---------------------------------|
| | 0 | | | | Uvigerina bosiusi |
| | 0 | | | | Bulimina elongata var. subulata |
| | 0 | | | | Nonion affine |
| | 0 | | | | Nonion soldanii |
| | 0 | | | | Nonion granosum |
| | 0 | | | | Globigerina bulloides |
| | 0 | | | | Globigerina angustilimbata |
| | 0 | | | | Cibicides pseudoungerianus |
| | 0 | | | | Lagena striata |
| | 0 | | | | Rotalia beccarii var. |
| | 0 | | | | Sigollina celata |
| | 0 | | | | Pullenia sphaeroides |
| | 0 | | | | Cassidulina laevigata |
| | 0 | | | | Quinqueloculina scripinulum |
| | 0 | | | | Uvigerina canariensis |
| | 0 | | | | Nonion boueanum |
| | 0 | | | | Cibicides aknerianus |
| | 0 | | | | Bulimina elongata var. tenera |
| | 0 | | | | Loxostomum sinuosum |
| | 0 | | | | Lagena laevigata |
| | 0 | | | | Dentalina soluta |
| | 0 | | | | Elphidium inflatum |
| | 0 | | | | Lenticulina hauerina |
| | 0 | | | | "Cythere" latimarginata |
| | 0 | | | | Uvigerina asperula |
| | 0 | | | | Sphaeroidina bulloides |
| | 0 | | | | Discorbis milletti |
| | 0 | | | | Dentalina arcuata |
| | 0 | | | | Globorotalia mayeri |
| | 0 | | | | Lenticulina grandis |
| | 0 | | | | Pullenia quinqueloba |
| | 0 | | | | Globorotalia acostaensis |
| | 0 | | | | Karreriella siphonella |
| | 0 | | | | Globigerina concinna |
| | 0 | | | | Eponides umbonatus |
| | 0 | | | | Bathysiphon dubia |
| | 0 | | | | Cyclammina sp. |
| | 0 | | | | Glomospira cf. charoides |
| | 100 | | | | |
| | 200 | | | | |
| | 300 | | | | |
| | 400 | | | | |
| | 500 | MIDDLE MIOCENE | | | |
| | 600 | | | | |
| | 700 | | | | |
| | 800 | | | | |
| | 900 | | | | |
| | 1000 | | | | |

ROBERTSON RESEARCH COMPANY LIMITED

MICROPALAEONTOLOGICAL ANALYSIS CHART

DATE: 21.10.69 ANALYST: RVH, CWH LOCATION: Norwegian North Sea Well 2/4-1AX
 FOR: Phillips Petroleum Limited, Norway CHART No. 2
 3000' - 4000'

- LIMESTONE
- DOLOMITE
- OOLITIC LIMESTONE
- CLAY
- SHALE
- SILTY/SANDY SHALE
- SILTSTONE
- SANDSTONE
- CONGLOMERATE
- GYPSUM
- VOLCANICS
- INTRUSIVES
- S SALT
- COAL
- C CHERT
- P Pyrites
- F Shell Fragments

* Reworked Miocene/
Oligocene forms

MICROFOSSILS

- Cassidulina laevigata
- Bulimina elongata var. subulata
- Bulimina elongata var. tenera
- Nonion affine
- Nonion soldanii
- Nonion granosum
- Sigmoliina celata
- Quinqueloculina seminulum
- Discorbis milletti
- Lenticulina hauerina
- Bolivina beyrichi
- Rotalia beccarii var.
- Globigerina bulloides
- Elphidium antoninum
- Cyclamina placenta *
- Glandulina aquabilis
- Cibicides peelensis
- Elphidium inflatum
- Cancris auriculatus
- Cibicides aknerianus
- Loxostomum sinuosum
- Cibicides pseudoungerianus
- Globigerina angustiumbilicata
- Eponides umbonatus
- Pullenia sphaeroides
- Pullenia quinqueloba
- Nonion boueanum
- Lagena laevigata
- Glandulina laevigata
- Karreriella siphonella
- Uvigerina asperula
- Lenticulina grandis
- Quadracythere macropora
- Cassidulina subglobosa
- Lagena hexagona
- Trifarina bradyi
- Uvigerina canariensis
- Sphaeroidina bulloides
- Uvigerina hosiusi
- "Cythere" latimarginata
- Siphotextularia labiata
- Nodosaria pyrula
- Dentalina arcuata
- Dentalina soluta
- Lagena striata
- Listerella communis

| LITHOLOGY | DEPTH IN FEET | SYSTEM | STAGE | ZONE | MICROFOSSILS |
|-----------|---------------|----------------|-------|------|--------------|
| CEMENT | 100 | UPPER MIOCENE | | | + |
| | 110 | | | | + |
| | 120 | | | | + |
| | 130 | | | | + |
| | 140 | | | | + |
| | 150 | | | | + |
| | 160 | | | | + |
| | 170 | | | | + |
| | 180 | | | | + |
| | 190 | | | | + |
| CEMENT | 200 | | | | + |
| | 210 | | | | + |
| | 220 | | | | + |
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| F | 400 | MIDDLE MIOCENE | | | + |
| | 410 | | | | + |
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| | 1080 | | | | + |
| | 1090 | | | | + |

ROBERTSON RESEARCH COMPANY LIMITED

MICROPALAEONTOLOGICAL ANALYSIS CHART

DATE 21.10.69. ANALYST RVH, CWH LOCATION Norwegian North Sea Well 2/4-1AX
 FOR Phillips Petroleum Limited, Norway CHART No. 1
 2360' - 3000'

- LIMESTONE
 - DOLOMITE
 - OOLITIC LIMESTONE
 - CLAY
 - SHALE
 - SILTY/SANDY SHALE
 - SILTSTONE
 - SANDSTONE
 - CONGLOMERATE
 - GYPSUM
 - VOLCANICS
 - INTRUSIVES
 - S SALT
 - COAL
 - C CHERT
 - F Shell Fragments
 - P Pyrites
- * Reworked Miocene - Oligocene forms

| LITHOLOGY | DEPTH IN FEET | SYSTEM | STAGE | ZONE | MICROFOSSILS |
|-----------|---------------|----------------|----------------|------|--------------|
| | 100 | | | | |
| | 200 | | | | |
| | 300 | | | | |
| | 400 | | | | |
| | 500 | | | | |
| | 600 | LOWER Pliocene | UPPER Diestian | | |
| CEMENT | 650 | | | | |
| CEMENT | 700 | | | | |
| | 800 | UPPER Miocene | LOWER Diestian | | |
| | 900 | | | | |
| | 1000 | | | | |

Cassidulina laevigata
 Cibicides lobatulus var. grossa
 Bulimina elongata var. tenera
 Bulimina elongata var. subulata
 Nonion granosum
 Elphidium antoninum
 Nonion baarleanum
 Nonion affine
 Cibicides lobatulus
 Discorbis millietti
 Glandulina laevigata
 Lenticulina grandis
 Cibicides pseudoungerianus
 Cibicides peelensis
 Rotalia beccarii var.
 Nonion soldanii
 Bolivina beyrichi
 Sigmolina celata
 Globigerina bulloides
 Dentalina soluta
 Cyclamina placenta *
 Quinqueloculina seminulum
 Glandulina aequabilis
 Cuneocythere ? cribosea
 Cyamocytheridea punctillata
 Lagena gracillima
 Cyclamina sp. *

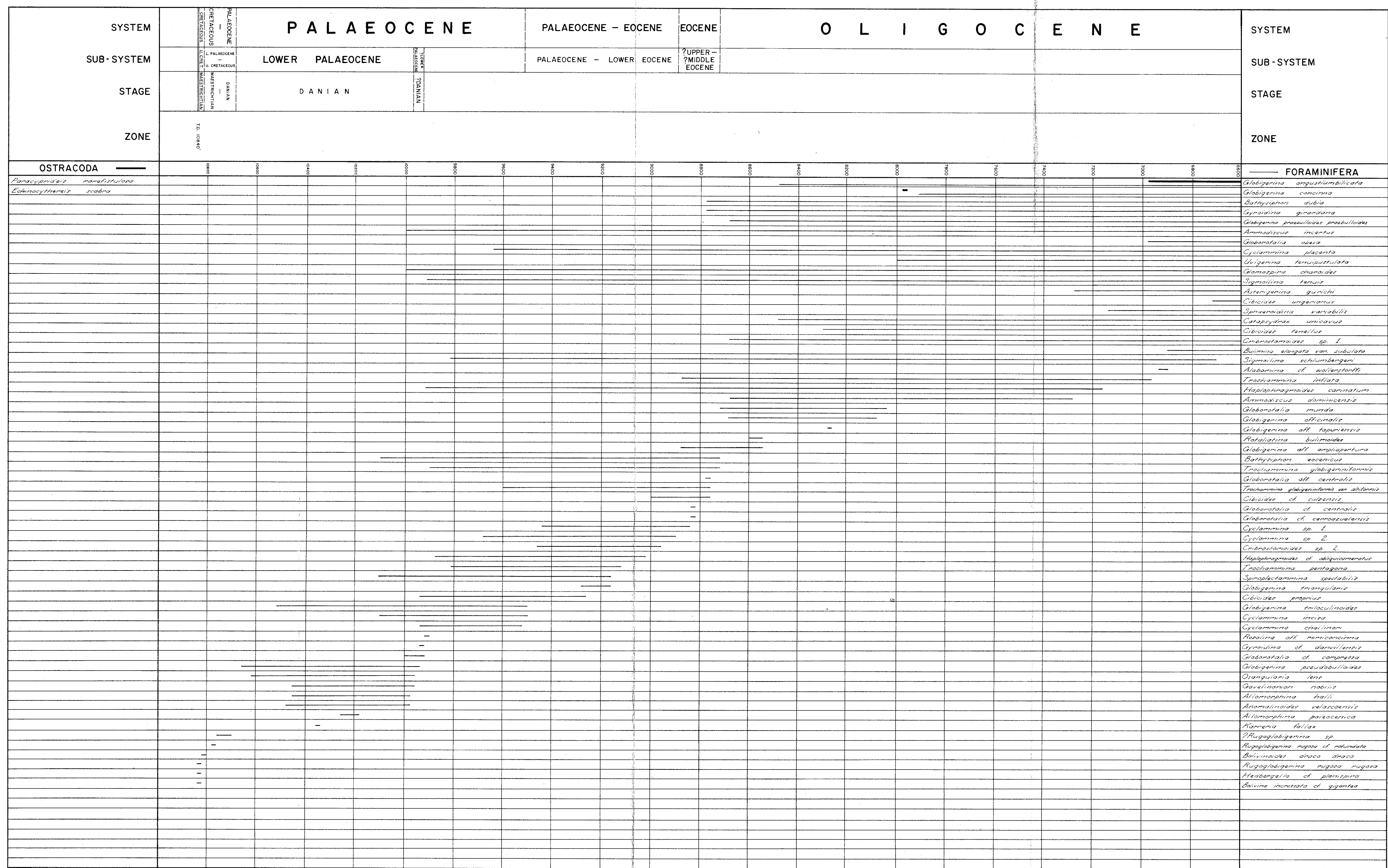


BIOSTRATIGRAPHIC CHART SHOWING THE DISTRIBUTION OF THE DIAGNOSTIC CAENOZOIC AND MESOZOIC FORAMINIFERA AND OSTRACODA IN THE PHILLIPS (NORWAY) 2/4-1AX WELL

SHEET 1 OF 2

by ROBERTSON RESEARCH COMPANY LIMITED, Llandulas, Abergelle, Denbighshire.





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