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REPORT TITLE/ TITTEL

Biostratigraphy of well 6609/7-1

CLIENT/ OPPDRAGSGIVER

Phillips Petroleum Company Att. C. Knight

RESPONSIBLE SCIENTIST/ PROSJEKTANSVARLIG

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SUMMARY/ SAMMENDRAG

A thick sequence of Pleistocene and Pliocene clastics is present in this well down to 1460 m. Pleistocene sediments are recorded down to 620 m. Paleogene sediments of Early Eocene age are encountered at 1465 m and Paleocene from 1525 m though heavy caving from the Tertiary sequence makes precise definition difficult. No evidence of Maastrichtian deposits was observed and the uppermost Cretaceous seems to be of Late Campanian age. Evidence of other Late Cretaceous stages is lacking or masked by caving though a thin sequence of Late Albian-Early Cenomanian age is recorded from 1845 - 1872,5 m. They lie unconformably on Permian dolomites which are present down to c. 1920 m. The well bottoms in basement of indeterminate age at 1968.5 m.

KEY WORDS/ STIKKORD

Norway | Trænabanken | 6609/7-1 | Biostratigraphy

CONTENTS AND STRATIGRAPHY SUMMARY OF WELL 6609/7-1

INTRODUCTION

Phillips Petroleum Company well 6609/7-1 was amongst the first wells to be drilled in the Træna Bank area, offshore mid-Norway. The well is situated on the flanks of a structural feature known as the Nordland Ridge. As such, this well is of considerable importance in resolution of regional geological problems in this area.

The biostratigraphy of this well 6609/7-1 is based on analyses of ditch-cuttings. The cuttings samples were analysed for micropaleontology, palynology and, in the lower parts of the well for macrofossils. Core chips were available only from the crystalline basement, but these did not yield any fossils and do not contribute to the stratigraphy of the well.

A separate report documenting our petrographic/SEM observations and conclusions of the core chips has been compiled. Electrical logs were not available and we have not threrefore adjusted sequence boundaries. Serious caving problems complicate interpretation throughout the lower part of the well. Caving from the Late Paleocene and Early Eocene is particularly abundant and overshadows much of the indigenous material of Cretaceous age. This limits the reliability of the sequence boundaries which could be slightly higher than the first positive paleontological evidence suggests.

Micropaleontological analyses were carried out by M. Løfaldli (Cretaceous) and J. Verdenius (Quaternary - Cretaceous). Palynological work was done by H. Selnes, who also compiled this report together with D.G. Bell. Lithological description were done by V. Fjerdingstad. Macrofossils were analysed by Dr. P.D. Taylor of British Museum.

360 - 620 m PLEISTOCENE

Lithology

Cement is recorded from the uppermost sample between 350 and 360 m. Sand and gravel occur from 360 m, and from 380 m there is a regular element of claystone.

Micropaleontology

A rich association of mainly benthonic foraminifera is met in this interval. The abundance of Elphidium excavatum is evidence of a Pleistocene age. This is confirmed by the presence of Cassidulina reniforme, C. obtusa, Nonion labradoricum and Stainforthia loeblichi. The two latter species seem to have their lowermost occurrence close to the Pliocene boundary, and this is believed to be significant in this area. Elphidium groenlandicum is common in the upper samples.

Environment

The rich foraminiferal association and the presence of planktonic foraminifera in all samples indicate open marine conditions. The abundance of mollusc and echinoid debris evidence a high-energy environment, probably in the shallow neritic zone.

640-1040 LATE PLIOCENE

Lithology

The sand and gravel with claystone continue from the interval above and throughout this interval.

Micropaleontology

Common to abundant occurrences of Cibicides grossa (top at 640 m) characterise this interval. Important markers are also Sigmoilopsis

schlumbergeri, Elphidium bartletti and Trifarina fluens. Of note is that Elphidiella hannai tops below C.grossa, which is the reverse of the stratigraphical pattern in the North Sea region. This does, however seem to be consistent in wells from the coast of mid-Norway and may be a reflection of differing environmental conditions. The record of Martinottiella communis and S.schlumbergeri slightly above (620 m) the Pliocene boundary is of uncertain significance, but could be due to reworking.

Moreover, reworking of earlier Tertiary sediments seems to be rather common during the Pleistocene-Pliocene, and microfossils from several different epochs are represented, e.g. Miocene (E.aff.inflatum) and Oligocene (A.osnabrugensis).

The record of the species Bolivina sp.1, in the lower part of the section is also noteworthy. This species has not earlier been reported from the Norwegian continental margin, except in seabottom samples from the Trænabanken area. The species is very characteristic, and may be morphologically related to Bolivina hebes reported from the Miocene beds in the English Channel.

Assemblages in the lower part of the interval are relatively poor. In the absence of additional evidence a Late Pliocene age is presumed down to 1060 m.

Environment

The fairly rich and varied foraminiferal association indicates an open marine environment of deposition. The common to abundant mollusc and echinoid fragments and the coarse terrigeneous debris suggest a shallow marine, high energy environment.

1060-1460 EARLY PLIOCENE

Lithology

A sudden rise in claystone content takes place between 1035 m and 1090 m. Cement at 1045. The sand is mostly subangular and

subrounded grains of quartz, with smaller amounts of garnet, pyrite and shell fragments. Gravel is mainly rock fragments of garnet-mica schist (quartz biotite and a red garnet).

Micropaleontology

The assemblages are similar to those in the Late Pliocene interval. But the occurrence of Globorotalia puncticulata and Uvigerina hosiusi/venusta at 1060 m is taken to represent Early Pliocene deposits.

Downhole caving is thought to dilute the probably poorer assemblages in the lower part of the Pliocene interval. However, regular occurrences of e.g. C.grossa, E.excavatum, E.bartletti, E.hannai, Buccella frigida, Islandiella helenae and Quinqueloculina seminula, across the casing shoe at 1025 m, make a Pliocene age likely down to the 1440 m level, possibly even to the 1460 m.

Environment

As above. A shallow marine high energy environment with open circulation.

1465-1510 EARLY EOCENE

Lithology

Claystone, occasionally silty with small amounts of tuff and a light olive grey to dark grey very fine grained siderite. The first appearance of tuff is at 1490 m. It is laminated, fine grained and grey, often with light blue laminae of quartz.

Micropaleontology

Most of the species recorded are probably caved from the Pliocene. Indigenous foraminifera were not located but the record of sphaerical

reliculate radiolarians from 1465 m and below is taken as evidence of an Eocene age. The occurrence of Coscinodiscus sp. 1. Bettenstaedt at 1480 m is thought to be indicative of Early Eocene - Late Paleocene.

Palynology

Palynological work started at 1510 m. The top of the Paleocene is defined at 1525 m on the basis of the achme of Deflandrea oebisfeldensis. Levels above this are referred to the Eocene.

Comment

A non-sequence in the order of 40-45 million years seems to be present between the top of this interval and the base of that above.

The Paleocene/Eocene boundary is often fixed on micropaleontological grounds by the Coscinodiscus sp. 1 maximum event which is at 1580 m in this well. Palynological evidence, however, indicates that the Paleocene should be extended up to about 1525 m on the basis of D. oebisfeldensis. As detailed palynological analyses are not always carried out on this part of the well section, correlations with wells in which only micropaleontological analyses have been carried out might result in a correlation error. In such cases the Coscinodiscus sp. 1 maximum event should be correlated.

Environment

The relative high recovery of bisaccates, the low content of sapropel and other plant fragments together with the presence of radiolaria and diatoms indicate open marine, probably offshore conditions.

1525-1620 m PALEOCENE

Lithology

A sudden rise in the siderite content occurs at 1510 m. The rock is occasionally pyritic and dolomitic. It also contains small particles of organic material or clay. The light green claystone disappears at about 1560 m. Between 1560 and 1580 claystone dominates, interbedded with coarse grained dolomite and siderite, together with small amounts of tuff, sandstone and pyrite. Large amounts of tuff, volcanoclastic claystone, and bentonites are met with from 1585 to 1650. In the interval 1540 to 1615 large amounts of the material are stained brown by oxidation of pyrite.

Micropaleontology

The common occurrence of Coscinodiscus sp. 1 BETTENSTAEDT (large) at 1580 m is normally taken as the top Paleocene on micropaleontological criteria, where no palynological analyses are available (cf. comment above). However, the uphole regular occurrence of this species support the conclusion regarding the upper boundary of Paleocene based on palynomorphs.

The income of an agglutinated fauna at 1600 m may correspond to the top of the Lista fm. equivalent. The common occurrence of Spiroplectammina spectabilis and Ammodiscus cretaceous suggest a Late Paleocene age. The Cretaceous-Tertiary boundary is difficult to define on microfaunal content, since the agglutinated fauna seem to continue in the Cretaceous section and Paleocene obviously is heavily caved.

Palynology

The boundary between Paleocene and Eocene is fixed above the acme of Deflandrea oebisfeldensis, at 1525 m in this well. This marker has a top range in the latest Paleocene in the Norwegian Sea and neighbouring areas. Apectodinium augustum (top 1605 m) and A.

hyperxanthum (top 1600 m) have short ranges restricted to the Late Paleocene.

An abundant Paleocene flora occurs within this interval, including the above mentioned species and Lentinia wetzelii/serrata, Glaphrocysta ordinata, Ceratiopsis spp., Palaeocystodinium australinium, P.hyperxanthum, Alisocysta rugolirata, Taxodiaceaeous pollen and Caryapollenites. Palaeocystodinium hyperxanthum is typical of the Early Paleocene strata, while P.australinum and Alisocysta rugolirata normally succed D. oebisfeldensis downwards.

A considerable part of the palynomorphs recovered from this, and the sections below are caved. Intensive caving seem to have taken place around the Paleocene/Eocene boundary as evidenced by regular occurrences of e.g. Deflandrea oebisfeldensis and Apectodinium spp. far down into the well.

The assemblages suggest that both Early and Late Paleocene strata are present within the section. Caving makes any interpretation rather tentative but most of the section seems to be of Late Paleocene age. Floral elements noted from the lowermost sample (1620 m) do though have an Early Paleocene aspect.

Environment

The abundance of Taxodiaceous pollen indicate deposition outside a marshy coast. Sapropel is common throughout the interval and agglutinated foraminifera dominate the fauna in the lower part of the interval. This seems consistent with stagnating conditions near the sea bottom which evolved into more open marine conditions towards the top of the interval as the agglutinated fauna gives way to diatomes indicating open surface circulation.

1635-1840 m CAMPANIAN

Lithology

The large tuff content in the lower parts of the above lying interval continues down to 1650 m. This could be caved. From 1650 m claystones dominate. These are interlayered with thin veneers of grey very fine grained inpure limestone and coarse grained yellow calcite. Pyrite, glauconite, tuff, and gravel occur in variable amounts. The sand content increases from about 1775 to 1790 m.

From 1800 m the sand content increases again. The sand consists of calcite cemented quartz and glauconite. A sudden appearance of tuff takes place at 1825 m together with brown stained material.

Micropaleontology

The upper boundary of this unit is fixed by palynology. A poor fauna of mainly arenaceous foraminifera is met in this sequence. This fauna has a Late Cretaceous - Paleocene aspect. In the lowermost part of the interval there is a component of calcareous benthonic foraminifera. This calcareous element together with Spiroplectammina chicoana may point to a Late Campanian age. Radiolaria, fish teeth and partly common occurrences of diatomes are met. A part of the microfossils is caved.

Palynology

The first downhole observations of well defined Cretaceous species are from sample 1635 m at which level Odontochitina operculata, Cyclonephelium distinctum, Dinopterygium cladoides and Spinidinium clavum occur. These species range from the basal Maastrichtian/Latest Campanian down through the Late Cretaceous and some range well down into the Early Cretaceous. In practice they can be considered as Campanian and older.

Of note is the record of Spiniferites porosus at 1605 m i.e. above the limit of this interval. S. porosus is a distinct species occurring in the

Late Cretaceous. Its record at 1605 m implies either reworking of Cretaceous into the Paleocene (a common feature in this area) or that the Cretaceous extents up to this level. We note also that caving of Tertiary on a fairly massive scale has taken place and that much of the Cretaceous sequence (particularly the upper part) is completely overshadowed. On the basis of the fossil evidence available to us we interpret the 1605 m occurrence as reworked and take the occurrence of a number of Cretaceous species together at 1635 m as top Cretaceous.

Of particular significance to dating are the records of Aquilapollenites spp. from 1665-1810 m and Spongiodinium delitense at 1650-1765 m. Aquilapollenites is typical of the Campanian/Maastrichtian and an achme of S. deltitiense has previously been noted by us in the Late Campanian of this area. We conclude that a Campanian age, probably Late Campanian is most likely for this sequence.

Environment

The relative high yield of sapropelic material and traces of pyrite, together with a dominant arenaceous foraminiferal fauna, seem consistent with a deposition in a basin with restricted circulation and oxygen deficit near the bottom. The occurrence of dinoflagellate cysts does though indicate open circulation of surface waters.

1845-1872,5 m LATE ALBIAN - EARLY CENOMANIAN

Lithology

Cement occurs between 1840 and 1850. From 1850 to 1872,5 there is a grey calcareous claystone and small amounts of calcite cemented sandstone as above.

Micropaleontology

The upper boundary of this interval is fixed by palynology. The foraminiferal fauna is still poor and no change in the microfossil fauna

is registered in the upper part of this interval. However, new elements of arenaceous foraminifera appear at 1870 m and the assemblages are richer in individuals and species. The appearance of Textularia foeda, Reophax minuta and Arenobulimina moesiana together with common occurrences of Ammodiscus cretaceous and Glomospira charoides suggests a Cenomanian or Albian age. Radiolaria, diatomes and Inoceramus prisms are present throughout the unit. A part of the microfossil content could be caved from the strata above.

Palynology

Oligosphaeridium anthophorum and Litosphaeridium siphoniphorum are met with at 1845 m. Other common contituents of the Cenomanian - Albian assemblage are also present in this interval, and as caved constituents of the interval below; Palaeoperidinium cretaceum, Chlamydophorella nyei, Exochosphaeridium truncatum, Cauca parva, Surculosphaeridium longifurcatum, Florentinia mantelli, and Cicatricosisporites.

These are typical Albian-Cenomanian species. L. siphoniphorum has a well established base in the Late Albian and is particularly common in the Early Cenomanian. C. parva has a top in the Early Cenomanian and a base within the Albian.

Environment

The arenaceous fauna points to restricted bottom conditions, as in the strata above. However, the fauna is more diverse, and the sapropel plays a minor part, so some aeriation of the sea bottom seem to have occurred. This must be seen in the light of a more high-energy environment evidenced by a relatively high input of structured wood particles. The common occurrence of Micrhystridium acritarchs also suggests a high energy, near shore environment.

1872,5-1920 PERMIAN

Lithology

Fossiliferous dolomite is the predominant lithology. The rock is coarse grained to medium grained and is white and yellow in colour. Abundant euhedral crystals of dolomite occur on cracks and cavities. Small amounts of grey, very fine grained sandstone as above exist throughout the interval.

Macrofossils

Fragments of bryozoa were found in a number of samples from 1872,5 m and below. A number of these were picked, embedded and thin sections made. These were briefly examined by IKU and then sent for detailed expert examination. We have received the following comments:

The dolomite is rich in bryozoa fragments. These are neither sufficiently well-preserved nor distinctive enough to permit species determination. General characteristics of the bryozoan fauna, especially the presence of a likely acanthocladiid, and the relative abundance of fenestrates suggests a Late Palaeozoic age, most probably Permian though Carboniferous is not specifically excluded.

The bryozoans present belong to two orders: Trepostomata (including a cavariiform stenoporid colony) and Fenestrata (including Fenestella sensu lato and a probable acanthocladiid). Trepostomes range from Ordovician to Triassic but the rare species from the Triassic are unlike those present in these thin sections. Fenestrates have an Ordovician to Permian range.

Micropaleontology and palynology

There is a sharp reduction in the microfaunal and floral elements recovered from 1885 m and downwards. Though several samples have been examined, we have not observed specimens indicative of sediments older than Cenomanian - Albian in this interval. These are regarded as caved.

Environment

Only general comments can be made. The presence of bryozoa indicate a shallow marine environment, possibly with low or moderate energy conditions. In Svalbard bioherm type facies are known to have developed in which bryozoa were important elements. There is however insufficient evidence to suggests comparable developments here.

1920-1968,5 INDETERMINATE AGE; BASEMENT

Lithology

The core chips examined represent crystalline basement rocks probably of low metamorphic/high diagenetic facies. Quartzite occasionally with red staining due to non oxide (haematite) and quartz-muscovite-feldspar schist are the predominant lithologies.

Cored samples:

1944.24,1945.14 and 1945.34 m

These consist of carbonate cemented breccia with fragments/pebbles of quartzite and schist, mainly quartz-muscovite feldspar schist.

1945.72, 1945.90, 1946 and 1968.5 m

Quartz-muscovite schist and quartz-muscovite feldspar schist.

A separate report on the results of our examination of the core chips has been compiled and is enclosed together with this report.

Paleontology

Micropaleontological and palynological analyses were carried out on the core ships. No micropaleontological or palynological fossils were obtained and hence no dating can be proposed.

APPENDIX 1

Taxa lists

COMPANY **Phillips Petroleum**
WELL **6609/7–1**
DEPTH
DATE **Sept . '83**

ANALYST **Verdenius**
TAXALIST **Micropaleontology** 1 OF 2

OTHER SAMPLES ARE CUTTINGS
S SIDEWALL
C CORE
CF ? UNCERTAIN AFFINITY
• PRESENT
○ COMMON
● ABUNDANT

DEPTH NOT TO SCALE	ELPHIDIUM GROENLANDICUM	BULIMINA MARGINATA	CIBICIDES LOBATULUS	ELPHIDIUM EXCAVATUM	PROTELPHIDIUM ORBICULARE	HYALINEA BALTICA	ISLANDIELLA ISLANDICA	TRIFARINA ANGULOSA	FISSURINA SP.	ELPHIDIUM ALBUMBILICATUM	ELPHIDIUM ASKLUNDI	NONION LABRADORICUM	NONION AFFINE	CASSIDULINA LAEVIGATA	CASSIDULINA RENIFORME	CIBICIDES PSEUDOUNGERIANUS	ISLANDIELLA HELENAE	GLOBIGERINA PACHYDERMA SIN	GLOBIGERINA SP	CASSIDULINA OBTUSA	ISLANDIELLA NORCROSSI	BUCCELLA FRIGIDA
360	○	•	•																			
410	○	•	•	○	•	•	•	•	•													
460	•	•	•	○		•				•	•	•	•	•	•	•	•	•	•	•		
500			•	○		•		•		•			•		•	•		○		•	•	•
560			•	○						•		•	•	•	•	•		•	•	•	•	
580			•	○	•					•					•	•	•			•		•
590		•	•	○						•					•	•	•	○		•	•	•
600		•		○						•		•	•	•	•			○			•	•
610			•	○				•		•			•	•	•	•	•	○				•
620		•	•	•				•		•		•	•			○		•				
640		•	•	•				•		•			•		•	•		•	•			•
660		•	•	•	•		•			•			•	•		•		•	•			•
710			•	•						•			•	•				•				
760			•	•						•			•			•	•	•				•
810		•	•	•			•	•					•	•					•			•
840		•	•	•			•	•		•				•								•
860		•	•	•	•			•		•			•	•		•		•	•		•	•
910		•	•	•	•		•	•						•					•		•	•
960		•		•	•			•					•	•		•	•	•				•
980		•	•	•			•	•		•			•	•			•	•	•			
990		•	•	•			•			•				•				•				
1010		•	•	•	•		•						•	•		•		•	•			•
1020		•	•	•				•		•			•	•				•	•		•	
1040		•	•	•				•					•	•								
1060			•				•						•	•		•	•		•			
1080										•			•	•			•					•
1100			•	•	•												•				•	
1110			•	•				•					•				•					
1120				•	•												•					•
1140				•	•												•					
1160			•	•										•			•		•			•
1180			•				•						•				•		•			•
1210				•													•					•
1240					•		•						•	•								•
1260				•						•				•		•			•			
1280					•					•												
1310			•																			
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1360			•	•															•			
1380			•	•									•									•
1410			•																			
1440													•									•
1460		•	•					•		•			•						•			
1465			•							•									•			•

DEPTH NOT TO SCALE	GLOBIGERINA BULLOIDES	QUINQUELOCULINA SPP.	LOXOSTOMUM CF. LAMMERSI	GLOBIGERINA QUINQUELOBA	PATEORIS HAUERINOIDES	UVIGERINA PEREGRINA	STAINFORTHIA LOEBLICHI	PULLENIA BULLOIDES	POLYMORPHINA SPP.	OOLINA WILLIAMSONI	PAROMALINA BILATERALIS	GLOBOROTALIA CF. INFLATA	PYRGO SP.	SIGMOILOPSIS SCHLUMBERGERI	MARTINOTTIELLA COMMUNIS	CIBICIDES GROSSA	TRIFARINA FLUENS	ELPHIDIUM BARTLETTI	ALMAENA OSNABRUGENSIS	DENTALINA SP.	ELPHIDIELLA HANNAI	BULIMINA ACULEATA	ELPHIDIUM CRISPUM (?)
360																							
410																							
460																							
500	•	•	•	•																			
560		•			•	•	•	•															
580		•								•	•												
590	•	•		•			•				•												
600	•	•	•		•		•					•	•										
610	•	○	•		•	•	•				•	•	•										
620		•			•	○	•				•	•		•	•								
640						•			•				•			○	•						
660	•	•			•	•							•		•	○	•	•					
710	•					•			•							○							
760		○											•	•		○		•	?	•			
810		•														○					•		
840		•												•		○							
860		•							•							○		•			•	cf.	?
910		•												•		○						cf.	
960	•															○		•			•	cf.	
980		•														○		•				cf.	
990	•							•								○		•				cf.	
1010																○		•			•	cf.	
1020	•	•						•								○	•	•				•	
1040		•														○	•	•		•		•	
1060																○	•	•		•	•	•	
1080																○		•					
1100		•														•		•				•	
1110																•		•				•	
1120		•														•							
1140											•					•		•			•		
1160																○		•			•		
1180																○	•	•				•	
1210																•		•					
1240		○														○	•	•					
1260		•														○	•	•					
1280		•														•		•					
1310		•												•		•		•					
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1360		•														○					•		
1380		•												•		•		•					
1410																•		•					
1440		•														○		•					
1460																○		•					
1465		•														○		•					

DEPTH NOT TO SCALE	TEXTULARIA SP.	OOLINA HEXAGONA	BOLIVINA SP. 1	CIBICIDES CF. AKNERIANUS	AMMONIA BECCARII	UVIGERINA HOSIUSI/VENUSTA	GLOBIGERINA CF. PREBULLOIDES	GLOBOROTALIA PUNCTICULATA	NONIONELLA MIOCENICA	ELPHIDIUM AFF. INFLATUM	LENTICULINA SP.	COSCINODISCUS SP.	BUDASHEVAELLA MULTICAMERATA	CASSIDULINA CARAPITANA	RADIOLARIANS	MYCID CYSTS	DIATOMS	BRYOZOA	SPONGE NEEDLES	INOCERAMUS PRISMS	OSTRACODS	ECHINID SPINES	MOLLUSCS	FOSSIL STRATIGRAPHY	SYNTHESIS REMARKS
360																						•	•	PLEISTOCENE	E.groen landicum
410																					•		•		
460																				•	•	•	○		E.excavatum
500																					•		○		C.reniforme C.obtusa N.labradoricum
560																			•		•	○	○		
580																			•		•	○	○		
590																					•	•	○		S.loeblichi
600																		•	•		○	○	○		
610																			•		•	•	•		
620																		•				•	○		
640																		•			•		•	LATE PLIOCENE	C.grossa T.fluens
660																						•	○		
710																						•			
760																		•		•		•	○		
810																		•		•		•	•		
840																					•		○		
860																		•				•	○		
910	•																				•	•	•		
960		•	•																	•	•	•	○		
980																					•				
990				•																			•		
1010																						•	•		
1020			•																		•	•	•		
1040			•	•	•													•			•		•		
1060			•		•	•	•	•											•				•	EARLY PLIOCENE	G.puncticulata U.hosiusi/venusta
1080																	•					•	•		
1100		•			•	•			•													•	○		
1110										•												•	○		
1120																						•	○		
1140																							•		
1160																							○		
1180																•							○		
1210																						•	•		
1240																				•		•	○		
1260																							•		
1280																						•	○		
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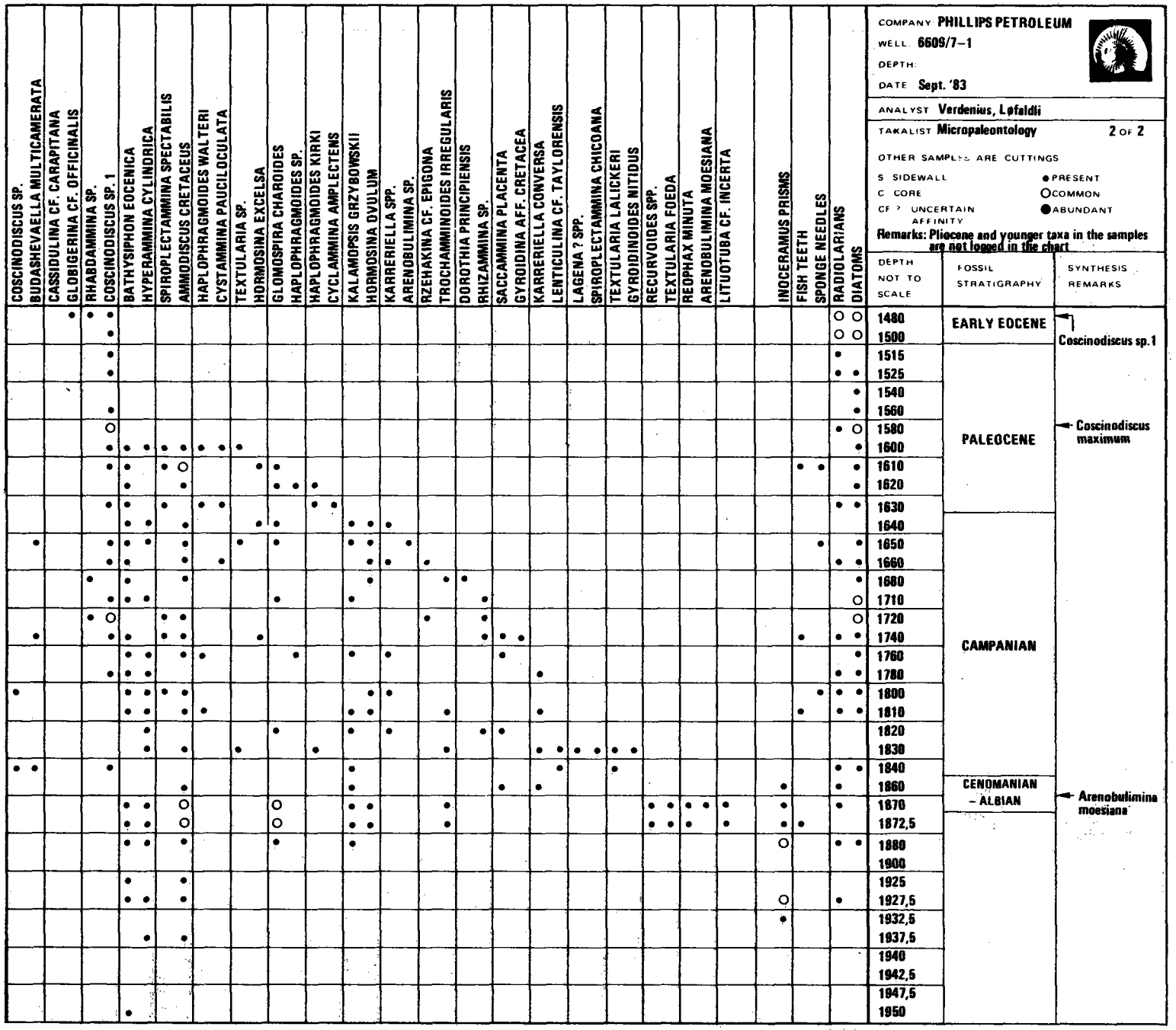
1340																						•	•		
1360																						•	○		
1380				•														•				•	•		
1410											•										•				
1440				•							•	•					•			•			○		
1460				•									?	?								•	•		
1465															•							•		EARLY EOCENE	



COMPANY PHILLIPS PETROLEUM

WELL 6609/7–1

DEPTH:

DATE Sept. '83

ANALYST Verdenius, Løfaldli

TAXALIST Micropaleontology 2 OF 2

OTHER SAMPLES ARE CUTTINGS

S SIDEWALL
C CORE
CF ? UNCERTAIN AFFINITY

• PRESENT
○ COMMON
● ABUNDANT

Remarks: Pliocene and younger taxa in the samples are not logged in the chart

COMPANY Phillips Petr. Co.
WELL 6609 / 7 - 1
DEPTH 1525 - 1885
DATE Sept. 1983

ANALYST H. Selnes
TAXALIST PALYNOLOGY 1 OF 1

OTHER SAMPL·· ARE CUTTINGS
S SIDEWALL
C CORE
CF ? UNCERTAIN AFFINITY
● PRESENT
○ COMMON
⬤ ABUNDANT

DEFLANDREA OEBISFELDENSIS, D.PHOSPHORITICA, SMALL DEFLANDREOIDS, LENTINIA WETZELII/SERRATA, GLAPHROCYSTA ORDINATA, THALASSIPHORA PELAGICA, HOMOTRYBLIUM SP., SPINIFERITES SPP., SP.RAMOSUS, OPERCULUM AFF. ODONTOCHITINA, CERATIOPSIS "MAGNA", THALASSIPHORA DELICATA, ACHOMOSPHAERA SP., PALAEOCYSTODINIUM AUSTRALINUM, CERATIOPSIS SPP., ALISOCYSTA RUGOLIRATA, PALAEOPERIDINIUM PYROPHORUM, CHATANGIELLA SP., SUBTILISPHAERA SP.A, SPINIFERITES CORNUTUS, FROMEA FRAGILIS/COMPLICATA, APECTODINIUM HYPERACANTHUM, HYSTRICHOSPHAERIDIUM TUBIFERUM, AREOLIGERA CF. SENONENSIS, DEFLANDREA DENTICULATA, APECTODINIUM HOMOMORPHUM, A. AUGUSTUM, LEJEUNEA HYALINEA, FROMEA SP.2, SPINIFERITES POROSUS, CHIROPTERIDIUM SP., PALAEOCYSTODINIUM HYPERXANTHUM, CORDOSPHAERIDIUM GRACILIS, DRACODINIUM VARIELONGITUDUM, APECTODINIUM PARVUM, ADNATOSPHAERIDIUM SP., ODONTOCHITINA OPERCULATA, CYCLONEPHELIUM DISTINCTUM, CHATANGIELLA / ISABELIDINIUM, CORDOSPHAERIDIUM INODES, DEFLANDREA SP., SPINIDINIUM CLAVUM, DINOPTERYGIUM CLADOIDES, CORONIFERA OCEANICA, APTEODINIUM SP., SPONGODINIUM DELITIENSE, MICRODINIUM SP., MICRHYSTRIDIUM, PALAEOTETRADINIUM SP., GONYAULACYSTA SP., XENASCUS GOCHTII, SENONIASPHAERA SP., DINOGYMNIUM SP., EXOCHOSPHAERIDIUM PHRAGMITES, DICONODINIUM SP., TRITHYRODINIUM SP., PALAEOHYSTRICHOPHORA INFUSOROIDES, SCRINIODINIUM CAMPANULUM, HYSTRICHODINIUM PULCHRUM, MEMBRANILARNACIA RETICULATA, ISABELIDINIUM SP., AREOSPHAERIDIUM SP., CHATANGIELLA TRIPARTITA, CLEISTOSPHAERIDIUM SP., ODONTOCHITINA COSTATA, CHATANGIELLA DITISSIMA, CEREBROCYSTA SP., CRIBROPERIDINIUM SP., DAPSILIDINIUM SP., OLIGOSPHAERIDIUM ANTHOPHORUM, LITHOSPHAERIDIUM SIPHONIPHORUM, PALAEOPERIDINIUM CRETACEUM, CHLAMYDOPHORELLA NYEI, CYCLOPSIELLA VIETA, EXOCHOSPHAERIDIUM TRUNCATUM, OVOIDINIUM SP. (CF.), FLORENTINIA MANTELLI, CAUCA PARVA, SURCULOSPHAERIDIUM LONGIFURCATUM, BISACCATES, TAXODIACEAE POLL., CARYA POLL., TASMANITES, AQUILAPOLL., ORBICULOPOLLIS, PARAMIPOLL., PTEROSPERMOPSIS, BROWN SPHERES, NORMAPOLLES, CICATRICOSISPORITES, SAPROPEL, WOOD PARTICLES

DEPTH NOT TO SCALE	FOSSIL STRATIGRAPHY	SYNTHESIS REMARKS
1510	EARLY EOCENE	
1525		← D.oebisfeldensis
1540		
1555		
1570		
1585		
1600		
1605	PALEOCENE	
1610		
1620		
1635		← O.operculata, Chatangiella spp., D.cladoides; ← C.oceanica, S.delitiense
1650		
1665		← Aquilapoll.; ← X.ceratioides
1680		
1695		← P.infusoroides, S.campanulum, H.pulchrum
1710		
1720		
1735	CAMPANIAN	
1750		
1765		
1780		
1795		
1810		
1825		
1840		
1845	CENOMANIAN	← O.anthophorum
1865	– ALBIAN	← L.siphoniphorum
1885		← C.nyei, P.cretaceum; ← C.parva, S.longifurcatum
1905		
1925		