



**MICROPALEO**  
CONSULTANTS, INC.

**U. S. NAVY - NPRA**  
**SOUTH BARROW NO. 1**

**API #50-023-10009**

**SEC. 28, T23N/R18W UM**

**NORTH SLOPE, ALASKA**

**Prepared by:**

**Michael B. Mickey - Foraminifera**

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**BIOSTRATIGRAPHY REPORT**

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## **ILLUSTRATIONS**

(In pockets at back of report)

Figure B-1	High Resolution Biostratigraphy Plots
Figure F-1	Foraminifera Distribution Chart (2700-3400')
Figure P-1	Palynomorph Distribution Chart (2700-3400')

## **INTEGRATED SUMMARY**

2700' Top Sample

2700-2864'

Early Cretaceous  
Aptian to Early Albian

2864-3354'

Early Cretaceous  
Barremian  
KE<sub>B</sub>

3354-3402'

Early Cretaceous  
Hauterivian  
KE<sub>H</sub>

3402-3553"T.D.

Indeterminate Age

Discussion. Argillite. Top based on e-log data.

# **FORAMINIFERA REPORT**

**Interpreted by**  
**Michael B. Mickey**

## **FORAMINIFERA SUMMARY**

2700' Top Sample

2700-2860'

<u>Age.</u>	Early Cretaceous Aptian to Early Albian
<u>Zones.</u>	F-10 to F-11
<u>Environment.</u>	Upper to Middle Bathyal - Some Basal Distal (Upper to Middle Slope - Some Basal Starved Basin)

2860-3340'

<u>Age.</u>	Early Cretaceous Barremian
<u>Zone.</u>	F-12
<u>Environment.</u>	Outer Neritic to Upper Bathyal (Outer Shelf to Upper Slope)

3340-3380'

<u>Age.</u>	Early Cretaceous Hauterivian
<u>Zone.</u>	F-13a
<u>Environment.</u>	Inner to Middle Neritic (Inner to Middle Shelf)

3380-3400' Bottom Sample

<u>Age.</u>	Indeterminate
<u>Environment.</u>	Indeterminate
<u>Discussion.</u>	Argillite basement.

## **INTRODUCTION**

### **Scope**

Data from 46 Foraminifera samples from the U. S. Navy South Barrow No. 1 well were incorporated into this report. These samples consisted of 32 ditch and 14 conventional core samples covering the interval 2700 to 3400 feet. This work was done as part of M.C.I. Job Number 22-113.

### **Procedures**

Standard techniques were used to process the material. All samples were boiled in Quaternary-O and washed over 20 and 200 mesh screens. Frequency symbols correspond to the following numerical values: very rare (1), rare (2 - 4), frequent (5 -25), common (26 - 100), abundant (101 - 999) and prolific (1000+). The picked foram slides and residues are repositied at the State of Alaska Geological Materials Center in Eagle River, Alaska.

Certain factors such as shelf widths, basin configuration and overall basin depths associated with Arctic Mesozoic basins are not completely understood at present. The paleoenvironments presented in this report reflect relative basinal position only and should not be tied to specific water depths. Generally, neritic corresponds to shelf or deltaic environments, while bathyal corresponds to slope or prodelta environments and bathyal (starved basin) corresponds to distal (far from the source) deposition. As an example, prodelta deposits could represent deposition as shallow as middle neritic or as deep as bathyal (slope) depending on the delta type and shelf width. With a narrow shelf, a river-dominated deltaic system could build across the shelf and the prodelta deposits would be in a bathyal (slope) depth. A tide-dominated deltaic system associated with a wide shelf could result in middle neritic prodelta deposition.



## **Format**

A listing of the age, environment, fauna and occasional lithology comments for each biostratigraphic interval follows. A generalized summary of the well is presented in the Conclusions section at the end of the Foraminifera Report. A Foraminifera Distribution Chart (Figure F-1) and a High Resolution Biostratigraphy Plot (Figure B-1) containing foram diversity/abundance plots, a cumulative faunal plot and paleoenvironmental plot(s) are in pockets at the back of this report.

## RESULTS

2700' Top Sample

2700-2860'

<u>Age.</u>	Early Cretaceous Aptian to Early Albian
<u>Zones.</u>	F-10 to F-11
<u>Environment.</u>	Upper to Middle Bathyal - Some Basal Distal (Upper to Middle Slope - Some Basal Starved Basin)
<u>Fauna.</u>	<i>Ammodiscus rotalarius</i> , <i>Bathysiphon vitta</i> , <i>Haplophragmoides excavatus</i> , <i>H. topagorukensis</i> , <i>Miliammina awunensis</i> , <i>Pseudobolivina rayi</i> , <i>Saracenaria projectura</i> , <i>Textularia topagorukensis</i> , <i>Thuramminoides</i> cf. <i>septagonalis</i> , <i>Verneuilioides</i> <i>borealis</i> , <i>Cenosphaera</i> spp. (pyritized), <i>Spongodiscus</i> sp. (pyritized), <i>Lithocampe</i> spp. (pyritized), <i>Inoceramus</i> prisms, pelmatozoan fragments, pyrite, and common paper shale in the basal sample.

2860-3340'

<u>Age.</u>	Early Cretaceous Barremian
<u>Zone.</u>	F-12
<u>Environment.</u>	Outer Neritic to Upper Bathyal (Outer Shelf to Upper Slope)
<u>Fauna.</u>	<i>Pseudobolivina rayi</i> , <i>Saracenaria projectura</i> , arenaceous spp. (large, coarse), <i>Conorboides</i> cf. <i>umiatensis</i> , <i>Bathysiphon scintillata</i> , <i>Gaudryina tailleuri</i> , <i>G. tappanae</i> , <i>G. subcretacea</i> , <i>Glomospirella arctica</i> , <i>Haplophragmoides coronis</i> , <i>H. duoflatis</i> , <i>H. goodenoughensis</i> , <i>Glomospira subarctica</i> , <i>Ammobaculites reophacoides</i> , <i>A. erectus</i> , <i>Lenticulina muensteri</i> , <i>Thuramminoides</i> sp., <i>T. septagonalis</i> , <i>Vaginulina exilis</i> , <i>Gaudryinella irregularis</i> , <i>Marginulinopsis collinsi</i> , <i>Gavelinella awunensis</i> , <i>G. barremiana</i> , <i>G. stictata</i> , <i>Ammodiscus mackenziensis</i> , <i>A. elongatus</i> , <i>Miliammina ischnia</i> , <i>Trochammina squamata</i> , <i>Gyroidinoides nitidus</i> , <i>Frondicularia cushmani</i> , <i>Trochamminoides</i> sp. (small, thin), <i>Cenosphaera</i> spp. (pyritized), <i>Spongodiscus</i> sp. (pyritized), <i>Lithocampe</i> sp. (pyritized), <i>Dictyomitra</i> sp. (pyritized), <i>Inoceramus</i> prisms, fish debris, shell fragments, pyrite and common to abundant rounded frosted quartz floating sand grains.

3340-3380'

<u>Age.</u>	Early Cretaceous Hauterivian
<u>Zone.</u>	F-13a
<u>Environment.</u>	Inner to Middle Neritic (Inner to Middle Shelf)
<u>Fauna.</u>	Arenaceous spp. (large, coarse), <i>Bathysiphon scintillata</i> , <i>Haplophragmoides coronis</i> , <i>H. duoflatis</i> , <i>Ammobaculites erectus</i> , <i>Ammodiscus mackenziensis</i> , <i>Marginulina planiuscula</i> , pyrite and frequent to common rounded frosted quartz floating sand grains.

3380-3400' Bottom Sample

<u>Age.</u>	Indeterminate
<u>Environment.</u>	Indeterminate
<u>Fauna.</u>	Barren of indigenous Foraminifera.
<u>Discussion.</u>	Argillite basement.

## **CONCLUSIONS**

The U. S. Navy South Barrow No. 1 well penetrated the following biostratigraphic sequence based on foraminiferal analysis:

- 680+ feet (2700-3380') of Hauterivian to Early Albian age (Early Brookian & Beaufortian - Rift Sequence) base of slope bottomsets, slope foresets and shelf topsets sitting on a Hauterivian age basal coarse grained sandstone.
- 20+ feet (3380-3400' Bottom Sample) of indeterminate age (Franklinian) basement argillite.

# **PALYNOLOGY REPORT**

**Interpreted by:**

**Hideyo Haga**

## **PALYNOLOGY SUMMARY**

2700-2820'?

Age. Early Cretaceous  
Aptian - Early Albian

Zone. P-M18

Environment. Marine

2820?-3400'

Age. Early Cretaceous  
Probable Barremian - Aptian

Zone. Probable P-M18a

Environment. Marine

# **INTRODUCTION**

## **Purpose and Scope**

The U. S. Navy South Barrow No. 1 well was drilled during the late 1940's as part of the early exploration efforts in the NPR-4. This report is a compilation of two palynologic studies performed by the author during 1979, and in the early 1980's.

The analyzed samples total 46, and consist of 32 ditch samples and 14 conventional core samples. The samples cover the well section from 2700 feet to 3400 feet.

This report provides an updated format from the original data. Some of the taxon designations have been revised to reflect the changes in taxonomic assignments that have evolved over the decades since the initial study.

## **Procedures**

The original palynomorph distribution chart data were entered into a desktop PC using proprietary software to compile new format charts. The charts are located in the pocket.

The Palynomorph Distribution Chart (Figure P-1) lists the occurrence and abundance of recorded taxa in each sample. Included on this chart are the diversity and abundance curves for the spore-pollen and the microplankton cysts.

High Resolution Biostratigraphy Plots - Foraminifera/Palynomorphs (Figure B-1) are also provided. This chart includes additional palynology parameters in the form of a cumulative plot that illustrates the relative abundance of the nonmarine, marine and miscellaneous palynomorph components.



## RESULTS

Based on the palynomorph assemblages observed, an age and generalized environment of deposition were interpreted for the palynostratigraphic subdivisions. The environments, as interpreted from the palynological preparations, are simply categorized as nonmarine, marginal marine or marine. These categories are based on the absence or the presence and diversity of microplankton.

The samples begin at 2700 feet and encountered Early Cretaceous strata from that depth down to the bottom of the last sample at 3400 feet.

### 2700-2820'?

<u>Age.</u>	Early Cretaceous Aptian to Early Albian
<u>Zone.</u>	P-M18
<u>Environment.</u>	Marine
<u>Palynomorphs.</u>	<p>The uppermost interval examined is assigned an Aptian - Early Albian age based on a limited dinocyst assemblage. The forms recorded include <i>Cyclonephelium distinctum</i>, <i>Muderongia asymmetrica</i>, <i>Odontochitina operculata</i> and <i>Oligosphaeridium complex</i>.</p> <p>Some reworked Mississippian spores, and Jurassic and Neocomian dinocysts were also recorded.</p>
<u>Discussion.</u>	The absence of a well-developed dinocyst assemblage and no consistent occurrences of marker species is characteristic of this age unit.

2820?-3400'

<u>Age.</u>	Early Cretaceous Probable Barremian to Aptian
<u>Zone.</u>	Probable P-M18a
<u>Environment.</u>	Marine
<u>Palynomorphs.</u>	<p>The interval of Barremian - Aptian strata is marked by an increase in dinocyst abundance. The assemblage includes <i>Cyclonephelium distinctum</i>, <i>Gardodinium trabeculosum</i>, <i>Imbatodinium jaegeri</i>, <i>Micrhystridium</i> sp. A, <i>Odontochitina operculata</i>, <i>O.</i> sp. 1, <i>Oligosphaeridium complex</i> and <i>Palaeoperidinium cretaceum</i>.</p> <p>The spore-pollen assemblage consists largely of undifferentiated bisaccates, <i>Deltoidospora</i>, <i>Gleicheniidites senonicus</i>, <i>Lycopodiumsporites</i> and Taxodiaceae.</p> <p>Some scattered, rare occurrences of reworked spore-pollen and dinocysts were also recorded.</p>
<u>Discussion.</u>	<p>This section has an overall increase in palynomorph diversity and abundance that is commonly associated with the P-M18a zonule. Less typical are the occurrences of the reworked species that are evidence for detrital input. This zonule is usually very amorphous-rich and nearly absent of reworked species. Based on these occurrences the age assignment is left tentative.</p>

## **CONCLUSIONS**

Palynological analysis of the U. S. Navy South Barrow No. 1 well provides the following generalized palynostratigraphic succession:

- Marine Aptian - Early Albian strata are identified between 2700 feet and 2820? feet. This age assignment is based on negative evidence.
- Marine, probable Barremian - Aptian strata, are designated from 2820? feet to 3400 feet. This interval is somewhat less typical of the low detrital input intervals usually seen in this age section.