



MICROPALÉO
CONSULTANTS, INC.

USGS/HUSKY - NPRA

AWUNA NO. 1

API #50-155-20001

SEC. 30, T3S/R25W UM

NORTH SLOPE, ALASKA

Prepared by:

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BIOSTRATIGRAPHY REPORT

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ILLUSTRATIONS

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INTEGRATED SUMMARY

100-5310'?

Early Cretaceous
Albian

5310?-10,120'?

Early Cretaceous
Aptian

10,120?- 11,200'T.D.

Early Cretaceous
Possible Barremian
KE_B?

Discussion. Possible Brookian sourced Barremian
flysch deposition.

FORAMINIFERA REPORT

Interpreted by
Michael B. Mickey

FORAMINIFERA SUMMARY

100-5310'?

<u>Age.</u>	Early Cretaceous Albian
<u>Zone.</u>	F-11
<u>Environment.</u>	100-1360': Upper to Middle Bathyal Flysch Deposition (Upper to Middle Slope Flysch Deposition) 1360-5310'?: Middle to Lower Bathyal Flysch Deposition (Middle to Lower Slope Flysch Deposition)

5310?-10,220'?

<u>Age.</u>	Early Cretaceous Aptian	
<u>Zone.</u>	F-11	
<u>Environment.</u>	5310?-6660':	Middle to Lower Bathyal Flysch Deposition (Middle to Lower Slope Flysch Deposition)
	6660-7080':	Upper to Middle Bathyal Flysch Deposition (Upper to Middle Slope Flysch Deposition)
	7080-10,220'?:	Middle to Lower Bathyal Flysch Deposition (Middle to Lower Slope Flysch Deposition)

10,220?-11,200'T.D.

<u>Age.</u>	Early Cretaceous Possible Barremian	
<u>Zone.</u>	F-12?	
<u>Environment.</u>	Middle to Lower Bathyal Flysch Deposition (Middle to Lower Slope Flysch Deposition)	

INTRODUCTION

Scope

Data from 351 Foraminifera samples from the USGS/Husky Awuna No. 1 well were incorporated into this report. These samples consisted of 334 ditch and 17 conventional core samples covering the interval 100 to 11,200 feet total depth. 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 reposited 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. Foraminifera Distribution Charts (Figures F-1 and F-2) 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

100-5310'?

Age.

Early Cretaceous
Albian

Zone.

F-11

Environment.

100-1360': Upper to Middle Bathyal Flysch
Deposition
(Upper to Middle Slope Flysch
Deposition)
1360-5310'?: Middle to Lower Bathyal Flysch
Deposition
(Middle to Lower Slope Flysch
Deposition)

Fauna.

Glomospira corona, *Bathysiphon vitta*, arenaceous spp.,
Trochamminoides sp., *Haplophragmoides excavatus*,
Gavelinella stictata, *Verneuulinoides borealis*,
Hippocrepina barksdalei, *Reophax* sp., *Lithocampe* sp.
(pyritized), *Dictyomitra* sp. (pyritized), *Cenosphaera*
spp. (pyritized), *Spongodiscus* sp. (pyritized),
Inoceramus prisms, shell fragments, fecal pellets, pyrite,
and rare to frequent tar between 1540 to 4380 feet.

5310?-10,220'?

<u>Age.</u>	Early Cretaceous Aptian	
<u>Zone.</u>	F-11	
<u>Environment.</u>	5310?-6660':	Middle to Lower Bathyal Flysch Deposition (Middle to Lower Slope Flysch Deposition)
	6660-7080':	Upper to Middle Bathyal Flysch Deposition (Upper to Middle Slope Flysch Deposition)
	7080-10,220'?:	Middle to Lower Bathyal Flysch Deposition (Middle to Lower Slope Flysch Deposition)
<u>Fauna.</u>	<i>Bathysiphon vitta</i> , arenaceous spp., <i>Haplophragmoides excavatus</i> , <i>Psamminopelta bowsheri</i> , <i>Gaudryina</i> aff. <i>tailleuri</i> , <i>Lenticulina erecta</i> , <i>Saccamina</i> spp., <i>Bullopore?</i> sp., <i>Valvulineria loetterlei</i> , <i>Marginulinopsis collinsi</i> , astrorhizids? sp., <i>Inoceramus</i> prisms, pyrite and gray spherules. Clear angular and hydrothermal quartz occurring between 7530 and 8890 feet suggest that a possible thrust? fault(s) may occur within this interval.	

10,220?-11,200'T.D.

<u>Age.</u>	Early Cretaceous Possible Barremian
<u>Zone.</u>	F-12?
<u>Environment.</u>	Middle to Lower Bathyal Flysch Deposition (Middle to Lower Slope Flysch Deposition)
<u>Fauna.</u>	Barren of Foraminifera.
<u>Discussion.</u>	While this interval is barren of Foraminifera, regional correlations on the compressed NPRA 2D seismic lines suggest that it might represent Barremian age barren (diluted) flysch deposition from a southern (Brookian) source. However, the presence of clear angular and hydrothermal quartz grains between 7530 and 8890 feet in the interval above may indicate the presence of one, or more, thrust faults that would make this barren interval merely fault repeated barren Aptian strata.

CONCLUSIONS

The USGS/Husky Awuna No. 1 well penetrated the following biostratigraphic sequence based on foraminiferal analysis:

- 11,100+ feet (100-11,200'T.D.) of possible Barremian to Albian age (Early Brookian) slope foresets characterized by rapidly deposited flysch type deposition.

PALYNOLOGY REPORT

Interpreted by:

Hideyo Haga

PALYNOLOGY SUMMARY

100-10,720'

<u>Age.</u>	Early Cretaceous Aptian - Early Albian
<u>Zone.</u>	P-M18
<u>Environment.</u>	Marginal Marine - Marine
<u>Remarks.</u>	This age assignment is based mainly on negative evidence.

10,720-11,200'T.D.

<u>Age.</u>	Indeterminate
<u>Environment.</u>	No evidence of marine.

INTRODUCTION

Purpose and Scope

The USGS/Husky Awuna No. 1 well completed drilling in April, 1981. The drilling process covered two seasons. The spud date for the well was February 29, 1980, with suspension in drilling through the summer of 1980.

During the drilling process, a palynological study was conducted of selected sample material from the well. A total of 137 palynology samples were examined in the course of this investigation. The sample total consisted of 114 ditch-cutting composites, 22 conventional core fragments, and one (1) sidewall core taken between 100 feet and the total depth of 11,200 feet.

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

Procedures

At the time this well was drilled, the palynological samples were processed in San Diego, California, using techniques that were standard for the time. The chemical treatments involved the use of hydrochloric, hydrofluoric and nitric acids. The resulting kerogen residues were further concentrated by physical separation with heavy liquids and a sieving/panning technique. Permanent slide mounts were made of the residue concentrates. The coverslip mounting medium used was a synthetic resin sold under the brand name of "Coverbond".

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

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 each palynostratigraphic subdivision. 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 presence and diversity of microplankton.

The samples available for examination begin at 100 feet, and the youngest units encountered at that depth were of Aptian to Albian age. The underlying strata representing several hundred feet at the base of well were of indeterminate age.

100-10,720'

<u>Age.</u>	Early Cretaceous Aptian to Early Albian
<u>Zone.</u>	P-M18
<u>Environment.</u>	Marginal Marine to Marine
<u>Palynomorphs.</u>	<p>The interval carries a general Aptian - Albian palynomorph assemblage. The assemblage includes the dinocysts <i>Callaiosphaeridium asymmetricum</i>, <i>Imbatodinium jaegeri</i>, <i>Muderongia asymmetrica</i>, <i>Palaeoperidinium cretaceum</i>, <i>Pseudoceratium polymorphum</i> and <i>P. retusum</i>.</p> <p>Common to this interval are numerous scattered occurrences of reworked Carboniferous, Triassic and Jurassic palynomorphs.</p>
<u>Discussion.</u>	Although the assemblage is similar to the Middle - Late Albian, P-M17 zonule, an absence of Albian-restrictive

species is significant. In particular, the marker species *Luxadinium propatulum*, *Ovoidinium verrucosum*, *Spinidinium vestitum* and *Wigginsella grandstandica* were not present. Therefore, this age assignment is based mainly on negative evidence.

10,720-11,200'T.D.

<u>Age.</u>	Indeterminate
<u>Environment.</u>	No evidence of marine.
<u>Palynomorphs.</u>	This bottom interval is separated by the decrease in palynomorph abundances. No dinocysts were observed and a very sparse spore-pollen assemblage was recorded.
<u>Discussion.</u>	Although a noticeable decrease in palynomorph diversity and abundance is present below 5200 feet, this lowermost interval is identified by a further decrease in palynomorphs.

CONCLUSIONS

Palynological analysis of the USGS/Husky Awuna No. 1 well provides the following generalized palynostratigraphic succession:

- Marginal marine and marine Aptian - Early Albian strata are identified between 100 feet and 10,720 feet.
- A significant decrease in palynomorph diversity and abundance is seen below 5200 feet, but no age differentiation is obvious.
- The basal interval, from 10,270 feet to 11,200 feet total depth, consists of indeterminate age strata. No marine palynomorphs were observed in this interval.