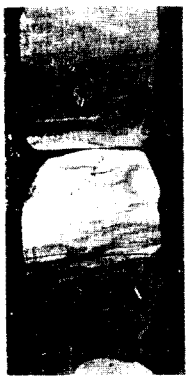
INITIAL CORE DESCRIPTIONS

DEEP SEA DRILLING PROJECT

LEG 62

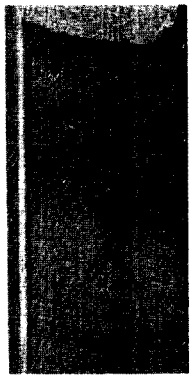
NORTH PACIFIC PALEOENVIRONMENTS



463-63-1
91–106 cm
1

463-70-5
15–30 cm
2

463-86-1
35–50 cm
3



465A-40-1
92–107 cm
4

465A-40-2
127–142 cm
5

Prepared for the
NATIONAL SCIENCE FOUNDATION
National Ocean Sediment Coring Program
Under Contract C-482
By the
UNIVERSITY OF CALIFORNIA
Scripps Institution of Oceanography
Prime Contractor for the Project

Captions to Cover Photos

1. 463-63-1, 91–106 cm: Cyclic multicolored limestone with common burrowing.

2. 463-70-5, 15–30 cm: Carbonaceous limestone, laminated with no burrowing.

3. 463-86-1, 35–50 cm: Pelagic and clastic limestone. Note the microfaulted and fractured nature of the pelagic limestone and undisturbed nature of the clastic limestone.

4. 465A-40-1, 92–107 cm: Olive gray laminated limestone. Note the change in dip of over 15°.

5. 465A-40-2, 127–142 cm: Trachyte breccia with calcite and barite cement.

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SCRIPPS INSTITUTION OF OCEANOGRAPHY

LA JOLLA, CALIFORNIA 92093

January 25, 1980

Dear Colleague:

This document has been printed and distributed by the Deep Sea Drilling Project for the purpose of sample selection by interested earth scientists. Sample requests are honored two months after publication of the Initial Core Descriptions or no later than one year following completion of the cruise on which the samples were collected. It is an interim and informal document consisting of site data and sedimentologic and paleontologic data and interpretations as known six (6) months post-cruise. These data, while adequate for most sample selection needs, are subject to slight revision by the time of issue of the corresponding volume of the Initial Reports of the Deep Sea Drilling Project.

The information contained herein is preliminary and privileged, consequently this document is not to be cited or used as the basis of other publications. Data cited or used in a manuscript will be considered a breach of professional ethics.

Thank you for your interest in the Deep Sea Drilling Project.

Sincerely,

David G. Moore
Chief Scientist
Deep Sea Drilling Project

INITIAL CORE DESCRIPTIONS

DEEP SEA DRILLING PROJECT

LEG 62

28 JULY — 7 SEPTEMBER 1978

A Project Planned by and Carried Out With the Advice of the
JOINT OCEANOGRAPHIC INSTITUTIONS FOR DEEP EARTH SAMPLING (JOIDES)

MEMBER ORGANIZATIONS

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Lamont-Doherty Geological Observatory, Columbia University
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Bundesanstalt für Geowissenschaften und Rohstoffe, Hannover
Ocean Research Institute, University of Tokyo
USSR Academy of Sciences, P. P. Shirshov Institute of Oceanology, Moscow

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LEG 62
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INTRODUCTION

Late Mesozoic and Cenozoic paleoenvironments in the central North Pacific Ocean were examined during Leg 62 of the International Phase of Ocean Drilling (IPOD) of the Deep Sea Drilling Project (DSDP). The drilling program was designed to study the history of pelagic sedimentation and the evolution of planktonic communities of the North Pacific Ocean. Studies of igneous rocks from the basement were intended to determine ages, petrology, rock magnetism and paleomagnetism of old fast-spreading crust in the Pacific Ocean and of late stage differentiates.

The original 57 day cruise was shortened to 41 days in order to allow extra time to complete Site 462 of Leg 61. As a result, all three sites from the Gulf of Alaska were dropped. Leg 62 began on 28 July 1978 when the *Glomar Challenger* departed Majuro (Marshall Islands, U.S.A.). We concentrated on drilling sites in the Mid-Pacific Mountains (Site 463) and on Hess Rise (Sites 464, 465, and 466).

In the present-day North Pacific Ocean, planktonic organisms are associated in a small number of communities of broad geographic extent—Subarctic, Transition Zone, Central Gyre, Equatorial and Eastern Tropical Pacific. Factors which determined the characteristics and coherence of the communities can be illuminated by tracing their development through the Neogene. It is likely, but by no means certain, that they have persisted throughout the Neogene although they may have undergone pronounced changes. In order to understand the history of the present-day patterns, it was necessary to investigate the Neogene records of each major community and some of the principal zones of transition between them. The regional distribution of several communities was probed in at least two places in order to provide information on their geographical variation, which in turn can be used to compare differences between communities. The four sites drilled during Leg 62, were critical to establish the regional coverage needed for such attempts and they have to be seen in the framework of previously drilled sites in the North Pacific Ocean.

Investigations are required to determine the following aspects of communities:

1. The persistence or transience of the dominance pattern of members of each community. If changes are apparent, their degree and rates, as well as possible relationships to environmental factors.
2. The variabilities of individual members of the communities, as they can be related to environmental or community changes.
3. The extent to which changes in the communities are due to changes in indigenous species, and to invasion by non-indigenous forms.
4. Any evidence of synchronous evolutionary changes in taxonomically distinct lineages of individual communities.
5. Whether the process of character displacement, which forms a prominent component of modern evolutionary theory, is widely recognizable in planktonic organisms.
6. Indications of the stability or instability of the main water masses, and whether any observed changes are synchronous from one to the other.
7. The history and distribution of upwelling regimes, both coastal and at major divergences.
8. The extent and direction of exchange of plankton between the Atlantic and Pacific during periods of submergence of the Panamanian region and of open seaways through the Arctic Ocean.

Several times in the geologic record pelagic organisms have shown extinction and subsequent radiation. The extinctions are characterized by decreased species diversity, simple morphology, and perhaps cosmopolitan distributions of species. The radiations are characterized by increasing species diversity, complex morphologies, and provincial distributions. These represent large-scale changes in pelagic community structure.

Because the structure of modern pelagic communities varies between water masses, sampling of contrasting paleoenvironments analogous to modern water masses through the Eocene to Oligocene, extinction and radiation was designed to test the hypotheses proposed to account for these phenomena. We probed sites which are representative of different water masses through this time, without mixing from adjacent communities. The centers (in Eocene-Oligocene time) of the Central Gyres, Equatorial Upwelling, Eastern Tropical Pacific and Boreal Zones were primary targets.

With adequate samples from each of these zones, previous hypotheses may be tested. These hypotheses include the following:

1. That changing climates, affecting oceanographic regimes, have caused the massive changes in community structure.
2. That changes in nutrient input to the oceans through tectonic or oceanographic phenomena cause restructuring of the communities.
3. That transgressions and regressions provide varying areas for species and for isolation of peripheral biotas, thus resulting in additional species.
4. That changing circulation patterns due to continental movements have affected evolution.
5. That changing vertical structure of the water column is important in the adaptive radiations and extinctions.
6. That trophic resource stability and predation affect community evolution.

Another important objective for understanding the evolution of pelagic communities was the sampling of the Jurassic and Cretaceous sediments. During this part of the geologic record, several major groups of pelagic microorganisms apparently began, or were just beginning, their initial radiation into the oceanic regime. Evidence from sedimentary rocks formed in marginal seas indicates that calcareous nannoplankton were undergoing a major diversification. Planktonic foraminifera, diatoms and silicoflagellates first appear and radiate within this interval, and tintinnids, although they appeared first in the early Paleozoic, are abundant and diverse. Thus, this part of the Mesozoic seems to represent a major change in the structure and evolution of pelagic sediments. In order to understand this radiation better, a detailed record of truly pelagic communities is necessary.

OBJECTIVES AND RESULTS

WESTERN MID-PACIFIC MOUNTAINS (SITE 463)

The primary objective at Site 463 was to recover upper Mesozoic and Tertiary pelagic carbonate sediments for interpretation of paleoenvironments. A second objective was to obtain samples of the oldest sediment and underlying igneous rocks in order to date the volcanic platform. Apparently, the age of the Mid-Pacific Mountains is not the same in all areas. DSDP Holes 171 (Horizon Guyot) and 313 (northeastern Mid-Pacific Mountains) (Figure 1) bottomed in basalt that is overlain by Albian and Campanian sediments, respectively. Mesozoic magnetic anomalies northwest of the Mid-Pacific Mountains are Late Jurassic and Early Cretaceous in age, thereby suggesting that the western part of the Mid-Pacific Mountains may be older.

Coring at Site 463 was continuous to a sub-bottom depth of 822.5 meters. The bit wore out before basalt was penetrated. The recovered sediments are divided into four units (Figure 2). The oldest unit is Lower Cretaceous (Barremian and lower Aptian) interbedded clastic and pelagic limestones. Shallow water debris and reworked, probably older, radiolarian faunas are common. Paleomagnetic studies of this unit show a probable correlation with the M0-M3 Mesozoic magnetic anomaly sequence. An overlying unit consists of lower Aptian carbonaceous limestone, marlstone, claystone, and volcanic ash which contain as much as 4.3% organic carbon. The next youngest unit has cyclic alterations of green, white, gray and pink limestones which range in age from early Aptian to late Albian. Chert is abundant.

The youngest lithologic unit is further subdivided into two subunits: the lower one consists of nannofossil and foraminifer chalk, ooze, and limestone of late Albian to early Maastrichtian age and the upper subunit is lower Eocene through Pleistocene nannofossil ooze. Major hiatuses in Hole 463 occur from the early Maastrichtian to early Eocene and from the late Oligocene to the late Miocene. Condensed sections, with possible hiatuses, encompass intervals from the late Santonian through middle Campanian and from the middle Eocene through most of the Oligocene.

NORTHERN HESS RISE (SITE 464)

Northern Hess Rise was sampled at Site 464 in a water depth of 4637 meters (Figure 1) and was continuously

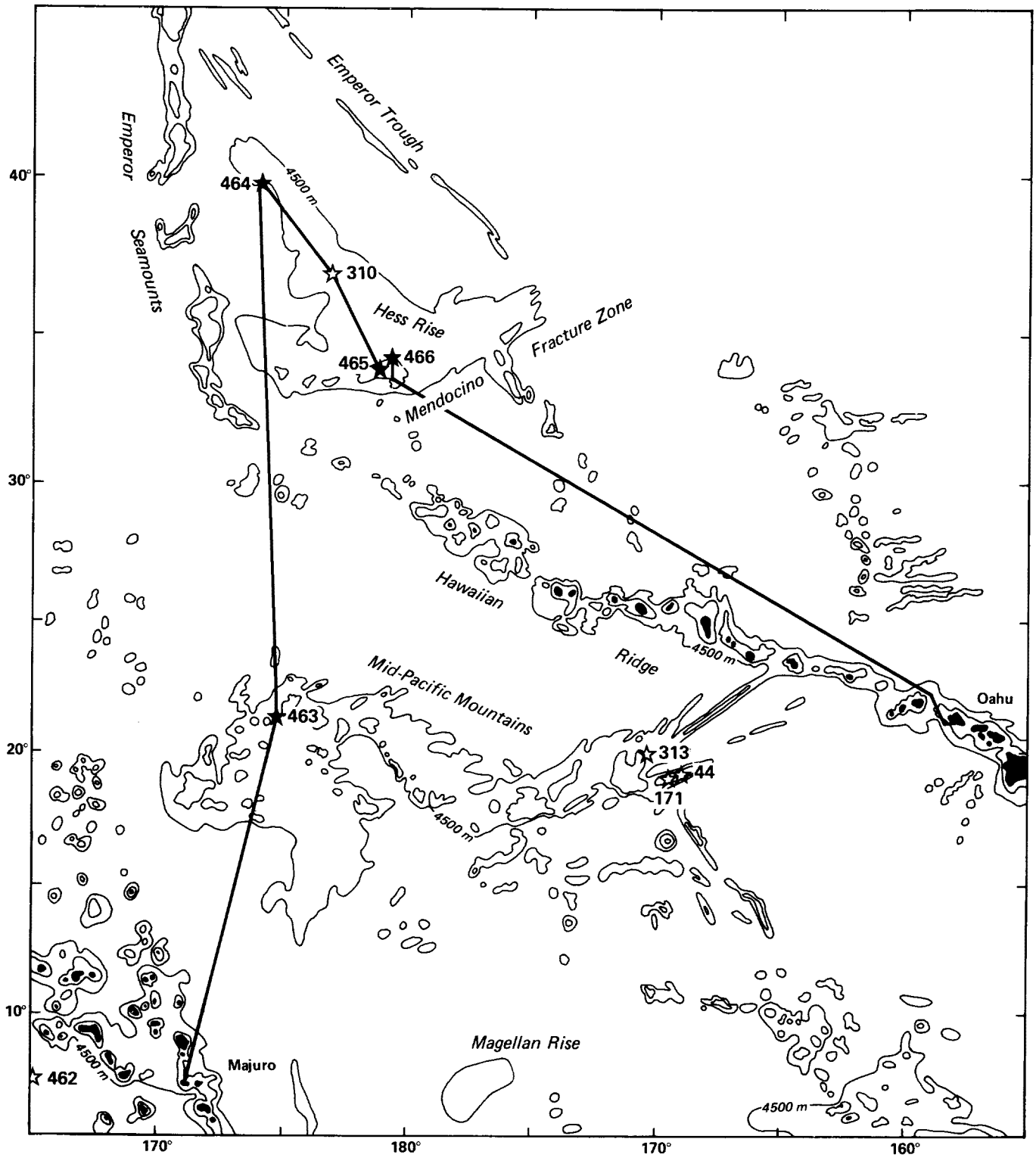


Figure 1. Index map of DSDP sites in the North Central Pacific.

cored to a sub-bottom depth of 308.5 meters. This site was selected for the study of planktonic communities within the high latitude water mass.

A few pieces of altered alkali basalt were recovered at the base of the hole before poor drilling conditions forced us to abandon the site. We do not know if the alkali basalt represents a flow or sill. The sediment column above basalt is divided into three lithologic units (Figure 2). The lowest consists of chert, chalk, and marlstone of late Aptian (?) to Cenomanian age. Recovery of the softer sediments was hampered by the presence of abundant chert. The second unit is pelagic brown clay of unknown age. The youngest unit consists of siliceous clay and clayey radiolarian and siliceous oozes of late Miocene to early Pleistocene age.

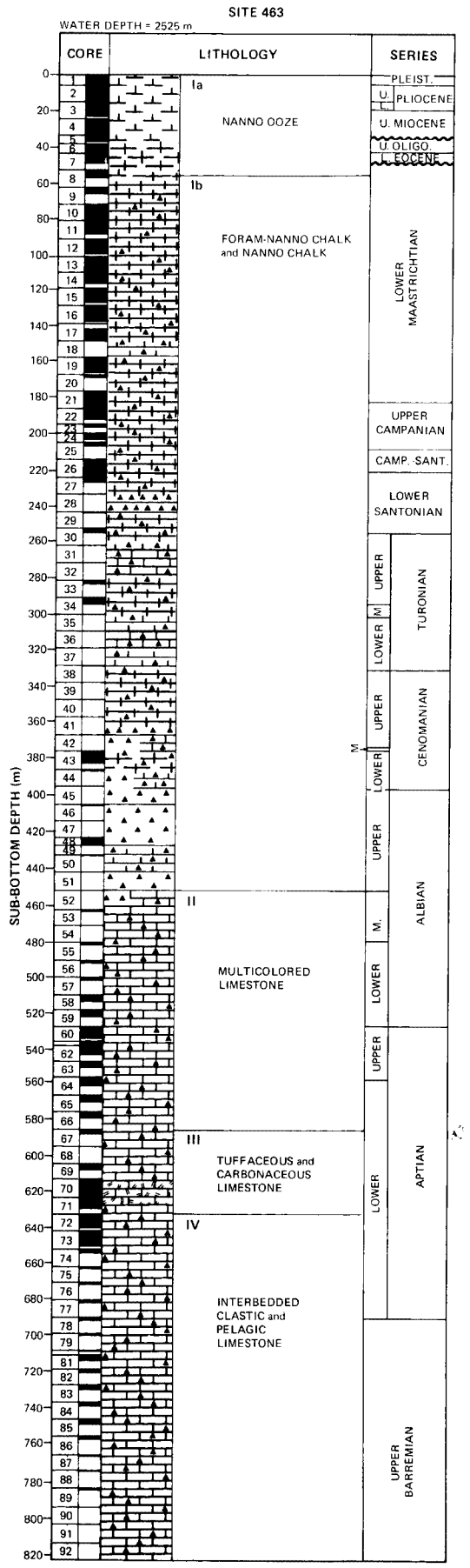
SOUTHERN HESS RISE (SITES 465 and 466)

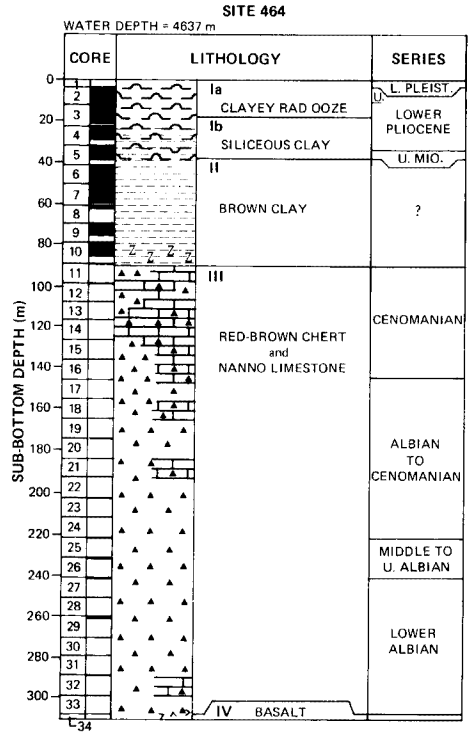
We drilled three holes at two sites (465 and 466) on southern Hess Rise (Figure 1). Site 465 was a primary site and Site 466 was drilled about 50 km away to complement data obtained from Site 465. At Site 465 we planned to sample a thick section of Neogene sediments that could be used for paleoceanographic studies. We also hoped to penetrate reef or other shallow water sediments and to sample igneous basement. Moreover, by combining the results from Site 465 on southern Hess Rise, Site 310 on central Hess Rise, and Site 464 on northern Hess Rise, we planned to obtain data that could be used to document the crossing of Hess Rise under the fertile equatorial regime in the Late Cretaceous.

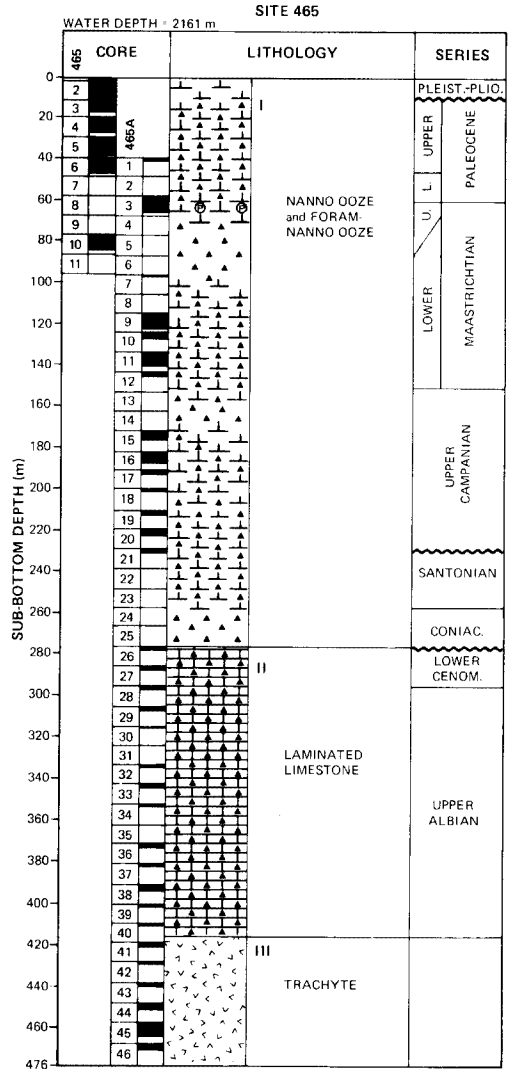
Two holes (465 and 465A) were drilled at Site 465. Hole 465 was continuously cored to a depth of 96 m and sediments ranging in age from early Maastrichtian to early Pleistocene were recovered. The hole was abandoned because of ship positioning problems. Continuous coring of Hole 465A began at 39 m sub-bottom depth in order to sample the Cretaceous-Tertiary boundary which had been missed in Hole 465. We cored Hole 465A to a depth of 476 m which includes 412 m of sediment and 64 m of trachyte.

The trachyte from Hole 465A is highly altered. The original glass groundmass was subsequently changed to smectite minerals and the rare primary mafic minerals have been replaced. These trachytes are late stage differentiates of alkali basalts and probably form a significant part of southern Hess Rise. Large vesicles up to 5 mm in diameter and massive, non-pillowed structures suggest that the cored sequence represents shallow water or subaerial flows. The overlying sediments are divided into two lithologic units (Figure 2). The oldest is predominantly olive-gray laminated limestone of late Albian to middle Cenomanian age. Evidence for current erosion and redeposition is common, but no reef or other shallow water fossil debris occurs in the unit. The youngest sedimentary unit consists of nannofossil and foraminifer nannofossil ooze of late Turonian to early Pleistocene age. Within this unit we recovered an apparently complete sedimentary sequence across the Cretaceous-Tertiary boundary, with well-preserved sediment of the *G. eugubina* Zone in the lowermost Paleocene. Values of magnetic intensity and susceptibility in the trachyte samples are low. Inclination values indicate probable eruption at low latitudes. The observed heat flow value of 1.36 HFU is similar to that of averaged North Pacific heat flow values for crust of this age.

We failed to find a thick section of Neogene as anticipated at Site 465, so with the time remaining we drilled Site 466 about 50 km northeast of Site 465. Coring was continuous to a sub-bottom depth of 312 m when we were forced to stop drilling because of time considerations. The upper Albian to Pleistocene sediment section contains two major lithologic units and at least three lacunas. The oldest unit consists of upper Albian to Turonian/Coniacian limestone and nannofossil chalk that are correlative with the lower part of the sedimentary column in Hole 465A. The youngest lithologic unit consists of cherty nannofossil oozes and nannofossil ooze of Turonian/Coniacian through Pleistocene age. The Pliocene and Pleistocene sediments contain diverse assemblages of siliceous and calcareous microfossils. A mixed zone of middle to late Eocene age contains reworked microfossils as old as Late Cretaceous in age. Major hiatuses encompass the late Santonian through part of the Campanian, early Maastrichtian through the early Eocene, and Oligocene to the early Pliocene. The occurrence of rounded basalt pebbles in Upper Cretaceous sediments suggests subaerial erosion of surrounding volcanic islands.







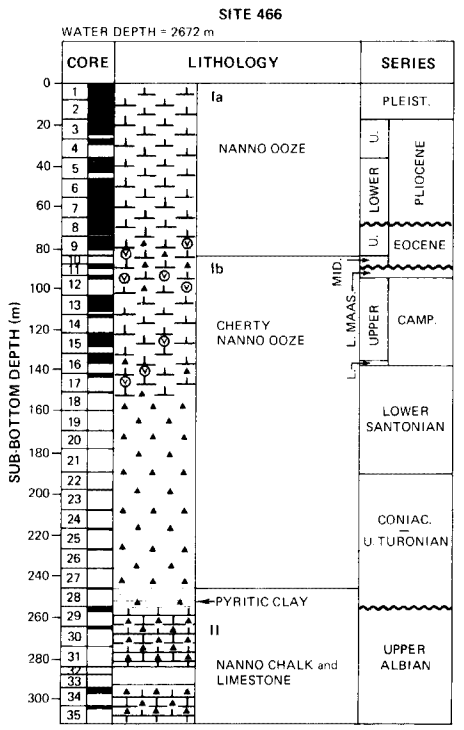


Figure 2. Lithologic columns and biostratigraphic zonation of sites drilled on Leg 62.

DISCUSSION OF RESULTS

Some preliminary interpretations can be made with regards to the paleoenvironments of the central North Pacific on the basis of data collected during Leg 62. Many of the complex problems, however, must await shore-based laboratory data before they can be adequately solved.

It is clear that the Mid-Pacific Mountains are not the same age throughout the province. Oldest sediments recovered at Site 463 are of Barremian age, approximately 15-20 m.y. older than those overlying basaltic rocks at Site 171 and about 40 m.y. older than those overlying basalt at Site 313. The Mid-Pacific Mountains represent a complex structural high whose segments have been built or added to by volcanic events over a time span of at least 40 to 50 m.y.

The paleodepth of deposition for oldest sediments at Site 463 is difficult to reconstruct because the sediments consist of pelagic limestones that are interbedded with layers rich in clastic, shallow water calcareous components. Stromatolites, oolites, and mollusc fragments apparently were displaced from a contemporaneous adjacent neritic environment. Dredge hauls from flanks of guyots in other parts of the Mid-Pacific Mountains contain shallow water fossil assemblages, a fact which supports the conclusion that many of the submarine volcanoes and guyots were islands surrounded by reefs or carbonate banks during a large part of the Cretaceous. Site 463 apparently was close to one of these islands during the Barremian. The presence of altered ash beds of Aptian age in Unit 3 at Site 463 marks a period of extensive volcanic activity. The volcanism may be contemporaneous with the generation of basaltic basement farther east in the Mid-Pacific Mountains. The ash beds are interbedded with greenish black to olive black limestone and marly claystone that have relatively high organic carbon contents which indicate an oxygen-poor depositional environment. Although most rocks in this interval contain benthic fossils which indicate an oxygenated benthic boundary, several dark laminated horizons suggest that the interface between the reducing and oxidizing environments at times coincided with the benthic boundary and at other times probably moved into the overlying water masses. The development of an oceanic midwater minimum has been suggested as a possible cause for the widespread occurrence of anoxic lithofacies in the world oceans and our preliminary results support this hypothesis.

Re-oxygenation of the ocean floor occurred later in the Aptian, and cyclic, multicolored limestone beds were deposited until the late Albian. Pelagic organisms and a lack of shallow water debris in the carbonates indicate a pelagic environment with no input from surrounding islands and guyots. Displaced materials in this unit consist entirely of siliceous and calcareous remains of fossil plankton.

The Upper Cretaceous calcareous ooze and chalk section at Site 463 is more than 400 m thick and represents a time span when the site passed the high productivity zone under the equatorial current system. Important changes in the sedimentation rates of the dominantly pelagic biogenic deposits suggest that major fluctuations of this current regime are not restricted to the Cenozoic but that they occurred during late Mesozoic times as well.

The calcareous ooze sequence, deposited during the Cenozoic at Site 463, was unexpectedly thin and incomplete. The section is less than 50 m thick and includes long hiatuses spanning from late Oligocene to late Miocene, from early Eocene to late Oligocene, and from early Maastrichtian to early Eocene. The condensed sections between these hiatuses and the deposits of late Miocene and younger ages are typical examples of sediments deposited at the intermediate water depths well above the CCD under the oligotrophic central subtropical water mass of the North Pacific. The upper Miocene and Pliocene nannofossil oozes consist almost entirely of discoasters, and at the present time it is not clear if this is the product of specialized algal floras in the oligotrophic central subtropical North Pacific surface water masses, or the result of selective dissolution of the smaller coccoliths and/or of mechanical separation of the biogenic sedimentary components.

Hess Rise is one of the major structural features of the north central Pacific. It is a triangle-shaped, aseismic high that is bounded on the west by the Emperor Seamounts, on the east by the Emperor Trough, and on the south by the Mendocino Fracture Zone. Highest parts of the rise are along the south side, and the sea floor gradually deepens to the north.

The age of Hess Rise is Albian or older as indicated by the age of oldest sediments at two sites. The trachyte on southern Hess Rise must have been extruded either subaerially or in shallow water, which suggests that the feature probably was exposed during its early history.

Rapid sedimentation rates in Albian time on Hess Rise are most likely related to high fertility when the site was near the equatorial zone and to redeposition of sediments. Although it is possible that many of the features in the oldest carbonate units can be attributed to distal turbidite sedimentation, the coincidence of laminated sediments, high organic carbon contents, an oxygen-poor depositional environment, high concentrations of radiolarians, and high sedimentation rates point to the probable presence of very fertile surface water masses of the equatorial high productivity zone about 90 m.y. ago according to current models of Cretaceous plate movements. Low sedimentation rates at that time at Sites 310 and 466 and a hiatus at Site 465 need further evaluation in order to explain the discrepancy.

No significant age differences exist among the sites on Hess Rise, which suggests that the entire rise was formed at approximately the same time. The present-day bathymetry may reflect the original sea floor topography, but alkali basalt pebbles found in Campanian sediments at Site 466 suggest that additional tectonism, and possible volcanism, occurred in the Late Cretaceous.

Important changes of the surface water during the global crises at the end of the Mesozoic are indicated by the very small lowermost Paleocene foraminiferal faunas and anomalous nannofossil floras in Hole 465A. The apparent complete recovery of the Upper Cretaceous and lower Tertiary interval will allow a detailed assessment of any changes in the surface waters as well as the bottom waters.

EXPLANATORY NOTES

INTRODUCTION

The Leg 62 Initial Core Description is presented here to aid investigators in selecting samples for detailed study. Samples from Leg 62 become available to the scientific community two months after the publication of this ICD.

Potential investigators who desire to obtain samples should refer to the DSDP-NSF Sample Distribution Policy (see Table of Contents). Sample request forms may be obtained from:

The Curator
Deep Sea Drilling Project, A-031
University of California, San Diego
La Jolla, California 92093

Requests must be as specific as possible: include site, core, section, interval within a section, and volume of sample required. The purpose of this publication is to aid interested investigators in understanding the (1) terminology, labeling, and numbering conventions used by the Deep Sea Drilling Project (DSDP); (1) sediment classification and biostratigraphic framework used on Leg 62; and in addition, (3) present the preliminary lithologic and paleontologic data on core forms, so that sampling can be guided. However, the investigator should be aware that the data is subject to future revision.

NUMBERING OF SITES, HOLES, CORES, AND SAMPLES

DSDP drill sites are numbered consecutively from the first site drilled by *Glomar Challenger* in 1968. Site numbers are slightly different from hole numbers. A site number refers to one or more holes drilled while the ship was positioned over one acoustic beacon. These holes could be located within a radius as great as 900 meters from the beacon. Several holes may be drilled at a single site by pulling the drill pipe above the sea floor (out of one hole) and moving the ship 100 meters or more from the previous hole, and then begin drilling another hole.

The first (or only) hole drilled at a site takes the site number. A letter suffix distinguishes each additional hole at the same site. For example: the first hole takes only the site number; the second takes the site number with suffix A; the third takes the site number with suffix B, and so forth. It is important, for sampling purposes, to distinguish the holes drilled at a site, since recovered sediments or rocks from different holes usually do not come from equivalent positions in the stratigraphic column.

The cored interval is measured in meters below the sea floor. The depth interval of an individual core is the depth below sea floor that the coring operation began to the depth that the coring operation ended. Each coring interval is generally 9.5 meters long, which is the nominal length of a core barrel; however, the coring interval may be shorter or longer (rare). "Cored intervals" are not necessarily adjacent to each other, but may be separated by "drilled intervals". In soft sediment, the drill string can be "washed ahead" with the core barrel in place, but not recovering sediment, by pumping water down the pipe at high pressure to wash the sediment out of the way of the bit and up the space between the drill pipe and wall of the hole; however, if thin hard rock layers are present, then it is possible to get "spotty" sampling of these resistant layers within the washed interval, and thus have a cored interval greater than 9.5 meters.

Cores taken from a hole are numbered serially from the top of the hole downward. Core numbers and their associated cored interval in meters below the sea floor are normally unique for a hole, however, problems may arise if an interval is cored twice. When this situation occurs, the core number is assigned a suffix, such as "S"* for supplementary.

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*Note that this designation has been used on previous legs as a prefix to the core number for sidewall core samples.

Full recovery for a single core is normally 9.28 meters of sediment or rock, which is in a plastic liner (6.6 cm I.D.), plus about a 0.2 meter-long sample (without a plastic liner) in the Core-Catcher. The Core-Catcher is a device at the bottom of the core barrel which prevents the cored sample from sliding out when the barrel is being retrieved from the hole. The sediment-core, which is in the plastic liner, is then cut into 1.5 meter-long sections and numbered serially from the top of the sediment-core (Figure 3). When we obtain full recovery, the sections are numbered from 1 through 7 with the last section possibly being shorter than 1.5 meters. The Core-Catcher sample is placed below the last section when the core is described, and labeled Core-Catcher (CC): it is treated as a separate section.

When recovery is less than 100 percent, and if the sediment or rock is contiguous, the recovered sediment is placed in the top* of the cored interval, and then 1.5 meter-long sections are numbered serially, starting with Section 1 at the top. There will be as many sections as needed to accommodate the length of the core recovered (Figure 3); for example 3 meters of core sample in plastic liners will be divided into two 1.5 meter-long sections. Sections are cut starting at the top of the recovered sediment, and the last section may be shorter than the normal 1.5 meter length.

When recovery is less than 100 percent, the sediment's original stratigraphic position in the cored interval is unknown, so we employ the convention assigning the top of the sediment recovered to the top of the cored interval. This is done for convenience in data handling, and consistency. If recovery is less than 100 percent, and core fragments are separated, and if shipboard scientists believe the sediment was not contiguous, then sections are numbered serially and the intervening sections are noted as void, whether it is contiguous or not. The Core-Catcher sample is described in the Core Description Forms beneath the lowest section.

Samples are designated by centimeter distances from the top of each section to the top and bottom of the sample in that section. A full identification number for a sample consists of the following information:

Leg
Site
Hole
Core Number
Interval in centimeters from the top of section

For example, a sample identification number of "62-465A-9-3, 12-14 cm" is interpreted as follows: 12 to 14 cm designates a sample taken at 12 to 14 cm from the top of Section 3 of Core 9, from the second hole drilled at Site 465 during Leg 62. A sample from the Core-Catcher of this core is designated as "62-465A-9, CC, 12-14 cm".

The depth below the sea floor for a sample numbered "62-465A-9-3, 12-14 cm" is the summation of the following: (1) the depth to the top of the cored interval for Core 9, which is 115 meters; (2) plus 3 meters for Sections 1 and 2 (each 1.5 meters long); and plus the 12 cm depth below the top of Section 3. All of these variables add up to 118.12 meters**, which theoretically is the sample depth below the sea floor.

HANDLING OF CORES

A core was normally cut into 1.5 meter sections, sealed, and labeled; and then the sections were brought into the core laboratory for processing. The following determinations were normally made before the sections are split: gas analysis, thermal conductivity analysis (soft sediment only), and continuous wet-bulk density determinations using the Gamma Ray Attenuation Porosity Evaluation (GRAPE).

The cores were then split longitudinally into "working" and "archive" halves. Samples were extracted from the "working" half, including those for determination of grain-size distribution, mineralogy by X-ray diffraction, sonic velocity by the Hamilton Frame method, wet-bulk density by a static GRAPE technique, water content

*This technique differs from the labeling systems used on Legs 1 through 45, which had a designation called "zero section", but did not have a "number 7 section".

**Sample requests should refer to a specific interval within a core-section, rather than the level below sea floor.

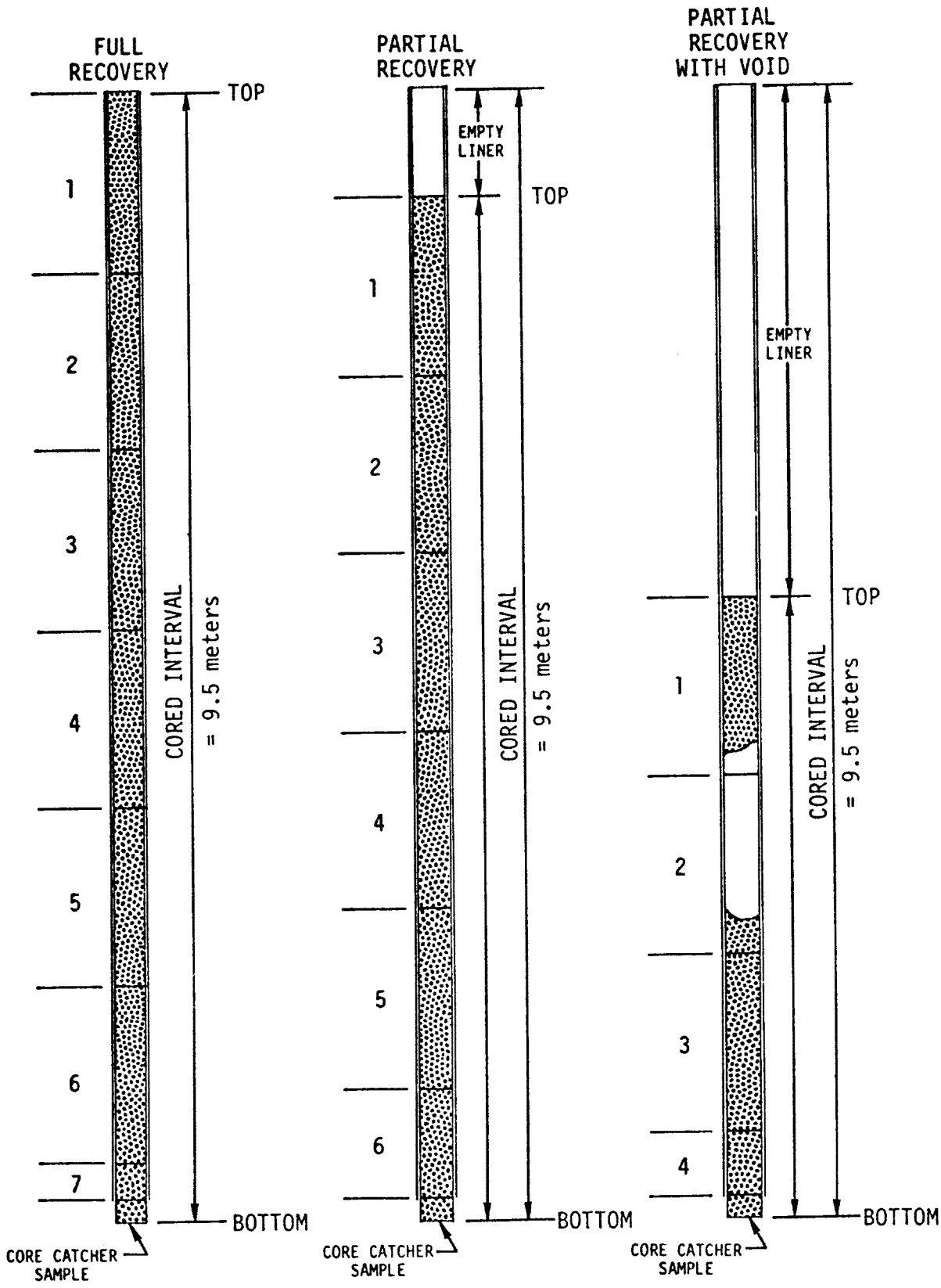


Figure 3. Diagram showing procedure in cutting and labeling of core sections.

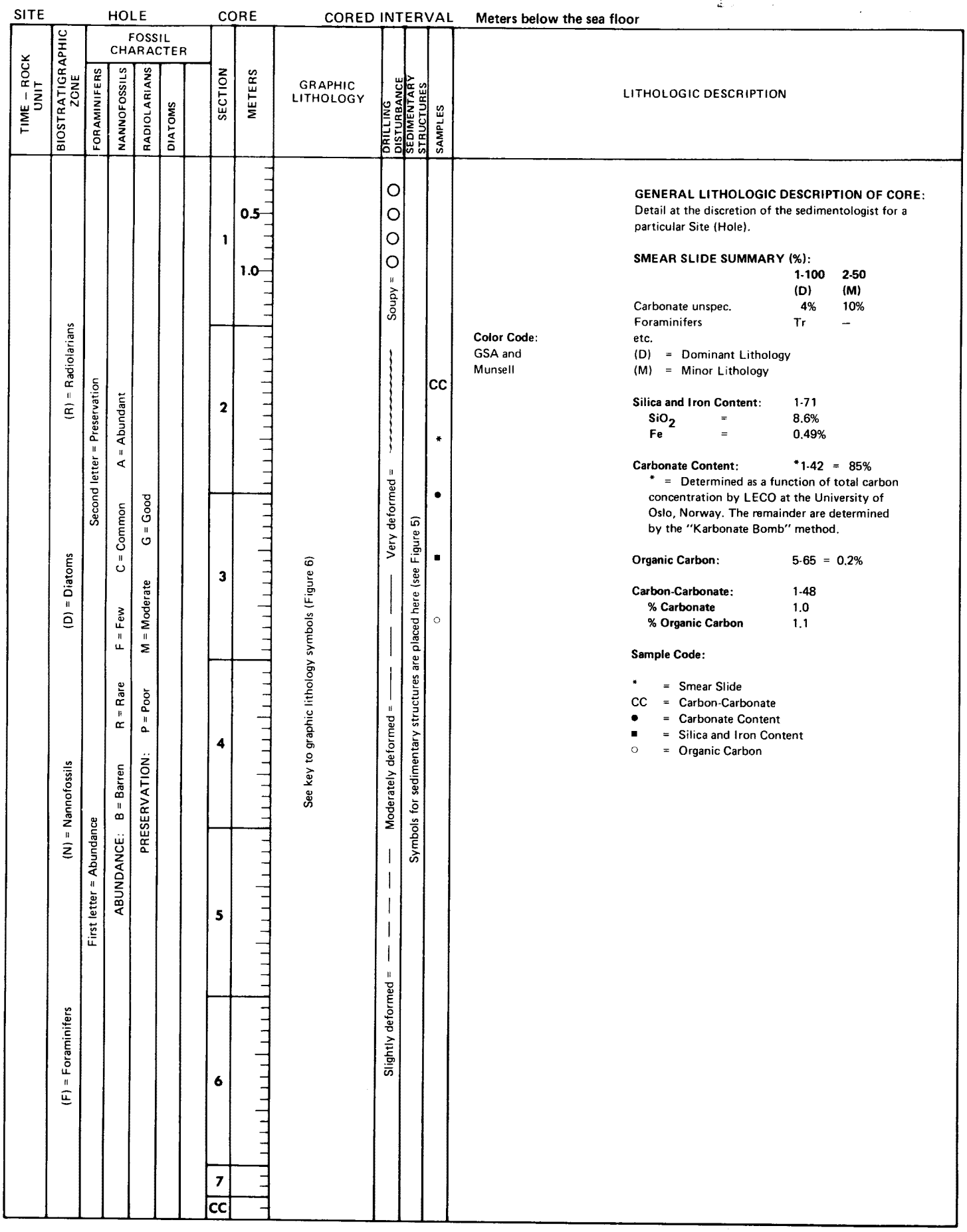


Figure 4. Sample core description form (sediments), with the sediment deformation symbols, sample codes, and other general information.

by gravimetric analysis, carbon-carbonate analysis, percent calcium carbonate (Karbonate Bomb), geochemical analysis, paleontological studies, and others.

Smear slides from each major lithology, and most minor lithologies, were prepared and examined microscopically. The archive half was then described and photographed. Physical disturbance by the drill bit, color, texture (for uncemented lithologies), sedimentary structure and composition (±20%) of the various lithologies were noted on core description forms.

After the cores were sampled and described, they are maintained in cold storage aboard *Glomar Challenger* until they can be transferred to the DSDP repository. Core sections which were removed for organic geochemistry study were frozen immediately onboard ship and kept frozen. All Leg 62 cores and frozen cores are presently stored at the DSDP West Coast Repository (Scripps Institution of Oceanography).

Core descriptions, smear slide descriptions, carbonate bomb determinations (% $CaCO_3$), biostratigraphy (these data were determined primarily aboard ship), carbon-carbonate determinations (determined at DSDP), and Silica and Iron content determinations (from the USGS, Denver), serve as the data for the Core Descriptions in this volume. These samples, and their location in the core, are coded with a symbol on the core description sheets. The key to these codes, in order to identify the samples, is in Figure 4.

VISUAL DESCRIPTIONS

Sediment Disturbance

Recovered rocks, and particularly the soft sediments, may be extremely disturbed. This mechanical disturbance is the result of the coring technique, which uses a large 25 cm diameter bit with a small 6.0 cm opening for the core sample. The following disturbance categories are used for soft and firm sediment. These categories will be indicated on the core description sheet (in a column) by coded patterns to which the key is in Figure 4. The categories are as follows:

(a) Slightly deformed: Bedding contacts are slightly bent.
(b) Moderately deformed: Bedding contacts have undergone extreme bowing.
(c) Very deformed: Bedding is completely disturbed, sometimes showing symmetrical diapir-like structure.
(d) Soupy: Water saturated intervals which have lost all aspects of original bedding.

Sedimentary Structures

In the soft, and even in some harder sedimentary cores, it may be extremely difficult to distinguish between natural structures and structures created by the coring process. Thus, the description of sedimentary structures was optional. A column on the Core Description sheet (Figure 4) may have patterns (coded symbols) to indicate typical structures. The key to the set of structure-symbol codes is in Figure 5.

Color

Colors of the geologic material are determined with a Munsell or Geological Society of America Rock-Color Chart. Colors were determined immediately after the cores were split and while they were in a wet condition.

Graphic Lithology Column

A graphic lithologic column is presented. This graphic column is based on the lithologic classification scheme (see Table of Contents). The lithologies and their corresponding symbols are in Figure 6. Often a single lithology will be represented by a single pattern. Some lithologies are represented by a grouping of two or more symbols. The symbols in this grouping may correspond to end member sediment constituents, such as clay and nannofossil ooze. Normally the symbol for the dominant constituent is placed on the right-hand side of the column, and the symbol for the subordinate constituent will be on the left-hand side of the column (see examples in Figure 6). The percentage of one component to another may be represented in the graphic column by the symbols being

Recommended Symbol	Description
	Current ripples
	Micro-cross–laminae (including climbing ripples)
	Parallel bedding
	Wavy bedding
	Flaser bedding
	Lenticular bedding
	Cross-stratification
	Slump blocks or slump folds
	Load casts
	Scour
	Normal graded bedding
	Reversed graded bedding
	Convolute and contorted bedding
	Water escape pipes
	Mudcracks
	Sharp contact
	Scoured, sharp contact
	Disturbed sharp contact
	Gradational contact
	Imbrication
	Fining-upward sequence
	Coarsening-upward sequence
	Interval over which a specific structure occurs in core
	Bioturbation–minor (0–30% surface area)
	Bioturbation–moderate (30–60% surface area)
	Bioturbation–strong (more than 60% of surface area)
	Burrows

Figure 5. Symbols for sedimentary structures, DSDP/IPOD.

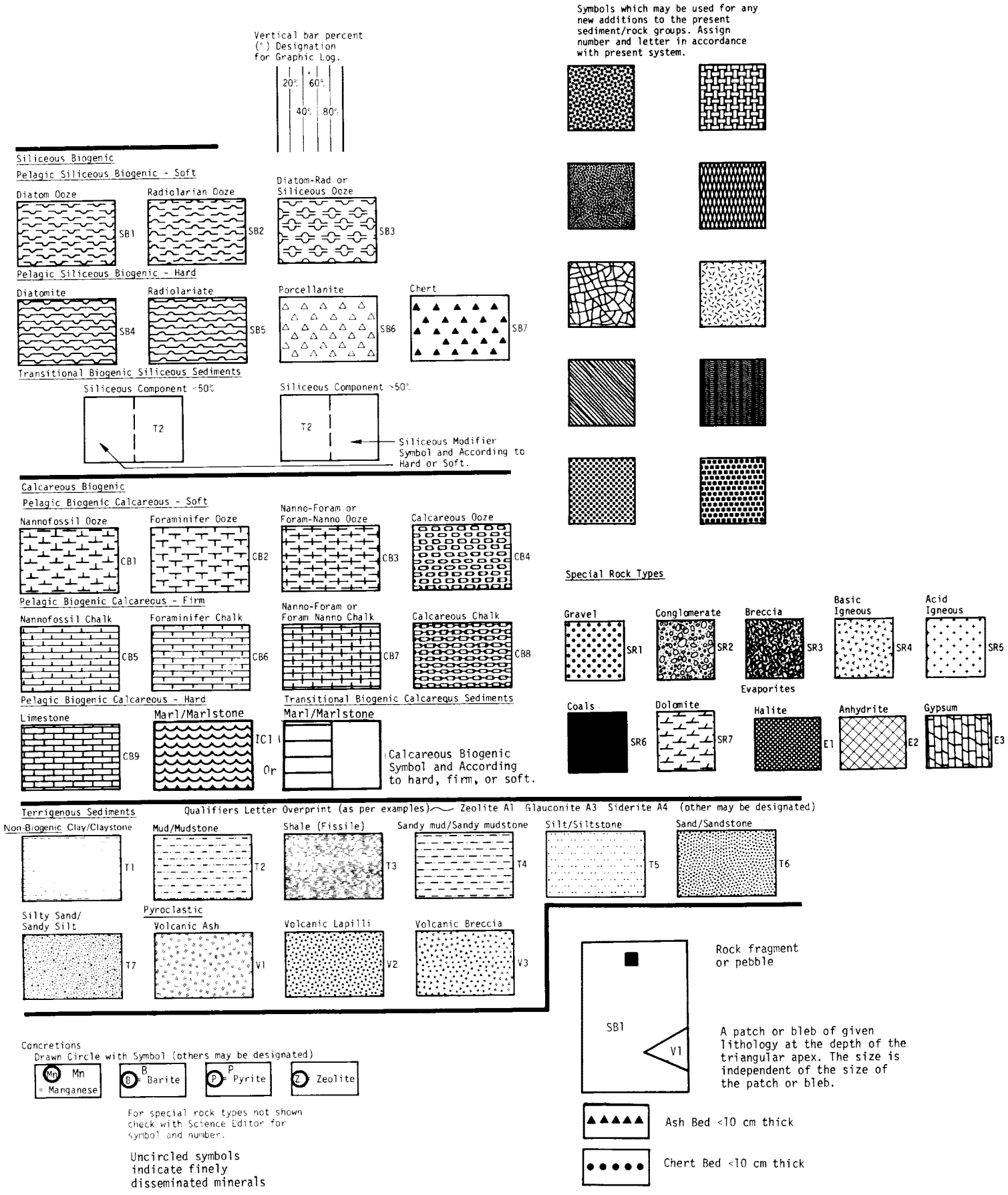


Figure 6. Graphic symbols to accompany the lithologic classification scheme.

presented in proportion to their percentages. For example, the left 20% of the column may have a clay symbol while the right 80% of the column may have a nannofossil ooze symbol. This would mean that the sample was approximately 80% nannofossils and 20% clay. The vertical lines which separate the symbols are shown in Figure 6 with their corresponding percentages and positions in the column.

Because of the difference in the length-to-width ratio between the actual sediment core and the graphic lithologic column, it is not possible to reproduce structures as they appeared in the core. They become highly flattened and distorted. The same is true for concretions and changes of lithology in the cores. As a result, the locations of concretions are shown by a circle with an abbreviation for the type of concretion inside the circle (Figure 6). If the material is dispersed throughout the sediment, the symbol is used without being encircled. The depth of small "blebs" of ash or other lithologic changes are given by a triangular insert of the appropriate lithologic symbol on the right side of the lithologic column (Figure 6). This convention applies only to lithologies which do not extend across the entire core. Beds of ash and chert less than 10 cm thick are shown by the symbols 'vvvv" and "▲▲▲▲", respectively, overprinting the symbol for the surrounding lithology (Figure 6): beds greater than 10 cm thick are shown by the proper lithologic symbol (Figure 6).

Text of Core Description

Format, style, and terminology of the descriptive portion of the Core Description sheets (Figure 4) are not controlled by the "Mandatory Graphic Lithologic Column Scheme", beyond the minimal name assignment which is derived from the lithologic classification. Colors and additional information such as structure and textures, are normally included in the text portion of the core description.

LITHOLOGIC CLASSIFICATION

Introduction

The sediment classification used on Leg 62 is basically that devised by the JOIDES Panel on Sedimentary Petrology and Physical Properties with modifications as outlined below. As a first approximation, we considered each sediment to be a mixture of biogenic and nonbiogenic components. Authigenic components (mainly Fe/Mn micronodules and zeolites) usually comprise less than 10% of the sediment. Any component comprising more than 10% of the sediment may be used as a qualifier in the descriptive sediment name. No more than two qualifiers are used in a descriptive name, with the last qualifier being the component in higher abundance.

We have divided the frequencies of sediment components into four major groups:

<10%
10-30%
30-60%
>60%

These boundaries have been used for both calcareous and siliceous components, and thus depart slightly from the SPPP panel's classification, which employs only major subdivision (50%) in the biogenic siliceous sediments:

<50% siliceous fossils = siliceous clay
>50% siliceous fossils = siliceous ooze

To be consistent, we subdivided both siliceous and calcareous pelagic facies in the same way.

Descriptive Data

Sediment and rock names are defined solely on the basis of composition and texture. Composition is most important for description of those deposits more characteristic of open marine conditions, with texture becoming

more important for the classification of hemipelagic and nearshore facies. These data are primarily determined onboard the ship by visual estimates "in smear slides" with the aid of a microscope.

Basic Sediment Types

Nonbiogenic Sediments

Nonbiogenic sedimentary components are treated entirely on the basis of texture (sand, silt, or clay) according to Shepard's (1954) classification (Figure 7). Because no separate category is used for "pelagic clay", it is simply referred to as "clay". The texture is determined entirely on the estimated percentages of sizes of nonbiogenic material from smear slide descriptions. The term "clay" under composition in the smear slide description is taken to represent all clay-sized material regardless of mineralogy. Silt- and sand-sized materials appear in the smear slide descriptions as percentages of component minerals (e.g., quartz, feldspar, heavy minerals, pyrite, etc.) where determinable.

Biogenic Siliceous Sediments

Biogenic siliceous sediments are those that contain more than 30% siliceous microfossils. Sediments containing between 10% and 30% siliceous microfossils should contain the name(s) of the microfossil(s) as qualifiers. The following terminology is used for siliceous biogenic sediments:

1. Soft: Siliceous ooze (radiolarian ooze, diatom ooze, etc., depending on the dominant fossil component).

2. Hard: Radiolarite, diatomite, chert, or porcellanite. The term "chert" in the past has been used in a very broad sense to designate almost any form of recrystallized silica. The term porcellanite (which had a very broad usage in the past) will be used here to refer to "low density, more or less porous and dull-lustered varieties of 'chert' made of opaline silica or cristobalite . . ." (Lancelot, 1971). Chert used here will have a narrower scope than that of past usage, and will refer to "hard nodules and sometimes beds, that are largely quartz and/or chalcedony, and show a conchoidal fracture and a vitrous luster . . ." (Lancelot, 1979).

3. Compositional Qualifiers: Diatoms and radiolaria may be the principle components, thus one or two qualifiers may be used, for example:

Indeterminate siliceous fossils:	Siliceous ooze, Chert, or Porcellanite
Radiolaria only:	Radiolarian ooze, or Radiolarite
Diatoms only:	Diatom ooze, or Diatomite
Diatom < radiolarians:	Diatom radiolarian ooze, or Diatom radiolarite
Diatom > radiolarians:	Radiolarian diatom ooze, or Radiolarian diatomite

The order of the two modifiers in the terms is dependent on the dominant fossil type. The most dominant component is listed last and the minor component is listed first. For example, the terminology for mixtures of clay with diatom sediments is as follows:

% Biogenic Siliceous Fossil Particles	% Nonbiogenic	Lithologic Type	
<10	90	Clay	(soft)
		Claystone	(hard)
30 to 10	70 to 90	Diatom clay	(soft)
		Diatom claystone	(hard)

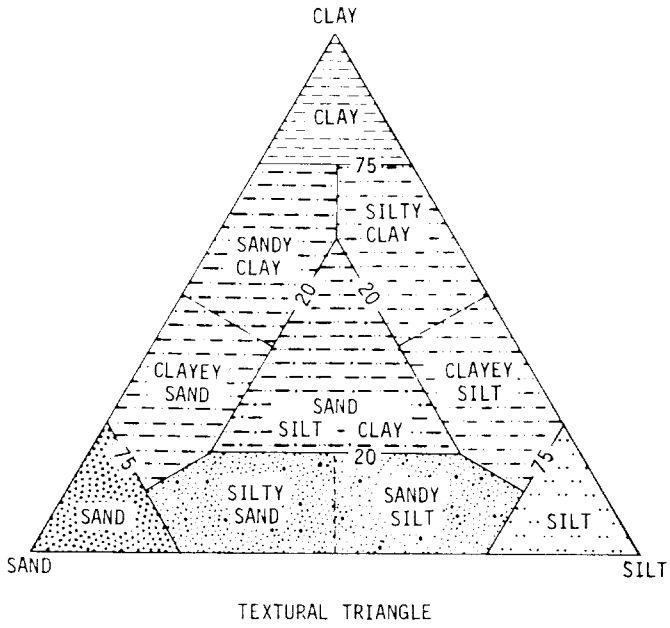


Figure 7. Textural classification of clastic sediments (after Shepard, 1954).

% Biogenic Siliceous Fossil Particles	% Nonbiogenic	Lithologic Type	
60 to 30	40 to 70	Clayey diatom ooze Clayey diatomite	(soft) (hard)
100 to 60	0 to 40	Diatom ooze Diatomite	(soft) (hard)

If radiolarians are the dominant siliceous microfossil, the terms radiolarian and radiolarite are substituted for diatom and diatomite respectively. The terms siliceous may be used if the fossil type is indeterminate. Likewise, other textural terms for the nonbiogenic components can be substituted for clay in accordance with Shepard's (1954) classification (e.g., silty diatom ooze, diatom silty clay, etc.).

Biogenic Calcareous Sediment

Calcareous-biogenic-sediments are distinguished by a $CaCO_3$ content in excess of 30%. These are two classes: (1) Biogenic Calcareous Sediments that contain 60 to 100% biogenic $CaCO_3$ and (2) Transitional Biogenic-Calcareous Sediments that contain 30 to 60% biogenic $CaCO_3$.

1. For Biogenic Calcareous Sediment with 60 to 100% $CaCO_3$ the following terminology is used:
   a. Soft: Calcareous ooze
   b. Firm: Chalk
   c. Hard and cemented: Limestone
   d. Compositional Qualifiers: If nannofossils and foraminifers are the principal components, then one or two qualifiers may be used, as in the following examples:

Indeterminate carbonate fossils:	Calcareous ooze, Calcareous chalk, or Calcareous limestone
Foraminifers (0-10%)—nannofossils (90-100%):	Nannofossil ooze, Nannofossil chalk, or Nannofossil limestone
Foraminifers (10-30%)—nannofossils (60-90%):	Foraminifer nannofossil ooze, Foraminifer nannofossil chalk, or Foraminifer nannofossil limestone
Foraminifers (30-60%)—nannofossils (40-70%):	Nannofossil foraminifer ooze, Nannofossil foraminifer chalk, or Nannofossil foraminifer limestone

2. Transitional Biogenic Calcareous Sediments:
   a. Marl or Marlstone: 30-60% $CaCO_3$, nonbiogenic components > siliceous biogenic components.
      1). Soft: Calcareous marl, Foraminifer marl, or Nannofossil marl.
      2). Hard: Calcareous marlstone, Foraminifer marlstone, or Nannofossil marlstone.

      Note that the use of the terms marl or marlstone differ from the SPPP panel's classification. The panel's classification used marly as an adjective to ooze, chalk, or limestone (e.g., marly limestone) to denote sediments which had 30 to 60% biogenic carbonate).

For example, the terminology for mixtures of clay with nannofossil sediments is as follows:

% Biogenic Siliceous Fossil Particles	% Nonbiogenic	Lithologic Type	
0 to 10	90 to 100	Clay	(soft)
		Claystone	(hard)
30 to 10	70 to 90	Nannofossil clay	(soft)
		Nannofossil claystone	(hard)
60 to 30	40 to 70	Nannofossil marl	(soft)
		Nannofossil marlstone	(hard)
100 to 60	0 to 10	Nannofossil ooze	(soft)
		Nannofossil chalk	(firm)
		Nannofossil limestone	(hard)

Other terms may be substituted for nannofossil, such as (1) foraminifer, nannofossil-foraminifer if foraminifers are present in the percentages as discussed, or (2) calcareous if the fossil type is indeterminate. Likewise, other textural terms for the nonbiogenic components can be substituted for clayin accordance with Shepard's (1954) classification (e.g., silty nannofossil ooze, foraminifer silty clay, etc.).

b. Biogenic ooze: 30-60% $CaCO_3$, siliceous biogenic components > nonbiogenic components.
   1). Calcareous components > siliceous components examples: Radiolarian nannofossil ooze (chalk); Diatom foraminifer ooze; Siliceous limestone.
   2). Siliceous components ≥ calcareous components examples: Nannofossil diatom ooze (diatomite); Foraminifer radiolarian ooze (radiolarite).

In some of the sediments on Leg 62, the original calcareous lithology has been replaced by silica (generally >40% SiO_2). In this instance we modify the original name with the word "silicified" (for example, Silicified Chalk or Silicified Limestone).

Volcanogenic Sediments

Pyroclastic rocks are described according to the textural and compositional scheme of Wentworth and Williams (1932). The textural groups are:

>32 mm – volcanic breccia
4-32 mm – volcanic lapilli
<4 – volcanic ash (tuff, indurated)

Compositionally, these pyroclastic rocks are described as vitric (glass), crystalline, or lithic.

CARBON-CARBONATE ANALYSIS

Following the cruise, sediment samples were analyzed for carbon and carbonate content at the DSDP sediment laboratory on a LECO WR-12 Carbon Analyzer by USGS personnel under the supervision of T. Vallier. Sample preparation procedures are outlined in Boyce and Bode (1972) and Bode (1973). Discussions of the LECO WR-12

Analyzer are in Bode (1973). Accuracy and precision of the results are as follows:

Total Carbon	=	±0.3% (absolute)
Organic carbon	=	±0.06% (absolute)
$CaCO_3$	=	±3% (absolute)

The carbon-carbonate data are presented in Appendix I and the data are also presented on the core forms (sample code CC). The sample interval is designated by two numbers: the section number, followed by the top of the sample interval, for example: a sample from Section 2 at 11 cm with 0.1% carbonate, and 74% organic carbon will be presented on the core forms as follows:

Carbon-Carbonate	**2-11**
% Carbonate	0.1
% Organic Carbon	74

CARBONATE CONTENT

Percent $CaCO_3$ was also determined onboard ship by the "Karbonate Bomb" technique (Müller and Gastner, 1971) and at the University of Oslo under the supervision of J. Thiede by LECO Total Carbon determinations. In the "Karbonate Bomb" procedure, a sample is powdered and treated with HC1 in a closed cylinder. Any resulting CO_2 pressure is proportional to the $CaCO_3$ content of the sample. Application of the calibration factor to the manometer reading (X 100) yields percent $CaCO_3$. Percent error can be as low as 1% for sediments high in $CaCO_3$, and in general an accuracy of ±2 to 5% can be obtained.

Samples run at the University of Oslo by LECO Total Carbon determinations are distinguished from those run by the "Karbonate Bomb" method by use of the symbol (*) preceding the section and sample interval. These samples were run following standard LECO procedures referred to in the section on Carbon-Carbonate Analysis. The carbonate content is determined by multiplying the total carbon content by 8.33. This carbonate determination assumes no contribution of carbon by organic compounds. Care was taken to use this method only in parts of the lithologic section where organic carbon (as determined by carbon-carbonate analysis) was very low. An accuracy in calcium carbonate of -2% to +5% is obtained.

These data are present on the core forms (sample code = ●). The sample interval is designated by two numbers: the section number, followed by the top of the sample interval, for example: a sample from Section 2 from 11 cm with 90% calcium carbonate will be present on the core form as follows:

Carbonate Content
*2-11 = 90%

SILICA AND IRON CONTENT

Silica (% SiO_2) and Iron (% Fe) determinations were run on the same samples and were provided by W. E. Dean of the USGS in Denver. Silica determinations were run using standard X-ray fluorescence techniques and iron was determined by emission spectrophotometry. Values for iron weight percent are not accurate below 0.05%. Silica values are precise to ±5% of the value, and iron values are precise to ±15% of the value above 0.05%.

Values of silica and iron content are presented on the core forms (sample code = ■). The sample interval is designated in the same manner as that for other data and is presented on the core form as follows:

Silica and Iron Content		**1-26**
SiO_2	=	6.0%
Fe	=	0.57%

ORGANIC CARBON

Shipboard measurements or organic carbon were determined for several samples at each of Sites 463, 465, and 466, using the CHN analyzer. These are considered rough values and no strict value of accuracy has been calculated.

Values for organic carbon content were presented on the core forms (sample code = O) as follows:

Organic Carbon: 5-65 = .2%

BIOSTRATIGRAPHY

Biostratigraphic studies of Leg 62 material were still in progress when the Leg 62 Initial Core Description was compiled. Consequently, biostratigraphic boundaries given herein are tentative; although no major changes in age assignments are anticipated, some boundaries are likely to be adjusted prior to publication of the Initial Reports for Leg 62.

IGNEOUS ROCKS

Visual Core Description Forms

All igneous rocks were split using a rock saw into working and archive halves described and sampled onboard. Figure 8 shows a composit Visual Core Description Form used for the description of igneous rocks recovered on Leg 62. On this form, each section of a core is described under a set of five column headings: (1) piece number, (2) graphic representation, (3) orientation, (4) shipboard studies, and (5) alteration.

In the graphic representation column each piece is accurately drawn and different features, such as texture, glassy margins, or vesicles, coded according to the symbols given in Figure 9. Two closely spaced horizontal lines in this column indicate the location of styrofoam spacers taped between pieces inside the liner. Each piece is numbered sequentially from the top of the section beginning with the number 1 (piece number column). Pieces are labeled on the rounded surface rather than the flat slabbed face. Pieces which fit together before splitting were given the same number, but are consecutively lettered as 1A, 1B, 1C, etc. Spacers were placed only between pieces which did not fit together; those pieces were given different numbers. In general, spacers may or may not indicate missing material (not recovered) between pieces. All cylindrical pieces longer than the diameter ofthe liner have arrows in the "orientation" column indicating that top and bottom have not been reversed as a result of drilling and recovery. Arrows also appear on the labels of these pieces on both archive and working halves.

The column marked "Shipboard Studies" designates the location and the type of measurements made on a sample onboard. The column headed "Alteration" gives the degree of alteration using the code given in Figure 9. Below each set of five descriptive columns is the designation for core and section for which these data apply.

Figure 8 gives the outline for core descriptions of igneous rocks in the right-hand margin of the Visual Core Description Form. If more than one core appear on the core form these data are listed below the description of the first core using the same format. As many cores as space allows are included on one Visual Core Description Form. When space for descriptions is inadequate on this form, these data appear on the following or facing page. However, in no case does information from one core appear on successive core forms.

For each core, the core number, sections, and depth interval recovered are listed followed by the major and minor rock types and a short description. Thin section data are tallied below this, then shipboard data.

Classification of Igenous Rocks

We informally classified igneous rocks recovered on Leg 62 according to mineralogy and texture determined from visual inspection of hand specimens and thin sections. Standard rock names, such as basalt and dolerite come from mineralogic compositions.

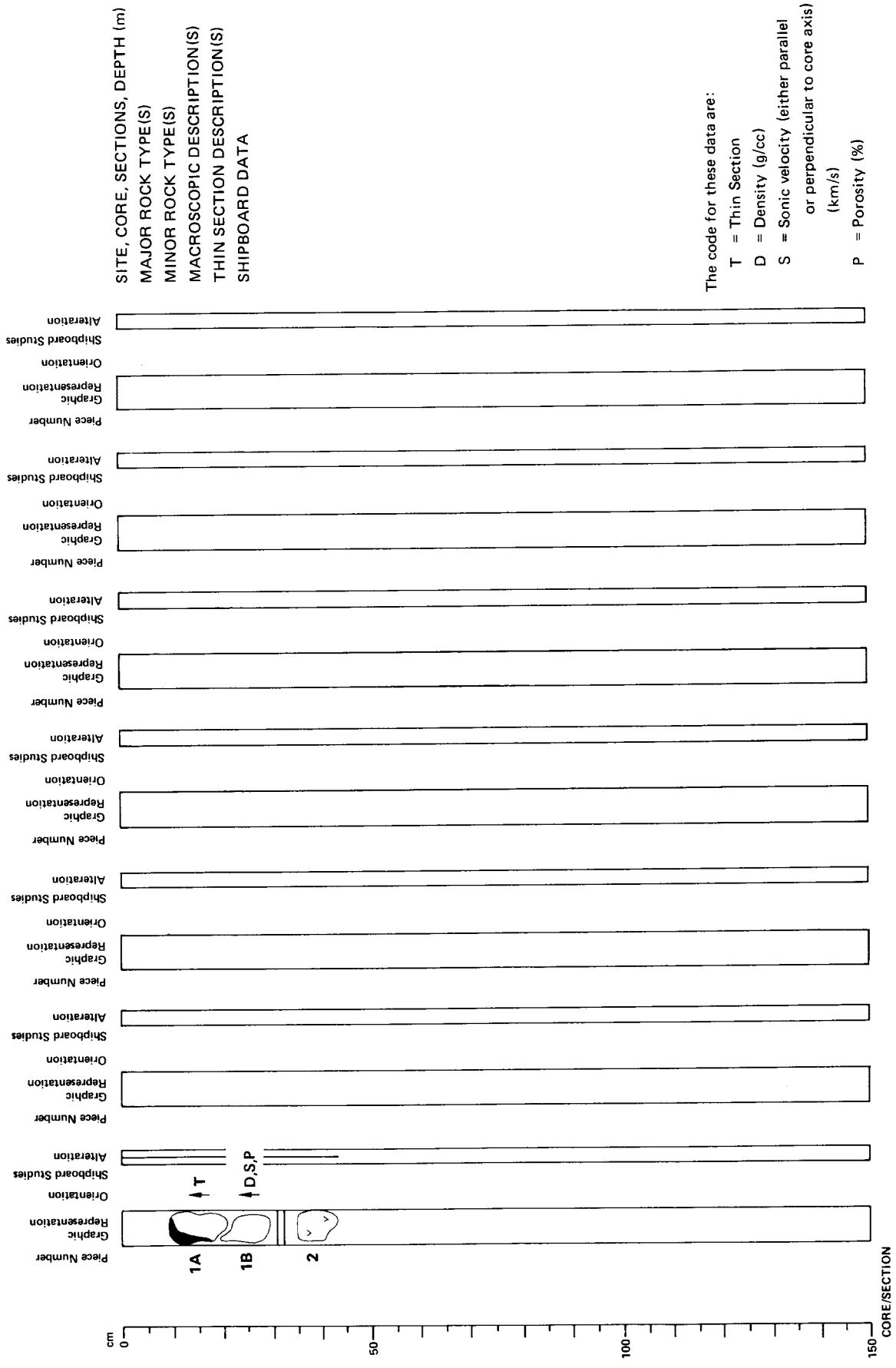
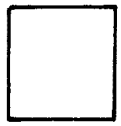
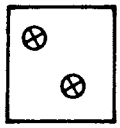


Figure 8. Visual Core Description Form (Igneous Rocks).

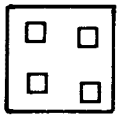
TEXTURE:
Used in graphic representation column



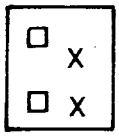
Aphyric basalt



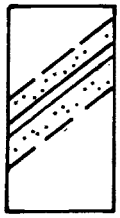
Variolitic basalt



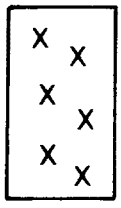
Porphyritic basalt
Olivine and plagioclase phenocrysts



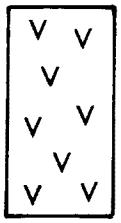
Olivine plagioclase and clinopyroxene phenocrysts



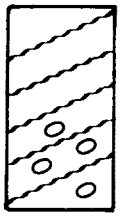
Vein with altered zone next to it



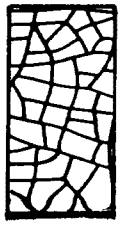
Gabbro



Diabase and Metabasalt
(Site 453 only)



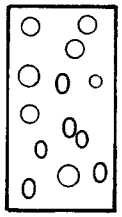
Serpentinite (shear orientation approximately as in core; Augen shown toward bottom)



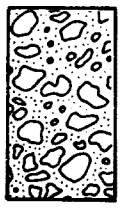
Fractures

Glass on edge
(rounded piece)

Altered rind on rounded piece



Vesicles
(proportional to size)

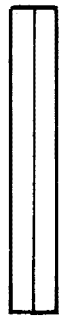


Breccia
(as graphic as possible)

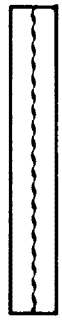
WEATHERING: ALTERATION[1]
Used in alteration column

Very fresh
(no discoloration)

Moderately altered
(slight discoloration)



Badly altered
(discolored, but has fresh core)



Almost completely altered (completely discolored, beginning to disaggregate, clayey)

Figure 9. List of symbols for igneous rocks.

SAMPLE DISTRIBUTION POLICY

Deep Sea Drilling Project/International Phase of Ocean Drilling

Distribution of Deep Sea Drilling samples for investigation will be undertaken in order to (1) provide supplementary data to support GLOMAR CHALLENGER scientists in achieving the scientific objectives of their particular cruise, and in addition to serve as a mechanism for contributions to the INITIAL REPORTS; (2) provide individual investigators with materials to conduct detailed studies beyond the scope of the Initial Reports; and (3) provide the reference centers where paleontologic materials are stored with samples for reference and comparison purposes.

The National Science Foundation has established a Sample Distribution Panel to advise on the distribution of core materials. This panel is chosen in accordance with usual Foundation practices, in a manner that will assure advice in the various disiplines leading to a complete and adequate study of the cores and their contents. Funding for the proposed research must be secured separately by the investigator. It cannot be provided through the Deep Sea Drilling Project.

The Deep Sea Drilling Project's Curator is responsible for distributing the samples and controlling their quality, as well as preserving and conserving core material. He also is responsible for maintaining a record of all samples that have been distributed, shipboard and subsequent, indicating the recipient, and the natures of the proposed investigation. This information is made available to all investigators of DSDP materials as well as other interested researchers on request.

The distribution of samples is made directly from one of the two existing repositories, Lamont-Doherty Geological Observatory and Scripps Institution of Oceanography, by the Curator or his designated representative.

1. Distribution of Samples for Research Leading to Contributions to Initial Reports

Any investigator who wishes to contribute a paper to a given volume of the Initial Reports may write to the Chief Scientist, Deep Sea Drilling Project (A-031), Scripps Institution of Oceanography, University of California at San Diego, La Jolla, California 92093, U.S.A., requesting samples from a forthcoming cruise. Requests for a specific cruise should be received by the Chief Scientist TWO MONTHS in advance of the departure of the cruise in order to allow time for the review and consideration of all requests and to establish a suitable shipboard sampling program. The request should include a statement of the nature of the study proposed, size and approximate number of samples required to complete the study, and any particular sampling technique or equipment that might be required. The requests will be reviewed by the Chief Scientist of the Project and the cruise co-chief scientists; approval will be given in accordance with the scientific requirements of the cruise as determined by the appropriate JOIDES Advisory Panel(s). If approved, the requested samples will be taken, either by the shipboard party if the workload permits, or by the curatorial staff shortly following the return of the cores to the repository. Proposals must be of a scope to ensure that samples can be processed and a contribution completed in time for publication in the Initial Reports. Except for rare, specific instances involving ephemeral properties, sampling will not exceed one-quarter of the volume of core recovered, with no interval being depleted and one-half of all core being retained as an archive. Shipboard sampling shall not exceed approximately 100 igneous samples per investigator; in all cases co-chief scientists are requested to keep sampling to a minimum.

The co-chief scientists may elect to have special studies of selected core samples made by other investigators. In this event the names of these investigators and complete listings of all materials loaned or distributed must be forwarded, if possible, prior to the cruise or, as soon as possible following the cruise, to the Chief Scientist through the DSDP Staff Science Representative for that particular cruise. In such cases, all requirements of the Sample Distribution Policy shall also apply.

If a dispute arises or if a decision cannot be reached in the manner prescribed, the NSF Sample Distribution Panel will conduct the final arbitration.

Any publication of results other than in the Initial Reports within twelve (12) months of the completion of the cruise must be approved and authored by the whole shipboard party and, where appropriate, shore-based investigators. After twelve months, individual investigators may submit related papers for open publication provided they have submitted their contributions to the Initial Reports. Investigations not completed in time for inclusion in the Initial Reports for a specific cruise may not be published in other journals until final publication of that Initial Report for which it was intended. Notice of submission to other journals and a copy of the article should be sent to the DSDP Chief Science Editor.

2. Distribution of Samples for Research Leading to Publication other than in Initial Reports

A. Researchers intending to request samples for studies beyond the scope of the Initial Reports should first obtain sample request forms from the Curator, Deep Sea Drilling Project (A-031), Scripps Institution of Oceanography, University of California at San Diego, La Jolla, California 92093, U.S.A. On the forms the researcher is requested to specify the quantities and intervals of the core required, make a clear statement of the proposed research, state time required to complete and submit results for publication, specify the status of funding and the availability of equipment and space foreseen for the research.

In order to ensure that all requests for highly desirable but limited samples can be considered, approval of requests and distribution of samples will not be made prior to 2 months after publication of the Initial Core Descriptions (I.C.D.). ICD's required to be published within 10 months following each cruise. The only exceptions to this policy will be for specific instances involving ephemeral properties. Requests for samples can be based on the Initial Core Descriptions, copies of which are on file at various institutions throughout the world. Copies of original core logs and data are kept on file at DSDP and at the Repository at Lamont-Doherty Geological Observatory, Palisades, New York. Requests for samples from researchers in industrial laboratories will be handled in the same manner as these from academic organizations, with the same obligation to publish results promptly.

B. (1) The DSDP Curator is authorized to distribute samples up to 50 ml per meter of core. Requests for volumes of material in excess of this amount will be referred to the NSF Sample Distribution Panel for review and approval. Experience has shown that most investigations can be accomplished with 10ml sized samples or less. All investigators are encouraged to be as judicious as possible with regard to sample size and, especially, frequency within any given core interval. The Curator will not automatically distribute any parts of the cores which appear to be in particularly high demand; requests for such parts will be referred to the Sample Distribution Panel for review. Requests for samples from thin layers or important stratigraphic boundaries will also require Panel review.

(2) If investigators wish to study certain properties which may deteriorate prior to the normal availability of his samples, they may request that the normal waiting period not apply. All such requests must be reviewed by the curators and approved by the NSF Sample Distribution Panel.

C. Samples will not be provided prior to assurance that funding for sample studies either exists or is not needed. However, neither formal approval of sample requests nor distribution of samples will be made until the appropriate time (Item A). If a sample request is dependent, either wholly or in part, on proposed funding, the organization to whom the funding proposal has been submitted any information on the availability (or potential availability) of samples that it may request.

D. Investigators receiving samples are responsible for:

(1) publishing significant results; however contributions shall not be submitted for publication prior to 12 months following the termination of the appropriate leg;

(2) acknowledging, in publications, that samples were supplied through the assistance of the U.S. National Science Foundation and others as appropriate;

(3) submitting five (5) copies (for distribution to the Curator's file, the DSDP Repositories, the GLOMAR CHALLENGER's Library, and the National Science Foundation) of all reprints of published results to the Curator, Deep Sea Drilling Project (A-012), Scripps Institution of Oceanography, University of California at San Diego, La Jolla, California 92093, U.S.A.;

(4) returning, in good condition, the remainders of samples after termination of research, if requested by the Curator.

E. Cores are made available at repositories for investigators to examine and to specify exact samples in such instances as may be necessary for the scientific purposes of the sampling, subject to the limitations of B (1 and 2) and D, above, with specific permission of the Curator or his delegate.

F. Shipboard-produced smear slides of sediments and thin sections of indurated sediments, igneous and metamorphic rocks, will be returned to the appropriate repository at the end of each cruise or at the publication of the Initial Reports for that cruise. These smear slides and thin sections will form a reference collection of the cores stored at each repository and may be viewed at the respective repositories as an aid in the selection of core samples.

G. The Deep Sea Drilling Project routinely processes by computer most of the quantitative data presented in the Initial Reports. Space limitations in the Initial Reports preclude the detailed presentation of all such data. However, copies of the computer readout are available for those who wish the data for further analysis or as an aid in selecting samples. A charge will be made to recover expenses in excess of $50.00 incurred in filling requests.

3. Other Records

Magnetics, seismic reflection, downhole logging, and bathymetric data collected by the GLOMAR CHALLENGER will also be available for distribution at the same time samples become available.

Requests for data may be made to:

Associate Chief Scientist,
Science Services
Deep Sea Drilling Project (A-031)
Scripps Institution of
Oceanography
University of California
at San Diego
La Jolla, California 92093

A charge will be made to recover the expenses in excess of $50.00 in filling individual requests. If required, estimated charges can be furnished before the request is processed.

4. Reference Centers

As a separate and special category samples will be distributed for the purpose of establishing up to five reference centers where paleontologic materials will be available for reference and comparison purposes. The first of these reference centers has been approved at Basel, Switzerland.
Revised 9/28/76

REFERENCES

Bode, G. W., 1973. Carbon and Carbonate Analyses – Leg 18. In Kulm, L. D., von Huene, R., et a., 1973. *Initial Reports of the Deep Sea Drilling Project,* v. 18: Washington (U. S. Government Printing Office), p. 1069-1076.

Boyce, R. E., and Bode, G. W., 1972. Carbon and Carbonate Analyses, Leg 9. In Hays, J. D., et al., 1972. *Initial Reports of the Deep Sea Drilling Project,* v. 9: Washington (U. S. Government Printing Office), p. 797-816.

Lancelot, Y., 1973. Chert and Silica Diagenesis in Sediments from the Central Pacific. In: *Initial Reports of the Deep Sea Drilling Project,* in Winterer, E. L., Ewing, J. I., et al., Washington (U. S. Government Printing Office), v. 17, p. 377-405.

Muller, G. and Gastner, M., 1971. The "Karbonate-Bomb," A Simple Device for Determination of the Carbonate Content in Sediments, Soils and Other Materials: N. Jb. Miner. Mh., v. 10, p. 466-469.

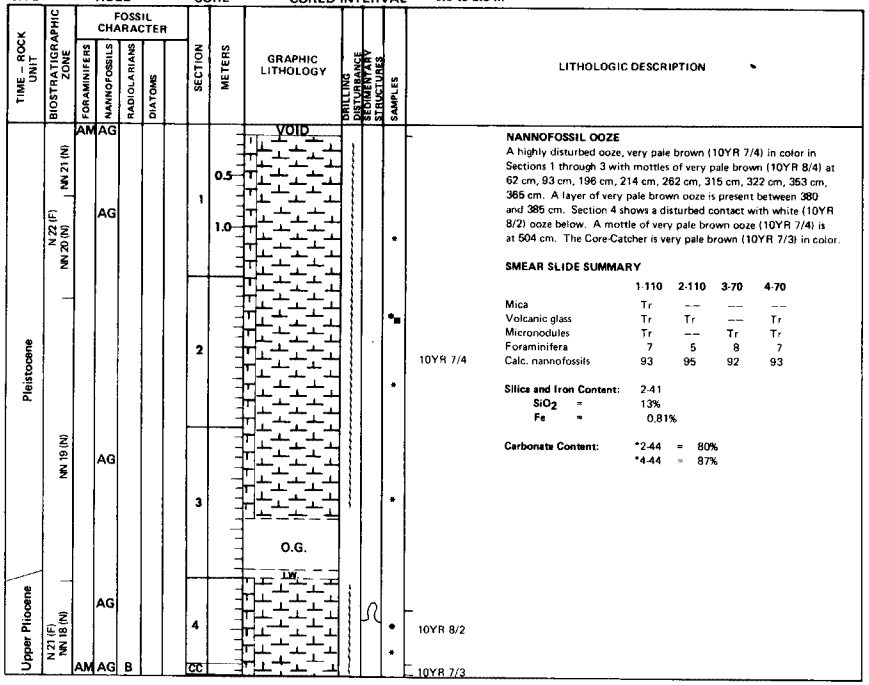
Shepard, F. P., 1954. Nomenclature Based on Sand-Silt-Clay Ratios: J. Sediment. Petrol., v. 24, p. 151-158.

SITE SUMMARY SHEET

SITE 463

Date occupied:	August 2, 1978 (1708Z)
Date departed:	August 10, 1978 (1515Z)
Time on hole:	190.2 hours
Position: Latitude:	21°21.01'N
Longitude:	174°40.07'E
Water depth (sea level):	2525 corrected meters, echo sounding
Water depth (rig floor):	2535 corrected meters, echo sounding
Bottom felt at:	2532 meters, drill pipe
Penetration:	822.5 meters
Number of holes:	1
Number of cores:	92
Total length of cored section:	822.5 meters
Total core recovery:	301.8 meters
Percentage core recovery:	36.6%
Oldest Sediment Cored	
Depth sub-bottom:	822.5 meters
Nature:	Limestone
Age:	Upper Barremian
Measured velocity:	n/a
Basement	
Depth sub-bottom:	n/a
Nature:	n/a
Velocity range:	n/a

SITE 463 HOLE CORE 1 CORED INTERVAL 0.0 to 5.5 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE

A highly disturbed ooze, very pale brown (10YR 7/4) in color in Sections 1 through 3 with mottles of very pale brown (10YR 8/4) at 62 cm, 93 cm, 196 cm, 214 cm, 262 cm, 315 cm, 322 cm, 353 cm, 365 cm. A layer of very pale brown ooze is present between 380 and 385 cm. Section 4 shows a disturbed contact with white (10YR 8/2) ooze below. A mottle of very pale brown ooze (10YR 7/4) is at 504 cm. The Core-Catcher is very pale brown (10YR 7/3) in color.

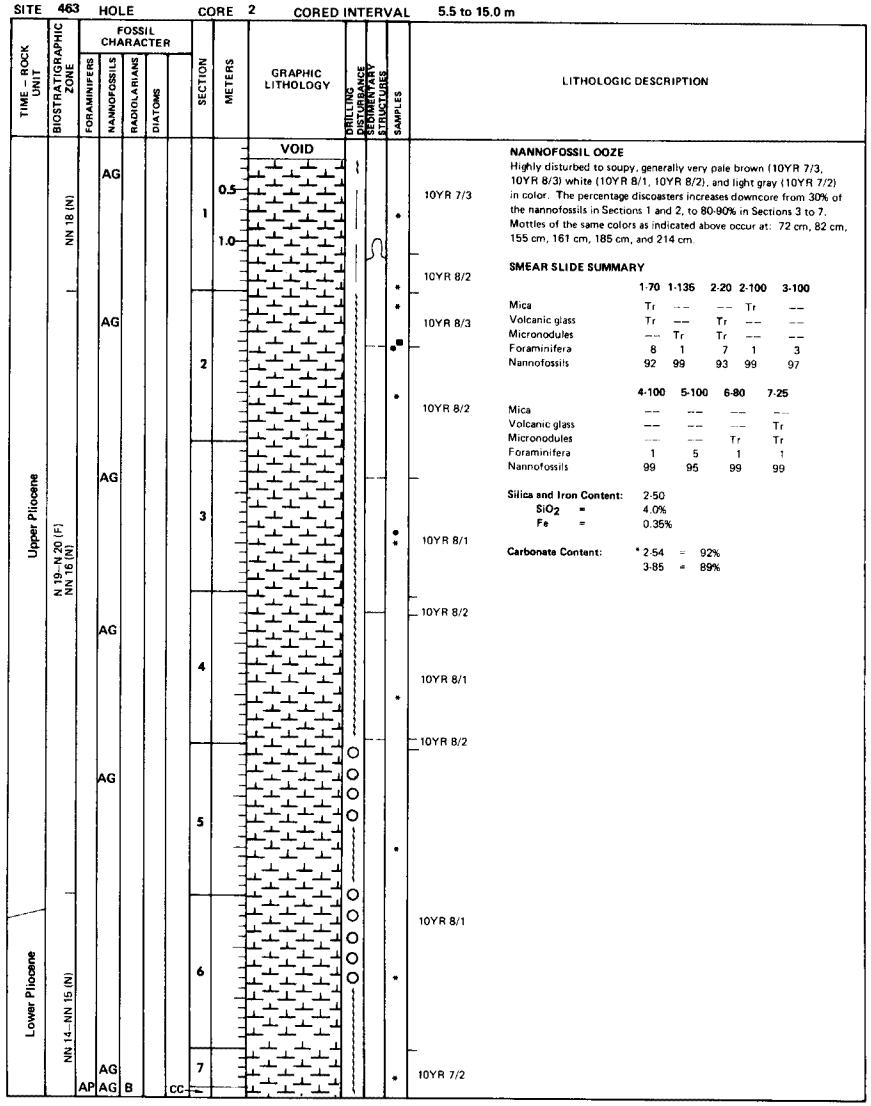
SMEAR SLIDE SUMMARY

	1-110	2-110	3-70	4-70
Mica	Tr	--	--	--
Volcanic glass	Tr	Tr	--	Tr
Micronodules	Tr	--	Tr	Tr
Foraminifera	7	5	8	7
Calc. nannofossils	93	95	92	93

Silica and Iron Content: 2-41
SiO_2 = 13%
Fe = 0.81%

Carbonate Content: *2-44 = 80%
*4-44 = 87%

SITE 463 HOLE CORE 2 CORED INTERVAL 5.5 to 15.0 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE

Highly disturbed to soupy, generally very pale brown (10YR 7/3, 10YR 8/3) white (10YR 8/1, 10YR 8/2), and light gray (10YR 7/2) in color. The percentage discoasters increases downcore from 30% of the nannofossils in Sections 1 and 2, to 80-90% in Sections 3 to 7. Mottles of the same colors as indicated above occur at: 72 cm, 82 cm, 155 cm, 161 cm, 185 cm, and 214 cm.

SMEAR SLIDE SUMMARY

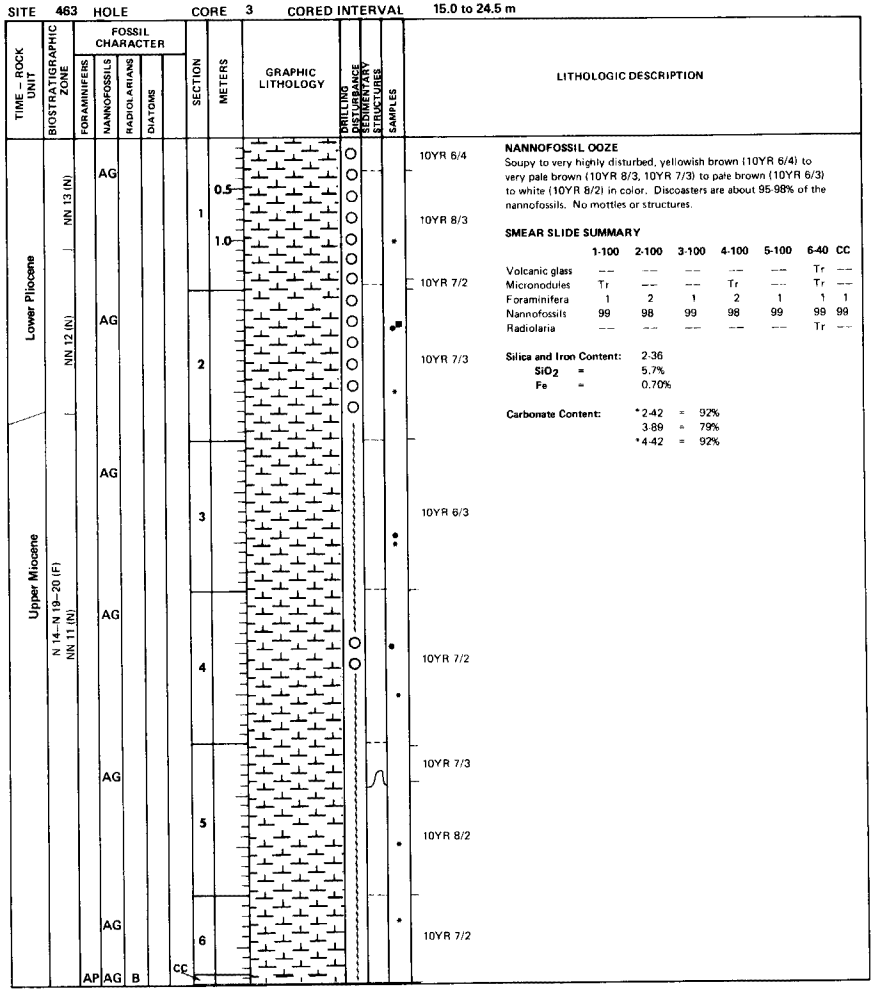
	1-70	1-136	2-20	2-100	3-100
Mica	Tr	--	--	Tr	--
Volcanic glass	Tr	--	Tr	--	--
Micronodules	--	Tr	Tr	--	--
Foraminifera	8	1	7	1	3
Nannofossils	92	99	93	99	97

	4-100	5-100	6-80	7-25
Mica	--	--	--	--
Volcanic glass	--	--	--	Tr
Micronodules	--	--	Tr	Tr
Foraminifera	1	5	1	1
Nannofossils	99	95	99	99

Silica and Iron Content: 2-50
SiO_2 = 4.0%
Fe = 0.35%

Carbonate Content: * 2-54 = 92%
3-85 = 89%

SITE 463 HOLE CORE 3 CORED INTERVAL 15.0 to 24.5 m



NANNOFOSSIL OOZE

Soupy to very highly disturbed, yellowish brown (10YR 6/4) to very pale brown (10YR 8/3, 10YR 7/3) to pale brown (10YR 6/3) to white (10YR 8/2) in color. Discoasters are about 95-98% of the nannofossils. No mottles or structures.

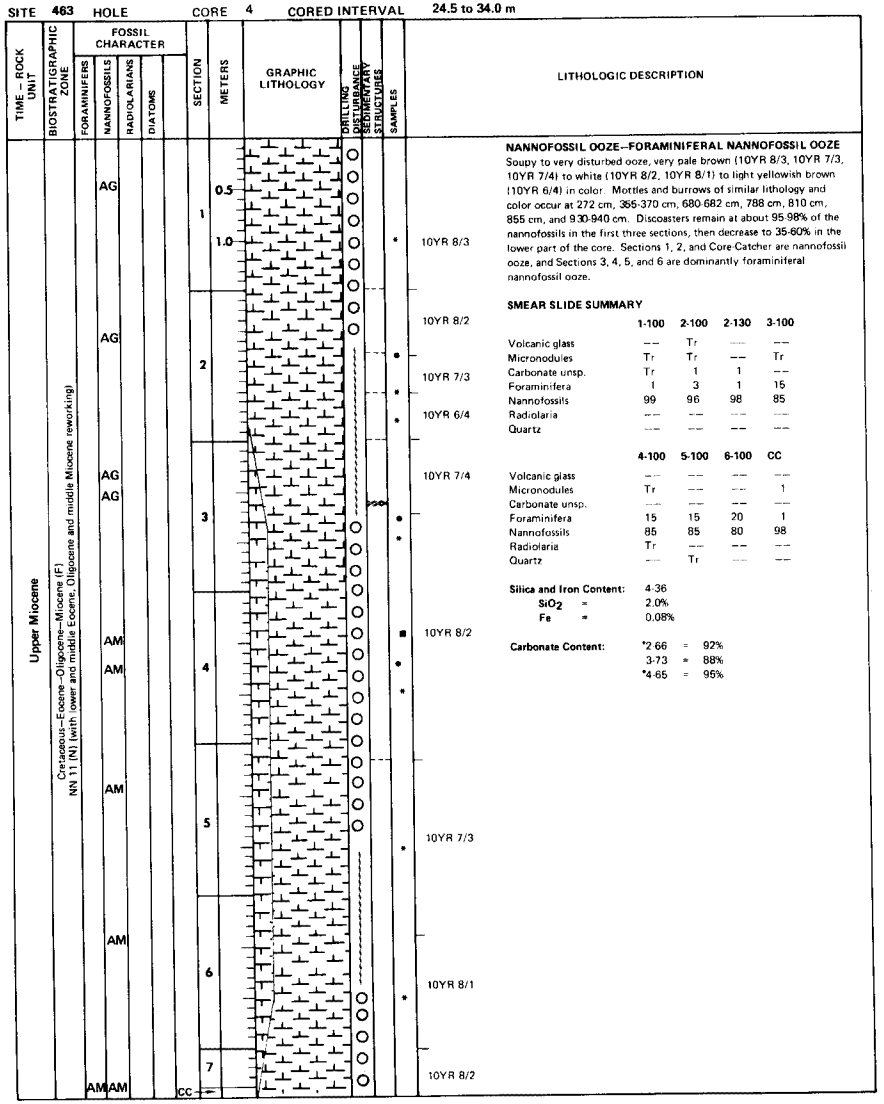
SMEAR SLIDE SUMMARY

	1-100	2-100	3-100	4-100	5-100	6-40	CC
Volcanic glass	—	—	—	—	—	Tr	—
Micronodules	Tr	—	—	Tr	—	Tr	—
Foraminifera	1	2	1	2	1	1	1
Nannofossils	99	98	99	98	99	99	99
Radiolaria	—	—	—	—	—	Tr	—

Silica and Iron Content: 2-36
SiO_2 = 5.7%
Fe = 0.70%

Carbonate Content: *2-42 = 92%
3-89 = 79%
*4-42 = 92%

SITE 463 HOLE CORE 4 CORED INTERVAL 24.5 to 34.0 m



NANNOFOSSIL OOZE–FORAMINIFERAL NANNOFOSSIL OOZE

Soupy to very disturbed ooze, very pale brown (10YR 8/3, 10YR 7/3, 10YR 7/4) to white (10YR 8/2, 10YR 8/1) to light yellowish brown (10YR 6/4) in color. Mottles and burrows of similar lithology and color occur at 272 cm, 355-370 cm, 680-682 cm, 788 cm, 810 cm, 855 cm, and 930-940 cm. Discoasters remain at about 95-98% of the nannofossils in the first three sections, then decrease to 35-60% in the lower part of the core. Sections 1, 2, and Core-Catcher are nannofossil ooze, and Sections 3, 4, 5, and 6 are dominantly foraminiferal nannofossil ooze.

SMEAR SLIDE SUMMARY

	1-100	2-100	2-130	3-100
Volcanic glass	—	Tr	—	—
Micronodules	Tr	Tr	—	Tr
Carbonate unsp.	Tr	1	1	—
Foraminifera	1	3	1	15
Nannofossils	99	96	98	85
Radiolaria	—	—	—	—
Quartz	—	—	—	—

	4-100	5-100	6-100	CC
Volcanic glass	—	—	—	—
Micronodules	Tr	—	—	1
Carbonate unsp.	—	—	—	—
Foraminifera	15	15	20	1
Nannofossils	85	85	80	98
Radiolaria	Tr	—	—	—
Quartz	—	Tr	—	—

Silica and Iron Content: 4-36
SiO_2 = 2.0%
Fe = 0.08%

Carbonate Content: *2-66 = 92%
3-73 = 88%
*4-65 = 95%

SITE 463 HOLE CORE 5 CORED INTERVAL 34.0 to 38.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Oligocene	P 20 (F) NP 23–NP 24 (N)		AG			1	0.5 1.0				•	10YR 8/3
			AG			2					■ • *	10YR 8/2
		AM	AG			CC					*	

NANNOFOSSIL OOZE

Highly disturbed very pale brown (10YR 8/3) to white (10YR 8/2) ooze. Occasional white (10YR 8/1 and lighter) streaks and mottles at 60 cm, 87 cm, and 123 cm. Contamination by the pressure core barrel occurs at the top and bottom of the core (0-35 cm, and 275-285 cm). Discoasters are less abundant than in the preceding cores, about 30% of the nannofossils.

SMEAR SLIDE SUMMARY

	1-100	2-100	CC
Foraminifera	7	9	3
Nannofossils	93	91	97

Silica and Iron Content: 2-28
SiO_2 = 1.0%
Fe = 0.04%

Carbonate Content: 1-83 = 89%
*2-50 = 97%

SITE 463 HOLE CORE 6 CORED INTERVAL 38.0 to 43.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Oligocene	P 11 (F) NP 23–NP 24 (with lower and middle Eocene reworking) (N)		AG			1	0.5 1.0				*	10YR 8/2
			AG			2					*	
			AG			3					• *	10YR 8/2 to 10YR 7/3
			AG			4					*	
			AG			5		O.G. LW				10YR 8/2
Middle Eocene	NP 16 (N)	AG	AM			6					• • ■	10YR 8/1
						CC						10YR 8/2

FORAMINIFERAL NANNOFOSSIL OOZE

Soupy to highly disturbed uniform ooze, white (10YR 8/2, 10YR 8/1) to very pale brown (10YR 7/3) in color. Streaks of white (10YR 8/1 and lighter) are found at 58 cm, 110 cm, 340-370 cm, and 405-410 cm. A small piece of chert is at 790 cm.

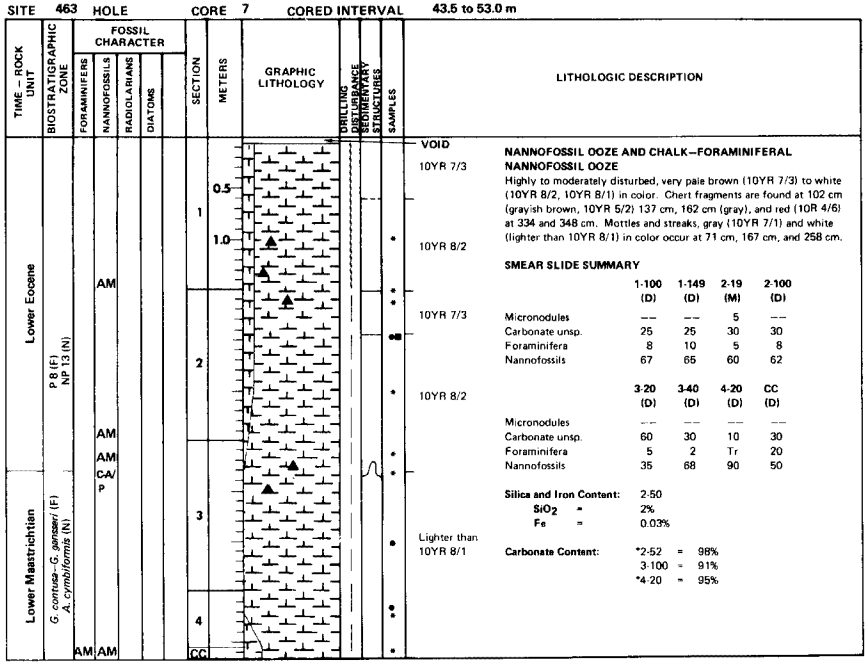
SMEAR SLIDE SUMMARY

	1-100	2-100	3-100	4-100	6-11	6-30
Calc. rhombs	—	—	—	—	2	1
Foraminifera	10	15	10	15	20	20
Nannofossils	90	85	90	85	78	79

Silica and Iron Content: 6-38
SiO_2 = 1%
Fe = 0.04%

Carbonate Content: 3-70 = 96%
*6-4 = 97%

SITE 463 HOLE CORE 7 CORED INTERVAL 43.5 to 53.0 m



NANNOFOSSIL OOZE AND CHALK–FORAMINIFERAL NANNOFOSSIL OOZE

Highly to moderately disturbed, very pale brown (10YR 7/3) to white (10YR 8/2, 10YR 8/1) in color. Chert fragments are found at 102 cm (grayish brown, 10YR 5/2) 137 cm, 162 cm (gray), and red (10R 4/6) at 334 and 348 cm. Mottles and streaks, gray (10YR 7/1) and white (lighter than 10YR 8/1) in color occur at 71 cm, 167 cm, and 258 cm.

SMEAR SLIDE SUMMARY

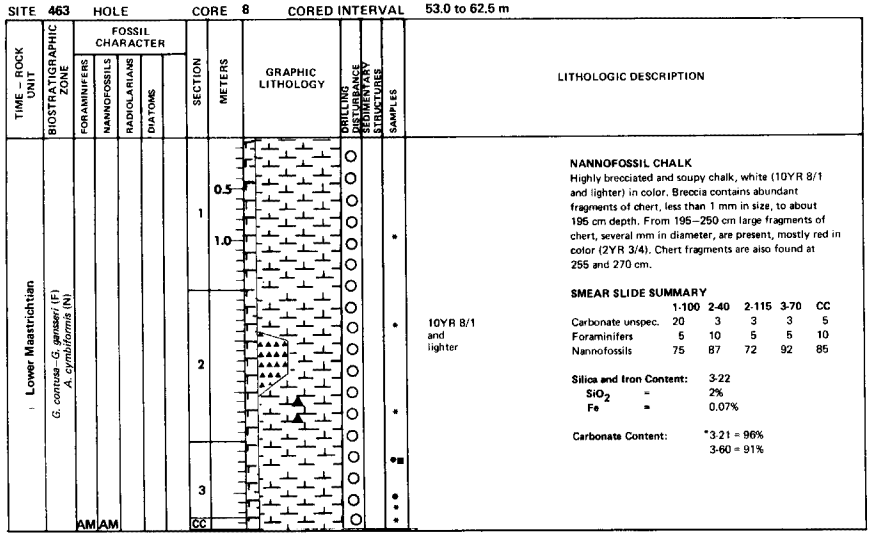
	1-100 (D)	1-149 (D)	2-19 (M)	2-100 (D)
Micronodules	—	—	5	—
Carbonate unsp.	25	25	30	30
Foraminifera	8	10	5	8
Nannofossils	67	65	60	62

	3-20 (D)	3-40 (D)	4-20 (D)	CC (D)
Micronodules	—	—	—	—
Carbonate unsp.	60	30	10	30
Foraminifera	5	2	Tr	20
Nannofossils	35	68	90	50

Silica and Iron Content: 2-50
SiO_2 = 2%
Fe = 0.03%

Carbonate Content: *2-52 = 98%
3-100 = 91%
*4-20 = 95%

SITE 463 HOLE CORE 8 CORED INTERVAL 53.0 to 62.5 m



NANNOFOSSIL CHALK

Highly brecciated and soupy chalk, white (10YR 8/1 and lighter) in color. Breccia contains abundant fragments of chert, less than 1 mm in size, to about 195 cm depth. From 195–250 cm large fragments of chert, several mm in diameter, are present, mostly red in color (2YR 3/4). Chert fragments are also found at 255 and 270 cm.

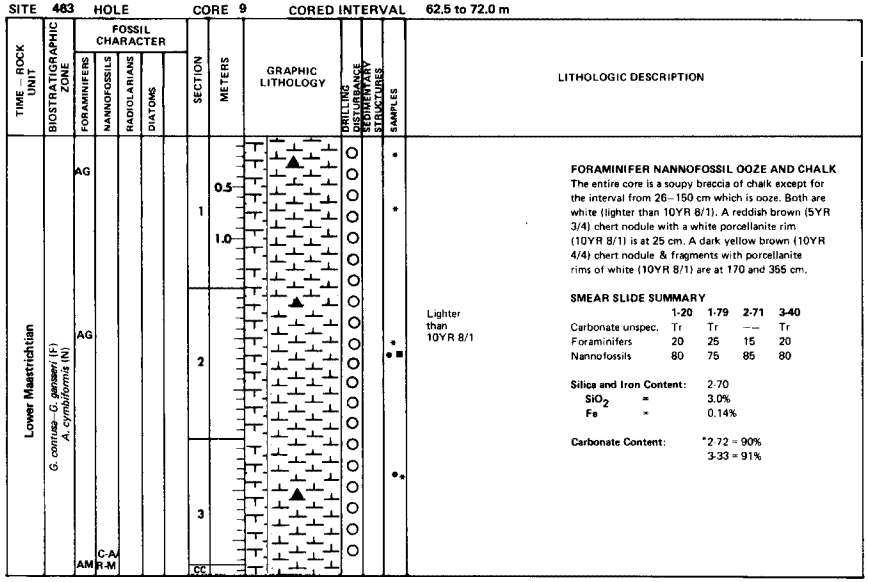
SMEAR SLIDE SUMMARY

	1-100	2-40	2-115	3-70	CC
Carbonate unspec.	20	3	3	3	5
Foraminifers	5	10	5	5	10
Nannofossils	75	87	72	92	85

Silica and Iron Content: 3-22
SiO_2 = 2%
Fe = 0.07%

Carbonate Content: *3-21 = 96%
3-60 = 91%

SITE 463 HOLE CORE 9 CORED INTERVAL 62.5 to 72.0 m



FORAMINIFER NANNOFOSSIL OOZE AND CHALK

The entire core is a soupy breccia of chalk except for the interval from 26–150 cm which is ooze. Both are white (lighter than 10YR 8/1). A reddish brown (5YR 3/4) chert nodule with a white porcellanite rim (10YR 8/1) is at 25 cm. A dark yellow brown (10YR 4/4) chert nodule & fragments with porcellanite rims of white (10YR 8/1) are at 170 and 355 cm.

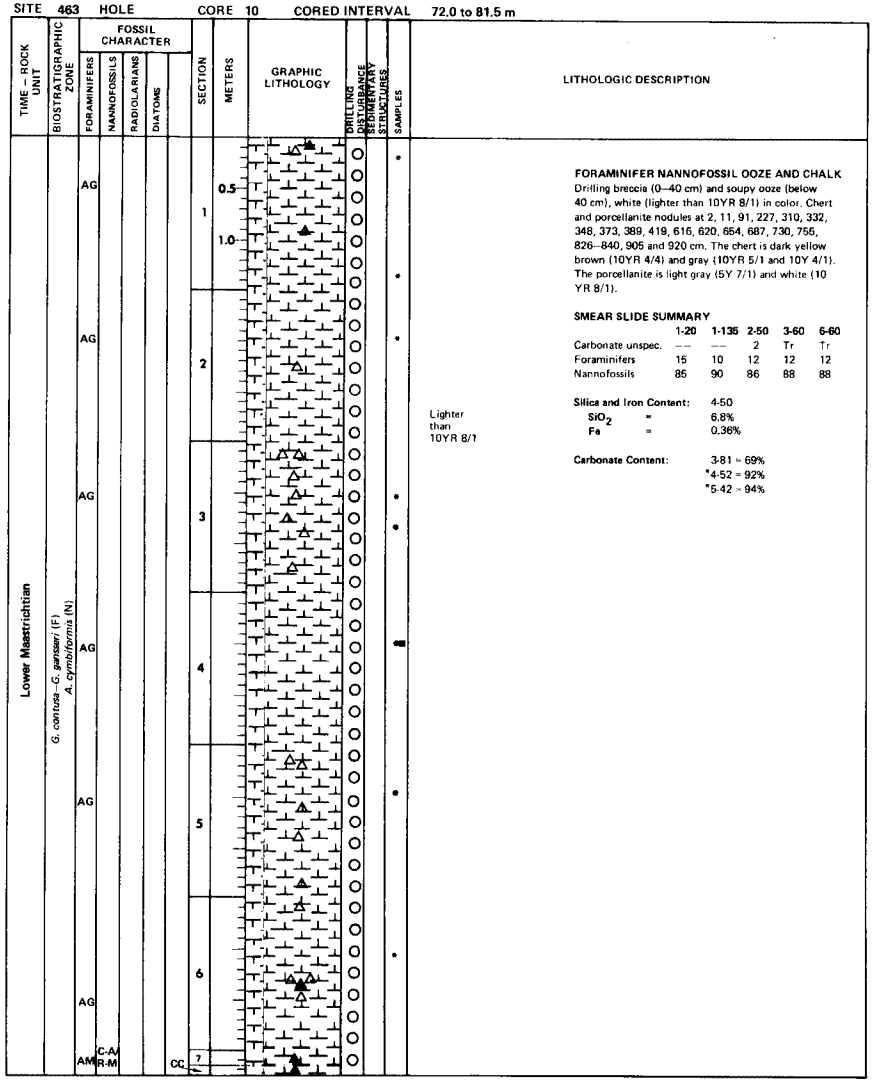
SMEAR SLIDE SUMMARY

	1-20	1-79	2-71	3-40
Carbonate unspec.	Tr	Tr	—	Tr
Foraminifers	20	25	15	20
Nannofossils	80	75	85	80

Silica and Iron Content: 2-70
SiO_2 = 3.0%
Fe = 0.14%

Carbonate Content: *2-72 = 90%
3-33 = 91%

SITE 463 HOLE CORE 10 CORED INTERVAL 72.0 to 81.5 m



FORAMINIFER NANNOFOSSIL OOZE AND CHALK

Drilling breccia (0–40 cm) and soupy ooze (below 40 cm), white (lighter than 10YR 8/1) in color. Chert and porcellanite nodules at 2, 11, 91, 227, 310, 332, 348, 373, 389, 419, 616, 620, 654, 687, 730, 755, 826–840, 905 and 920 cm. The chert is dark yellow brown (10YR 4/4) and gray (10YR 5/1 and 10Y 4/1). The porcellanite is light gray (5Y 7/1) and white (10 YR 8/1).

SMEAR SLIDE SUMMARY

	1-20	1-135	2-50	3-60	6-60
Carbonate unspec.	—	—	2	Tr	Tr
Foraminifers	15	10	12	12	12
Nannofossils	86	90	86	88	88

Silica and Iron Content: 4-50

SiO_2 = 6.8%

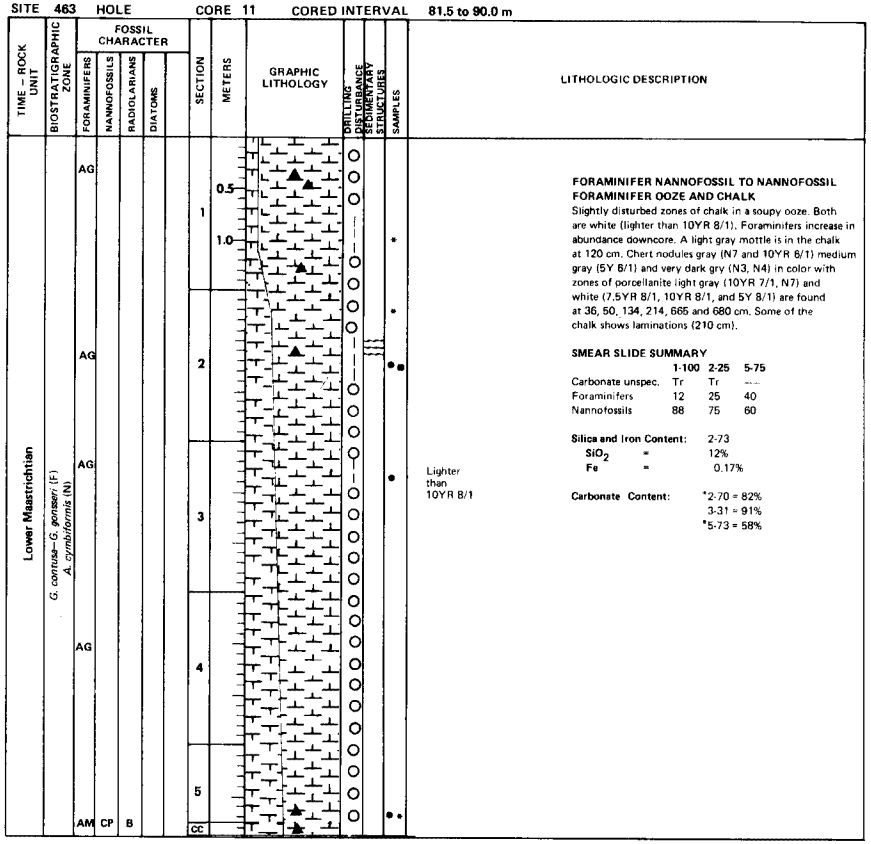
Fe = 0.36%

Carbonate Content: 3-81 = 69%

*4-52 = 92%

*5-42 = 94%

SITE 463 HOLE CORE 11 CORED INTERVAL 81.5 to 90.0 m



FORAMINIFER NANNOFOSSIL TO NANNOFOSSIL FORAMINIFER OOZE AND CHALK

Slightly disturbed zones of chalk in a soupy ooze. Both are white (lighter than 10YR 8/1). Foraminifers increase in abundance downcore. A light gray mottle is in the chalk at 120 cm. Chert nodules gray (N7 and 10YR 6/1) medium gray (5Y 8/1) and very dark gry (N3, N4) in color with zones of porcellanite light gray (10YR 7/1, N7) and white (7.5YR 8/1, 10YR 8/1, and 5Y 8/1) are found at 36, 50, 134, 214, 665 and 680 cm. Some of the chalk shows laminations (210 cm).

SMEAR SLIDE SUMMARY

	1-100	2-25	5-75
Carbonate unspec.	Tr	Tr	—
Foraminifers	12	25	40
Nannofossils	88	75	60

Silica and Iron Content: 2-73

SiO_2 = 12%

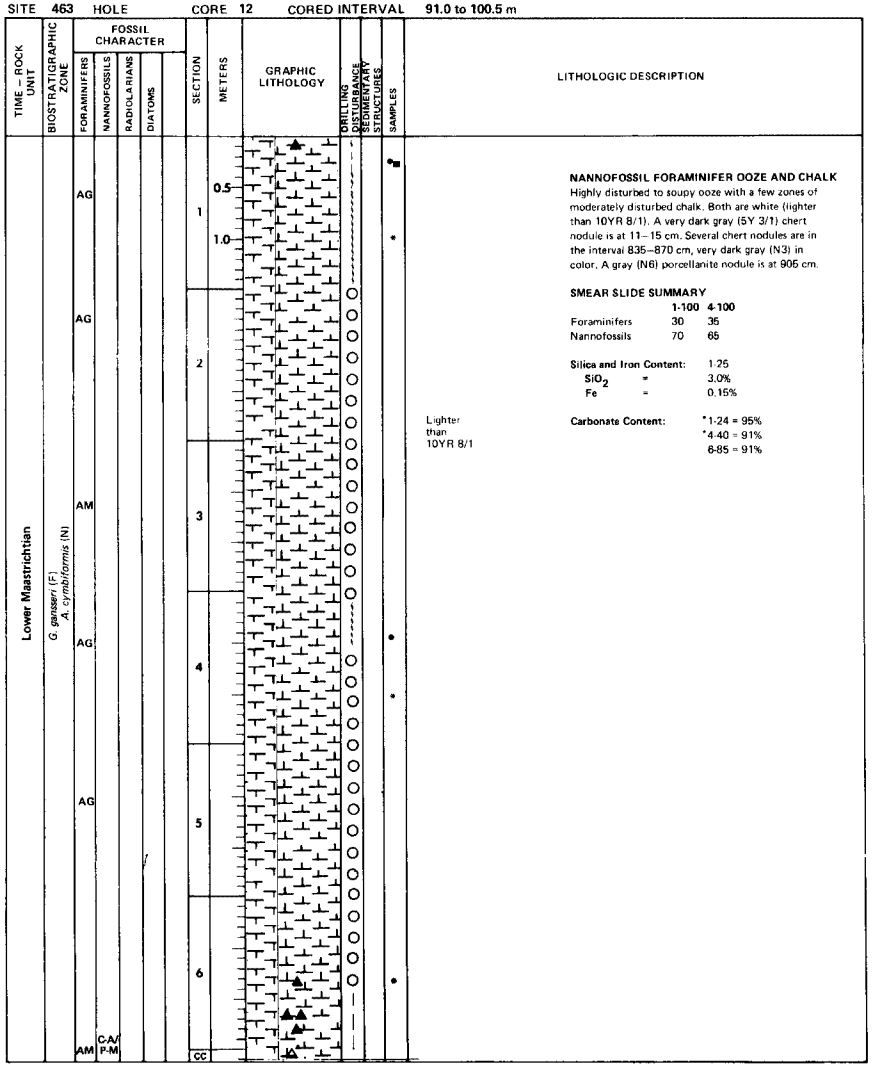
Fe = 0.17%

Carbonate Content: *2-70 = 82%

3-31 = 91%

*5-73 = 58%

SITE 463 HOLE CORE 12 CORED INTERVAL 91.0 to 100.5 m



NANNOFOSSIL FORAMINIFER OOZE AND CHALK
Highly disturbed to soupy ooze with a few zones of moderately disturbed chalk. Both are white (lighter than 10YR 8/1). A very dark gray (5Y 3/1) chert nodule is at 11–15 cm. Several chert nodules are in the interval 835–870 cm, very dark gray (N3) in color. A gray (N6) porcellanite nodule is at 905 cm.

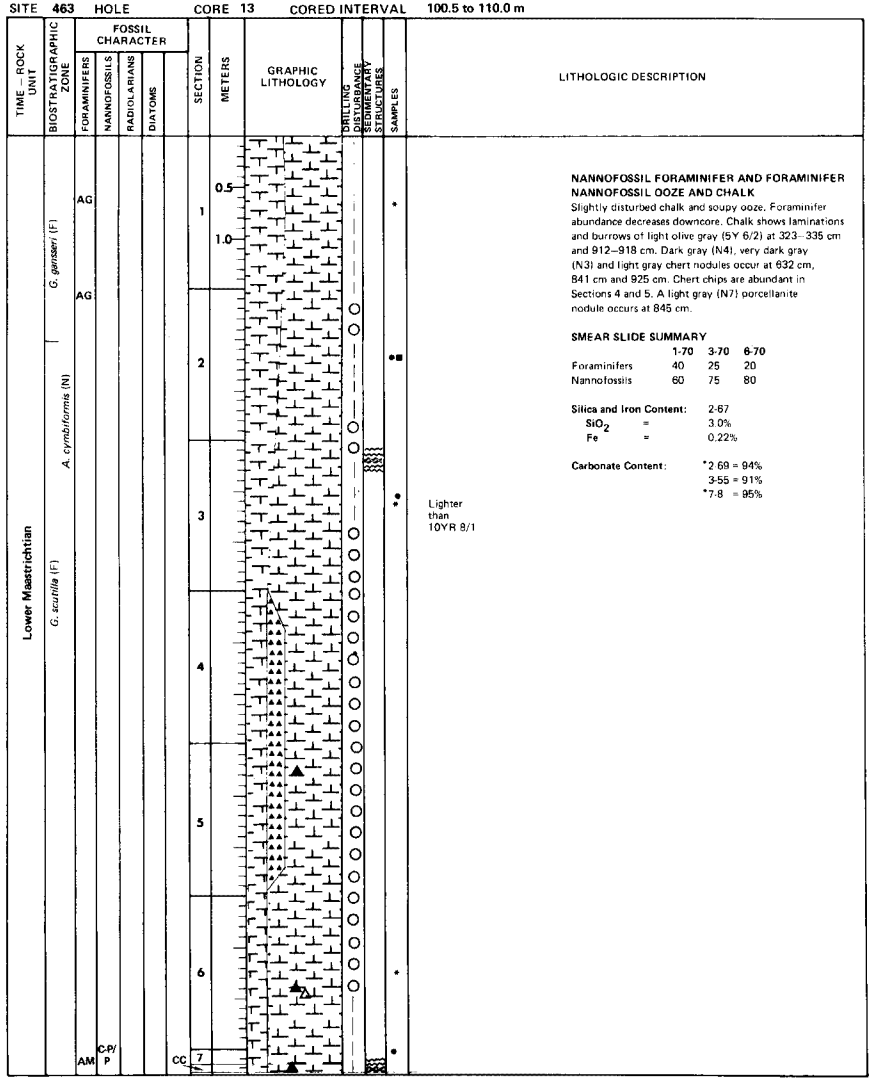
SMEAR SLIDE SUMMARY

	1-100	4-100
Foraminifers	30	35
Nannofossils	70	65

Silica and Iron Content: 1-25
SiO_2 = 3.0%
Fe = 0.15%

Carbonate Content: *1-24 = 95%
*4-40 = 91%
6-85 = 91%

SITE 463 HOLE CORE 13 CORED INTERVAL 100.5 to 110.0 m



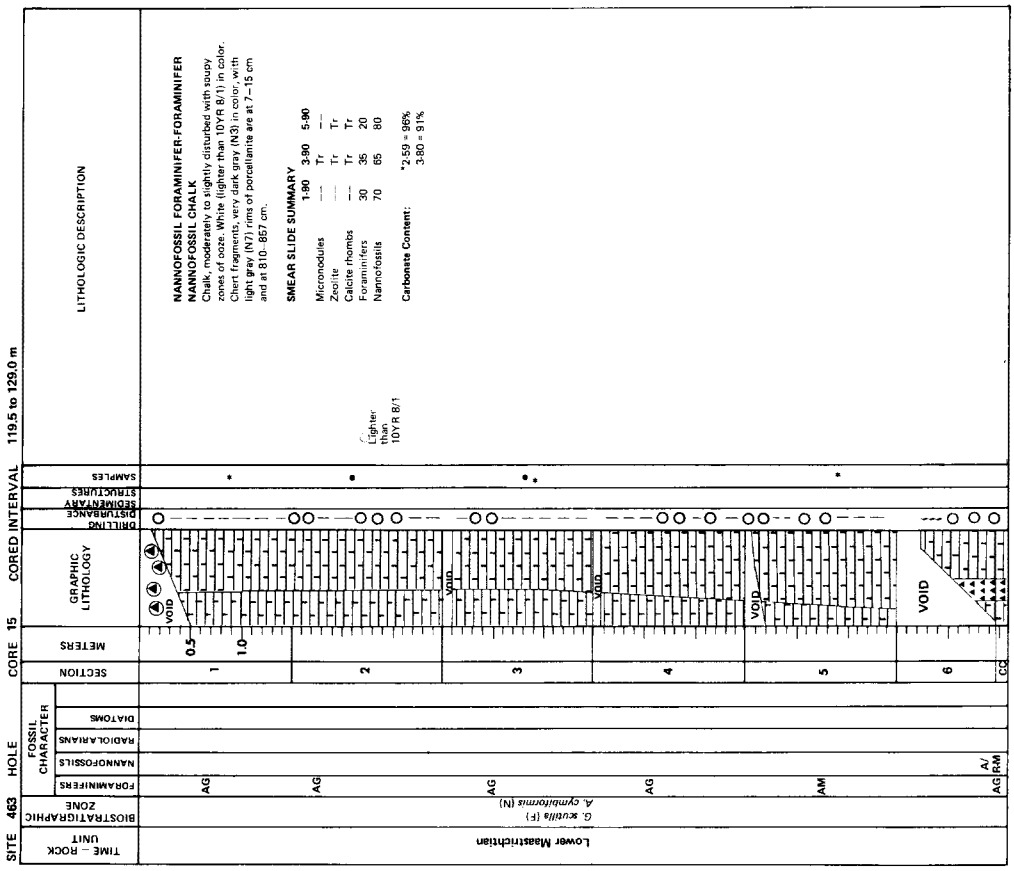
NANNOFOSSIL FORAMINIFER AND FORAMINIFER NANNOFOSSIL OOZE AND CHALK
Slightly disturbed chalk and soupy ooze. Foraminifer abundance decreases downcore. Chalk shows laminations and burrows of light olive gray (5Y 6/2) at 323–335 cm and 912–918 cm. Dark gray (N4), very dark gray (N3) and light gray chert nodules occur at 632 cm, 841 cm and 925 cm. Chert chips are abundant in Sections 4 and 5. A light gray (N7) porcellanite nodule occurs at 845 cm.

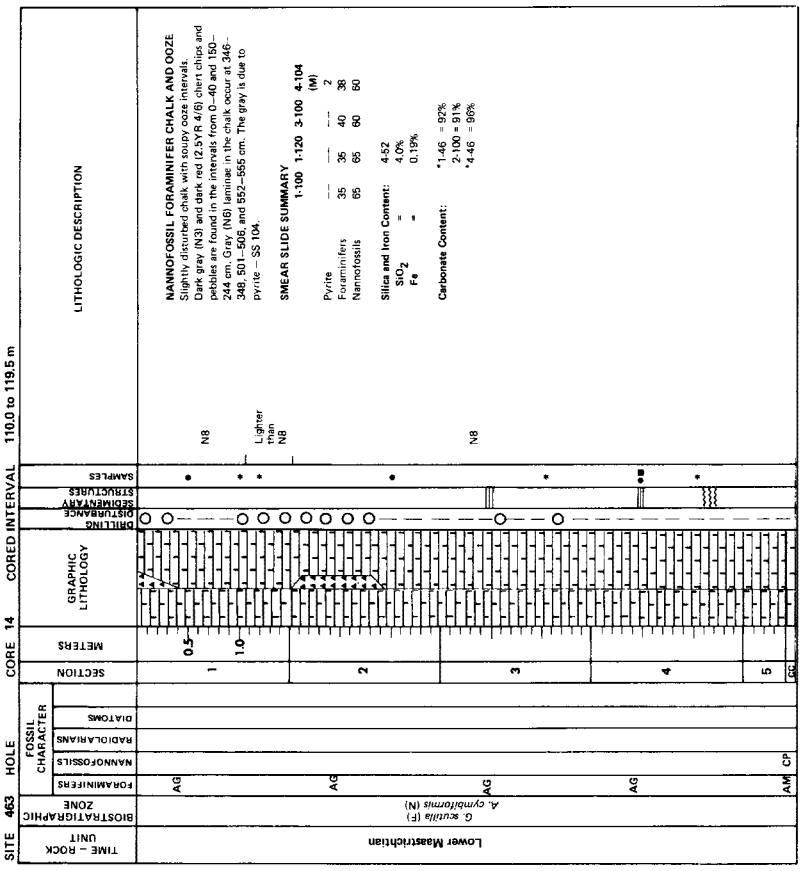
SMEAR SLIDE SUMMARY

	1-70	3-70	6-70
Foraminifers	40	25	20
Nannofossils	60	75	80

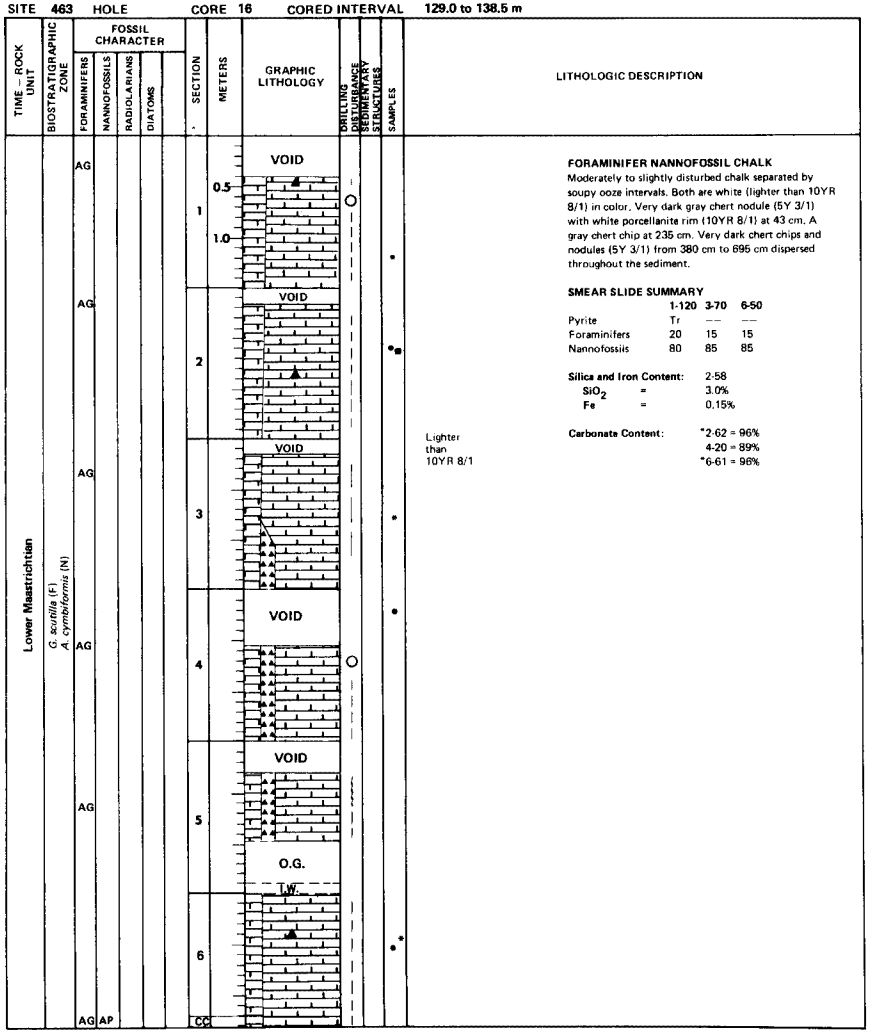
Silica and Iron Content: 2-67
SiO_2 = 3.0%
Fe = 0.22%

Carbonate Content: *2-69 = 94%
3-55 = 91%
*7-8 = 95%


SITE 463 HOLE CORE 15 CORED INTERVAL 119.5 to 129.0 m
TIME – ROCK UNIT
Lower Maastrichtian
BIOSTRATIGRAPHIC ZONE
G. scutilla (F)
A. cymbiformis (N)
FOSSIL CHARACTER
FORAMINIFERS
NANNOFOSSILS
RADIOLARIANS
DIATOMS
SECTION
METERS
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
SAMPLES
LITHOLOGIC DESCRIPTION
NANNOFOSSIL FORAMINIFER-FORAMINIFER NANNOFOSSIL CHALK
Chalk, moderately to slightly disturbed with soupy zones of ooze. White (lighter than 10YR 8/1) in color. Chert fragments, very dark gray (N3) in color, with light gray (N7) rims of porcellanite are at 7–15 cm and at 810–857 cm.
SMEAR SLIDE SUMMARY
1-90 3-90 5-90
Micronodules — Tr —
Zeolite — Tr Tr
Calcite rhombs — Tr Tr
Foraminifers 30 35 20
Nannofossils 70 65 80
Carbonate Content: *2.59 = 96%
3.80 = 91%
Lighter than 10YR 8/1
VOID


SITE 463 HOLE CORE 14 CORED INTERVAL 110.0 to 119.5 m
TIME – ROCK UNIT
Lower Maastrichtian
BIOSTRATIGRAPHIC ZONE
G. scutilla (F)
A. cymbiformis (N)
FOSSIL CHARACTER
FORAMINIFERS
NANNOFOSSILS
RADIOLARIANS
DIATOMS
SECTION
METERS
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
SAMPLES
LITHOLOGIC DESCRIPTION
NANNOFOSSIL FORAMINIFER CHALK AND OOZE
Slightly disturbed chalk with soupy ooze intervals. Dark gray (N3) and dark red (2.5YR 4/6) chert chips and pebbles are found in the intervals from 0–40 and 150–244 cm. Gray (N6) laminae in the chalk occur at 346–348, 501–506, and 552–565 cm. The gray is due to pyrite – SS 104.
SMEAR SLIDE SUMMARY
1-100 1-120 3-100 4-104
(M)
Pyrite — — — 2
Foraminifers 35 35 40 38
Nannofossils 65 65 60 60
Silica and Iron Content: 4-52
SiO2 = 4.0%
Fe = 0.19%
Carbonate Content: *1.46 = 92%
2.100 = 91%
*4.46 = 96%
N8
Lighter than N8

SITE 463 HOLE CORE 16 CORED INTERVAL 129.0 to 138.5 m



FORAMINIFER NANNOFOSSIL CHALK

Moderately to slightly disturbed chalk separated by soupy ooze intervals. Both are white (lighter than 10YR 8/1) in color. Very dark gray chert nodule (5Y 3/1) with white porcellanite rim (10YR 8/1) at 43 cm. A gray chert chip at 235 cm. Very dark chert chips and nodules (5Y 3/1) from 380 cm to 695 cm dispersed throughout the sediment.

SMEAR SLIDE SUMMARY

	1-120	3-70	6-50
Pyrite	Tr	—	—
Foraminifers	20	15	15
Nannofossils	80	85	85

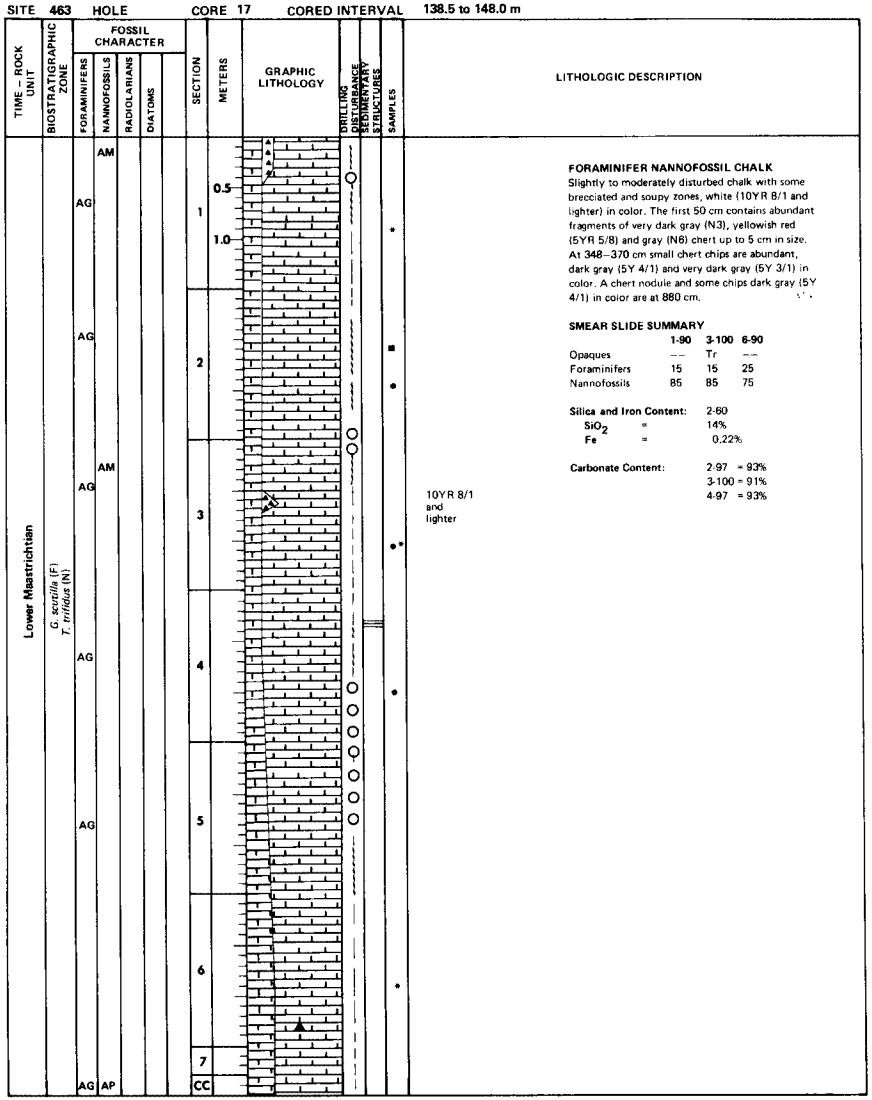
Silica and Iron Content: 2-58

SiO_2 = 3.0%

Fe = 0.15%

Carbonate Content: *2-62 = 96%
4-20 = 89%
*6-61 = 96%

SITE 463 HOLE CORE 17 CORED INTERVAL 138.5 to 148.0 m



FORAMINIFER NANNOFOSSIL CHALK

Slightly to moderately disturbed chalk with some brecciated and soupy zones, white (10YR 8/1 and lighter) in color. The first 50 cm contains abundant fragments of very dark gray (N3), yellowish red (5YR 5/8) and gray (N6) chert up to 5 cm in size. At 348–370 cm small chert chips are abundant, dark gray (5Y 4/1) and very dark gray (5Y 3/1) in color. A chert nodule and some chips dark gray (5Y 4/1) in color are at 880 cm.

SMEAR SLIDE SUMMARY

	1-90	3-100	6-90
Opaques	—	Tr	—
Foraminifers	15	15	25
Nannofossils	85	85	75

Silica and Iron Content: 2-60

SiO_2 = 14%

Fe = 0.22%

Carbonate Content: 2-97 = 93%
3-100 = 91%
4-97 = 93%

SITE 463 HOLE CORE 18 CORED INTERVAL 148.0 to 157.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Lower Maastrichtian	*G. scutilla* (F) *T. trifidus* (N)	AM	AP			1 CC	0.5 1.0				*	2.5Y 8/1

NANNOFOSSIL CHALK
Slightly disturbed chalk (0–10 cm) and drilling breccia below – chalk mixed with chert. Chert fragments are several mm in diameter and are white (2.5Y 8/1) gray (N5) and red (2.5YR 4/6).

SMEAR SLIDE SUMMARY

	1-5
Foraminifers	8
Nannofossils	92

SITE 463 HOLE CORE 19 CORED INTERVAL 157.5 to 167.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Lower Maastrichtian	*G. scutilla* (F) *T. trifidus* (N)	AG AG AG AG AG AG		AM		1 2 3 4 5 6 7 CC	0.5 1.0				*	N8

FORAMINIFER-NANNOFOSSIL OOZE AND CHALK
Moderately to slightly disturbed chalk with zones of highly disturbed to soupy breccia and ooze. Both white (N8) in color. Abundant chert nodules very dark gray (N3) in color, with some having light gray (N7) porcellanite rims at 8–13, 110–117, 133–143, 152, 210, 394, 696, 852 and 905 cm. Zones of chert chips are at 0–230, 327–402, 620–630, 670–678 and 790–794 cm.

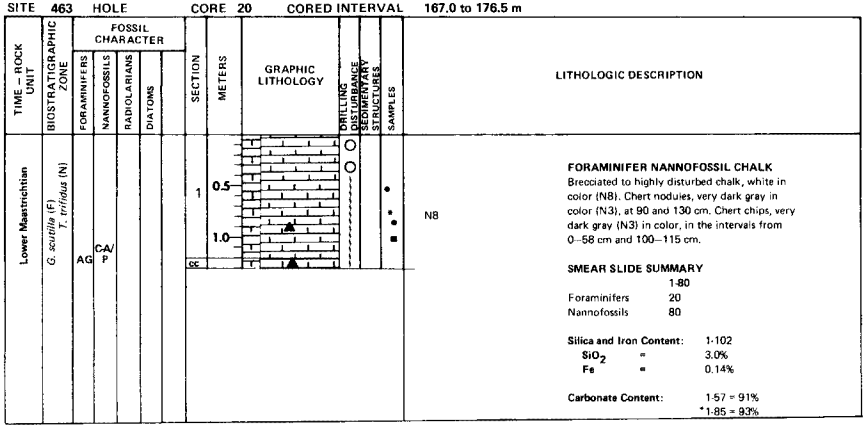
SMEAR SLIDE SUMMARY

	1-70	3-70	5-50
Calcite Rhombs	Tr	—	—
Foraminifers	25	20	20
Nannofossils	75	80	80

Silica and Iron Content: 2-60
SiO_2 = 3.0%
Fe = 0.14%

Carbonate Content: *2-50 = 96%
3-127 = 92%
*4-70 = 96%

SITE 463 HOLE CORE 20 CORED INTERVAL 167.0 to 176.5 m



FORAMINIFER NANNOFOSSIL CHALK
Brecciated to highly disturbed chalk, white in color (N8). Chert nodules, very dark gray in color (N3), at 90 and 130 cm. Chert chips, very dark gray (N3) in color, in the intervals from 0–58 cm and 100–115 cm.

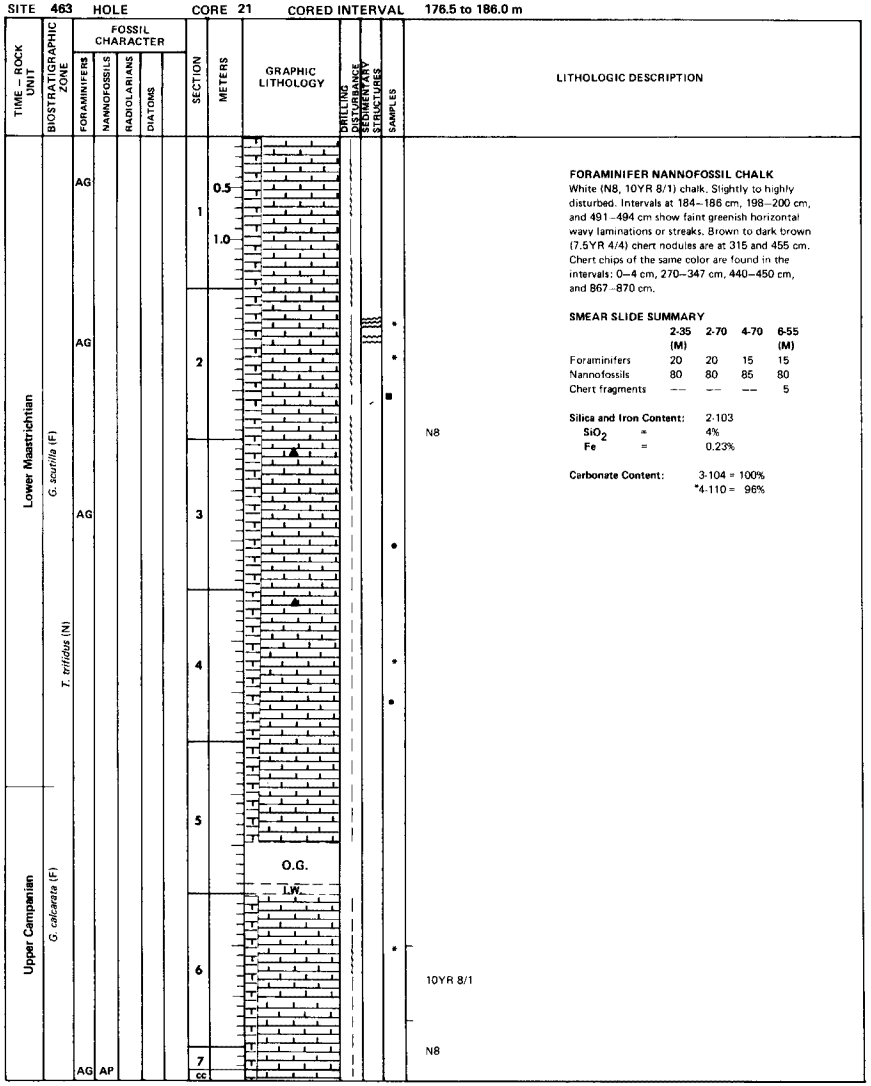
SMEAR SLIDE SUMMARY

	1-80
Foraminifers	20
Nannofossils	80

Silica and Iron Content: 1-102
SiO_2 = 3.0%
Fe = 0.14%

Carbonate Content: 1-57 = 91%
*1-85 = 93%

SITE 463 HOLE CORE 21 CORED INTERVAL 176.5 to 186.0 m



FORAMINIFER NANNOFOSSIL CHALK
White (N8, 10YR 8/1) chalk. Slightly to highly disturbed. Intervals at 184–186 cm, 198–200 cm, and 491–494 cm show faint greenish horizontal wavy laminations or streaks. Brown to dark brown (7.5YR 4/4) chert nodules are at 315 and 455 cm. Chert chips of the same color are found in the intervals: 0–4 cm, 270–347 cm, 440–450 cm, and 867–870 cm.

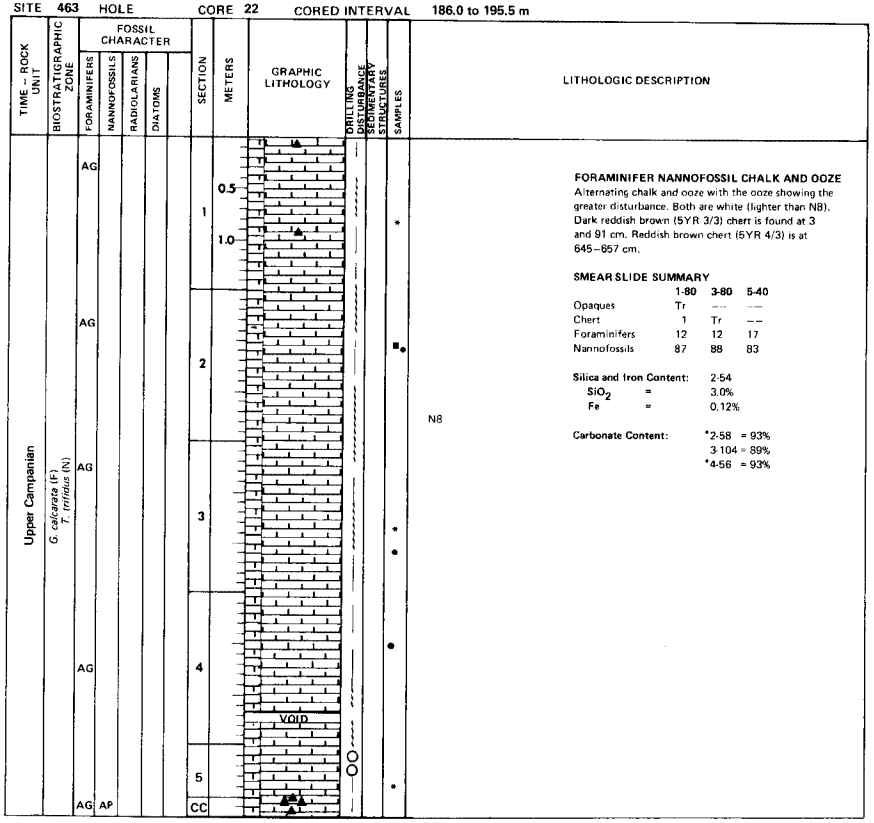
SMEAR SLIDE SUMMARY

	2-35 (M)	2-70	4-70	6-55 (M)
Foraminifers	20	20	15	15
Nannofossils	80	80	85	80
Chert fragments	—	—	—	5

Silica and Iron Content: 2-103
SiO_2 = 4%
Fe = 0.23%

Carbonate Content: 3-104 = 100%
*4-110 = 96%

SITE 463 HOLE CORE 22 CORED INTERVAL 186.0 to 195.5 m



FORAMINIFER NANNOFOSSIL CHALK AND OOZE
Alternating chalk and ooze with the ooze showing the greater disturbance. Both are white (lighter than N8). Dark reddish brown (5YR 3/3) chert is found at 3 and 91 cm. Reddish brown chert (5YR 4/3) is at 645–657 cm.

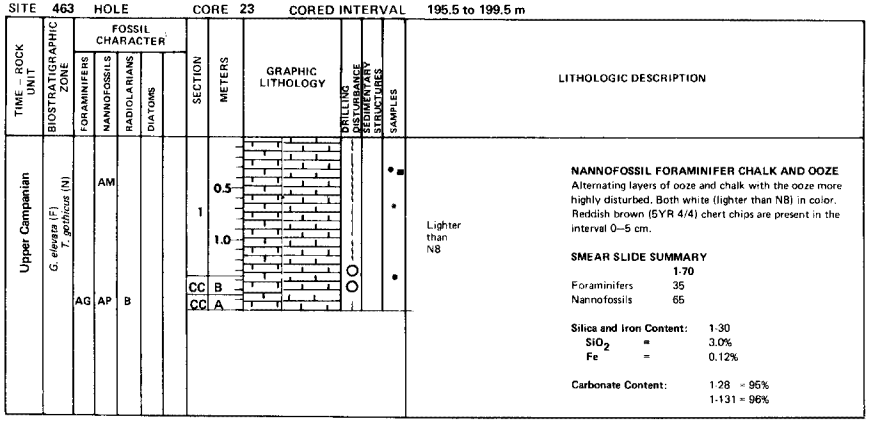
SMEAR SLIDE SUMMARY

	1-80	3-80	5-40
Opaques	Tr	—	—
Chert	1	Tr	—
Foraminifers	12	12	17
Nannofossils	87	88	83

Silica and Iron Content: 2-54
SiO_2 = 3.0%
Fe = 0.12%

Carbonate Content: *2-58 = 93%
3-104 = 89%
*4-56 = 93%

SITE 463 HOLE CORE 23 CORED INTERVAL 195.5 to 199.5 m



NANNOFOSSIL FORAMINIFER CHALK AND OOZE
Alternating layers of ooze and chalk with the ooze more highly disturbed. Both white (lighter than N8) in color. Reddish brown (5YR 4/4) chert chips are present in the interval 0–5 cm.

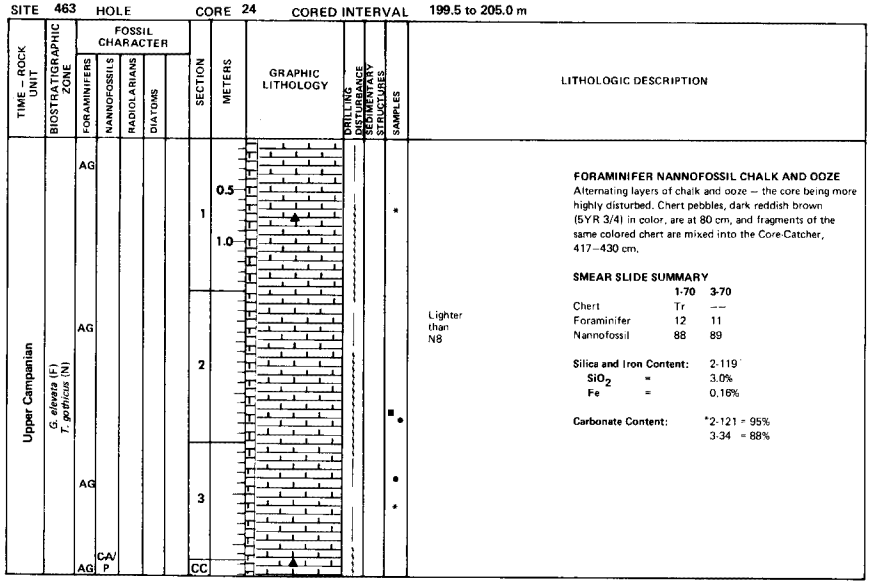
SMEAR SLIDE SUMMARY

	1-70
Foraminifers	35
Nannofossils	65

Silica and Iron Content: 1-30
SiO_2 = 3.0%
Fe = 0.12%

Carbonate Content: 1-28 = 95%
1-131 = 96%

SITE 463 HOLE CORE 24 CORED INTERVAL 199.5 to 205.0 m



FORAMINIFER NANNOFOSSIL CHALK AND OOZE
Alternating layers of chalk and ooze – the core being more highly disturbed. Chert pebbles, dark reddish brown (5YR 3/4) in color, are at 80 cm, and fragments of the same colored chert are mixed into the Core-Catcher, 417–430 cm.

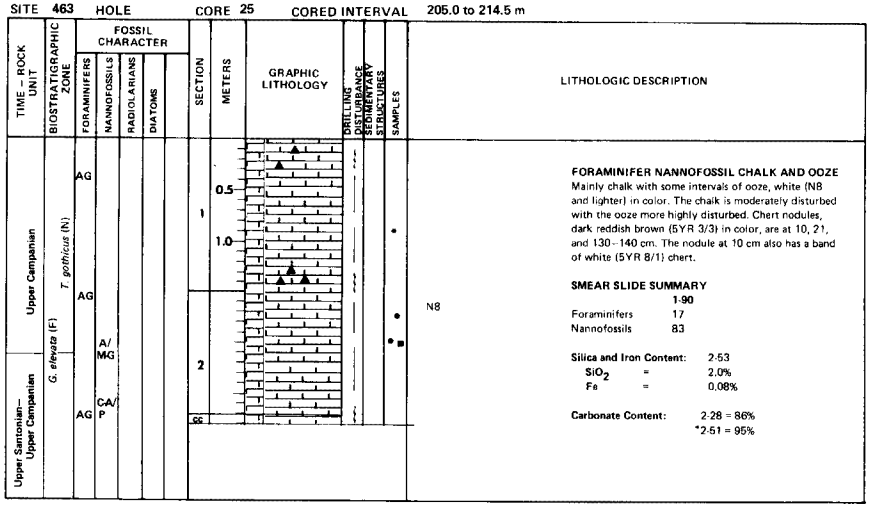
SMEAR SLIDE SUMMARY

	1-70	3-70
Chert	Tr	—
Foraminifer	12	11
Nannofossil	88	89

Silica and Iron Content: 2-119
SiO_2 = 3.0%
Fe = 0.16%

Carbonate Content: *2-121 = 95%
3-34 = 88%

SITE 463 HOLE CORE 25 CORED INTERVAL 205.0 to 214.5 m



FORAMINIFER NANNOFOSSIL CHALK AND OOZE
Mainly chalk with some intervals of ooze, white (N8 and lighter) in color. The chalk is moderately disturbed with the ooze more highly disturbed. Chert nodules, dark reddish brown (5YR 3/3) in color, are at 10, 21, and 130–140 cm. The nodule at 10 cm also has a band of white (5YR 8/1) chert.

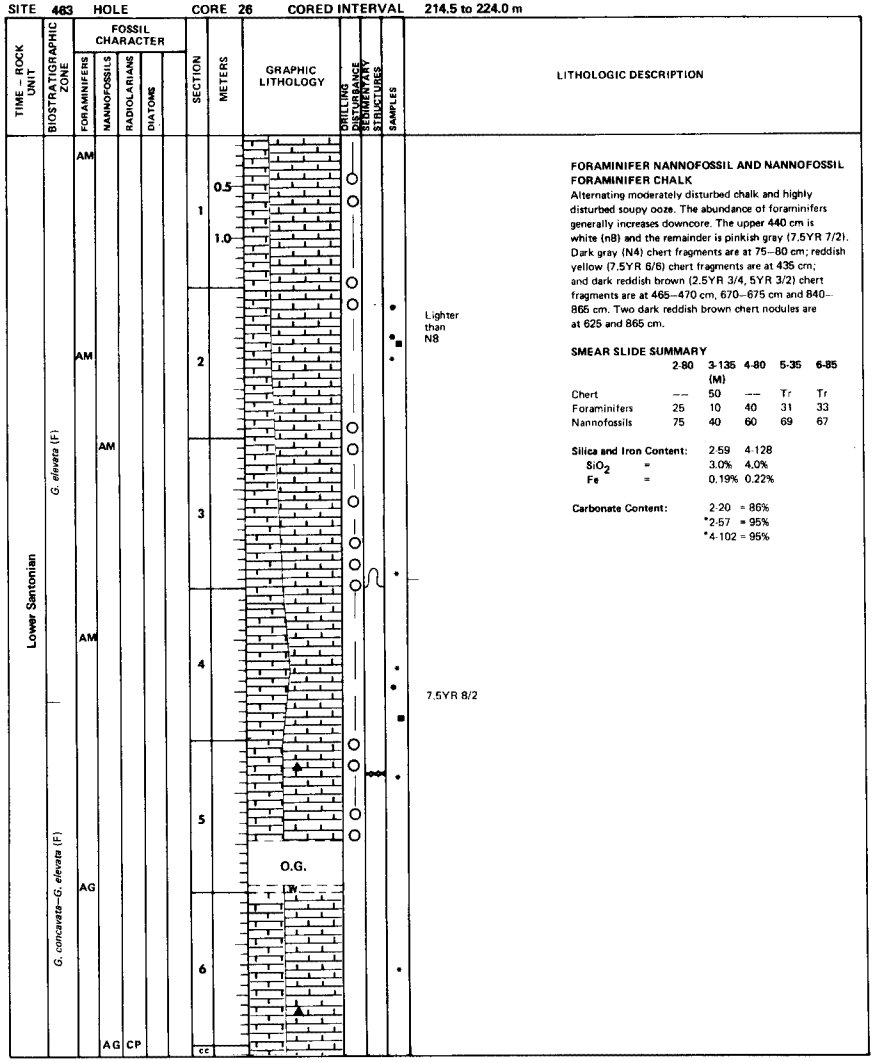
SMEAR SLIDE SUMMARY

	1-90
Foraminifers	17
Nannofossils	83

Silica and Iron Content: 2-53
SiO_2 = 2.0%
Fe = 0.08%

Carbonate Content: 2-28 = 86%
*2-51 = 95%

SITE 463 HOLE CORE 26 CORED INTERVAL 214.5 to 224.0 m



FORAMINIFER NANNOFOSSIL AND NANNOFOSSIL FORAMINIFER CHALK

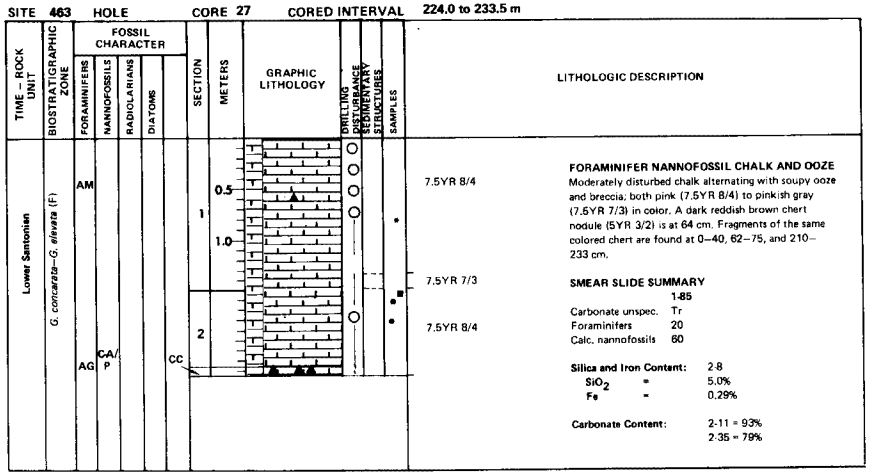
Alternating moderately disturbed chalk and highly disturbed soupy ooze. The abundance of foraminifers generally increases downcore. The upper 440 cm is white (N8) and the remainder is pinkish gray (7.5YR 7/2). Dark gray (N4) chert fragments are at 75–80 cm; reddish yellow (7.5YR 6/6) chert fragments are at 435 cm; and dark reddish brown (2.5YR 3/4, 5YR 3/2) chert fragments are at 465–470 cm, 670–675 cm and 840–865 cm. Two dark reddish brown chert nodules are at 625 and 865 cm.

SMEAR SLIDE SUMMARY

	2-80	3-135 (M)	4-80	5-35	6-85
Chert	––	50	––	Tr	Tr
Foraminifers	25	10	40	31	33
Nannofossils	75	40	60	69	67

Silica and Iron Content:	2-59	4-128	
SiO_2 =	3.0%	4.0%	
Fe =	0.19%	0.22%	
Carbonate Content:	2-20 = 86%		
	*2-57 = 95%		
	*4-102 = 95%		

SITE 463 HOLE CORE 27 CORED INTERVAL 224.0 to 233.5 m



FORAMINIFER NANNOFOSSIL CHALK AND OOZE

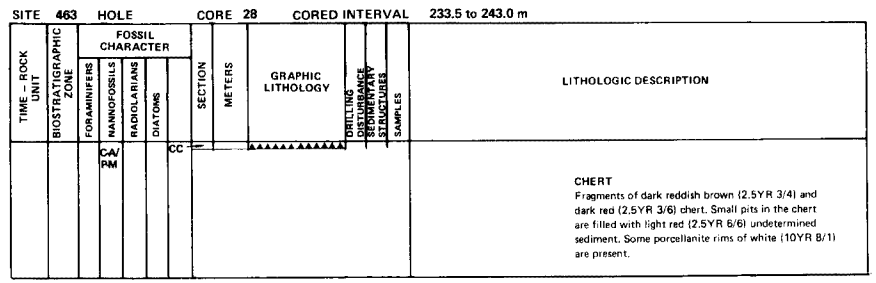
Moderately disturbed chalk alternating with soupy ooze and breccia; both pink (7.5YR 8/4) to pinkish gray (7.5YR 7/3) in color. A dark reddish brown chert nodule (5YR 3/2) is at 64 cm. Fragments of the same colored chert are found at 0–40, 62–75, and 210–233 cm.

SMEAR SLIDE SUMMARY

	1-85
Carbonate unspec.	Tr
Foraminifers	20
Calc. nannofossils	60

Silica and Iron Content:	2-8	
SiO_2 =	5.0%	
Fe =	0.29%	
Carbonate Content:	2-11 = 93%	
	2-35 = 79%	

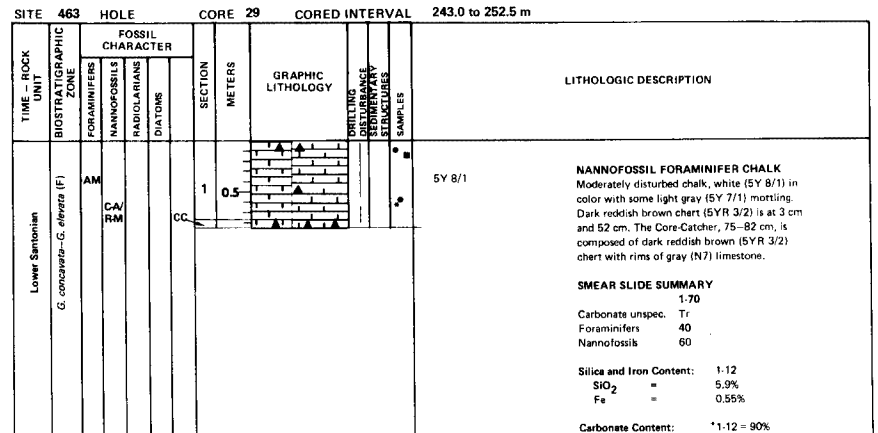
SITE 463 HOLE CORE 28 CORED INTERVAL 233.5 to 243.0 m



CHERT

Fragments of dark reddish brown (2.5YR 3/4) and dark red (2.5YR 3/6) chert. Small pits in the chert are filled with light red (2.5YR 6/6) undetermined sediment. Some porcellanite rims of white (10YR 8/1) are present.

SITE 463 HOLE CORE 29 CORED INTERVAL 243.0 to 252.5 m



NANNOFOSSIL FORAMINIFER CHALK

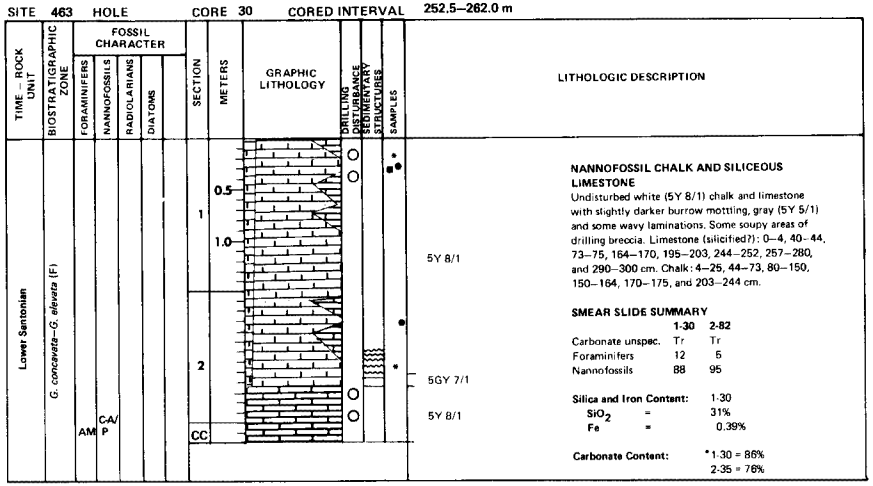
Moderately disturbed chalk, white (5Y 8/1) in color with some light gray (5Y 7/1) mottling. Dark reddish brown chert (5YR 3/2) is at 3 cm and 52 cm. The Core-Catcher, 75–82 cm, is composed of dark reddish brown (5YR 3/2) chert with rims of gray (N7) limestone.

SMEAR SLIDE SUMMARY

	1-70
Carbonate unspec.	Tr
Foraminifers	40
Nannofossils	60

Silica and Iron Content:	1-12	
SiO_2 =	5.9%	
Fe =	0.55%	
Carbonate Content:	*1-12 = 90%	
	1-58 = 81%	

SITE 463 HOLE CORE 30 CORED INTERVAL 252.5–262.0 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL CHALK AND SILICEOUS LIMESTONE

Undisturbed white (5Y 8/1) chalk and limestone with slightly darker burrow mottling, gray (5Y 5/1) and some wavy laminations. Some soupy areas of drilling breccia. Limestone (silicified?): 0–4, 40–44, 73–75, 164–170, 195–203, 244–252, 257–280, and 290–300 cm. Chalk: 4–25, 44–73, 80–150, 150–164, 170–175, and 203–244 cm.

SMEAR SLIDE SUMMARY

	1-30	2-82
Carbonate unspec.	Tr	Tr
Foraminifers	12	5
Nannofossils	88	95

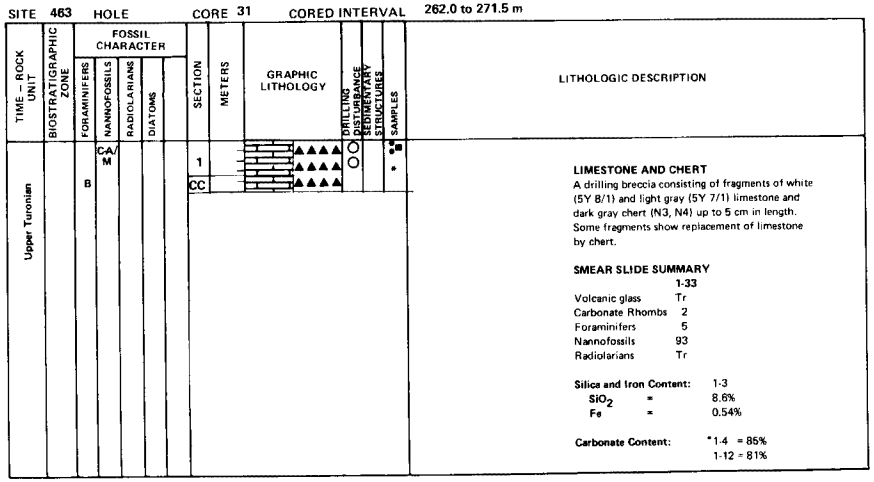
Silica and Iron Content: 1-30

SiO_2 = 31%

Fe = 0.39%

Carbonate Content: *1-30 = 86%; 2-35 = 78%

SITE 463 HOLE CORE 31 CORED INTERVAL 262.0 to 271.5 m



LITHOLOGIC DESCRIPTION

LIMESTONE AND CHERT

A drilling breccia consisting of fragments of white (5Y 8/1) and light gray (5Y 7/1) limestone and dark gray chert (N3, N4) up to 5 cm in length. Some fragments show replacement of limestone by chert.

SMEAR SLIDE SUMMARY

	1-33
Volcanic glass	Tr
Carbonate Rhombs	2
Foraminifers	5
Nannofossils	93
Radiolarians	Tr

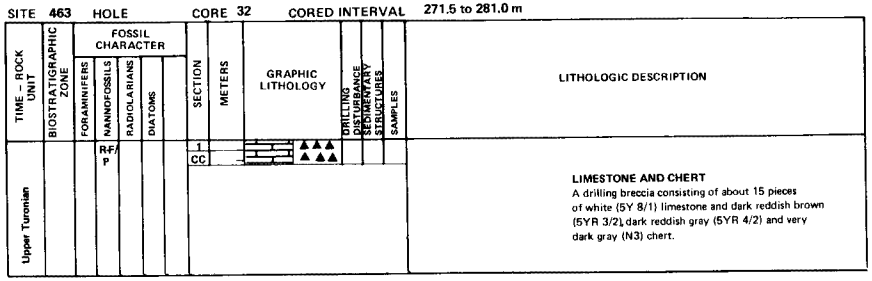
Silica and Iron Content: 1-3

SiO_2 = 8.6%

Fe = 0.54%

Carbonate Content: *1-4 = 85%; 1-12 = 81%

SITE 463 HOLE CORE 32 CORED INTERVAL 271.5 to 281.0 m

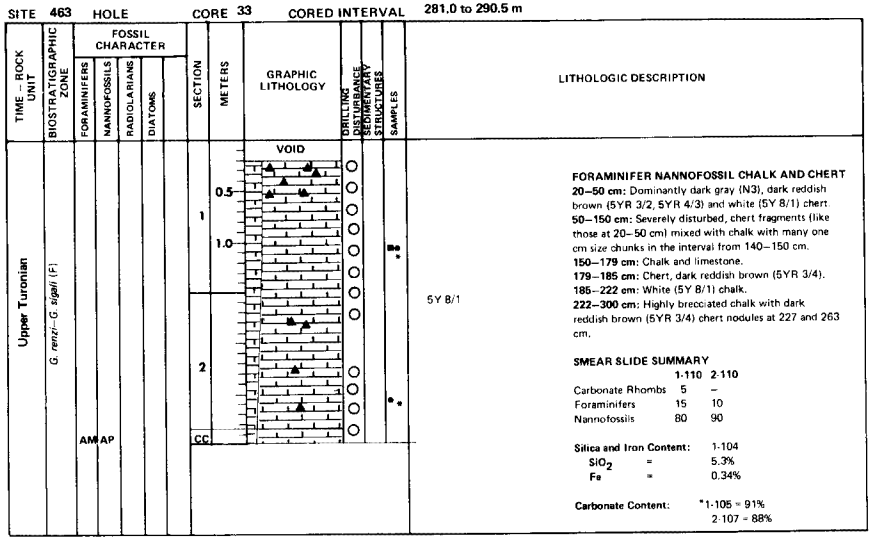


LITHOLOGIC DESCRIPTION

LIMESTONE AND CHERT

A drilling breccia consisting of about 15 pieces of white (5Y 8/1) limestone and dark reddish brown (5YR 3/2), dark reddish gray (5YR 4/2) and very dark gray (N3) chert.

SITE 463 HOLE CORE 33 CORED INTERVAL 281.0 to 290.5 m



LITHOLOGIC DESCRIPTION

FORAMINIFER NANNOFOSSIL CHALK AND CHERT

20–50 cm: Dominantly dark gray (N3), dark reddish brown (5YR 3/2, 5YR 4/3) and white (5Y 8/1) chert

50–150 cm: Severely disturbed, chert fragments (like those at 20–50 cm) mixed with chalk with many one cm size chunks in the interval from 140–150 cm.

150–179 cm: Chalk and limestone.

179–185 cm: Chert, dark reddish brown (5YR 3/4).

185–222 cm: White (5Y 8/1) chalk.

222–300 cm: Highly brecciated chalk with dark reddish brown (5YR 3/4) chert nodules at 227 and 263 cm.

SMEAR SLIDE SUMMARY

	1-110	2-110
Carbonate Rhombs	5	–
Foraminifers	15	10
Nannofossils	80	90

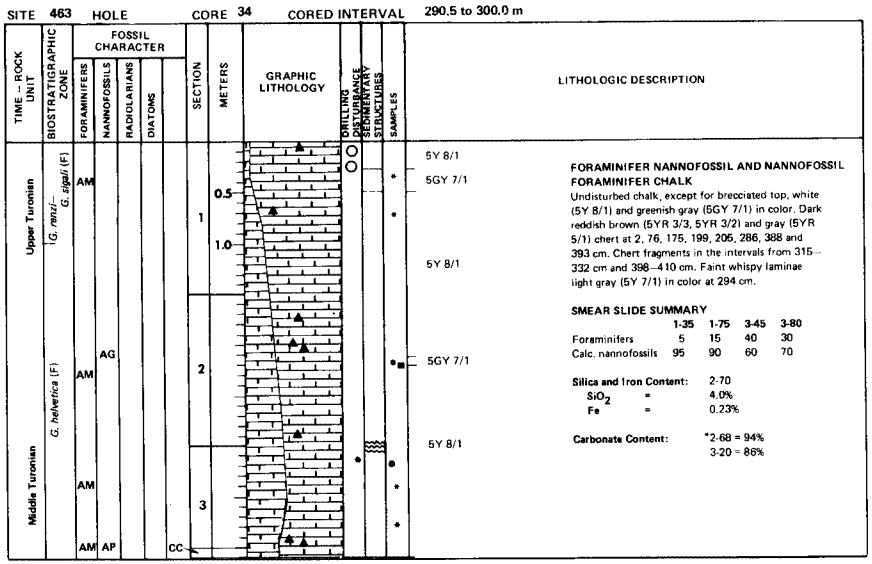
Silica and Iron Content: 1-104

SiO_2 = 5.3%

Fe = 0.34%

Carbonate Content: *1-105 = 91%; 2-107 = 88%

SITE 463 HOLE CORE 34 CORED INTERVAL 290.5 to 300.0 m



LITHOLOGIC DESCRIPTION

FORAMINIFER NANNOFOSSIL AND NANNOFOSSIL FORAMINIFER CHALK

Undisturbed chalk, except for brecciated top, white (5Y 8/1) and greenish gray (5GY 7/1) in color. Dark reddish brown (5YR 3/3, 5YR 3/2) and gray (5YR 5/1) chert at 2, 76, 175, 199, 205, 286, 388 and 393 cm. Chert fragments in the intervals from 315–332 cm and 398–410 cm. Faint whispy laminae light gray (5Y 7/1) in color at 294 cm.

SMEAR SLIDE SUMMARY

	1-35	1-75	3-45	3-80
Foraminifers	5	15	40	30
Calc. nannofossils	95	90	60	70

Silica and Iron Content: 2-70

SiO_2 = 4.0%

Fe = 0.23%

Carbonate Content: *2-68 = 94%; 3-20 = 86%

SITE 463 HOLE CORE 35 CORED INTERVAL 300.0 to 309.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Lower Turonian	*H. lahmani* (F)	A/AMG AMAP				1						5Y 8/1

NANNOFOSSIL CHALK
Brecciated to undisturbed chalk, white (5Y 8/1) in color. Chert fragments are found in the brecciated sections, 0-15 cm and 25-34 cm. The chert is dark reddish brown (5YR 3/4) and gray (5YR 6/1) in color.

SMEAR SLIDE SUMMARY

	1-20
Micronodules	Tr
Carbonate unsp.	15
Foraminifers	1
Calc. nannofossils	84

Silica and Iron Content: 1-14
SiO_2 = 5.1%
Fe = 0.27%

Carbonate Content: *1-15 = 92%

SITE 463 HOLE CORE 36 CORED INTERVAL 309.5 to 319.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Lower Turonian		AM				1						

SILICIFIED LIMESTONE AND CHERT
A drilling breccia containing four pebbles of white (10YR 8/1) silicified limestone. Two pebbles of chert: one gray (5YR 5/1) with light gray mottles (5YR 7/1), one dark reddish brown (5YR 3/3) with a limestone rim.

SMEAR SLIDE SUMMARY

	1-18
Pyrite	1
Carbonate unsp.	98
Foraminifers	1

Silica and Iron Content: 1-13
SiO_2 = 73%
Fe = 0.31%

Carbonate Content: *1-10 = 36%

SITE 463 HOLE CORE 37 CORED INTERVAL 319.0 to 328.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Lower Turonian	*H. lahmani* (F) *L. alatus* (N)	AP	AP			1						

NANNOFOSSIL CHALK
One fragment of white (5YR 8/1) chalk, 2 cm in diameter.

SITE 463 HOLE CORE 38 CORED INTERVAL 328.5 to 338.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Lower Turonian	*H. lahmani* (F) *L. alatus* (N)	AP	AP AG			1	0.5					5YR 8/1

FORAMINIFER NANNOFOSSIL CHALK
White chalk (5YR 8/1) with gray (N6) wavy laminations (0-15 and 60-78 cm) and greenish gray wavy laminations (5GY 8/1) from 15-30 cm. Breccia of chalk and gray (N6 and N3) chert from 43-60 cm. Chert nodule, mottled light gray (N6) and dark gray (N3) from 78-85 cm.

SMEAR SLIDE SUMMARY

	1-25
Carbonate unsp.	Tr
Foraminifers	20
Nannofossils	80

Silica and Iron Content: 1-62
SiO_2 = 7.1%
Fe = 0.34%

Carbonate Content: *1-62 = 88%

SITE 463 HOLE CORE 39 CORED INTERVAL 338.0 to 347.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Upper Cenomanian	*R. cushmani–R. gandolfi–R. greenhornensis* (F) *L. alatus* (N)	AM	CP			CC						

FORAMINIFER NANNOFOSSIL CHALK AND CHERT
Ten fragments of dark gray (N3, N4) chert and a few fragments of white (5YR 8/1) chalk.

SMEAR SLIDE SUMMARY

	CC
Pyrite	Tr
Foraminifers	30
Nannofossils	70

SITE 463 HOLE CORE 40 CORED INTERVAL 347.5 to 357.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Upper Cenomanian	*R. cushmani–R. gandolfi–R. greenhornensis* (F) *L. alatus* (N)	CM	CP			CC					*	**CHERT–FORAMINIFER NANNOFOSSIL CHALK** Pebbles of dark gray (N3) to gray (N5) chert with some mottles of lighter gray (N6). The chert pebbles have white (N8) porcellanite rims. One fragment of white (10YR 8/1) chalk. **SMEAR SLIDE SUMMARY** CC: Carbonate unsp. Tr; Foraminifers 25; Nannofossils 75

SITE 463 HOLE CORE 41 CORED INTERVAL 357.0 to 366.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Upper Cenomanian	*R. cushmani–R. gandolfi–R. greenhornensis* (F) *L. alatus* (N)	CP	AP			1						**CHERT** Four pieces of black (5Y 2/1) chert, one with some carbonate adhering to it.

SITE 463 HOLE CORE 42 CORED INTERVAL 366.5 to 376.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Upper Cenomanian	*R. cushmani–R. gandolfi–R. greenhornensis* (F) *L. alatus* (N)	CM	A/P-M			CC					*	**CHERT AND FORAMINIFER NANNOFOSSIL LIMESTONE** Black (5Y 2/1) chert fragments and white (N8) limestone fragments. **SMEAR SLIDE SUMMARY** CC: Calc. rhombs Tr; Foraminifers 15; Nannofossils 85

SITE 463 HOLE CORE 43 CORED INTERVAL 376.0 to 385.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Lower Cenomanian	*R. cushmani–R. gandolfi–R. greenhornensis* (F) / *G. gandolfi–R. greenhornensis* (F) *L. alatus* (N)	AM				1	0.5				■	**FORAMINIFER NANNOFOSSIL OOZE AND NANNOFOSSIL OOZE** White (N8 and lighter) soupy ooze with a few intervals of chalk, Dark gray (N4) to black (N2) chert nodules at 11 cm, 251 cm, 276 cm, and 675 cm. The interval from 150 cm to 395 cm contains chert fragments. **SMEAR SLIDE SUMMARY** 1-75 / 3-85 / 5-30: Volcanic glass Tr / — / Tr; Pyrite Tr / Tr / ?; Chert — / Tr / —; Micronodules — / — / ?; Foraminifers 11 / 15 / 7; Nannofossils 89 / 85 / 93. **Silica Content:** 1-39 = SiO_2 = 7.0%, Fe = 0.62%
							1.0					
		AM				2						N8
											*	
		AM				3		O.G. LW				
		AM				4		VOID				Lighter than N8
		CM	A/P-M			5					*	
						CC						

SITE 463 HOLE CORE 44 CORED INTERVAL 385.5 to 395.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Lower Cenomanian	*R. gandolfi–R. greenhornensis* (F) *L. alatus* (N)	CM	AP			1 CC	0.5				*	N2 to N5 N8 N2, N6, 5Y 3/1

CHERT AND NANNOFOSSIL CHALK
Drilling Breccia
0–89 cm: Drilling induced graded bed of chert chips, black (N2) to gray (N5). 10 mm at the bottom to 1 mm at the top.
80–86 cm: White (N8) disturbed chalk with chert chips.
86–115 cm: Very dark gray (5Y 3/1), gray (N6) and black (N2) chert. A few pieces of nannofossil chalk are present.

SMEAR SLIDE SUMMARY

	1-82
Chert	Tr
Pyrite	Tr
Foraminifers	8
Nannofossils	92

SITE 463 HOLE CORE 45 CORED INTERVAL 395.0 to 404.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Lower Cenomanian	*L. alatus* (N)	F-C/P				1						

CHERT
Five pebbles of chert, gray (N5) to dark gray (N4). White (N8) porcellanite on one fragment.

SITE 463 HOLE CORE 46 CORED INTERVAL 404.5 to 414.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Upper Albian	*P. buxtorfi–R. appenninica* (F) *L. alatus* (N)	CM	AP			1 CC	0.5					

CHERT
0–77 cm: Graded drilling breccia of chert, gray (N4, N5) and red (10R 3/6) in color, with some white (N8) porcellanite. 0.5–1 mm at the top and 2 cm at the bottom.
77–103 cm: Pebbles of light gray (N7) and dark gray (N4) chert.

SITE 463 HOLE CORE 47 CORED INTERVAL 414.0 to 423.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Upper Albian	*P. buxtorfi–R. appenninica* (F) *L. alatus* (N)	F-C/P				CC						

CHERT
Very dark gray (N4), gray (N5) and light gray (N7) in color. Irregularly mottled with some white (N8) porcellanite.

SITE 463 HOLE CORE 48 CORED INTERVAL 423.5 to 427.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Upper Albian	*P. buxtorfi–R. appenninica* (F) *L. alatus* (N)	CM CM AM	A/R-M			1 2 3 CC	0.5 1.0				•	Lighter than N8

NANNOFOSSIL CHALK
White (lighter than N8) chalk, highly disturbed by drilling. Chips of light gray (N6, N7) chert are present at: 0–5, 55–65, 130–177, 209–237, 308–320, and 376–383 cm.

SMEAR SLIDE SUMMARY

	1-80	3-60
Pyrite	Tr	—
Carbonate unspec.	3	Tr
Foraminifers	10	10
Nannofossils	87	90
Silica and Iron Content:	2-27	2-28
SiO_2 =	8.7%	9.8%
Fe =	0.29%	0.30%
Carbonate Content:	3-70 = 91%	

SITE 463 HOLE CORE 49 CORED INTERVAL 427.5 to 433.0 m

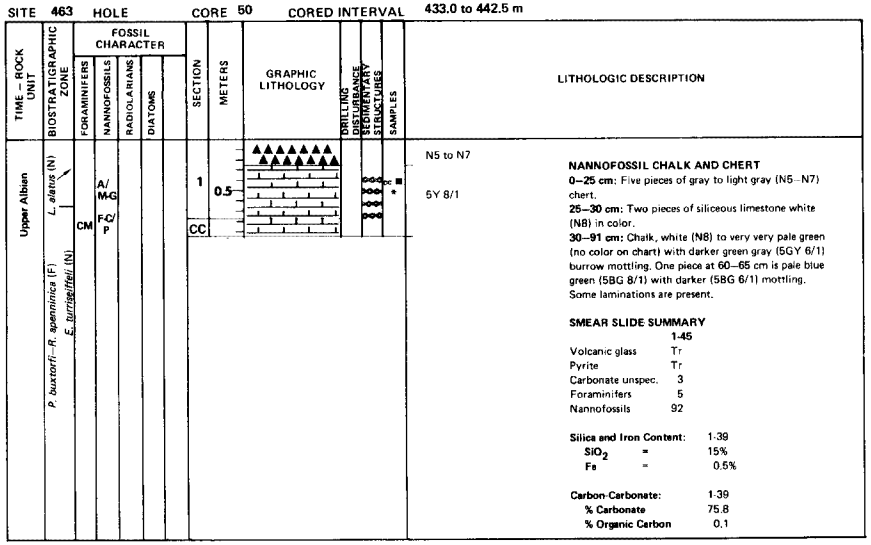
TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Upper Albian	*P. buxtorfi–R. appenninica* (F) *L. alatus* (N)	AM	AP			CC					*	

CHERT AND CHALK
Three pebbles of banded chert gray (N6), light gray (N7), and white (N8) in color. One white (N8) pebble of chalk.

SMEAR SLIDE SUMMARY

	CC
Micronodules	1
Chert	5
Foraminifers	15
Calc. nannofossils	79

SITE 463 HOLE CORE 50 CORED INTERVAL 433.0 to 442.5 m



NANNOFOSSIL CHALK AND CHERT

0–25 cm: Five pieces of gray to light gray (N5–N7) chert.
25–30 cm: Two pieces of siliceous limestone white (N8) in color.
30–91 cm: Chalk, white (N8) to very very pale green (no color on chart) with darker green gray (5GY 6/1) burrow mottling. One piece at 60–65 cm is pale blue green (5BG 8/1) with darker (5BG 6/1) mottling. Some laminations are present.

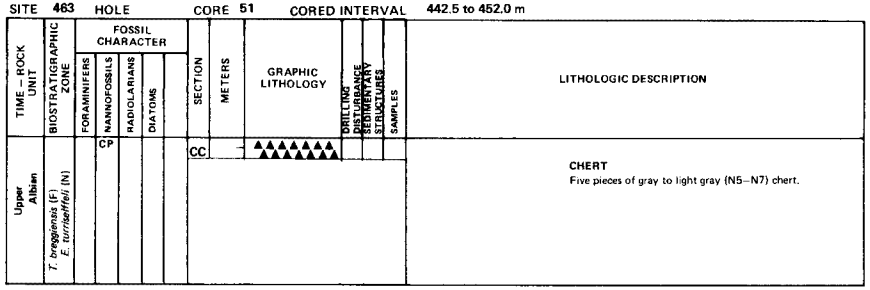
SMEAR SLIDE SUMMARY

	1-45
Volcanic glass	Tr
Pyrite	Tr
Carbonate unspec.	3
Foraminifers	5
Nannofossils	92

Silica and Iron Content:	1-39
SiO_2 =	15%
Fe =	0.5%

Carbon-Carbonate:	1-39
% Carbonate	75.8
% Organic Carbon	0.1

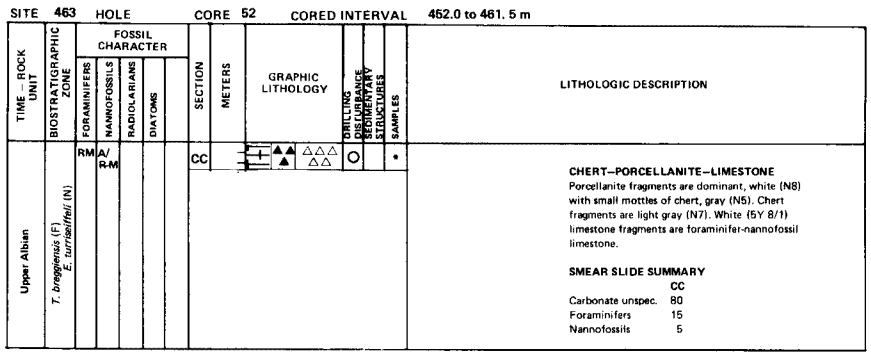
SITE 463 HOLE CORE 51 CORED INTERVAL 442.5 to 452.0 m



CHERT

Five pieces of gray to light gray (N5–N7) chert.

SITE 463 HOLE CORE 52 CORED INTERVAL 452.0 to 461. 5 m



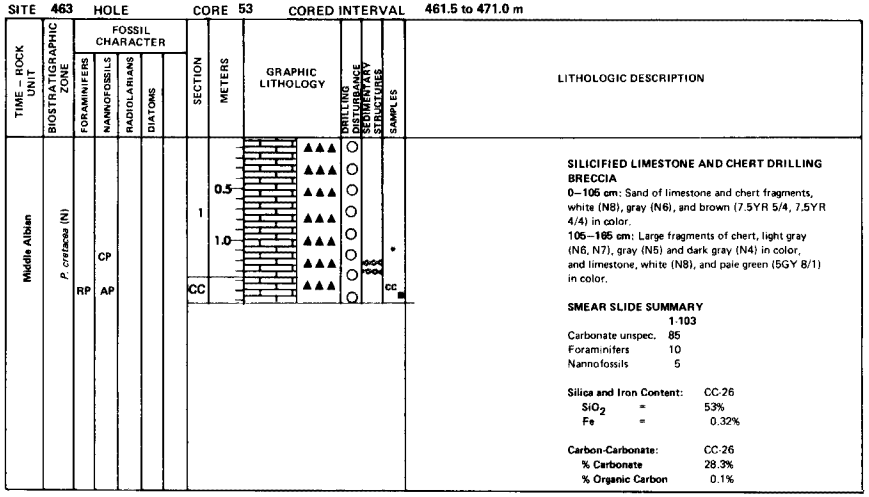
CHERT–PORCELLANITE–LIMESTONE

Porcellanite fragments are dominant, white (N8) with small mottles of chert, gray (N5). Chert fragments are light gray (N7). White (5Y 8/1) limestone fragments are foraminifer-nannofossil limestone.

SMEAR SLIDE SUMMARY

	CC
Carbonate unspec.	80
Foraminifers	15
Nannofossils	5

SITE 463 HOLE CORE 53 CORED INTERVAL 461.5 to 471.0 m



SILICIFIED LIMESTONE AND CHERT DRILLING BRECCIA

0–105 cm: Sand of limestone and chert fragments, white (N8), gray (N6), and brown (7.5YR 5/4, 7.5YR 4/4) in color.
105–165 cm: Large fragments of chert, light gray (N6, N7), gray (N5) and dark gray (N4) in color, and limestone, white (N8), and pale green (5GY 8/1) in color.

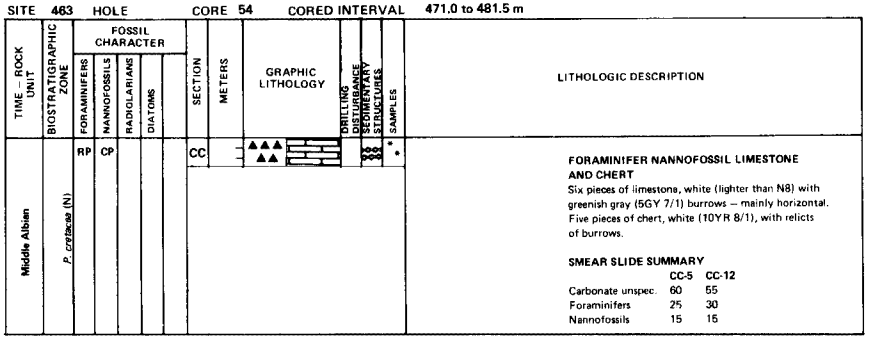
SMEAR SLIDE SUMMARY

	1-103
Carbonate unspec.	85
Foraminifers	10
Nannofossils	5

Silica and Iron Content:	CC-26
SiO_2 =	53%
Fe =	0.32%

Carbon-Carbonate:	CC-26
% Carbonate	28.3%
% Organic Carbon	0.1%

SITE 463 HOLE CORE 54 CORED INTERVAL 471.0 to 481.5 m



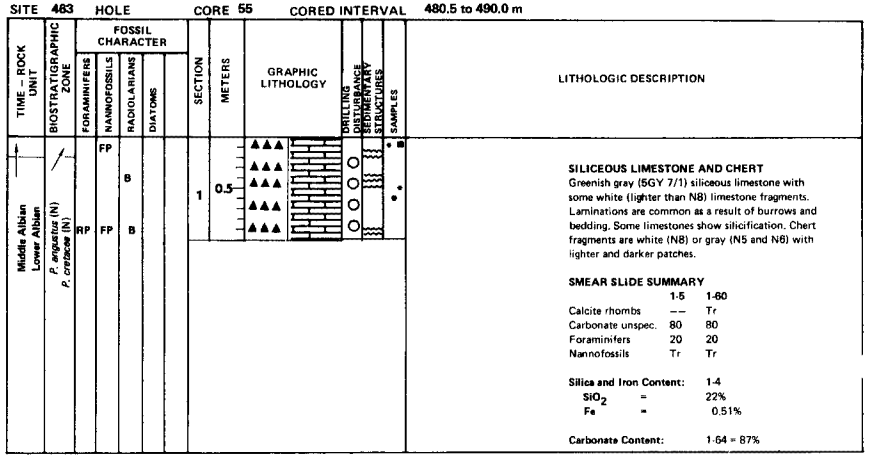
FORAMINIFER NANNOFOSSIL LIMESTONE AND CHERT

Six pieces of limestone, white (lighter than N8) with greenish gray (5GY 7/1) burrows – mainly horizontal. Five pieces of chert, white (10YR 8/1), with relicts of burrows.

SMEAR SLIDE SUMMARY

	CC-5	CC-12
Carbonate unspec.	60	55
Foraminifers	25	30
Nannofossils	15	15

SITE 463 HOLE CORE 55 CORED INTERVAL 480.5 to 490.0 m



LITHOLOGIC DESCRIPTION

SILICEOUS LIMESTONE AND CHERT

Greenish gray (5GY 7/1) siliceous limestone with some white (lighter than N8) limestone fragments. Laminations are common as a result of burrows and bedding. Some limestones show silicification. Chert fragments are white (N8) or gray (N5 and N8) with lighter and darker patches.

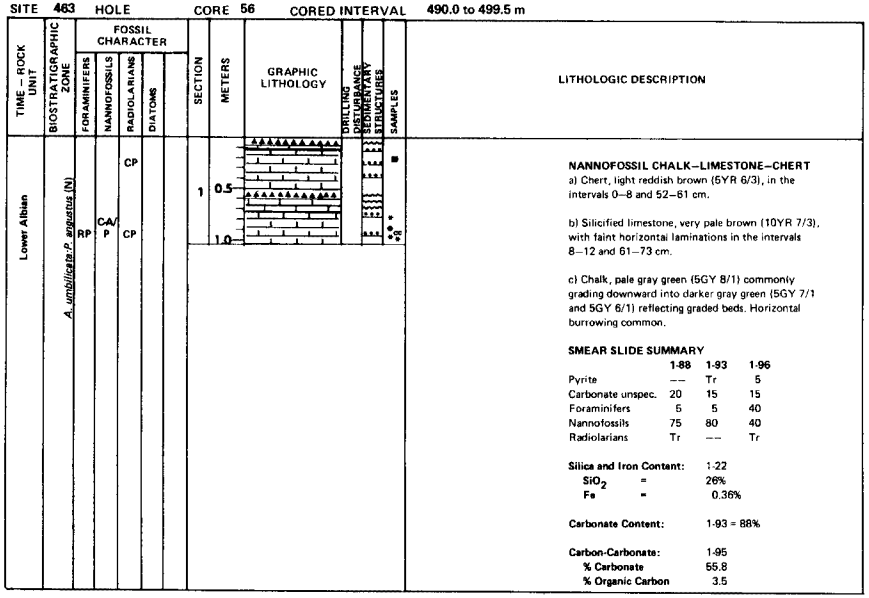
SMEAR SLIDE SUMMARY

	1-5	1-60
Calcite rhombs	––	Tr
Carbonate unspec.	80	80
Foraminifers	20	20
Nannofossils	Tr	Tr

Silica and Iron Content:	1-4
SiO_2 =	22%
Fe =	0.51%

Carbonate Content: 1-64 = 87%

SITE 463 HOLE CORE 56 CORED INTERVAL 490.0 to 499.5 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL CHALK–LIMESTONE–CHERT

a) Chert, light reddish brown (5YR 6/3), in the intervals 0–8 and 52–61 cm.

b) Silicified limestone, very pale brown (10YR 7/3), with faint horizontal laminations in the intervals 8–12 and 61–73 cm.

c) Chalk, pale gray green (5GY 8/1) commonly grading downward into darker gray green (5GY 7/1 and 5GY 6/1) reflecting graded beds. Horizontal burrowing common.

SMEAR SLIDE SUMMARY

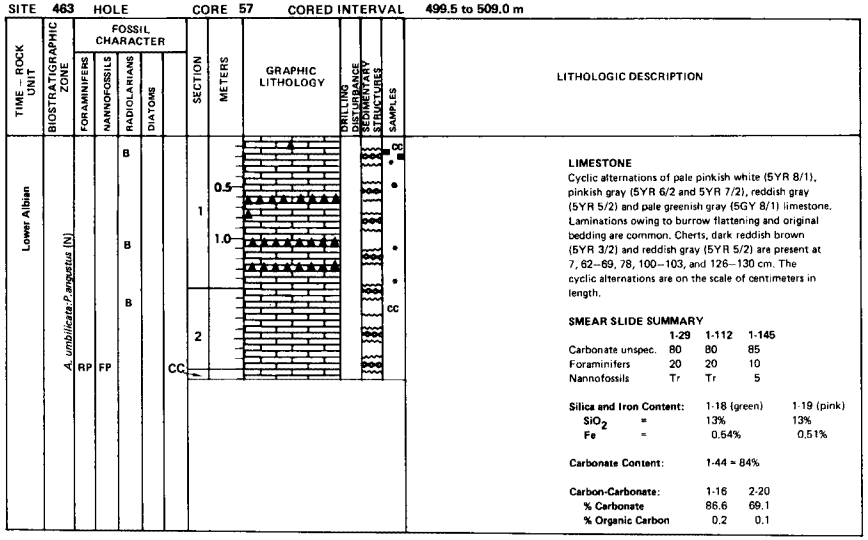
	1-88	1-93	1-96
Pyrite	––	Tr	5
Carbonate unspec.	20	15	15
Foraminifers	5	5	40
Nannofossils	75	80	40
Radiolarians	Tr	––	Tr

Silica and Iron Content:	1-22
SiO_2 =	26%
Fe =	0.36%

Carbonate Content: 1-93 = 88%

Carbon-Carbonate:	1-95
% Carbonate	55.8
% Organic Carbon	3.5

SITE 463 HOLE CORE 57 CORED INTERVAL 499.5 to 509.0 m



LITHOLOGIC DESCRIPTION

LIMESTONE

Cyclic alternations of pale pinkish white (5YR 8/1), pinkish gray (5YR 6/2 and 5YR 7/2), reddish gray (5YR 5/2) and pale greenish gray (5GY 8/1) limestone. Laminations owing to burrow flattening and original bedding are common. Cherts, dark reddish brown (5YR 3/2) and reddish gray (5YR 5/2) are present at 7, 62–69, 78, 100–103, and 126–130 cm. The cyclic alternations are on the scale of centimeters in length.

SMEAR SLIDE SUMMARY

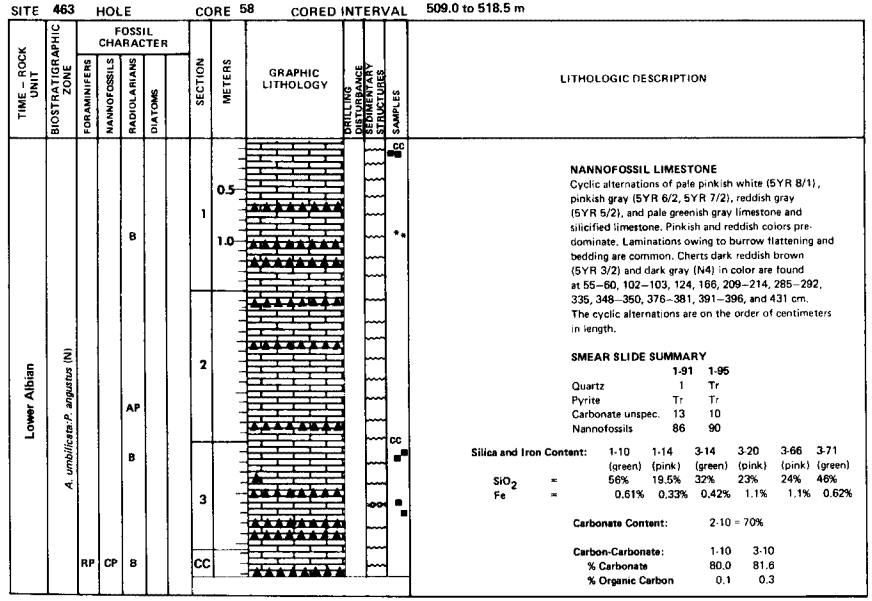
	1-29	1-112	1-145
Carbonate unspec.	80	80	85
Foraminifers	20	20	10
Nannofossils	Tr	Tr	5

Silica and Iron Content:	1-18 (green)	1-19 (pink)
SiO_2 =	13%	13%
Fe =	0.54%	0.51%

Carbonate Content: 1-44 = 84%

Carbon-Carbonate:	1-16	2-20
% Carbonate	86.6	69.1
% Organic Carbon	0.2	0.1

SITE 463 HOLE CORE 58 CORED INTERVAL 509.0 to 518.5 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL LIMESTONE

Cyclic alternations of pale pinkish white (5YR 8/1), pinkish gray (5YR 6/2, 5YR 7/2), reddish gray (5YR 5/2), and pale greenish gray limestone and silicified limestone. Pinkish and reddish colors predominate. Laminations owing to burrow flattening and bedding are common. Cherts dark reddish brown (5YR 3/2) and dark gray (N4) in color are found at 55–60, 102–103, 124, 166, 209–214, 285–292, 335, 348–350, 376–381, 391–396, and 431 cm. The cyclic alternations are on the order of centimeters in length.

SMEAR SLIDE SUMMARY

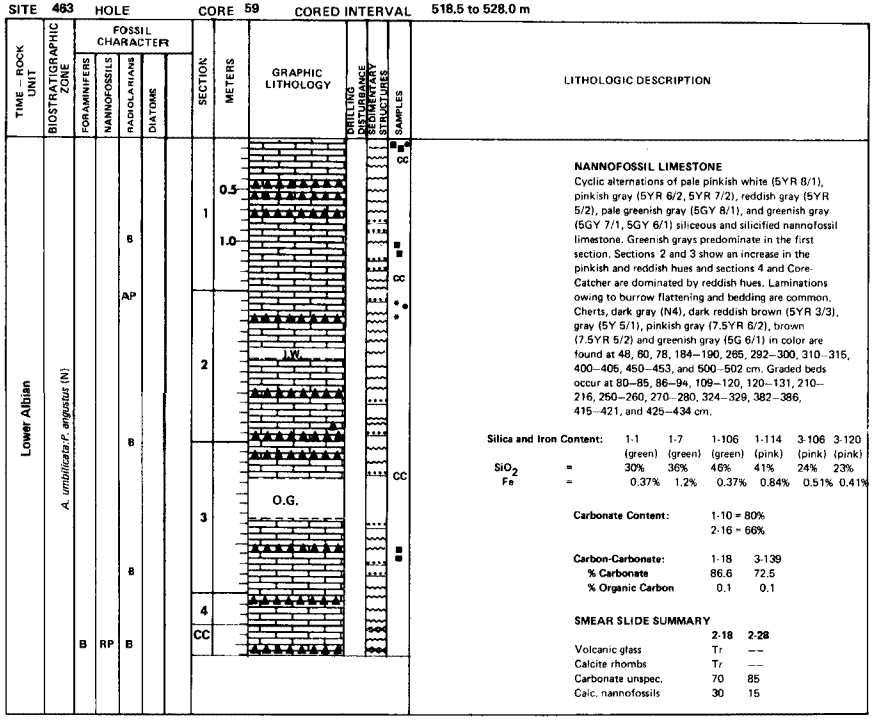
	1-91	1-95
Quartz	1	Tr
Pyrite	Tr	Tr
Carbonate unspec.	13	10
Nannofossils	86	90

Silica and Iron Content:	1-10 (green)	1-14 (pink)	3-14 (green)	3-20 (pink)	3-66 (pink)	3-71 (green)
SiO_2 =	56%	19.5%	32%	23%	24%	46%
Fe =	0.61%	0.33%	0.42%	1.1%	1.1%	0.62%

Carbonate Content: 2-10 = 70%

Carbon-Carbonate:	1-10	3-10
% Carbonate	80.0	81.6
% Organic Carbon	0.1	0.3

SITE 463 HOLE CORE 59 CORED INTERVAL 518.5 to 528.0 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL LIMESTONE

Cyclic alternations of pale pinkish white (5YR 8/1), pinkish gray (5YR 6/2, 5YR 7/2), reddish gray (5YR 5/2), pale greenish gray (5GY 8/1), and greenish gray (5GY 7/1, 5GY 6/1) siliceous and silicified nannofossil limestone. Greenish grays predominate in the first section. Sections 2 and 3 show an increase in the pinkish and reddish hues and sections 4 and Core-Catcher are dominated by reddish hues. Laminations owing to burrow flattening and bedding are common. Cherts, dark gray (N4), dark reddish brown (5YR 3/3), gray (5Y 5/1), pinkish gray (7.5YR 6/2), brown (7.5YR 5/2) and greenish gray (5G 6/1) in color are found at 48, 60, 78, 184–190, 265, 292–300, 310–316, 400–405, 450–453, and 500–502 cm. Graded beds occur at 80–85, 86–94, 109–120, 120–131, 210–216, 250–260, 270–280, 324–329, 382–386, 415–421, and 425–434 cm.

Silica and Iron Content:

	1-1 (green)	1-7 (green)	1-106 (green)	1-114 (pink)	3-106 (pink)	3-120 (pink)
SiO_2 =	30%	36%	46%	41%	24%	23%
Fe =	0.37%	1.2%	0.37%	0.84%	0.51%	0.41%

Carbonate Content: 1-10 = 80%; 2-16 = 66%

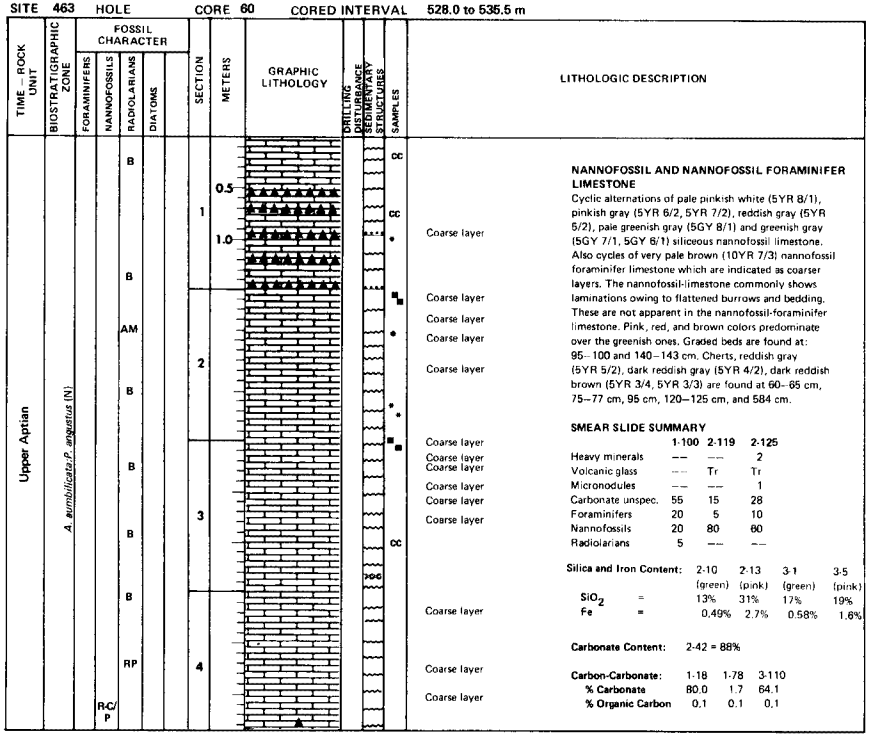
Carbon-Carbonate:

	1-18	3-139
% Carbonate	86.6	72.5
% Organic Carbon	0.1	0.1

SMEAR SLIDE SUMMARY

	2-18	2-28
Volcanic glass	Tr	—
Calcite rhombs	Tr	—
Carbonate unspec.	70	85
Calc. nannofossils	30	15

SITE 463 HOLE CORE 60 CORED INTERVAL 528.0 to 535.5 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL AND NANNOFOSSIL FORAMINIFER LIMESTONE

Cyclic alternations of pale pinkish white (5YR 8/1), pinkish gray (5YR 6/2, 5YR 7/2), reddish gray (5YR 5/2), pale greenish gray (5GY 8/1) and greenish gray (5GY 7/1, 5GY 6/1) siliceous nannofossil limestone. Also cycles of very pale brown (10YR 7/3) nannofossil foraminifer limestone which are indicated as coarser layers. The nannofossil-limestone commonly shows laminations owing to flattened burrows and bedding. These are not apparent in the nannofossil-foraminifer limestone. Pink, red, and brown colors predominate over the greenish ones. Graded beds are found at: 95–100 and 140–143 cm. Cherts, reddish gray (5YR 5/2), dark reddish gray (5YR 4/2), dark reddish brown (5YR 3/4, 5YR 3/3) are found at 60–65 cm, 75–77 cm, 95 cm, 120–125 cm, and 584 cm.

Coarse layer
Coarse layer
Coarse layer
Coarse layer
Coarse layer
Coarse layer
Coarse layer
Coarse layer
Coarse layer
Coarse layer
Coarse layer
Coarse layer

SMEAR SLIDE SUMMARY

	1-100	2-119	2-125
Heavy minerals	—	—	2
Volcanic glass	—	Tr	Tr
Micronodules	—	—	1
Carbonate unspec.	55	15	28
Foraminifers	20	5	10
Nannofossils	20	80	60
Radiolarians	5	—	—

Silica and Iron Content:

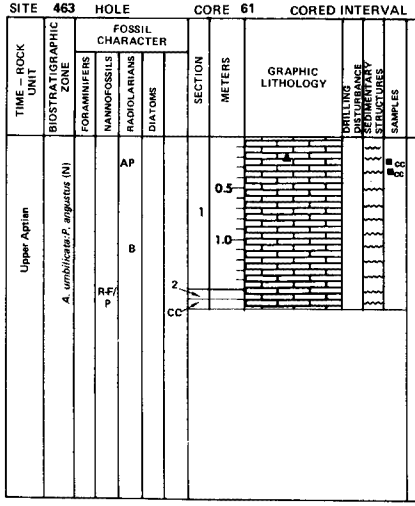
	2-10 (green)	2-13 (pink)	3-1 (green)	3-5 (pink)
SiO_2 =	13%	31%	17%	19%
Fe =	0.49%	2.7%	0.58%	1.6%

Carbonate Content: 2-42 = 88%

Carbon-Carbonate:

	1-18	1-78	3-110
% Carbonate	80.0	1.7	64.1
% Organic Carbon	0.1	0.1	0.1

SITE 463 HOLE CORE 61 CORED INTERVAL 535.5 to 537.5 m



LITHOLOGIC DESCRIPTION

Coarse layer
Coarse layer
Coarse layer
Coarse layer
Calcite rhombs

NANNOFOSSIL AND NANNOFOSSIL FORAMINIFER LIMESTONE

Cyclic alternations of pale pinkish white (5YR 8/1), pinkish gray (5YR 6/2, 5YR 7/2), reddish gray (5YR 5/2), pale greenish gray (5GY 8/1), and dark greenish gray (5GY 7/1, 5GY 6/1) nannofossil limestone. Also cycles of very pale brown (10YR 7/3) nannofossil foraminifer limestone which are indicated as "coarse" layers. The nannofossil limestone commonly shows laminations owing to flattened burrows and bedding. The nannofossil foraminifer limestone is uniform without structures. Pink, red, and brown colors predominant in this core. A dark reddish brown (5YR 3/3) chert is found at 17 cm. The cyclic alternations are on the scale of a few centimeters to 20 centimeters.

Silica and Iron Content:

	1-28 (pink)	1-29
SiO_2 =	29.5%	30%
Fe =	0.78%	0.79%

Carbon-Carbonate:

	1-20	1-28
% Carbonate	55.8	54.1
% Organic Carbon	0.1	0.0

SITE 463 HOLE CORE 62 CORED INTERVAL 537.5 to 547.0 m

TIME – ROCK UNIT: Upper Aptian

BIOSTRATIGRAPHIC ZONE: *A. umbilicata/P. angustus* (N)

FOSSIL CHARACTER: FORAMINIFERS; NANNOFOSSILS: RP; RADIOLARIANS: CM, AM, CP, AP, FP, B, B; DIATOMS

SECTION: 1, 2, 3, CC

METERS: 0.5, 1.0

GRAPHIC LITHOLOGY

DRILLING DISTURBANCE

SEDIMENTARY STRUCTURES

SAMPLES: CC, CC, CC, CC

LITHOLOGIC DESCRIPTION

Ash bed

LIMESTONE

Cyclic alternations of pinkish white (5YR 8/2), pinkish gray (5YR 7/2, 5YR 6/2), reddish gray (5YR 5/2, 5YR 4/2), pale greenish gray (5GY 8/1), greenish gray (5GY 7/1, 5GY 6/1, 5G 6/1, 5G 5/1), and dark greenish gray to greenish black (5G 4/1 to 5BG 4/1) siliceous limestone. Most contacts are very gradational and burrowed. Laminations are common as a result of flattened burrows and bedding. Cherts, gray (N5) and greenish black (5BG 4/1) are at 160–164 and 335–339 cm. A greenish black altered ash is at 216–222 cm. The first section is dominated by pinkish colors, the second by greenish colors, the last is slightly dominated by pinkish ones. Alternations are on the scale of centimeters to about 15 cm.

SMEAR SLIDE SUMMARY

	1-83	1-99	1-106	1-137	2-24	2-32	2-70 (M)	2-122	2-132 (M)
Quartz	—	—	Tr	—	—	—	Tr	—	Tr
Feldspar	—	—	Tr	—	—	—	Tr	—	Tr
Clay (aggregates)	—	—	—	—	—	—	—	—	10
Volcanic glass	—	—	—	—	Tr	Tr	95	Tr	30
Hematite	Tr	Tr	Tr	Tr	Tr	Tr	—	Tr	—
Carb. unspec.	60	50	85	60	70	70	Tr	60	Tr
Calcite rhombs	—	—	—	—	—	—	—	Tr	—
Foraminifers	40	40	10	40	30	30	—	40	—
Nannofossils	Tr	10	Tr	Tr	Tr	Tr	Tr	Tr	—

Silica and Iron Content:

	2-17 (green)	2-35 (pink)	3-78 (green)	3-84 (pink)
SiO_2 =	28%	31%	19%	22%
Fe =	0.49%	0.67%	0.43%	0.54%

Carbonate Content: 1-91 = 57%

Carbon-Carbonate:	2-14	2-71	2-90	2-116	3-64
% Carbonate	60.8	12.5	30.8	53.3	75.8
% Organic Carbon	0.0	0.1	0.1	1.3	0.1

SITE 463 HOLE CORE 63 CORED INTERVAL 547.0 to 556.5 m

TIME – ROCK UNIT: Upper Aptian

BIOSTRATIGRAPHIC ZONE: *G. algeriana*? (F) / *A. umbilicata*/*P. angustus* (N)

FOSSIL CHARACTER: FORAMINIFERS; NANNOFOSSILS: RP; RADIOLARIANS: C/P-M; DIATOMS: AP

SECTION: 1, 2, 3, CC

METERS: 0.5, 1.0

GRAPHIC LITHOLOGY

DRILLING DISTURBANCE

SEDIMENTARY STRUCTURES

SAMPLES: CC, CC, CC, CC

LITHOLOGIC DESCRIPTION

Coarse layer

LIMESTONE

Cyclic alternations of pale pinkish white (5YR 8/1), pinkish gray (5YR 8/2, 5YR 7/2), reddish gray (5YR 5/2), pale greenish gray (5GY 8/1), and greenish gray (5GY 7/1, 5GY 6/1) siliceous limestone. Most contacts are gradational. Laminations and burrows are common. One coarser layer (sandy) enriched in foraminifers is at 357–361 cm. White (N8) and and dark gray chert is at 72–75 cm and 80–83 cm. Alternations are on the scale of centimeters to 20 cm. Pinkish colors predominate in this core.

SMEAR SLIDE SUMMARY

	2-5	2-30	2-45
Hematite	Tr	—	—
Brown carbon aggregates	40	—	—
Carbonate unspec.	60	80	—
Foraminifers	—	20	40
Nannofossils	—	—	60
Radiolarians	—	—	Tr

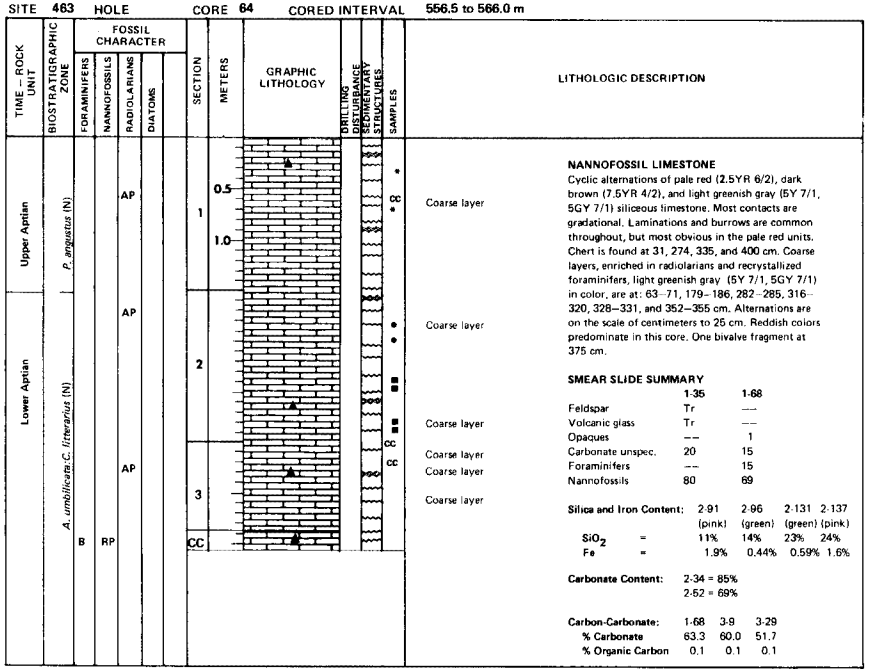
Silica and Iron Content:

	2-2 (pink)	2-5 (green)	CC-10 (pink)	CC-16 (green)
SiO_2 =	29%	9.1%	30%	11%
Fe =	1.9%	0.34%	1.3%	0.41%

Carbonate Content: 1-47 = 79%; 1-52 = 62%

Carbon-Carbonate:	1-128	2-2	2-128	CC-10
% Carbonate	83.3	55.8	75.8	50.8
% Organic Carbon	0.1	0.1	0.0	0.1

SITE 463 HOLE CORE 64 CORED INTERVAL 556.5 to 566.0 m



NANNOFOSSIL LIMESTONE

Cyclic alternations of pale red (2.5YR 6/2), dark brown (7.5YR 4/2), and light greenish gray (5Y 7/1, 5GY 7/1) siliceous limestone. Most contacts are gradational. Laminations and burrows are common throughout, but most obvious in the pale red units. Chert is found at 31, 274, 335, and 400 cm. Coarse layers, enriched in radiolarians and recrystallized foraminifers, light greenish gray (5Y 7/1, 5GY 7/1) in color, are at: 63–71, 179–186, 282–285, 316–320, 328–331, and 352–355 cm. Alternations are on the scale of centimeters to 25 cm. Reddish colors predominate in this core. One bivalve fragment at 375 cm.

SMEAR SLIDE SUMMARY

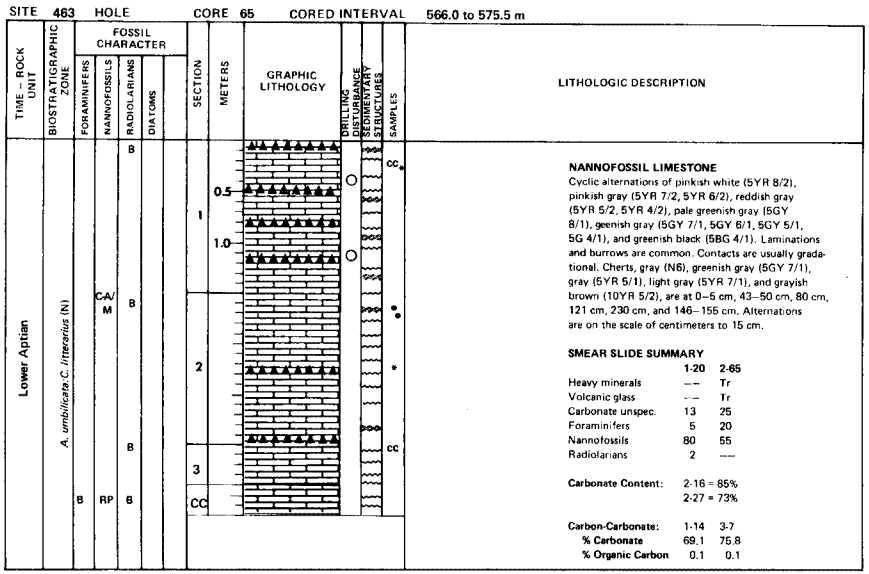
	1-35	1-68
Feldspar	Tr	—
Volcanic glass	Tr	—
Opaques	—	1
Carbonate unspec.	20	15
Foraminifers	—	15
Nannofossils	80	69

Silica and Iron Content:	2-91 (pink)	2-96 (green)	2-131 (green)	2-137 (pink)
SiO_2 =	11%	14%	23%	24%
Fe =	1.9%	0.44%	0.59%	1.6%

Carbonate Content: 2-34 = 85%; 2-52 = 69%

Carbon-Carbonate:	1-68	3-9	3-29
% Carbonate	63.3	60.0	51.7
% Organic Carbon	0.1	0.1	0.1

SITE 463 HOLE CORE 65 CORED INTERVAL 566.0 to 575.5 m



NANNOFOSSIL LIMESTONE

Cyclic alternations of pinkish white (5YR 8/2), pinkish gray (5YR 7/2, 5YR 6/2), reddish gray (5YR 5/2, 5YR 4/2), pale greenish gray (5GY 8/1), greenish gray (5GY 7/1, 5GY 6/1, 5GY 5/1, 5G 4/1), and greenish black (5BG 4/1). Laminations and burrows are common. Contacts are usually gradational. Cherts, gray (N6), greenish gray (5GY 7/1), gray (5YR 5/1), light gray (5YR 7/1), and grayish brown (10YR 5/2), are at 0–5 cm, 43–50 cm, 80 cm, 121 cm, 230 cm, and 146–155 cm. Alternations are on the scale of centimeters to 15 cm.

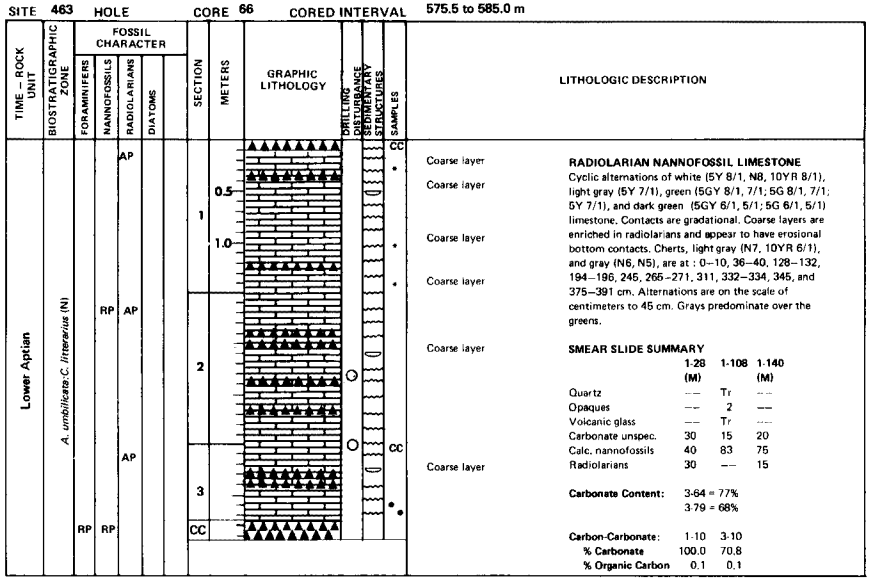
SMEAR SLIDE SUMMARY

	1-20	2-65
Heavy minerals	—	Tr
Volcanic glass	—	Tr
Carbonate unspec.	13	25
Foraminifers	5	20
Nannofossils	80	55
Radiolarians	2	—

Carbonate Content: 2-16 = 85%; 2-27 = 73%

Carbon-Carbonate:	1-14	3-7
% Carbonate	69.1	75.8
% Organic Carbon	0.1	0.1

SITE 463 HOLE CORE 66 CORED INTERVAL 575.5 to 585.0 m



RADIOLARIAN NANNOFOSSIL LIMESTONE

Cyclic alternations of white (5Y 8/1, N8, 10YR 8/1), light gray (5Y 7/1), green (5GY 8/1, 7/1; 5G 8/1, 7/1; 5Y 7/1), and dark green (5GY 6/1, 5/1; 5G 6/1, 5/1) limestone. Contacts are gradational. Coarse layers are enriched in radiolarians and appear to have erosional bottom contacts. Cherts, light gray (N7, 10YR 6/1), and gray (N6, N5), are at : 0–10, 36–40, 128–132, 194–196, 245, 265–271, 311, 332–334, 345, and 375–391 cm. Alternations are on the scale of centimeters to 45 cm. Grays predominate over the greens.

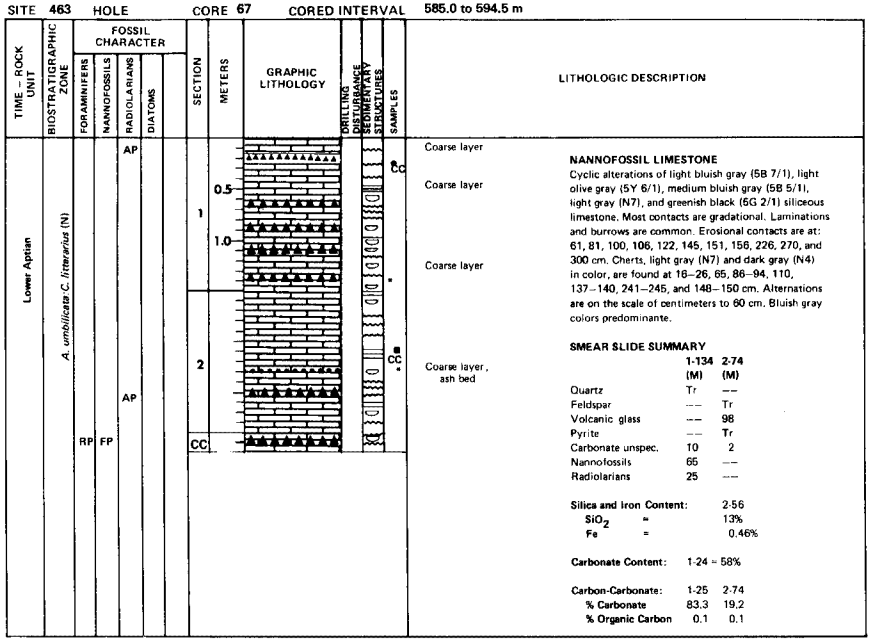
SMEAR SLIDE SUMMARY

	1-28 (M)	1-108	1-140 (M)
Quartz	—	Tr	—
Opaques	—	2	—
Volcanic glass	—	Tr	—
Carbonate unspec.	30	15	20
Calc. nannofossils	40	83	75
Radiolarians	30	—	15

Carbonate Content: 3-64 = 77%; 3-79 = 68%

Carbon-Carbonate:	1-10	3-10
% Carbonate	100.0	70.8
% Organic Carbon	0.1	0.1

SITE 463 HOLE CORE 67 CORED INTERVAL 585.0 to 594.5 m



NANNOFOSSIL LIMESTONE

Cyclic alterations of light bluish gray (5B 7/1), light olive gray (5Y 6/1), medium bluish gray (5B 5/1), light gray (N7), and greenish black (5G 2/1) siliceous limestone. Most contacts are gradational. Laminations and burrows are common. Erosional contacts are at: 61, 81, 100, 108, 122, 145, 151, 158, 226, 270, and 300 cm. Cherts, light gray (N7) and dark gray (N4) in color, are found at 18–26, 65, 86–94, 110, 137–140, 241–245, and 148–150 cm. Alternations are on the scale of centimeters to 60 cm. Bluish gray colors predominante.

SMEAR SLIDE SUMMARY

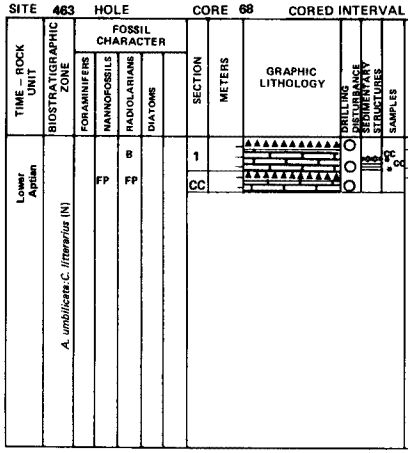
	1-134 (M)	2-74 (M)
Quartz	Tr	—
Feldspar	—	Tr
Volcanic glass	—	98
Pyrite	—	Tr
Carbonate unspec.	10	2
Nannofossils	65	—
Radiolarians	25	—

Silica and Iron Content:	2-56
SiO_2 =	13%
Fe =	0.46%

Carbonate Content: 1-24 = 58%

Carbon-Carbonate:	1-25	2-74
% Carbonate	83.3	19.2
% Organic Carbon	0.1	0.1

SITE 463 HOLE CORE 68 CORED INTERVAL 594.5 to 604.0 m



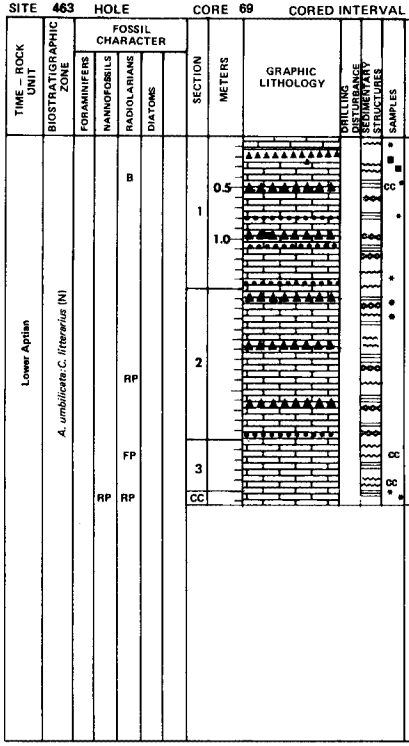
LIMESTONE AND CHERT DRILLING BRECCIA

0–11 and 32–42 cm: Chert fragments, brownish gray (5YR 4/1) gray (N6) and white (N8) in color.
11–32 and 42–57 cm: Limestone fragments greenish gray (5G 8/1, 5G 6/1), greenish black (5G 2/1), light gray (N7) and white (n8) in color.

SMEAR SLIDE SUMMARY

	1-22 (M)	1-22
Quartz	Tr	Tr
Feldspar	—	Tr
Clay	—	30
Volcanic glass	100	70
Pyrite	Tr	Tr
Calc. nannofossils	Tr	Tr
Carbon-Carbonate:	1-16	1-22
% Carbonate	86.6	18.3
% Organic Carbon	0.1	0.1

SITE 463 HOLE CORE 69 CORED INTERVAL 604.0 to 613.5 m



NANNOFOSSIL LIMESTONE

Cyclic alternations of bluish white (5B 9/1), medium bluish gray (5B 5/1), light bluish gray (5B 7/1), greenish gray (5G 6/1), light gray (N7), and dark greenish gray (5G 4/1, 5G 2/1) siliceous limestone. Ash beds, greenish black (5GY 2/1), and greenish gray (5G 6/1) in color, are at: **80, 110, 146–150,** and **295–300 cm.** Burrow and bedding laminations are common. Most contacts are gradational. Cherts, brownish gray (5YR 4/1), light olive gray (5Y 6/1), dark reddish brown (5YR 3/2), dark gray (5YR 4/1), very dark gray (10YR 3/1), and light gray (N7) in color, are found at: 13–27, 66–59, 102, 152–161, 209–211, and 265 cm. Alternations are on the scale of centimeters to 25 cm.

SMEAR SLIDE SUMMARY

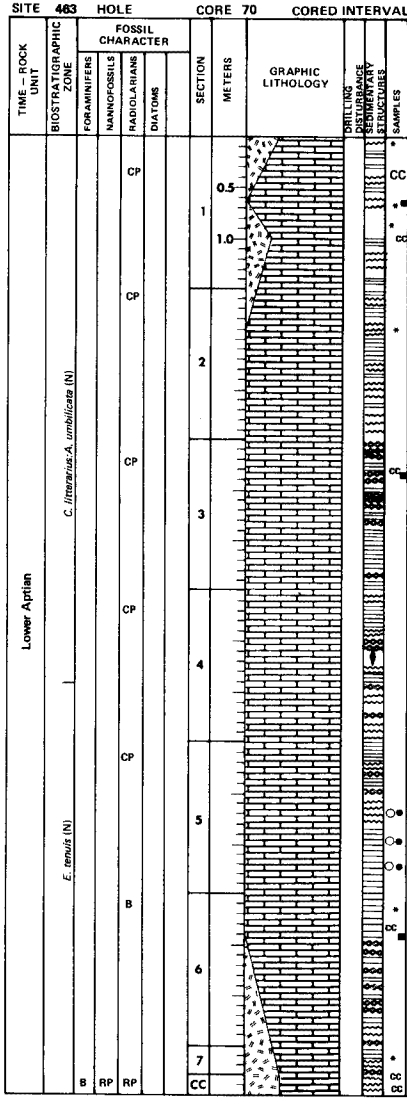
	1-10	1-42 (M)	1-76 (M)	1-140	CC-3 (M)	CC-8
Quartz	Tr	—	Tr	Tr	1	—
Feldspar	Tr	—	—	Tr	1	1
Clay	—	—	100	—	98	5
Opaques	—	Tr	—	—	—	Tr
Volcanic glass	Tr	—	—	7	Tr	—
Pyrite	—	—	—	—	Tr	Tr
Carbonate unspec.	60	50	—	43	—	53
Nannofossils	40	50	Tr	50	Tr	40
Radiolarians	—	—	—	—	—	1

	1-30	1-40
Silica and Iron Content:		
SiO_2 =	10%	21%
Fe =	0.93%	2.9%

Carbonate Content: 2-18 = 85%
2-30 = 42%

Carbon-Carbonate:	1-46	3-16	3-41
% Carbonate	75.8	30.0	25.8
% Organic Carbon	1.5	0.8	1.6

SITE 463 HOLE CORE 70 CORED INTERVAL 613.5 to 623.0 m



SILICIFIED LIMESTONE–ASHY LIMESTONE–CARBONACEOUS LIMESTONE

Cyclic alternations of bluish white (5B 9/1), medium light gray (N6), light bluish gray (5B 7/1), medium bluish gray (5B 5/1), greenish gray (5G 6/1), olive black (5Y 2/1), greenish black (5G 2/1) limestone. Contacts are both sharp and gradational. Darker layers show fine parallel laminations without burrowing and are enriched in organic carbon. Burrows are abundant in the lighter colored sections. Some dark beds are enriched in volcanic ash. Many horizons are enriched in calcite rhombs 2–3 mm in size. Alternations are on the scale of centimeters to 60 cm.

SMEAR SLIDE SUMMARY

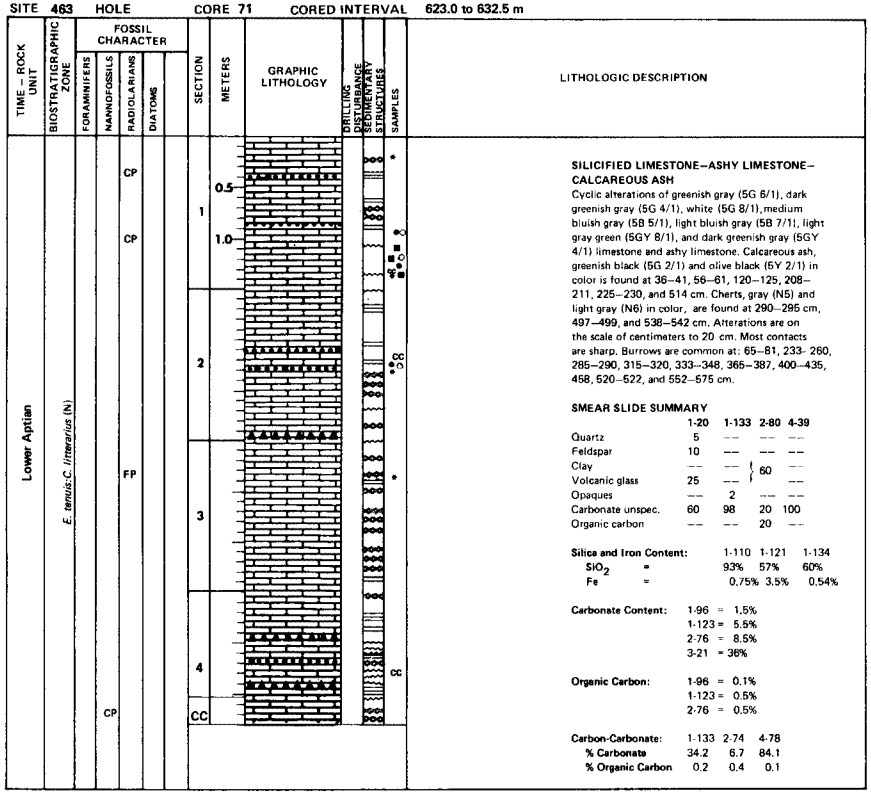
	1-4	1-67	1-95	2-40	6-30	7-17
Quartz	—	—	Tr	15	—	5
Feldspar	—	—	Tr	—	—	10
Volcanic glass	15	—	15	—	—	30
Pyrite	Tr	Tr	Tr	—	10	—
Organic carbon	—	—	—	—	20	—
Carbonate unspec.	85	100	85	85	70	55
Calcite rhombs	—	Tr	—	—	—	—
Nannofossils	Tr	Tr	Tr	—	—	—

	1-69	3-35	6-41
Silica and Iron Content:			
SiO_2 =	61%	87%	86%
Fe =	0.66%	1.7%	1.7%

Carbonate Content:	5-65	= 37%	
	5-99	= 23%	
	5-119	= 22%	
Organic Carbon:	5-65	= 0.2%	
	5-99	= 2.6%	
	5-119	= 4.3%	

Carbon-Carbonate:	1-32	1-100	3-33	6-31	CC-0	CC-10
% Carbonate	26.7	15.0	1.7	37.5	29.2	19.2
% Organic Carbon	0.0	0.3	0.6	0.1	0.1	0.7

SITE 463 HOLE CORE 71 CORED INTERVAL 623.0 to 632.5 m



SILICIFIED LIMESTONE—ASHY LIMESTONE—CALCAREOUS ASH

Cyclic alterations of greenish gray (5G 6/1), dark greenish gray (5G 4/1), white (5G 8/1), medium bluish gray (5B 5/1), light bluish gray (5B 7/1), light gray green (5GY 8/1), and dark greenish gray (5GY 4/1) limestone and ashy limestone. Calcareous ash, greenish black (5G 2/1) and olive black (5Y 2/1) in color is found at 36–41, 56–61, 120–125, 208–211, 225–230, and 514 cm. Cherts, gray (N5) and light gray (N6) in color, are found at 290–295 cm, 497–499, and 538–542 cm. Alterations are on the scale of centimeters to 20 cm. Most contacts are sharp. Burrows are common at: 65–81, 233–260, 285–290, 315–320, 333–348, 365–387, 400–435, 458, 520–522, and 552–575 cm.

SMEAR SLIDE SUMMARY

	1-20	1-133	2-80	4-39
Quartz	5	—	—	—
Feldspar	10	—	—	—
Clay	—	—	60	—
Volcanic glass	25	—		—
Opaques	—	2	—	—
Carbonate unspec.	60	98	20	100
Organic carbon	—	—	20	—

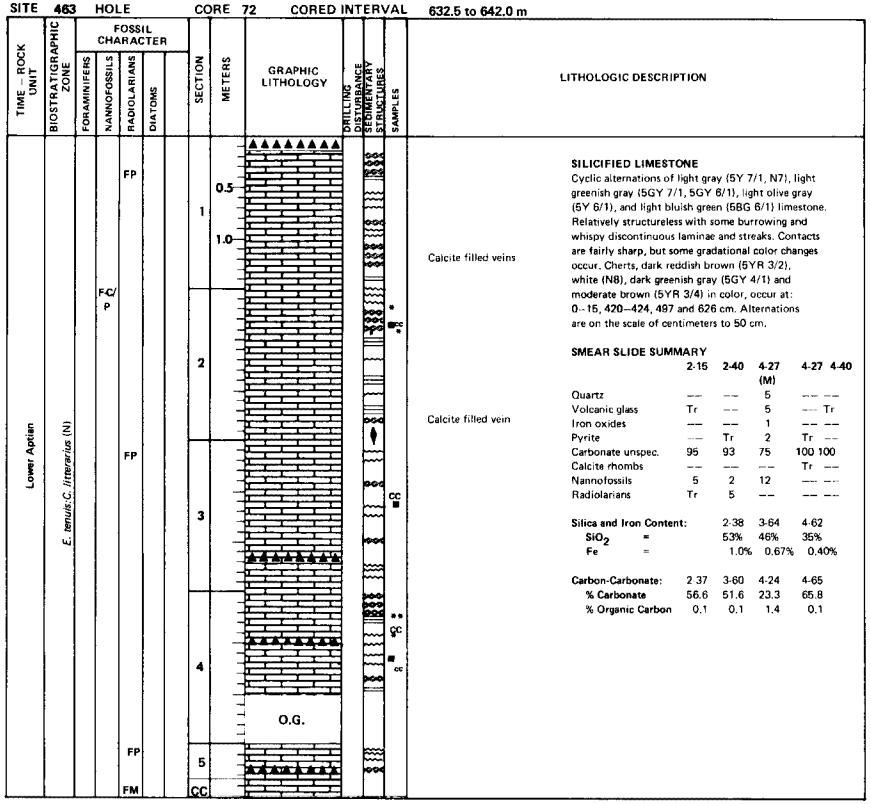
		1-110	1-121	1-134
Silica and Iron Content:				
SiO_2	=	93%	57%	60%
Fe	=	0.75%	3.5%	0.54%

Carbonate Content: 1-96 = 1.5%; 1-123 = 5.5%; 2-76 = 8.5%; 3-21 = 36%

Organic Carbon: 1-96 = 0.1%; 1-123 = 0.5%; 2-76 = 0.5%

Carbon-Carbonate:	1-133	2-74	4-78
% Carbonate	34.2	6.7	84.1
% Organic Carbon	0.2	0.4	0.1

SITE 463 HOLE CORE 72 CORED INTERVAL 632.5 to 642.0 m



Calcite filled veins

Calcite filled vein

SILICIFIED LIMESTONE

Cyclic alternations of light gray (5Y 7/1, N7), light greenish gray (5GY 7/1, 5GY 8/1), light olive gray (5Y 6/1), and light bluish green (5BG 6/1) limestone. Relatively structureless with some burrowing and whispy discontinuous laminae and streaks. Contacts are fairly sharp, but some gradational color changes occur. Cherts, dark reddish brown (5YR 3/2), white (N8), dark greenish gray (5GY 4/1) and moderate brown (5YR 3/4) in color, occur at: 0–15, 420–424, 497 and 626 cm. Alternations are on the scale of centimeters to 50 cm.

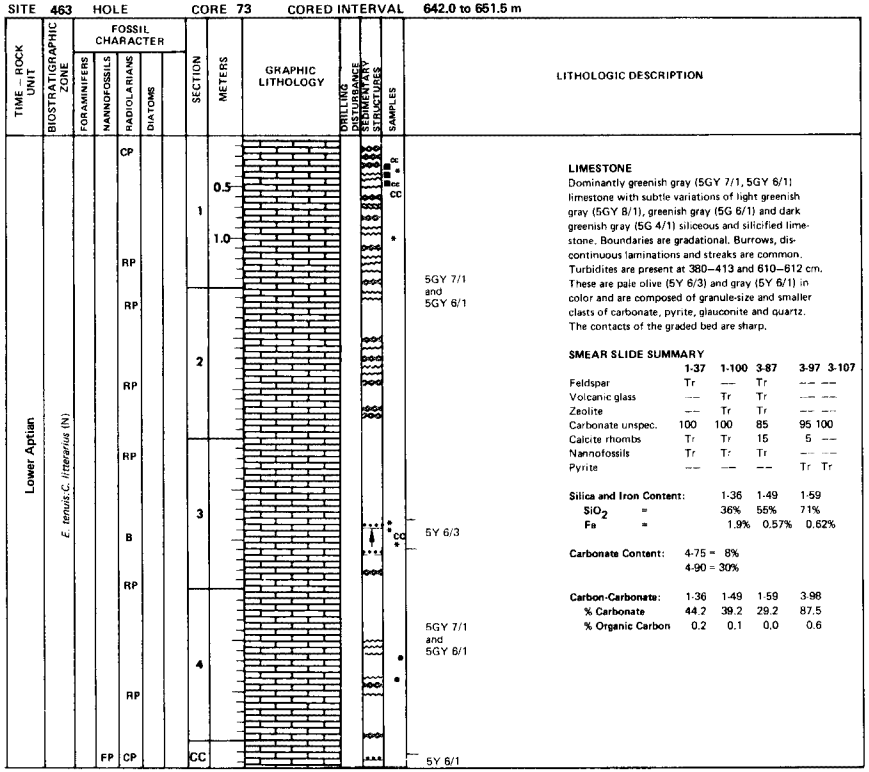
SMEAR SLIDE SUMMARY

	2-15	2-40	4-27 (M)	4-27	4-40
Quartz	—	—	5	—	—
Volcanic glass	Tr	—	5	—	Tr
Iron oxides	—	—	1	—	—
Pyrite	—	Tr	2	Tr	—
Carbonate unspec.	95	93	75	100	100
Calcite rhombs	—	—	—	Tr	—
Nannofossils	5	2	12	—	—
Radiolarians	Tr	5	—	—	—

		2-38	3-64	4-62
Silica and Iron Content:				
SiO_2	=	53%	46%	35%
Fe	=	1.0%	0.67%	0.40%

Carbon-Carbonate:	2-37	3-60	4-24	4-65
% Carbonate	56.6	51.6	23.3	65.8
% Organic Carbon	0.1	0.1	1.4	0.1

SITE 463 HOLE CORE 73 CORED INTERVAL 642.0 to 651.5 m



LIMESTONE
Dominantly greenish gray (5GY 7/1, 5GY 6/1) limestone with subtle variations of light greenish gray (5GY 8/1), greenish gray (5G 6/1) and dark greenish gray (5G 4/1) siliceous and silicified limestone. Boundaries are gradational. Burrows, discontinuous laminations and streaks are common. Turbidites are present at 380–413 and 610–612 cm. These are pale olive (5Y 6/3) and gray (5Y 6/1) in color and are composed of granule-size and smaller clasts of carbonate, pyrite, glauconite and quartz. The contacts of the graded bed are sharp.

SMEAR SLIDE SUMMARY

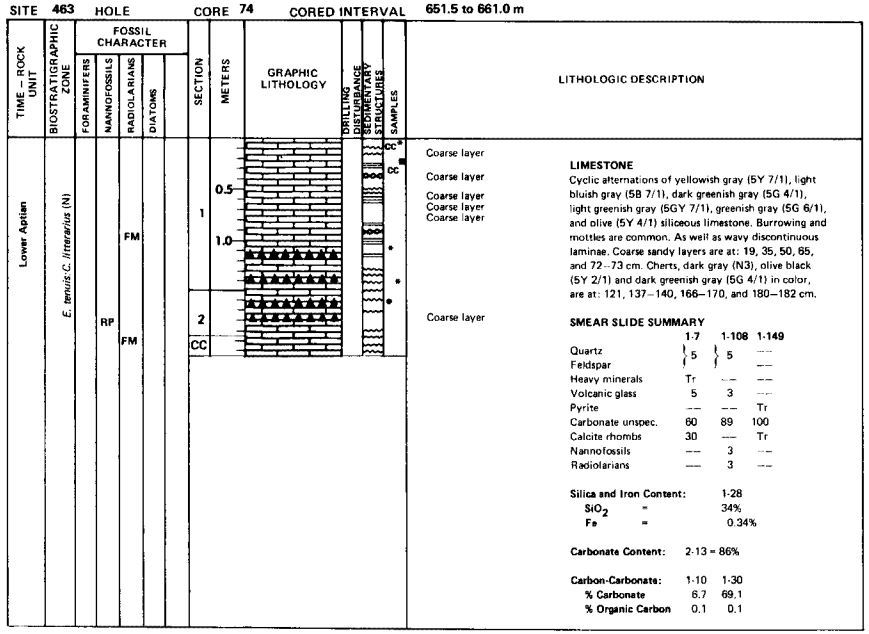
	1-37	1-100	3-87	3-97	3-107
Feldspar	Tr	—	Tr	—	—
Volcanic glass	—	Tr	Tr	—	—
Zeolite	—	Tr	Tr	—	—
Carbonate unspec.	100	100	85	95	100
Calcite rhombs	Tr	Tr	15	5	—
Nannofossils	Tr	Tr	Tr	—	—
Pyrite	—	—	—	Tr	Tr

Silica and Iron Content:	1-36	1-49	1-59	
SiO_2 =	36%	55%	71%	
Fe =	1.9%	0.57%	0.62%	

Carbonate Content: 4-75 = 8%; 4-90 = 30%

Carbon-Carbonate:	1-36	1-49	1-59	3-98
% Carbonate	44.2	39.2	29.2	87.5
% Organic Carbon	0.2	0.1	0.0	0.6

SITE 463 HOLE CORE 74 CORED INTERVAL 651.5 to 661.0 m



LIMESTONE
Cyclic alternations of yellowish gray (5Y 7/1), light bluish gray (5B 7/1), dark greenish gray (5G 4/1), light greenish gray (5GY 7/1), greenish gray (5G 6/1), and olive (5Y 4/1) siliceous limestone. Burrowing and mottles are common. As well as wavy discontinuous laminae. Coarse sandy layers are at: 19, 35, 50, 85, and 72–73 cm. Cherts, dark gray (N3), olive black (5Y 2/1) and dark greenish gray (5G 4/1) in color, are at: 121, 137–140, 166–170, and 180–182 cm.

SMEAR SLIDE SUMMARY

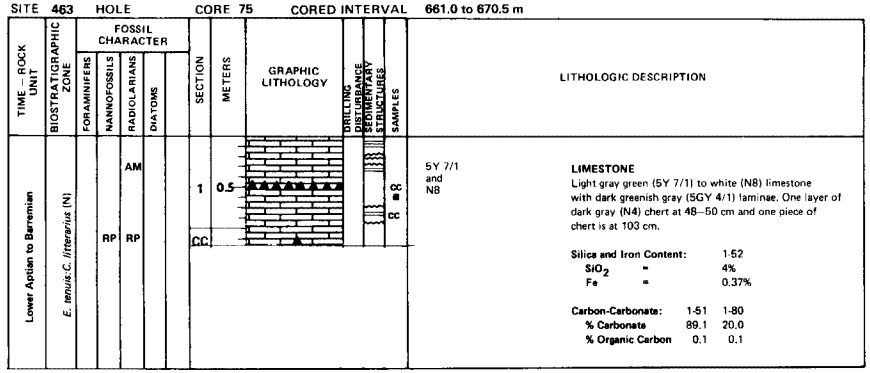
	1-7	1-108	1-149
Quartz	5	5	—
Feldspar			—
Heavy minerals	Tr	—	—
Volcanic glass	5	3	—
Pyrite	—	—	Tr
Carbonate unspec.	60	89	100
Calcite rhombs	30	—	Tr
Nannofossils	—	3	—
Radiolarians	—	3	—

Silica and Iron Content:	1-28		
SiO_2 =	34%		
Fe =	0.34%		

Carbonate Content: 2-13 = 86%

Carbon-Carbonate:	1-10	1-30
% Carbonate	6.7	69.1
% Organic Carbon	0.1	0.1

SITE 463 HOLE CORE 75 CORED INTERVAL 661.0 to 670.5 m

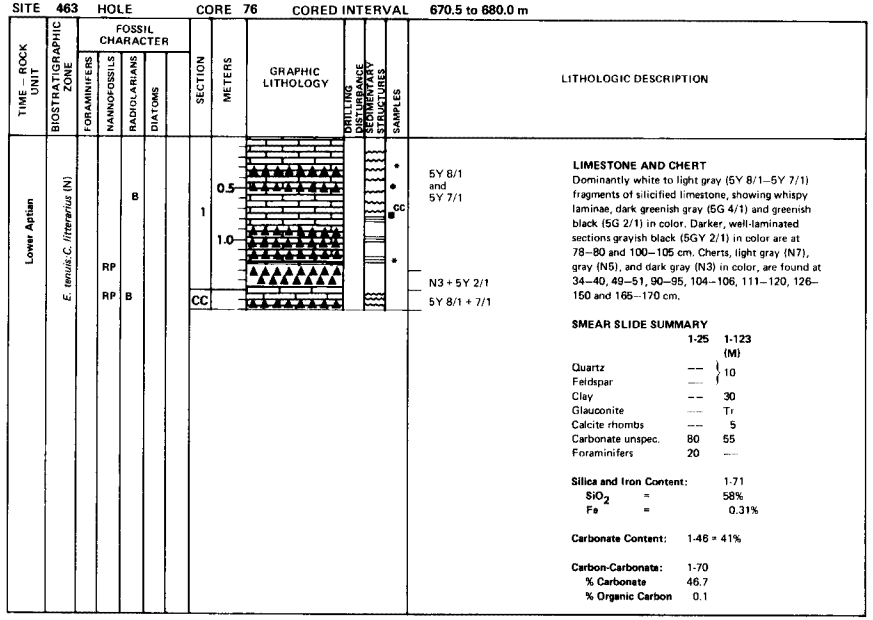


LIMESTONE
Light gray green (5Y 7/1) to white (N8) limestone with dark greenish gray (5GY 4/1) laminae. One layer of dark gray (N4) chert at 48–50 cm and one piece of chert is at 103 cm.

Silica and Iron Content:	1-52	
SiO_2 =	4%	
Fe =	0.37%	

Carbon-Carbonate:	1-51	1-80
% Carbonate	89.1	20.0
% Organic Carbon	0.1	0.1

SITE 463 HOLE CORE 76 CORED INTERVAL 670.5 to 680.0 m



LIMESTONE AND CHERT
Dominantly white to light gray (5Y 8/1–5Y 7/1) fragments of silicified limestone, showing whispy laminae, dark greenish gray (5G 4/1) and greenish black (5G 2/1) in color. Darker, well-laminated sections grayish black (5GY 2/1) in color are at 78–80 and 100–105 cm. Cherts, light gray (N7), gray (N5), and dark gray (N3) in color, are found at 34–40, 49–51, 90–95, 104–106, 111–120, 126–150 and 165–170 cm.

SMEAR SLIDE SUMMARY

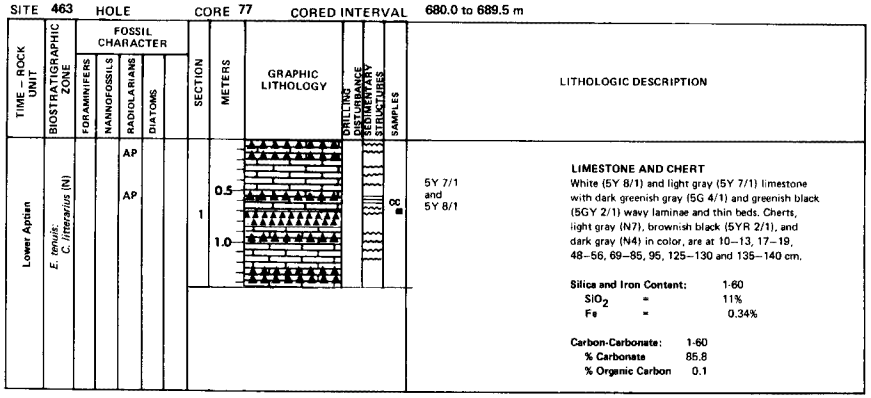
	1-25	1-123 (M)
Quartz	—	10
Feldspar	—	
Clay	—	30
Glauconite	—	Tr
Calcite rhombs	—	5
Carbonate unspec.	80	55
Foraminifers	20	—

Silica and Iron Content: 1-71
SiO_2 = 58%
Fe = 0.31%

Carbonate Content: 1-48 = 41%

Carbon-Carbonate: 1-70
% Carbonate 46.7
% Organic Carbon 0.1

SITE 463 HOLE CORE 77 CORED INTERVAL 680.0 to 689.5 m

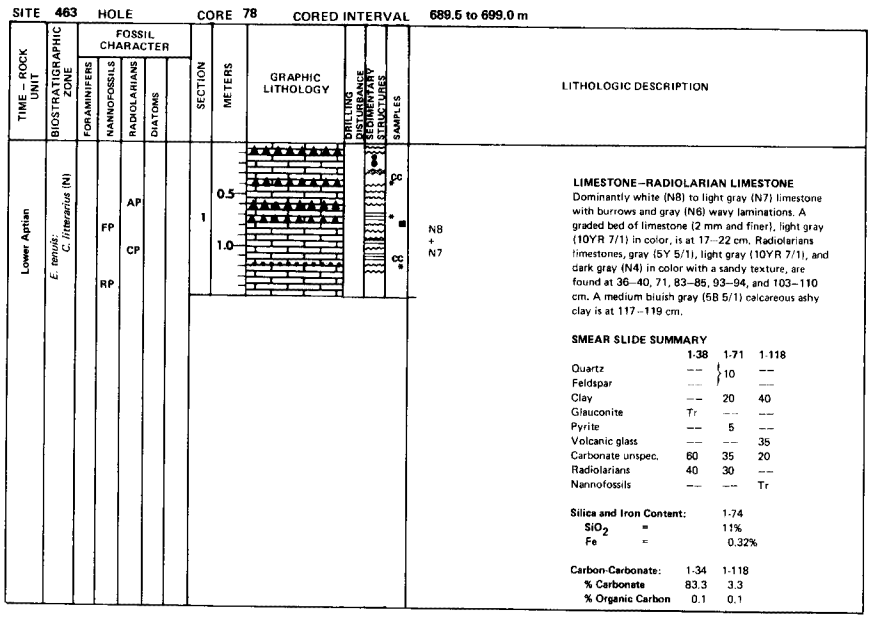


LIMESTONE AND CHERT
White (5Y 8/1) and light gray (5Y 7/1) limestone with dark greenish gray (5G 4/1) and greenish black (5GY 2/1) wavy laminae and thin beds. Cherts, light gray (N7), brownish black (5YR 2/1), and dark gray (N4) in color, are at 10–13, 17–19, 48–56, 69–85, 95, 125–130 and 135–140 cm.

Silica and Iron Content: 1-60
SiO_2 = 11%
Fe = 0.34%

Carbon-Carbonate: 1-60
% Carbonate 85.8
% Organic Carbon 0.1

SITE 463 HOLE CORE 78 CORED INTERVAL 689.5 to 699.0 m



LIMESTONE–RADIOLARIAN LIMESTONE
Dominantly white (N8) to light gray (N7) limestone with burrows and gray (N6) wavy laminations. A graded bed of limestone (2 mm and finer), light gray (10YR 7/1) in color, is at 17–22 cm. Radiolarians limestones, gray (5Y 5/1), light gray (10YR 7/1), and dark gray (N4) in color with a sandy texture, are found at 36–40, 71, 83–85, 93–94, and 103–110 cm. A medium bluish gray (5B 5/1) calcareous ashy clay is at 117–119 cm.

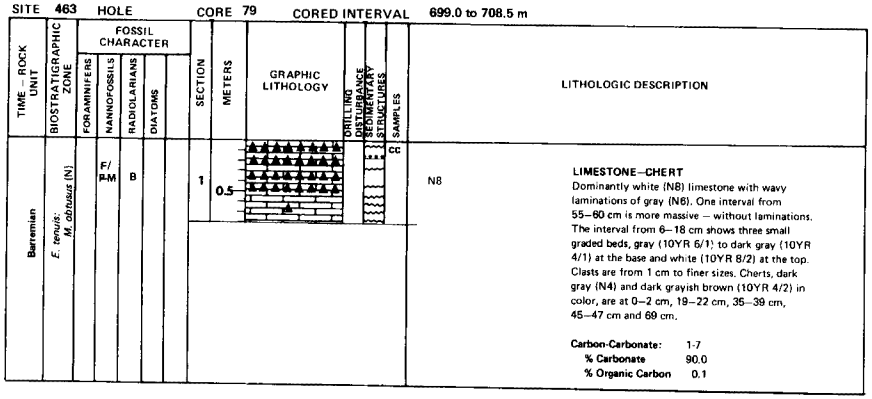
SMEAR SLIDE SUMMARY

	1-38	1-71	1-118
Quartz	—	10	—
Feldspar	—		—
Clay	—	20	40
Glauconite	Tr	—	—
Pyrite	—	5	—
Volcanic glass	—	—	35
Carbonate unspec.	60	35	20
Radiolarians	40	30	—
Nannofossils	—	—	Tr

Silica and Iron Content: 1-74
SiO_2 = 11%
Fe = 0.32%

Carbon-Carbonate: 1-34 1-118
% Carbonate 83.3 3.3
% Organic Carbon 0.1 0.1

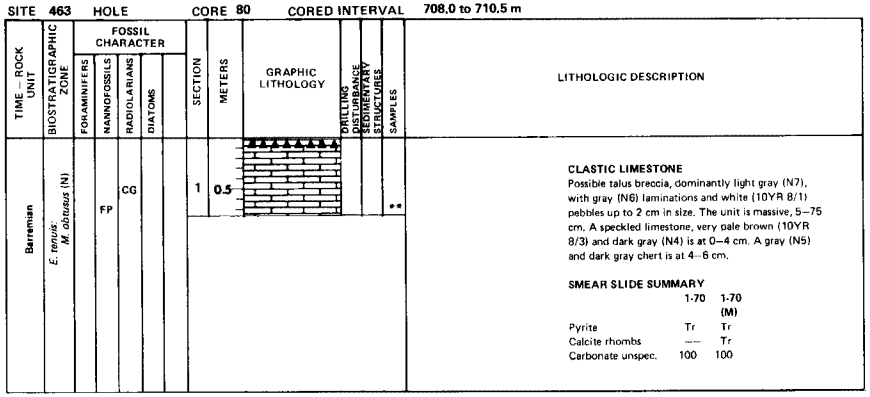
SITE 463 HOLE CORE 79 CORED INTERVAL 699.0 to 708.5 m



LIMESTONE–CHERT
Dominantly white (N8) limestone with wavy laminations of gray (N6). One interval from 55–60 cm is more massive – without laminations. The interval from 6–18 cm shows three small graded beds, gray (10YR 6/1) to dark gray (10YR 4/1) at the base and white (10YR 8/2) at the top. Clasts are from 1 cm to finer sizes. Cherts, dark gray (N4) and dark grayish brown (10YR 4/2) in color, are at 0–2 cm, 19–22 cm, 35–39 cm, 45–47 cm and 69 cm.

Carbon-Carbonate: 1-7
% Carbonate 90.0
% Organic Carbon 0.1

SITE 463 HOLE CORE 80 CORED INTERVAL 708.0 to 710.5 m

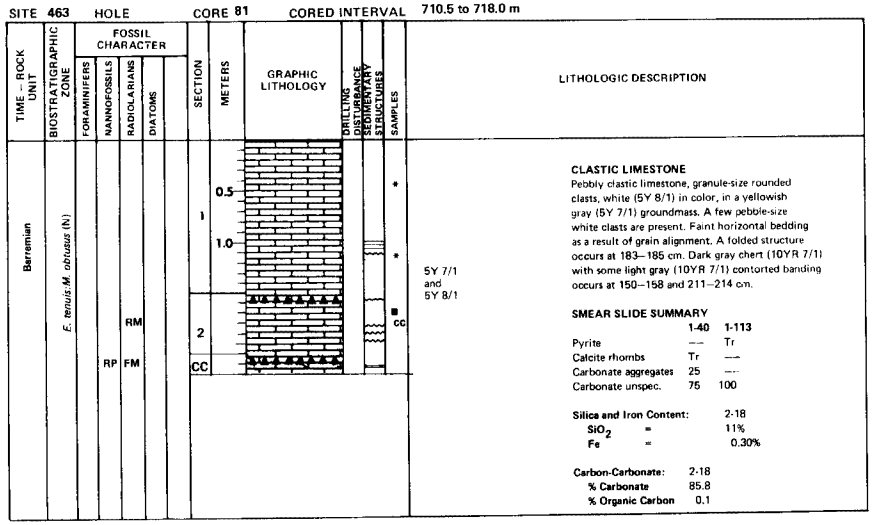


CLASTIC LIMESTONE
Possible talus breccia, dominantly light gray (N7), with gray (N6) laminations and white (10YR 8/1) pebbles up to 2 cm in size. The unit is massive, 5–75 cm. A speckled limestone, very pale brown (10YR 8/3) and dark gray (N4) is at 0–4 cm. A gray (N5) and dark gray chert is at 4–6 cm.

SMEAR SLIDE SUMMARY

	1-70	1-70 (M)
Pyrite	Tr	Tr
Calcite rhombs	—	Tr
Carbonate unspec.	100	100

SITE 463 HOLE CORE 81 CORED INTERVAL 710.5 to 718.0 m



CLASTIC LIMESTONE
Pebbly clastic limestone, granule-size rounded clasts, white (5Y 8/1) in color, in a yellowish gray (5Y 7/1) groundmass. A few pebble-size white clasts are present. Faint horizontal bedding as a result of grain alignment. A folded structure occurs at 183–185 cm. Dark gray chert (10YR 7/1) with some light gray (10YR 7/1) contorted banding occurs at 150–158 and 211–214 cm.

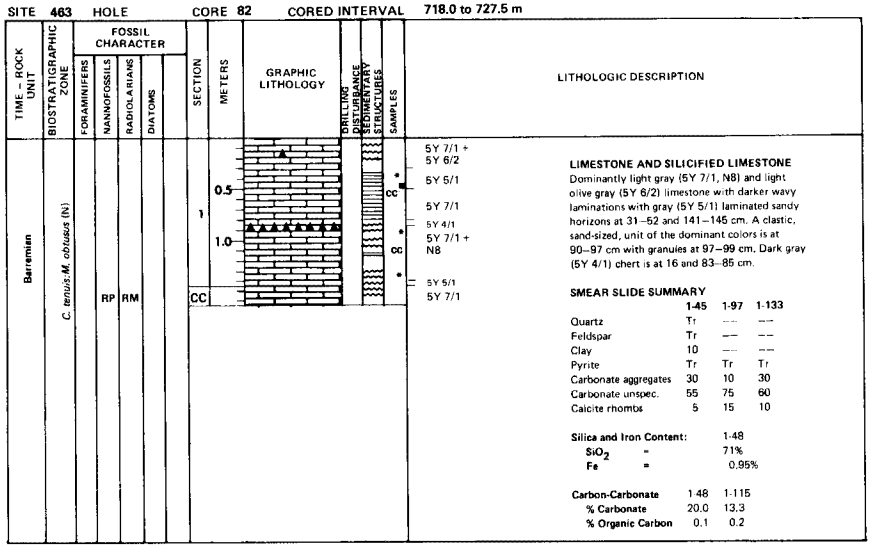
SMEAR SLIDE SUMMARY

	1-40	1-113
Pyrite	—	Tr
Calcite rhombs	Tr	—
Carbonate aggregates	25	—
Carbonate unspec.	75	100

Silica and Iron Content: 2-18
SiO_2 = 11%
Fe = 0.30%

Carbon-Carbonate: 2-18
% Carbonate 85.8
% Organic Carbon 0.1

SITE 463 HOLE CORE 82 CORED INTERVAL 718.0 to 727.5 m



LIMESTONE AND SILICIFIED LIMESTONE
Dominantly light gray (5Y 7/1, N8) and light olive gray (5Y 6/2) limestone with darker wavy laminations with gray (5Y 5/1) laminated sandy horizons at 31–52 and 141–145 cm. A clastic, sand-sized, unit of the dominant colors is at 90–97 cm with granules at 97–99 cm. Dark gray (5Y 4/1) chert is at 16 and 83–85 cm.

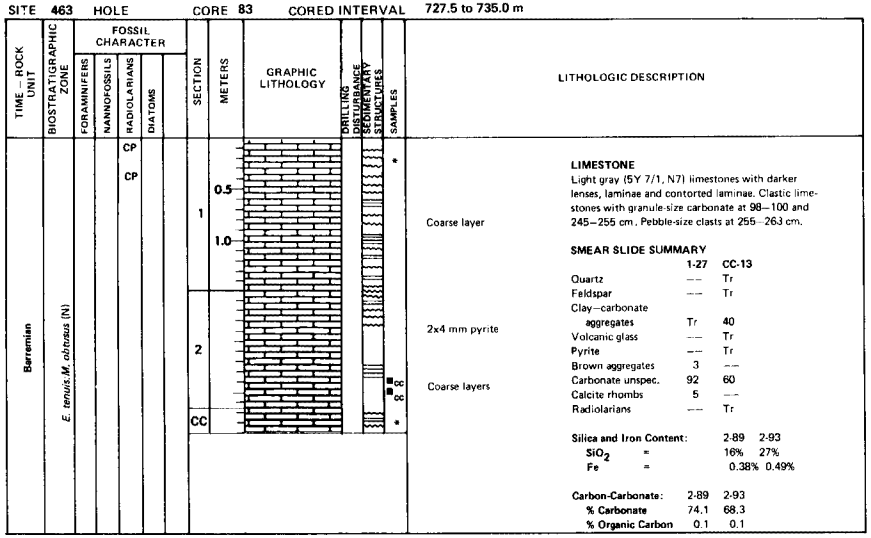
SMEAR SLIDE SUMMARY

	1-45	1-97	1-133
Quartz	Tr	—	—
Feldspar	Tr	—	—
Clay	10	—	—
Pyrite	Tr	Tr	Tr
Carbonate aggregates	30	10	30
Carbonate unspec.	55	75	60
Calcite rhombs	5	15	10

Silica and Iron Content: 1-48
SiO_2 = 71%
Fe = 0.95%

	1-48	1-115
Carbon-Carbonate		
% Carbonate	20.0	13.3
% Organic Carbon	0.1	0.2

SITE 463 HOLE CORE 83 CORED INTERVAL 727.5 to 735.0 m



LIMESTONE
Light gray (5Y 7/1, N7) limestones with darker lenses, laminae and contorted laminae. Clastic limestones with granule-size carbonate at 98–100 and 245–255 cm. Pebble-size clasts at 255–263 cm.

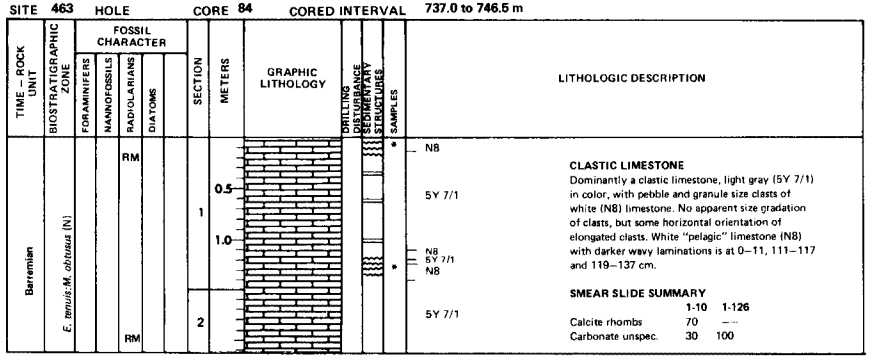
SMEAR SLIDE SUMMARY

	1-27	CC-13
Quartz	—	Tr
Feldspar	—	Tr
Clay–carbonate aggregates	Tr	40
Volcanic glass	—	Tr
Pyrite	—	Tr
Brown aggregates	3	—
Carbonate unspec.	92	60
Calcite rhombs	5	—
Radiolarians	—	Tr

Silica and Iron Content: 2-89 2-93
SiO_2 = 16% 27%
Fe = 0.38% 0.49%

	2-89	2-93
Carbon-Carbonate:		
% Carbonate	74.1	68.3
% Organic Carbon	0.1	0.1

SITE 463 HOLE CORE 84 CORED INTERVAL 737.0 to 746.5 m



LITHOLOGIC DESCRIPTION

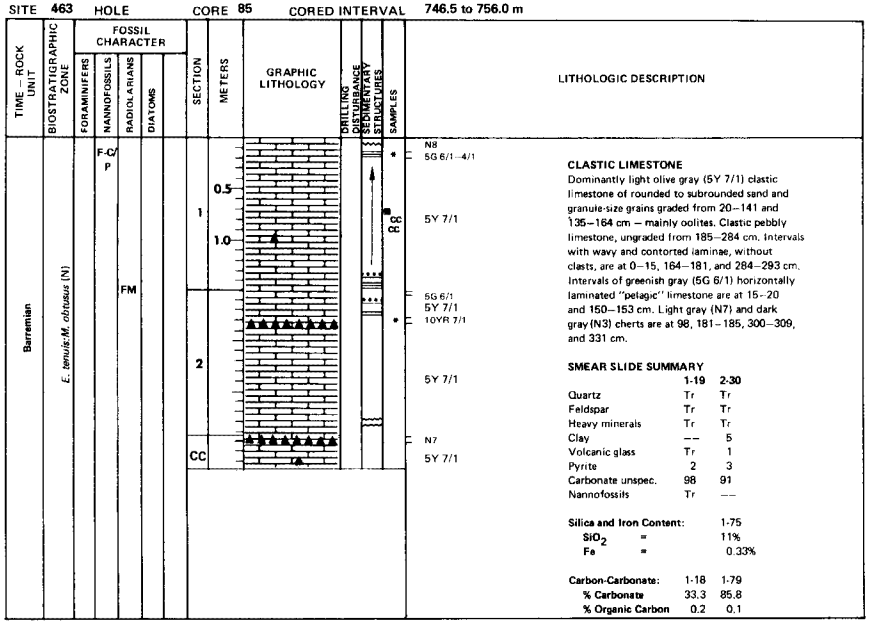
CLASTIC LIMESTONE

Dominantly a clastic limestone, light gray (5Y 7/1) in color, with pebble and granule size clasts of white (N8) limestone. No apparent size gradation of clasts, but some horizontal orientation of elongated clasts. White "pelagic" limestone (N8) with darker wavy laminations is at 0–11, 111–117 and 119–137 cm.

SMEAR SLIDE SUMMARY

	1-10	1-126
Calcite rhombs	70	—
Carbonate unspec.	30	100

SITE 463 HOLE CORE 85 CORED INTERVAL 746.5 to 756.0 m



LITHOLOGIC DESCRIPTION

CLASTIC LIMESTONE

Dominantly light olive gray (5Y 7/1) clastic limestone of rounded to subrounded sand and granule-size grains graded from 20–141 and 135–164 cm – mainly oolites. Clastic pebbly limestone, ungraded from 185–284 cm. Intervals with wavy and contorted laminae, without clasts, are at 0–15, 164–181, and 284–293 cm. Intervals of greenish gray (5G 6/1) horizontally laminated "pelagic" limestone are at 15–20 and 150–153 cm. Light gray (N7) and dark gray (N3) cherts are at 98, 181–185, 300–309, and 331 cm.

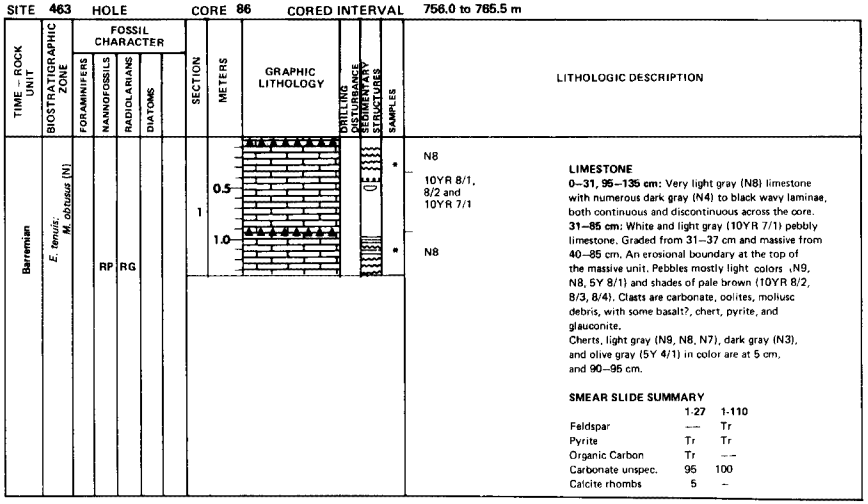
SMEAR SLIDE SUMMARY

	1-19	2-30
Quartz	Tr	Tr
Feldspar	Tr	Tr
Heavy minerals	Tr	Tr
Clay	—	5
Volcanic glass	Tr	1
Pyrite	2	3
Carbonate unspec.	98	91
Nannofossils	Tr	—

Silica and Iron Content:	1-75
SiO_2 =	11%
Fe =	0.33%

Carbon-Carbonate:	1-18	1-79
% Carbonate	33.3	85.8
% Organic Carbon	0.2	0.1

SITE 463 HOLE CORE 86 CORED INTERVAL 756.0 to 765.5 m



LITHOLOGIC DESCRIPTION

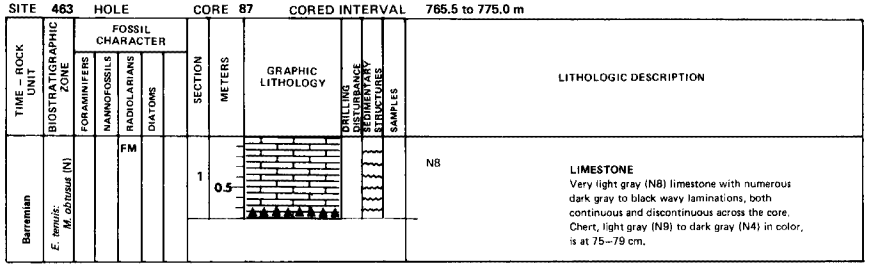
LIMESTONE

0–31, 95–135 cm: Very light gray (N8) limestone with numerous dark gray (N4) to black wavy laminae, both continuous and discontinuous across the core.
31–85 cm: White and light gray (10YR 7/1) pebbly limestone. Graded from 31–37 cm and massive from 40–85 cm. An erosional boundary at the top of the massive unit. Pebbles mostly light colors (N9, N8, 5Y 8/1) and shades of pale brown (10YR 8/2, 8/3, 8/4). Clasts are carbonate, oolites, mollusc debris, with some basalt?, chert, pyrite, and glauconite.
Cherts, light gray (N9, N8, N7), dark gray (N3), and olive gray (5Y 4/1) in color are at 5 cm, and 90–95 cm.

SMEAR SLIDE SUMMARY

	1-27	1-110
Feldspar	—	Tr
Pyrite	Tr	Tr
Organic Carbon	Tr	—
Carbonate unspec.	95	100
Calcite rhombs	5	–

SITE 463 HOLE CORE 87 CORED INTERVAL 765.5 to 775.0 m

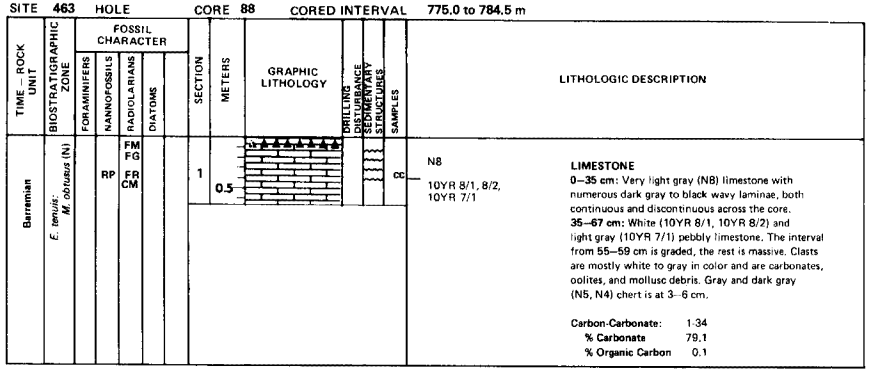


LITHOLOGIC DESCRIPTION

LIMESTONE

Very light gray (N8) limestone with numerous dark gray to black wavy laminations, both continuous and discontinuous across the core. Chert, light gray (N9) to dark gray (N4) in color, is at 75–79 cm.

SITE 463 HOLE CORE 88 CORED INTERVAL 775.0 to 784.5 m



LITHOLOGIC DESCRIPTION

LIMESTONE

0–35 cm: Very light gray (N8) limestone with numerous dark gray to black wavy laminae, both continuous and discontinuous across the core.
35–67 cm: White (10YR 8/1, 10YR 8/2) and light gray (10YR 7/1) pebbly limestone. The interval from 55–59 cm is graded, the rest is massive. Clasts are mostly white to gray in color and are carbonates, oolites, and mollusc debris. Gray and dark gray (N5, N4) chert is at 3–6 cm.

Carbon-Carbonate:	1-34
% Carbonate	79.1
% Organic Carbon	0.1

SITE 463 HOLE CORE 89 CORED INTERVAL 784.5 to 794.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Barremian	*S. systemporata*: *M. obtusus* (N)			CG AM		1	0.5 1.0				*	5Y 7/1
			RP	AG	CG							

LIMESTONE AND CHERT
Light olive gray (5Y 7/1) limestone. Wavy and contorted laminae of dark gray and black in the interval 5–94 cm. Clastic limestone of the same color from 94–113 cm, generally sand-size grains, no apparent bedding. Cherts, dark gray (10YR 4/1, N3) and light gray (N6) in color, are at 0–5, 31, 44, 59–65, and 84–86 cm.

SMEAR SLIDE SUMMARY

	1-65
Clay aggregates	40
Volcanic glass	Tr
Pyrite	Tr
Carbonate unspec.	60
Calc. nannofossils	Tr

SITE 463 HOLE CORE 90 CORED INTERVAL 794.0 to 803.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Barremian	*S. systemporata*: *M. obtusus* (N)		RP	RG AG		1					R	

LIMESTONE
Pebbles of limestone, light gray (N8 to 5Y 7/1) in color, with dark gray and black wavy laminations. Some show green (5G 5/2) parting surfaces. One dark gray (N4) chert pebbie at the bottom.

Carbon-Carbonate: 1-1

% Carbonate	81.6
% Organic Carbon	0.1

SITE 463 HOLE CORE 91 CORED INTERVAL 803.5 to 813.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Barremian (possible Upper Hauterivian)	*S. systemporata*; *M. obtusus* (N)		RP	AM		CC						

LIMESTONE
One 3 cm piece of light gray (5Y 7/1) limestone with faint whispy laminations.

SMEAR SLIDE SUMMARY

	CC-2
Clay	Tr
Carbonate unspec.	100

SITE 463 HOLE CORE 92 CORED INTERVAL 813.0 to 822.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Barremian (possible Upper Hauterivian)	*S. systemporata*; *M. obtusus* (N)		RP	AG AM		1						

LIMESTONE AND CHERT
White (10YR 8/1) limestone with some wavy laminations (3 pieces). Cherts, light gray (N8, N7, 10YR 7/1) and white (5YR 8/1) are at the top and bottom of the section.

SITE SUMMARY SHEET

SITE 464

Date occupied:	August 17, 1978
Date departed:	August 21, 1978
Time on hole:	121 hours
Position: Latitude:	39° 51.64'N
Longitude:	173° 53.33'E
Water depth (sea level):	4637 corrected meters, echo sounding
Water depth (rig floor):	4670 corrected meters, echo sounding
Bottom felt at:	4670 meters, drill pipe
Penetration:	308.5 meters
Number of holes:	1
Number of cores:	34
Total length of cored section:	308.5 meters
Total core recovery:	75.66 meters
Percentage core recovery:	24.5%
Oldest Sediment Cored	
Depth sub-bottom:	308.34 meters
Nature:	Chert and chalk
Age:	Lower Albian
Measured velocity:	5.1 km/s (chert)
Basement	
Depth sub-bottom:	308.5 meters
Nature:	Basaltic(?) sill
Velocity range:	Not measured

SITE 464 HOLE CORE 1 CORED INTERVAL 0.0 to 3.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Lower Pleistocene	*E. matuyamai–A. ypsilon* (R) / NN 19 (N) / Lower *P. doliolus* (D)		FM	AG	P	1		Mn Mn Mn			*	**MANGANESE NODULES AND TUFFACEOUS SILTY CLAY.** **0.0-2.0 cm:** Black (N1) manganese nodules 0.5-2.5 cm in diameter. The largest nodule has a center of yellowish red (5YR 5/6) tuffaceous silty clay. One 1.3 cm diameter greenish gray (5G 6/1) clay ball.

SMEAR SLIDE SUMMARY

	1-1
Feldspar	21
Clay	45
Volcanic glass	20
Opaques	2
Calc. nannofossils	Tr
Diatoms	5
Radiolaria	5
Sponge spicules	2

SITE 464 HOLE CORE 2 CORED INTERVAL 3.5 to 13.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Upper Pliocene	*S. peritas* (R) / NN 16 (N)		FM	AG	PG	1	0.5				*	**CLAYEY RADIOLARIAN OOZE** **0-210 cm:** Gray (5Y 5/1, 5Y 6/1). Clayey radiolarian ooze, intensely disturbed, mottled with very pale brown (10YR 7/4), olive gray (5Y 5/2) colors of same sediment. **210-950 cm:** Alternating/intermingling units of: clayey radiolarian ooze, diatom radiolarian ooze, and radiolarian clay. Moderately to highly disturbed. Colors are various shades of light gray to tan: gray (5Y 5/1, 5Y 6/1), olive gray (5Y 5/2), very pale brown (10YR 7/4), light gray (5Y 7/1), white (5Y 8/1), light olive gray (5Y 6/2), olive (5Y 5/3), light yellowish brown (10YR 6/4), very pale brown (10YR 8/3). Browns become more prominant near the bottom of the core. A manganese nodule at 348-350 cm is very dark gray (5Y 3/1). Color variations occur both as layers and mottles.
							1.0				CC	
			CM									
			CM			2					•	
				AG	PG						•	
											•	
			CM					Mn			•	
				AG	CG	3					•	
			CM									
				AG	AG	4		O. G.				
			CM									
				AG	AG	5					•	
			FM									I.W.
				AG	AG	6					•	
			CM	AG	AG	7					•	
		RP	B	CG	AG	CC					•	

SMEAR SLIDE SUMMARY

	1-95† (M)	2-63 (D)	2-110 (D)	2-130 (D)	3-2 (D)
Total Detrital	1	---	---	---	---
Quartz	1	---	---	---	1
Feldspar	---	---	---	---	1
Mica	---	---	---	---	1
Clay	40	40	50	30	75
Volcanic glass	---	---	2	Tr	1
Opaques	Tr	---	Tr	---	---
Glauc.	---	---	Tr	---	---
Micronodules	---	---	1	1	---
Carbonate unsp.	15	5	1	2	2
Calc. nannofossils	20	5	5	2	2
Diatoms	– 7	15	12	22	5
Radiolaria	+15	30	25	40	10
Sponge spicules	2	5	3	2	1
Silicoflaggelates	Tr	Tr	Tr	1	1
Fish remains	Tr	---	---	---	---

† Minor lithology

	3-20 (D)	5-142 (D)	6-15 (D)	7-45 (D)	CC (D)
Total Detrital	---	1	---	---	---
Quartz	---	1	---	5	Tr
Feldspar	---	---	---		---
Mica	---	---	---	Tr	---
Clay	55	40	70	55	15
Volcanic glass	---	2	2	Tr	Tr
Opaques	---	---	---	---	Tr
Glauc.	---	---	---	---	Tr
Micronodules	---	---	---	---	---
Carbonate unsp.	2	5	---	Tr	1
Calc. nannofossils	5	2	6	---	10
Diatoms	7	15	10	10	24
Radiolaria	25	30	10	25	45
Sponge spicules	3	5	---	5	3
Silicoflagellates	---	1	2	Tr	2
Fish remains	---	---	---	---	Tr

Silica and Iron Content:

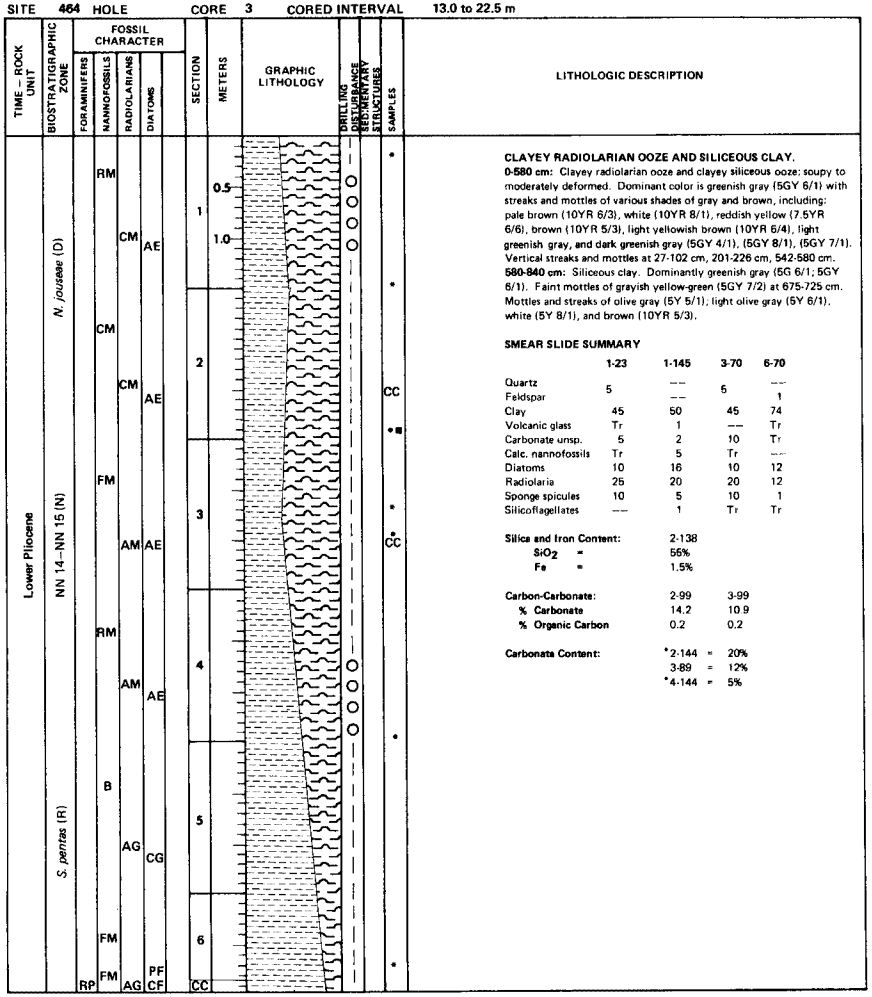
	2-70	2-71
SiO_2 =	50%	50%
Fe =	1.5%	2.0%

Carbon-Carbonate:

	1-128
% Carbonate	10.0
% Organic carbon	0.1

Carbonate Content: * 2-75 = 9%; 3-135 = 12%; * 5-91 = 3%

SITE 464 HOLE CORE 3 CORED INTERVAL 13.0 to 22.5 m



CLAYEY RADIOLARIAN OOZE AND SILICEOUS CLAY.

0-580 cm: Clayey radiolarian ooze and clayey siliceous ooze: soupy to moderately deformed. Dominant color is greenish gray (5GY 6/1) with streaks and mottles of various shades of gray and brown, including: pale brown (10YR 6/3), white (10YR 8/1), reddish yellow (7.5YR 6/6), brown (10YR 5/3), light yellowish brown (10YR 6/4), light greenish gray, and dark greenish gray (5GY 4/1), (5GY 8/1), (5GY 7/1). Vertical streaks and mottles at 27-102 cm, 201-226 cm, 542-580 cm.

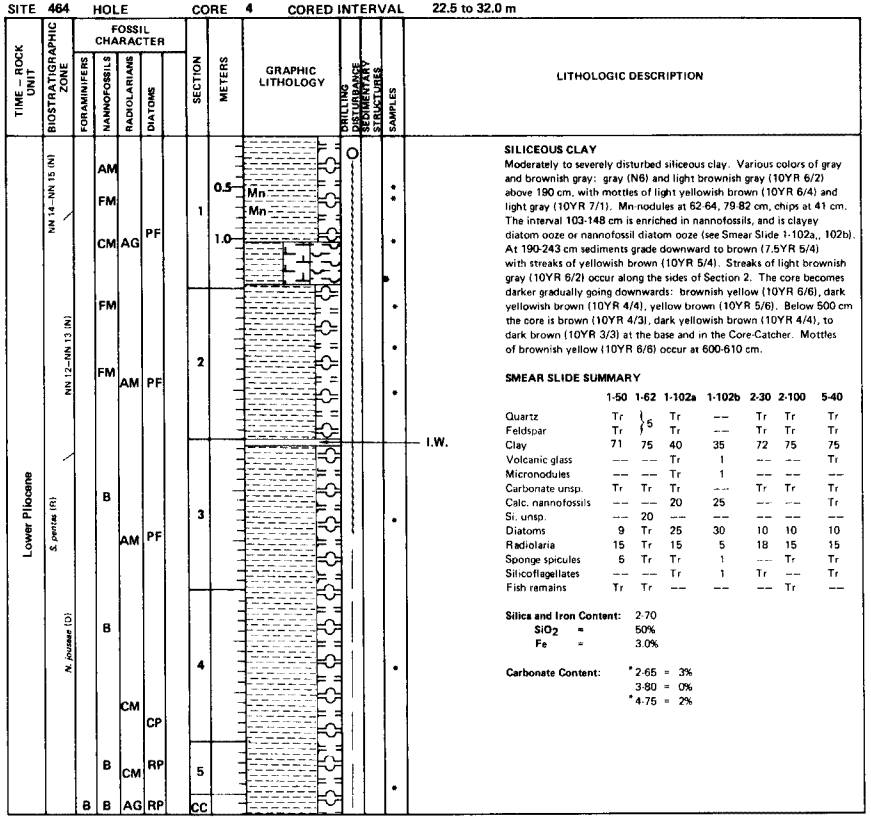
580-840 cm: Siliceous clay. Dominantly greenish gray (5G 6/1; 5GY 6/1). Faint mottles of grayish yellow-green (5GY 7/2) at 675-725 cm. Mottles and streaks of olive gray (5Y 5/1); light olive gray (5Y 6/1), white (5Y 8/1), and brown (10YR 5/3).

SMEAR SLIDE SUMMARY

	1-23	1-145	3-70	6-70
Quartz	5	—	6	—
Feldspar		—		1
Clay	45	50	45	74
Volcanic glass	Tr	1	—	Tr
Carbonate unsp.	5	2	10	Tr
Calc. nannofossils	Tr	5	Tr	—
Diatoms	10	16	10	12
Radiolaria	25	20	20	12
Sponge spicules	10	5	10	1
Silicoflagellates	—	1	Tr	Tr

Silica and Iron Content:	2-138	
SiO_2 =	56%	
Fe =	1.5%	
Carbon-Carbonate:	2-99	3-99
% Carbonate	14.2	10.9
% Organic Carbon	0.2	0.2
Carbonate Content:	*2-144 = 20%	
	3-89 = 12%	
	*4-144 = 5%	

SITE 464 HOLE CORE 4 CORED INTERVAL 22.5 to 32.0 m



SILICEOUS CLAY

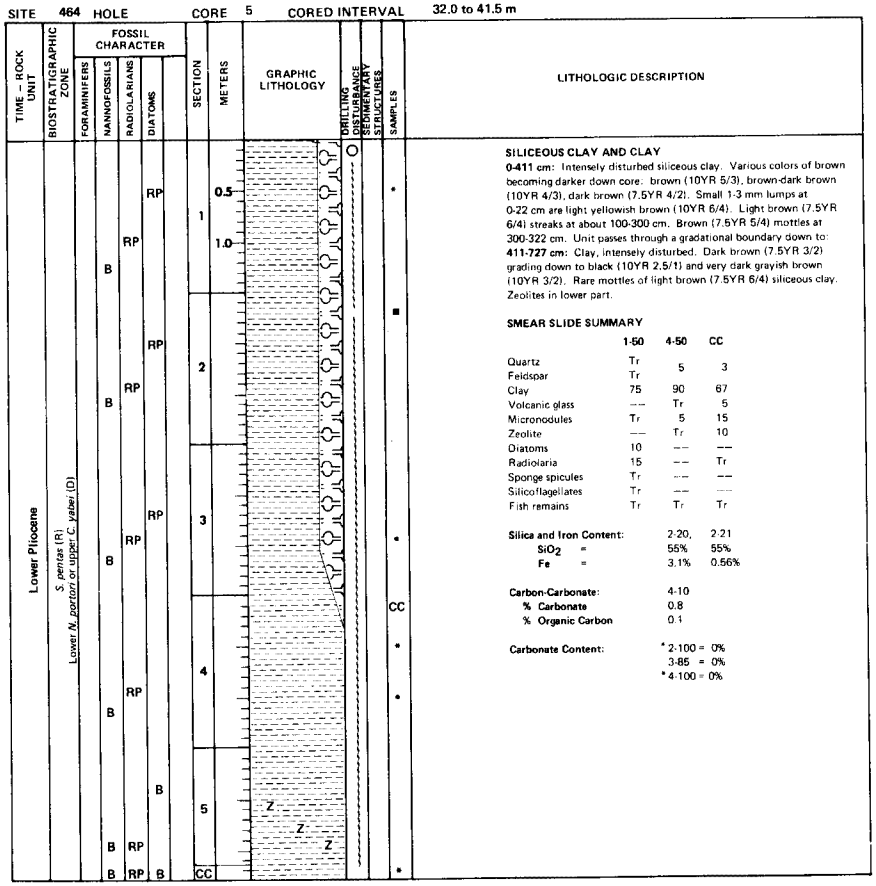
Moderately to severely disturbed siliceous clay. Various colors of gray and brownish gray: gray (N6) and light brownish gray (10YR 6/2) above 190 cm, with mottles of light yellowish brown (10YR 6/4) and light gray (10YR 7/1). Mn-nodules at 62-64, 79-82 cm, chips at 41 cm. The interval 103-148 cm is enriched in nannofossils, and is clayey diatom ooze or nannofossil diatom ooze (see Smear Slide 1-102a,, 102b). At 190-243 cm sediments grade downward to brown (7.5YR 5/4) with streaks of yellowish brown (10YR 5/4). Streaks of light brownish gray (10YR 6/2) occur along the sides of Section 2. The core becomes darker gradually going downwards: brownish yellow (10YR 6/6), dark yellowish brown (10YR 4/4), yellow brown (10YR 5/6). Below 500 cm the core is brown (10YR 4/3), dark yellowish brown (10YR 4/4), to dark brown (10YR 3/3) at the base and in the Core-Catcher. Mottles of brownish yellow (10YR 6/8) occur at 600-610 cm.

SMEAR SLIDE SUMMARY

	1-50	1-62	1-102a	1-102b	2-30	2-100	5-40
Quartz	Tr	5	Tr	—	Tr	Tr	Tr
Feldspar	Tr		Tr	—	Tr	Tr	Tr
Clay	71	75	40	35	72	75	75
Volcanic glass	—	—	Tr	1	—	—	Tr
Micronodules	—	—	Tr	1	—	—	—
Carbonate unsp.	Tr	Tr	Tr	—	Tr	Tr	Tr
Calc. nannofossils	—	—	20	25	—	—	Tr
Si. unsp.	—	20	—	—	—	—	—
Diatoms	9	Tr	25	30	10	10	10
Radiolaria	15	Tr	15	5	18	15	15
Sponge spicules	5	Tr	Tr	1	—	Tr	Tr
Silicoflagellates	—	—	Tr	1	Tr	—	Tr
Fish remains	Tr	Tr	—	—	—	Tr	—

Silica and Iron Content:	2-70	
SiO_2 =	50%	
Fe =	3.0%	
Carbonate Content:	*2-65 = 3%	
	3-80 = 0%	
	*4-75 = 2%	

SITE 464 HOLE CORE 5 CORED INTERVAL 32.0 to 41.5 m



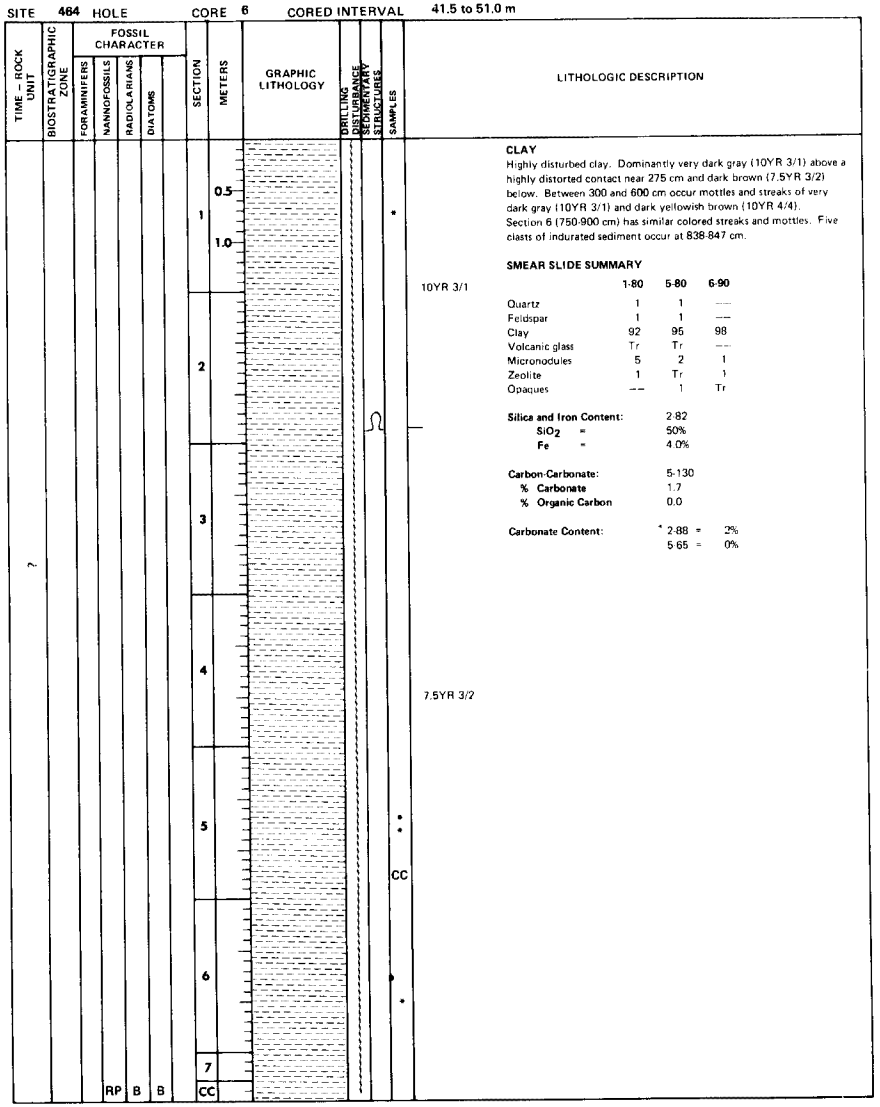
SILICEOUS CLAY AND CLAY

0-411 cm: Intensely disturbed siliceous clay. Various colors of brown becoming darker down core: brown (10YR 5/3), brown-dark brown (10YR 4/3), dark brown (7.5YR 4/2). Small 1-3 mm lumps at 0-22 cm are light yellowish brown (10YR 6/4). Light brown (7.5YR 6/4) streaks at about 100-300 cm. Brown (7.5YR 5/4) mottles at 300-322 cm. Unit passes through a gradational boundary down to:
411-727 cm: Clay, intensely disturbed. Dark brown (7.5YR 3/2) grading down to black (10YR 2.5/1) and very dark grayish brown (10YR 3/2). Rare mottles of light brown (7.5YR 6/4) siliceous clay. Zeolites in lower part.

SMEAR SLIDE SUMMARY

	1-50	4-50	CC
Quartz	Tr	5	3
Feldspar	Tr	90	67
Clay	75	Tr	5
Volcanic glass	—	Tr	15
Micronodules	Tr	5	15
Zeolite	—	Tr	10
Diatoms	10	—	—
Radiolaria	15	—	Tr
Sponge spicules	Tr	—	—
Silicoflagellates	Tr	—	—
Fish remains	Tr	Tr	Tr
Silica and Iron Content:	2-20,	2-21	
SiO_2 =	55%	55%	
Fe =	3.1%	0.56%	
Carbon-Carbonate:	4-10		
% Carbonate	0.8		
% Organic Carbon	0.1		
Carbonate Content:	*2-100 = 0%		
	3-85 = 0%		
	*4-100 = 0%		

SITE 464 HOLE CORE 6 CORED INTERVAL 41.5 to 51.0 m



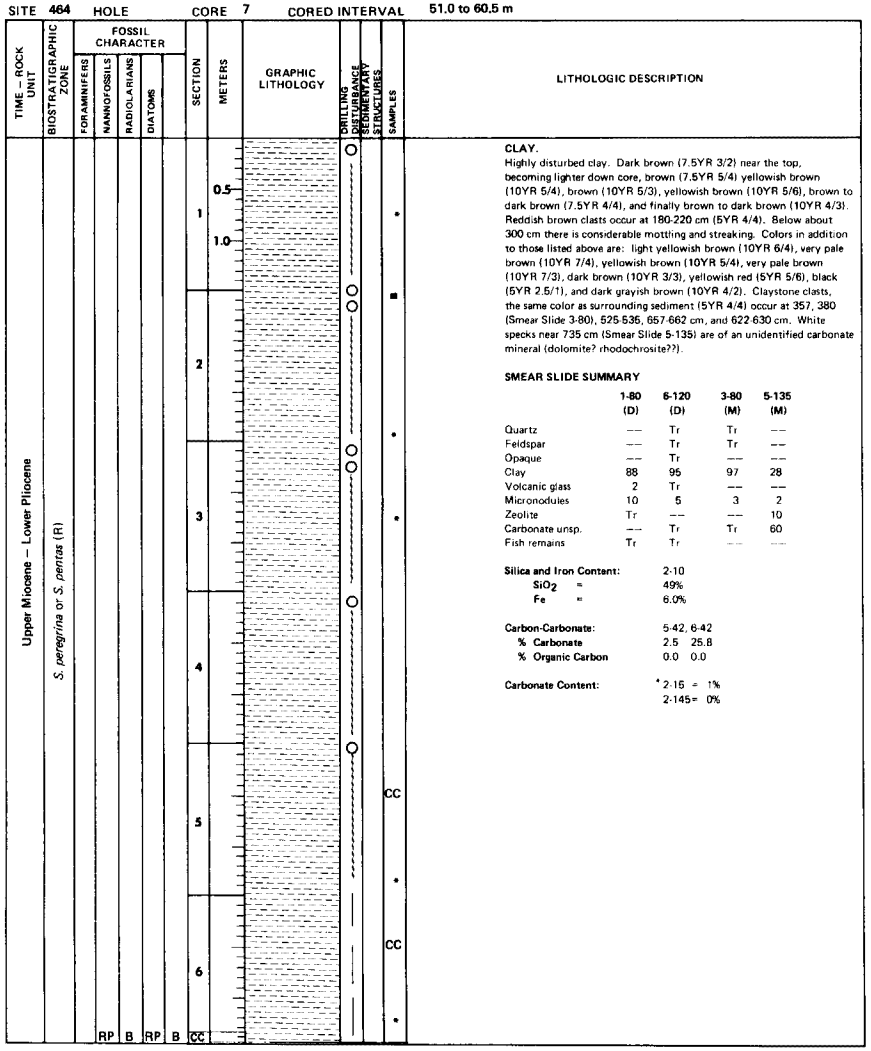
CLAY

Highly disturbed clay. Dominantly very dark gray (10YR 3/1) above a highly distorted contact near 275 cm and dark brown (7.5YR 3/2) below. Between 300 and 600 cm occur mottles and streaks of very dark gray (10YR 3/1) and dark yellowish brown (10YR 4/4). Section 6 (750-900 cm) has similar colored streaks and mottles. Five clasts of indurated sediment occur at 838-847 cm.

SMEAR SLIDE SUMMARY

	1-80	5-80	6-90
Quartz	1	1	—
Feldspar	1	1	—
Clay	92	95	98
Volcanic glass	Tr	Tr	—
Micronodules	5	2	1
Zeolite	1	Tr	1
Opaques	—	1	Tr
Silica and Iron Content:	2-82		
SiO_2 =	50%		
Fe =	4.0%		
Carbon-Carbonate:	5-130		
% Carbonate	1.7		
% Organic Carbon	0.0		
Carbonate Content:	*2-88 =	2%	
	5-65 =	0%	

SITE 464 HOLE CORE 7 CORED INTERVAL 51.0 to 60.5 m



CLAY.
Highly disturbed clay. Dark brown (7.5YR 3/2) near the top, becoming lighter down core, brown (7.5YR 5/4) yellowish brown (10YR 5/4), brown (10YR 5/3), yellowish brown (10YR 5/6), brown to dark brown (7.5YR 4/4), and finally brown to dark brown (10YR 4/3). Reddish brown clasts occur at 180-220 cm (5YR 4/4). Below about 300 cm there is considerable mottling and streaking. Colors in addition to those listed above are: light yellowish brown (10YR 6/4), very pale brown (10YR 7/4), yellowish brown (10YR 5/4), very pale brown (10YR 7/3), dark brown (10YR 3/3), yellowish red (5YR 5/6), black (5YR 2.5/1), and dark grayish brown (10YR 4/2). Claystone clasts, the same color as surrounding sediment (5YR 4/4) occur at 357, 380 (Smear Slide 3-80), 525-535, 657-662 cm, and 622-630 cm. White specks near 735 cm (Smear Slide 5-135) are of an unidentified carbonate mineral (dolomite? rhodochrosite??).

SMEAR SLIDE SUMMARY

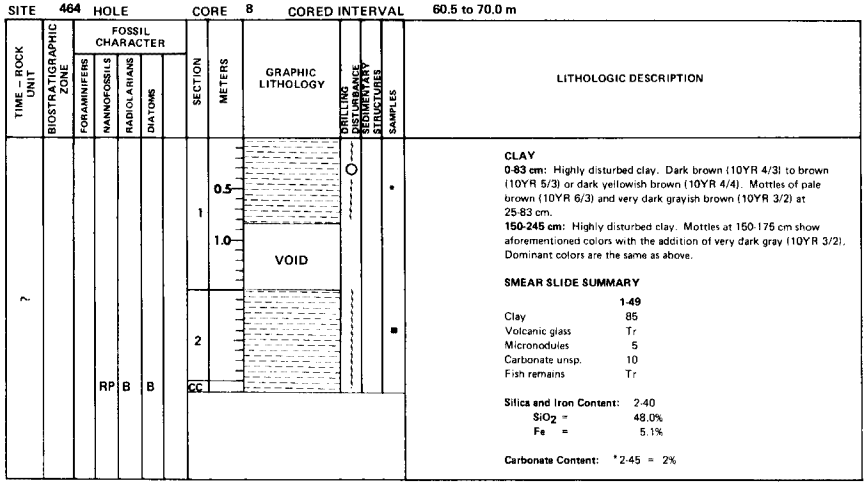
	1-80 (D)	6-120 (D)	3-80 (M)	5-135 (M)
Quartz	—	Tr	Tr	—
Feldspar	—	Tr	Tr	—
Opaque	—	Tr	—	—
Clay	88	95	97	28
Volcanic glass	2	Tr	—	—
Micronodules	10	5	3	2
Zeolite	Tr	—	—	10
Carbonate unsp.	—	Tr	Tr	60
Fish remains	Tr	Tr	—	—

Silica and Iron Content: 2-10
SiO_2 = 49%
Fe = 6.0%

Carbon-Carbonate: 5-42, 6-42
% Carbonate 2.5 25.8
% Organic Carbon 0.0 0.0

Carbonate Content: *2-15 = 1%
2-145= 0%

SITE 464 HOLE CORE 8 CORED INTERVAL 60.5 to 70.0 m



CLAY
0-83 cm: Highly disturbed clay. Dark brown (10YR 4/3) to brown (10YR 5/3) or dark yellowish brown (10YR 4/4). Mottles of pale brown (10YR 6/3) and very dark grayish brown (10YR 3/2) at 25-83 cm.
150-245 cm: Highly disturbed clay. Mottles at 150-175 cm show aforementioned colors with the addition of very dark gray (10YR 3/2). Dominant colors are the same as above.

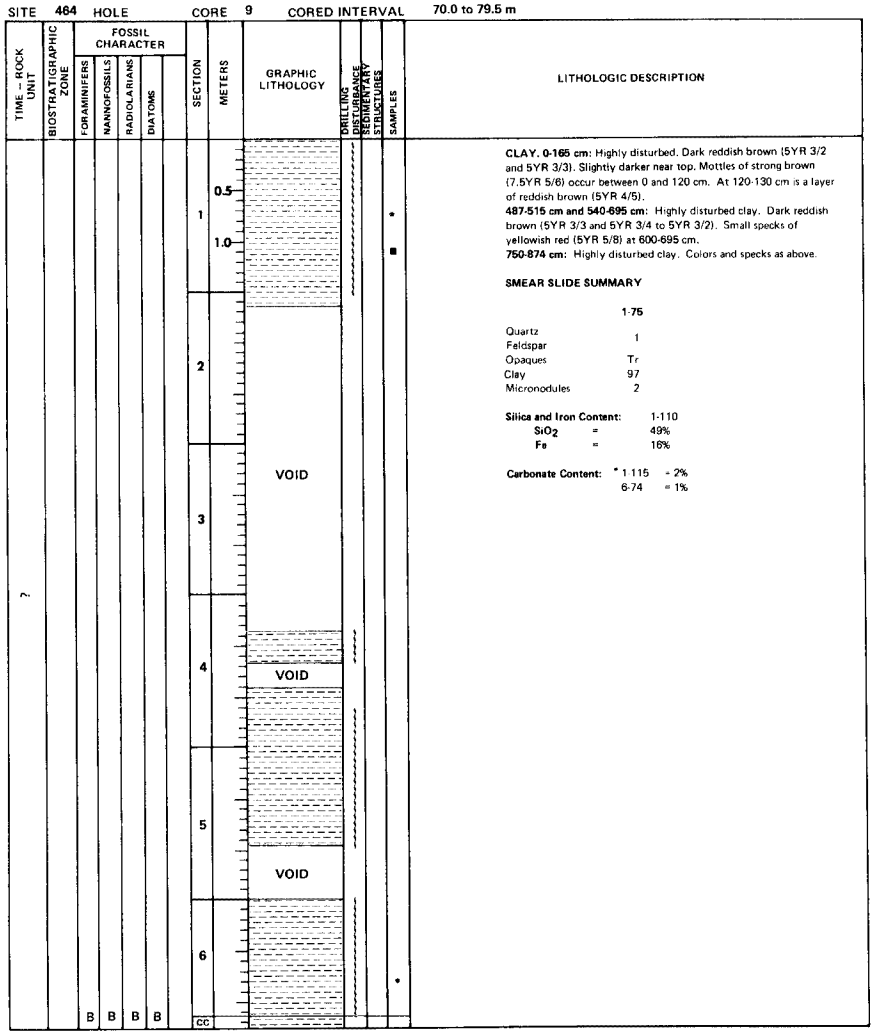
SMEAR SLIDE SUMMARY

	1-49
Clay	85
Volcanic glass	Tr
Micronodules	5
Carbonate unsp.	10
Fish remains	Tr

Silica and Iron Content: 2-40
SiO_2 = 48.0%
Fe = 5.1%

Carbonate Content: *2-45 = 2%

SITE 464 HOLE CORE 9 CORED INTERVAL 70.0 to 79.5 m



CLAY, 0-165 cm: Highly disturbed. Dark reddish brown (5YR 3/2 and 5YR 3/3). Slightly darker near top. Mottles of strong brown (7.5YR 5/6) occur between 0 and 120 cm. At 120-130 cm is a layer of reddish brown (5YR 4/5).
487-515 cm and 540-695 cm: Highly disturbed clay. Dark reddish brown (5YR 3/3 and 5YR 3/4 to 5YR 3/2). Small specks of yellowish red (5YR 5/8) at 600-695 cm.
750-874 cm: Highly disturbed clay. Colors and specks as above.

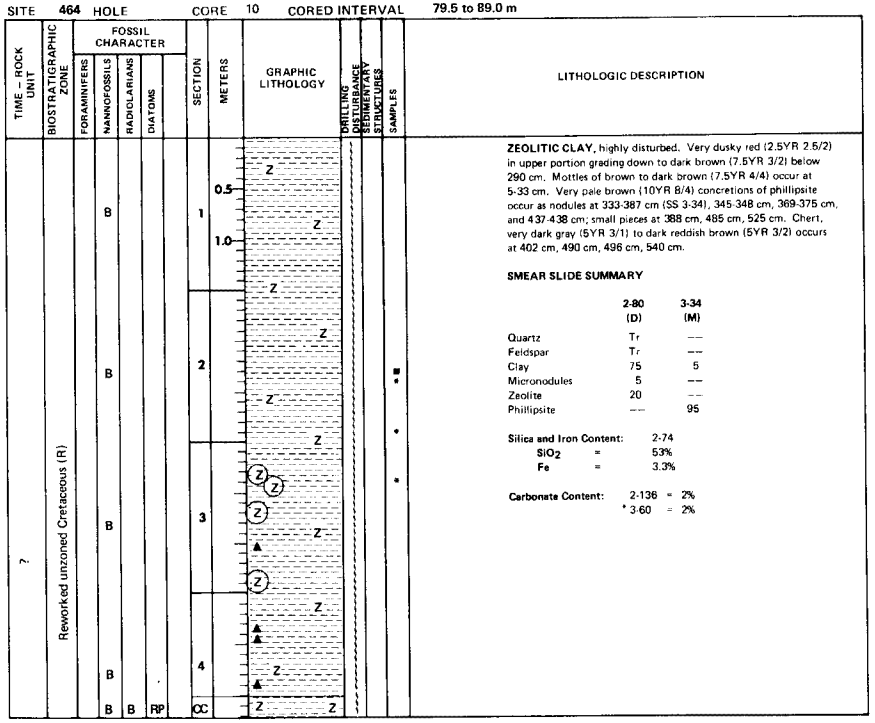
SMEAR SLIDE SUMMARY

	1-75
Quartz	1
Feldspar	
Opaques	Tr
Clay	97
Micronodules	2

Silica and Iron Content: 1-110
SiO_2 = 49%
Fe = 16%

Carbonate Content: * 1-115 = 2%
6-74 = 1%

SITE 464 HOLE CORE 10 CORED INTERVAL 79.5 to 89.0 m



ZEOLITIC CLAY, highly disturbed. Very dusky red (2.5YR 2.5/2) in upper portion grading down to dark brown (7.5YR 3/2) below 290 cm. Mottles of brown to dark brown (7.5YR 4/4) occur at 5-33 cm. Very pale brown (10YR 8/4) concretions of phillipsite occur as nodules at 333-387 cm (SS 3-34), 345-348 cm, 369-375 cm, and 437-438 cm; small pieces at 388 cm, 485 cm, 525 cm. Chert, very dark gray (5YR 3/1) to dark reddish brown (5YR 3/2) occurs at 402 cm, 490 cm, 496 cm, 540 cm.

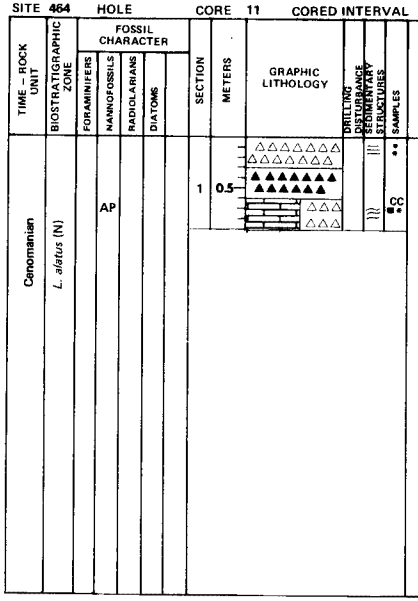
SMEAR SLIDE SUMMARY

	2-80 (D)	3-34 (M)
Quartz	Tr	—
Feldspar	Tr	—
Clay	75	5
Micronodules	5	—
Zeolite	20	—
Phillipsite	—	95

Silica and Iron Content: 2-74
SiO_2 = 53%
Fe = 3.3%

Carbonate Content: 2-136 = 2%
* 3-60 = 2%

SITE 464 HOLE CORE 11 CORED INTERVAL 89.0 to 98.5 m

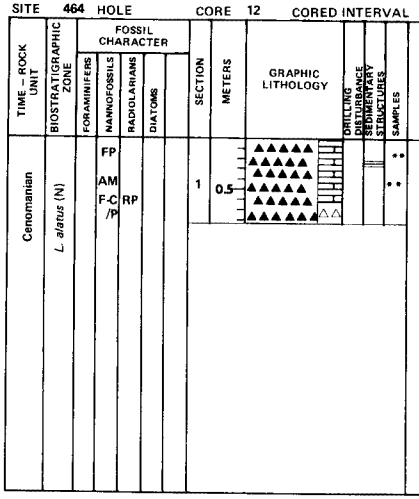


PORCELLANITE, CHERT AND SILICIFIED LIMESTONE.
0-30 cm: Porcellanite in various pieces and fragments. Colors include light reddish brown (5YR 6/3) and dark reddish gray (5YR 4/2). Occasionally brecciated and laminated. Rare chert of dark reddish brown (5YR 3/3).
30-60 cm: Chert pieces and fragments. Yellowish brown (10YR 5/6), dark grayish brown (10YR 4/2) at 30-45 cm. Pale yellow (5Y 7/4), olive brown (2.5Y 4/4) and dark olive gray (5Y 3/2) at 45-60 cm. Chert shows brecciation and mottling.
60-89 cm: Silicified limestone in five pieces. White (5Y 8/1, 5Y 8/2) to light gray (5Y 7/1) or gray (5Y 6/1). Chert at 72 cm (5Y 3/2) and at 87-89 cm very dark gray (7.5YR 3/2). Some wavy laminations.

SMEAR SLIDE SUMMARY

	1-75	1-18
Quartz	40	5
Opaques	5	—
Carbonate unsp.	55	—
Clay	—	20
Opal CT	—	75
Silica and Iron Content:		1-71
SiO_2		86%
Fe		0.39%
Carbon-Carbonate:		1-68
% Carbonate		11.7
% Organic Carbon		0.0
Carbonate Content:		1-11 = 0%

SITE 464 HOLE CORE 12 CORED INTERVAL 98.5 to 108.0 m



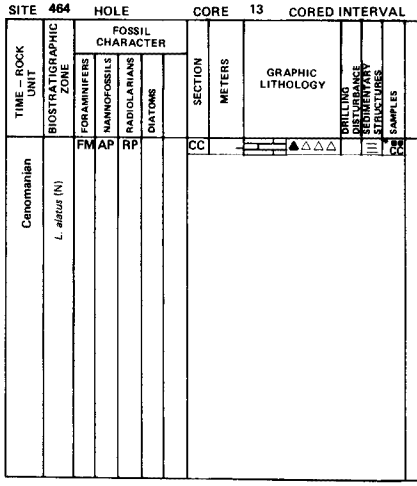
CHERT AND LIMESTONE. Chert with occasional nannofossil limestone; 22 pieces total. Cherts are shades of gray and olive, two brown pieces near bottom of core. Colors are pale olive (10Y 6/2), greenish gray (5GY 6/1), dark reddish brown (5YR 3/4), dark olive gray (5Y 3/2), reddish brown (5YR 4/4). Some chert pieces display mottles. Nannofossil limestones and siliceous limestones are generally light gray and green. Colors are pale green (5G 6/2), dark greenish gray (5G 4/1) occurs as laminae in the pale green, very pale green (10G 8/2), light greenish gray (5G 7/1). Chert to limestone proportion is ~75/25.

SMEAR SLIDE SUMMARY:

	1-20	1-50	1-50 Insol. Residue
Quartz	2	—	—
Feldspar	3	—	—
Recrystallized Si	—	10	100
Volcanic glass	Tr	—	—
Pyrite	Tr	—	—
Carbonate unsp.	85	70	—
Calc. nannofossils	10	20	—
Fish remains	Tr	—	—

Carbonate Content: 1-22 = 19%

SITE 464 HOLE CORE 13 CORED INTERVAL 108.0 to 117.5 m

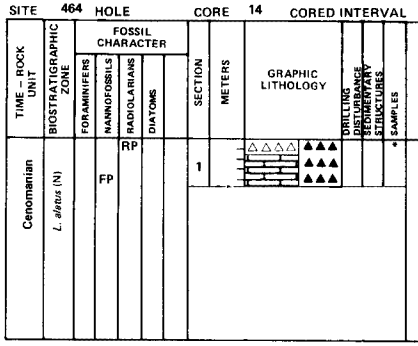


SILICIFIED LIMESTONE. Silicified limestone, generally light greenish gray (5G 7/1) or (5G 8/1). Has greenish gray (5G 6/1) discontinuous laminae and streaks/specks of medium bluish gray (5B 5/1). Chert, one piece, black (5Y 2/1).

SMEAR SLIDE SUMMARY

	CC
Clay	25
Carbonate unsp.	65
Calc. nannofossils	5
Radiolaria	5
Silica and Iron Content:	CC-9
SiO_2	69.0%
Fe	0.45%
Carbon-Carbonate:	CC-10
%Carbonate	22.5
%Organic Carbon	0.0
Carbonate Content: CC-9 = 27.0%	

SITE 464 HOLE CORE 14 CORED INTERVAL 117.5 to 127.0 m

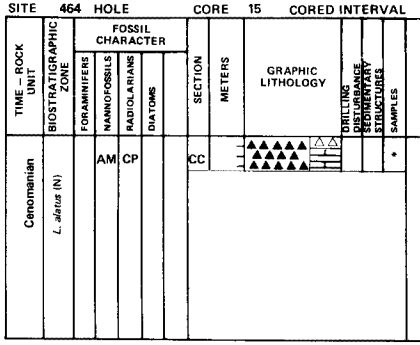


CHERT AND SILICEOUS LIMESTONE. Siliceous limestone with chert. The limestone is pale blue green (5BG 7/1), pale blue (5B 7/1), medium bluish gray (5B 5/1), greenish gray (5G 7/1). Cherts are various shades of gray: dark gray (N3, N4), gray (N5), light gray (N7). Lowest piece of dark gray (N3) chert has mottles of light gray (N7) to white (N8) and pyrite (possibly marcasite) blebs scattered in a 1 cm layer. Chert to limestone ratio is ~50/50.

SMEAR SLIDE SUMMARY

	1-7
Clay	35
Pyrite	5
Carbonate unsp.	60

SITE 464 HOLE CORE 15 CORED INTERVAL 127.0 to 136.5 m



CHERT AND SILICEOUS LIMESTONE. Chert with some siliceous nannofossil limestone. Cherts are dark grays and browns: dark reddish brown (5YR 3/3), dark gray (N4), one piece with a light olive gray (5Y 6/1) stripe down the middle. Limestones are light greenish gray (5GY 7/1), greenish gray (5G 6/1), and light gray (N7). Four pieces of chert, two pieces of limestone.

SMEAR SLIDE SUMMARY

	CC
Carbonate unsp.	40
Siliceous unsp.	15
Calc. nannofossils	40
Radiolaria	5

SITE 464 HOLE CORE 16 CORED INTERVAL 135.5 to 146.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES
Cenomanian	*L. alatus* (N)		CP	CP		CC					C,•

SILICEOUS NANNOFOSSIL LIMESTONE. One large piece (7 cm) of siliceous nannofossil limestone, four small pieces of chert. Limestone is light greenish gray (5G 8/1) with mottles of dark reddish brown (5YR 3/4) chert. Faint laminations. Chert pieces are also 5YR 3/4, one has a rim of the same siliceous nannofossil limestone.

SMEAR SLIDE SUMMARY

	CC
Clay	15
Carbonate unsp.	45
Calc. nannofossils	20
Radiolaria	20
Carbon-Carbonate:	CC-16
% Carbonate	40.0
% Organic Carbon	0.1

SITE 464 HOLE CORE 17 CORED INTERVAL 146.0 to 155.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES
Albian to Cenomanian	*R. apenninica–P. buxtorfi* (F) *L. alatus* (N)	RP	AM	RP		CC					•

CHERT. Chert in fragments. Reddish brown (5YR 4/4), dark reddish brown (5YR 3/3), brown (10YR 5/3), and dark brown (7.5YR 4/2) (10YR 4/3). Fragments display streaks of strong brown (7.5YR 5/6). Many pieces contain small cavaties filled with limestone of various colors: light gray (5Y 7/1), red (2.5YR 5/6), yellowish red (5YR 7/8), white (5Y 8/1, mostly coatings), reddish yellow (7.5YR 8/6), pink (5YR 7/4). Some of the chert is mottled. Other have stripes of reddish brown (5YR 5/3) and light reddish brown (5YR 6/3).

SMEAR SLIDE SUMMARY

	CC-30 White coating on chert
Carbonate unsp.	100
Calc. nannofossils	Tr

SITE 464 HOLE CORE 18 CORED INTERVAL 155.5 to 165.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES
Albian to Cenomanian	*E. turriseiffeli*–*L. alatus* (N)	RP	CP AP	B		CC					•

CHERT AND SILICEOUS LIMESTONE. Chert fragments with some siliceous limestone. Cherts are dark brown (7.5YR 4/2 and 3/2), dark reddish brown (5YR 3/4) and (5YR 3/3), reddish brown (5YR 5/3). Color variations form irregular streaks. Siliceous limestone occurs as white (10YR 8/1) coatings, and pink (5YR 7/4 to 5YR 8/4) vug fillings. One piece of limestone is light gray (2.5Y 7/0) with lighter and darker streaks forming horizontal and wavy laminae. Streaks are white (2.5Y N8) to dark gray or gray (N4, N5). The chert to limestone ratio is about 85/15.

SMEAR SLIDE SUMMARY

	CC-13 Chert Coating
Pyrite	5
Carbonate unsp.	75
Calc. nannofossils	5
Radiolaria	15

SITE 464 HOLE CORE 19 CORED INTERVAL 165.0 to 174.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES
Albian to Cenomanian	? Albian (F) *E. turriseiffeli* (N)	RP	AP	B		CC					

CHERT. Four pieces of chert. Three are yellowish red (5YR 5/4) with streaks and mottles of dusky red (2.5YR 3/2). Some limestone filled vugs are present. One piece is dark reddish brown (2.5YR 2.5/2) containing elongated vugs filled with pink (7.5YR 7/4) limestone.

SITE 464 HOLE CORE 20 CORED INTERVAL 174.5 to 184.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES
Albian to Cenomanian	? Albian (F) *E. turriseiffeli* (N)	RP	AP	RP		1					•

CHERT. Chert pieces and fragments. The chert is various shades of reddish brown and has vugs filled with lighter colored limestone. Chert colors are dark reddish brown (5YR 2.5/2 and 5YR 3/2), reddish brown (5YR 5/4), black (5YR 2.5/1), dark yellowish brown (10YR 4/4), dark reddish brown (2.5YR 3/4), reddish brown (2.5YR 5/4). The chert is sometimes mottled. Limestone occurs as white (10YR 8/1 and lighter) coatings on chert fragments, and as light brown to pink vug fillings: pink (5YR 8/3), (5YR 7/3), reddish yellow (5YR 7/6). Sometimes the vugs are elongated.

SMEAR SLIDE SUMMARY

	1-44 Vug Filling
Carbonate unsp.	80
Hematite	Tr
Calc. nannofossils	20

SITE 464 HOLE CORE 21 CORED INTERVAL 184.0 to 193.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES
Albian to Cenomanian	? Albian (F) *E. turriseiffeli* (N)	FP	RP CP	RP		1	0.5				•

CHERT AND SILICEOUS MARLSTONE. Chert with occasional siliceous marlstone. The chert is dark brown to brown (7.5YR 4/4), dark brown (7.5YR 3/2), reddish brown (2.5YR 4/4), and dark reddish brown (2.5YR 3/4). Chert fragments have coatings of chalk or marlstone that is yellowish red (5YR 4/6) and pinkish white (5YR 8/2). Vugs in chert also filled with chalk that is red (2.5YR 5/6). Siliceous marlstone is yellowish red (5YR 4/6) or dark reddish brown (5YR 3/4). One piece at 10 cm has mottles of light olive gray (5Y 6/2). Chert is ≈95% of the material recovered.

SMEAR SLIDE SUMMARY

	1-10 (red)	1-10 (green)
Quartz	Tr	—
Feldspar	Tr	Tr
Clay	20	30
Volcanic glass	Tr	—
Hematite	—	Tr
Carbonate unsp.	50	58
Calc. nannofossils	5	2
Recrystallized SiO_2 (Radiolaria)	25	10

SITE 464 HOLE CORE 22 CORED INTERVAL 193.5 to 203.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Albian to Cenomanian	?Albian (F) *E. turriseiffeli* (N)	FP	CP			1						**CHERT.** Several pieces of chert of various shades of brown. Colors are dark yellpwish brown (10YR 4/4), yellowish brown (10YR 5/6), dark red (2.5YR 3/6), dark brown (7.5YR 4/4), reddish brown (2.5YR 4/4), dark reddish brown (5YR 3/4). Vug fillings and coatings of siliceous chalk which is yellow (10YR 7/6), light red (2.5YR 6/8 and 2.5YR 6/6), and sometimes white (5YR 8/1). Rarely cherts show banding.

SITE 464 HOLE CORE 23 CORED INTERVAL 203.0 to 212.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Albian to Cenomanian	? Albian (F) *E. turriseiffeli* (N)	FP	AP AP C-A /P			1	0.5				*	**CHERT.** Pieces of chert of various shades of red brown. Colors are weak red (2.5YR 4/2), dark brown (7.5YR 4/4), brown (7.5YR 5/4), and light red (2.5YR 6/6). Cherts are often banded and less often mottled. Some pieces contain vugs that are filled with siliceous chalk (see Smear Slide) that is light red (2.5YR 6/8) and reddish yellow (7.5YR 8/6). **SMEAR SLIDE SUMMARY** **1-27** Carbonate unsp. 65 Calc. nannofossils 20 Radiolaria 15

SITE 464 HOLE CORE 24 CORED INTERVAL 212.5 to 222.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Albian to Cenomanian	? Albian (F) *E. turriseiffeli* (N)	FP	AM	FP		CC					*	**CHERT.** Chert in fragments. Dark brown (7.5YR 4/4), dark reddish brown (2.5YR 3/4), and reddish brown (2.5YR 4/4). Some mottling and striping or banding. Most pieces contain vugs filled with siliceous chalk that can be red (2.5YR 5/8), pink (5YR 7/3 or 7/4), or pinkish white (5YR 8/2). Some chert pieces are coated with chalk (see Smear Slide) that can be white (5YR 8/1), pinkish white (5YR 8/2) or pink (5YR 8/3). **SMEAR SLIDE SUMMARY** **CC-26** Carbonate unsp. 70 Calc. nannofossils 20 Radiolaria 10

SITE 464 HOLE CORE 25 CORED INTERVAL 222.0 to 231.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Lower Albian	?Albian (F) *P. cretacea* (N)	FP FP				1	0.5 1.0				*	**CHERT.** Many pieces of chert of various colors, including: 2.5YR 4/4 – reddish brown 2.5YR 3/2 – dusky red 2.5YR 3/4 – dark reddish brown 2.5YR 3/6 – dark red 2.5YR 4/2 – weak red 5YR 4/4 – reddish brown 7.5YR 4/2 – brown to dark brown 7.5YR 4/4 – brown to dark brown 7.5YR 5/4 – brown Most chert pieces have vugs filled with chalk that also comes in many colors: 2.5YR 6/4 – light reddish brown 2.5YR 6/8 – light red 5YR 5/8 – yellowish red 5YR 7/6 – reddish yellow 5YR 7/8 – reddish yellow 7.5YR 6/8 – reddish yellow 7.5YR 7/2 – pinkish gray 7.5YR 7/4 – pink 5B 9/1 – bluish white (Smear Slide 57)-coating only. One chert pebble has a mottle of 5Y 6/8, olive yellow. **SMEAR SLIDE SUMMARY** **1-57** Hematite Tr Carbonate unsp. 96 Calc. nannofossils 4 Radiolaria Tr

SITE 464 HOLE CORE 26 CORED INTERVAL 231.5 to 241.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Lower Albian	? Albian (F) *P. cretacea* (N)	FP	CP	RP		1	0.5 1.0				*	**CHERT.** Chert in many pieces and fragments. Dark red brown rock with lighter chalk vug fillings and coatings. Chert colors include dark reddish brown (5YR 3/2, 3/3) (also 2.5YR 3/4), dusky red (2.5YR 3/2), dark brown (7.5YR 3/2), reddish brown (2.5YR 4/4), brown to dark brown (7.5YR 4/4), reddish brown (5YR 4/4). Some pieces have mottles and streaks of reddish brown (5YR 4/3). One piece has grayish olive (10Y 4/2) and moderate olive brown (5Y 4/4) cracks. Nearly all chert pieces have chalk-filled vugs that are white (5YR 8/1), pinkish white (5YR 8/2) or yellowish red (5YR 5/8). Coatings are white (5Y 8/2) or yellowish red (5YR 4/6). **SMEAR SLIDE SUMMARY** **1-63** **Vug Filling** Carbonate unsp. 50 Calc. nannofossils 40 Radiolaria 10

SITE 464 HOLE CORE 27 CORED INTERVAL 241.0 to 250.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES
Upper Aptian to Lower Albian	? Albian (F) *P. angustus* to *P. cretacea* (N)	CM	AM	Otlin water RP)		1	0.5				*

CHERT. Many pieces of chert, generally reddish brown in color; vug fillings and coatings of light brown to pink or white. Chert colors include dark reddish brown (5YR 3/2, 3/3, and 3/4), dark red (2.5YR 3/6), brown (7.5YR 5/4), dark grayish brown (2.5Y 4/2), and dark brown (7.5YR 3/2). Radiolarian-nannofossil chalk (see Smear Slide) in vugs occurs as pink (7.5YR 8/4), reddish yellow (5YR 7/6), white (N8), pink (5YR 7/3), very pale brown (10YR 7/4), light red (2.5YR 6/8), light gray (2.5Y 7/2), light reddish brown (5YR 6/4). Cherts show rare mottling and banding. One piece of porcellanite at 10-11 cm is grayish blue (5PB 5/2) and white (N8).

SMEAR SLIDE SUMMARY

	1-43
Carbonate unsp.	25
Calc. nannofossils	60
Radiolaria	15

SITE 464 HOLE CORE 28 CORED INTERVAL 250.5 to 260.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES
				AP		1					

CHERT. Pieces of chert, generally dark reddish brown with lighter vug fillings; a few quartz veins. Chert colors are reddish brown (5YR 3/2) with yellowish red (5YR 5/6) vug fillings of chalk at 0-29 cm. From 30-50 cm chert is much darker, very dark gray (10YR 3/1) and very dark grayish brown (10YR 3/2).

SITE 464 HOLE CORE 29 CORED INTERVAL 260.0 to 269.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES
Lower Cretaceous	? Albian (F)	FP	C-A /P	CP		1	0.5 1.0				* * * *

CHERT. Many pieces of chert. Streaks, bands and filled vugs are common. Very thin coatings of siliceous clay (see Smear Slides) on a few pieces. Chert colors are black (10YR 2/1, 2.5YR N2.5), dark reddish brown (5YR 3/2 and 3/4), very dusky red (2.5YR 2.5/2), dark red (2.5YR 3/6), dark brown (10YR 3/8). Colors of the sediment in vugs and coatings are white (10YR 8/1), light reddish brown (5YR 6/3), red (2.5YR 5/8), light red (2.5YR 6/6) and yellowish gray (5Y 7/2).
At 65-67 cm occurs a small piece of dark brown (7.5YR 3/2) nannofossil marlstone; see Smear Slide 1-66 cm.

SMEAR SLIDE SUMMARY

	1-26	1-42	1-66†	1-96
Quartz	Tr	—	—	Tr
Opaques	Tr	—	4	1
Clay	78	70	53	72
Volcanic glass	—	—	3	Tr
Hematite	1	—	—	1
Micronodules	1	1	—	1
Zeolites	Tr	—	—	—
Carbonate unsp.	5	9	20	5
Calc. nannofossils	Tr	5	20	—
Recrystallized SiO_2	15	15	—	20

†Minor lithology

SITE 464 HOLE CORE 30 CORED INTERVAL 269.5 to 279.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES
Lower Cretaceous	? Albian (F)	FP	RP			1					* *

CHERT. Nine pieces of chert; uniform in color, olive black (5Y 2/1). Two pieces have vug filling of porcellanite (?) which is yellowish brown (10YR 5/4). Sediments coating some pieces are clay (see SS descriptions) which is very pale brown (10YR 7/4), and yellow (10YR 7/8).

SMEAR SLIDE SUMMARY

	1-23	1-33
Opaques	1	Tr
Clay	88	85
Volcanic glass	Tr	Tr
Hematite	1	—
Micronodules	Tr	—
Carbonate unsp.	—	10
Calc. nannofossils	1	—
Rextlz SiO_2	8	5

SITE 464 HOLE CORE 31 CORED INTERVAL 279.0 to 288.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES
Lower Cretaceous		RP	RP AP			1	0.5				

Chert, generally brown chert, occasionally mottled. Sediments occur as vug fillings, laminae (both porcellanite?) and surface coatings which are lighter in color. Chert colors are dark yellowish brown (10YR 4/4), brown (10YR 5/3), grayish brown (10YR 5/2), greenish gray (5GY 6/1), olive black (5Y 2/1), brown (7.5YR 5/4), reddish brown (2.5YR 5/4), dark reddish brown (2.5YR 3/4), and light gray (N7). Colors of vug fillings, laminae, etc., are yellow (10YR 7/6), white (10YR 8/2), light gray (10YR 7/1), yellowish brown (10YR 5/6) grayish brown (10YR 5/2), light red (2.5YR 6/6), white (N9), bluish white (5B 9/1) and light bluish gray (5B 7/1).

SITE 464 HOLE CORE 32 CORED INTERVAL 288.5 to 298.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES
Lower Cretaceous			AP	B		1	0.5				* *

CHERT AND NANNOFOSSIL MARLSTONE, many pieces of chert with one piece of nannofossil marlstone at 24-30 cm. Chert colors are dark brown (10YR 3/3), black (10YR 2/1), very dark gray (10YR 3/1), dark brown (7.5YR 4/4), reddish brown (5YR 4/4, 4/3) dark reddish brown (5YR 3/3, 2.5/2), dark reddish gray (5YR 4/2). Cherts show both banding and mottling of reddish yellow (7.5YR 7/6), weak red (10R 5/3) and black (10YR 2/1). Chert vugs and coatings of chalk (?) are white (lighter than 10YR 8/1), pale yellow (5Y 7/3) and red (2.5YR 5/8). White coatings on a chert piece at 31-38 cm are calcite crystals. The nannofossil marlstone is dark red (2.5YR 3/6) with horizontal laminations of red (2.5YR 4/8).

SMEAR SLIDE SUMMARY

	1-25	1-27 Insol. Residue
Quartz	—	Tr
Clay	55	80
Volcanic glass	Tr	5
Hematite	5	10
Carbonate unsp.	5 (dolo?)	—
Cal. nannofossils	30	5
Radiolaria	3	—

Carbon-Carbonate: 1-25
%Carbonate 25.0
%Organic Carbon 4.2

SITE 464 HOLE CORE 33 CORED INTERVAL 298.0 to 307.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
						1		▲▲▲▲▲▲▲▲▲				**CHERT,** several pieces of chert. Above 36 cm, cherts are banded red (2.5YR 4/8) and dark gray (N3). Below 36 cm cherts are very dark gray (10YR 3/1) and dark grayish brown (2.5Y 4/2) banded; also olive brown (2.5Y 4/4) and dark reddish brown (2.5YR 3/4) with vugs filled with pale blue green (5BG 7/2) porcellanite.

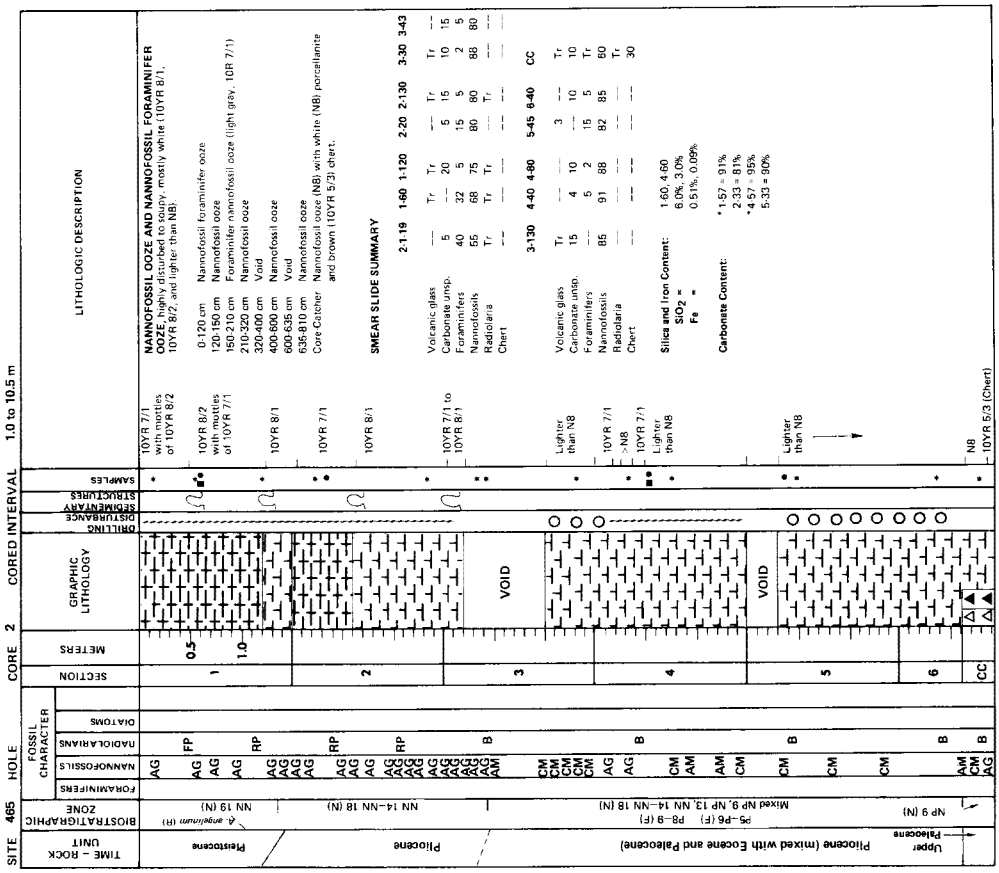
SITE 464 HOLE CORE 34 CORED INTERVAL 307.5 to 308.5 m

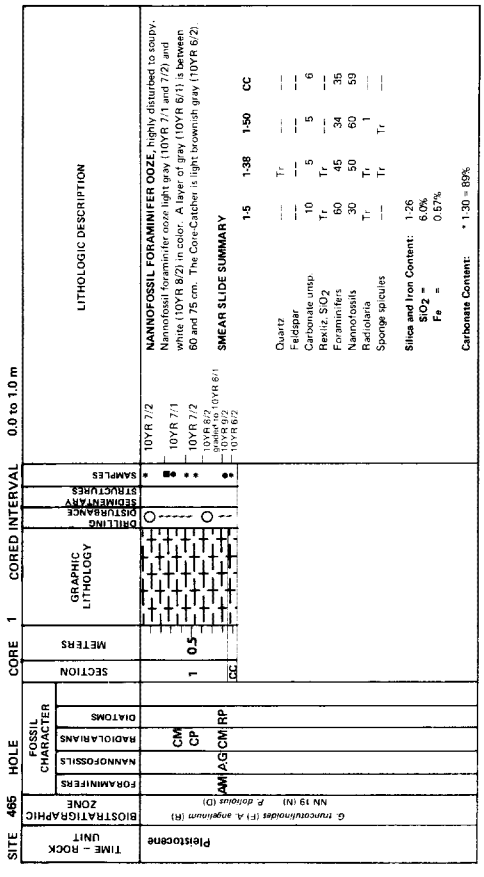
TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
						CC		▲▲▲▲▲▲▲				**CHERT AND BASALT** **0-10 cm:** One large piece and many chips of chert, banded red (2.5YR 4/8) and very dark gray (N3). **10-26 cm, CC:** Several pieces of fine-grained, variably altered basalt. Their color is gray (N5).

SITE SUMMARY SHEET

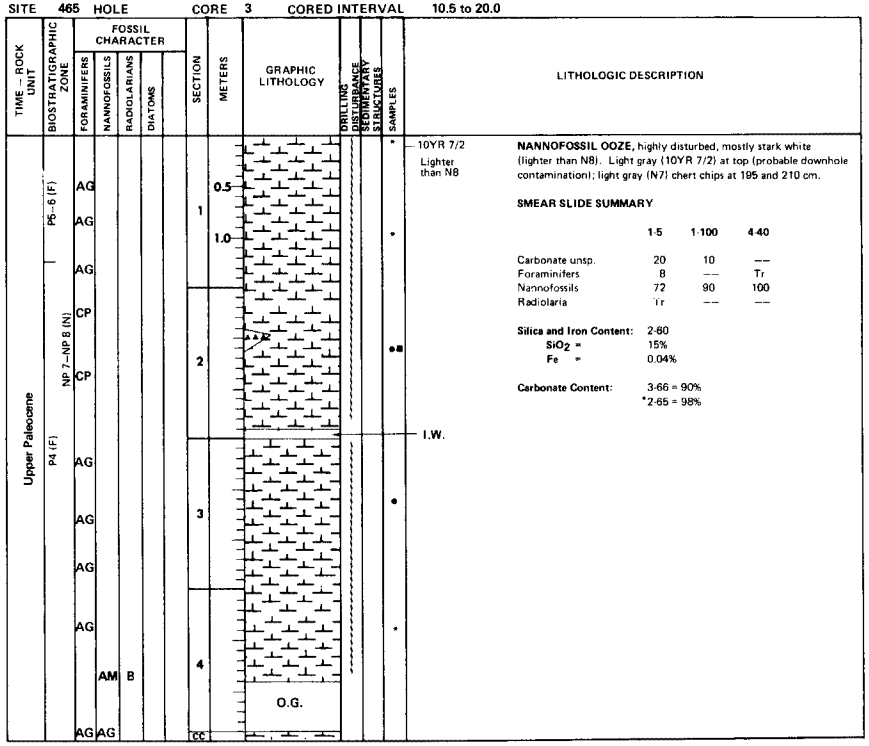
SITE 465

Date occupied:	August 23, 1978 (2045Z)
Date departed:	August 24, 1978 (1800Z)
Time on hole:	20.75 hours
Position: Latitude:	33° 49.23'N
Longitude:	178° 55.14'E
Water depth (sea level):	2161 corrected meters, echo sounding
Water depth (rig floor):	2167 corrected meters, echo sounding
Bottom felt at:	2165.5 meters, drill pipe
Penetration:	96 meters
Number of holes:	1
Number of cores:	11
Total length of cored section:	96 meters
Total core recovery:	43.89 meters
Percentage core recovery:	46.0%
Oldest Sediment Cored	
Depth sub-bottom:	96 meters
Nature:	Foraminifer nannofossi ooze
Age:	Lower Maastrichtian
Measured velocity:	n/a
Basement	
Depth sub-bottom:	n/a
Nature:	n/a
Velocity range:	n/a


SITE 465 HOLE CORE 2 CORED INTERVAL 1.0 to 10.5 m
TIME – ROCK UNIT
BIOSTRATIGRAPHIC ZONE
FOSSIL CHARACTER
FORAMINIFERS
NANNOFOSSILS
RADIOLARIANS
DIATOMS
SECTION
METERS
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
SAMPLES
LITHOLOGIC DESCRIPTION
Pleistocene
Pliocene
Pliocene (mixed with Eocene and Paleocene)
Upper Pliocene
NN 19 (N)
NN 14–NN 18 (N)
Mixed NP 9, NP 13, NN 14–NN 18 (N)
NP 9 (N)
VOID
NANNOFOSSIL OOZE AND NANNOFOSSIL FORAMINIFER OOZE, highly disturbed to soupy, mostly white (10YR 8/1, 10YR 8/2, and lighter than N8).
0-120 cm Nannofossil foraminifer ooze
120-150 cm Nannofossil ooze
150-210 cm Foraminifer nannofossil ooze (light gray, 10R 7/1)
210-320 cm Nannofossil ooze
320-400 cm Nannofossil ooze
400-600 cm Nannofossil ooze
600-635 cm Void
635-810 cm Nannofossil ooze
Core-Catcher Nannofossil ooze (N8) with white (N8) porcellanite and brown (10YR 5/3) chert.
SMEAR SLIDE SUMMARY
Volcanic glass
Carbonate unsp.
Foraminifers
Nannofossils
Radiolaria
Chert
Silica and Iron Content:
SiO2 =
Fe =
Carbonate Content:
Lighter than N8
10YR 5/3 (Chert)


SITE 465 HOLE CORE 1 CORED INTERVAL 0.0 to 1.0 m
TIME – ROCK UNIT
BIOSTRATIGRAPHIC ZONE
FOSSIL CHARACTER
FORAMINIFERS
NANNOFOSSILS
RADIOLARIANS
DIATOMS
SECTION
METERS
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
SAMPLES
LITHOLOGIC DESCRIPTION
Pleistocene
G. truncatulinoides (F) A. angulatum (R)
NN 19 (N) P. doliolus (D)
NANNOFOSSIL FORAMINIFER OOZE, highly disturbed to soupy. Nannofossil foraminifer ooze light gray (10YR 7/1 and 7/2) and white (10YR 8/2) in color. A layer of gray (10YR 6/1) is between 60 and 75 cm. The Core-Catcher is light brownish gray (10YR 6/2).
SMEAR SLIDE SUMMARY
Quartz
Feldspar
Carbonate unsp.
Rexite, SiO2
Foraminifers
Nannofossils
Radiolaria
Sponge spicules
Silica and Iron Content:
SiO2 =
Fe =
Carbonate Content:
* 1:30 = 89%

SITE 465 HOLE CORE 3 CORED INTERVAL 10.5 to 20.0



LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, highly disturbed, mostly stark white (lighter than N8). Light gray (10YR 7/2) at top (probable downhole contamination); light gray (N7) chert chips at 195 and 210 cm.

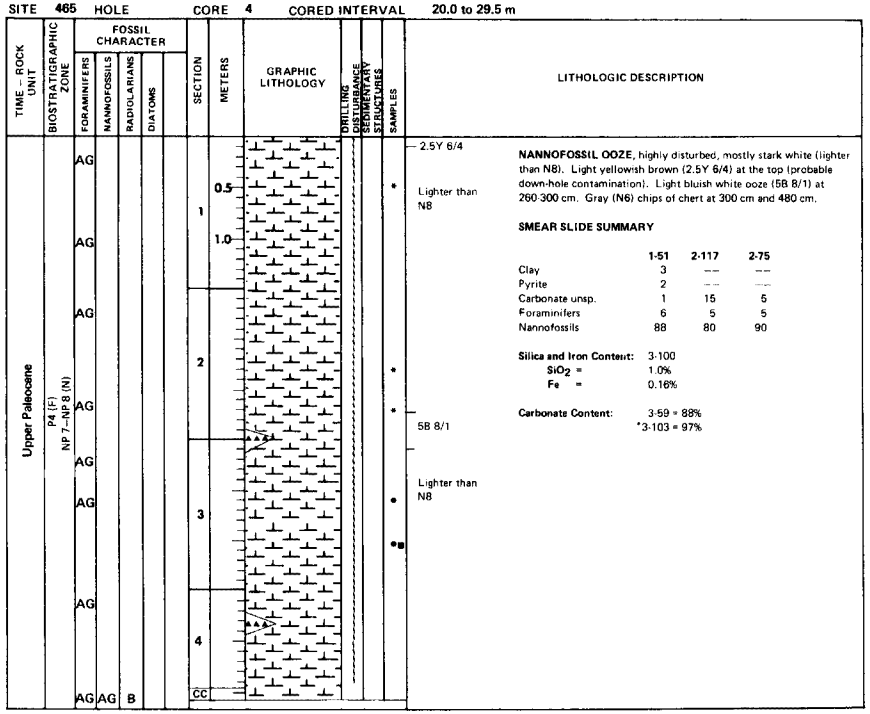
SMEAR SLIDE SUMMARY

	1-5	1-100	4-40
Carbonate unsp.	20	10	—
Foraminifers	8	—	Tr
Nannofossils	72	90	100
Radiolaria	Tr	—	—

Silica and Iron Content: 2-60
SiO_2 = 15%
Fe = 0.04%

Carbonate Content: 3-66 = 90%
*2-65 = 98%

SITE 465 HOLE CORE 4 CORED INTERVAL 20.0 to 29.5 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, highly disturbed, mostly stark white (lighter than N8). Light yellowish brown (2.5Y 6/4) at the top (probable down-hole contamination). Light bluish white ooze (5B 8/1) at 260-300 cm. Gray (N6) chips of chert at 300 cm and 480 cm.

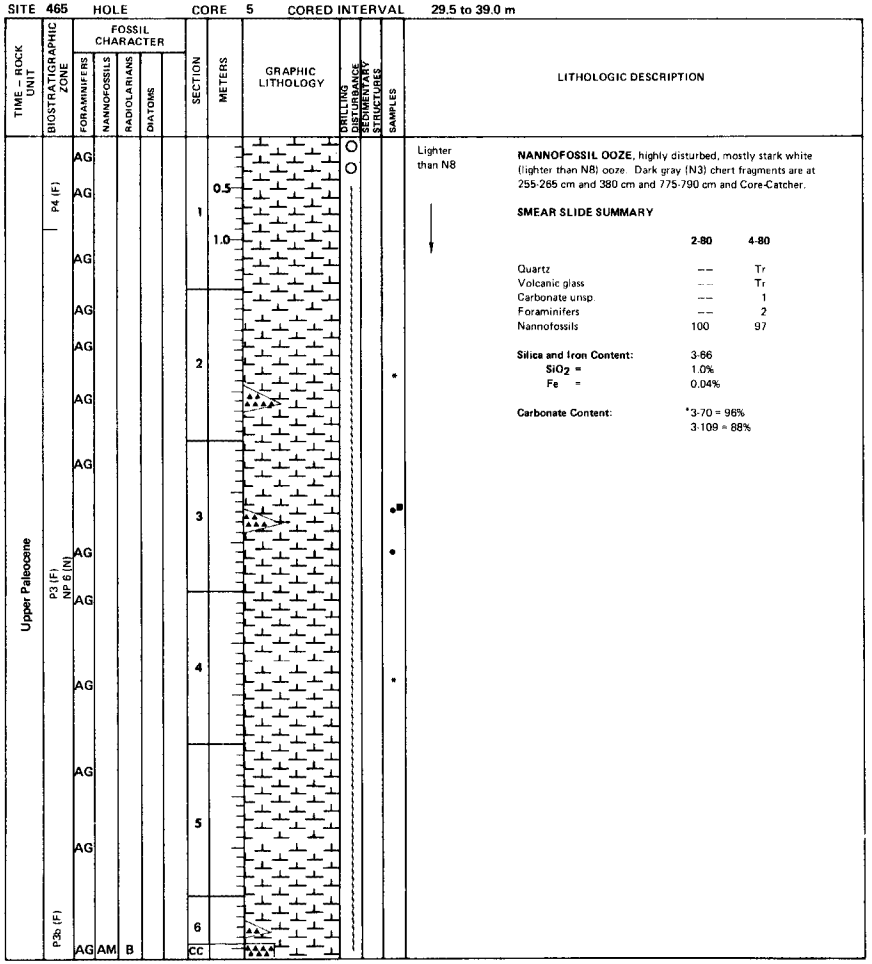
SMEAR SLIDE SUMMARY

	1-51	2-117	2-75
Clay	3	—	—
Pyrite	2	—	—
Carbonate unsp.	1	15	5
Foraminifers	6	5	5
Nannofossils	88	80	90

Silica and Iron Content: 3-100
SiO_2 = 1.0%
Fe = 0.16%

Carbonate Content: 3-59 = 88%
*3-103 = 97%

SITE 465 HOLE CORE 5 CORED INTERVAL 29.5 to 39.0 m



LITHOLOGIC DESCRIPTION

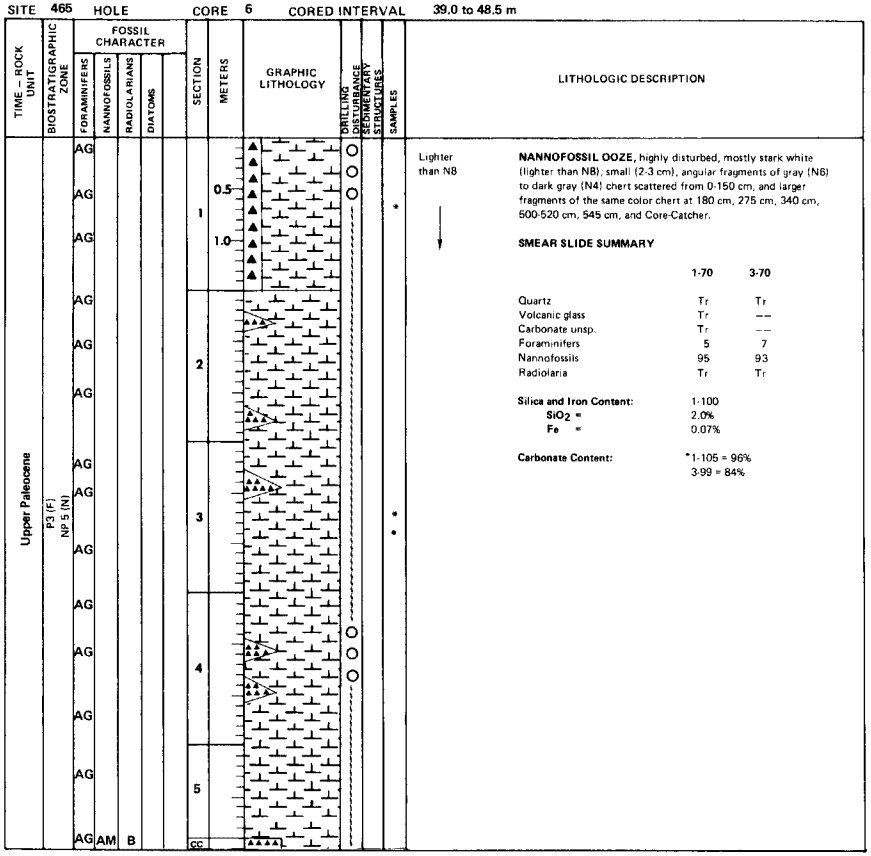
Lighter than N8

NANNOFOSSIL OOZE, highly disturbed, mostly stark white (lighter than N8) ooze. Dark gray (N3) chert fragments are at 255-265 cm and 380 cm and 775-790 cm and Core-Catcher.

SMEAR SLIDE SUMMARY

	2-80	4-80
Quartz	--	Tr
Volcanic glass	--	Tr
Carbonate unsp.	--	1
Foraminifers	--	2
Nannofossils	100	97
Silica and Iron Content:	3-86	
SiO_2 =	1.0%	
Fe =	0.04%	
Carbonate Content:	*3-70 = 96%	
	3-109 = 88%	

SITE 465 HOLE CORE 6 CORED INTERVAL 39.0 to 48.5 m



LITHOLOGIC DESCRIPTION

Lighter than N8

NANNOFOSSIL OOZE, highly disturbed, mostly stark white (lighter than N8); small (2-3 cm), angular fragments of gray (N6) to dark gray (N4) chert scattered from 0-150 cm, and larger fragments of the same color chert at 180 cm, 275 cm, 340 cm, 500-520 cm, 545 cm, and Core-Catcher.

SMEAR SLIDE SUMMARY

	1-70	3-70
Quartz	Tr	Tr
Volcanic glass	Tr	--
Carbonate unsp.	Tr	--
Foraminifers	5	7
Nannofossils	95	93
Radiolaria	Tr	Tr
Silica and Iron Content:	1-100	
SiO_2 =	2.0%	
Fe =	0.07%	
Carbonate Content:	*1-105 = 96%	
	3-99 = 84%	

SITE 465 HOLE CORE 7 CORED INTERVAL 48.5 to 58.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Upper Paleocene	P3 (F) NP 3–NP 4 (N)	AG	AG	B		CC		▲▲▲				**NANNOFOSSIL OOZE AND CHERT,** stark white (lighter than N8) nannofossil ooze with fragments of gray (10YR 5/1) and dark gray (10YR 4/1) chert.

SITE 465 HOLE CORE 8 CORED INTERVAL 58.0 to 67.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Lower Paleocene	P1 (F) NP 2–NP 3 (N)	AG	CM			CC		▲▲▲▲▲				**CHERT,** chips and pieces of dark gray (10YR 4/1) and gray (10YR 5/1) chert. One piece of chert has a coating of stark white (lighter than N8) **NANNOFOSSIL CHALK.**

SITE 465 HOLE CORE 9 CORED INTERVAL 67.5 to 77.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Upper Maastrichtian	*A. mayaroensis* (F) *L. quadratus* (N)	AG	A/M-G			CC		▲▲▲▲▲▲▲ ▲▲▲▲▲▲▲				**CHERT,** several fragments of gray (N6) to light gray (N7) chert.

SITE 465 HOLE CORE 10 CORED INTERVAL 77.0 to 86.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Upper Maastrichtian	*A. mayaroensis* (F) *L. quadratus* (N)	AG	AG	AM	B	1	0.5				•	Lighter than N8
							1.0					
						2						
						3		O. G.			•	
												I.W.
						4						Lighter than N8
						5					•	Lighter than N8
						CC		▲▲▲			•	

NANNOFOSSIL OOZE AND FORAMINIFERA NANNOFOSSIL OOZE, soupy, mostly stark white (lighter than N8); gray (N5) cherts are at 25-28 cm, 260 cm. Chert fragments are scattered throughout the intervals from 150-300 cm, 450-600 cm, and 720-735 cm.

0-395 cm Nannofossil Ooze
450-600 cm Foraminifera Nannofossil Ooze
600-750 cm Nannofossil Ooze

SMEAR SLIDE SUMMARY

	1-70	3-10	4-70	5-120
Volcanic glass	—	—	—	Tr
Carbonate unsp.	1	—	3	—
Foraminifers	6	6	15	4
Nannofossils	93	94	82	96

Silica and Iron Content: 5-100
SiO_2 = 4.0%
Fe = 0.03%

Carbonate Content: 5-16 = 90%
*5-106 = 94%

SITE 465 HOLE CORE 11 CORED INTERVAL 86.5 to 96.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Lower Maastrichtian	*Gr. gansseri* (F) *A. cymbiformis* (N)	AG	A/M-G	B B		1 CC	0.5 1.0	VOID	○ ○ ○		• • •	N8

NANNOFOSSIL OOZE AND CHERT, soupy, white (N8) ooze. Numerous small (2-3 cm) fragments of very dark gray (N3), dark gray (N4), gray (N5 and N6), and white (N8) chert scattered throughout. The Core-Catcher contains numerous chert fragments ranging in size from 1 mm to 3 cm. Colors are mostly black (N2) and very dark gray (N3). Fragments are in a soupy matrix of white (N8) nannofossil ooze.

SMEAR SLIDE SUMMARY

	1-10	CC-20
Feldspar	—	Tr
Quartz	—	Tr
Volcanic glass	—	60
Carbonate unsp.	65	25
Pyrite	—	Tr
Foraminifers	10	—
Nannofossils	20	25
Radiolaria	Tr	—

SITE SUMMARY SHEET

HOLE 465A

Date occupied:	August 24, 1978 (1800Z)
Date departed:	August 28, 1978 (0512Z)
Time on hole:	83.2 hours
Position: Latitude:	33° 49.23'N
Longitude:	178° 55.14'E
Water depth (sea level):	2161 corrected meters, echo sounding
Water depth (rig floor):	2167 corrected meters, echo sounding
Bottom felt at:	2165.5 meters, drill pipe
Penetration:	476 meters
Number of holes:	1
Number of cores:	46
Total length of cored section:	437 meters
Total core recovery:	108.5 meters
Percentage core recovery:	24.8%

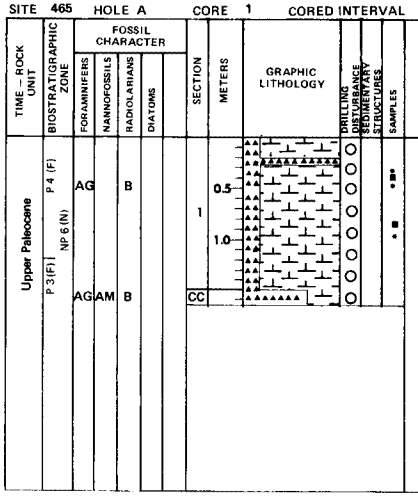
Oldest Sediment Cored

Depth sub-bottom:	411.7 meters
Nature:	Limestone
Age:	Upper Albian
Measured velocity:	2.89 km/s

Basement

Depth sub-bottom:	411.7 meters
Nature:	Altered basalt
Velocity range:	3.60 ±0.12 km/s

SITE 465 HOLE A CORE 1 CORED INTERVAL 39.0 to 48.5 m



Lighter than N9

NANNOFOSSIL OOZE

Soupy, white (lighter than N9) ooze. A few small (1–2 mm) **CHERT** fragments are scattered throughout; several larger (> 1 cm) fragments are at 145–150 cm. A large piece is at 20–25 cm. Colors of the chert are shades of medium to light gray (N4–N7), with most medium dark gray (N4).

The Core-Catcher has fragments of N4 chert in a matrix of soupy nannofossil ooze.

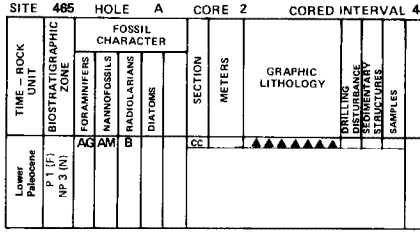
SMEAR SLIDE SUMMARY:

	1-100
Carbonate unspec.	2
Foraminifers	2
Nannofossils	95
Radiolarians	1

Silica and Iron Content:	1-37	1-88
SiO_2 =	2.0%	4.0%
Fe =	0.04%	0.37%

Carbonate Content: *1-34 = 97%
1-55 = 93%

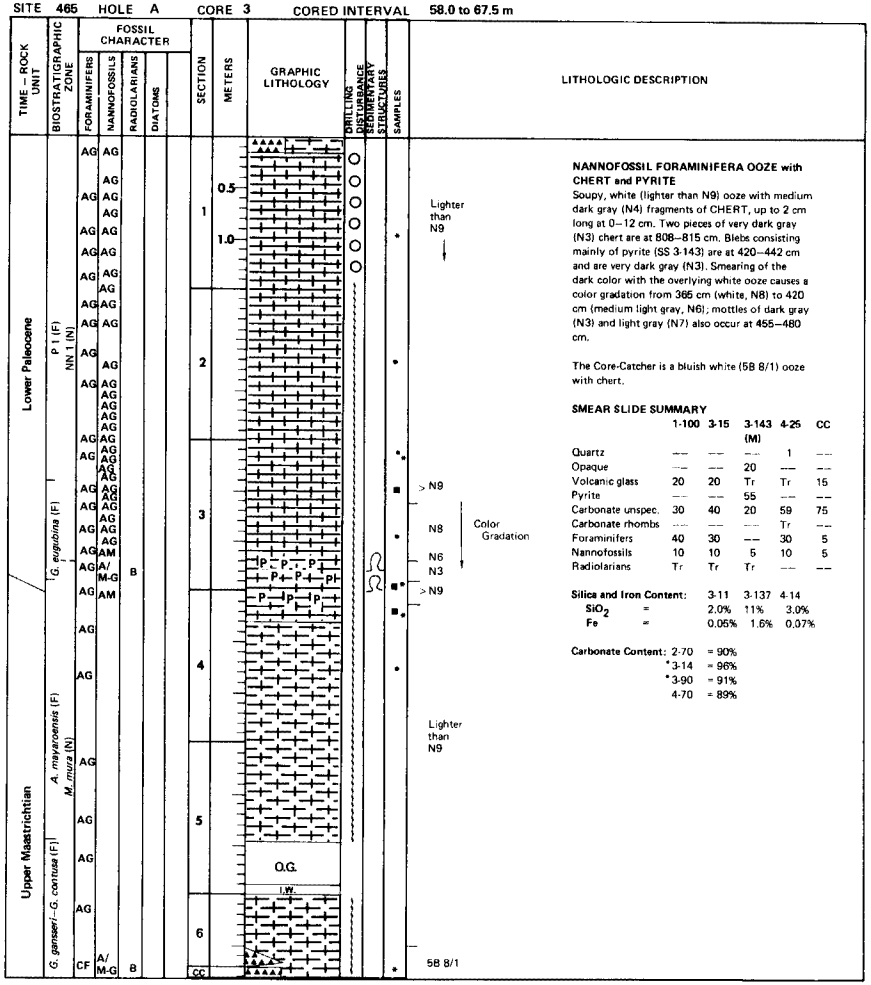
SITE 465 HOLE A CORE 2 CORED INTERVAL 48.5 to 58.0 m



CHERT

The Core-Catcher consists of 4 pieces of chert up to 2 cm long; medium dark gray (N4) with coatings of white (N8) porcellanite(?).

SITE 465 HOLE A CORE 3 CORED INTERVAL 58.0 to 67.5 m



Lighter than N9

> N9
N8
N6
N3
> N9

Color Gradation

Lighter than N9

58 8/1

NANNOFOSSIL FORAMINIFERA OOZE with CHERT and PYRITE

Soupy, white (lighter than N9) ooze with medium dark gray (N4) fragments of CHERT, up to 2 cm long at 0–12 cm. Two pieces of very dark gray (N3) chert are at 808–815 cm. Blebs consisting mainly of pyrite (SS 3-143) are at 420–442 cm and are very dark gray (N3). Smearing of the dark color with the overlying white ooze causes a color gradation from 365 cm (white, N8) to 420 cm (medium light gray, N6); mottles of dark gray (N3) and light gray (N7) also occur at 455–480 cm.

The Core-Catcher is a bluish white (5B 8/1) ooze with chert.

SMEAR SLIDE SUMMARY

	1-100	3-15	3-143 (M)	4-25	CC
Quartz	—	—	—	1	—
Opaque	—	—	20	—	—
Volcanic glass	20	20	Tr	Tr	15
Pyrite	—	—	55	—	—
Carbonate unspec.	30	40	20	59	75
Carbonate rhombs	—	—	—	Tr	—
Foraminifers	40	30	—	30	5
Nannofossils	10	10	5	10	5
Radiolarians	Tr	Tr	Tr	—	—

Silica and Iron Content:	3-11	3-137	4-14
SiO_2 =	2.0%	11%	3.0%
Fe =	0.05%	1.6%	0.07%

Carbonate Content: 2-70 = 90%
*3-14 = 96%
*3-90 = 91%
4-70 = 89%

SITE 465 HOLE A CORE 4 CORED INTERVAL 67.5 to 77.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Lower Maastrichtian	*G. gansseri–G. contusa* (F) / *L. quadratus* (N)	AG	A/M-G	B		CC						

CHERT
A drilling breccia of dark gray (N3) to medium light gray (N6) chert chips ranging from several mm to 7 cm (7 pieces >2 cm); several pieces contain a white (N9) rind of porcellanite.

Site 465A, Core 5, 77.0–86.5 m: No sediment recovered.

SITE 465 HOLE A CORE 6 CORED INTERVAL 86.5 to 96.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Lower Maastrichtian	*G. gansseri–G. contusa* (F) / *A. cymbiformis* (N)	AM	A/M-G			CC						

CHERT
A drilling breccia of medium gray (N5) to light gray (N7) translucent chert chips with white (N9) porcellanite rims; chips range in size from several mm to 5 cm (7 pieces >2 cm).

SITE 465 HOLE A CORE 7 CORED INTERVAL 96.0 to 105.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Lower Maastrichtian	*G. gansseri–G. contusa* (F)	AG		B		1 CC	0.5 1.0	VOID			*	Lighter than N9

NANNOFOSSIL OOZE
0–10 cm: A drilling breccia containing soupy white (lighter than N9) ooze with chert fragments ranging in size from <1 mm to 4 mm.

CHERT
55–165 cm: A drilling breccia containing angular, chert fragments ranging in size from <1 mm to 8 cm; their color ranges from very dark gray (N3) to light gray (N7), with some pinkish gray (7.5YR 7/2). Some chert fragments contain rinds of white (N9) porcellanite. Some fragments contain remnants of white NANNOFOSSIL OOZE (as above).

SMEAR SLIDE SUMMARY

	1-5
Opaques	Tr
Carbonate unspec.	5
Foraminifers	5
Nannofossils	90

SITE 465 HOLE A CORE 8 CORED INTERVAL 105.5 to 115.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Lower Maastrichtian	*G. gansseri–G. contusa* (F) / *A. cymbiformis* (N)	AM	A/M-G	B		1 CC					* *	> N9

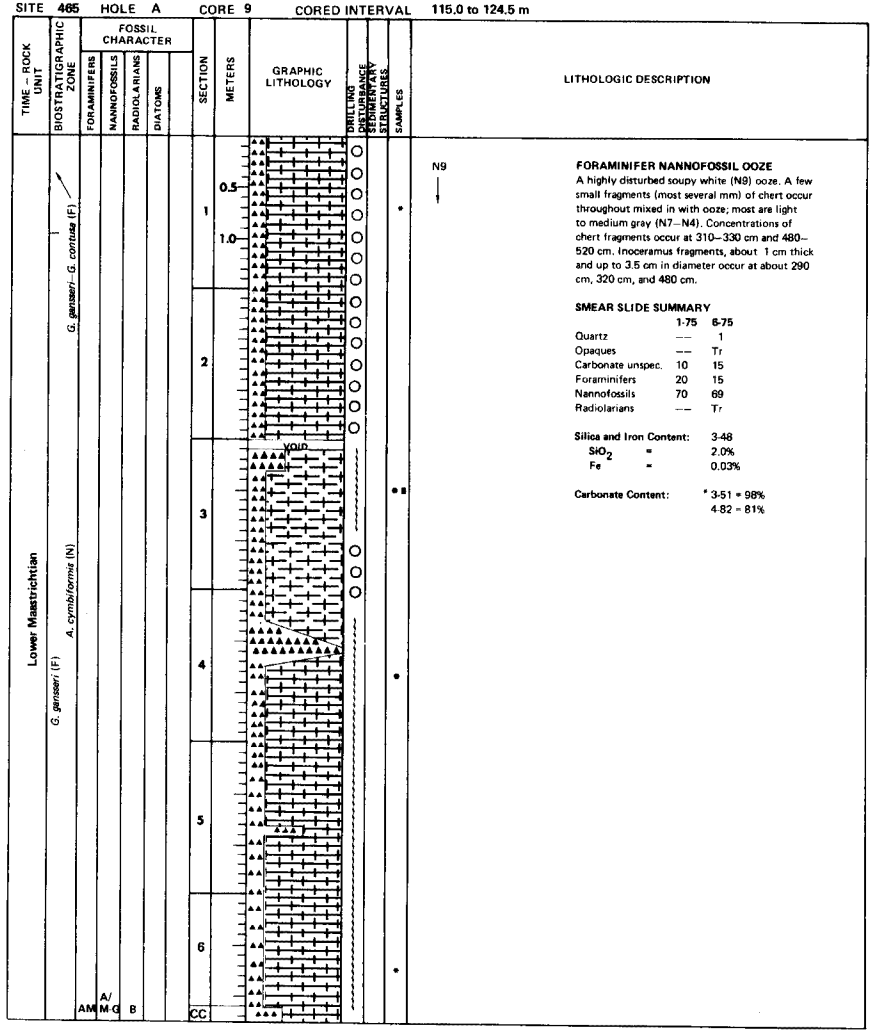
FORAMINIFER NANNOFOSSIL OOZE
A highly disturbed soupy white (lighter than N9) ooze. Fragments of gray CHERT are scattered throughout. The largest (about 5 cm) is at 35 cm and is dark gray (N4). A dark bleb at about 50 cm contains pyrite and chert chips.

SMEAR SLIDE SUMMARY

	1-22	CC-8
Chert	—	2
Volcanic glass	Tr	—
Carbonate unspec.	20	10
Foraminifers	20	15
Nannofossils	60	71
Pyrite	—	2

Carbonate Content: *1-14 = 97%

SITE 465 HOLE A CORE 9 CORED INTERVAL 115.0 to 124.5 m



FORAMINIFER NANNOFOSSIL OOZE

A highly disturbed soupy white (N9) ooze. A few small fragments (most several mm) of chert occur throughout mixed in with ooze; most are light to medium gray (N7–N4). Concentrations of chert fragments occur at 310–330 cm and 480–520 cm. Inoceramus fragments, about 1 cm thick and up to 3.5 cm in diameter occur at about 290 cm, 320 cm, and 480 cm.

SMEAR SLIDE SUMMARY

	1-75	6-75
Quartz	—	1
Opaques	—	Tr
Carbonate unspec.	10	15
Foraminifers	20	15
Nannofossils	70	69
Radiolarians	—	Tr

Silica and Iron Content: 3-48

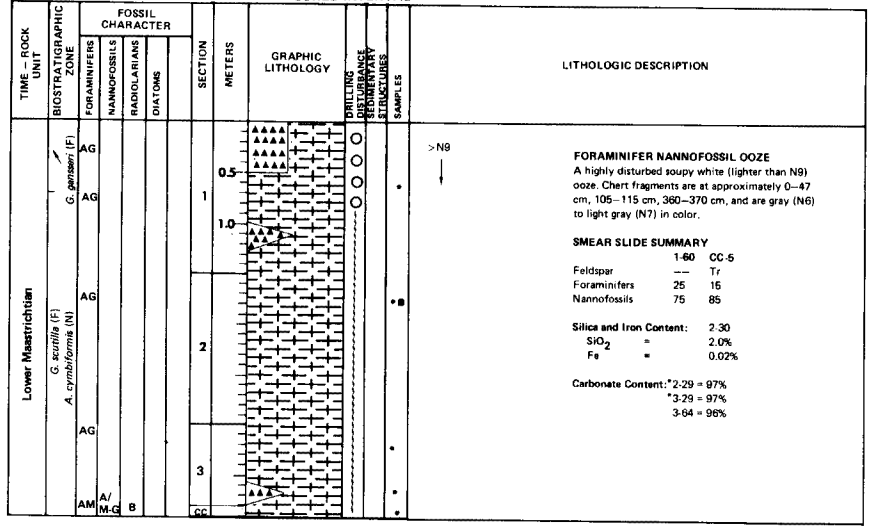
SiO_2 = 2.0%

Fe = 0.03%

Carbonate Content: *3-51 = 98%

4-82 = 81%

SITE 465 HOLE A CORE 10 CORED INTERVAL 124.5 to 134.0 m



FORAMINIFER NANNOFOSSIL OOZE

A highly disturbed soupy white (lighter than N9) ooze. Chert fragments are at approximately 0–47 cm, 105–115 cm, 360–370 cm, and are gray (N6) to light gray (N7) in color.

SMEAR SLIDE SUMMARY

	1-60	CC-5
Feldspar	—	Tr
Foraminifers	25	15
Nannofossils	75	85

Silica and Iron Content: 2-30

SiO_2 = 2.0%

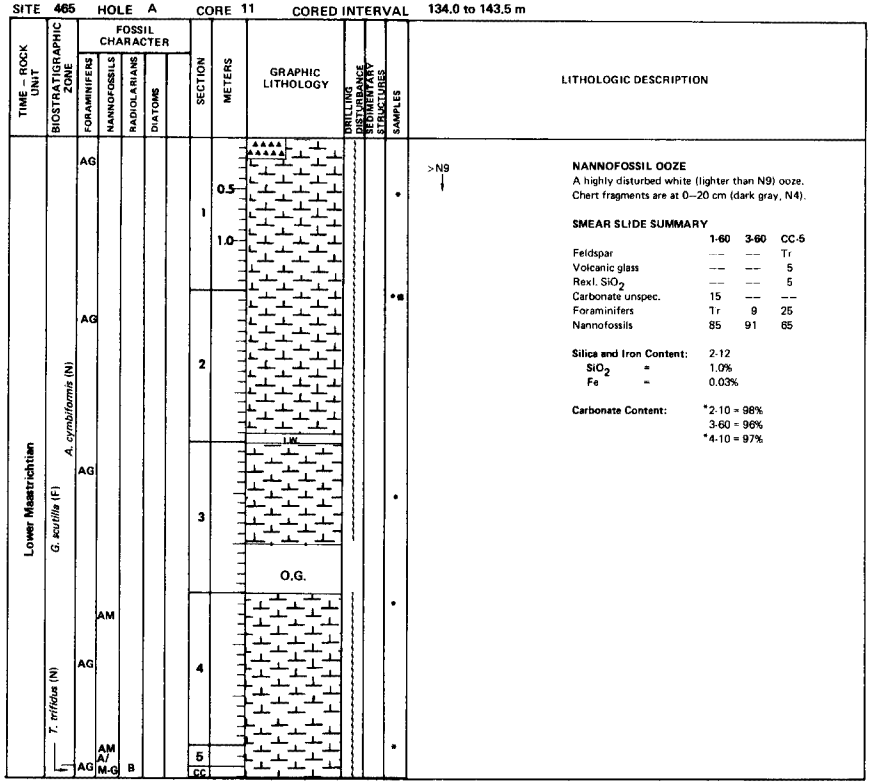
Fe = 0.02%

Carbonate Content: *2-29 = 97%

*3-29 = 97%

3-64 = 96%

SITE 465 HOLE A CORE 11 CORED INTERVAL 134.0 to 143.5 m



NANNOFOSSIL OOZE
A highly disturbed white (lighter than N9) ooze.
Chert fragments are at 0–20 cm (dark gray, N4).

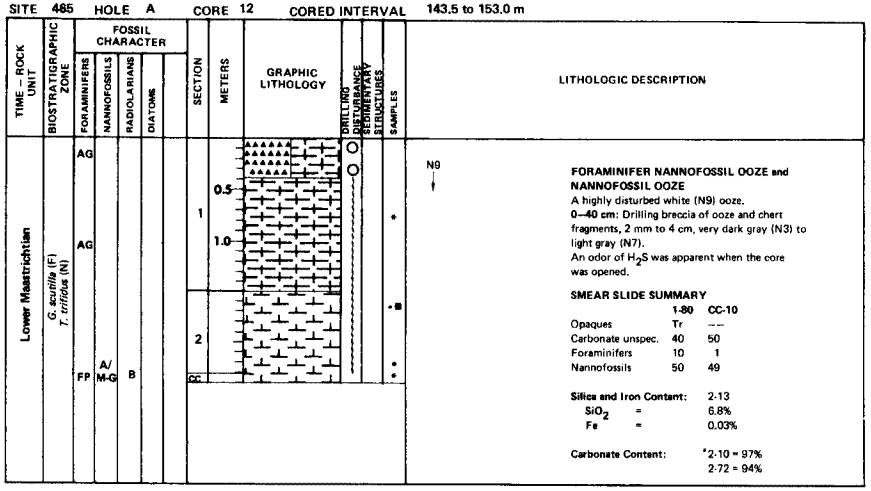
SMEAR SLIDE SUMMARY

	1-60	3-60	CC-5
Feldspar	—	—	Tr
Volcanic glass	—	—	5
Rexl. SiO_2	—	—	5
Carbonate unspec.	15	—	—
Foraminifers	Tr	9	25
Nannofossils	85	91	65

Silica and Iron Content: 2-12
SiO_2 = 1.0%
Fe = 0.03%

Carbonate Content: *2-10 = 98%
3-60 = 96%
*4-10 = 97%

SITE 465 HOLE A CORE 12 CORED INTERVAL 143.5 to 153.0 m



FORAMINIFER NANNOFOSSIL OOZE and NANNOFOSSIL OOZE
A highly disturbed white (N9) ooze.
0–40 cm: Drilling breccia of ooze and chert fragments, 2 mm to 4 cm, very dark gray (N3) to light gray (N7).
An odor of H_2S was apparent when the core was opened.

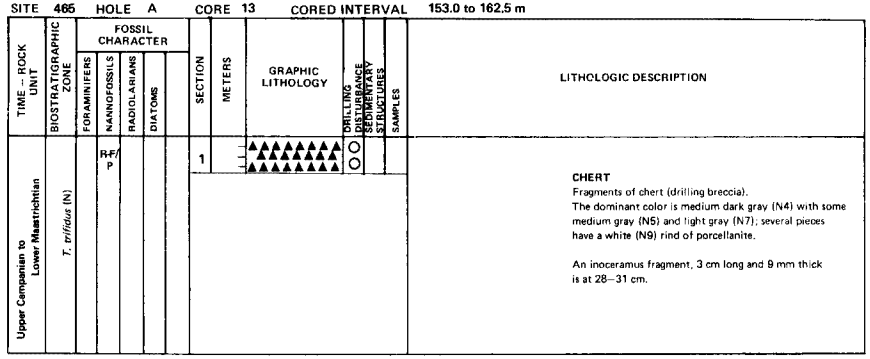
SMEAR SLIDE SUMMARY

	1-80	CC-10
Opaques	Tr	—
Carbonate unspec.	40	50
Foraminifers	10	1
Nannofossils	50	49

Silica and Iron Content: 2-13
SiO_2 = 6.8%
Fe = 0.03%

Carbonate Content: *2-10 = 97%
2-72 = 94%

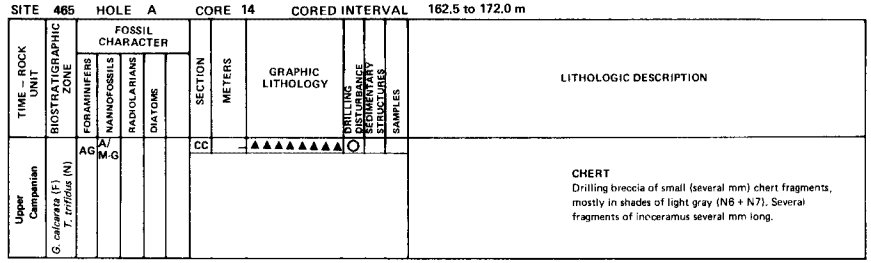
SITE 465 HOLE A CORE 13 CORED INTERVAL 153.0 to 162.5 m



CHERT
Fragments of chert (drilling breccia).
The dominant color is medium dark gray (N4) with some medium gray (N5) and light gray (N7); several pieces have a white (N9) rind of porcellanite.

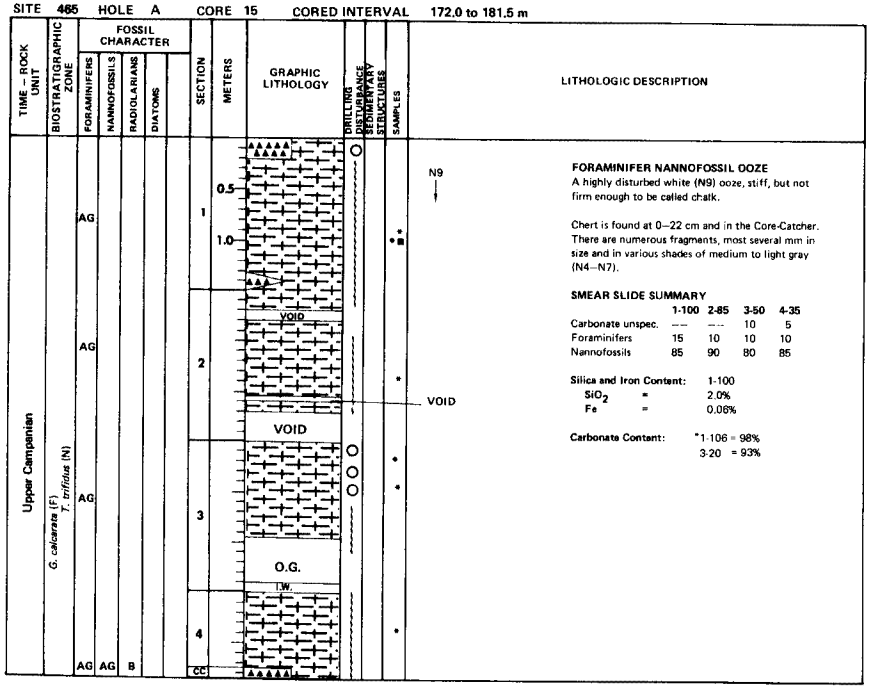
An inoceramus fragment, 3 cm long and 9 mm thick is at 28–31 cm.

SITE 465 HOLE A CORE 14 CORED INTERVAL 162.5 to 172.0 m



CHERT
Drilling breccia of small (several mm) chert fragments, mostly in shades of light gray (N6 + N7). Several fragments of inoceramus several mm long.

SITE 465 HOLE A CORE 15 CORED INTERVAL 172.0 to 181.5 m



FORAMINIFER NANNOFOSSIL OOZE
A highly disturbed white (N9) ooze, stiff, but not firm enough to be called chalk.

Chert is found at 0–22 cm and in the Core-Catcher. There are numerous fragments, most several mm in size and in various shades of medium to light gray (N4–N7).

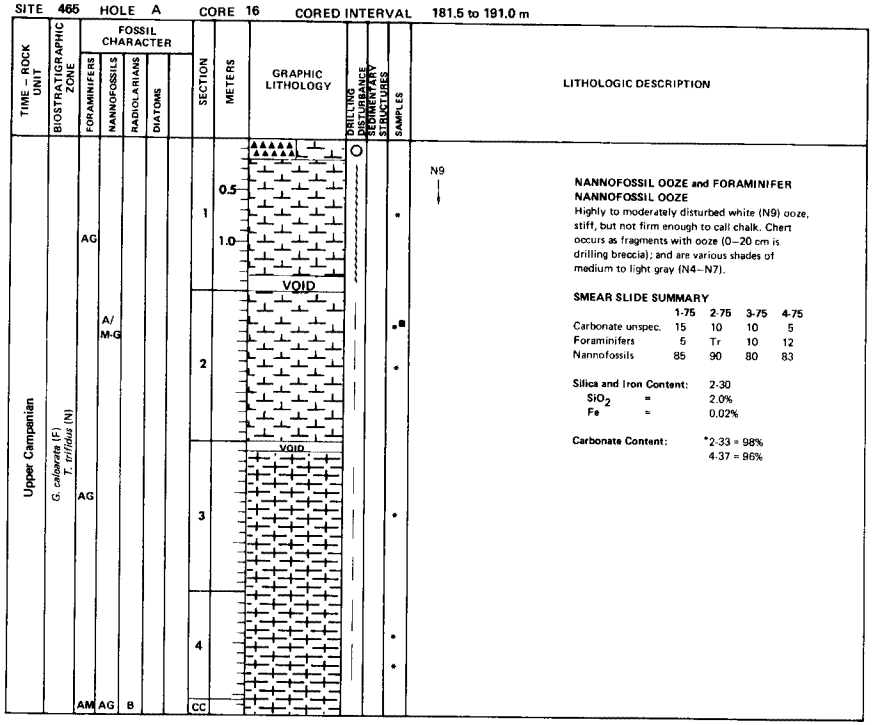
SMEAR SLIDE SUMMARY

	1-100	2-85	3-50	4-35
Carbonate unspec.	---	---	10	5
Foraminifers	15	10	10	10
Nannofossils	85	90	80	85

Silica and Iron Content: 1-100
SiO_2 = 2.0%
Fe = 0.06%

Carbonate Content: *1-106 = 98%
3-20 = 93%

SITE 465 HOLE A CORE 16 CORED INTERVAL 181.5 to 191.0 m



NANNOFOSSIL OOZE and FORAMINIFER NANNOFOSSIL OOZE
Highly to moderately disturbed white (N9) ooze, stiff, but not firm enough to call chalk. Chert occurs as fragments with ooze (0–20 cm is drilling breccia); and are various shades of medium to light gray (N4–N7).

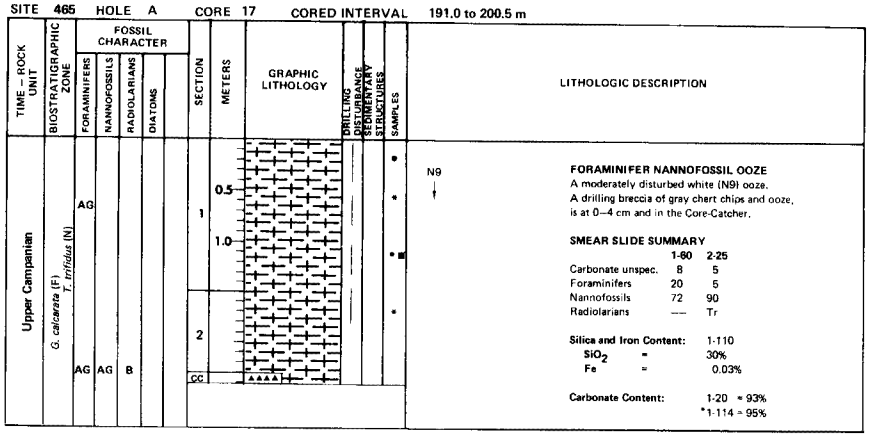
SMEAR SLIDE SUMMARY

	1-75	2-75	3-75	4-75
Carbonate unspec.	15	10	10	5
Foraminifers	5	Tr	10	12
Nannofossils	85	90	80	83

Silica and Iron Content: 2-30
SiO_2 = 2.0%
Fe = 0.02%

Carbonate Content: *2-33 = 98%
4-37 = 96%

SITE 465 HOLE A CORE 17 CORED INTERVAL 191.0 to 200.5 m



FORAMINIFER NANNOFOSSIL OOZE
A moderately disturbed white (N9) ooze.
A drilling breccia of gray chert chips and ooze, is at 0–4 cm and in the Core-Catcher.

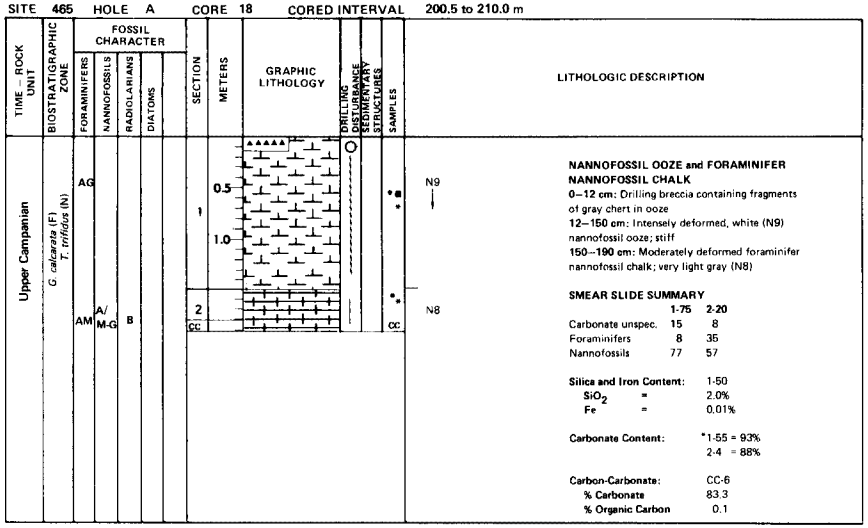
SMEAR SLIDE SUMMARY

	1-80	2-25
Carbonate unspec.	8	5
Foraminifers	20	5
Nannofossils	72	90
Radiolarians	---	Tr

Silica and Iron Content: 1-110
SiO_2 = 30%
Fe = 0.03%

Carbonate Content: 1-20 = 93%
*1-114 = 95%

SITE 465 HOLE A CORE 18 CORED INTERVAL 200.5 to 210.0 m



NANNOFOSSIL OOZE and FORAMINIFER NANNOFOSSIL CHALK

0–12 cm: Drilling breccia containing fragments of gray chert in ooze

12–150 cm: Intensely deformed, white (N9) nannofossil ooze; stiff

150–190 cm: Moderately deformed foraminifer nannofossil chalk; very light gray (N8)

SMEAR SLIDE SUMMARY

	1-75	2-20
Carbonate unspec.	15	8
Foraminifers	8	35
Nannofossils	77	57

Silica and Iron Content: 1-50

SiO_2 = 2.0%

Fe = 0.01%

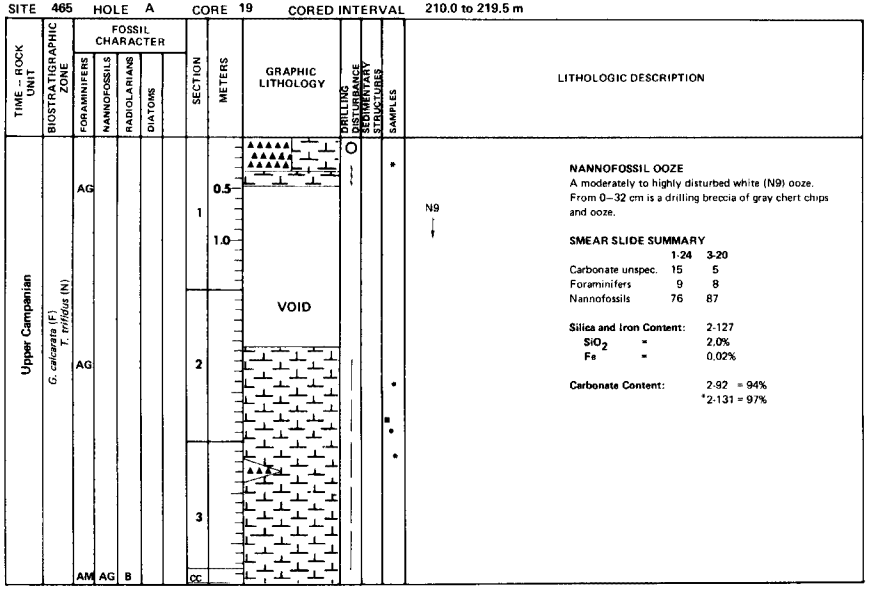
Carbonate Content: *1-55 = 93%; 2-4 = 88%

Carbon-Carbonate: CC-6

% Carbonate 83.3

% Organic Carbon 0.1

SITE 465 HOLE A CORE 19 CORED INTERVAL 210.0 to 219.5 m



NANNOFOSSIL OOZE

A moderately to highly disturbed white (N9) ooze. From 0–32 cm is a drilling breccia of gray chert chips and ooze.

SMEAR SLIDE SUMMARY

	1-24	3-20
Carbonate unspec.	15	5
Foraminifers	9	8
Nannofossils	76	87

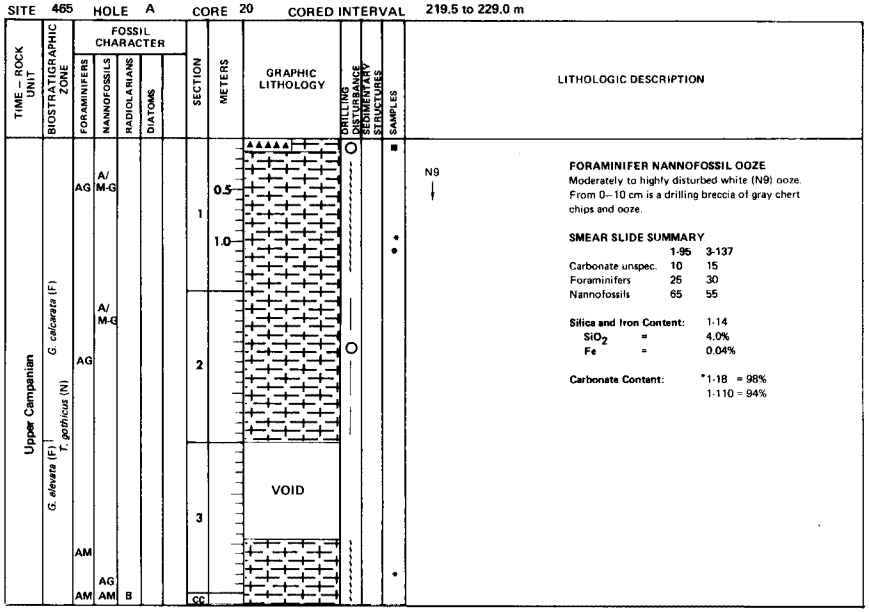
Silica and Iron Content: 2-127

SiO_2 = 2.0%

Fe = 0.02%

Carbonate Content: 2-92 = 94%; *2-131 = 97%

SITE 465 HOLE A CORE 20 CORED INTERVAL 219.5 to 229.0 m



FORAMINIFER NANNOFOSSIL OOZE

Moderately to highly disturbed white (N9) ooze. From 0–10 cm is a drilling breccia of gray chert chips and ooze.

SMEAR SLIDE SUMMARY

	1-95	3-137
Carbonate unspec.	10	15
Foraminifers	25	30
Nannofossils	65	55

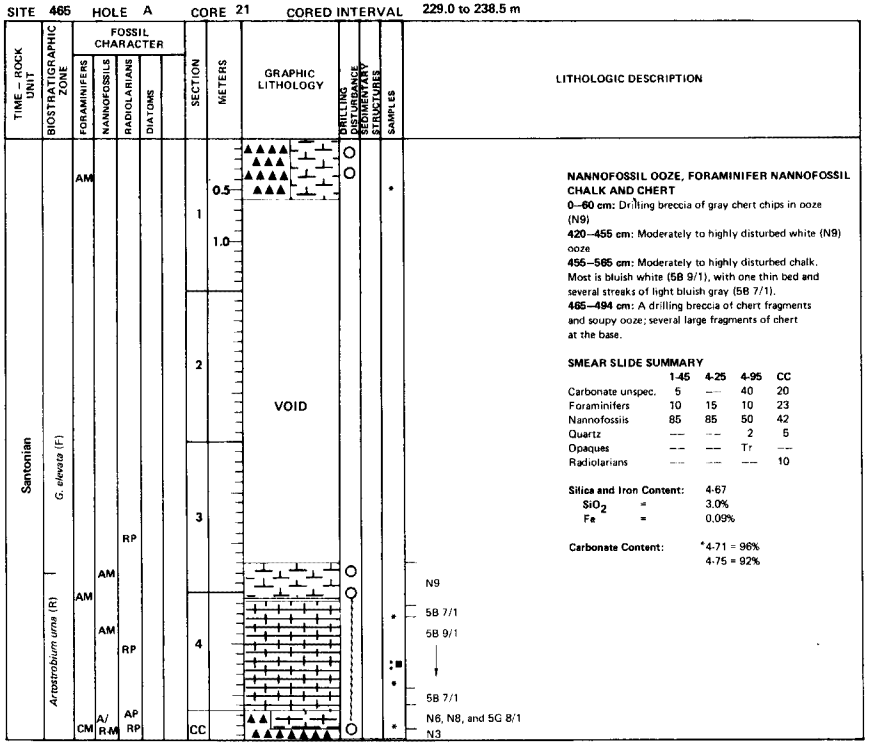
Silica and Iron Content: 1-14

SiO_2 = 4.0%

Fe = 0.04%

Carbonate Content: *1-18 = 98%; 1-110 = 94%

SITE 465 HOLE A CORE 21 CORED INTERVAL 229.0 to 238.5 m



NANNOFOSSIL OOZE, FORAMINIFER NANNOFOSSIL CHALK AND CHERT

0–60 cm: Drilling breccia of gray chert chips in ooze (N9)

420–455 cm: Moderately to highly disturbed white (N9) ooze

455–565 cm: Moderately to highly disturbed chalk. Most is bluish white (5B 9/1), with one thin bed and several streaks of light bluish gray (5B 7/1).

465–494 cm: A drilling breccia of chert fragments and soupy ooze; several large fragments of chert at the base.

SMEAR SLIDE SUMMARY

	1-45	4-25	4-95	CC
Carbonate unspec.	5	—	40	20
Foraminifers	10	15	10	23
Nannofossils	85	85	50	42
Quartz	—	—	2	5
Opaques	—	—	Tr	—
Radiolarians	—	—	—	10

Silica and Iron Content: 4-67

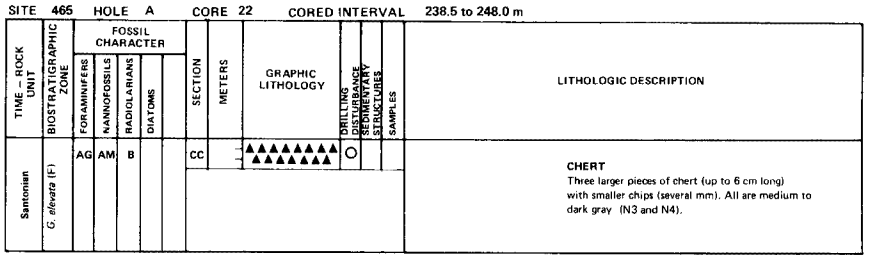
SiO_2 = 3.0%

Fe = 0.09%

Carbonate Content: *4-71 = 96%

4-75 = 92%

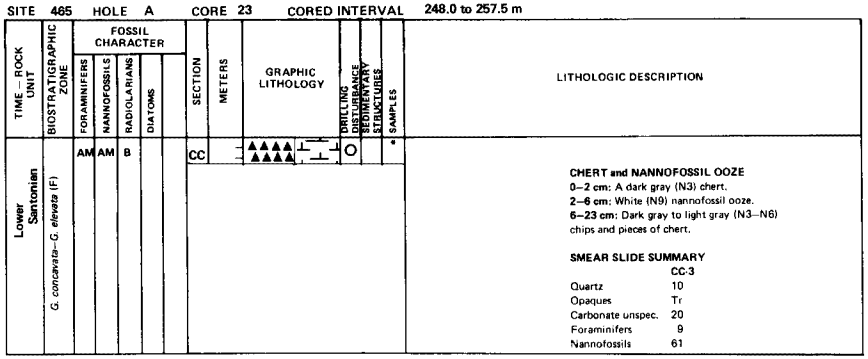
SITE 465 HOLE A CORE 22 CORED INTERVAL 238.5 to 248.0 m



CHERT

Three larger pieces of chert (up to 6 cm long) with smaller chips (several mm). All are medium to dark gray (N3 and N4).

SITE 465 HOLE A CORE 23 CORED INTERVAL 248.0 to 257.5 m



CHERT and NANNOFOSSIL OOZE

0–2 cm: A dark gray (N3) chert.

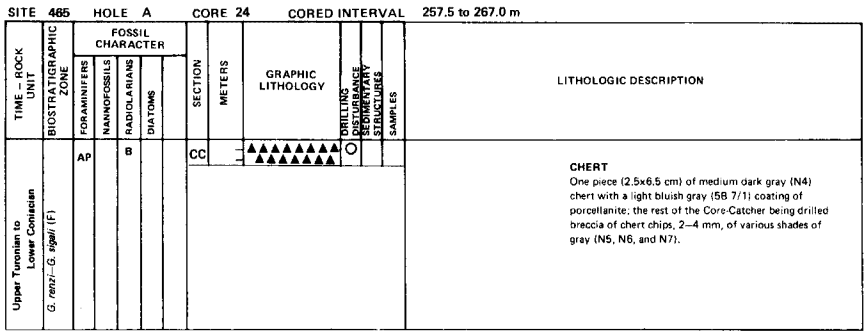
2–6 cm: White (N9) nannofossil ooze.

6–23 cm: Dark gray to light gray (N3–N6) chips and pieces of chert.

SMEAR SLIDE SUMMARY

	CC-3
Quartz	10
Opaques	Tr
Carbonate unspec.	20
Foraminifers	9
Nannofossils	61

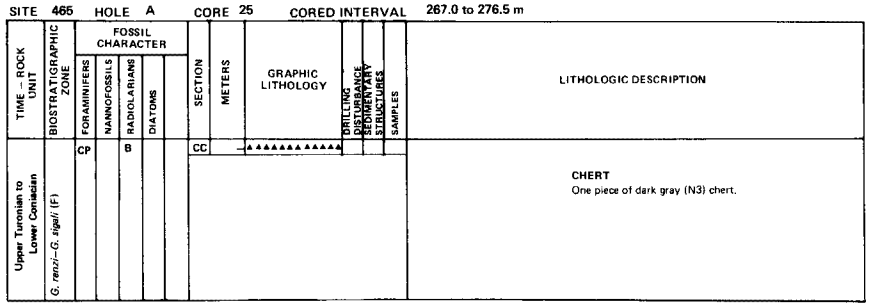
SITE 465 HOLE A CORE 24 CORED INTERVAL 257.5 to 267.0 m



CHERT

One piece (2.5x6.5 cm) of medium dark gray (N4) chert with a light bluish gray (5B 7/1) coating of porcellanite; the rest of the Core-Catcher being drilled breccia of chert chips, 2–4 mm, of various shades of gray (N5, N6, and N7).

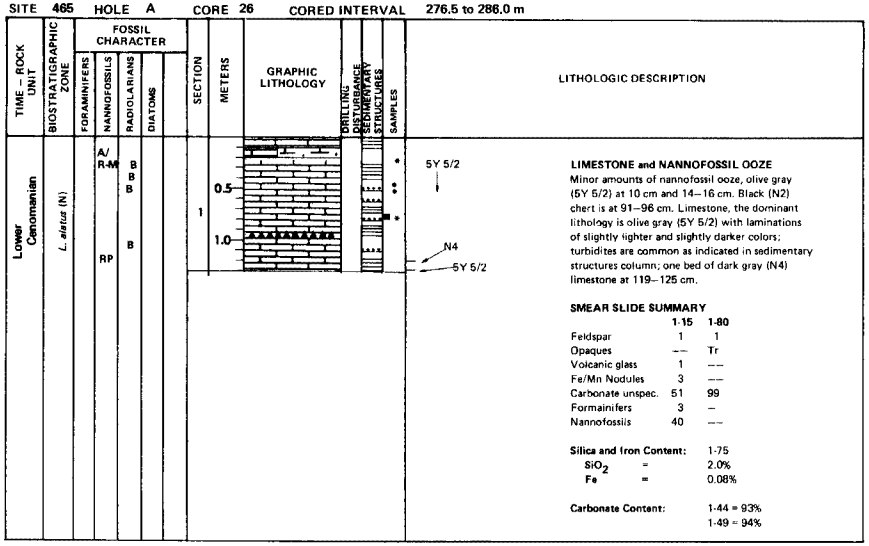
SITE 465 HOLE A CORE 25 CORED INTERVAL 267.0 to 276.5 m



CHERT

One piece of dark gray (N3) chert.

SITE 465 HOLE A CORE 26 CORED INTERVAL 276.5 to 286.0 m



LIMESTONE and NANNOFOSSIL OOZE
Minor amounts of nannofossil ooze, olive gray (5Y 5/2) at 10 cm and 14–16 cm. Black (N2) chert is at 91–96 cm. Limestone, the dominant lithology is olive gray (5Y 5/2) with laminations of slightly lighter and slightly darker colors; turbidites are common as indicated in sedimentary structures column; one bed of dark gray (N4) limestone at 119–125 cm.

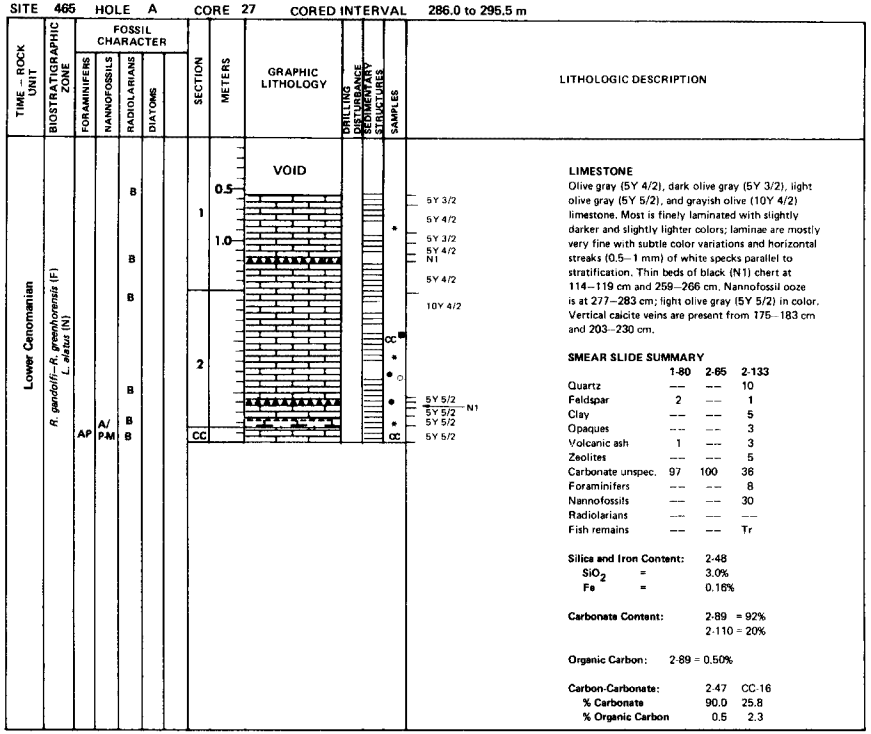
SMEAR SLIDE SUMMARY

	1-15	1-80
Feldspar	1	1
Opaques	—	Tr
Volcanic glass	1	—
Fe/Mn Nodules	3	—
Carbonate unspec.	51	99
Formainifers	3	—
Nannofossils	40	—

Silica and Iron Content: 1-75
SiO_2 = 2.0%
Fe = 0.08%

Carbonate Content: 1-44 = 93%
1-49 = 94%

SITE 465 HOLE A CORE 27 CORED INTERVAL 286.0 to 295.5 m



LIMESTONE
Olive gray (5Y 4/2), dark olive gray (5Y 3/2), light olive gray (5Y 5/2), and grayish olive (10Y 4/2) limestone. Most is finely laminated with slightly darker and slightly lighter colors; laminae are mostly very fine with subtle color variations and horizontal streaks (0.5–1 mm) of white specks parallel to stratification. Thin beds of black (N1) chert at 114–119 cm and 259–266 cm. Nannofossil ooze is at 277–283 cm; light olive gray (5Y 5/2) in color. Vertical calcite veins are present from 175–183 cm and 203–230 cm.

SMEAR SLIDE SUMMARY

	1-80	2-65	2-133
Quartz	—	—	10
Feldspar	2	—	1
Clay	—	—	5
Opaques	—	—	3
Volcanic ash	1	—	3
Zeolites	—	—	5
Carbonate unspec.	97	100	36
Foraminifers	—	—	8
Nannofossils	—	—	30
Radiolarians	—	—	—
Fish remains	—	—	Tr

Silica and Iron Content: 2-48
SiO_2 = 3.0%
Fe = 0.16%

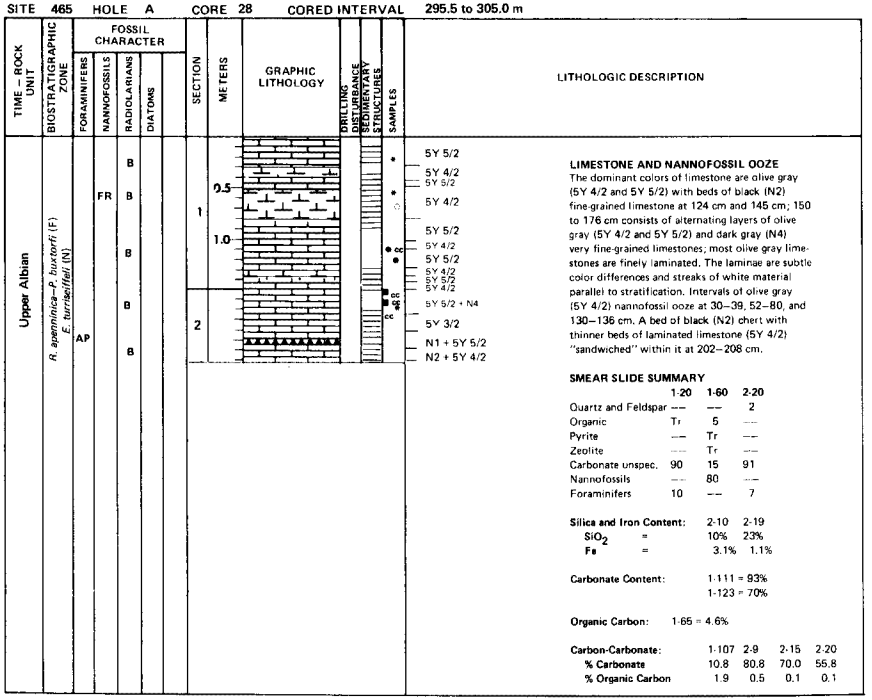
Carbonate Content: 2-89 = 92%
2-110 = 20%

Organic Carbon: 2-89 = 0.50%

Carbon-Carbonate:

	2-47	CC-16
% Carbonate	90.0	25.8
% Organic Carbon	0.5	2.3

SITE 465 HOLE A CORE 28 CORED INTERVAL 295.5 to 305.0 m



LIMESTONE AND NANNOFOSSIL OOZE
The dominant colors of limestone are olive gray (5Y 4/2 and 5Y 5/2) with beds of black (N2) fine-grained limestone at 124 cm and 145 cm; 150 to 176 cm consists of alternating layers of olive gray (5Y 4/2 and 5Y 5/2) and dark gray (N4) very fine-grained limestones; most olive gray limestones are finely laminated. The laminae are subtle color differences and streaks of white material parallel to stratification. Intervals of olive gray (5Y 4/2) nannofossil ooze at 30–39, 52–80, and 130–136 cm. A bed of black (N2) chert with thinner beds of laminated limestone (5Y 4/2) "sandwiched" within it at 202–208 cm.

SMEAR SLIDE SUMMARY

	1-20	1-60	2-20
Quartz and Feldspar	—	—	2
Organic	Tr	5	—
Pyrite	—	Tr	—
Zeolite	—	Tr	—
Carbonate unspec.	90	15	91
Nannofossils	—	80	—
Foraminifers	10	—	7

Silica and Iron Content:

	2-10	2-19
SiO_2 =	10%	23%
Fe =	3.1%	1.1%

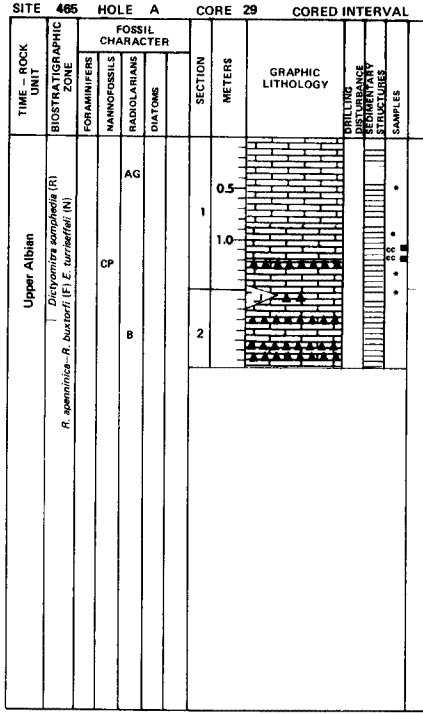
Carbonate Content: 1-111 = 93%
1-123 = 70%

Organic Carbon: 1-65 = 4.6%

Carbon-Carbonate:

	1-107	2-9	2-15	2-20
% Carbonate	10.8	80.8	70.0	55.8
% Organic Carbon	1.9	0.5	0.1	0.1

SITE 465 HOLE A CORE 29 CORED INTERVAL 305.0 to 314.5 m



LITHOLOGIC DESCRIPTION

LIMESTONE
Alternating beds of gray (N5) and olive gray (5Y 5/2) to dark olive gray (5Y 3/2) limestone; olive-colored beds usually finely laminated; most beds are on the order of 2–5 cm. Nannofossil ooze is at 150–154 cm; olive gray (5Y 5/2) in color. Beds and nodules of dark gray (5Y 3/1) and black (N2.5) chert at 124–128, 154, 174, 207–208, and 215–218 cm.

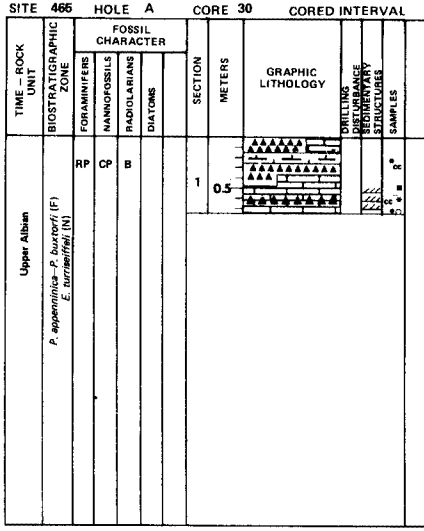
SMEAR SLIDE SUMMARY

	1-45	1-138	2-1
Feldspar	1	Tr	Tr
Opaques	—	Tr	—
Volcanic glass	2	—	—
Pyrite	1	—	—
Fe/Mn Nodules	—	—	2
Zeolites	—	Tr	—
Carbonate unspec.	60	85	25
Foraminifers	Tr	—	20
Nannofossils	35	15	53
Radiolarians	1	—	—

		1-109[a]	1-117[b]
Silica and Iron Content:			
SiO_2	=	8.0%	23%
Fe	=	1.6%	1.3%
Carbonate Content:		1-93 = 58%	
Organic Carbon:		1-93 = 0.04%	
Carbon-Carbonate:		1-110	1-118
% Carbonate		75.8	55.8
% Organic Carbon		0.3	0.4

a = from olive gray laminated beds
b = from gray massive beds

SITE 465 HOLE A CORE 30 CORED INTERVAL 314.5 to 324.0 m



LITHOLOGIC DESCRIPTION

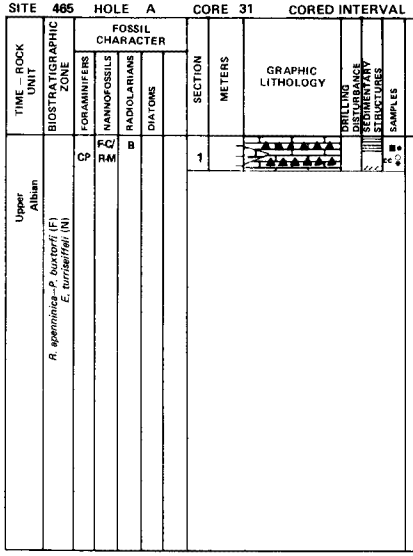
LIMESTONE, CHERT, and NANNOFOSSIL OOZE
An olive gray (5Y 5/2), finely laminated and cross-laminated limestone at 47–49 cm, 54–56 cm, and 60–63 cm. Olive gray (5Y 5/2) nannofossil ooze is at 18–25 cm. Black (N2.5) chert is at 0–3 cm, 8–16 cm, 26–45 cm, and 59–61 cm.

SMEAR SLIDE SUMMARY

	1-20	1-65
Clay	10	—
Carbonate unspec.	2	90
Foraminifers	10	10
Nannofossils	78	—

Silica and Iron Content:		1-59
SiO_2	=	7.2%
Fe	=	0.6%
Carbonate Content:		1-71 = 90%
Organic Carbon:		1-71 = 0.30%
Carbon-Carbonate:		1-23 1-58
% Carbonate		32.5 70.8
% Organic Carbon		6.1 1.7

SITE 465 HOLE A CORE 31 CORED INTERVAL 324.0 to 333.5 m



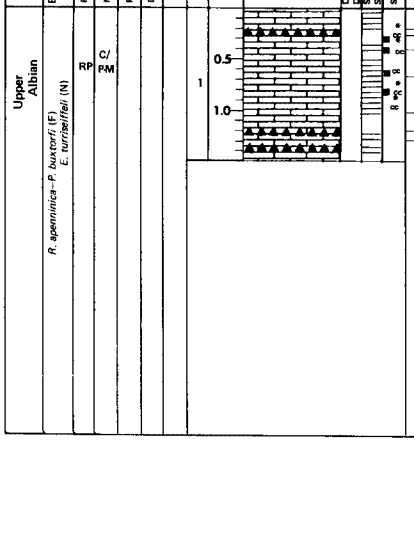
LIMESTONE, CHERT, and NANNOFOSSIL OOZE
Olive gray limestone (5Y 5/2) finely laminated at 0–8 cm; medium dark gray (N4) at 28–34 cm with faint laminae and cross-stratification. Black (N2.5) chert at 7–12 cm and 25–27 cm. Olive gray (5Y 5/2) nannofossil ooze at 16–23 cm.

SMEAR SLIDE SUMMARY

	1-22
Clay	2
Pyrite	3
Carbonate unspec.	25
Foraminifers	5
Nannofossils	65

Silica and Iron Content:		1-13
SiO_2	=	2.0%
Fe	=	0.07%
Carbonate Content:		1-15 = 93%
Organic Carbon:		1-15 = 0.36%
Carbon-Carbonate:		1-14
% Carbonate		87.5
% Organic Carbon		0.7

SITE 465 HOLE A CORE 32 CORED INTERVAL 333.5 to 343.0 m



LIMESTONE AND CHERT
Olive gray (5Y 5/2 and 4/2), finely laminated (<1 mm) limestone alternating with beds of very dark gray (N3) finely crystalline limestone, massive to faintly laminated. Black (N3) chert at 23–27 cm, 119–120 cm and 137–140 cm.

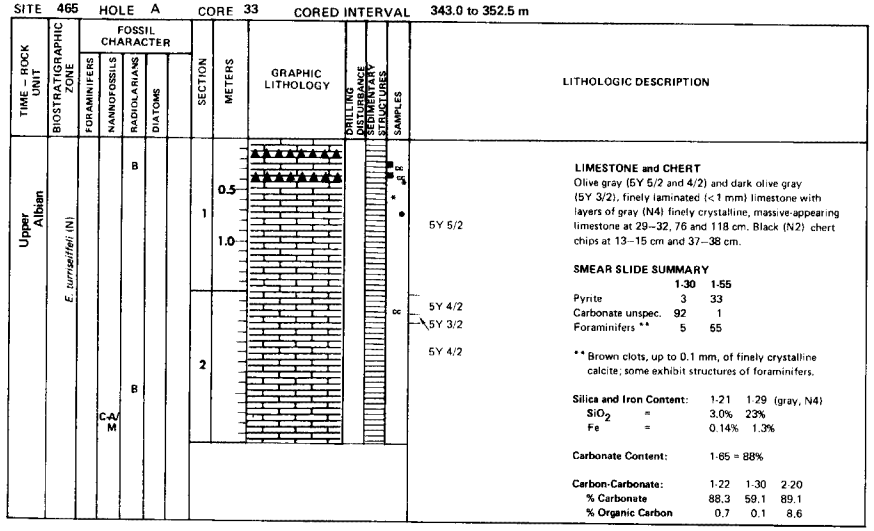
SMEAR SLIDE SUMMARY

	1-15	1-35	1-79
Quartz and Feldspar	—	5	—
Clay	—	85	—
Pyrite	Tr	10	8
Carbonate unspec.	70	—	92
Foraminifers**	30	—	—

** clots of finely crystalline carbonate, some of which exhibit relict structure of foraminifers

Silica and Iron Content:	1-32	1-39	1-64	1-85	
SiO_2 =	14%	12%	4%	4%	
Fe =	0.76%	0.17%	0.24%	0.29%	
Carbonate Content:	1-94 = 81%				
Carbon-Carbonate:	1-32	1-38	1-63	1-84	1-96
% Carbonate	76.6	59.1	90.8	25.0	90.8
% Organic Carbon	0.2	2.0	0.1	7.1	3.8

SITE 465 HOLE A CORE 33 CORED INTERVAL 343.0 to 352.5 m



LIMESTONE and CHERT
Olive gray (5Y 5/2 and 4/2) and dark olive gray (5Y 3/2), finely laminated (<1 mm) limestone with layers of gray (N4) finely crystalline, massive-appearing limestone at 29–32, 76 and 118 cm. Black (N2) chert chips at 13–15 cm and 37–38 cm.

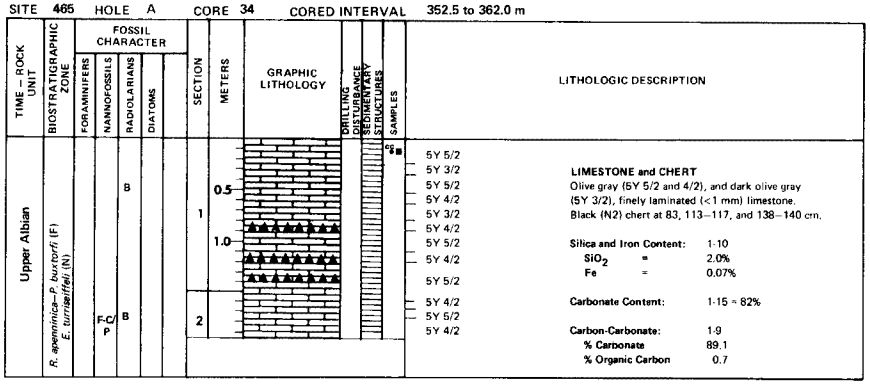
SMEAR SLIDE SUMMARY

	1-30	1-55
Pyrite	3	33
Carbonate unspec.	92	1
Foraminifers **	5	55

** Brown clots, up to 0.1 mm, of finely crystalline calcite; some exhibit structures of foraminifers.

Silica and Iron Content:	1-21	1-29	(gray, N4)
SiO_2 =	3.0%	23%	
Fe =	0.14%	1.3%	
Carbonate Content:	1-65 = 88%		
Carbon-Carbonate:	1-22	1-30	2-20
% Carbonate	88.3	59.1	89.1
% Organic Carbon	0.7	0.1	8.6

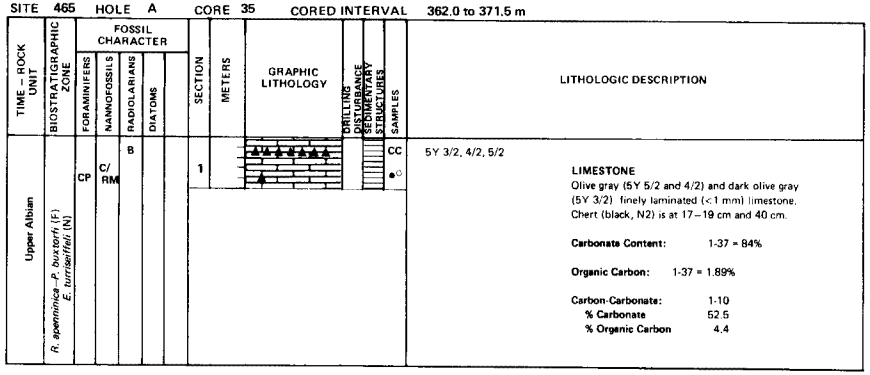
SITE 465 HOLE A CORE 34 CORED INTERVAL 352.5 to 362.0 m



LIMESTONE and CHERT
Olive gray (5Y 5/2 and 4/2), and dark olive gray (5Y 3/2), finely laminated (<1 mm) limestone. Black (N2) chert at 83, 113–117, and 138–140 cm.

Silica and Iron Content:	1-10	
SiO_2 =	2.0%	
Fe =	0.07%	
Carbonate Content:	1-15 = 82%	
Carbon-Carbonate:	1-9	
% Carbonate	89.1	
% Organic Carbon	0.7	

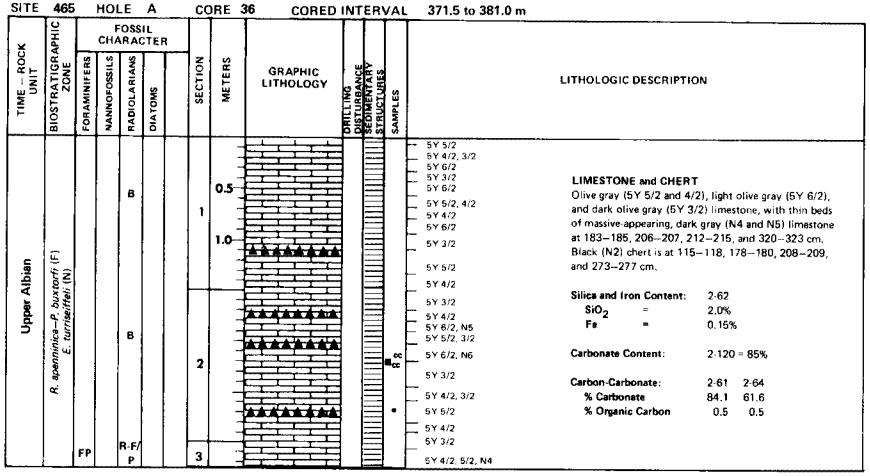
SITE 465 HOLE A CORE 35 CORED INTERVAL 362.0 to 371.5 m



LIMESTONE
Olive gray (5Y 5/2 and 4/2) and dark olive gray (5Y 3/2) finely laminated (<1 mm) limestone. Chert (black, N2) is at 17–19 cm and 40 cm.

Carbonate Content:	1-37 = 84%
Organic Carbon:	1-37 = 1.89%
Carbon-Carbonate:	1-10
% Carbonate	52.5
% Organic Carbon	4.4

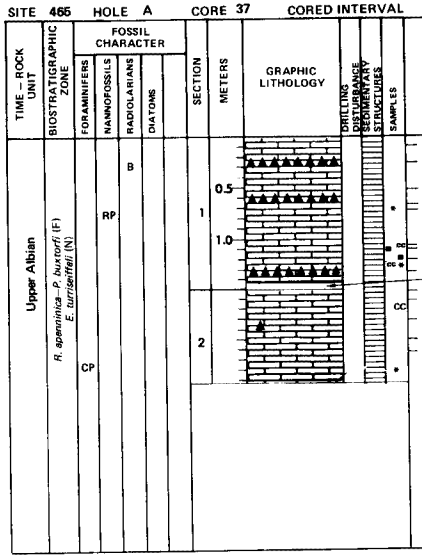
SITE 465 HOLE A CORE 36 CORED INTERVAL 371.5 to 381.0 m



LIMESTONE and CHERT
Olive gray (5Y 5/2 and 4/2), light olive gray (5Y 6/2), and dark olive gray (5Y 3/2) limestone, with thin beds of massive-appearing, dark gray (N4 and N5) limestone at 183–185, 206–207, 212–215, and 320–323 cm. Black (N2) chert is at 115–118, 178–180, 208–209, and 273–277 cm.

Silica and Iron Content:	2-62	
SiO_2 =	2.0%	
Fe =	0.15%	
Carbonate Content:	2-120 = 85%	
Carbon-Carbonate:	2-61	2-64
% Carbonate	84.1	61.6
% Organic Carbon	0.5	0.5

SITE 465 HOLE A CORE 37 CORED INTERVAL 381.0 to 390.5 m



LITHOLOGIC DESCRIPTION

LIMESTONE
Olive gray (5Y 5/2 and 4/2), dark olive gray (5Y 3/2), and light olive gray (5Y 6/2) finely laminated (<1 mm) limestone. Beds of gray (N4, N5, and N6) massive-appearing to faintly laminated limestone at 75–77, 83, 89, 110–113, 139–142, and 157–161 cm. Black (N2) chert is at 21–23, 65–66, and 132–136 cm.

SMEAR SLIDE SUMMARY

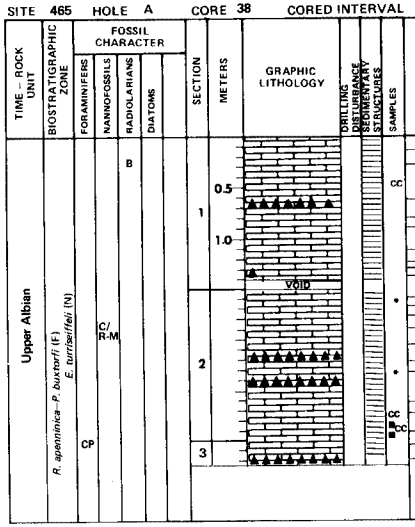
	1-70	1-125	2-82
Quartz and Feldspar	—	2	Tr
Clay	—	—	10
Pyrite	Tr	8	—
Carbonate unspec.	95	85	60
Foraminifers**	5	5	20
Nannofossils	—	—	10

** Brown clots of carbonate, probably are recrystallized foraminifers.

Silica and Iron Content:		1-104	1-111
SiO_2	=	8.2%	2.0%
Fe	=	0.50%	1.0%

Carbon-Carbonate:	1-103	1-112	2-20
% Carbonate	55.0	44.2	91.6
% Organic Carbon	3.5	0.1	7.5

SITE 465 HOLE A CORE 38 CORED INTERVAL 390.5 to 400.0 m



LITHOLOGIC DESCRIPTION

LIMESTONE
Olive gray (5Y 5/2 and 4/2), dark olive gray (5Y 3/2), and light olive gray (5Y 6/2) finely laminated (<1 mm) limestone. CHERT: Black (N2) chert at 70–71, 133, 216–218, 230–232 and 322–327 cm.

SMEAR SLIDE SUMMARY

	2-89
Pyrite	Tr
Carbonate unspec.	80
Foraminifers**	20

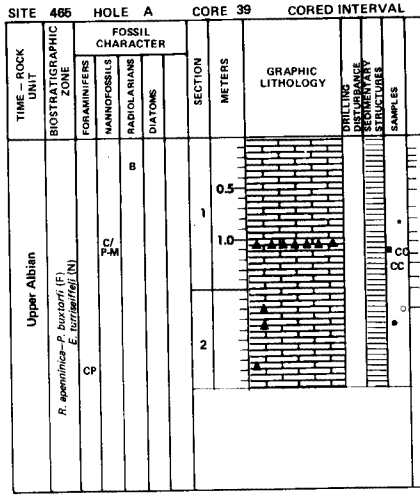
** Light brown clots of finely crystalline carbonate up to 0.06 mm probably replaced foraminifers.

Silica and Iron Content:		2-129	2-137
SiO_2	=	25%	3.0%
Fe	=	1.3%	0.09%

Carbonate Content: 2-15 = 84%

Carbon-Carbonate:	1-47	2-128	2-136
% Carbonate	90.8	90.8	61.6
% Organic Carbon	4.3	0.4	0.2

SITE 465 HOLE A CORE 39 CORED INTERVAL 400.0 to 409.5 m



LITHOLOGIC DESCRIPTION

LIMESTONE
Olive gray (5Y 5/2 and 3/2); finely laminated limestone (<1 mm) with two thin beds of very dark gray (N3) limestone at 35–36 cm and 64–65 cm. CHERT: Black (N2) chert at 102–105, 174–176, 186 and 221 cm.

SMEAR SLIDE SUMMARY

	1-83
Carbonate unspec.	97
Foraminifers	3

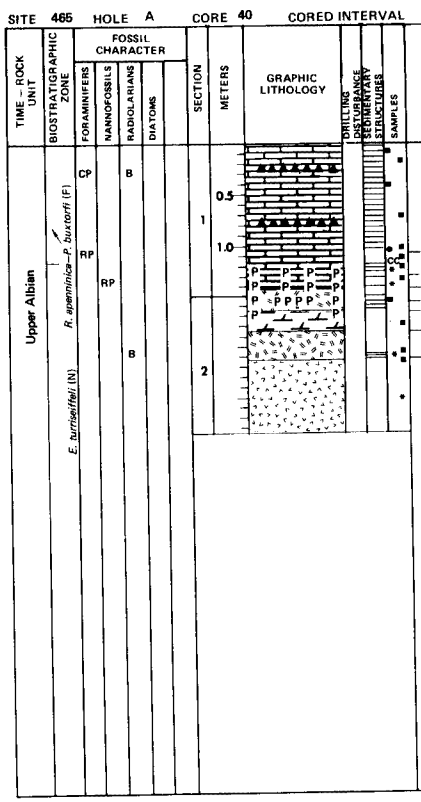
Silica and Iron Content:		1-111
SiO_2	=	1.0%
Fe	=	0.05%

Carbonate Content: 2-34 = 83%

Organic Carbon: 2-25 = 0.83%

Carbon-Carbonate:	1-111	1-121
% Carbonate	68.3	90.8
% Organic Carbon	2.4	3.4

SITE 465 HOLE A CORE 40 CORED INTERVAL 409.5 to 419.0 m



LITHOLOGIC DESCRIPTION

LIMESTONE, VOLCANIC ASH, and TRACHYTE
0–107 cm: Olive gray (5Y 4/2 and 5/2) limestone finely laminated (<1 mm); CHERT: black (N2) at 24–27 and 71–72 cm.
107–141 cm: Limestone whose dominant colors are olive gray (5Y 5/2 and 4/2) and dark olive gray (5Y 3/2) and black (N2); massive to laminated; abundant pyrite, organic-rich layers, and calcite veins.
143–215 cm: Gray (N4 to N7) massive to laminated volcanic ash; abundant pyrite; a bed of clastic dolomite with veins of dolomite is at 166–184 cm (white, N8; gray, N4–N7; very dark olive, 5Y 3/2; and reddish yellow, 7.5YR 8/4); organic-rich layers and dolomite, 143–148 cm.
215–285 cm: Trachyte.

SMEAR SLIDE SUMMARY

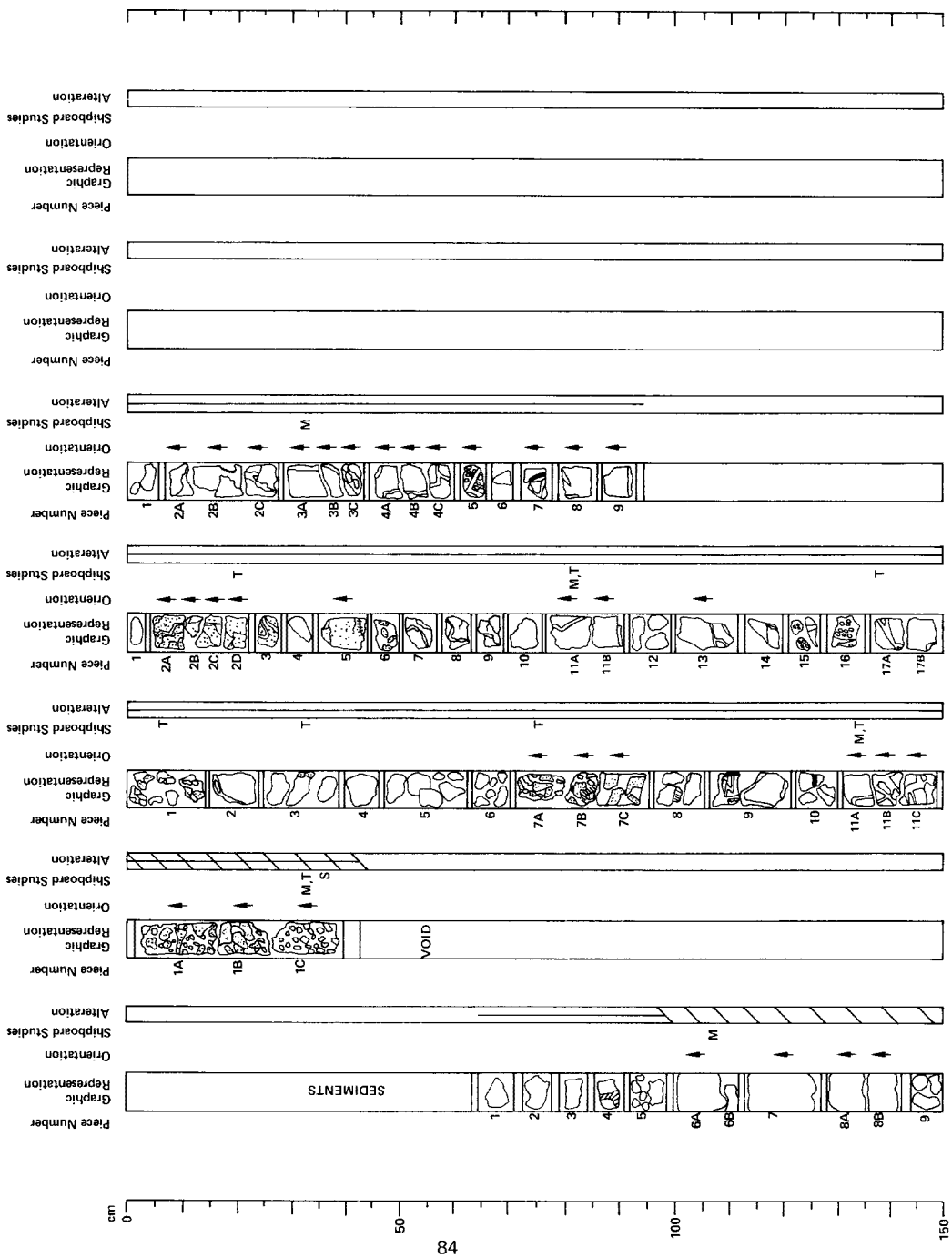
	1-111	1-129	1-138	2-64	2-105
Quartz	2	—	—	—	—
Feldspar		4	—	20	5
Heavy minerals	—	Tr	—	—	—
Clay	10	64	—	74	87
Volcanic glass	15	10	—	2	8
Zeolites	—	1	—	—	Tr
Carbonate rhombs	—	2	—	—	—
Carbonate unspec.	68	15	93	1	Tr
Foraminifers	Tr	—	5	—	—
Nannofossils	—	3	—	—	—
Pyrite	5	1	2	3	Tr

Silica and Iron Content:		1-01	1-29	1-44	1-73	1-104	1-111
SiO_2	=	5.0%	5.5%	3.0%	7.8%	11%	2.0%
Fe	=	0.31%	0.27%	0.35%	0.48%	0.53%	0.72%

		1-113	1-139	2-1	2-32	2-56	2-65
SiO_2	=	8.8%	46%	53%	14%	59%	59%
Fe	=	0.55%	1.2%	4.4%	17%	2.0%	1.4%

Carbonate Content: 1-108 = 81%

Carbon-Carbonate:	1-111
% Carbonate	81.6
% Organic Carbon	0.2



62-465A-40 **Depth: 409.5 to 419.0 m**

SECTION 2: VOLCANIC BRECCIA, medium bluish gray (5B 5/1)

Pieces 1–5 are fine-grained with visible plagioclase laths under the binocular microscope. Highly altered; possible to mark with the fingernail. Pyrite and calcite coatings on boundries. In Piece 4 a vein is dark red to white and may contain barite in addition to calcite and pyrite.

Pieces 6–9 are larger and obviously brecciated. The volcanic rock is generally slightly coarser grained than in Pieces 1–5 and contains both plagioclase and pyroxene microphenocrysts. This volcanic rock is not so badly altered. The veins are filled with calcite and a green mineral. The volcanic rock contains fairly abundant sulfides in places. The volcanic rock pieces are angular to subrounded. One euhedral olivine microphenocryst outline was noted.

SECTION 3: VOLCANIC BRECCIA

Clasts of volcanic rock cemented by veins of calcite. The texture of the individual clasts varies from very fine-grained to medium-grained. The coarser grained clasts contain plagioclase laths that are visible under the binocular microscope. The clasts range in color from gray (N5) to medium bluish gray (5B 5/1). Many of the clasts contain veins of pyrite; often pyrite occurs at the clast-carbonate interface. Flow layering, exemplified by alignment of plagioclase crystals, is present in some clasts. A few clasts contain microphenocrysts of plagioclase. No holohyaline clasts were seen; some highly altered clasts were found, however, that may represent altered glass.

No size sorting of clasts is observed. Most, however, show a moderate degree of rounding.

TS (40-3, 31 cm): Hyalopilitic to pilotaxitic trachyte from the flow interior containing less than 1% euhedral olivine phenocrysts, 0.1–0.2 mm in size, and 8% plagioclase phenocrysts, 0.25–0.75 mm in size. The groundmass contains 15.4% plagioclase, dominantly microlites, 3.0% magnetite and ilmenite and 73.4% glass which is replaced by clay. Alteration of the original trachyte to clays is extensive.

62-465A-41 **Depth: 419.5 to 428.5 m**

SECTION 1: TRACHYTE/VOLCANIC BRECCIA

Piece 1: Rubble of volcanic breccia. Clasts of varying grain sizes in a calcite matrix. A smear slide of a light colored (light bluish gray, 5B 7/1) clast contained devitrified glass and feldspar crystals. The clast is presumed to be an altered glass fragment; no crystals are large enough to be seen even with the binocular microscope.

Pieces 2–5: Very fine-grained trachyte containing rare plagioclase microphenocrysts; patches of altered glass are common. Thin coatings of pyrite, with or without calcite, occur on several pieces. Color is a fairly uniform light bluish gray (5B 7/1).

Piece 6: Consists of a rubble of small pieces of trachyte, some brecciated and containing calcite and pyrite veins.

Pieces 7A–C: Breccia containing highly angular trachyte fragments in a matrix of calcite. The trachyte is badly altered. Plagioclase crystals, some apparently flow aligned, may be seen with the binocular microscope. Dessimated pyrite occurs in many clasts. Color varies from gray (N5) to medium bluish gray (5B 5/1), except one clast which is about pinkish gray (5YR 8/1) and banded. Several pieces show layering, probably flowage induced.

Pieces 8–11: Similar to above except that brecciation appears to have occurred *in situ*. Pieces are very angular and appear to fit together across the calcite veins. Piece 9 shows flow layering that has been folded. A green alteration mineral is abundant; it is either an alteration product of glass, or a vesicle filling.

TS (41-1, 30 cm): Hyalopilitic trachyte containing 8.0% plagioclase phenocrysts, 0.05–0.2 mm in size. The larger crystals are zoned. The groundmass contains 12.3% plagioclase microlites and 1.2% magnetite. Glass altered to clays makes up about 76.5% rock and rare carbonate veins (0.2%) are present. Irregularly shaped vesicles filled with clay cover about 1.8% of the surface.

TS (41-1, 75 cm): Hyalopilitic trachyte from a breccia clast containing 6.2% phenocrysts of plagioclase laths 0.1–1.0 mm in size, some of which are zoned. The groundmass contains 26.8% plagioclase microlites, 1.2% magnetite, and 65.7% glass which has been altered to clay. A small amount of carbonate (0.1%) is present.

SECTION 2: TRACHYTE

Altered trachyte , gray (N5–N7), that has been highly fractured; fractures now filled with calcite occasionally with a bright green, unidentified mineral. In contrast to the upper part of Section 1, transportation of brecciated clasts does not appear to have occurred, with the possible exception of Piece 6 in which calcite accounts for about one-half of the specimen. Brecciation is most intense in the upper 30 cm of the section.

Texturally, Piece 2 is fine- to medium-grained with visible plagioclase laths and phenocrysts of plagioclase and pseudomorphed olivine. Grain size appears to decrease downward to at least Piece 14. Piece 15 is highly vesicular; Pieces 16 and 17 are also vesicular, but contain fewer vesicles than Piece 15.

Alteration is pervasive and the rock can easily be scratched with a spatula. A green material is ubiquitous, occuring as patches throughout the trachyte. It is probably a replacement product of either glass, or is a vesicle filling.

Layering is present in Pieces 12 and 13 and possibly in Piece 2. The layering is presumed due to flowage. Layering in Piece 12 is folded.

Pyrite occurs sparsely disseminated throughout the trachyte.

TS (41-2, 19 cm): A pilotaxitic trachyte from a flow interior with microphenocrysts of plagioclase. Magnetite and ilmenite are present in greater than 1% abundance. Calcite is present in veins and glass has been altered to clays.

TS (41-2, 82 and 137 cm): A hyalopititic trachyte from next to a glassy margin. It contains both phenocrysts and microphenocrysts of plagioclase with some partly fresh plagioclase in the groundmass. Magnetite and ilmenite are present in greater than 1% abundance. Clays are abundant dominantly as altered glass.

SECTION 3: TRACHYTE, gray (N6)

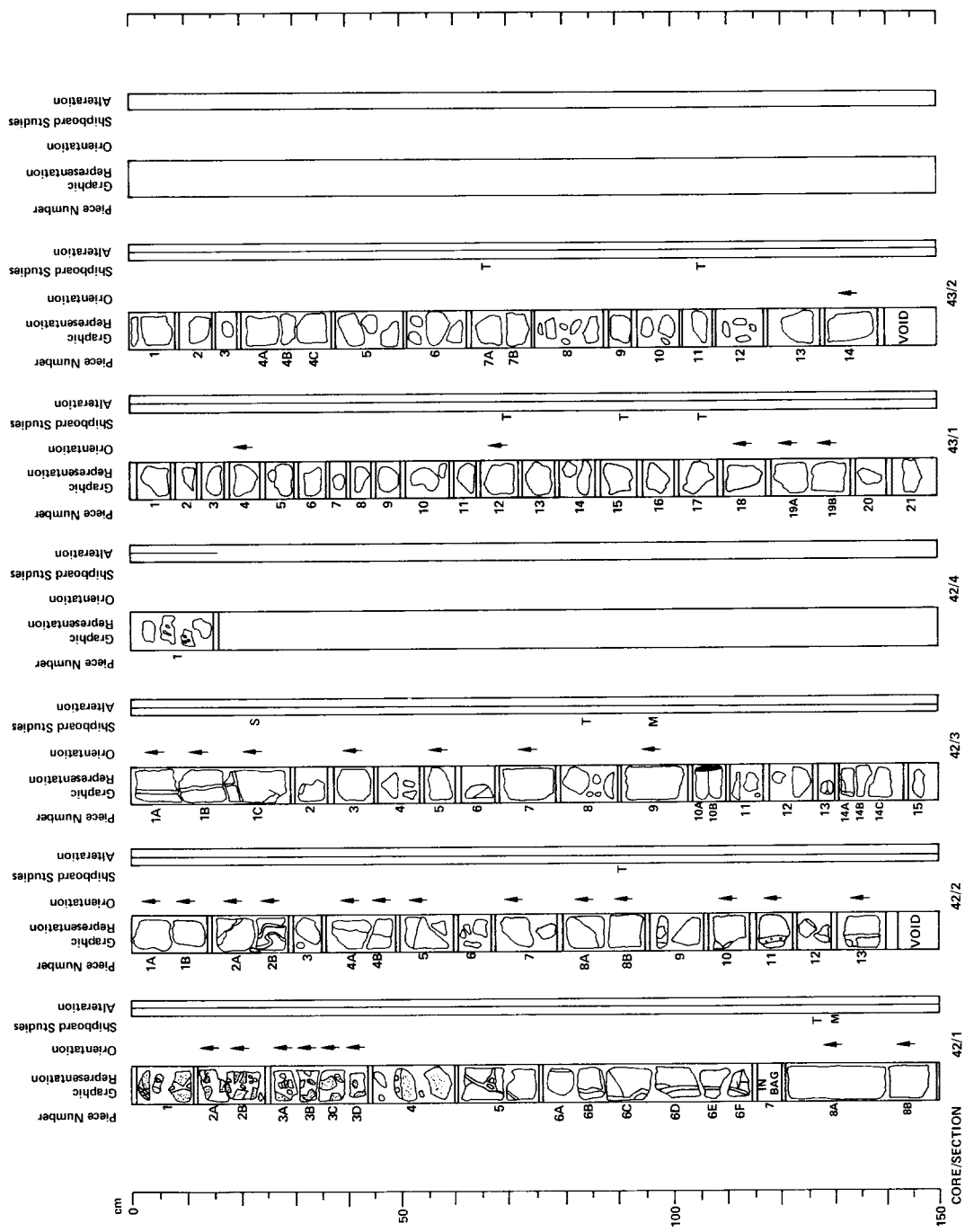
Piece 1: Vesicular trachyte; number of vesicles appears to continue trend noted at bottom of Section 2. Grain size is small.

Piece 2: Top of Piece 2C vesicular. Pieces 2B and 2C non-vesicular. Number of open vesicles decreases from Piece 1 downward and grain size increases to Piece 2C.

Grain size approximately constant from Piece 2C through 3B, then decreases to Piece 4C. Piece 5 is fine-grained and vesicular. Grain size increases from Piece 5 downward to bottom of core.

Degree of fracturing is reduced from top of core (see Sections 1 and 2), but some fracturing is still present. Calcite fills virtually all of the fractures. Fracturing is most intense in Piece 3C.

Pyrite is very sparse in this section. A dark green material is abundant throughout the trachyte. It appears to be either replacing glass or filling vesicles.


CORE/SECTION
42/1
42/2
42/3
42/4
43/1
43/2
Piece Number
Graphic Representation
Orientation
Shipboard Studies
Alteration
cm
0
50
100
150
VOID
BAG

62-465A-42 **Depth 428.5 to 438.0 m**

SECTION 1: TRACHYTE/BRECCIA

Pieces 1–3: Breccia containing very angular fragments of trachyte that range in texture from fine-grained vesicular trachyte and altered glass to medium-grained trachyte containing oriented feldspars. The matrix is mostly calcite; an unidentified light-green mineral, commonly occurring as crystals, is observed in the open vugs between clasts. Several clasts are surrounded by pyrite. One clast in Piece 3C is very different in appearance from the other trachyte (olive gray, 5Y 4/1) and may represent a differentiate.

Piece 4 consists of several small, vesicular pieces. One of these exhibits an interface of breccia with vesicular trachyte. The vesicular trachyte is aphyric aphanitic.

Pieces 5–8: Aphyric aphanitic vesicular trachyte, gray (N6). Veins of calcite occur in Pieces 5A, 5B, 6A–6F, and rubble in bag (No. 7). Sparce pyrite dessimated throughout this interval.

TS (42-1, 127 cm): A hyalopilitic vesicular trachyte with 3.8% plagioclase phenocrysts (laths and rhombs), 0.06–0.4 mm in size. The groundmass contains 0.7% magnetite and 27.5% plagioclase. Glass altered to clay is dominant, 57.4%. Vesicles cover 8.6% of the surface and some are filled with calcite, 2.4%.

SECTION 2: TRACHYTE, light gray (N7)

Very fine-grained aphyric trachyte with many vesicules. Veins are filled with calcite, Vesicule size is generally ≥1 mm but range up to 1 cm and range from unaligned to fairly well aligned. Dessiminated sulfides occur throughout. Vesicle fillings are generally a rim of smectite? and a central filling of calcite.

Piece 5: Slightly larger plagioclase microphenocrysts.

Pieces 11 and 13: Slightly larger plagioclase microphenocrysts.

TS (42-2, 90 cm): A pilotaxitic trachyte from next to a glassy margin which contains phenocrysts and microphenocrysts of plagioclase. The groundmass contains plagioclase which in part appears fresh, rare magnetite and ilmenite, and glass which has been altered to clay.

SECTION 3: VESICULAR TRACHYTE, light gray (N7)

Very fine-grained aphyric vesicular trachyte, badly altered. Most vesicles are ≥1 mm, but some are a few mm in size.

Veins are filled with calcite.

Vesicules are sometimes oriented, ranging from equidemensional poorly aligned to flattened elliptical, and well aligned.

Sulfides are dessiminated throughout the trachyte, but occurs in larger amounts in Pieces 1A and 1B.

In Pieces 9–11 the vesilces are filled; lined with smectite? and the center filled with other material.

Flow unit, Pieces 6–9.

Flow unit, Pieces 9–15.

TS (42-3, 84 cm): A pilotaxitic trachyte from next to a glassy margin which contains microphenocrysts of plagioclase. The groundmass contains plagioclase which in part appears fresh, rare magnetie and ilmenite, and glass which has been altered to clay.

SECTION 4: TRACHYTE, gray (N5)

Altered trachyte, very fine-grained. Two pieces contain a few small vesicles.

62-465A-43 **Depth 438.0 to 447.5 m**

SECTION 1: VESICULAR TRACHYTE, light gray (N7)

Fine-grained highly altered vesicular trachyte. Small parallel to subparallel plagioclase microphenocrysts throughout. Finely disseminated pyrite in small amounts, concentrations in veins.

Flow unit, Pieces 1–5; with Pieces 2, 3, and 4 slightly coarser grained and 1 and 5 finer grained and more vesicular.

Flow unit, Pieces 6–9.

Flow unit, Pieces 9–13.

Flow unit, Pieces 13–16.

Flow unit, Pieces 16–19.

Flow unit, Pieces 19–21.

Flow units based on vesicle and microphenocryst size variations. Vesicle size ranges up to about one-half cm, but is generally about 1 mm.

TS (43-2, 69 cm): A pilotaxitic trachyte which contains microphenocrysts of plagioclase. The groundmass contains plagioclase which is mostly fresh, rare magnetite and ilmenite, and glass which has been altered to clay.

TS (43-1, 91 cm): A hyalopilitic trachyte from next to a glassy margin which contains phenocrysts and microphenocrysts of plagioclase. The groundmass contains partly fresh plagioclase, over 2% magnetite and ilmenite, and glass which has been altered to clay.

TS (43-1, 105 cm): A hyalopilitic trachyte from next to a glassy margin containing phenocrysts and microphenocrysts of plagioclase. Partly fresh plagioclase is in the groundmass as well as rare magnetite and ilmenite, and glass altered to clay.

SECTION 2: VESICULAR TRACHYTE, light gray (N7)

Very fine-grained highly altered vesicular trachyte. Vesicle size ranges up to one-half cm but is generally near 1 mm or less.

Flow unit, Pieces 1–4C.

Pieces 5–7 all very vesicular and fine-grained with only small plagioclase microphenocrysts.

Flow unit, Pieces 7–10.

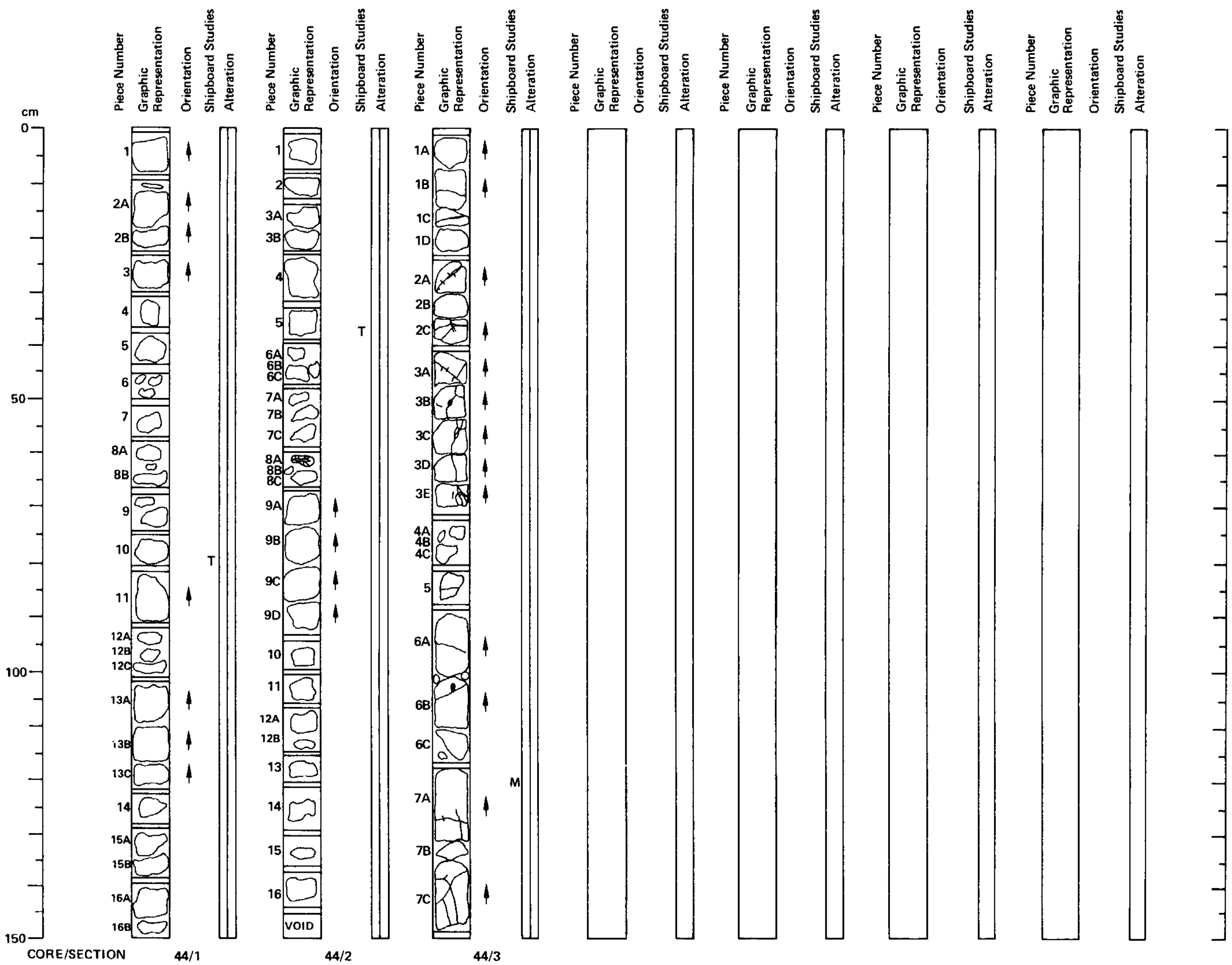
Flow unit, Pieces 10–14.

Disseminated pyrite in small amounts throughout. Less in Core 43 than in Core 42.

Filled vesicles with smectite? linings and central calcite fillings in Pieces 1, 2, 8, and 9.

TS (43-2, 65 cm): A hyalopilitic trachyte with microphenocrysts of plagioclase. The groundmass contains partly fresh plagioclase, rare magnetite and ilmenite and glass altered to clay.

TS (43-2, 107 cm): A vesicular hyalopilitic–pilotaxitic trachyte contains 4.1% plagioclase laths, 0.08–0.5 mm size. The groundmass contains plagioclase microlites 31.1%, magnetite, 1.0%, and glass altered to clay, 61.1%. Vesicles cover 2.5% of the surface.



62-465A-44 Depth 447.5 to 457.5 m

SECTION 1: VESICULAR TRACHYTE, light gray (N7)

Fine-grained highly altered trachyte with plagioclase microphenocrysts. Vesicular throughout with vesicles ranging from ≥ 1 mm in general to one-half cm.

Some very finely disseminated pyrite.

Flow unit, Pieces 1–8B

Flow unit, Piece 8B–13B.

Flow unit, Pieces 13B–16B.

TS (44-1, 78 cm): A pilotaxitic trachyte with both phenocrysts and microphenocrysts of plagioclase. The groundmass contains rather fresh plagioclase, rare magnetite and ilmenite, and glass altered to clay.

SECTION 2: VESICULAR TRACHYTE, light gray (N7)

Fine-grained highly altered trachyte with plagioclase microphenocrysts. Vesicles range from generaly ≥1 mm to one-half cm in size.

Finely disseminated pyrite in very small amounts.

Flow unit, Piece 1–3A.

Flow unit, Piece 3B–7C.

Flow unit, Piece 7C– –9B?

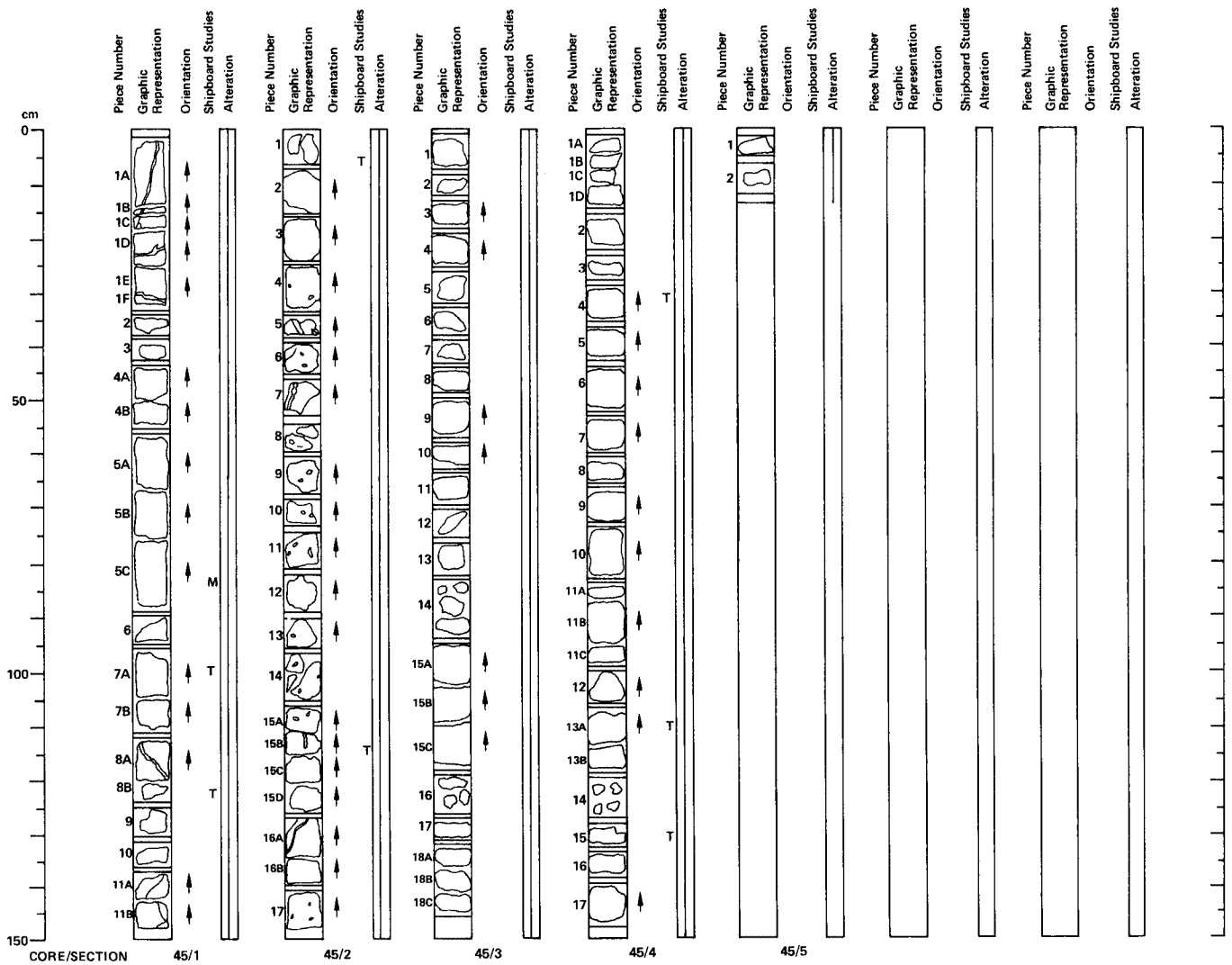
Fine-grained and vesicular from 9A on through the remainder of core – Piece 16.

TS (44-2, 37 cm): A hyalopilitic trachyte with microphenocrysts of plagioclase. The groundmass contains partly fresh plagioclase, rare magnetite and ilmenite and glass altered to clay.

SECTION 3: VESICULAR TRACHYTE, gray (N6)

Altered aphyric aphanitic vesicular trachyte. Veins filled with calcite are common; alteration of trachyte present around veins. Some vesicles are flattened penpendicular to axial direction of core. Finely disseminated pyrite occurs throughout section.

Pieces 6A and 6B show a very faint reddish color.



62-465A-45 Depth 457.0 to 466.5 m

SECTION 1: VESICULAR TRACHYTE, gray (N6)

Altered aphyric aphanitic vesicular trachyte. Degree of vesiculation variable; Pieces 4A–B contain fewer vesicles than Pieces above or below, and Pieces 8A–B also contain fewer than surrounding pieces. Several pieces contain fractures filled with calcite; alteration is common around the veins. Calcite also occurs in patches scattered throughout the trachyte. Pieces 6, 7A–B, 9, 10, 11, and 12A have a faint reddish tint, especially surrounding some of the larger vesicles.

TS (45-1, 99 cm): A hyalopilitic trachyte with microphenocrysts of plagioclase. The groundmass contains partly fresh plagioclase, rare magnetite and ilmenite, and glass altered to clay. Some carbonate formed from plagioclase is present.

TS (45-1, 123 cm): A pilotaxitic trachyte with phenocrysts and microphenocrysts of plagioclase. The groundmass contains mostly fresh plagioclase, greater than 2% magnetite and ilmenite, and glass altered to clay.

SECTION 2: VESICULAR TRACHYTE, gray (N6)

Altered aphyric aphanitic trachyte. Vesicles commonly flattened perpendicular to axis of core. Calcite veins common. Number and size of vesicles decreases in bottom of Piece 3. Pieces 4–7 contain more than bottom of 3, but less than 1, 2 and top of 3. Vesicle size then increases from Piece 8 to bottom of section, Piece 17. Pieces 3, 9, 10, 11, 14A–D, and 15A–B have a faint reddish tint.

TS (45-2, 6 cm): A hyalopilitic trachyte with microphenocrysts of plagioclase. The groundmass contains partly fresh plagioclase, over 2% magnetite and ilmenite, and glass altered to clay. Some large crystals of carbonate are present as an alteration product.

TS (45-2, 114 cm): A hyalopilitic trachyte with phenocrysts and microphenocrysts of plagioclase. The groundmass contains mostly fresh plagioclase, rare magnetite and ilmenite, and glass altered to clays.

SECTION 3: VESICULAR TRACHYTE, light gray (N7)

Fine-grained highly altered vesicular trachyte with relic olivine and fresh plagioclase microphenocrysts. The olivine has been pseudomorphed by a bright green soft mineral, but has maintained good euhedral outlines. Portions of the cut surface have a reddish cast. Small amounts of pyrite are scattered throughout.

Flow unit, Pieces 8–18C continued.

Pieces 1–7 all fine-grained and highly vesicular.

SECTION 4: VESICULAR TRACHYTE, light gray (N7)

Fine- to medium-grained highly altered trachyte with varying amounts of vesicles. Vesicle size normally is > 1 mm, but ranges to one-half cm. Abundant plagioclase microphenocrysts and a few euhedral, bright green, olivine pseudomorphs are observed. Pyrite veins are disseminated throughout the core.

Flow unit, continued Piece 1–4.

Flow unit, Pieces 5–11C.

Flow unit, Pieces 11C–16.

TS (45-4, 31 cm): A pilotaxitic trachyte with phenocrysts and microphenocrysts of plagioclase. The groundmass contains partly fresh plagioclase, over 2% magnetite and ilmenite, and glass altered to clays. Veins containing calcite are present.

SECTION 5: VESICULAR TRACHYTE, light gray (N7)

Fine-grained highly altered vesicular trachyte with plagioclase microphenocrysts. A few bright green olivine pseudomorphs are observed.

62-465A-46 Depth 466.5 to 476.0 m

SECTION 1: VESICULAR TRACHYTE; light gray (N7)

Fine-grained highly vesicular trachyte that is badly altered to smectite. Fine plagioclase microphenocrysts throughout and occasional bright green olivine pseudomorphs. Pieces 6E, 6F, and 6G have abundant bright green patches, perhaps olivine pseudomorphs in part. In Piece 9B similar green patches are partly olivine pseudomorphs and partly vesicle fillings.
Finely disseminated pyrite occurs throughout.
Vesicle size generally is <1 mm but ranges up to one-half cm as in previous cores.

TS (46-1, 37 cm): A pilotaxitic trachyte with phenocrysts and microphenocrysts of plagioclase. The groundmass contains partly fresh plagioclase, rare magnetite and ilmenite and glass altered to clays.

SECTION 2: TRACHYTE; light gray (N7)

Fine-grained badly altered trachyte with plagioclase microphenocrysts and occasional olivine pseudomorphs. Finely disseminated pyrite occurs in small amounts.
Pieces 1–4 have the vesicles mostly filled with green or white material.
Flow unit, Pieces 4B–7.
Piece 9–12 medium grained and vesicular.
Pieces 4C–12 are unfilled vesicles.

SECTION 3: VESICULAR TRACHYTE; light gray (N7)

Medium-grained vesicular trachyte with plagioclase microphenocrysts. Highly altered throughout.
Vesicles are filled in Pieces 6, 8, 9A, and 10.
Vesicle size still the same, generally <1 mm but up to one-half cm.
Piece 7 is fine-grained.

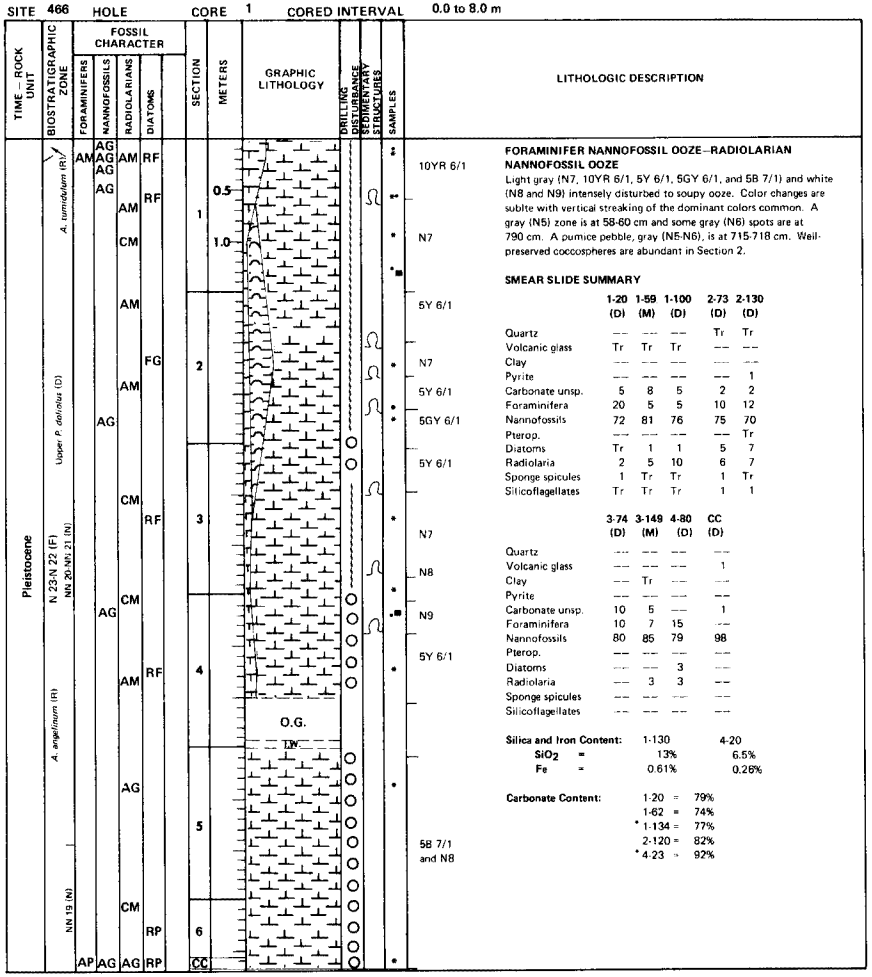
TS (46-3, 16 cm): A hyalopilitic trachyte with phenocrysts and microphenocrysts of plagioclase. The groundmass contains partly fresh plagioclase, rare magnetite and ilmenite, and glass altered to clay.

SITE SUMMARY SHEET

SITE 466

Date occupied:	August 28, 1978 (1332Z)
Date departed:	August 30, 1978 (2354Z)
Time on hole:	58.3 hours
Position: Latitude:	34° 11.46'N
Longitude:	179° 15.34'E
Water depth (sea level):	2665 corrected meters, echo sounding
Water depth (rig floor):	2675 corrected meters, echo sounding
Bottom felt at:	2672 meters, drill pipe
Penetration:	312 meters
Number of holes:	1
Number of cores:	35
Total length of cored section:	312 meters
Total core recovery:	105.4 meters
Percentage core recovery:	33.8%
Oldest Sediment Cored	
Depth sub-bottom:	312 meters
Nature:	Limestone
Age:	Upper Albian
Measured velocity:	n/a
Basement	
Depth sub-bottom:	n/a
Nature:	n/a
Velocity range:	n/a

SITE 466 HOLE CORE 1 CORED INTERVAL 0.0 to 8.0 m



FORAMINIFER NANNOFOSSIL OOZE–RADIOLARIAN NANNOFOSSIL OOZE

Light gray (N7, 10YR 6/1, 5Y 6/1, 5GY 6/1, and 5B 7/1) and white (N8 and N9) intensely disturbed to soupy ooze. Color changes are sublte with vertical streaking of the dominant colors common. A gray (N5) zone is at 58-60 cm and some gray (N6) spots are at 790 cm. A pumice pebble, gray (N5-N6), is at 715-718 cm. Well-preserved coccospheres are abundant in Section 2.

SMEAR SLIDE SUMMARY

	1-20 (D)	1-59 (M)	1-100 (D)	2-73 (D)	2-130 (D)
Quartz	—	—	—	Tr	Tr
Volcanic glass	Tr	Tr	Tr	—	—
Clay	—	—	—	—	—
Pyrite	—	—	—	—	1
Carbonate unsp.	5	8	5	2	2
Foraminifera	20	5	5	10	12
Nannofossils	72	81	76	75	70
Pterop.	—	—	—	—	Tr
Diatoms	Tr	1	1	5	7
Radiolaria	2	5	10	6	7
Sponge spicules	1	Tr	Tr	1	Tr
Silicoflagellates	Tr	Tr	Tr	1	1

	3-74 (D)	3-149 (M)	4-80 (D)	CC (D)
Quartz	—	—	—	—
Volcanic glass	—	—	—	1
Clay	—	Tr	—	—
Pyrite	—	—	—	—
Carbonate unsp.	10	5	—	1
Foraminifera	10	7	15	—
Nannofossils	80	85	79	98
Pterop.	—	—	—	—
Diatoms	—	—	3	—
Radiolaria	—	3	3	—
Sponge spicules	—	—	—	—
Silicoflagellates	—	—	—	—

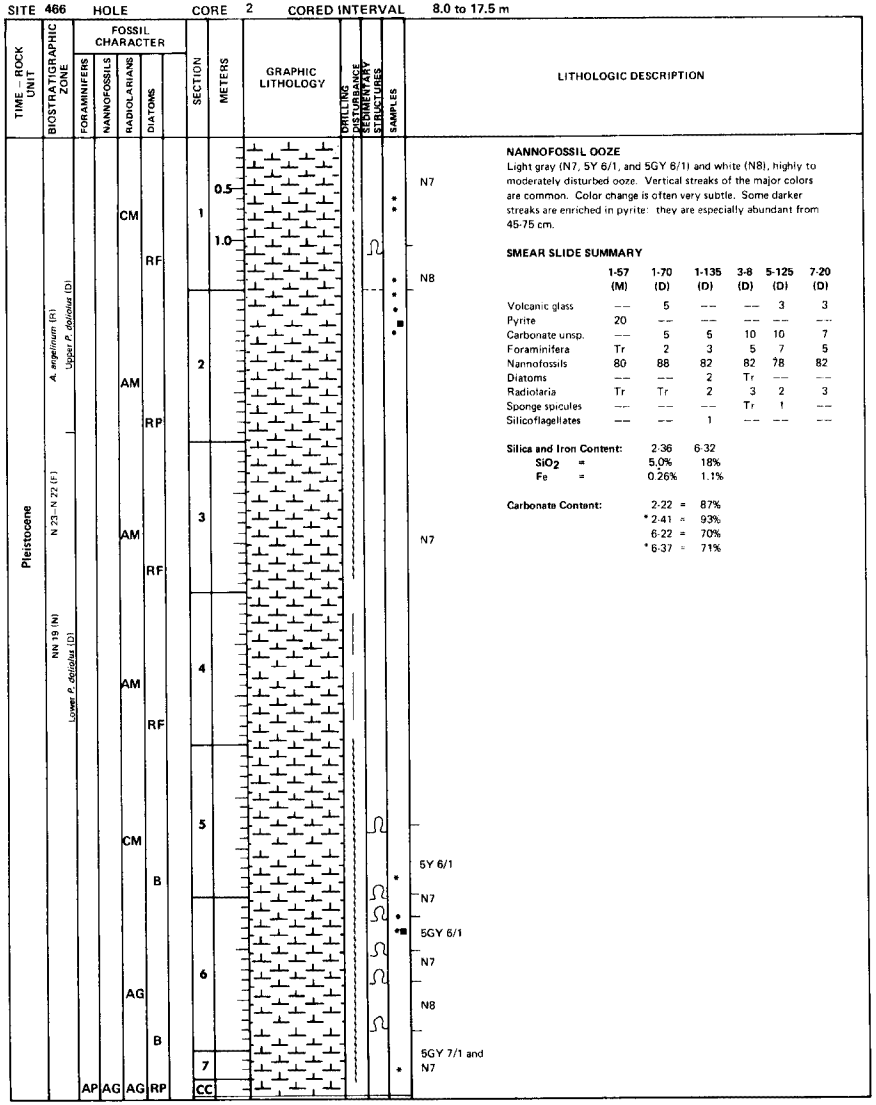
Silica and Iron Content:

	1-130	4-20
SiO_2 =	13%	6.5%
Fe =	0.61%	0.26%

Carbonate Content:

1-20 =	79%
1-62 =	74%
*1-134 =	77%
2-120 =	82%
*4-23 =	92%

SITE 466 HOLE CORE 2 CORED INTERVAL 8.0 to 17.5 m



NANNOFOSSIL OOZE

Light gray (N7, 5Y 6/1, and 5GY 6/1) and white (N8), highly to moderately disturbed ooze. Vertical streaks of the major colors are common. Color change is often very subtle. Some darker streaks are enriched in pyrite: they are especially abundant from 45-75 cm.

SMEAR SLIDE SUMMARY

	1-57 (M)	1-70 (D)	1-135 (D)	3-8 (D)	5-125 (D)	7-20 (D)
Volcanic glass	—	5	—	—	3	3
Pyrite	20	—	—	—	—	—
Carbonate unsp.	—	5	5	10	10	7
Foraminifera	Tr	2	3	5	7	5
Nannofossils	80	88	82	82	78	82
Diatoms	—	—	2	Tr	—	—
Radiolaria	Tr	Tr	2	3	2	3
Sponge spicules	—	—	—	Tr	1	—
Silicoflagellates	—	—	1	—	—	—

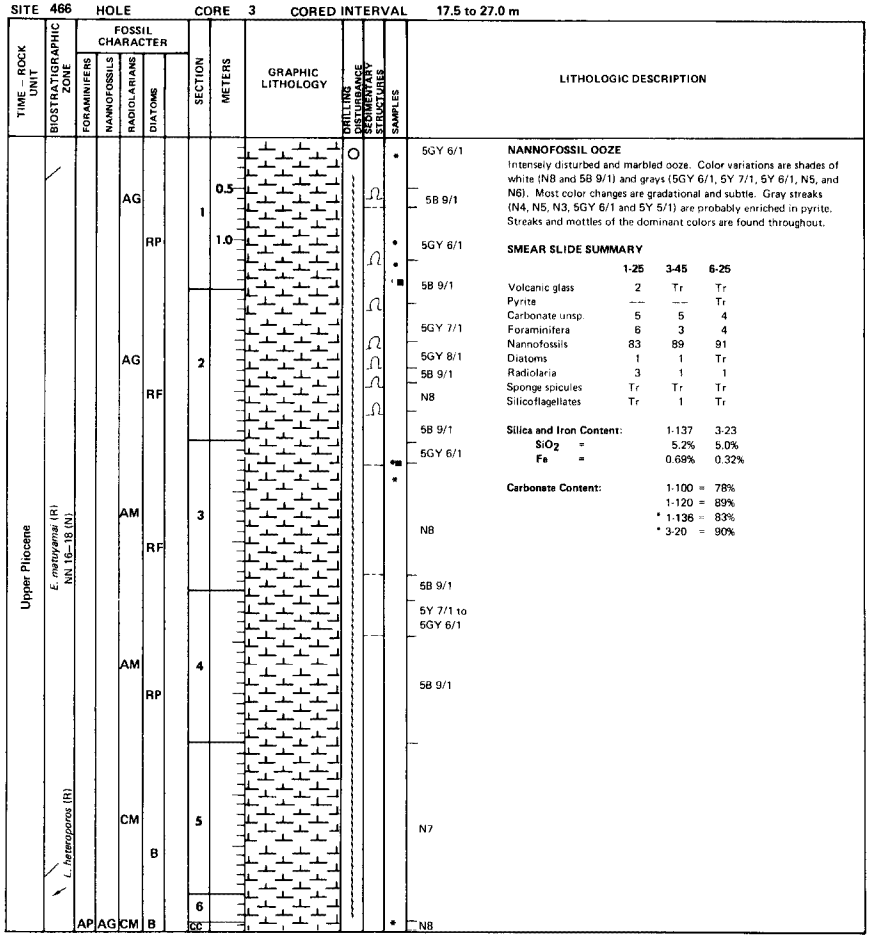
Silica and Iron Content:

	2-36	6-32
SiO_2 =	5.0%	18%
Fe =	0.26%	1.1%

Carbonate Content:

2-22 =	87%
*2-41 =	93%
6-22 =	70%
*6-37 =	71%

SITE 466 HOLE CORE 3 CORED INTERVAL 17.5 to 27.0 m



NANNOFOSSIL OOZE

Intensely disturbed and marbled ooze. Color variations are shades of white (N8 and 5B 9/1) and grays (5GY 6/1, 5Y 7/1, 5Y 6/1, N5, and N6). Most color changes are gradational and subtle. Gray streaks (N4, N5, N3, 5GY 6/1 and 5Y 5/1) are probably enriched in pyrite. Streaks and mottles of the dominant colors are found throughout.

SMEAR SLIDE SUMMARY

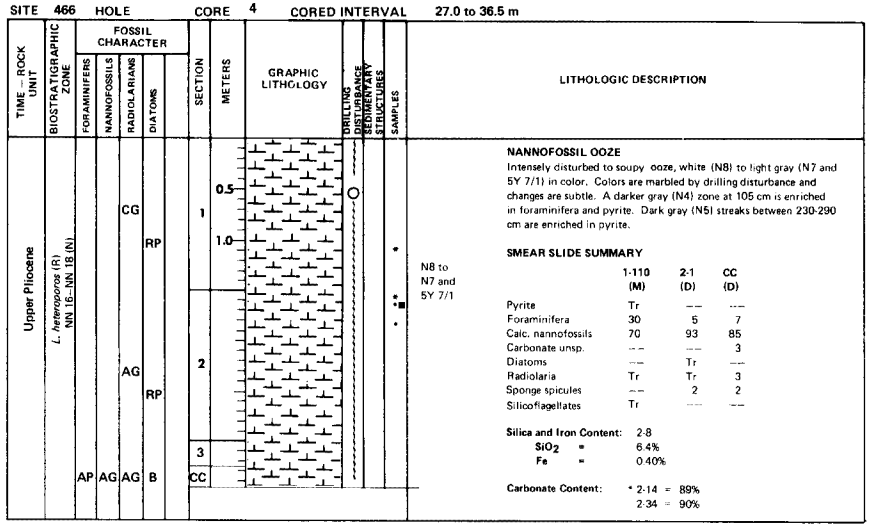
	1-25	3-45	6-25
Volcanic glass	2	Tr	Tr
Pyrite	—	—	Tr
Carbonate unsp.	5	5	4
Foraminifera	6	3	4
Nannofossils	83	89	91
Diatoms	1	1	Tr
Radiolaria	3	1	1
Sponge spicules	Tr	Tr	Tr
Silicoflagellates	Tr	1	Tr

	1-137	3-23
Silica and Iron Content:		
SiO_2 =	5.2%	5.0%
Fe =	0.69%	0.32%

Carbonate Content:

1-100 = 78%
1-120 = 89%
* 1-136 = 83%
* 3-20 = 90%

SITE 466 HOLE CORE 4 CORED INTERVAL 27.0 to 36.5 m



NANNOFOSSIL OOZE

Intensely disturbed to soupy ooze, white (N8) to light gray (N7 and 5Y 7/1) in color. Colors are marbled by drilling disturbance and changes are subtle. A darker gray (N4) zone at 105 cm is enriched in foraminifera and pyrite. Dark gray (N5) streaks between 230-290 cm are enriched in pyrite.

SMEAR SLIDE SUMMARY

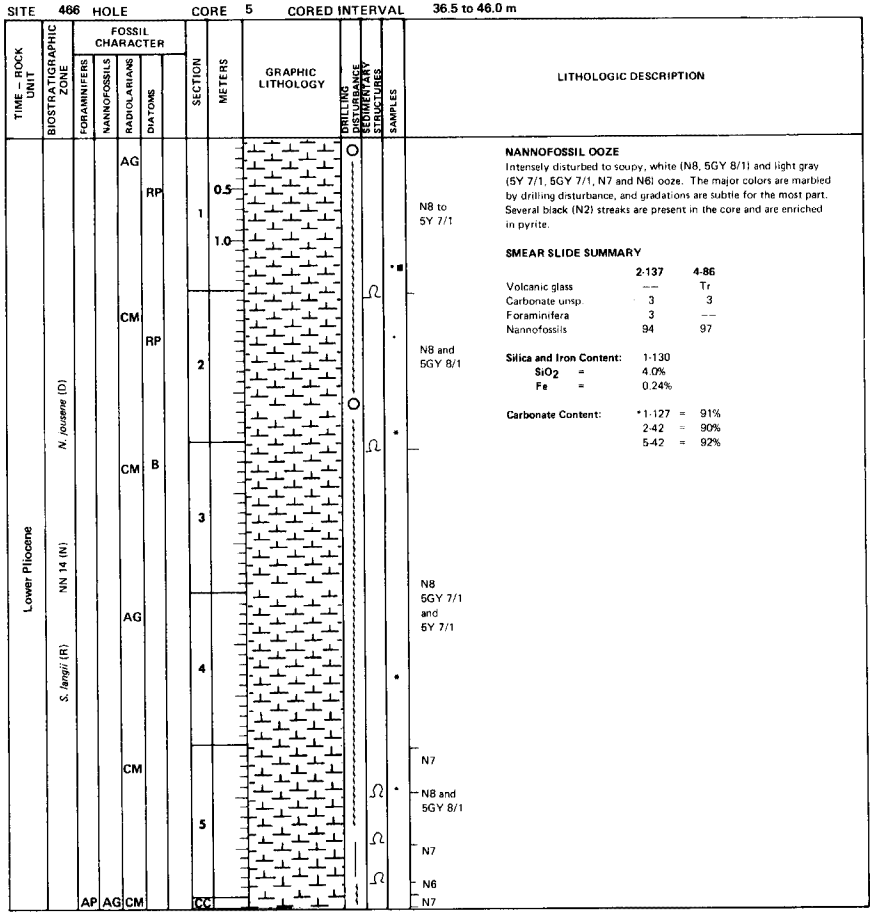
	1-110 (M)	2-1 (D)	CC (D)
Pyrite	Tr	—	—
Foraminifera	30	5	7
Calc. nannofossils	70	93	85
Carbonate unsp.	—	—	3
Diatoms	—	Tr	—
Radiolaria	Tr	Tr	3
Sponge spicules	—	2	2
Silicoflagellates	Tr	—	—

	2-8
Silica and Iron Content:	
SiO_2 =	6.4%
Fe =	0.40%

Carbonate Content:

* 2-14 = 89%
2-34 = 90%

SITE 466 HOLE CORE 5 CORED INTERVAL 36.5 to 46.0 m



NANNOFOSSIL OOZE

Intensely disturbed to soupy, white (N8, 5GY 8/1) and light gray (5Y 7/1, 5GY 7/1, N7 and N6) ooze. The major colors are marbled by drilling disturbance, and gradations are subtle for the most part. Several black (N2) streaks are present in the core and are enriched in pyrite.

SMEAR SLIDE SUMMARY

	2-137	4-86
Volcanic glass	—	Tr
Carbonate unsp.	3	3
Foraminifera	3	—
Nannofossils	94	97

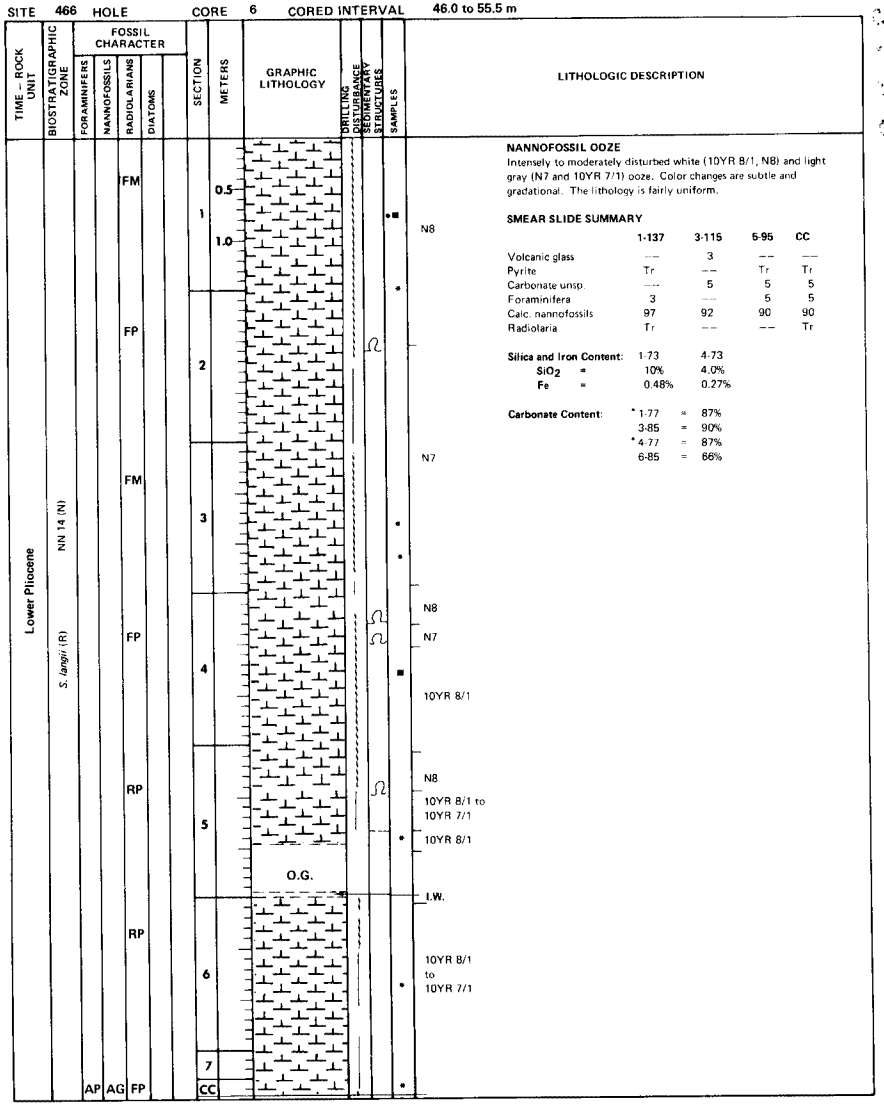
Silica and Iron Content: 1-130

SiO_2 = 4.0%

Fe = 0.24%

Carbonate Content: *1-127 = 91%; 2-42 = 90%; 5-42 = 92%

SITE 466 HOLE CORE 6 CORED INTERVAL 46.0 to 55.5 m



NANNOFOSSIL OOZE

Intensely to moderately disturbed white (10YR 8/1, N8) and light gray (N7 and 10YR 7/1) ooze. Color changes are subtle and gradational. The lithology is fairly uniform.

SMEAR SLIDE SUMMARY

	1-137	3-115	5-95	CC
Volcanic glass	—	3	—	—
Pyrite	Tr	—	Tr	Tr
Carbonate unsp.	—	5	5	5
Foraminifera	3	—	5	5
Calc. nannofossils	97	92	90	90
Radiolaria	Tr	—	—	Tr

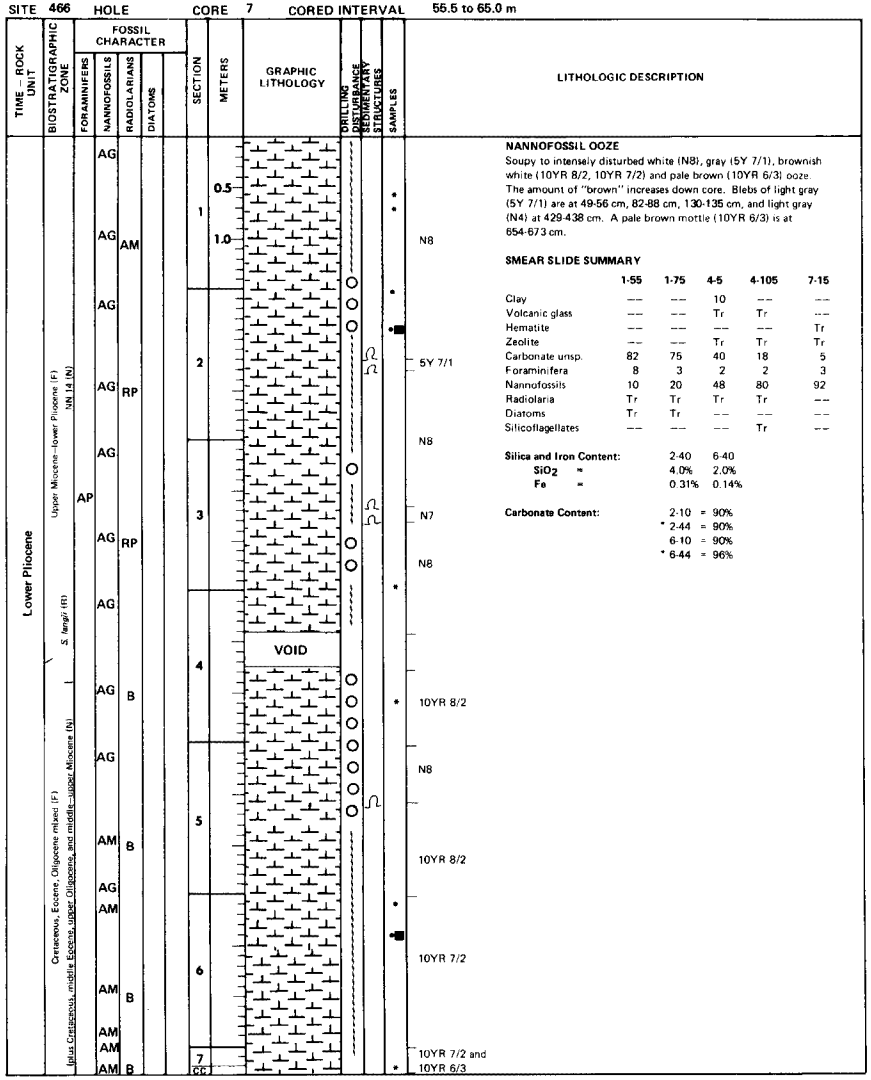
Silica and Iron Content: 1-73 4-73

SiO_2 = 10% 4.0%

Fe = 0.48% 0.27%

Carbonate Content: *1-77 = 87%; 3-85 = 90%; *4-77 = 87%; 6-85 = 66%

SITE 466 HOLE CORE 7 CORED INTERVAL 55.5 to 65.0 m



NANNOFOSSIL OOZE

Soupy to intensely disturbed white (N8), gray (5Y 7/1), brownish white (10YR 8/2, 10YR 7/2) and pale brown (10YR 6/3) ooze. The amount of "brown" increases down core. Blebs of light gray (5Y 7/1) are at 49-56 cm, 82-88 cm, 130-135 cm, and light gray (N4) at 429-438 cm. A pale brown mottle (10YR 6/3) is at 654-673 cm.

SMEAR SLIDE SUMMARY

	1-55	1-75	4-5	4-105	7-15
Clay	—	—	10	—	—
Volcanic glass	—	—	Tr	Tr	—
Hematite	—	—	—	—	Tr
Zeolite	—	—	Tr	Tr	Tr
Carbonate unsp.	82	75	40	18	5
Foraminifera	8	3	2	2	3
Nannofossils	10	20	48	80	92
Radiolaria	Tr	Tr	Tr	Tr	—
Diatoms	Tr	Tr	—	—	—
Silicoflagellates	—	—	—	Tr	—

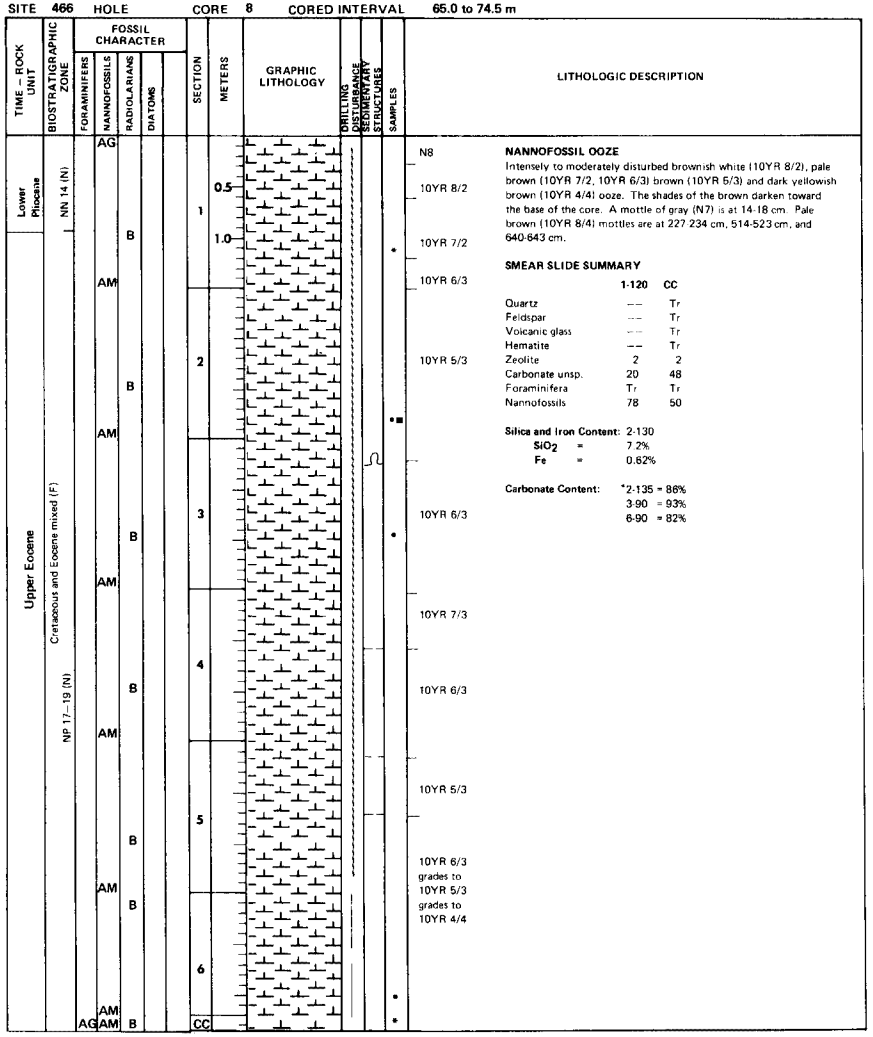
Silica and Iron Content:

SiO_2	=	4.0%	2.0%
Fe	=	0.31%	0.14%

Carbonate Content:

2-10 = 90%
* 2-44 = 90%
6-10 = 90%
* 6-44 = 96%

SITE 466 HOLE CORE 8 CORED INTERVAL 65.0 to 74.5 m



NANNOFOSSIL OOZE

Intensely to moderately disturbed brownish white (10YR 8/2), pale brown (10YR 7/2, 10YR 6/3) brown (10YR 5/3) and dark yellowish brown (10YR 4/4) ooze. The shades of the brown darken toward the base of the core. A mottle of gray (N7) is at 14-18 cm. Pale brown (10YR 8/4) mottles are at 227-234 cm, 514-523 cm, and 640-643 cm.

SMEAR SLIDE SUMMARY

	1-120	CC
Quartz	—	Tr
Feldspar	—	Tr
Volcanic glass	—	Tr
Hematite	—	Tr
Zeolite	2	2
Carbonate unsp.	20	48
Foraminifera	Tr	Tr
Nannofossils	78	50

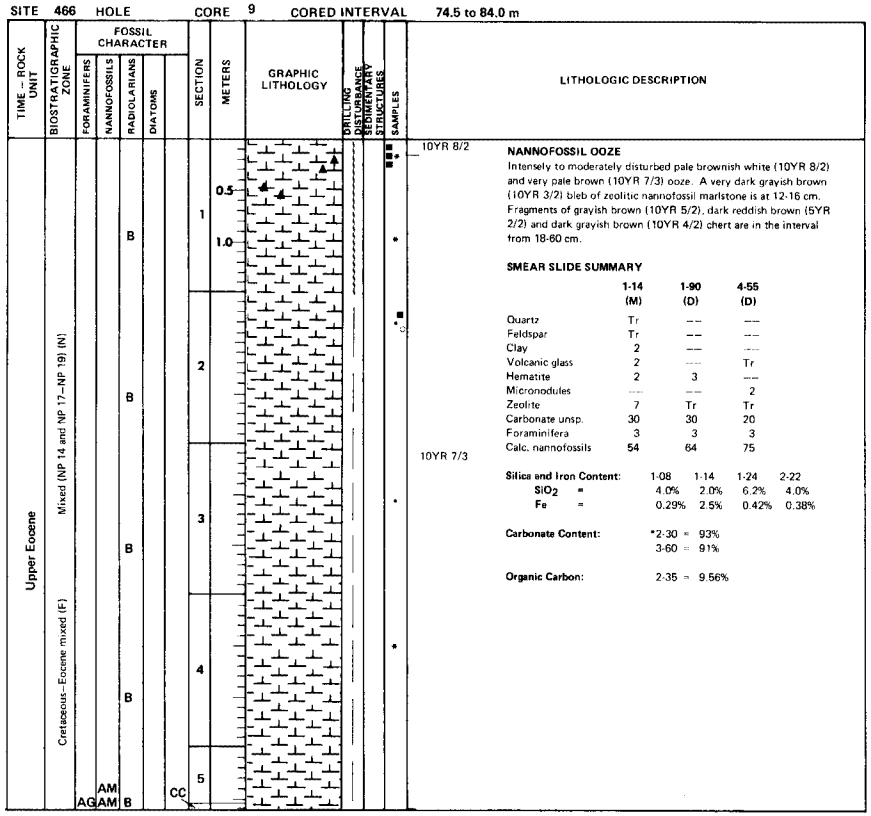
Silica and Iron Content: 2-130

SiO_2	=	7.2%
Fe	=	0.62%

Carbonate Content:

*2-135 = 86%
3-90 = 93%
6-90 = 82%

SITE 466 HOLE CORE 9 CORED INTERVAL 74.5 to 84.0 m



NANNOFOSSIL OOZE

Intensely to moderately disturbed pale brownish white (10YR 8/2) and very pale brown (10YR 7/3) ooze. A very dark grayish brown (10YR 3/2) bleb of zeolitic nannofossil marlstone is at 12-16 cm. Fragments of grayish brown (10YR 5/2), dark reddish brown (5YR 2/2) and dark grayish brown (10YR 4/2) chert are in the interval from 18-60 cm.

SMEAR SLIDE SUMMARY

	1-14 (M)	1-90 (D)	4-55 (D)
Quartz	Tr	---	---
Feldspar	Tr	---	---
Clay	2	---	---
Volcanic glass	2	---	Tr
Hematite	2	3	---
Micronodules	---	---	2
Zeolite	7	Tr	Tr
Carbonate unsp.	30	30	20
Foraminifera	3	3	3
Calc. nannofossils	54	64	75

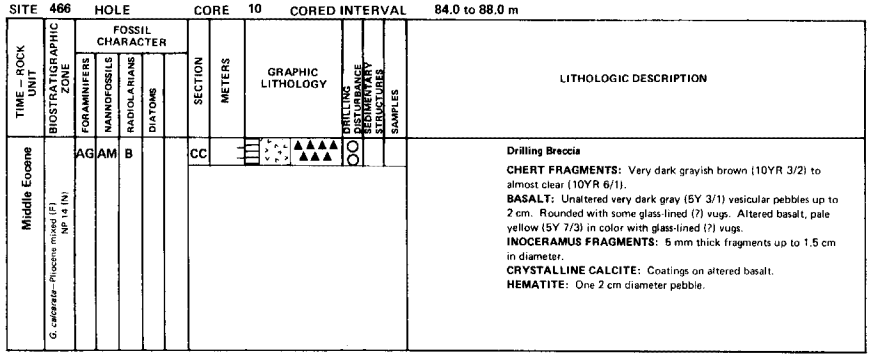
Silica and Iron Content:

	1-08	1-14	1-24	2-22
SiO_2 =	4.0%	2.0%	6.2%	4.0%
Fe =	0.29%	2.5%	0.42%	0.38%

Carbonate Content: *2-30 = 93%; 3-60 = 91%

Organic Carbon: 2-35 = 9.56%

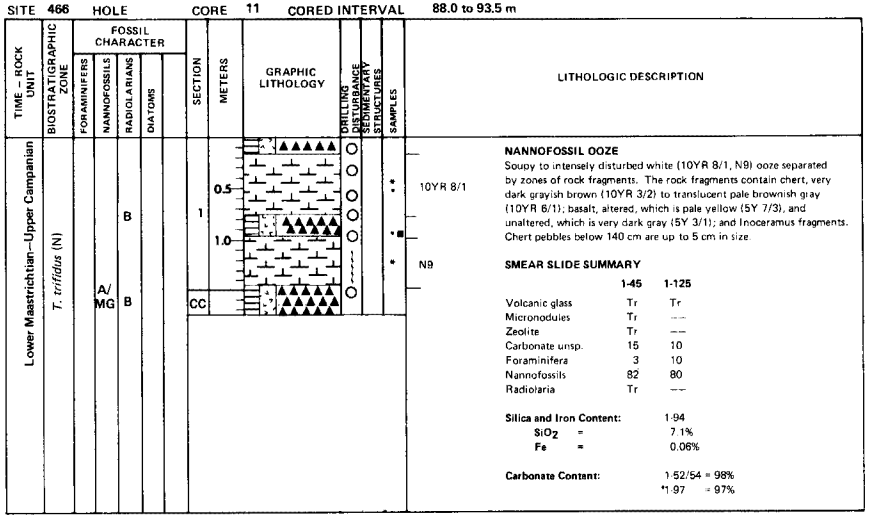
SITE 466 HOLE CORE 10 CORED INTERVAL 84.0 to 88.0 m



Drilling Breccia

CHERT FRAGMENTS: Very dark grayish brown (10YR 3/2) to almost clear (10YR 6/1).
BASALT: Unaltered very dark gray (5Y 3/1) vesicular pebbles up to 2 cm. Rounded with some glass-lined (?) vugs. Altered basalt, pale yellow (5Y 7/3) in color with glass-lined (?) vugs.
INOCERAMUS FRAGMENTS: 6 mm thick fragments up to 1.5 cm in diameter.
CRYSTALLINE CALCITE: Coatings on altered basalt.
HEMATITE: One 2 cm diameter pebble.

SITE 466 HOLE CORE 11 CORED INTERVAL 88.0 to 93.5 m



NANNOFOSSIL OOZE

Soupy to intensely disturbed white (10YR 8/1, N9) ooze separated by zones of rock fragments. The rock fragments contain chert, very dark grayish brown (10YR 3/2) to translucent pale brownish gray (10YR 8/1); basalt, altered, which is pale yellow (5Y 7/3), and unaltered, which is very dark gray (5Y 3/1); and Inoceramus fragments. Chert pebbles below 140 cm are up to 5 cm in size.

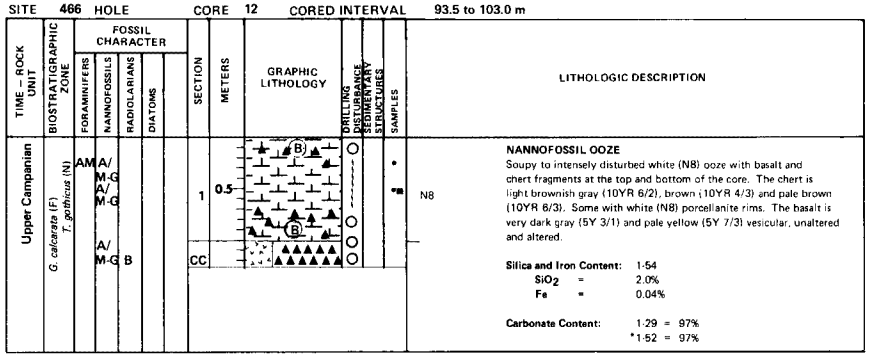
SMEAR SLIDE SUMMARY

	1-45	1-125
Volcanic glass	Tr	Tr
Micronodules	Tr	---
Zeolite	Tr	---
Carbonate unsp.	15	10
Foraminifera	3	10
Nannofossils	82	80
Radiolaria	Tr	---

Silica and Iron Content: 1-94
SiO_2 = 7.1%
Fe = 0.06%

Carbonate Content: 1-52/54 = 98%; *1-97 = 97%

SITE 466 HOLE CORE 12 CORED INTERVAL 93.5 to 103.0 m



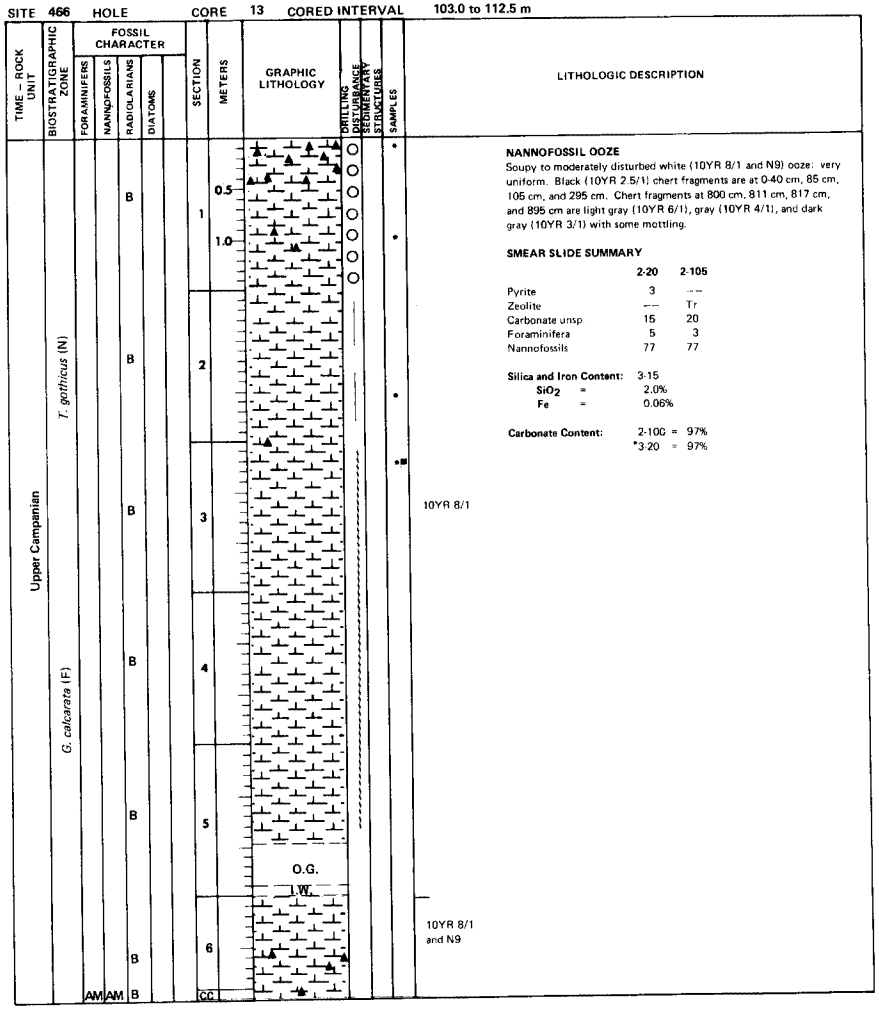
NANNOFOSSIL OOZE

Soupy to intensely disturbed white (N8) ooze with basalt and chert fragments at the top and bottom of the core. The chert is light brownish gray (10YR 6/2), brown (10YR 4/3) and pale brown (10YR 6/3). Some with white (N8) porcellanite rims. The basalt is very dark gray (5Y 3/1) and pale yellow (5Y 7/3) vesicular, unaltered and altered.

Silica and Iron Content: 1-54
SiO_2 = 2.0%
Fe = 0.04%

Carbonate Content: 1-29 = 97%; *1-52 = 97%

SITE 466 HOLE CORE 13 CORED INTERVAL 103.0 to 112.5 m



NANNOFOSSIL OOZE

Soupy to moderately disturbed white (10YR 8/1 and N9) ooze: very uniform. Black (10YR 2.5/1) chert fragments are at 0-40 cm, 85 cm, 105 cm, and 295 cm. Chert fragments at 800 cm, 811 cm, 817 cm, and 895 cm are light gray (10YR 6/1), gray (10YR 4/1), and dark gray (10YR 3/1) with some mottling.

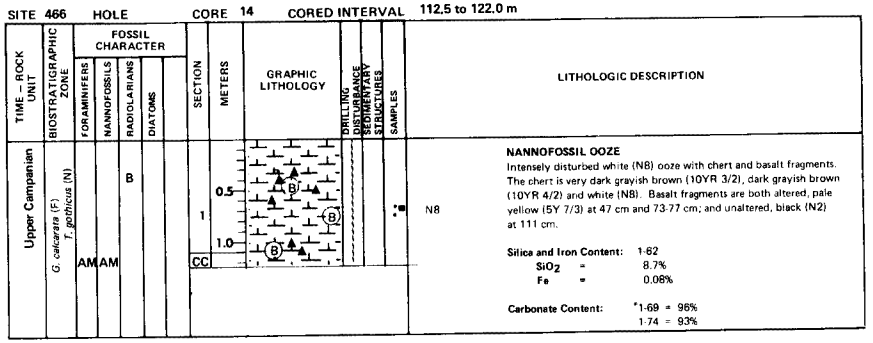
SMEAR SLIDE SUMMARY

	2-20	2-105
Pyrite	3	—
Zeolite	—	Tr
Carbonate unsp.	15	20
Foraminifera	5	3
Nannofossils	77	77

Silica and Iron Content: 3-15
SiO_2 = 2.0%
Fe = 0.06%

Carbonate Content: 2-100 = 97%
*3-20 = 97%

SITE 466 HOLE CORE 14 CORED INTERVAL 112.5 to 122.0 m



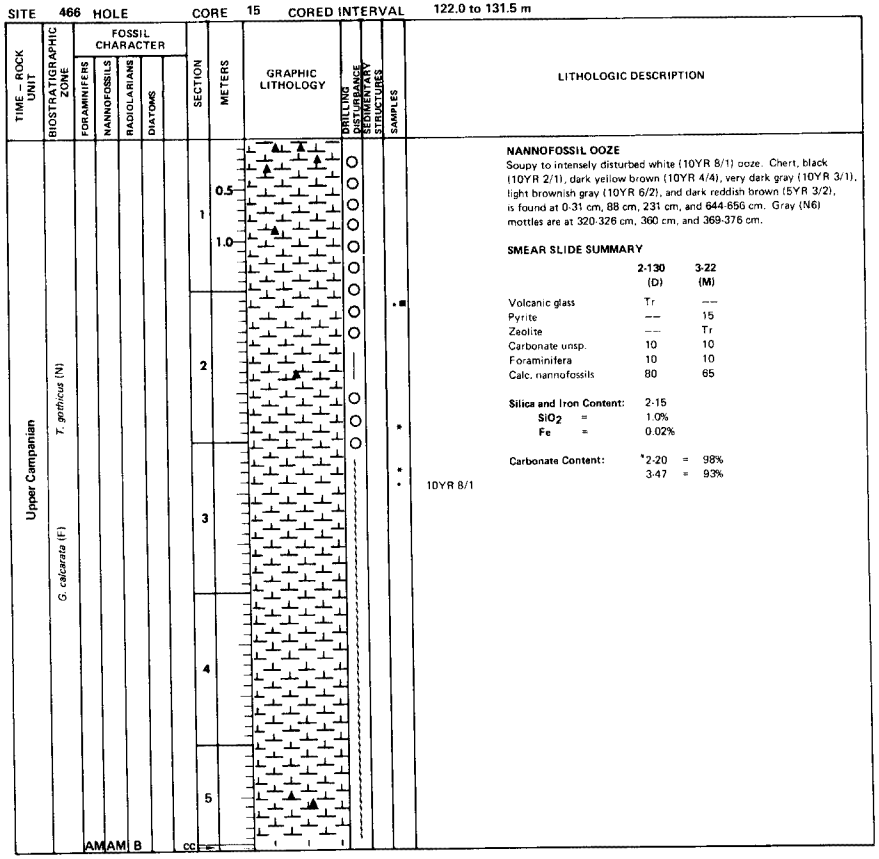
NANNOFOSSIL OOZE

Intensely disturbed white (N8) ooze with chert and basalt fragments. The chert is very dark grayish brown (10YR 3/2), dark grayish brown (10YR 4/2) and white (N8). Basalt fragments are both altered, pale yellow (5Y 7/3) at 47 cm and 73-77 cm; and unaltered, black (N2) at 111 cm.

Silica and Iron Content: 1-62
SiO_2 = 8.7%
Fe = 0.08%

Carbonate Content: *1-69 = 96%
1-74 = 93%

SITE 466 HOLE CORE 15 CORED INTERVAL 122.0 to 131.5 m



NANNOFOSSIL OOZE

Soupy to intensely disturbed white (10YR 8/1) ooze. Chert, black (10YR 2/1), dark yellow brown (10YR 4/4), very dark gray (10YR 3/1), light brownish gray (10YR 6/2), and dark reddish brown (5YR 3/2), is found at 0-31 cm, 88 cm, 231 cm, and 644-656 cm. Gray (N6) mottles are at 320-326 cm, 360 cm, and 369-376 cm.

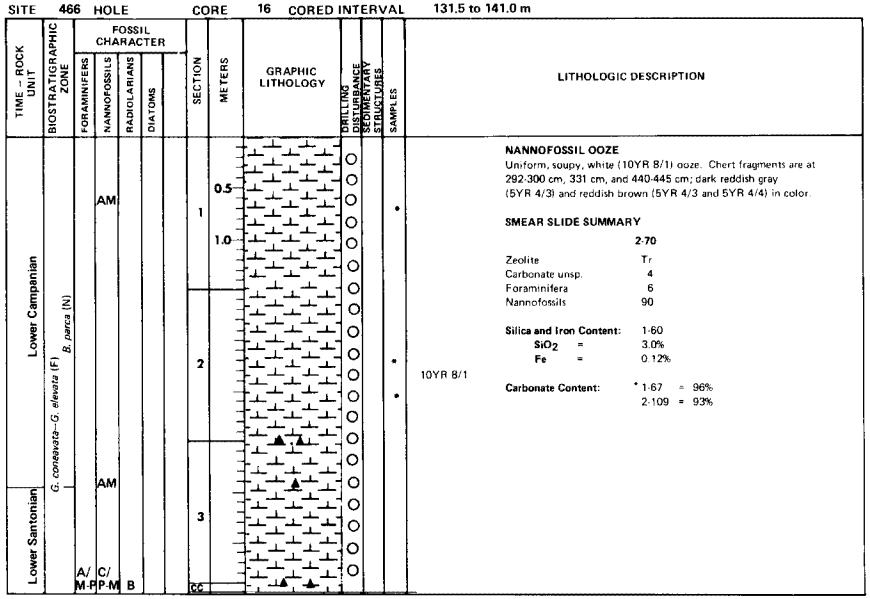
SMEAR SLIDE SUMMARY

	2-130 (D)	3-22 (M)
Volcanic glass	Tr	—
Pyrite	—	15
Zeolite	—	Tr
Carbonate unsp.	10	10
Foraminifera	10	10
Calc. nannofossils	80	65

Silica and Iron Content: 2-15
SiO_2 = 1.0%
Fe = 0.02%

Carbonate Content: *2-20 = 98%
3-47 = 93%

SITE 466 HOLE CORE 16 CORED INTERVAL 131.5 to 141.0 m



NANNOFOSSIL OOZE
Uniform, soupy, white (10YR 8/1) ooze. Chert fragments are at 292-300 cm, 331 cm, and 440-445 cm; dark reddish gray (5YR 4/3) and reddish brown (5YR 4/3 and 5YR 4/4) in color.

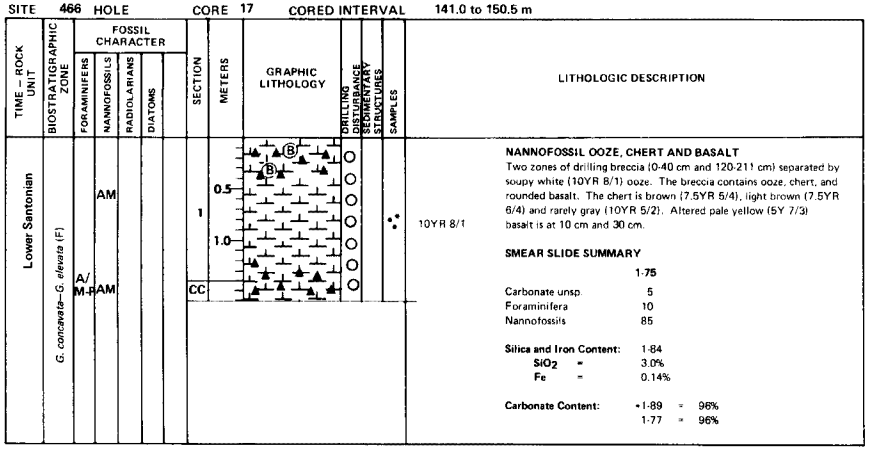
SMEAR SLIDE SUMMARY

	2-70
Zeolite	Tr
Carbonate unsp.	4
Foraminifera	6
Nannofossils	90

Silica and Iron Content: 1-60
SiO_2 = 3.0%
Fe = 0.12%

Carbonate Content: * 1-67 = 96%
2-109 = 93%

SITE 466 HOLE CORE 17 CORED INTERVAL 141.0 to 150.5 m



NANNOFOSSIL OOZE, CHERT AND BASALT
Two zones of drilling breccia (0-40 cm and 120-211 cm) separated by soupy white (10YR 8/1) ooze. The breccia contains ooze, chert, and rounded basalt. The chert is brown (7.5YR 5/4), light brown (7.5YR 6/4) and rarely gray (10YR 5/2). Altered pale yellow (5Y 7/3) basalt is at 10 cm and 30 cm.

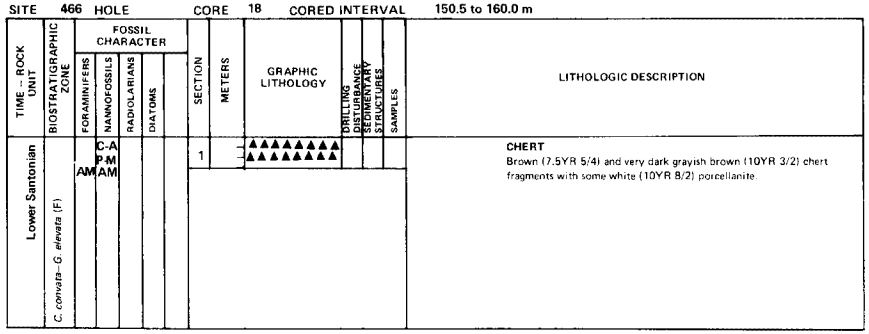
SMEAR SLIDE SUMMARY

	1-75
Carbonate unsp.	5
Foraminifera	10
Nannofossils	85

Silica and Iron Content: 1-84
SiO_2 = 3.0%
Fe = 0.14%

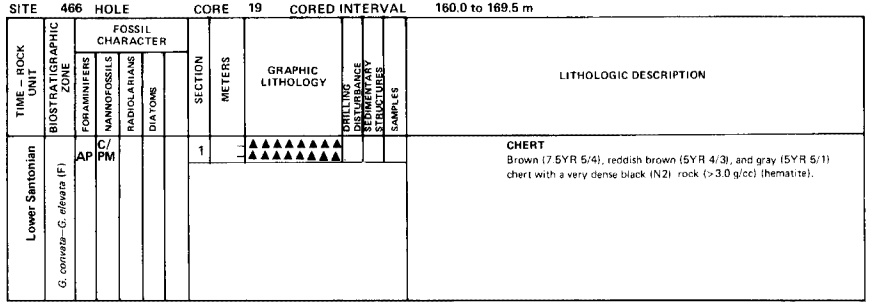
Carbonate Content: • 1-89 = 96%
1-77 = 96%

SITE 466 HOLE CORE 18 CORED INTERVAL 150.5 to 160.0 m



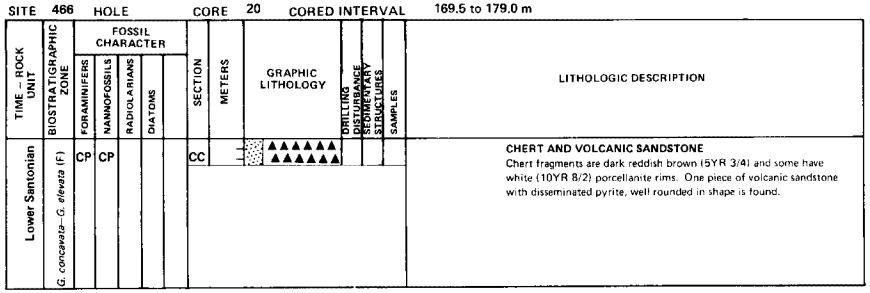
CHERT
Brown (7.5YR 5/4) and very dark grayish brown (10YR 3/2) chert fragments with some white (10YR 8/2) porcellanite.

SITE 466 HOLE CORE 19 CORED INTERVAL 160.0 to 169.5 m



CHERT
Brown (7.5YR 5/4), reddish brown (5YR 4/3), and gray (5YR 5/1) chert with a very dense black (N2) rock (>3.0 g/cc) (hematite).

SITE 466 HOLE CORE 20 CORED INTERVAL 169.5 to 179.0 m



CHERT AND VOLCANIC SANDSTONE
Chert fragments are dark reddish brown (5YR 3/4) and some have white (10YR 8/2) porcellanite rims. One piece of volcanic sandstone with disseminated pyrite, well rounded in shape is found.

SITE 466 HOLE CORE 21 CORED INTERVAL 179.0 to 188.5 m

TIME–ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Lower Santonian	*G. concavata–G. elevata* (F)	AM	FC/P			CC						**CHERT** Three pieces of chert from 2.5 cm in size and many smaller fragments. The large pieces are light gray (N7) but the smaller ones show a complete color variation in the grays, and reddish browns.

SITE 466 HOLE CORE 22 CORED INTERVAL 188.5 to 198.0 m

TIME–ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	?	FP	FP			CC						**CHERT** Three larger pieces of chert up to 3 cm in diameter: black (N2) with a white porcellanite rim, very dark grayish brown (10YR 3/2), and brown (7.5YR 5/4) with a pale brown (10YR 7/3) porcellanite rim. Smaller fragments in the core exhibit a range of colors in gray and reddish brown.

SITE 466 HOLE CORE 23 CORED INTERVAL 198.0 to 207.5 m

TIME–ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	?		FP			CC						**CHERT** Nine fragments of chert: grays (N6, N5), black (N2), white (N9), brown (7.5YR 5/4) and grayish brown (10YR 5/2).

SITE 466 HOLE CORE 24 CORED INTERVAL 207.5 to 217.0 m

TIME–ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Lower Coniacian–Upper Turonian	*G. renzi–G. sigali* (F)	CP				CC						**CHERT** Six fragments of chert: grays (N7, N4), white (N8), black (N2), dark brown (7.5YR 4/2), and olive black (5Y 2/1).

SITE 466 HOLE CORE 25 CORED INTERVAL 217.0 to 226.5 m

TIME–ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Lower Coniacian–Upper Turonian	*G. renzi–G. sigali* (F)	CP				CC						**CHERT** Seventeen fragments of chert: mostly white to black shades (N1 to N8) with a couple of reddish brown pieces.

SITE 466 HOLE CORE 26 CORED INTERVAL 226.5 to 236.0 m

TIME–ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?			B			1						**CHERT** Fragments of chert: dark yellowish brown (10YR 4/2), dark gray (7.5YR 3/1), dusky yellowish brown (10YR 2/2), and black (7.5YR 2/1). Some contain white (7.5YR 8/1) and gray (7.5YR 6/1) mottles.

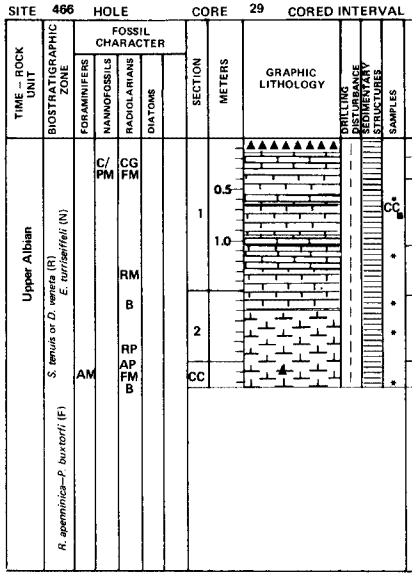
SITE 466 HOLE CORE 27 CORED INTERVAL 236.0 to 245.5 m

TIME–ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?						CC						**CHERT** Black (N2), very dark gray (N3), medium gray (N5), and dark brown (10YR 3/3) chert. One piece of laminated gray ash and one piece of white (10YR 8/2) porcellanite.

SITE 466 HOLE CORE 28 CORED INTERVAL 245.5 to 255.0 m

TIME–ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
Lower Coniacian–Upper Turonian	*G. renzi–G. sigali* (F)		B RP	AM		CC					5Y 2/1	**CHERT AND PYRITIC CLAY** Chert fragments overlying black (5Y 2/1) pyritic clay. The chert is varying shades of gray (N7, N6, N5, N3), black (N2), and very dark brown (5Y 3/1). One fine grained dark gray (5Y 4/1) fragment may be basalt? **SMEAR SLIDE SUMMARY** CC-25 Quartz 5 Feldspar Clay 73 Glauconite Tr Pyrite 20 Zeolite 2 Calc. nannofossils Tr Volcanic glass Tr

SITE 466 HOLE CORE 29 CORED INTERVAL 255.0 to 264.5 m



NANNOFOSSIL LIMESTONE AND CHALK

Limestone and chalk of varying degrees of induration. Some ooze is present. The sediment is finely laminated, and is olive gray (5Y 4/2, 4/1), and dark olive gray (5Y 3/2). A zone of breccia is at 0-17 cm containing black (N2) and gray (N1) chert; and a vesicular basalt, dark gray (5Y 3/1) with spots of brownish yellow (10YR 6/8). A black chert is at the bottom of the core at 217 cm. An olive black layer (5Y 2/1) of ooze is at 213-216 cm.

SMEAR SLIDE SUMMARY

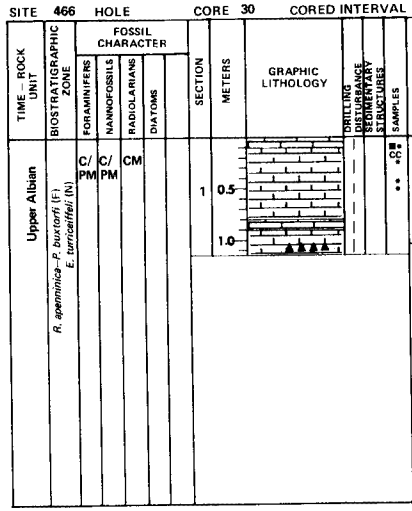
	1-115	2-15	2-35	CC-20
Quartz	—	—	—	2
Feldspar	—	—	—	
Clay	3	20	20	5
Pyrite	1	1	1	3
Organic carbon	—	—	—	10
Carbonate unsp.	88	19	34	24
Foraminifera	3	10	5	6
Nannofossils	5	50	40	30

Silica and Iron Content: 1-71
SiO_2 = 8.6%
Fe = 0.49%

Carbon-Carbonate: 1-72
% Carbonate 20.8
% Organic Carbon 7.5

Carbonate Content: 1-60 = 73%

SITE 466 HOLE CORE 30 CORED INTERVAL 264.5 to 274.0 m



NANNOFOSSIL LIMESTONE AND CHALK

Olive gray (5Y 4/2) limestone and chalk with mottles of black (5Y 2/2). One piece of light gray (N7) limestone at 16-19 cm. At the bottom of the core are several black (N2) chert fragments up to 3 cm in diameter and one piece of the overlying limestone.

SMEAR SLIDE SUMMARY

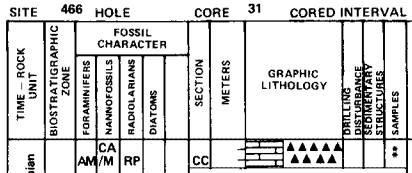
	1-18	1-45
Clay	Tr	10
Pyrite	—	Tr
Carbonate unsp.	80	56
Foraminifera	—	5
Nannofossils	15	30

Silica and Iron Content: 1-11
SiO_2 = 4.0%
Fe = 0.37%

Carbon-Carbonate: 1-12
% Carbonate 89.
% Organic Carbon 0.7

Carbonate Content: 1-10 = 93%
1-59 = 80%

SITE 466 HOLE CORE 31 CORED INTERVAL 274.0 to 283. 5 m



CHERT AND NANNOFOSSIL LIMESTONE

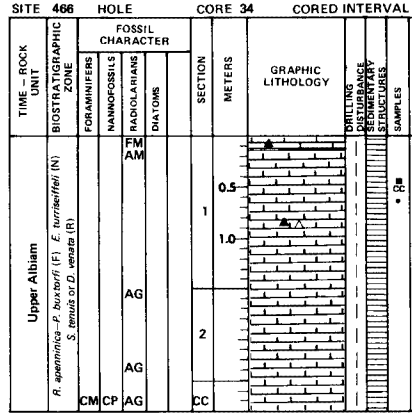
Drilling breccia of black (N2) chert up to 1 cm in size; and limestone, olive gray (5Y 4/2) in color, and up to 5 cm in diameter.

SMEAR SLIDE SUMMARY

	1-13	1-18
Clay	—	12
Volcanic glass	2	1
Pyrite	1	Tr
Micronodules	8	—
Carbonate unsp.	2	65
Foraminifera	—	2
Nannofossils	86	20
Radiolaria	1	—

NOTE: Site 466, Core 33, 283.5—287.5 m: NO RECOVERY
Site 466, Core 34, 293.0—302.5 m: NO RECOVERY

SITE 466 HOLE CORE 34 CORED INTERVAL 293.0 to 302.5 m



NANNOFOSSIL LIMESTONE AND CHALK

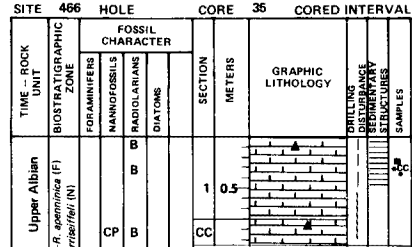
Olive gray (5Y 4/2) limestone overlying chalk of the same color. Both uniform in lithology with some faint laminations. Very dark gray (5Y 3/1) mottles are at 182-186 cm. Black (N2) chert is at 0-2 cm and 80-86 cm. The one at 80-86 cm has a large olive gray (5Y 4/2) porcellanite rim.

Silica and Iron Content: 1-49
SiO_2 = —
Fe = 0.28%

Carbon-Carbonate: 1-48
% Carbonate 77.5%
% Organic Carbon 1.0%

Carbonate Content: 1-69 = 90%

SITE 466 HOLE CORE 35 CORED INTERVAL 302.5 to 312.0 m



NANNOFOSSIL CHALK

Slight and highly disturbed olive gray (5Y 4/2) chalk with the less disturbed sections showing faint laminations. Lithology is otherwise uniform. Black chert (5Y 2/1) is at 6-11 cm and 83-86 cm. Olive gray (5Y 4/2) porcellanite is also at 83-86 cm.

SMEAR SLIDE SUMMARY

	1-30
Clay	7
Pyrite	1
Carbonate unsp.	50
Foraminifera	2
Nannofossils	40

Silica and Iron Content: 1-26
SiO_2 = 6.4%
Fe = 0.43%

Carbon-Carbonate: 1-25
% Carbonate 65.0
% Organic Carbon 2.6

Carbonate Content: 1-42 = 85%

Appendix I.
Carbon/Carbonate Data, Leg 62

Hole Core-Section, Interval (cm)	$CaCO_3$ (%)	Total Carbon (%)	Organic Carbon (%)
463			
50-1, 39	75.8	10.0	0.1
53, CC–26	28.3	3.5	0.1
56-1, 95	55.8	10.2	3.5
57-1, 16	86.6	10.6	0.2
57-2, 20	69.1	8.4	0.1
58-1, 10	80.0	9.7	0.1
58-3, 10	81.6	10.1	0.3
59-1, 18	86.6	10.5	0.1
59-3, 139	72.5	8.6	0.1
60-1, 18	80.0	9.7	0.1
60-1, 78	1.7	0.3	0.1
60-3, 110	64.1	7.8	0.1
61-1, 20	55.8	6.8	0.1
61-1, 28	54.1	6.5	0.0
62-2, 14	60.8	7.3	0.0
62-2, 71	12.5	1.6	0.1
62-2, 90	30.8	3.8	0.1
62-2, 116	53.3	7.7	1.3
62-3, 64	75.8	9.2	0.1
63-1, 128	83.3	10.1	0.1
63-2, 2	55.8	6.8	0.1
63-2, 128	75.8	9.1	0.0
63, CC–10	50.8	6.2	0.0
64-1, 68	63.3	7.7	0.1
64-3, 9	60.0	7.3	0.1
64-3, 29	51.7	6.3	0.1
65-1, 14	69.1	8.4	0.1
65-3, 7	75.8	9.2	0.1
66-1, 10	100.0	12.2	0.1
66-3, 10	70.8	8.6	0.1
67-1, 25	83.3	10.1	0.1
67-2, 59	–	–	–
67-2, 74	19.2	2.4	0.1
68-1, 16	86.6	10.5	0.1
68-1, 22	18.3	2.3	0.1
69-1, 46	75.8	10.6	1.5
69-3, 16	30.0	4.4	0.8
69-3, 41	25.8	4.7	1.6
70-1, 32	26.7	3.2	0.0
70-1, 100	15.0	2.1	0.3
70-3, 33	1.7	0.8	0.6
70-5, 119	–	–	–
70-6, 31	37.5	4.6	0.1
70, CC–0	29.2	3.6	0.1
70, CC–16	19.2	3.0	0.7
71-1, 120	–	–	–
71-1, 128	–	–	–
71-1, 133	34.2	4.3	0.2
71-2, 74	6.7	1.2	0.4
71-4, 78	84.1	10.2	0.1
72-2, 37	56.6	6.9	0.1
72-3, 60	51.6	6.3	0.1
72-4, 24	23.3	4.2	1.4
72-4, 65	65.8	8.0	0.1
73-1, 36	44.2	5.5	0.2
73-1, 49	39.2	4.8	0.1
73-1, 59	29.2	3.5	0.0
73-3, 98	87.5	11.1	0.6
74-1, 10	6.7	0.9	0.1
74-1, 30	69.1	8.4	0.1
75-1, 51	89.1	10.8	0.1
75-1, 80	20.0	2.5	0.1
76-1, 70	46.7	5.7	0.1
77-1, 60	85.8	10.4	0.1
78-1, 34	83.3	10.1	0.1
78-1, 118	3.3	0.5	0.1
79-1, 7	90.0	10.9	0.1
81-2, 18	85.8	10.4	0.1
82-1, 48	20.0	2.5	0.1
82-1, 115	13.3	1.8	0.2
83-2, 89	74.1	9.0	0.1
83-2, 93	68.3	8.3	0.1
85-1, 18	33.3	4.2	0.2
85-1, 79	85.8	10.4	0.1
88-1, 34	79.1	9.6	0.1
90-1, 1	81.6	9.9	0.1
464			
2-1, 128	10.0	1.3	0.1
3-2, 99	14.2	1.9	0.2
3-3, 99	10.9	1.5	0.2
5-4, 10	0.8	0.2	0.1
6-5, 130	1.7	0.2	0.0
7-5, 42	2.5	0.3	0.0
7-6, 42	25.8	3.2	0.1
11-1, 68	11.7	1.4	0.0
12-1, 20	20.0	2.5	0.1
13, CC–10	22.5	2.7	0.0
16, CC–8	40.0	4.9	0.1
32-1, 25	25.0	7.2	4.2
465A			
18, CC–6	83.3	10.1	0.1
27-2, 47	90.0	11.3	0.5
27, CC–16	25.8	5.4	2.3
28-1, 107	10.8	3.2	1.9
28-2, 9	80.8	10.2	0.5
28-2, 15	70.0	8.5	0.1
28-2, 20	55.8	6.8	0.1
29-1, 110	75.8	9.4	0.3
29-1, 118	55.8	7.1	0.4
30-1, 23	32.5	10.0	6.1
30-1, 58	70.8	10.2	1.7
31-1, 14	87.5	11.2	0.7
32-1, 32	76.6	9.4	0.2
32-1, 38	59.1	9.1	2.0
32-1, 63	90.8	11.0	0.1
32-1, 84	25.0	10.1	7.1
32-1, 96	90.8	14.7	3.8
33-1, 22	88.3	11.3	0.7
33-1, 30	59.1	7.2	0.1
33-2, 20	89.1	19.3	8.6
34-1, 9	89.1	11.4	0.7
35-1, 10	52.5	10.7	4.4
36-2, 61	84.1	10.6	0.5
36-2, 64	61.6	7.5	0.1
37-1, 103	55.0	10.1	3.5
37-1, 112	44.2	5.4	0.1
37-2, 21	91.6	18.4	7.5
38-1, 47	90.8	15.2	4.3
38-2, 128	90.8	11.3	0.4
38-2, 136	61.6	7.6	0.2
39-1, 111	68.3	10.6	2.4
39-1, 121	90.8	14.3	3.4
40-1, 111	81.6	10.0	0.2
466			
2-5, 117	23.3	3.0	0.2
3-1, 58	79.1	9.6	0.1
7-3, 58	87.5	10.6	0.1
28, CC–20	77.5	11.6	2.3
29-1, 72	20.8	10.0	7.5
30-1, 12	89.1	11.4	0.7
30-1, 81	5.8	2.5	1.8
34-1, 4	33.3	5.0	1.0
34-1, 48	77.5	10.3	1.0
34-1, 99	58.3	11.5	4.5
35-1, 25	65.0	10.4	2.6
35-1, 52	95.0	14.6	3.2

Appendix II.
Silica and Iron Content Data, Leg 62

Hole Core-Section, Interval (cm)	SiO_2 (%)	Fe (%)
463		
1-2, 41	13.0	0.810
2-2, 50	4.0	0.350
3-2, 36	5.7	0.700
4-4, 36	2.0	0.810
4-4, 36	2.0	0.073
5-2, 28	1.0	0.037
6-2, 38	1.0	0.036
7-2, 50	2.0	0.032
8-3, 22	2.0	0.068
9-2, 70	3.0	0.140
10-4, 50	6.8	0.360
11-2, 73	12.0	0.170
12-1, 25	3.0	0.150
13-2, 67	3.0	0.220
14-4, 52	4.0	0.190
15-2, 56	3.0	0.130
16-2, 58	3.0	0.150
17-2, 60	14.0	0.220
19-2, 60	3.0	0.140
20-1, 102	3.0	0.140
21-2, 103	4.0	0.230
22-2, 54	3.0	0.120
23-1, 30	3.0	0.120
24-2, 119	3.0	0.160
25-2, 53	2.0	0.084
26-2, 59	3.0	0.190
26-2, 60	2.0	0.220
26-4, 128	4.0	0.270
27-2, 8	5.0	0.290
29-1, 12	5.9	0.550
30-1, 30	31.0	0.390
31-1, 3	8.6	0.540
33-1, 104	5.3	0.340
34-2, 70	4.0	0.230
35-1, 14	5.1	0.270
36-1, 13	73.0	0.310
38-1, 62	7.1	0.340
43-2, 34	7.0	0.620
48-2, 27	8.7	0.290
48-2, 28	9.8	0.300
50-1, 39	15.0	0.500
53, CC–26	53.0	0.320
55-1, 4	22.0	0.510
56-1, 22	26.0	0.360
57-1, 18	13.0	0.540
57-1, 19	13.0	0.510
58-1, 10	56.0	0.610
58-1, 14	19.0	0.830
58-1, 15	20.0	0.840
58-3, 14	32.0	0.420
58-3, 20	23.0	1.100
58-3, 66	24.0	1.100
58-3, 71	46.0	0.620
59-1, 1	30.0	0.370
59-1, 7	36.0	1.200
59-1, 106	46.0	0.370
59-1, 114	41.0	0.840
59-3, 106	24.0	0.510
59-3, 120	23.0	0.410
60-2, 10	13.0	0.490
60-2, 13	31.0	2.700
60-3, 0	17.0	0.580
60-3, 5	19.0	1.600
61-1, 28	29.0	0.780
61-1, 29	30.0	0.790
62-2, 17	28.0	0.490
62-2, 18	28.0	0.510
62-2, 35	31.0	0.670
62-3, 78	19.0	0.430
62-3, 84	22.0	0.540
63-2, 2	29.0	1.900
63-2, 5	9.1	0.340
63, CC–10	30.0	1.300
66, CC–16	11.0	0.410
64-2, 91	11.0	1.900
64-2, 96	14.0	0.440
64-2, 131	24.0	0.590
64-2, 137	23.0	1.600
67-2, 56	13.0	0.460
69-1, 30	10.0	0.930
69-1, 40	21.0	2.900
70-1, 69	61.0	0.650
70-3, 35	87.0	1.700
70-3, 36	88.0	1.700
70-6, 41	86.0	2.800
70-6, 42	86.0	1.500
71-1, 110	93.0	0.750
71-1, 121	57.0	3.500
71-1, 134	60.0	0.540
72-2, 38	53.0	1.000
72-3, 64	46.0	0.670
72-4, 62	35.0	0.400
73-1, 36	36.0	1.900
73-1, 49	55.0	0.570
73-1, 59	71.0	0.620
74-1, 28	34.0	0.340
75-1, 52	4.0	0.370
76-1, 71	58.0	0.310
77-1, 60	11.0	0.340
78-1, 74	11.0	0.320
81-2, 18	11.0	0.300
82-1, 48	71.0	0.950
83-2, 89	16.0	0.380
83-2, 93	27.0	0.490
85-1, 75	11.0	0.360
85-1, 75	10.0	0.330
464		
2-2, 70	50.0	1.500
2-2, 71	50.0	2.000
3-2, 138	55.0	1.500

Appendix II. Continued

Hole Core-Section, Interval (cm)	SiO_2 (%)	Fe (%)
4-2, 70	56.0	3.000
5-2, 20	55.0	3.100
5-2, 21	55.0	0.560
6-2, 82	50.0	4.700
6-2, 82	50.0	4.000
7-2, 10	49.0	6.000
8-2, 40	48.0	5.100
9-1, 110	49.0	16.000
10-2, 74	53.0	3.300
10-2, 74	95.0	0.370
11-1, 71	86.0	0.390
13, CC–9	69.0	0.450
465 1-1, 26	6.0	0.570
1-1, 27	5.7	0.580
2-1, 60	6.0	0.520
2-4, 60	3.0	0.091
3-2, 60	15.0	0.036
4-3, 100	1.0	0.160
5-3, 66	1.0	0.043
6-1, 100	2.0	0.065
6-1, 101	2.0	0.072
10-5, 100	4.0	0.034
465A		
1-1, 37	2.0	0.039
3-3, 11	4.0	0.370
3-3, 137	11.0	1.600
3-4, 14	3.0	0.068
9-3, 48	2.0	0.028
10-2, 30	2.0	0.023
10-2, 31	2.0	0.015
11-2, 12	1.0	0.026
12-2, 13	6.8	0.032
15-1, 100	2.0	0.058
16-2, 30	2.0	0.016
17-1, 110	30.0	0.077
18-1, 50	2.00	0.013
19-2, 127	2.0	0.015
20-1, 14	4.0	0.043
21-4, 67	3.0	0.095
26-1, 75	2.0	0.082
27-2, 48	3.0	0.160
28-2, 10	10.0	3.100
28-2, 18	10.0	0.610
28-2, 19	23.0	1.100
29-1, 109	8.0	1.600
29-1, 117	23.0	1.300
30-1, 59	7.2	0.570
31-1, 13	2.0	0.074
32-1, 32	14.0	0.760
32-1, 39	12.0	0.170
32-1, 64	4.0	0.240
32-1, 85	4.0	0.290
33-1, 21	3.0	0.140
33-1, 22	3.0	0.120
33-1, 29	23.0	1.300
34-1, 10	2.0	0.068
34-1, 11	2.0	0.085
36-2, 62	2.0	0.150
37-1, 104	8.2	0.500
37-1, 111	2.0	1.000
38-2, 129	25.0	1.300
38-2, 137	3.0	0.089
39-1, 111	1.0	0.046
40-1, 1	5.0	0.310
40-1, 29	5.5	0.270
40-1, 44	3.0	0.350
40-1, 73	7.8	0.480
40-1, 104	11.0	0.530
40-1, 111	2.0	0.720
40-1, 113	8.8	0.550
40-1, 139	46.0	1.200
40-2, 1	53.0	4.400
40-2, 32	14.0	17.000
40-2, 32	14.0	17.000
40-2, 56	59.0	2.000
40-2, 65	59.0	1.400
466		
1-1, 130	13.0	0.610
1-4, 20	6.5	0.260
2-2, 36	5.0	0.260
2-6, 32	18.0	1.100
3-1, 137	5.2	0.690
3-1, 138	10.0	0.620
3-3, 23	5.0	0.320
4-2, 8	6.4	0.400
5-1, 130	4.0	0.240
5-1, 131	4.0	0.220
6-1, 73	10.0	0.480
6-4, 73	4.0	0.270
7-2, 40	4.0	0.310
7-2, 41	5.0	0.300
7-6, 40	2.0	0.140
8-2, 130	7.2	0.620
8-2, 131	27.0	0.590
9-1, 8	4.0	0.290
9-1, 14	2.0	2.500
9-1, 24	6.2	0.420
9-2, 22	4.0	0.380
11-1, 94	7.1	0.061
12-1, 54	2.0	0.044
13-3, 15	2.0	0.055
13-3, 16	2.0	0.050
14-1, 62	8.7	0.076
15-2, 15	1.0	0.018
16-1, 60	3.0	0.120
17-1, 84	3.0	0.140
29-1, 71	8.6	0.490
30-1, 11	4.0	0.370
34-1, 49	0.0	0.280
35-1, 26	6.4	0.430

Appendix III. Smear Slide Summary

SMEAR SLIDE SUMMARY

SITE 463

* = minor lithology

	TRACE
<5%	RARE
5–25%	COMMON
25–50%	ABUNDANT
>50%	DOMINANT

SAMPLE INTERVAL Core Section Interval (cm)	BIOGENIC COMPONENTS							NON-BIOGENIC COMPONENTS								AUTHIGENIC COMPONENTS									
	Forams	Nannofossils	Radiolarians	Diatoms	Sponge Spicules	Fish Debris	Silico-flagellates	Quartz	Feldspars	Heavy Minerals	Light Glass	Dark Glass	Glauconite	Clay Minerals	Other (Specify)	Palagonite	Zeolites	Amorphous Iron Oxides	Fe/Mn Micro Nodules	Pyrite	Recrystal. Silica	Carbonate (unspecified)	Carbonate Rhombs	Other (specify)
1-1, 110											t								t					
1-2, 110											t													
1-3, 70																			t					
1-4, 70											t								t					
2-1, 70											t													
2-1, 135																			t					
2-2, 20											t								t					
2-2, 110																								
2-3, 100																								
2-4, 100																								
2-5, 100																			t					
2-6, 80																								
2-7, 25											t								t					
3-1, 100																			t					
3-2, 100																								
3-3, 100																								
3-4, 100																			t					
3-5, 100																								
3-6, 40											t								t					
3, CC																								
4-1, 100											t								t					
4-2, 100											t								t					
4-2, 130																								
4-3, 100																			t					
4-4, 100			t																t					
4-5, 100								t																
4-6, 100																								
4, CC																			t					
5-1, 100																								
5-2, 100																								
5, CC																								
6-1, 100																								
6-2, 100																								
6-3, 100																								
6-4, 100																								
6-6, 11																								
6-6, 30																								
7-1, 100																								
7-1, 149																								
*7-2, 19																								
7-2, 100																								
7-3, 20																								
7-3, 40																								
7-4, 20																								
7, CC																								
8-1, 100																								
8-2, 40																								
8-2, 115																								
9-1, 20																								
9-1, 79																								
9-2, 71																								
9-3, 40																								
10-1, 20																								
10-1, 135																								
10-2, 50																								
10-3, 60																								
10-6, 4																								
10-6, 60																								
11-1, 100																								

Appendix III. Continued

SMEAR SLIDE SUMMARY

SITE 463

* = minor lithology

	TRACE
<5%	RARE
5–25%	COMMON
25–50%	ABUNDANT
>50%	DOMINANT

SAMPLE INTERVAL Core Section Interval (cm)	BIOGENIC COMPONENTS								NON-BIOGENIC COMPONENTS								AUTHIGENIC COMPONENTS								
	Forams	Nannofossils	Radiolarians	Diatoms	Sponge Spicules	Fish Debris	Silico-flagellates		Quartz	Feldspars	Heavy Minerals	Light Glass	Dark Glass	Glauconite	Clay Minerals	Other (Specify)	Palagonite	Zeolites	Amorphous Iron Oxides	Fe/Mn Micro Nodules	Pyrite	Recrystal. Silica	Carbonate (unspecified)	Carbonate Rhombs	Other (specify)
11-2, 25																							t		
11-5, 75																									
12-1, 100																									
12-4, 100																									
13-1, 70																									
13-3, 70																									
13-6, 70																									
14-1, 100																									
14-1, 100																									
14-3, 100																									
*14-4, 164																									
15-1, 90																									
15-3, 90																									
15-5, 90																									
16-1, 120																									
16-3, 70																									
16-6, 50																									
17-1, 90																									
17-3, 100																									
17-6, 90																									
18-1, 5																									
19-1, 70																									
19-3, 70																									
19-5, 50																									
20-1, 80																									
21-2, 70																									
21-4, 70																									
22-1, 80											t														
22-3, 80																						t			
22-5, 40																									
23-1, 70																									
24-1, 70																						t			
24-3, 70																									
25-1, 70																									
26-2, 80																									
26-4, 80																									
26-5, 35																						t			
26-6, 85																						t			
27-1, 85																							t		
29-1, 70																							t		
30-1, 20																							t		
30-2, 82																							t		
31-1, 33			t									t													
31-1, 110																									
33-2, 40																									
34-1, 35																									
34-1, 75																									
34-3, 45																									
34-3, 80																									
35-1, 20																				t					
36-1, 18																									
38-1, 25																									
39, CC																				t					
40, CC																							t		
42, CC																								t	
43-1, 75												t									t				
43-3, 85																					t	t			
43-5, 85													t												
44-1, 82																					t	t			

Appendix III. Continued

SITE 463

SMEAR SLIDE SUMMARY

* = minor lithology

TRACE	t
<5%	RARE
5–25%	COMMON
25–50%	ABUNDANT
>50%	DOMINANT

SAMPLE INTERVAL Core Section Interval (cm)	BIOGENIC COMPONENTS							NON-BIOGENIC COMPONENTS								AUTHIGENIC COMPONENTS							
	Forams	Nannofossils	Radiolarians	Diatoms	Sponge Spicules	Fish Debris	Silico-flagellates	Quartz	Feldspars	Heavy Minerals	Light Glass	Dark Glass	Glauconite	Clay Minerals	Other (Specify)	Palagonite	Zeolites	Amorphous Iron Oxides	Fe/Mn Micro Nodules	Pyrite	Recrystal. Silica	Carbonate (unspecified)	Carbonate Rhombs	Other (specify)
48-1, 80																				t				
48-3, 60																						t		
49, CC											t													
50-1, 45											t									t				
52, CC																								
53-1, 103																								
54, CC																								
54, CC																								
55-1, 3		t																						
55-1, 60		t																					t	
56-1, 88			t																					
56-1, 93																				t				
56-1, 96																								
57-1, 29																								
57-1, 112																								
57-1, 145																								
58-1, 91																								
58-1, 95								t												t				
59-2, 18											t												t	
59-2, 28																								
60-2, 119											t													
60-2, 125											t													
62-1, 83		t																t						
62-1, 99																		t						
62-1, 106		t						t	t									t						
62-1, 137		t																t						
62-2, 24		t										t						t						
62-2, 32		t																						
*62-2, 70		t						t	t													t		
*62-2, 122		t						t				t						t					t	
62-2, 132																		t				t		
63-2, 5																								
63-2, 30																								
63-2, 45			t						t															
64-1, 35									t															
64-1, 68										t														
65-1, 20																								
65-2, 65			t							t	t													
66-1, 108								t			t													
*66-1, 140			t																					
*61-1, 28			t																					
68-1, 22		t						t	t											t				
69-1, 10								t	t		t													
69-1, 140								t	t															
69, CC										t										t				
70-1, 4		t																		t				
70-1, 67		t													Organics					t				
70-1, 95		t													t					t				
70-2, 40																								
70-6, 30																								
70-7, 17																								
71-1, 20																								
71-2, 80																								
71-4, 39																								
72-2, 15			t								t													
72-2, 40			t																	t				
72-4, 27																				t				
73-1, 100			t								t													
73-3, 87																								

Appendix III. Continued

SMEAR SLIDE SUMMARY

* = minor lithology

SITE 463

	TRACE
<5%	RARE
5–25%	COMMON
25–50%	ABUNDANT
>50%	DOMINANT

SAMPLE INTERVAL Core Section Interval (cm)	BIOGENIC COMPONENTS							NON-BIOGENIC COMPONENTS							AUTHIGENIC COMPONENTS									
	Forams	Nannofossils	Radiolarians	Diatoms	Sponge Spicules	Fish Debris	Silico-flagellates	Quartz	Feldspars	Heavy Minerals	Light Glass	Dark Glass	Glauconite	Clay Minerals	Other (Specify)	Palagonite	Zeolites	Amorphous Iron Oxides	Fe/Mn Micro Nodules	Pyrite	Recrystal. Silica	Carbonate (unspecified)	Carbonate Rhombs	Other (specify)
73-3, 97																				t				
73-3, 107																				t				
74-1, 149																				t				
74-1, 108		■		■				■	■		■									t				
76-1, 38			■										t							t				
78-1, 71			■					■	■					■						t				
80-1, 70																				t				
80-1, 40																								
82-1, 45								t	t					■						t				
82-1, 133																				t				
83-1, 27														t										
84-1, 10																								
84-1, 126																								
86-1, 27																				t				

Appendix III. Continued

SMEAR SLIDE SUMMARY

SITE 463

	TRACE
<5%	RARE
5–25%	COMMON
25–50%	ABUNDANT
>50%	DOMINANT

* = minor lithology

SAMPLE INTERVAL Core Section Interval (cm)	BIOGENIC COMPONENTS							NON-BIOGENIC COMPONENTS							AUTHIGENIC COMPONENTS								
	Forams	Nannofossils	Radiolarians	Diatoms	Sponge Spicules	Fish Debris	Silico-flagellates	Chert	Feldspars	Opaques	Light Glass	Dark Glass	Glauconite	Clay Minerals	Other (Specify)	Palagonite	Zeolites	Amorphous Iron Oxides	Fe/Mn Micro Nodules	Pyrite	Recrystal. Silica	Carbonate (unspecified)	Carbonate Rhombs	Other (specify)
*4-5, 80																								
*4-5, 103																			t					
*7-2, 19																				t				
*14-4, 104																								
*21-2, 35																								
*21-6, 55																								
*26-3, 135																								
*60-1, 100																								
*66-1, 140																								
*66-1, 28																								
*69-1, 42										t														
*69-1, 76		t																						
*69, CC		t									t								t	t				
*67-1, 134								t																
*67-2, 74									t											t				
*68-1, 22		t						t												t				
*69-1, 42										t														
*69-1, 76		t							t															
*69, CC		t									t									t				
*72-4, 27																								
*73-1, 37		t							t															
*76-1, 123																								
*78-1, 118			t																	t				
*80-1, 70																				t				
*82-1, 97																				t				
*83, CC			t					t	t		t									t				
*85-1, 19		t						t	t		t													
*85-2, 30								t	t															
*86-1, 110									t															

Appendix III. Continued

SITE 464

SMEAR SLIDE SUMMARY

* = minor lithology

	TRACE t
<5%	RARE
5–25%	COMMON
25–50%	ABUNDANT
>50%	DOMINANT

SAMPLE INTERVAL Core Section Interval (cm)	BIOGENIC COMPONENTS							NON-BIOGENIC COMPONENTS							AUTHIGENIC COMPONENTS								
	Forams	Nannofossils	Radiolarians	Diatoms	Sponge Spicules	Fish Debris	Silico-flagellates	Quartz	Feldspars	Opaques	Light Glass	Dark Glass	Glauconite	Clay Minerals	Other (Specify)	Palagonite	Zeolites	Amorphous Iron Oxides	Fe/Mn Micro Nodules	Pyrite	Recrystal. Silica	Carbonate (unspecified)	Carbonate Rhombs	Other (specify)
2-2, 63		■	■		■		t							■								■		
2-2, 110		■	■	■	■						■			■				t	t			■		
2-2, 130		■	■	■	■		■				t			■					t			■		
2-3, 2		■	■	■	■		■	■	■					■										
2-3, 20		■	■	■	■									■								■		
2-5, 142		■	■	■	■		■	■	■		■		■	■								■		
2-6, 15		■	■	■			■							■								■		
2, CC		■	■	■	■						t		t					t				■		
3-1, 23		t	■	■	■			■	■		t			■								■		
3-1, 145		■	■	■	■		■				■			■								■		
3-3, 70		t	■	■			t	■	■					■								■		
3-6, 70			■	■	■		t				t			■								t		
4-1, 50			■	■	■	t		t	t					■								t		
4-2, 30			■	■			t	t	t					■								t		
4-2, 100			■	■	t	t		t	t					■								t		
4-5, 40		t	■	■	t		t	t	t		t			■								t		
5-1, 50			■	■	t	t	t	t	t					■					t					
5-4, 50						t		■	■		t			■			t		■					
6-1, 80								■	■		t			■			■		■					
6-5, 80								■	■	■	t			■			t		■					
7-1, 80						t					■			■			t		■					
7-6, 120						t		t	t	t	t			■					■			t		
8-1, 49						t					t			■					■			■		
9-1, 75								■	■	t				■										
10-2, 80								t						■			■		■					
11-1, 18								■		■				■							■			
11-1, 75								■		■												■		
12-1, 20		■																				■		
12-1, 50		■				t		■		■	t									t	■	■		
13, CC		■	■											■								■		
14-1, 7		■																		■		■		
15, CC		■	■																			■		
16, CC		■																			■	■		
17, CC–30		■																				■		
18, CC–13		■																		■		■		
21-1, 10		■						t	t					■				■			■	■		

Appendix III. Continued

SMEAR SLIDE SUMMARY

SITE 465

* = minor lithology

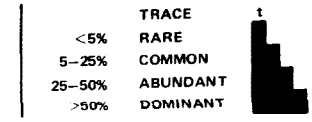
TRACE	t
<5%	RARE
5–25%	COMMON
25–50%	ABUNDANT
>50%	DOMINANT

SAMPLE INTERVAL Core Section Interval (cm)	BIOGENIC COMPONENTS							NON-BIOGENIC COMPONENTS								AUTHIGENIC COMPONENTS								
	Forams	Nannofossils	Radiolarians	Diatoms	Sponge Spicules	Fish Debris	Silico-flagellates	Quartz	Feldspars	Heavy Minerals	Light Glass	Dark Glass	Glauconite	Clay Minerals	Other (Specify)	Palagonite	Zeolites	Amorphous Iron Oxides	Fe/Mn Micro Nodules	Pyrite	Recrystal. Silica	Carbonate (unspecified)	Carbonate Rhombs	Other (specify)
1, CC																								
1-1, 5			t										t								t			
1-1, 38			t		t			t													t			
1-1, 50				t	t																			
2-1, 19			t						t															
2-1, 60			t																					
2-1, 12			t								t													
2-2, 20																								
2-2, 130			t								t													
2-3, 43																								
2-3, 130											t													
2-4, 40																								
2-4, 80																								
2-6, 40																								
3-1, 100																								
3-4, 40	t																							
4-2, 75																								
5-2, 80																								
5-4, 80								t			t													
6-1, 70									t		t													
6-3, 70								t																
10-1, 70																								
10-3, 10																								
10-4, 70																								
10-5, 120											t													
11-1, 10			t																					

Appendix III. Continued

SITE 166A

	TRACE t
<5%	RARE
5–25%	COMMON
25–50%	ABUNDANT
>50%	DOMINANT



* = minor lithology

SAMPLE INTERVAL Core Section Interval (cm)	BIOGENIC COMPONENTS								NON-BIOGENIC COMPONENTS							AUTHIGENIC COMPONENTS								
	Forams	Nannofossils	Radiolarians	Diatoms	Sponge Spicules	Fish Debris	Silico-flagellates		Quartz	Feldspars	Opaques	Light Glass	Dark Glass	Glauconite	Clay Minerals	Organics	Palagonite	Zeolites	Amorphous Iron Oxides	Fe/Mn Micro Nodules	Pyrite	Recrystal. Silica	Carbonate (unspecified)	Carbonate Rhombs	Other (specify)
1-1, 100																									
3-1, 100			t																						
3-3, 15			t																						
3, CC																									
7-1, 5											t														
8-1, 22												t													
9-1, 75																									
10-1, 60																									
10, CC–5										t															
11-1, 60	t																								
11-3, 60																Quartz replacement									
11, CC–5																									
12-1, 80											t														
12, CC–30																									
15-1, 100																									
15-2, 25																									
15-3, 50																									
15-4, 35																									
16-1, 75																									
16-2, 75	t																								
16-3, 75																									
16-4, 75																									
17-1, 60																									
18-1, 75																									
18-2, 20																									
19-1, 24																									
19-3, 20																									
20-1, 95																									
20-3, 137																									
21-1, 45																									
21-4, 95											t														
21, CC																									
21, CC–3											t														
26-1, 15																									
26-1, 80											t														
27-1, 80																									
27-2, 13						t										Organics									
28-1, 26																		t			t				
*28-1, 60																									
28-2, 20																									
29-1, 45	t																	t							
29-1, 138										t	t														
29-2, 1										t															
30-1, 65																									
32-1, 15																									
32-1, 79																									
33-1, 55																									
37-1, 70																					t				
38-2, 89																					t				
39-1, 83																									
40-1, 145																									
40-2, 65																									
40-2, 105																		t			t		t		

Appendix III. Continued

SMEAR SLIDE SUMMARY

* = minor lithology

SITE 465–465A

TRACE	t
<5%	RARE
5–25%	COMMON
25–50%	ABUNDANT
>50%	DOMINANT

SAMPLE INTERVAL Core Section Interval (cm)	BIOGENIC COMPONENTS							NON-BIOGENIC COMPONENTS								AUTHIGENIC COMPONENTS								
	Forams	Nannofossils	Radiolarians	Diatoms	Sponge Spicules	Fish Debris	Silico-flagellates	Quartz	Feldspars	Opaques	Light Glass	Dark Glass	Glauconite	Clay Minerals	Organics	Palagonite	Zeolites	Amorphous Iron Oxides	Fe/Mn Micro Nodules	Pyrite	Recrystal. Silica	Carbonate (unspecified)	Carbonate Rhombs	Other (specify)
*2-5, 45																								
*2, CC–23	t		t																					
*2-3, 43																								
*3-1, 5			t																					
*4-1, 51																								
*4-2, 117																								
*11, CC								t	t											t				
*3-3, 143			t									t												
*3-4, 25																							t	
*8, CC–8																								
*17-2, 25			t																					
*21-4, 25																								
*27-2, 65																								
*28-1, 60																	t			t				
*30-1, 20																								
*31-1, 22																								
*33-1, 30																								
*37-1, 125																								
*37-2, 82									t															
*40-1, 115	t																							
*40-1, 139																								

Appendix III. Continued

SMEAR SLIDE SUMMARY

* = minor lithology

SITE 466

	TRACE
<5%	RARE
5–25%	COMMON
25–50%	ABUNDANT
>50%	DOMINANT

SAMPLE INTERVAL Core Section Interval (cm)	BIOGENIC COMPONENTS							NON-BIOGENIC COMPONENTS								AUTHIGENIC COMPONENTS								
	Forams	Nannofossils	Radiolarians	Diatoms	Sponge Spicules	Fish Debris	Silico-flagellates	Quartz	Feldspars	Heavy Minerals	Light Glass	Dark Glass	Glauconite	Clay Minerals	Other (Specify)	Palagonite	Zeolites	Amorphous Iron Oxides	Fe/Mn Micro Nodules	Pyrite	Recrystal. Silica	Carbonate (unspecified)	Carbonate Rhombs	Other (specify)
1-1, 20				t			t				t													
*1-1, 59					t		t				t													
1-1, 100					t		t				t													
1-2, 73								t							Pteropods									
1-2, 130					t			t							t									
*1-3, 74																								
1-3, 149														t										
1-4, 80					t		t																	
*1-5, 42																								
1, CC				t							t													
2-1, 70			t																					
2-1, 135																								
2-3, 8				t	t																			
2-5, 125																								
2-7, 20																								
3-1, 25					t		t																	
3-3, 45					t						t													
3-6, 25				t	t		t				t			t						t				
4-1, 110			t				t													t				
4-2, 1			t	t																t				
4, CC																								
5-2, 137																								
5-4, 86											t													
6-1, 137			t																	t				
6-3, 115																								
6-5, 95																				t				
6, CC			t																	t				
7-1, 55			t	t																				
7-1, 75			t	t																				
7-4, 5			t								t						t							
7-4, 105			t				t				t						t							
7-7, 15																	t	t						
8-1, 120	t																							
8, CC	t							t		t	t							t						
*9-1, 14								t		t														
9-1, 90																	t							
9-4, 55											t						t							
11-1, 45			t								t						t							
11-1, 125											t													
11-2, 45																								
*13-2, 20																								
13-2, 105																	t							
15-2, 120											t													
*15-3, 22																	t							
16-2, 70																	t							
17-1, 75																								
28, CC–20			t								t													
28, CC–25								t		t	t		t				t							
29-1, 115																								
29-2, 15																								
29-2, 35															Organics									
29, CC–20								t		t														
*30-1, 18																								
30-1, 45																				t				
*31-1, 13											t													
31-1, 18											t									t				