

This document was produced
by scanning the original publication.

Ce document est le produit d'une
numérisation par balayage
de la publication originale.

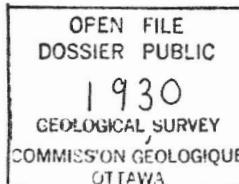
EASTERN PETROLEUM
GEOLOGY SECTION
G. S. C.

BIOSTRATIGRAPHY AND MATURATION OF
17 LABRADOR AND BAFFIN SHELF
WELLS

Volume 2:
Bjarni O-82 & Corte Real P-85

Report No. 86-0058
Bujak Davies Group

Calgary, Alberta



EXPLANATION OF CONTENTS

This volume contains the following results of analyses on Bjarni 0-82 and Corte Real P-85.

1. General drilling information

2. Consensus Age

The consensus age based on micropaleontology (M) and palynology (P).

3. Palynological Results

The palynological zones and assigned ages in order of increasing depth within each well. The more important taxa are listed alphabetically, with miospores and fungal spores being denoted by an asterisk (*). Marker species are highlighted in bold type. The degree of confidence is given for each zonal assignment as follows:

"4" The highest degree of confidence regarding both the zonal assignment and the sample level to which the top of the zone is assigned.

"3" A high degree of confidence regarding the zonal assignment, but including the possibility that the zonal assignment may be slightly too low.

"2" Indicates that the zonal assignment is probably correct but that the sample level indicated for the top of the zone is probably too low due to a scarcity of marker species.

"1" A highly tentative zonal assignment due to extreme scarcity of marker species.

4. Micropaleontological Results

The micropaleontological zones and assigned ages in order of increasing depth. Within each zone the more important taxa are listed alphabetically with planktonic foraminiferal species being denoted by an asterisk (*) and diatom species by a cross (+). Marker species are highlighted in bold type. The degree of confidence is given for each zonal assignment as follows:

"4" The highest degree of confidence regarding both the zonal assignment and the sample level to which the top of the zone is assigned. This degree of confidence indicates the presence of planktonic foraminifera together with the main benthonic foraminiferal markers.

"3" A high degree of confidence regarding the zonal assignment. Indicates the presence of the main benthonic foraminiferal markers.

"2" Indicates that the zonal assignment is most probably correct. The assignment is based only on taxa occurring commonly within the zone, due to the scarcity of marker species.

"1" A tentative zonal assignment. Based solely on stratigraphic position due to extreme scarcity of marker species.

5. Paleobathymetric Interpretations

The interpreted paleobathymetries are in order of increasing depth, together with the criteria upon which they are based. The interpreted environments and corresponding paleobathymetries reported are: Non-marine (above sea level), Transitional (approx. 0m), Inner Neritic (approx. 0-20m), Middle Neritic (approx. 20-100m), Outer Neritic (approx. 100-200m), Upper Bathyal (approx. 200-1000m), and Lower Bathyal (>1000m).

6. Kerogen, TAI and Vitrinite Reflectance

Data on kerogen types and TAI are listed in a table, and are then discussed relative to petroleum source rock potential and the consensus ages assigned in this report. Data on vitrinite reflectance are listed and are discussed relative to their degree of reliability and indicated maturation level.

All references are given in Volume 1 of the report.

The following charts are included for each well:

1. A Palynological Summary Chart showing the assigned palynological zones, inferred ages, lithology, formation assignments provided by P.N. Moir, studies in progress, important palynological events (mostly species tops).
2. Sawtooth diagrams showing the relative abundances of the following palynological categories: Apectodinium homomorphum, Areoligera senonensis, marine dinoflagellates, Azolla, Pediasium, gymnosperm pollen, angiosperm pollen, miospores, Late Cretaceous reworking, Early Cretaceous reworking.
3. A Micropaleontological Summary Chart showing the assigned micropaleontological zones, inferred ages, lithology, important micropaleontological events (mostly species tops), paleobathymetry.
4. A Kerogen Summary Chart showing the consensus ages, levels of Thermal Alteration (TAI), relative abundances of kerogen types.

5. A Vitrinite Summary Chart showing the consensus ages, histograms of the vitrinite reflectance measurements which are divided into three categories: caved (blue), in situ (green) and reworked (red). The in situ category is further subdivided into poor readings (horizontal lines) and good to excellent reading (solid colour). The means of the three main categories are indicated by correspondingly coloured triangles.

Bjarni D-82:

BIOSTRATIGRAPHY AND MATURATION OF

BJARNI O-82

Bujak Davies Group

Bjarni 0-821

TOTAL BJARNI 0-82

GSC locality: 55° 31'48" N, 75° 42' 34" W

KB elevation: 12.5m Water depth: 144m

Casing set at: 178m, 411m, 1260m, 2150.5m

Total depth: 2650m

Interval studied for palynology: 410-2650m

Interval studied for micropaleontology: 410-2630m

CONSENSUS AGE

410 420m	Plio-Pleistocene or older (P)
440- 510m	middle Miocene or older (P)
530- 570m	early Miocene or older (P)
590-1035m	early Oligocene (P)
1055-1335m	late Eocene (P)
1355-1620m	middle to late Eocene (P)
1640-1710m	middle Eocene (P)
1730-2010m	early Eocene (P)
2030-2040m	late Paleocene (M,P)
2060-2100m	early Paleocene (M)
2120-2250m	Maastrichtian (M,P)
2270-2280m	Campanian (P)
2300-2400m	Coniacian to Turonian (P)
2420-2520m	early to middle Albian (P)
2540-2650m	Barremian to early Aptian (P)

BJARNI 0-82PALYNOLOGICAL ZONATION

- 410- 420m Tsugaepollenites igniculus Zone or older
(Plio-Pleistocene or older)
- 440- 510m Systematophora ancyrea Zone or older (middle Miocene or older)
- 530- 570m Cordosphaeridinium cantharellum Zone or older (early Miocene or older)
- 590-1035m Areosphaeridium arcuatum Zone (early Oligocene)
- 1055-1335m Deflandrea #LR Zone (late Eocene to early Oligocene)
- 1355-1620m Areosphaeridium fenestratum Zone (middle to late Eocene)
- 1640-1710m Eocladiopyxis #LA Zone (middle Eocene)
- 1730-1890m Trinovantedinium #LA Zone (early Eocene)
- 1910-2010m Dracodinium condylos Zone (early Eocene)
- Not observed Ceratiopsis speciosa Zone (late Paleocene)
- 2030-2070m Alisocysta circumtabulata Zone (late Paleocene)
- 2090-2100m Palaeoperidinium pyrophorum Zone (early Paleocene)

- Not observed Spongodinium #LA Zone (early Paleocene)
- 2120-2190m Spongodinium deltiense Zone (Maastrichtian)
- 2210-2200m Impagidinium #LL Zone (Maastrichtian)
- 2240-2250m Isabelidinium cooksoniae Zone (Maastrichtian)
- 2270-2280m Chatangiella tripartita Zone (Campanian)
- Not observed Hystrichosphaeridium difficile Zone (Campanian)
- Not observed Palaeohystriophora infusorioides Zone (early Campanian)
- Not observed Senoniasphaera rotundata Zone (Santonian)
- 2300-2400m Cometodinium obscurum Zone (Coniacian to Turonian)
- Not observed Kiokansium polypes Zone (Cenomanian)
- Not observed Epelidospaeridia spinosa/Trilobosporites crassus Zone (late Albian to early Cenomanian)
- Not observed Trilobosporites humilis Zone (middle Albian)
- 2420-2520m Parvisaccites amplus Zone (early to middle Albian)
- Not observed Muderongia asymmetrica Zone (early to middle Albian)
- Not observed Oligosphaeridium asterigerum/Pilosispores trichopapillosum Zone (late Aptian)

Bujak Davies Group

Bjarni 0-824

2540-2580m Pseudoceratium pelliferum Zone (Barremian to early
 Aptian)

2600-2650m Cicatricosporites #EAL Zone (Barremian to early
 Aptian)

SELECTED SPECIES

410-420m: Tsugaepollenites igniculus Zone or older (Plio-Pleistocene or older)

410m Tsugaepollenites igniculus *

Degree of Confidence: 1

Remarks: The highest sample from the well at 410-420m is devoid of dinoflagellates and only contains rare gymnosperm pollen including T. igniculus. A Plio-Pleistocene or possibly older age is assigned to the sample because the absence of older marker species may be due to their scarcity.

440-510m: Systematophora ancyrea Zone or older (middle Miocene or older)

440m Osmundacidites claytonites *
Spiniferites pseudofurcatus

470m Hystrichokolpoma rigaudiae
Lingulodinium machaerophorum
Operculodinium centrocarpum
Systematophora ancyrea
Spiniferites ramosus
Tsugaepollenites viridifluminipites *

500m Juglanspollenites nigripites *

Degree of Confidence: 2

Bujak Davies Group

Bjarni 0-826

Remarks: Penetration of middle Miocene or older strata is indicated by the dinoflagellates highlighted above. The presence of pre-middle Miocene strata cannot be discounted because of the apparent absence of older marker species may be due to the scarcity of diagnostic palynomorphs.

530-570m: *Cordosphaeridinium cantharellum* Zone or older (early Miocene or older)

530m *Azolla* *
 Caritasphaeridium pseudopoculum

560m *Rouseisporites* #LA *

Degree of Confidence: 2

Remarks: Assignment of this interval of the *C. cantharellum* Zone is highly tentative, being based on the presence of a single specimen of the dinoflagellate *C. pseudopoculum*. This species appear to have a late Oligocene to early Miocene range in the Canadian Beaufort and north slope Alaskan region. It is possible that strata older than early Miocene occur in this section of the well and that marker species were not observed due to their scarcity.

590-1035m: *Areosphaeridium arcuatum* Zone (early Oligocene)

590m *Areosphaeridium* #LB
 Membranophoridium aspinatum
 Chiropoteridium mespilanum
 Dinopterygium cladoides
 Deflandrea heterophlycta
 Palaeocystodinium golzowense

Bujak Davies Group

Bjarni 0-827

615m	<u>Caryapollenites simplex</u> *
645m	<u>Areosphaeridium arcuatum</u>
675m	<u>Cordosphaeridium cantharellum</u>
735m	<u>Cribroperidinium giuseppei</u> <u>Deflandrea phosphoritica</u>
765m	<u>Pthananoperidium comatum</u> <u>Tiliaepollenites vescipites</u> *
825m	<u>Camarozonosporites</u> #LA * <u>Quercoidites</u> #LA * <u>Tiliaepollenites crassipites</u> *
	<u>Alnipollenites verus</u> *
970m	<u>Ericipites antecursorioides</u> * <u>Corylus</u> #LA *
995m	<u>Pterocaryapollenites stellatus</u> *

Degree of Confidence: 3

Remarks: Penetration of lower Oligocene strata is indicated at 590-610m by the dinoflagellate assemblages, but lower Oligocene strata may occur higher in the well as discussed above.

1055-1335m: Deflandrea #LR Zone (late Eocene to early Oligocene)

1055m	<u>Paralecaniella indentata</u> <u>Deflandrea #LR</u>
-------	--

Bujak Davies Group

Bjarni 0-828

Degree of Confidence: 2

Remarks: A single specimen of the dinoflagellate Deflandrea #LR at 1055-1075m would indicate penetration of the Deflandrea #LR Zone, providing the specimen is not reworked. Alternatively, the scarcity of this species may suggest that the top is depressed due to non-observation of this marker species higher in the well.

1355-1620m: Areosphaeridium fenestratum Zone (middle to late Eocene)

1335m	<u>Achilleodinium biformoides</u> <u>Chiropteridium #LS</u> <u>Glaphyrocysta spineta</u> <u>Lentinia serrata</u> <u>Micrhystridium fragile</u> (abundant) <u>Quercodites #LG *</u> <u>Quercodites #LV *</u> <u>Systematophora placacantha</u>
1400m	<u>Corylus #LA *</u>
1490m	<u>Kisselovia crassiramosa</u> <u>Wetzellielia articulata</u>
1520m	<u>Ulmipollenites undulosus</u> * <u>Wetzellielia ovalis</u>
1550m	<u>Momipites coryloides</u> *
1580m	<u>Cicatricosisporites dorogensis</u> *

Degree of Confidence: 4

Bujak Davies Group

Bjarni 0-829

Remarks: Penetration of the A. fenestratum Zone at 1335-1355m is strongly indicated by the co-occurrence of the dinoflagellate Chiropteridium #LS with abundant specimens of the acritarch M. fragile.

1640-1710m: Eo cladopyxis #LA Zone (middle Eocene)

1640m Lentinia wetzelii

1685m Caryapollenites sinensis *
Systematophora #LE

Degree of Confidence: 1

Remarks: Selection of the top of the Eo cladopyxis #LA Zone in the Bjarni 0-82 well is tentative and arbitrary because dinoflagellate marker species for the zone are absent from this part of the well.

1730-1890m: Trinovantedinium #LA Zone (early Eocene)

1730m Hystrichokolpoma salacium
Hystrichokolpoma unispinum
Trinovantedinium #LA
Thalassiphora pelagica
WetzelIELLA meckelfeldensis

1790m Homotryblium pallidum
Kisselovia edwardsii
Polysphaeridium subtile
Systematophora #LC
Trinovantedinium #LS

1820m	<u>Apectodinium homomorphum</u> <u>Diphyes colligerum</u>
1850m	<u>Areoligera senonensis</u> <u>Trinovantedinium #LL</u>
1880m	<u>Apectodinium homomorphum (common)</u> <u>Apectodinium hyperacanthum</u> <u>Heteraulacysta leptalea</u> <u>Homotryblium tenuispinosum</u>

Degree of Confidence: 4

1910-2010m: Dracodinium condylos Zone (early Eocene)

1910m	<u>Dracodinium condylos</u> <u>Kisselovia coleothrypta</u>
1940m	<u>Areoligera senonensis (common)</u> <u>Adnatosphaeridium robustum</u> <u>Hystrichokolpoma cinctum</u> <u>Camarozonosporites #LC *</u> <u>Isabelidinium #LP</u>
2000m	<u>Momipites rotundus *</u>

Degree of Confidence: 3

2030-2070m: Alisocysta circumtabulata Zone (late Paleocene)2030m Areoligera senonensis (abundant)Alisocysta #LAPervosphaeridinium pseudhystrichodiniumTurbiosphaera filosa2060m Ceratiopsis glabraCeratiopsis speciosa speciosaEisenackia crassitabulataDegree of Confidence: 2

Remarks: Penetration of the A. circumtabulata Zone is tentatively indicated at 2030-2050m by the occurrence of Alisocysta #LA which may range in the Labrador Shelf area into higher zones. Penetration of the A. circumtabulata Zone is more strongly indicated in the underlying sample at 2060-2080m by the occurrence of E. crassitabulata.

2090-2100m: Paleoperidinium pyrophorum Zone (early Paleocene)2090m Ceratiopsis striataPhelodinium tricuspePalaeoperidinium pyrophorumDegree of Confidence: 3

Bujak Davies Group

Bjarni 0-8212

2120-2190m Spongodinium delitiense Zone (Maastrichtian)

2120m Hystrichosphaeridium tubiferum

Tanyosphaeridium variecalamus

Trithyrodinium evittii

Trithyrodinium #LB

Trithyrodinium #LS

2150m Phelodinium magnificum

2180m Ceratiopsis diebelii

Ceratiopsos diebelii sensu McIntyre 1975

Gonyaulacysta cf. wetzelii

Hystrichosphaeridium #LP

Oligosphaeridium complex

Palaeoperidinium basilium

Spongodinium delitiense

Degree of Confidence: 3

Remarks: Penetration of the S. delitiense Zone is tentatively indicated at 2120-2140m by the occurrence of H. tubiferum and T. variecalamus, and is more strongly indicated at 2180-2200m by the occurrence of S. delitiense.

2210-2200m: Impagidinium #LL Zone (Maastrichtian)

2210m Impagidinium #LL

Degree of Confidence: 3

Bujak Davies Group

Bjarni 0-8213

2240-2250m: Isabelidinium cooksoniae Zone (Maastrichtian)

2240m Isabelidinium belfastense

Degree of Confidence: 3

2270-2280m: Chatangiella tripartita Zone (Campanian)

2270m Chatangiella tripartita

Degree of Confidence: 3

2300-2400m: Cometodinium obscurum Zone (Coniacian to Turonian)

2300m Ondnadatia tuberculata
Stiphrophaeridium anthophorum
Rugubivesiculites woodhamense *

2360m Kleithriasphaeridium loffrense
Cometodinium obscurum

2390m Isabelidinium cooksoniae (?caved)
Manumiella cretacea (?caved)
Odontochitina costata
Xenascus ceratiooides

Degree of Confidence: 3

Bujak Davies Group

Bjarni 0-8214

Remarks: The highest occurrence of S. anthophorum at 2320m indicates tentatively the top of the Cometodinium obscurum Zone. This is confirmed in the next sample by the presence of C. obscurum at 2380m.

2420-2520: Parvisaccites amplus Zone (early to middle Albian)

2420m Parvisaccites amplus *
 Spinidinium sverdrupianum (caved)
 Rugubivesiculites rugosus *

Degree of Confidence: 2

Remarks: A large hiatus is indicated between 2400m and 2420m. The presence of Parvisaccites amplus generally indicates the P. amplus Zone, however this species ranges lower into the Barremian. Therefore, the lack of other pollen and spores that are generally found within the P. amplus Zone may indicate that this interval in the Bjarni 0-82 well is older and closer in age to the underlying Pseudoceratium pelliferum Zone.

2540-2580m: Pseudoceratium pelliferum Zone (Barremian to early Aptian)

2540m Aequitriradites subverrucosus *
 Parvisaccites radiatus *
 Rotverrusporites #EC *

2570m Aequitriradites conisimilis *
 Podocarpidites granulosus *

Degree of Confidence: 4

Bujak Davies Group

Bjarni 0-8215

Remarks: The presence of A. subverrucosus and Rotverrusporites #EC at 2540-2560m suggests the top of the Pseudoceratium pelliferum Zone. These species range lower into the Cicatricosisporites #EAL Zone.

2600-2655m: Cicatricosisporites #EAL Zone (early Aptian to Barremian)

2600m	<u>Concavissimisporites punctatus</u> *
	<u>Cicatricosisporites</u> #EAL *
	<u>Trilobosporites trioreticululosus</u> *
2630m	<u>Cerebropollenites mesozoicus</u> *
	<u>Contignisporites glebulentus</u> *
	<u>Cicatricosisporites mohrioides</u> *
	<u>Plicatella</u> #ES *

Degree of Confidence: 4

Remarks: Although many of the species within this zone may be found in higher zones such as Concavissimisporites punctatus, Cicatricosisporites mohrioides and Plicatella #ES. The association of these species with Cicatricosisporites #EAL is typical for this zone.

MICROPALEONTOLOGICAL ZONATION

410-1095m No zonal assignment (No age assignment)

Not observed Cassidulina teretis Zone (late Miocene or younger)

Not observed Asterigerina guerichi Zone (early Miocene or older)

Not observed Asterigerina bartoniana Zone (late Oligocene)

1115-1245m Ceratobulimina contraria Zone (early Oligocene)

1265-1530m Spiroplectammina adamsi (late Eocene)

1550-1665m Cyclammina amplectens Zone (middle Eocene)

1685-1830m Haplophragmoides acutidorsatum Zone (middle Eocene)

1850-1860m Bulimina ovata Zone (middle Eocene)

1880-1980m Karreriella apicularis Zone (early Eocene)

2000-2010m Spiroplectammina grzybowski Zone (early Eocene)

2030-2040m Glomospira charoides Zone (late Paleocene)

2060-2100m Glomospira corona Zone (early Paleocene)

Bujak Davies Group

Bjarni 0-8217

Not observed Praecystammina globigerinaeformis Zone (early Paleocene)

2120-2320m Rzehakina epigona Zone (Maastrichtian)

2340-2650m No zonal assignment (No age assignment)

Not observed Arenobulimina dorbigny Zone (?Campanian)

Bujak Davies Group

Bjarni 0-8218

SELECTED FORAMINIFERA

410-1095m: No zonal assignment (No age assignment)

1115-1245m: Ceratobulimina contraria Zone (early Oligocene)

1115m Baggina subconica
Textularia smithvillensis
Alabamina wilcoxensis
Cibicidoides proprius
Gyroidinoides girardana
Globigerina postcretacea *
Globorotaloides suteri *

1145m Alveolophragmium #H 1
Rathysiphon discreta (coarse)

1175m Guttulina problema

1235m Hoeglundina eocenica
Globigerina angustumbilicata *

Degree of Confidence: 2

1265-1530m: Spiroplectammina adamsi Zone (late Eocene)

1260 CASING

1265m	<u>Coscinodiscus</u> #H 2 + <u>Ammodiscus cretaceus</u> <u>Nodosaria soluta</u> <u>Bulimina alazanensis</u> Scaphopods
1295m	<u>Cyclammina placenta</u> Pteropod
1355m	<u>Recurvooides walteri</u> <u>Haplophragmoides walteri</u> <u>Globigerina linaperta</u> * <u>Turrilina alsatica</u> <u>Textularia cf. agglutinans</u> <u>Heterolepa dutemplei</u>
1400m	<u>Cassidulina subglobosa</u> <u>Glandulina laevigata</u>
1490m	<u>Cyclammina cancellata</u> <u>Haplophragmoides eggeri</u>
1520m	<u>Spiroplectammina adamsi</u> <u>Vaginulinopsis decorata</u>

Degree of Confidence: 2

1550-1665m: Cyclammina amplectens Zone (late Eocene)

1550m	<u>Cyclammina amplectens</u> <u>Trochammina globigeriniformis</u> <u>Melonis affinis</u>
1580m	<u>Karreriella siphonella</u>
1610m	<u>Cribrostomoides scitulus</u>
1640m	<u>Anomalinoides acuta</u> <u>Trochammina inflata</u> <u>Nodosaria latejugata</u>

Degree of Confidence: 3

Remarks: The top of this zone could be located at 1520m due to the highest occurrence of Vaginulinopsis decorata.

1685-1830m: Haplophragmoides acutidorsatum Zone (middle Eocene)

1685m	<u>Haplophragmoides acutidorsatum</u> <u>Ceratbulimina contraria</u>
1730m	<u>Trifarina abbreviata</u> <u>Alabamina wolterstorfi</u> <u>Ammodiscus peruvianus</u> <u>Budashevaella multicamerata</u> <u>Trochammina irregularis</u>

Bujak Davies Group

Bjarni 0-8221

1760m	<u>Cibicides aff. westi</u> <u>Pseudohastigerina wilcoxensis</u> *
1790m	<u>Plectofrondicularia lirata</u> <u>Planularia toddae</u> <u>Marginulina bullata</u>
1820m	<u>Lenticulina midwayensis</u>

Degree of Confidence: 3

1850-1860m: Bulimina ovata Zone (early Eocene)

1850m	<u>Spiroplectammina navarroana</u> <u>Trochammina collyra</u>
-------	--

Degree of Confidence: 2

1880-1980m: Karreriella apicularis Zone (early Eocene)

1880	<u>Karreriella apicularis</u> <u>Spiroplectammina mexiaensis</u> <u>Spiroplectammina eocenica</u> <u>Uvigerina batjesi</u> <u>Siphogenerinoides eleganta</u> <u>Pullenia quinqueloba</u>
------	---

1940m	<u>Reophax pilulifer</u>
-------	--------------------------

1970m	<u>Chilostomella cylindroides</u>
-------	-----------------------------------

Degree of Confidence: 3

Bujak Davies Group

Bjarni 0-8222

2000-2010m: Spiroplectammina grzybowski Zone (early Eocene)

2000m Spiroplectammina grzybowski
Ammobaculites polythalamus
Ammobaculites expansus
Ammodiscus glabratus
Bulimina ovata
Cibicidoides blanpiedi

Degree of Confidence: 3

2030-2040m: Glomospira charoides Zone (late Paleocene)

2030m Glomospira charoides
Clavulina parisiensis
Haplophragmides impensus
Bulimina trigonalis
Rhizammina indivisa

Degree of Confidence: 3

2060-2100m: Glomospira corona Zone (early Paleocene)

2060m Glomospira corona
Gavelinella micra

Degree of Confidence: 3

Bujak Davies Group

Bjarni 0-8223

2120-2320m: Rzehakina epigona zone (Maastrichtian)

2120m	<u>Rzehakina epigona</u>
2150m	<u>Pleurostomella</u> cf. <u>paleocenica</u> CASING
2180m	<u>Trochamminoides subtrullissatus</u>
2210m	<u>Saccammina complanata</u> <u>Glomospira irregularis</u>
2240m	<u>Haplophragmoides</u> cf. <u>suborbicularis</u>
2270m	<u>Uvigerinammina jankoi</u> <u>Spirosigmoilinella compressa</u>

Degree of Confidence: 3

2340-2650m No zonal assignment (No age assignment)

PALEOBATHYMETRY

410- 420m	Non-marine to Transitional
<u>Criteria:</u>	No foraminifera to 1115m, angiosperm pollen
440- 510m	Transitional to Inner Neritic
<u>Criteria:</u>	Angiosperm pollen, marine dinoflagellates
530-570m	Non-marine to Transitional
<u>Criteria:</u>	Spores
590- 600m	Transitional to Inner Neritic
<u>Criteria:</u>	Marine dinoflagellates
615- 625m	Non-marine to Transitional
<u>Criteria:</u>	Angiosperm pollen
645- 745m	Inner Neritic
<u>Criteria:</u>	Marine dinoflagellates, angiosperm pollen
765- 1015m	Non-marine to Transitional
<u>Criteria:</u>	Angiosperm pollen
1035-1105m	Inner Neritic
<u>Criteria:</u>	Marine dinoflagellates
1115-1245m	Middle To Outer Neritic
<u>Criteria:</u>	Planktonic foraminifera, <u>Gyroidinoides girardana</u>

Bujak Davies Group

Bjarni 0-8225

1265-1530m	Outer Neritic to Upper Bathyal
<u>Criteria:</u>	<u>Coscinodiscus</u> #H 2, <u>Ammodiscus cretaceus</u> , <u>Bulimina alazanensis</u>
1550-1920m	Upper Bathyal
<u>Criteria:</u>	<u>Cyclammina amplectens</u> , <u>Trochammina globigeriniformis</u> , <u>Cribrostomoides scitulus</u> , <u>Karreriella siphonella</u>
1940-2010m	Upper Bathyal to Lower Bathyal
<u>Criteria:</u>	<u>Reophax pilulifer</u> , <u>Chilostomella cylindroides</u> , <u>Ammobaculites polythalamus</u> , <u>Ammodiscus glabratus</u>
2030-2340m	Lower Bathyal
<u>Criteria:</u>	<u>Glomospira charoides</u> , <u>Clavulina parisiensis</u> , <u>Saccammina complanata</u>
<u>Remarks:</u>	Paleoenvironments interpreted from 2280m to 2340m are only tentative due to the high probability of cavings.

Bujak Davies Group

Bjarni O-8226

KEROGEN & TAI

Depth	AM	AT	AG	SA	M	BT	ST	I	R	TAI
=====	---	---	---	---	---	---	---	---	---	---
410.0	10	20	0	0	5	40	20	5	0	1+
500.0	10	25	0	0	5	35	20	5	0	2-
615.0	5	10	0	0	10	35	35	5	0	2-
735.0	0	10	0	0	5	35	45	5	0	2-
825.0	0	20	0	0	5	35	30	10	0	2-
915.0	0	20	0	0	5	35	35	5	0	2-
1025.0	5	30	0	0	5	35	20	5	5	2-
1265.0	5	30	0	0	5	25	25	5	5	2-2
1355.0	1	20	0	0	5	35	30	5	5	2-2
1460.0	0	10	0	0	5	35	45	5	0	2-2
1550.0	0	10	0	0	5	35	40	10	0	2-2
1640.0	0	15	0	0	5	35	35	10	0	2-2
1760.0	5	30	0	0	5	30	25	5	0	2-2
1850.0	0	30	0	0	5	35	25	5	0	2-2
1970.0	5	25	0	0	5	35	25	5	0	2-2
2060.0	5	25	0	0	5	35	25	5	0	2-2
2150.0	5	20	0	0	5	35	30	5	0	2-2
2270.0	0	0	0	0	0	15	45	40	0	
2360.0	0	0	0	0	5	15	45	35	0	2+
2480.0	0	0	0	0	0	20	45	35	0	2+
2510.0	0	0	0	0	5	30	30	35	0	
2540.0	0	15	0	0	0	25	25	35	0	
2570.0	0	20	0	0	0	20	25	35	0	2+
2645.0	0	10	0	0	0	40	25	25	0	2+
2655.0	0	10	0	0	0	40	25	25	0	

KEROGEN, TAI AND VITRINITE REFLECTANCE

Amorphous kerogen is present throughout the Maastrichtian and younger interval above approximately 2250m and in the lower Aptian to upper Berremian interval below 2540m, being absent in the Albian, Coniacian-Turonian and Campanian sections of the well. The relative abundance of amorphous kerogen fluctuates throughout the Maastrichtian and younger interval, being most abundant in the Neogene or older section above 570m and in the lower Paleocene to lower Eocene section from 1730-2100m. Most of the amorphous kerogen comprises degraded terrestrial material, with marine amorphous kerogen being absent or rare except in the Neogene or older interval from 410-570m where it comprises 10% of the total kerogen. The relative abundances of other kerogen types are fairly constant throughout the well, except for an increase in the abundance of coaly inertinitic kerogen in the Campanian and older section of the well below 2270m. In this interval, herbaceous kerogen is less common except below approximately 2645m. Woody kerogen also becomes rare below approximately 2540m in the Lower Cretaceous section.

The level of Thermal Alteration increases from a value of 1+ in the Plio-Pleistocene or older interval at 410-420m, to a value of 2- in the lower Oligocene to lower Miocene or older section from 440-1035m. The TAI increases to a value of 2- to 2 in the Campanian to upper Eocene section from 1055-2280m, and reaches a value of 2+ below approximately 2360m in strata assigned a Lower Cretaceous to Coniacian age. This indicate that the herbaceous, woody and terrestrial amorphous kerogen is mature below approximately 2360m and has some source rock potential for predominantly gaseous thermogenic hydrocarbons. The absence or scarcity of marine amorphous kerogen throughout the well precludes its being a potential source.

The following levels of thermal maturity are indicated by vitrinite reflectance analysis.

430-1015m: Immature ($Ro\% = 2.48\%$ to 2.369%)

1200-1745m: Onset maturity ($Ro\% = 0.423\%$ to 0.570%)

1880-2450m: Mature ($Ro\% = 0.645\%$ to 0.745%)

2630m: Probably cavings ($Ro\% = 0.542\%$)

The thermal maturity of this well is generally immature to marginally mature with a high percentage of cavings in the lower portions of the well.

VITRINITE REFLECTANCEKey to Measurement Qualifying Labels

E = Excellent
= Good
P = Poor
C = Caved
R = Reworked

Sample Depth : 430.0

0.248 P

Actual Mean = 0.248 Actual Standard Deviation = 0.000

Edited Mean = 0.248 Edited Standard Deviation = 0.000

Sample Depth : 630.0

0.475 R 0.565 R

Actual Mean = 0.520 Actual Standard Deviation = 0.064

Sample Depth : 820.0

0.139	E	0.295	P	0.400	P	0.458		0.489	P	0.493	P	0.528	R
0.530	R	0.572	R	0.660	R	0.698	R	0.770	R	0.812	R	0.980	R
2.800	R												

Actual Mean = 0.708 Actual Standard Deviation = 0.615

Edited Mean = 0.379 Edited Standard Deviation = 0.139

Bujak Davies Group

Bjarni 0-8230

Sample Depth : 1015.0

0.197	C	0.266	C	0.280	P	0.283	P	0.304	P	0.327	P	0.365	
0.367	P	0.417		0.426	P	0.439	P	0.483	P	0.652	R	0.660	R
0.660	R	0.663	R	0.703	R	0.710	R	0.840	R	0.847	R	0.916	R
0.964	R	1.130	R										

Actual Mean = 0.561 Actual Standard Deviation = 0.260

Edited Mean = 0.369 Edited Standard Deviation = 0.071

Sample Depth : 1200.0

0.382	C	0.510		0.550	P	0.561	P	0.581	P	0.602	P	0.617	P
0.655	R	0.681	R	0.710	R	1.073	R						

Actual Mean = 0.629 Actual Standard Deviation = 0.172

Edited Mean = 0.670 Edited Standard Deviation = 0.039

Sample Depth : 1400.0

0.226	C	0.282	C	0.320	C	0.336	C	0.372	P	0.405	P	0.413	P
0.500	P	0.627	R	0.680	R	0.714	R	0.750	R				

Actual Mean = 0.469 Actual Standard Deviation = 0.181

Edited Mean = 0.423 Edited Standard Deviation = 0.055

Sample Depth : 1995.0

0.365	C	0.383	P	0.390	P	0.452	P	0.477		0.502	P	0.511	P
0.510	P	0.562	R	0.588	R	0.628	R	0.683	R	0.754	R	0.837	R
0.880	R												

Actual Mean = 0.505 Actual Standard Deviation = 0.156

Edited Mean = 0.462 Edited Standard Deviation = 0.056

Bujak Davies Group

Bjarni 0-8231

Sample Depth : 1745.0

0.274	C	0.317	C	0.330	C	0.420	P	0.433	E	0.450	P	0.562	R
0.610	R	0.671	R	0.990	R								

Actual Mean = 0.506 Actual Standard Deviation = 0.214

Edited Mean = 0.434 Edited Standard Deviation = 0.015

Sample Depth : 1880.0

0.304	P	0.634	P	0.737	P	0.740	P	0.810	P	1.034	R

Actual Mean = 0.710 Actual Standard Deviation = 0.240

Edited Mean = 0.645 Edited Standard Deviation = 0.201

Sample Depth : 2080.0

0.368	P	0.567	P	0.577	P	0.659	P	0.800	P	0.823	P	0.827	P
0.885	P	0.946		1.002									

Actual Mean = 0.745 Actual Standard Deviation = 0.198

Edited Mean = 0.745 Edited Standard Deviation = 0.198

Sample Depth : 2260.0

0.387	C	0.465	C	0.515	P	0.528		0.542	P	0.559	P	0.575	P
0.680	P	0.700	P	0.744	P	0.793	P	0.812	P	0.830	P	0.839	P
0.843		0.873	R	0.927	R	0.927	R	0.953	R	1.037	R	1.050	R
1.072	R	1.093	R	1.121	R	1.236	R	1.270	R				

Actual Mean = 0.822 Actual Standard Deviation = 0.244

Edited Mean = 0.689 Edited Standard Deviation = 0.130

Bujak Davies Group

Bjarni 0-8232

Sample Depth : 2450.0

0.470	C	0.487	C	0.506	C	0.546		0.554		0.575		0.614
0.650		0.658	P	0.682		0.685		0.687		0.690		0.716
0.719		0.720		0.720	P	0.732		0.795	P	0.825	P	0.826
0.909	R	0.915	R	0.933	R	0.953	R	1.018	R	1.092	R	1.569 R

Actual Mean = 0.759 Actual Standard Deviation = 0.226

Edited Mean = 0.689 Edited Standard Deviation = 0.082

Sample Depth : 2630.0

0.310	C	0.373	C	0.377	C	0.379	C	0.401	C	0.488	E	0.489 E
0.491	E	0.503		0.514	E	0.528		0.530	E	0.534	E	0.551 E
0.557		0.560	E	0.579	E	0.585	E	0.599	E	0.616		

Actual Mean = 0.498 Actual Standard Deviation = 0.086

Edited Mean = 0.542 Edited Standard Deviation = 0.041

Carte Real P-85:

BIOSTRATIGRAPHY AND MATURATION OF

CORTE REAL P-85

Bujak Davies Group

Corte Real P-851

PETRO-CANADA et al. CORTE REAL P-85

GSC locality: 56° 04' 49.01"N, 58° 12' 08.48"W

KB elevation: 13.4m Water depth: 438m

Casing set at: 486m, 756m, 1710m, 3921m

Total depth: 4551m

Interval studied for palynology: 775-4550m

Interval studied for micropaleontology: 775-3135m

CONSENSUS AGE

775-1025m	late Miocene or younger (M)
1045-1545m	early Oligocene (M)
1565-2545m	late Eocene (M)
2565-3225m	middle Eocene (M)
3245-4145m	early Eocene (M)
4165-4550m	early Paleocene (M)

CORTE REAL P-85PALYNOLOGICAL ZONATION

- 775-1545m Tsugaepollenites igniculus Zone or older
(Plio-Pleistocene or older)
- 1565-1625m Systematophora ancyrea Zone or older (middle
Miocene or older)
- 1645-1825m Cordosphaeridium cantharellum Zone or older (early
Miocene or older)
- 1845-1985m Chiroppteridium mespilanum Zone (late Oligocene)
- 2005-2305m Areosphaeridium arcuatum Zone (early Oligocene)
- 2325-2585m Deflandrea #LR Zone (late Eocene to early Oligocene)
- 2605-3145m Areosphaeridium fenestratum Zone (middle to late
Eocene)
- 3165-3985m Eo cladopyxis #LA Zone (middle Eocene)
- 4005-4550m Trinovantedinium #LA Zone (early Eocene)

SELECTED SPECIES

775-1545m: Tsugaepollenites igniculus Zone or older (Plio-Pleistocene or older)

775m	<u>Stereisporites clavus</u> *
805m	<u>Betulaceipollenites betulooides</u> * <u>Ericipites antecursorioides</u> * <u>Ilexpollenites margaritus</u> * <u>Osmundacidites claytonites</u> * <u>Tsugaepollenites igniculus</u> *
1325m	<u>Alnipollenites verus</u> * <u>Ericipites compactipolleniatus</u> *
1525m	<u>Ceratiacean #LA</u> <u>Lingulodinium machaerophorum</u> (?reworked)

Degree of Confidence: 1

Remarks: The highest section from the well contains only miospores other than the dinoflagellates Ceratiacean #LA and L. machaerophorum at 1525-1545m. Uncertainty regarding the stratigraphic ranges of the miospores precludes definite age-assignment, and a Plio-Pleistocene or older age is assigned to the interval. If the dinoflagellate L. machaerophorum is in place at 1525-1545m, it would indicate probable penetration of Miocene or older strata.

1565-1625m: Systematophora ancyrea Zone or older (middle Miocene or older)

1565m Spiniferites ramosus
Systematophora ancyrea

1605m Achomosphaera ramulifera
Cribroperidinium giuseppei
Hystrichokolpoma rigaudiae

Degree of Confidence: 2

Remarks: A single specimen of the dinoflagellate S. ancyrea at 1565-1585m tentatively indicates the presence of middle Miocene or older strata. It is possible that the section is Oligocene and that no markers were observed due to the scarcity of dinoflagellates.

1645-1825m: Cordosphaeridium cantharellum Zone or older (early Miocene or older)

1645m Camarozonosporites #LA *
Corylus #LA *
Lycopodiumsporites annotinoides *
Nematosphaeropsis lemniscata
Paralecaniella indentata

1685m Heteraulacacysta #LA
Impagidinium japonicum
Rouseisporites #LA *
Spiniferites hexatypicus

1725m Distatodinium paradoxum
Spiniferites adnatus

1770m Caryapollenites simplex *
Dapsilidinium pastielsii

Degree of Confidence: 2

1845-1985m: Chiropteridium mespilanum Zone (late Oligocene)

1845m Deflandrea phosphoritica
Juglanspollenites nigripites *
Spiniferites pseudofurcatus

1885m Chiropteridium mespilanum
Palaeocystodinium #LA

Degree of Confidence: 2

Remarks: Penetration of Oligocene strata is indicated by the dinoflagellates D. phosphoritica and C. mespilanum at 1845-1865m and 1885-2005m respectively. As discussed above, it is possible that Oligocene strata may occur higher than 1845m.

2005-2305m: Areosphaeridium arcuatum Zone (early Oligocene)

2005m Cordosphaeridium cantharellum
Quercoidites #LA * (singleton)
Trudopollis plena *
WetzelIELLA symmetrica

2045m	<u>Deflandrea heterophlycta</u>
	<u>Glaphyrocysta intricata</u>
	<u>Palaeocystodinium golzowense</u>
2245m	<u>Areosphaeridium multicornutum</u>
2285m	<u>Isabelidinium #LP</u> (reworked)

Degree of Confidence: 1

Remarks: Assignment of the sample at 2005-2025m to the lower Oligocene is tentative because of uncertainty of the stratigraphic range of W. symmetrica in the Labrador Shelf region. The general scarcity of dinoflagellates including marker species makes palynological zonal assignment very uncertain in this part of the well. It is possible that the observed markers may be caved from overlying sections of the well, or alternatively it is possible that some specimens are reworked.

2325-2585m: Deflandrea #LR Zone (late Eocene to early Oligocene)

2325m	<u>Azolla</u> *
	<u>Deflandrea</u> #LR
2445m	<u>Quercoidites</u> #LV *
2525m	<u>Palaeoperidinium pyrophorum</u> (reworked)
	<u>Quercoidites</u> #LG
	<u>Thalassiphora pelagica</u>

2565m Castanea #LA *
Fagus #LA *
Quercoidites #LA * (abundant)

Degree of Confidence: 1 to 2

Remarks: A single specimen of the dinoflagellate Deflandrea #LR indicates penetration of the Deflandrea #LR Zone at 2325-2345m. However, it is difficult to distinguish reworked from caved specimens in this part of the well as discussed above.

2605-3145m: Areosphaeridium fenestratum Zone (middle to late Eocene)

2605m Cicatricosisporites paradorogensis *
Dinopterygium cladooides
Lentinia serrata

2645m Lejeuneacysta hyalina
Systemataphora placacantha

2685m Carpinipites #LA *
Chiropteridium #LS
Retitricolpites #LF *

2725m Araneosphaera araneosa
Impagidinium californiense
Luxadinium #LA
Momipites coryloides *

2805m Dapsilidinium simplex

2965m Cyclonephelium sp.A, Williams & Brideaux 1975
Micrhystridium fragile (common)

Bujak Davies Group

Corte Real P-858

3045m Pterocaryapollenites stellatus *

3085m Ulmipollenites undulosus *

Degree of Confidence: 2

Remarks: The scarcity of marker species and their extremely sporadic occurrences (single specimens widely spaced through the well) makes it difficult to determine whether the selected species are caved, in place or reworked. There is therefore a high degree of uncertainty regarding the palynological zonal assignment of this and other zones in this part of the well.

3165-3985m: Eocladiopyxis #LA Zone (middle Eocene)

3165m Apectodinium homomorphum (singleton)

3205m Dracodinium condylos (reworked)

3245m Tiliaepollenites crassipites *

3325m Deflandrea eocenica

Dracodinium simile

3445m Areoligera senosensis

3485m Hystrichokolpoma unispinum

Polysphaeridium subtile

3525m Cordosphaeridium gracile

3725m Systematophora #LE

Bujak Davies Group

Corte Real P-859

Degree of Confidence: 2

Remarks: A single specimen of A. homomorphum at 3165-3185m may indicate penetration of the Eo cladopyxis #LA Zone. Other markers are extremely rare, so that the zonal assignment is uncertain.

4005-4550m: Trinovantedinium #LA Zone (early Eocene)

4005m	<u>Trinovantedinium</u> #LA
4125m	<u>Horologinella</u> #LA
4245m	<u>Ceratiopsis striata</u> (reworked) <u>Lentinia wetzelii</u>
4285m	<u>Deflandrea oebisfeldensis</u>
4235m	<u>Momipites tenuipolus</u> *
4405m	<u>Systematophora</u> #LC <u>Wetzelilla meckelfeldensis</u>

Degree of Confidence: 3

Remarks: Penetration of the Trinovantedinium #LA Zone is less tentative than any of the overlying zones in the well because the marker species Trinovantedinium #LA occurs persistently below 4005m, indicating that it is in place.

MICROPALEONTOLOGICAL ZONATION

775-1025m Cassidulina teretis Zone (late Miocene or younger)

Not observed Asterigerina querichi Zone (early Miocene or older)

Not observed Asterigerina bartoniana Zone (late Oligocene)

1045-1545m Ceratobulimina contraria Zone (early Oligocene)

1565-2545m Spiroplectammina adamsi Zone (late Eocene)

Not observed Cyclammina amplectens Zone (late Eocene)

2565-3225m Haplophragmoides acutidorsatum Zone (middle Eocene)

3245-4145m Bulimina ovata Zone (early Eocene)

Not observed Spiroplectammina grzybowski Zone (early Eocene)

Not observed Glomospira charoides Zone (late Paleocene)

4165-4550m Glomospira corona Zone (early Paleocene)

Not observed Praecystammina globigerinaeformis Zone (early Paleocene)

Not observed Rzehakina epigona Zone (Maastrichtian)

Not observed Arenobulimina dorbigny Zone (Campanian?)

SELECTED FORAMINIFERA775-1025m: Cassidulina teretis Zone (late Miocene or younger)

775m	<u>Elphidium ungeri</u> <u>Cibicides praecinctus</u>
805m	<u>Cassidulina teretis</u> <u>Elphidium subnodosum</u>
845m	<u>Elphidium granosum</u>
965m	<u>Triloculina trigonula</u> <u>Elphidium minutum</u>

Degree of Confidence: 21045-1545m: Ceratobulimina contraria Zone (early Oligocene)

1045m	<u>Asterigerina bartoniana</u> <u>Cibicidoides proprius</u> <u>Globorotaloides suteri</u> * <u>Elphidium roemeri</u>
1165m	<u>Melonis affinis</u> <u>Pullenia bulloides</u> <u>Nonionella spissa</u>

Bujak Davies Group

Corte Real P-8512

1325m Lenticulina #H. 1

1445m Cibrostomoides subglobosus (reworked)

Degree of Confidence: 3

1685-2565m: Spiroplectammina adamsi Zone (late Eocene)

1685m Haplophragmoides walteri
Globorotalia postcretacea *
Trochammina collyra
Trochammina globigeriniformis
Trochammina inflata
Bathysiphon discreta
Cibrostomoides scitulus (reworked)
Marginulina petrosa
Uvigerina hispidocostata
Haplophragmoides acutidorsatum (reworked)

1845m Cyclammina cancellata
Trochammina rota
Allomorphina paleocenica (reworked)
Trifarina gracilis
Haplophragmoides cf. suborbicularis (reworked)

1885m Hoeglundina eocenica

1925m Nodosaria latejugata
Heterolepa dutemplei

2005m	<u>Hoeglundina encenica</u> (large) <u>Karreriella siphonella</u>
2045m	<u>Saracenaria midwayensis</u>
2125m	<u>Bulimina kugleri</u>
2265m	<u>Guttulina problema</u>
2325m	<u>Globigerina linaperta</u> *
2405m	<u>Uvigerina batjesi</u> (reworked)

Degree of Confidence: 3

Remarks: The occurrence of K. siphonella at 2005m could be used to locate the top of the C. amplectens Zone.

2565-3225: Haplodragmoides acutidorsatum Zone (middle Eocene)

2565m	<u>Budashevaella multicamerata</u> <u>Trochammina deformis</u> <u>Haplodragmoides acutidorsatum</u> (common)
2605m	<u>Karreriella apicularis</u> (reworked) <u>Nodosaria elegantissima</u>
2645m	<u>Saccammina placenta</u> <u>Ammodiscus peruvianus</u>

2725m	<u>Plectofrondicularia lirata</u>
	<u>Frondicularia midwayensis</u>
	<u>Pulsiphonina prima</u>
2765m	<u>Dorothia cf. retusa</u>
2845m	<u>Psammosphaera sp.</u>
3125m	<u>Uvigerina spinicostata</u>
3165m	<u>Reophax pilulifer</u>
3205m	<u>Bulimina alazanensis</u>

Degree of Confidence: 3

3245-4145m: Bulimina ovata Zone (early Eocene)

3245m	<u>Saccammina complanata</u> <u>Nodosaria minor</u>
3285m	<u>Planorotalia pseudomenardii</u> * (reworked) <u>Saccammina sphaerica</u>
3325m	<u>Dorothia trochoidea</u> (reworked) <u>Ammobaculites</u> sp. <u>Pseudohastigerina wilcoxensis</u> *
3365m	<u>Dorothia cf. retusa</u> <u>Trochamminoides subtrullissatus</u> <u>Cibicides allenii</u>

- 3765m Osangularia sp.
- 3965m Anomalinoides acuta
Vaginulinopsis decorata
- 4005m Spiroplectammina carinata

Degree of Confidence: 3

4165-4530m: Glomospira corona Zone (early Paleocene)

- 4165m Gavelinella cf. becariiformis
Bulimina quadrata
Spiroplectammina navarroana
- 4245m Nuttallides truempyi
- 4285m Globigerina triloculinoides *
Globigerina aff. inconstans *
- 4325m Spirosigmoilinella compressa
- 4540m Ammosphaeroidina sp.

Degree of Confidence: 3

PALEOBATHYMETRY

775- 815m	Inner Neritic
<u>Criteria:</u>	<u>Elphidium ungeri</u> , <u>Cibicides praecinctus</u>
845- 975m	Transitional to Inner Neritic
<u>Criteria:</u>	<u>Elphidium</u> spp., marine dinoflagellates and angiosperm pollen
1005-1015m	Inner Neritic
<u>Criteria:</u>	<u>Elphidium</u> spp.
1045-1295m	Inner Neritic to Middle Neritic
<u>Criteria:</u>	<u>Melonis affinis</u> , <u>Pullenia bulloides</u> , <u>Globorotaloides suteri</u>
1325-1535m	Middle Neritic
<u>Criteria:</u>	<u>Cassidulina subgloboosa</u> , <u>Lenticulina #H1</u>
1565-1615m	Outer Neritic to Upper Bathyal
<u>Criteria:</u>	<u>Bathysiphon discreta</u> , <u>Trochammina globigeriniformis</u> , <u>Haplophragmoides walteri</u> , <u>Cyclammina placenta</u>
1645-1815m	Upper Bathyal
<u>Criteria:</u>	<u>Recurvoides walteri</u> , <u>Haplophragmoidis eggeri</u> , <u>Ammodiscus cretaceus</u>
1845-2175m	Upper Bathyal to Lower Bathyal
<u>Criteria:</u>	<u>Cyclammina cancellata</u> , <u>Allomorphina paleocenica</u> large <u>Hoeglundina eocenica</u> , <u>Karreriella siphonella</u>

2205-2275m	Upper Bathyal <u>Criteria:</u> Decrease in diversity and abundance
2285-2535m	Outer Neritic to Upper Bathyal <u>Criteria:</u> <u>Globigerina linaperta</u> , <u>Coscinodiscus</u> #H2
2565-2695m	Upper Bathyal <u>Criteria:</u> <u>Haplophragmoides acutidorsatum</u> , <u>Budashevaella multicamerata</u> , <u>Saccammina placenta</u> , <u>Ammodiscus peruvianus</u>
2725-2855m	Upper Bathyal to Lower Bathyal <u>Criteria:</u> <u>Plectofrondicularia lirata</u> , <u>Psammosphaera</u> sp. <u>Dorothia</u> cf. <u>retusa</u>
2885-3015m	Upper Bathyal <u>Criteria:</u> Decrease in diversity and abundance
3045-3135m	Outer Neritic to Upper Bathyal <u>Criteria:</u> Poor fossil recovery, <u>Uvigerina spinicostata</u>
3165-3255m	Upper Bathyal <u>Criteria:</u> <u>Reophax pilulifer</u> , <u>Bulimina alazanensis</u> , <u>Saccammina complanata</u>
3285-3375m	Upper Bathyal to Lower Bathyal <u>Criteria:</u> <u>Saccammina sphaerica</u> , <u>Ammobaculites</u> sp., <u>Trochamminoides subtrullisatus</u>
3405-4215m	Upper Bathyal <u>Criteria:</u> <u>Osangularia</u> sp., <u>Allomorphina paleocenica</u> , <u>Gavelinella</u> cf. <u>becariiformis</u> , <u>Karreriella apicularis</u>

4245-4375m Upper Bathyal to Lower Bathyal
Criteria: Nuttallides truempyi, Spirosigmoilinella cf.
compressa, planktonic foraminifera

4405-4550m Outer Neritic to Upper Bathyal
Criteria: Decrease in diversity and abundance,
Ammosphaeroidina sp.

KEROGEN & TAI

Depth	AM	AT	AG	SA	M	BT	ST	I	R	TAI
=====	---	---	---	---	---	---	---	---	---	---
780.0	5	0	0	5	10	15	45	25	0	2-
885.0	0	0	0	0	10	15	55	20	0	2-
1565.0	0	0	0	0	10	30	45	15	0	2-2
1685.0	0	0	0	0	5	25	50	20	0	2-2
1765.0	0	0	0	0	15	25	45	15	0	2-2
1885.0	5	5	0	0	10	20	40	15	0	2-2
2005.0	5	5	0	0	10	25	40	10	0	2-2
2085.0	5	5	0	0	10	25	40	15	0	2-2
2205.0	0	5	0	0	10	20	50	15	0	2-2
2485.0	0	5	0	0	5	25	45	20	0	2-2
2565.0	10	10	0	0	5	20	40	15	0	2-2
2685.0	5	10	0	0	5	25	40	15	0	2-2
2765.0	15	20	0	0	5	25	30	5	0	2-2
2885.0	15	20	0	0	5	25	30	5	0	2-2
2965.0	10	15	0	0	5	35	30	5	0	2-2
3085.0	10	15	0	0	5	35	30	5	0	2-2
3165.0	5	10	0	0	5	35	40	5	0	2-2
3285.0	10	15	0	0	5	30	35	5	0	2-2
3365.0	10	20	0	0	5	35	25	5	0	2-2
3445.0	10	15	0	0	5	35	30	5	0	2-2
3525.0	10	20	0	0	5	35	25	5	0	2-2
3605.0	10	20	0	0	5	30	30	5	0	2
3725.0	10	20	0	0	5	30	30	5	0	2
3805.0	10	25	0	0	5	30	25	5	0	2
3885.0	10	20	0	0	5	30	30	5	0	2
3965.0	10	15	0	0	5	35	30	5	0	2
4045.0	10	15	0	0	5	30	35	5	0	2
4165.0	10	15	0	0	10	25	30	10	0	2
4285.0	10	15	0	0	5	30	30	5	0	2
4365.0	10	15	0	0	5	25	40	5	0	2
4485.0	10	10	0	0	10	25	35	10	0	2
4540.0	10	15	0	0	5	20	0	10	0	2
4550.0	10	15	0	0	5	20	40	10	0	

KEROGEN, TAI AND VITRINITE REFLECTANCE

The upper Eocene to upper Miocene or younger interval from 780-2505m contains little or no amorphous kerogen, with 5% marine amorphous and 5% degraded terrestrial amorphous being observed in several samples below 1885m. Herbaceous kerogen comprises approximately 25% to 35%, woody kerogen comprises 40% to 50%, and coaly inertinitic kerogen comprises 10% to 25% of the total kerogen. The interval from 2565-2550m of early Paleocene to middle Eocene age contains similar kerogen types throughout, with amorphous kerogen being more common than in the overlying late Eocene and younger section. Marine amorphous kerogen comprises 10% to 15% in most samples, and degraded terrestrial kerogen mostly comprises 15% to 20%. Herbaceous kerogen comprises 30% to 40% in most samples, woody kerogen generally comprises 25% to 40%, and coaly inertinitic kerogen generally comprises 5% except in the uppermost and lowermost samples from this interval.

The level of Thermal Alteration increases from a value of 2⁻ between 780-905m in the lower Oligocene and upper Miocene or younger section, to a value of 2⁻ to 2 between 1565-3545m in the lower Eocene to upper Eocene section. It reaches a value of 2 in the lower part of the well below 3605m in the lower Paleocene to lower Eocene section. This indicates that the marine amorphous kerogen has some source rock potential for thermogenic liquid hydrocarbons in the section below 2565m of lower to middle Eocene age. There is no source rock potential indicated for the herbaceous, woody and degraded terrestrial amorphous material.

The following levels of thermal maturity are indicated by vitrinite reflectance analysis.

790m: Immature ($R_o\% = .0393\%$)
990-1590m: Onset of maturity ($R_o\% = 0.525\%$ to 0.580%)
1790-4540m: Mature ($R_o\% = 0.661\%$ to 0.926%)

Reworking is predominant in the upper portions of the well between 790m and 1790m. Predominant cavings occur in samples at 3005m, 3085m, 4165m, and 4540m.

VITRINITE REFLECTANCEKey to Measurement Qualifying Labels

E = Excellent

= Good

P = Poor

C = Caved

R = Reworked

Sample Depth : 790.0

0.287	E	0.350	P	0.356	P	0.394	P	0.396	P	0.463		0.502	P
0.529	R	0.543	R	0.569	R	0.597	R	0.664	R	0.682	R	0.692	R
0.710	R	0.733	R	0.737	R	0.743	R	0.759	R	0.798	R	0.882	R
0.884	R	0.898	R	0.900	R	0.924	R	0.940	R	0.992	R	1.016	R
1.026	R	1.032	R	1.034	R	1.100	R	1.415	R	1.526	R	1.815	R
1.838	R												

Actual Mean = 0.826 Actual Standard Deviation = 0.374

Edited Mean = 0.393 Edited Standard Deviation = 0.072

Sample Depth : 990.0

0.185	C	0.329	C	0.364	P	0.373	P	0.405	P	0.429		0.430	P
0.474	E	0.517	P	0.523		0.538	P	0.539	P	0.558		0.570	P
0.578		0.602	E	0.619	P	0.632	P	0.646	P	0.661		0.687	R
0.742	R	0.742	R	0.760	R	0.768	R	0.778	R	0.805	R	0.817	R
0.820	R	0.824	R	0.825	R	0.868	R	0.872	R	0.876	R	0.890	R
0.942	R	0.956	R	0.960	R	0.963	R	0.980	R	1.026	R	1.034	R
1.072	R	1.211	R	1.300	R	1.366	R	1.371	R	1.632	R	1.669	R

Actual Mean = 0.786 Actual Standard Deviation = 0.322

Edited Mean = 0.525 Edited Standard Deviation = 0.094

Sample Depth : 1190.0

0.226	C	0.363	C	0.436	C	0.522	P	0.605	P	0.654	P	0.664	P
0.676	P	0.686		0.714	P	0.772	R	0.820	R	0.825	R	0.861	R
0.973	R	1.027	R	1.030	R	1.053	R	1.117	R	1.320	R	1.330	R
1.421	R												

Actual Mean = 0.823 Actual Standard Deviation = 0.314

Edited Mean = 0.646 Edited Standard Deviation = 0.064

Sample Depth : 1390.0

0.214	C	0.269	C	0.357	C	0.367	C	0.372	C	0.382	C	0.383	C
0.416	C	0.416	C	0.448	C	0.476		0.494		0.527		0.537	
0.552	P	0.566		0.574		0.576	P	0.582		0.588		0.590	P
0.590		0.594		0.609		0.610	P	0.626		0.628		0.642	P
0.666		0.695	R	0.742	R	0.838	R	0.856	R	0.860	R	0.875	R
0.936	R	0.990	R	0.990	R	1.000	R	1.001	R	1.036	R	1.053	R
1.110	R	1.112	R	1.232	R	1.299	R	1.328	R	1.346	R	1.499	R
1.529	R												

Actual Mean = 0.740 Actual Standard Deviation = 0.328

Edited Mean = 0.580 Edited Standard Deviation = 0.048

Sample Depth : 1590.0

0.477		0.477		0.499		0.504		0.512	E	0.530	P	0.550	
0.570		0.571		0.581		0.599		0.620	P	0.621		0.641	P
0.704		0.747		0.770	R	0.792	R	0.793	R	0.825	R	0.911	R
0.912	R	1.021	R	1.026	R	1.206	R	1.259	R	1.372	R	1.404	R

Actual Mean = 0.768 Actual Standard Deviation = 0.277

Edited Mean = 0.575 Edited Standard Deviation = 0.078

Sample Depth : 1790.0

0.288	C	0.332	C	0.364	C	0.605	P	0.605	E	0.772	P	1.020	R
1.042	R	1.169	R	1.431	R								

Actual Mean = 0.763 Actual Standard Deviation = 0.391

Edited Mean = 0.661 Edited Standard Deviation = 0.096

Bujak Davies Group

Corte Real P-8524

Sample Depth : 1990.0

0.301	C	0.302	C	0.316	C	0.362	C	0.400	C	0.503	C	0.503	C
0.513	C	0.541		0.550	P	0.563		0.577	P	0.626		0.640	
0.643		0.659		0.677	P	0.727	P	0.840	P	0.889		0.906	
1.096													

Actual Mean = 0.597 Actual Standard Deviation = 0.207

Edited Mean = 0.710 Edited Standard Deviation = 0.164

Sample Depth : 2190.0

0.189	C	0.235	C	0.292	C	0.320	C	0.377	C	0.499	P	0.558	P
0.586	P	0.607		0.753		0.883	P						

Actual Mean = 0.482 Actual Standard Deviation = 0.221

Edited Mean = 0.648 Edited Standard Deviation = 0.143

Sample Depth : 2350.0

0.170	C	0.278	C	0.397	C	0.440	C	0.446	C	0.448	C	0.516	C
0.556	P	0.560	P	0.648	P	0.655	P	0.672		0.713	P	0.736	
0.747		0.781	R	0.900	R	0.930	R						

Actual Mean = 0.589 Actual Standard Deviation = 0.204

Edited Mean = 0.661 Edited Standard Deviation = 0.073

Sample Depth : 2520.0

0.159	C	0.245	C	0.293	C	0.294	C	0.299	C	0.325	C	0.393	C
0.442	C	0.447	C	0.493	C	0.502	C	0.510	C	0.514	C	0.525	C
0.541		0.550		0.555		0.605		0.613		0.619		0.632	
0.633		0.634		0.648		0.680		0.681		0.689	P	0.692	
0.699		0.709		0.715	P	0.728	P	0.739		0.743		0.757	P
0.759		0.765		0.859	R	0.905	R	0.905	R	0.965	R	0.972	R
0.993	R	1.007	R	1.015	R	1.017	R	1.033	R	1.095	R	1.098	R
1.211	R												

Actual Mean = 0.678 Actual Standard Deviation = 0.246

Edited Mean = 0.669 Edited Standard Deviation = 0.068

Bujak Davies Group

Corte Real P-8525

Sample Depth : 2680.0

0.262	C	0.265	C	0.285	C	0.287	C	0.294	C	0.317	C	0.350	C
0.357	C	0.477	C	0.478	C	0.484	C	0.503	C	0.655	P	0.686	P
0.686	P	0.690	P	0.699	P	0.700		0.715		0.778	P	0.781	P
0.902	R	0.936	R	0.939	R	1.075	R	1.082	R	1.100	R	1.207	R
1.244	R												

Actual Mean = 0.663 Actual Standard Deviation = 0.304

Edited Mean = 0.710 Edited Standard Deviation = 0.043

Sample Depth : 2845.0

0.124	C	0.204	C	0.348	C	0.423	C	0.461	C	0.463	C	0.500	C
0.570	P	0.590	P	0.606	E	0.641	P	0.663		0.749	P	0.774	P
0.825	R	0.853	R	0.887	R	0.937	R	0.970	R	1.011	R		

Actual Mean = 0.630 Actual Standard Deviation = 0.250

Edited Mean = 0.656 Edited Standard Deviation = 0.079

Sample Depth : 3005.0

0.144	C	0.221	C	0.262	C	0.277	C	0.290	C	0.297	C	0.323	C
0.325	C	0.330	C	0.355	C	0.373	C	0.375	C	0.391	C	0.412	P
0.417	P	0.612	P	0.627	P	0.666	P	0.712	P	0.796	P	0.960	R
0.999	R	1.184	R										

Actual Mean = 0.493 Actual Standard Deviation = 0.277

Edited Mean = 0.606 Edited Standard Deviation = 0.144

Sample Depth : 3085.0

0.264	C	0.297	C	0.312	C	0.370	C	0.375	C	0.381	C	0.384	C
0.385	C	0.387	C	0.390	C	0.392	C	0.400	C	0.400	C	0.413	P
0.454	P	0.467	P	0.503	P	0.511	P	0.546	P	0.579	P	0.624	P
0.657	P	0.689	P	0.695	P	0.784	P	0.823	P	0.830	P	0.912	R
0.955	R	1.111	R	1.180	R	1.279	R						

Actual Mean = 0.586 Actual Standard Deviation = 0.271

Edited Mean = 0.613 Edited Standard Deviation = 0.139

Bujak Davies Group

Corte Real P-8526

Sample Depth : 3300.0

0.211	C	0.286	C	0.323	C	0.334	C	0.351	C	0.371	C	0.372	C
0.393	C	0.393	C	0.441	C	0.442	C	0.446	C	0.478	C	0.481	C
0.486	C	0.487	C	0.526	C	0.531	C	0.557	P	0.560		0.567	P
0.573	P	0.574		0.603	P	0.623	P	0.632	P	0.635		0.638	
0.680	P	0.691		0.701		0.705	P	0.714	P	0.722		0.725	P
0.756		0.777	P	0.787		0.827		0.873	R	0.911	R	0.998	R
1.011	R	1.028	R	1.033	R	1.049	R	1.075	R	1.122	R	1.344	R
1.498	R												

Actual Mean = 0.667 Actual Standard Deviation = 0.276

Edited Mean = 0.669 Edited Standard Deviation = 0.081

Sample Depth : 3485.0

0.165	C	0.337	C	0.345	C	0.356	C	0.374	C	0.427	C	0.429	C
0.440	C	0.478	C	0.500	C	0.507	C	0.511	C	0.652	E	0.684	P
0.688	P	0.732	P	0.800		0.827		0.830	P	0.838	P	0.877	P
0.883	P	0.924	P	0.960	R	0.997	R	1.090	R	1.168	R		

Actual Mean = 0.660 Actual Standard Deviation = 0.264

Edited Mean = 0.794 Edited Standard Deviation = 0.091

Sample Depth : 3525.0

0.228	C	0.293	C	0.324	C	0.325	C	0.357	C	0.361	C	0.399	C
0.407	C	0.424	C	0.427	C	0.445	C	0.446	C	0.449	C	0.465	C
0.475	C	0.487	C	0.498	C	0.498	C	0.667	P	0.728	P	0.747	P
0.815	P	0.850	P	0.946	P	0.952	P	0.972	P	1.045	R	1.067	R

Actual Mean = 0.575 Actual Standard Deviation = 0.252

Edited Mean = 0.835 Edited Standard Deviation = 0.115

Sample Depth : 3645.0

0.163	C	0.323	C	0.338	C	0.367	C	0.391	C	0.417	C	0.423	C
0.436	C	0.441	C	0.441	C	0.445	C	0.458	C	0.464	C	0.467	C
0.477	C	0.537	P	0.550	P	0.623	E	1.152	R	1.523	R		

Actual Mean = 0.522 Actual Standard Deviation = 0.300

Edited Mean = 0.570 Edited Standard Deviation = 0.046

Sample Depth : 3685.0

0.106	C	0.149	C	0.193	C	0.228	C	0.233	C	0.378	C	0.385	C
0.405	C	0.460	C	0.461	C	0.479	C	0.482	C	0.486	C	0.505	C
0.548	C	0.616	P	0.719	P	0.795	P	0.878	P	0.906	P	0.942	i
0.942	P	1.015	R	1.020	R	1.036	R	1.075	R	1.145	R	1.179	R
1.202	R	1.288	R	1.386	R								

Actual Mean = 0.698 Actual Standard Deviation = 0.371

Edited Mean = 0.828 Edited Standard Deviation = 0.124

Sample Depth : 3805.0

0.287	C	0.372	C	0.410	C	0.516	C	0.692		0.710	P	0.716	P
0.765	P	0.791	P	1.055	R	1.179	R						

Actual Mean = 0.681 Actual Standard Deviation = 0.276

Edited Mean = 0.735 Edited Standard Deviation = 0.041

Sample Depth : 3925.0

0.346	P	0.389	P	0.940	
-------	---	-------	---	-------	--

Actual Mean = 0.558 Actual Standard Deviation = 0.331

Edited Mean = 0.558 Edited Standard Deviation = 0.331

Sample Depth : 4165.0

0.225	C	0.265	C	0.270	C	0.271	C	0.290	C	0.322	C	0.361	C
0.371	C	0.372	C	0.381	C	0.397	C	0.411	C	0.437	C	0.444	C
0.455	C	0.458	C	0.458	C	0.466	C	0.470	C	0.472	C	0.476	C
0.524	C	0.527	C	0.547	C	0.555	C	0.880	P	0.923	P	0.975	P
1.190	R												

Actual Mean = 0.489 Actual Standard Deviation = 0.227

Edited Mean = 0.926 Edited Standard Deviation = 0.048

Bujak Davies Group

Corte Real P-8528

Sample Depth : 4205.0

0.328	C	0.363	C	0.415	C	0.436	C	0.478	C	0.509	C	0.521	C
0.525	C	0.548	C	0.552	C	0.557	C	0.560	C	0.561	C	0.607	C
0.612	C	0.615	C	0.658	P	0.668	P	0.729	P	0.761		0.766	P
0.840	P	0.848	P	0.886		0.896		0.898		0.900	P	0.960	
0.969	P	1.025	P										

Actual Mean = 0.666 Actual Standard Deviation = 0.194

Edited Mean = 0.843 Edited Standard Deviation = 0.112

Sample Depth : 4350.0

0.240	C	0.361	C	0.443	C	0.443	C	0.563	C	0.612	C	0.652	
0.765		0.815	E	0.820		0.856	E	0.888	E	0.972	E	1.013	E
1.016		1.049	R	1.070	R	1.131	R	1.145	R	1.223	R	1.238	R

Actual Mean = 0.825 Actual Standard Deviation = 0.294

Edited Mean = 0.866 Edited Standard Deviation = 0.121

Sample Depth : 4540.0

0.303	C	0.355	C	0.374	C	0.408	C	0.418	C	0.424	C	0.426	C
0.442	C	0.473	C	0.476	C	0.479	C	0.533	C	0.544	C	0.566	C
0.576	C	0.592	P	0.599	P	0.639	P	0.659	P	0.661	P	0.662	P
0.676	P	0.688		0.695	P	0.701		0.730	P	0.762	P	0.813	P
0.820	P	0.842		0.910	P	1.338	R						

Actual Mean = 0.612 Actual Standard Deviation = 0.204

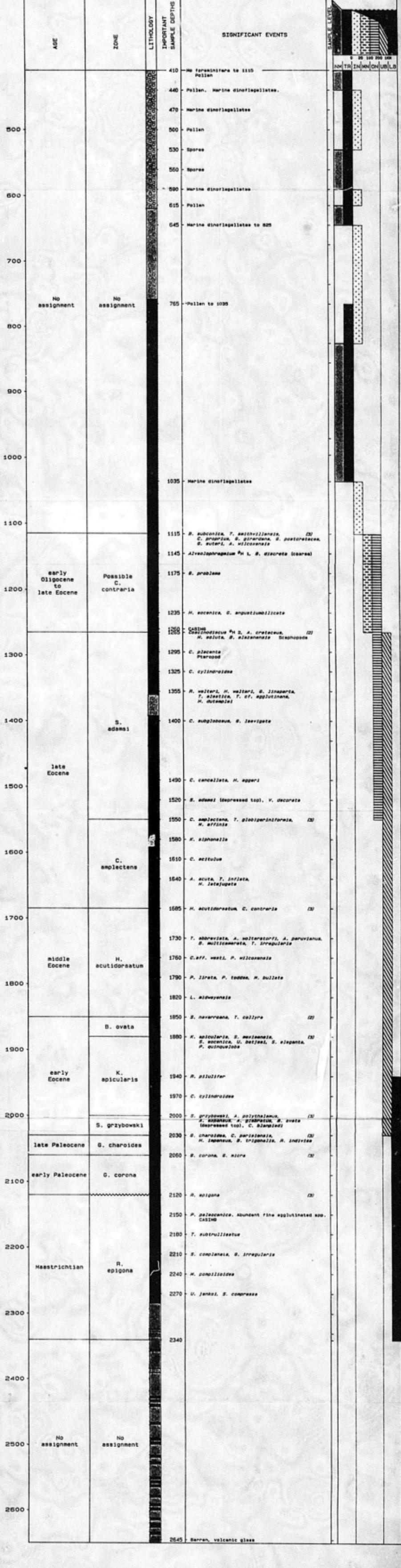
Edited Mean = 0.716 Edited Standard Deviation = 0.091

charts

MICROPALEONTOLOGICAL ANALYSIS CHART
BUJAK DAVIES GROUP

CLIENT: G.S.C.
WELL: Bjarni 0-82
AREA: Labrador Shelf

SCIENTIST: Bujak Davies Group
DATE: April 1987
SCALE: 1 cm = 25 metres

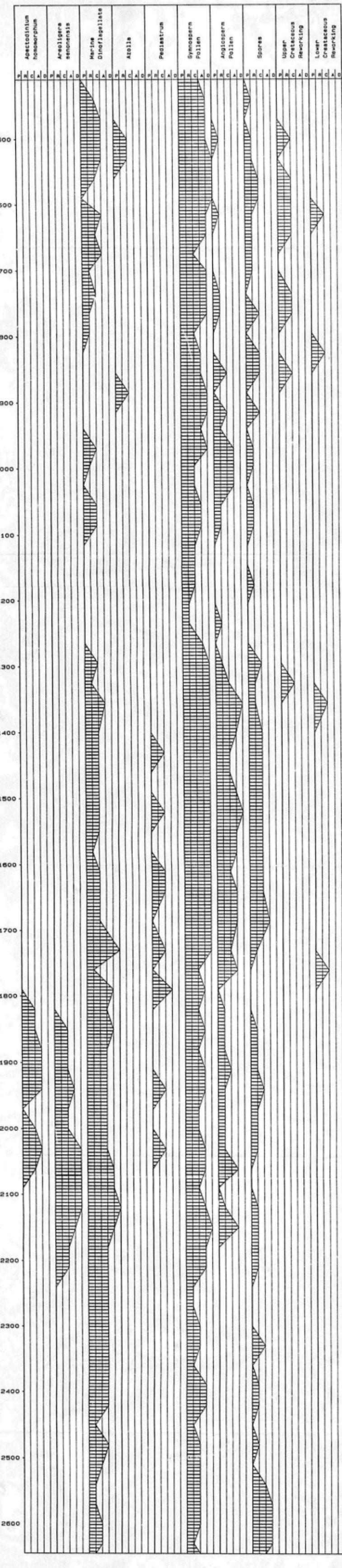


PALYNOLOGICAL ANALYSIS CHART

BUJAK DAVIES GROUP

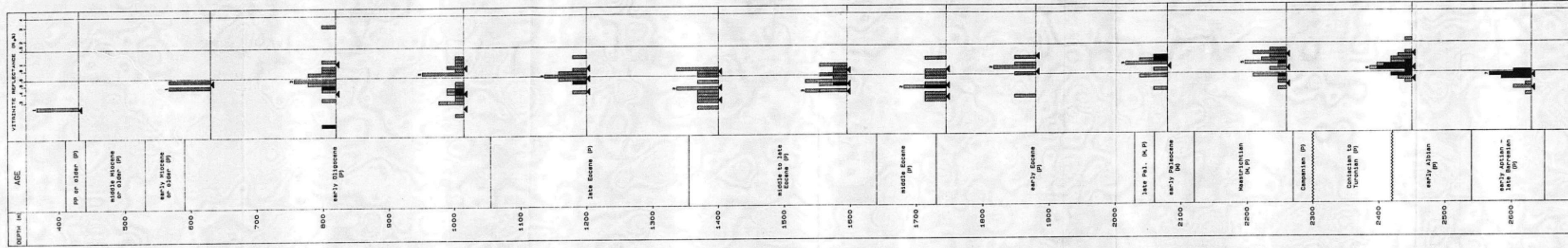
CLIENT: G.S.C.
WELL: Bjarni 0-82
AREA: Labrador ShelfSCIENTIST: Bujak Davies Group
DATE: April 1987
SCALE: 1 cm = 25 metres

AGE	ZONE	FORMATIONS	LITHOLOGY	IMPORTANT SAMPLE DEPTHS	PALYNOLOGICAL EVENTS		SAMPLE LEVEL
Plio-Pleistocene or older	T. igniculus or older	Saglek	Shale	410	T. igniculus		
middle Miocene or older	Systematopora ancyras or older			440	B. claytonites, S. pseudofurcatus		
early Miocene or older	Cordosphaerid. cantharellum or older			470	A. remillifer, H. ripidius, L. isochaeophoroides, S. concretorum, S. ancrys, S. ramous, T. virginitatis		
				500	J. intergrilites		
				530	Arenaria, C. pseudopoculum		
				560	Muscosporites #LA		
				590	Arenosphaeridium #LA, C. aspidianum, D. claudiae, H. heterophyta, M. spiniferum, P. polystena		
				615	C. simplex		
				645	A. arcuatum		
				675	C. cantharellum		
early Oligocene	Arenosphaeridium arcustum	Hokami	Shale	705	C. glaucescens, D. phosphoriticus		
				735	P. conatum, T. vesiculosus		
				825	C. arenaceus, Q. sphaeroides #LA, Q. sphaeroides #LA, T. crassitubulites		
				855	A. varus		
				970	E. antecursoroides, Corylus #LA		
				995	P. stellatum		
				1005	P. indentata, Deflandrea #LA		
early Oligocene to late Eocene	Deflandrea #LA						
middle Eocene	Eocladopyxis #LA	Kenai	Shale	1355	A. biformoides, Chonetesidium #LA, C. spinula, L. serrata, M. fragile (abundant), Q. sphaeroides #LA & LV, S. placentina		
				1400	Corylus #LA		
middle to late Eocene	Arenosphaeridium fenestratum			1450	K. crassitubulata, K. articulata		
				1520	G. umbilicatus, K. er. IIa		
				1550	K. coryloides		
				1580	C. deropenensis		
				1640	L. vetrella		
				1685	Systenotaphra #LA		
				1730	H. bellicium, H. uncinatum, Trinervatenedinium #LA, T. palpebralis, H. neckerioides		
				1790	H. pallidum, K. leavenworthii, P. sauteri, Systematopora #LA, Trinervatenedinium #LA		
early Eocene	Trinervatenedin. #LA	Cartwright	Shale	1820	A. hemisphaeroides, G. celligerus		
				1850	A. senonianus, Trinervatenedinium #LA		
				1880	A. hemisphaeroides (common), A. hyperboreum, H. leptolepis, H. tenuispinus		
				1910	G. cylindrica, K. coelestis		
				1940	A. senonianus (common), A. robustum, H. cinctum, Generozonospores #LA, Testicolidinium #LA		
				2000	H. reticulata		
late Paleocene	Alissocysts circumtabulata			2030	A. senonianus (abundant), A. hispida, P. pseudohistrioconchium		
early Paleocene	Palaeoperidin. pyrophorum	Markland	Shale	2060	G. species gibra, G. species speciosa, G. crassitubulata		
				2090	C. striata, P. tricuspidata, P. pyrophorum		
				2120	H. tuberculata, T. variabilis, T. levigata, Tritylodonium #LA & LS		
				2150	P. magnificum		
				2180	C. striata, C. distibilia sensu Holtyne 1975, C. cf. vetrella, Myctrichosphaeridium #LA, Oligospores #LA, P. basilium, S. sellitense		
				2210	Impagidinium #LA		
				2240	T. reticulata		
				2270	C. victoriana		
				2300	G. tuberculata, G. lanthanophorum, R. woodwardense		
				2360	C. coerulea		
Coniacian to Turonian	Cometidinium obscurum	Bjarni	Shale	2420	X. carinatoides		
early to middle Albian	Parvisaccites amplius			2450	P. amplius, S. evanescens (rare), R. rugosus		
early Aptian to late Barremian	Pseudocerasidium belliforme			2540	A. subverrucosus, P. radicatum, Rotverrucosporites #EC		
				2570	A. conicalis, P. radicella sp. indet., P. granulosus		
				2600	C. punctatus, C. cisticoloidesporites #EL, T. tricarinatum		
				2630	C. mesozoicus, C. planulatum, C. moniloides, P. pilosella #ES		
				2645	C. canaliculata		



BUJAK DAVIES GROUP KEROGEN: Bjarni 0-82

BUJAK DAVIES GROUP VITRANITE: Bjarni 0-82



	4	3	2	1	0	
	4.5	3.5	2.5	1.5	0.5	
Caves						
In Situ						
Recovered						

MICROPALEONTOLOGICAL ANALYSIS CHART

BUJAK DAVIES GROUP

CLIENT: G.S.C.

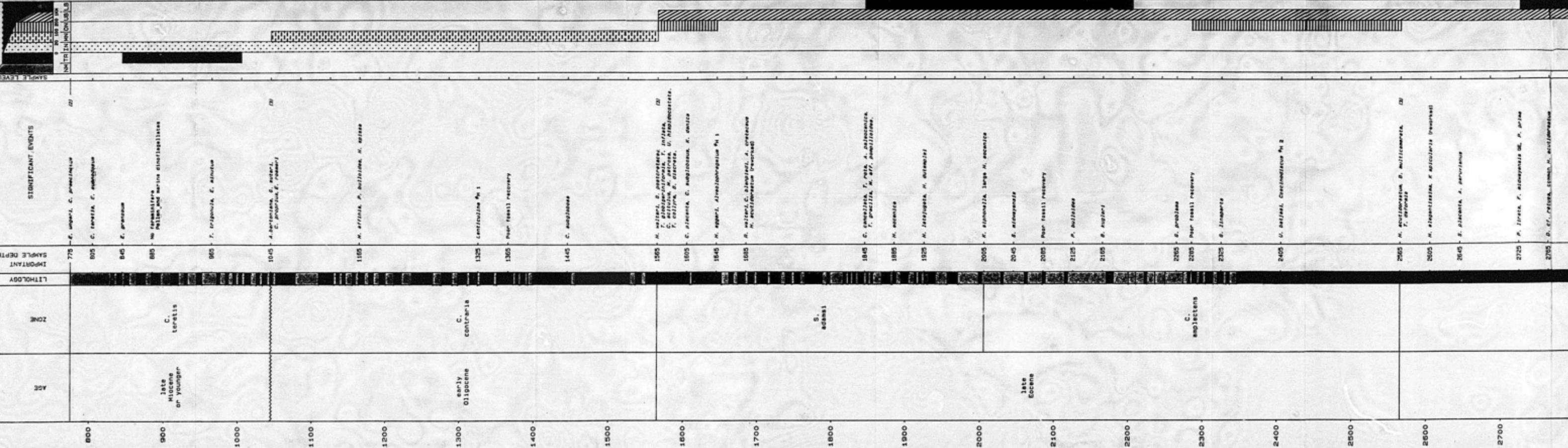
WELL: Corte Real P-86

AREA: Labrador Shelf

SCIENTIST: Bujak Davies Group

DATE: April 1987

SCALE: 1 cm = 25 metres



2795 - *G. sp.*, *Mesona*, common, *H. acutidensum*

2800 -

2800 - middle
Eocene

H.
acutidensum

2900 -

3000 -

3100 -

3200 -

3300 -

3400 -

3500 -

3600 -

3700 -

3800 -

3900 -

4000 -

4100 -

4200 -

4300 -

4400 -

4500 -

2795 - *G. sp.*, *Mesona*, common, *H. acutidensum*

2805 - *Ammochlorite* sp.

2945 - *Ammochlorite* sp.

H.
acutidensum

3125 - *H. acutidensum*

3165 - *H. acutidensum*

3205 - *H. acutidensum*

3245 - *S. compressa*, *H. acutidensum* (imperfect)

3285 - *G. compressa*, *Ammonia* sp.

3325 - *G. compressa*, *H. acutidensum* (imperfect)

3365 - *G. compressa*, *H. acutidensum* (imperfect)

G. compressa

3765 - *Ammonia* sp.

3805 - *J. rotula*, *V. oblongata*

4025 - *S. compressa*

4100 -

4155 - *S. cf. oblongata*, *H. acutidensum*,
S. compressa

4245 - *H. acutidensum*

4285 - *G. compressa*, *H. acutidensum*

4325 - *S. compressa*

4365 - *H. acutidensum*, *H. acutidensum*

4405 - *H. acutidensum*

4545 - *Ammonia* sp.

G. compressa

early
Paleocene

4425 - *volcanic glass*

4545 - *Ammonia* sp.

PALYNOLOGICAL ANALYSIS CHART

BUJAK DAVIES GROUP

CLIENT: G.S.C.

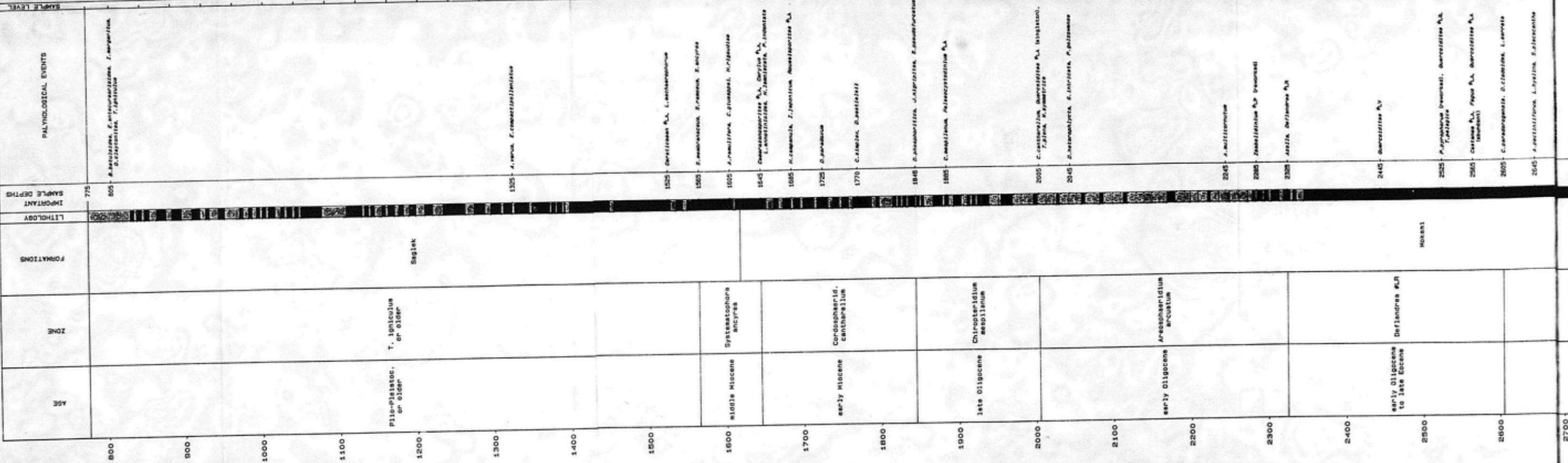
WELL: Corte Real P-85

AREA: Ladder Shelf

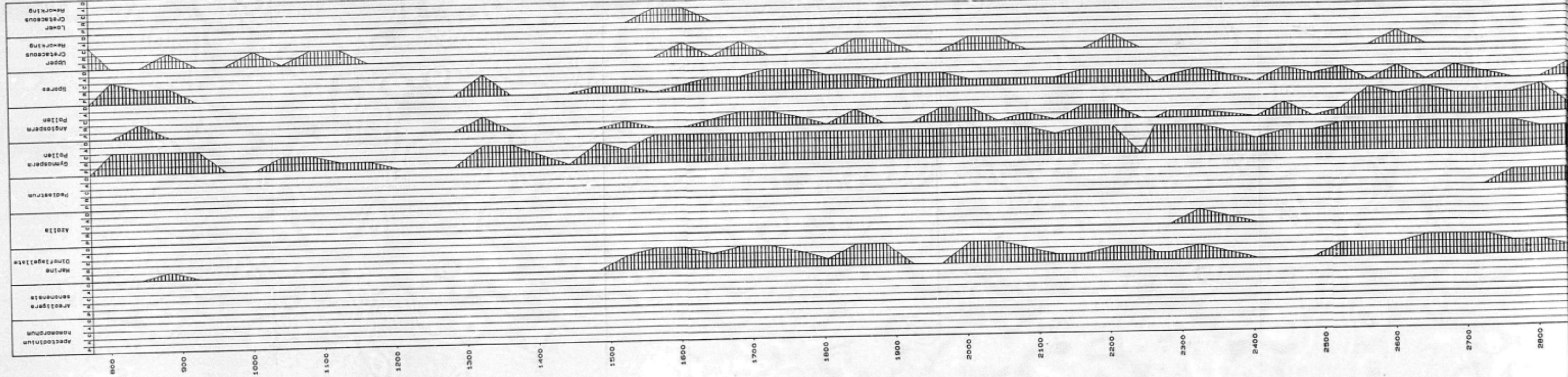
SCIENTIST: Bujak Davies Group

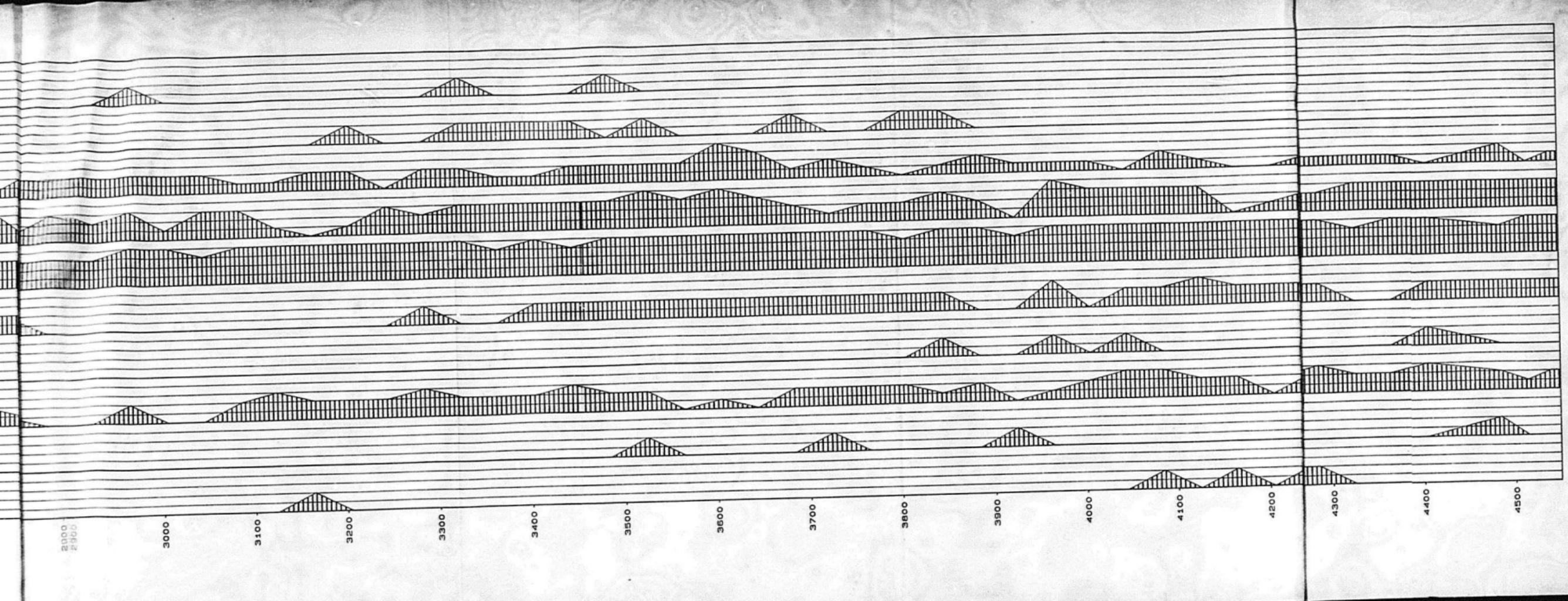
DATE: April 1987

SCALE: 1 cm = 25 metres

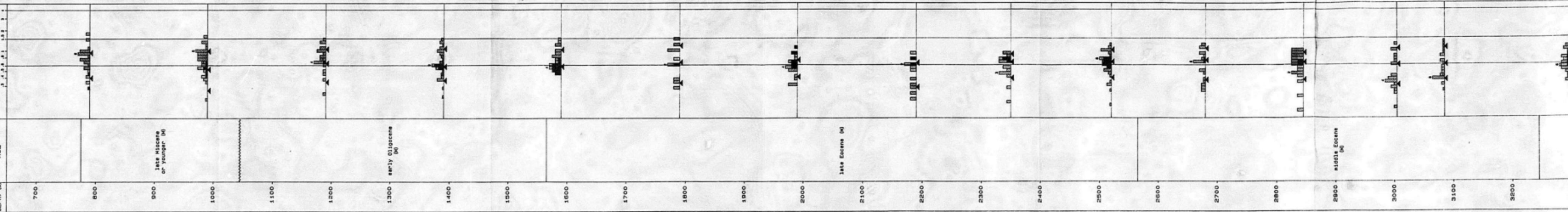


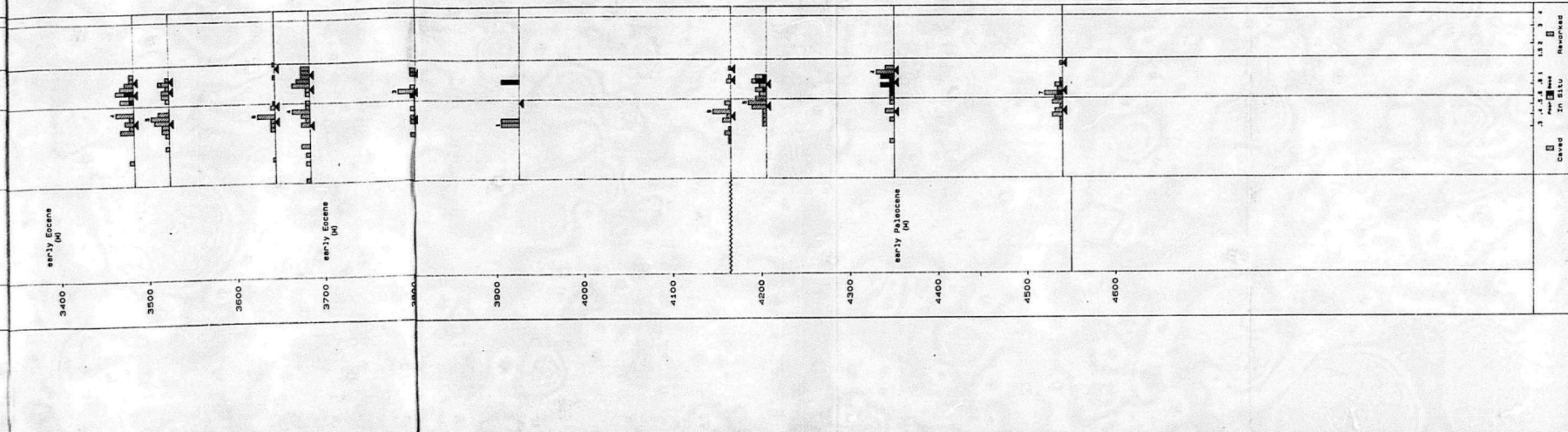
2700 -			2725 - <i>A. annulus</i> , <i>T. leptocephalum</i> , <i>Lobularia</i> sp. <i>K. coriifolium</i>
2800 -		2825 - <i>G. sphaeroides</i>	
2800 -	Middle to late Eocene	Aeroasphecidium penetratum	2855 - Cycloaspidites sp. A. Williams & Brinkman 1975 <i>N. marginata</i> (Nelson)
3000 -			3045 - <i>A. annulus</i> (longitarsus)
3100 -			3065 - <i>D. coniformis</i> (longitarsus)
3200 -			3085 - <i>F. cretaceus</i>
3300 -			3105 - <i>G. annulus</i> , <i>A. annulus</i>
3400 -			3445 - <i>A. annulus</i>
3500 -			3465 - <i>P. longitarsis</i> , <i>P. annulus</i>
	Middle Eocene	Ectoedemopsis	3525 - <i>C. punctata</i>
3700 -			3725 - <i>Systenocentrus</i> sp. A
3800 -			3800 - Kornblu
3900 -			4000 - 4025 - <i>A. annulus</i>
4000 -			4100 - 4125 - <i>W. rugosulus</i> sp. A.
4200 -			4200 - 4225 - <i>C. annulus</i> (narrowed), <i>L. venusta</i>
4300 -			4325 - <i>D. annulus</i> sp. A.
4400 -			4425 - <i>E. semipunctatus</i> sp. A.
4500 -			





BUJAK DAVIES GROUP VITRINITE: Corte Real P-85





BUJAK DAVIES GROUP KEROGEN: Corte Real P-85

