

This document was produced  
by scanning the original publication.

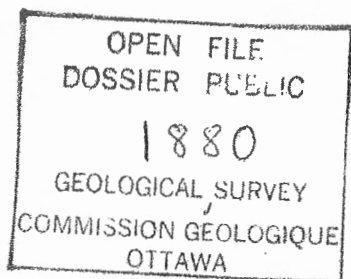
Ce document est le produit d'une  
numérisation par balayage  
de la publication originale.

**PALYNOLOGICAL BIOSTRATIGRAPHY  
OF TERRA NOVA K-08, GRAND BANKS**

**REPORT NO. 87-0066**

**JULY, 1987**

**CALGARY, ALBERTA**



BIOSTRATIGRAPHIC SUMMARY: TERRA NOVA K-08

- 695- 735m Deflandrea heterophlycta Zone (early Oligocene)
- 755- 945m Diphyes colligerum Zone (late Eocene)
- 965-1070m Adnatospheeridium reticulense Zone (middle Eocene)
- 1090-1100m Areoligera senonensis Zone (early Eocene)
- 1120-1190m Palaeoperidinium pyrophorum Zone (early Paleocene)
- 1270-1280m Dinogymnium euclaense Zone (Maastrichtian)
- 1290-1300m Odontochitina operculata Zone (Campanian)
- 1320-1330m Pervosphaeridium truncigerum Zone (Santonian)
- 1350-1360m Oligosphaeridium pulcherrimum Zone (Coniacian)
- 1380-1420m Surculosphaeridium longifurcatum Zone: Subzone 14B  
(late Turonian)
- 1440-1450m Surculosphaeridium longifurcatum Zone: Subzone 14A  
(early Turonian)
- 1470-1480m Kiokansium polypes Zone: Subzones 13A-B (early to  
late Cenomanian)
- 1500-1540m Chichaouadinium sp. A Zone: Subzones 12B-C (middle to  
late Albian)

- 1560-1660m Chichaouadinium sp. A Zone: Subzone 12A (middle  
Albian)
- 1680-1690m Parvisaccites amplus Zone: Subzone 10C (late Aptian)
- 1710-1750m Parvisaccites amplus Zone: Subzones 10A-B  
(early to "mid" Aptian)
- 1770-1810m Subtilisphaera terrula Zone: Subzone 9C (early  
Barremian)
- 1830-1870m Subtilisphaera terrula Zone: Subzone 9B (late  
Hauterivian)
- 1890-1900m Muderongia staurota Zone: Subzones 8A-B (late  
Valanginian)
- 1920-1960m Pseudoceratium pelliferum Zone: Subzones 7C-D (middle  
Valanginian)
- 1990-2020m Pseudoceratium pelliferum Zone: Subzone 7B (early  
Valanginian)
- 2040-2080m Pseudoceratium pelliferum Zone: Subzone 7A (early  
Valanginian)
- 2100-2230m Cerebropollenites macroverrucosus Zone: Subzone 6B  
(early Valanginian)
- 2280-2290m Cerebropollenites macroverrucosus Zone: Subzone 6A  
(late Berriasian)
- 2310-2590m Ctenidodinium panneum Zone: Subzones 5B-C (early  
Berriasian)

- 2610-2650m Ctenidodinium panneum Zone: possible Subzone 5A  
(possible Portlandian to possible early Berriasian)
- 2670-2770m Gonyaulacysta dualis Zone: Subzones 4A-B (late  
Kimmeridgian to Portlandian)
- 2810-2820m Subtilisphaera paeminosa Zone: Subzone 3C (late  
Kimmeridgian)
- 2840-2910m Subtilisphaera paeminosa Zone: Subzones 3A-B  
(middle to late Kimmeridgian)
- 2930-3060m Pilosisorites sp. A Zone: Subzone 2C (middle  
Kimmeridgian)
- 3080-3450m Pilosisorites sp. A Zone: Subzone 2B (early to  
middle Kimmeridgian)
- 3455-3660m Pilosisorites sp. A Zone: Subzone 2A (early  
Kimmeridgian)
- 3680-3720m Scriniodinium crystallinum Zone: Subzone 1B  
(early Kimmeridgian)
- 3721-4320m Gonyaulacysta jurassica Zone (late Oxfordian)
- 4370-4470m Hystrihogonyaulax #EA Zone (early Oxfordian)

SELECTED PALYNOMORPHS695-735m: Deflandrea heterophlycta Zone (early Oligocene)

695-705m      Cyclonephelium sp. A, Williams & Brideaux 1975  
              Deflandrea heterophlycta  
              Glaphyrocysta intricata (large form)  
              Lentinia serrata  
              Phthanoperidinium levimurum  
              Rhombodinium draco  
              Rouseisporites #LA

725-735m      Kisselovia coleothrypta  
              Wetzeliiella articulata

755-945m: Diphyes colligerum Zone (late Eocene)

755-765m      Glaphyrocysta semitecta  
              Gochtodinium simplex  
              Gochtodinium spinulum  
              Hystriochokolpoma salacium  
              Phthanoperidinium comatum  
              Systematophora placacantha

785-795m      Camerozonosporites #LA  
              Cicatricosporites auritus  
              Deflandrea #LR  
              Glaphyrocysta texta

845-855m      Camerozonosporites #LB  
              Cordosphaeridium gracile  
              Pentadinium laticinctum reticulatum

875-885m      Deflandrea eocenica  
              Glaphyrocysta intricata  
              Paralecaniella indentata

905-915m      Areoligera undulata  
              Phthanoperidinium S.L.G

965-1070m: Adnatosphaeridium reticulense Zone (middle Eocene)

965-975m      Glaphyrocysta laciniiforme  
              Paralecaniella indentata (abundant)

1000-1010m    Apectodinium homomorphum  
              Areoligera sentosa  
              Cicatricosisporites dorogensis  
              Lentinia wetzelii  
              Phthanoperidinium alectrolophum  
              Wetzeliiella ovalis

1030-1040m    Glaphyrocysta spineta

1060-1070m    Impagidinium californiense  
              Rhombodinium draco

1090-1100m: Areoligera senonensis Zone (early Eocene)

1090-1100m    Adnatosphaeridium multispinosum  
              Apectodinium augustum  
              Apectodinium homomorphum (abundant)  
              Apectodinium hyperacanthum (abundant)  
              Cordosphaeridium inodes inodes  
              Deflandrea oebisfeldensis

Isabelidium #LP (questionable identification)

Kisselovia crassiramosa

Samlandia chlamydophora

Wetzeliella meckelfeldensis

1120-1190m: Palaeoperidinium pyrophorum Zone (early Paleocene)

1120-1130m Areoligera senonensis (abundant)

Ceratiopsis speciosa glabra

Cordosphaeridium inodes longipes

Deflandrea denticulata

Palaeoperidinium pyrophorum

1150-1160m Ceratiopsis speciosa speciosa

Palaeocystodinium australinum

Spinidium densispinatum

1180-1190m Ceratiopsis pannucea

Ceratiopsis striata

Oligosphaeridium complex

1270-1280m: Dinogymnium euclaense Zone (Maastrichtian)

1270-1280m Isabelidium belfastense

Manumiella cretacea (questionable identification)

1290-1300m: Odontochitina operculata Zone (Campanian)

1290-1300m Ceratiopsis diebelii sensu McIntyre 1975

Chatangiella biapertura

Chatangiella scheii

Isabelidium cretaceumPhelodinium magnificum1320-1330m: Pervosphaeridium truncigerum Zone (Santonian)

1320-1330m

Cleistosphaeridium aciculareRouseisporites reticulatusSurculosphaeridium longifurcatumTanyosphaeridium variecalamum1350-1360m: Oligosphaeridium pulcherrimum Zone (Coniacian)

1350-1360m

Camazonosporites insignisChatangiella tripartitaOligosphaeridium pulcherrimumPalaeohystrichophora infusorioides1380-1420m: Surculosphaeridium longifurcatum Zone: Subzone 14B (late Turonian)

1380-1390m

Canningia colliveriHystrichosphaeridium cooksoniaeOdontochitina operculataSurculosphaeridium longifurcatum (common)

1410-1420m

Cyclonephelium brevispinumCyclonephelium distinctumHystrichodinium pulchrumOdontochitina poriferaOligosphaeridium pulcherrimumSenoniasphaera reticulataSurculosphaeridium longifurcatum (abundant)Trichodinium castaneum





Cicatricosisporites venustus  
Concavissimisporites punctatus  
Corollina torosa  
Nodosisporites babsei  
Plicatella problematica  
Podocarpidites potomacensis  
Stephanocolpites fredericksburgensis  
Tricolpites fragosus  
Trilobosporites humilis

1620-1630m Cicatricosisporites hughesii  
Oligosphaeridium asterigerum cf.

1650-1660m Costatoperforosporites foveolatus  
Cyclonephelium attadalicum cf.  
Oligosphaeridium asterigerum

1680-1690m: Parvisaccites amplus Zone: Subzone 10C (late Aptian)

1680-1690m Cicatricosisporites delicatus  
Cicatricosisporites potomacensis  
Foveltriletes subtriangularis  
Microreticulatisporites uniformis  
Podocarpidites epistriatus  
Subtilisphaera perlucida

1710-1750m: Parvisaccites amplus Zone: Subzone 10A-B (early to "mid" Aptian)

1710-1720m Costatoperforosporites #ET  
Parvisaccites amplus  
Podocarpidites granulatus

1770-1810m: Subtilisphaera terrula Zone: Subzone 9C (Hauterivian)

1770-1780m      Cribrorodinium #EX  
                 Cometodinium sp.

1830-1870m: Subtilisphaera terrula Zone: Subzone 9B (Hauterivian)

1830-1840m      Cyclonephelium attadalicum  
                 Hystrichogonyaulax cladophora cf.  
                 Nummus #EA  
                 Occisucysta sp. X

1860-1870m      Podocarpidites tricocca  
                 Rotverruisporites #EC

1890-1900m: Muderongia staurata: Subzone 8A-B (late Valanginian)

1890-1900m      Callialasporites turbatus  
                 Cicatricosisporites #EAE  
                 Meiourongonyaulax pertusa  
                 Muderongia staurata  
                 Plicatella #EAD  
                 Phoberocysta neocomica pterida  
                 Surculosphaeridium sp. III of Davey 1983  
                 (questionable identification)

1920-1960m: Pseudoceratium pelliferum Zone: Subzone 7C-D (middle late Valanginian)

1920-1930m      Cicatricosisporites hilsei  
                 Costatoperforosporites #EB  
                 Costatoperforosporites #EG  
                 Couperisporites complexis

Phoberocysta neocomica neocomica

Plicatella #ED

1990-1990m      Callialasporites monoalatus  
                      Dingodinium cerviculum  
                      Kleithriasphaeridium corrugatum  
                      Muderongia tetracantha

2040-2050m

<u>Auritulinasporites</u>	<u>deltaformis</u>
<u>Cicatricosisporites</u>	<u>mohrioides</u>
<u>Cicatricosisporites</u>	<u>striatus</u>
<u>Costatoperforosporites</u>	#EF
<u>Corrundinium</u>	#EA
<u>Pityosporites</u>	#EA

2100-2110m      Cymososphaeridium validum  
                     Densoisporites triradiatus cf.  
                     Pilosisporites ericus  
                     Polystephanophorus schindewolfii  
                     Phoberocysta neocomica cruciformis

2130-2140m      *Concavissimisporites robustus*

Oligosphaeridium diluculum

Pseudoceratium pelliiferum (depressed top)

2160-2170m Muderongia simplex perforata (questionable  
identification)

Striatella #EF

2190-2200m Rugubivesiculites #EA

Occisucysta distincta

2220-2230m Rotverrusporites #EA

Taeniophora #EA

2280-2290m: Cerebropollenites macroverrucosus: Subzone A (late  
Berriasian)

2280-2290m Cerebropollenites macroverrucosus cf.

Cicatricosisporites magnus

Concavissimisporites multituberculatum

2310-2590m: Ctenidodinium panneum Zone: Subzone 5B-C (early  
(Berriasian))

2310-2320m Microreticulatisporites #EA

Muderongia californica

2340-2350m Cicatricosisporites #EL

Concavissimisporites informis

Costatoperforosporites #ER

Meiourogoniaulax stoveri

Muderongia mcwhaei

2370-2380m Discorsia nanna

Plicatella #EB

Stiphrosphaeridium dictyophorum2430-2440m Cicatricosisporites globosus2460-2470m Perisseiasphaeridium #EAPlicatella #EAC2490-2500m Callialasporites infrapunctatus2520-2530m Plicatella #EO2550-2560m Impardecispora sp. A of Dorhofer 19772610-2650m: Ctenidodinium panneum Zone: possible Subzone 5A  
(possible Portlandian to possible early Berriasian)2610-2620m Cribroperidinium globatumCallialasporites monoalatusDensoisporites microrugulatus2640-2650m Aequitriradites conosimilisCicatricosisporites #EPCribroperidinium granuligeraSystematophora areolataTriangulopsis discoidalis2670-2770m: Gonyaulacysta dualis Zone: Subzones 4A-B (late Kimmeridgian  
to Portlandian)2670-2680m Amphorula spp.Lanterna bulgariaMuderongia sp. ASenoniasphaera jurassicaStriatella #EF

2730-2740m      Ctenidodinium schizoblastum  
Trilobosporites aornatus  
Trilobosporites valangiensis

2760-2770m      Cicatricosisporites purbeckensis  
Concavissimisporites giganteus  
Systematophora fasciculigera

2810-2820m: Subtilisphaera paeminosa Zone: Subzone 3C (late  
Kimmeridgian)

2810-2820m      Cantulodinium #EA  
Varirugosisporites mutabilis

2840-2910m: Subtilisphaera paeminosa Zone: Subzone 3A-B (middle  
to late Kimmeridgian)

2840-2850m      Amphorula metaelliptica  
Amphorula #EE  
Corollina vignoiensis  
Ctenidodinium #EZ  
Muderongia sp. A  
Pityosporites dividiuus

2870-2880m      Alisporites thomasii  
Corollina chateniensis  
Hystrichodinium #DA

2900-2910m      Cantolodinium speciosum  
Dingodinium jurassicum  
Hystrichogonyaulax cladophora  
Oligosphaeridium pulcherrimum cf.

2930-3060m: Pilosisporites sp. A Zone: Subzone 2C (middle  
Kimmeridgian)

2930-2940m      Coronatispora valdensis  
                 Cleistosphaeridium ehrenbergii  
                 Exesipollenites scabratus  
                 Ellipsoidictyum cinctum  
                 Imbatodinium attenuatum  
                 Imbatodinium kondratjevii  
                 Systematophora ovata

2960-2970m      Aequitriradites cooksoniae  
                 Araucariacites punctatus

2990-3000m      Cribroperidinium #EZ  
                 Subtlisphaera paeminosa

3050-3060m      Meiourogonyaulax callomonii  
                 Striatella #EH

3080-3450m: Pilosisporites sp. A Zone: Subzone 2B (early to middle  
Kimmeridgian)

3080-3090m      Muderongia #EA

3200-3210m      Breodoxiella #EB

3230-3240m      Epiplosphaera reticulospinosa  
                 Occisucysta aculeata  
                 Occisucysta balios  
                 Pareodinia sp. C



- 3260-3270m Taenophora iunctispina
- 3290-3300m Contignisporites notabilis  
Gochteodinia villosa cf.  
Meiourogonyaulax dicrypta
- 3320-3330m Cicatricosisporites purbeckensis (base)
- 3350-3360m Callialasporites #EA  
Corollina #EA
- 3380-3390m Cicatricosisporites mohrioides (base)  
Varirugosisporites #EK
- 3440-3450m Callialasporites obrutus

**3455-3660m: Pilosisporites sp. A Zone: Subzone 2A (early Kimmeridgian)**

- 3455m Scriniocassis osmyntonense
- 3500-3510m Varirugosisporites planirugulatus
- 3530-3540m Ctenidodinium chondrum (questionable identification)
- 3590-3600m Saxosporis #EB
- 3620-3630m Corollina #EV  
Ctenidodinium chondrum

**3680-3720m: Scriniodinium crystallinum Zone: Subzone 1B (early Kimmeridgian)**

- 3680-3690m Scriniodinium crystallinum

3721-4320m: Gonyaulacysta jurassica Zone: Subzone 1A (late Oxfordian)

3721m	<u>Gonyaulacysta jurassica</u>
3830-3840m	<u>Contignisporites</u> #EZ <u>Ctenidodinium chondrum</u> (base in cuttings) <u>Vastispora vastiformis</u>
3860-3870m	<u>Convolutispora klukiformis</u> <u>Striatella</u> #EY
3920-3930m	<u>Ischyosporites amplexiformis</u> <u>Saxosporis variabilis</u>
3950-3960m	<u>Cicatricosisporites abacus</u> (base)
3980-3990m	<u>Acanthaulax senta</u> <u>Callialasporites</u> #EF
4010-4020m	<u>Occisucysta thulia</u> cf. <u>Sentusidinium eurythrocomum</u>
4040-4050m	<u>Aldorpha scarburgensis</u> (common) <u>Prolixosphaeridium mixtispinosum</u>
4070-4080m	<u>Atopodinium prostaticum</u>
4100-4110m	<u>Concavissimisporites</u> #EX <u>Tuberositriletes concavus</u>
4250-4260m	<u>Prolixosphaeridium parvispinum</u> <u>Energlynia</u> sp. <u>Valensiella ovum</u> (questionably present)

4310-4320m      Hystrichogonyaulax cladophora (abundant)  
                  Perisseiasphaeridium panneum (abundant)

4370-4470m: Hystrichogonyaulax #EA (early Oxfordian)

4370-4380m      Hystrichogonyaulax #EA

4400-4410m      Gonyaulacysta jurassica (very abundant)  
                  Hystrichogonyaulax #EA (common)  
                  Scrinocassis dictyophorum

4460-4470m      Foraminisporis paucispinum

APPENDIX A

Alphabetical Listing of Species Shown on Occurrence Chart:  
Marine Dinoflagellates

Index number	Taxon names	Index number	Taxon names
1	Acanthaulax senta	147	Cometodinium #EA
255	Acanthaulax spp.	3	Cordosphaeridium cantharellum
141	Achomosphaera neptunii	30	Cordosphaeridium gracile
2	Achomosphaera ramulifera	53	Cordosphaeridium inodes inodes
28	Achomosphaera sagena	63	Cordosphaeridium inodes longipes
51	Adnatosphaeridium multispinosum	140	Corrundinium #EA
262	Aldorfia scarburghensis	139	Cribroperidinium #EA
236	Amphorula #EA	114	Cribroperidinium #EX
188	Amphorula #EE	224	Cribroperidinium #EZ
189	Amphorula metaelliptica	142	Cribroperidinium edwardsii
60	Apectodinium augustum	244	Cribroperidinium ehrenbergii
43	Apectodinium homomorphum	16	Cribroperidinium giuseppi
52	Apectodinium hyperacanthum	169	Cribroperidinium globatum
146	Aptea anaphrissa	230	Cribroperidinium granulatatum
111	Aptea polymorpha	174	Cribroperidinium granuligera
131	Apteodinium granulatatum	108	Cribroperidinium orthoceras
160	Apteodinium nuciforme	242	Cribroperidinium sp. A
61	Areoligera senonensis	192	Ctenidodinium #EZ
32	Areoligera sentosa	248	Ctenidodinium chondrum
35	Areoligera undulata	219	Ctenidodinium culmulum
120	Astrocysta cretacea	193	Ctenidodinium panneum
168	Atopodinium prostratum	182	Ctenidodinium schizoblatum
190	Breodoxiella #EA	261	Ctenidodinium sellwoodii
231	Breodoxiella #EB	200	Ctenidodinium sp. indet.
166	Caddosphaera halosa	116	Cyclonephelium attadalicum
107	Callaiosphaeridium asymmetrica	88	Cyclonephelium brevispinum
85	Canningia colliveri	89	Cyclonephelium distinctum
138	Canningia ringnesiorum	126	Cyclonephelium distinctum brevispinum
187	Cantulodinium #EA	4	Cyclonephelium sp. A, Will. & Brid. 1975
39	Cantulodinium #LA	132	Cymosphaeridium #EA
208	Cantulodinium speciosum	117	Cymosphaeridium validum
191	Cantulosphaeridium #EA	5	Dapsilidinium pastielsii
151	Cassiculosphaeridia magna	26	Deflandrea #LR
75	Ceratiopsis diebelii sensu McIntyre 1975	64	Deflandrea denticulata
69	Ceratiopsis pannucea	33	Deflandrea eocenica
62	Ceratiopsis speciosa glabra	6	Deflandrea heterophlycta
66	Ceratiopsis speciosa speciosa	54	Deflandrea oebisfeldensis
70	Ceratiopsis striata	39	Deflandrea phosphoritica
76	Chatangiella biapertura	256	Diacanthum sp. indet.
77	Chatangiella scheii	135	Dingodinium cerviculum
83	Chatangiella tripartita	159	Dingodinium jurassicum
106	Chichaouadinium sp. A	40	Dinopterygium cladoides
156	Chichaouadinium vestitum	55	Diphyes colligerum
99	Chlamydothorella nyei	163	Discorsia nanna
80	Cleistosphaeridium aciculare	216	Ellipsoidictyum cinctum
134	Cleistosphaeridium ehrenbergii	194	Endoscrinium pharo
100	Cleistosphaeridium huquntionii		

APPENDIX A (cont'd)Alphabetical Listing of Species Shown on Occurrence Chart:Marine Dinoflagellates

Index number	Taxon names	Index number	Taxon names
264	Energlynia spp.	143	Kleithriasphaeridium corrugatum
110	Epelidosphaeridia spinosa	177	Lanterna bulgaria
235	Epiplosphaera retispinosum	203	Lanterna sportula
171	Escharisphaeridia pocockii	8	Lentinia serrata
201	Escharisphaeridia rudis	44	Lentinia wetzelii
34	Glaphyrocysta intricata	204	Leptodinium hyalodermopsis
7	Glaphyrocysta intricata (large form)	225	Leptodinium major
41	Glaphyrocysta laciniiforme	229	Leptodinium mamilliferum
20	Glaphyrocysta semitecta	9	Lingulodinium machaerophorum
47	Glaphyrocysta spineta	186	Lithodinia jurassica
27	Glaphyrocysta texta	103	Litosphaeridium siphoniphorum
252	Glossodinium dimorphum	74	Manumiella cretacea
241	Gochteodinia villosa cf.	221	Meiourugonyaulax #ES
21	Gochtodinium simplex	226	Meiourugonyaulax callomonii
22	Gochtodinium spinulum	196	Meiourugonyaulax deflandrei
101	Gonyaulacysta cassidata	239	Meiourugonyaulax dicrypta
170	Gonyaulacysta dualis	128	Meiourugonyaulax pertusa
183	Gonyaulacysta exsanguia	122	Meiourugonyaulax stoveri
253	Gonyaulacysta jurassica	205	Mendicodinium groenlandicum
72	Hafniasphaera septata	197	Millioudodinium jubaris
161	Heslertonia pellucida	213	Millioudodinium mamilliferum
254	Heslertonia sp. indet.	181	Minerisporites #EA
220	Hystriocysta ornata	228	Muderongia #EA
202	Hystriodinium #DA	238	Muderongia #EG
195	Hystriodinium lanceatum	176	Muderongia #LA
90	Hystriodinium pulchrum	118	Muderongia asymmetrica
121	Hystriogonyaulax cladophora	158	Muderongia californica
269	Hystriogonyaulax #EA	162	Muderongia mcWhaei
127	Hystriogonyaulax cladophora cf.	180	Muderongia simplex
270	Hystriogonyaulax serrata	150	Muderongia simplex perforata
42	Hystriokolpoma granulatum	179	Muderongia sp. A
23	Hystriokolpoma salacium	243	Muderongia sp. E
86	Hystriosphæridium cooksoniae	129	Muderongia staurota
91	Hystriosphæridium stellatum	136	Muderongia tetracantha
215	Imbatodinium attenuatum	123	Nummus #EA
214	Imbatodinium kondratjevii	232	Occisucysta aculeata
217	Imbatodinium pomum	234	Occisucysta balios
50	Impagidinium californiense	152	Occisucysta distincta
56	Isabelidinium #LP	218	Occisucysta evittii
73	Isabelidinium belfastense	185	Occisucysta sp. S
78	Isabelidinium cretaceum	124	Occisucysta sp. X
102	Kiokansium polypes	258	Occisucysta thulia
17	Kisselovia coleothrypta	96	Odontochitina costata
57	Kisselovia crassiramosa	87	Odontochitina operculata
137	Kleithriasphaeridium #EA		

APPENDIX A (cont'd)Alphabetical Listing of Species Shown on Occurrence Chart:Marine Dinoflagellates

Index number	Taxon names	Index number	Taxon names
92	Odontochitina porifera	227	Senoniasphaera micrhysta
115	Oligosphaeridium asterigerum	109	Senoniasphaera microreticulata
71	Oligosphaeridium complex	97	Senoniasphaera protrusa
167	Oligosphaeridium diluculum	94	Senoniasphaera reticulata
93	Oligosphaeridium pulcherrimum	178	Sentusidinium cuculliforme
209	Oligosphaeridium pulcherrimum cf.	257	Sentusidinium erythrocomum
125	Oligosphaeridium vasiiforme	212	Sentusidinium filiferum
29	Operculodinium centrocarpum	249	Sentusidinium rioultii
172	Osmundacidites major	199	Sentusidinium sp. indet.
67	Palaeocystodinium australinum	268	Sirmiodinium grossii
48	Palaeocystodinium golzowense	68	Spinidinium densispinatum
84	Palaeohystrichophora infusorioides	12	Spiniferites membranaceus
65	Palaeoperidinium pyrophorum	18	Spiniferites pseudofurcatus
210	Pareodinia borealis	13	Spiniferites ramosus
222	Pareodinia ceratophora	112	Stephanelytron fredericksburgensis
233	Pareodinia sp. C	164	Stiphrosphaeridium dictyophorum
36	Pentadinium laticinctum laticinctum	149	Stiphrosphaeridium diluculum
31	Pentadinium laticinctum reticulatum	119	Subtilisphaera perlucida
246	Perisseiasphaeridium #EA	251	Subtilisphaera inaffecta
206	Perisseiasphaeridium #EB	223	Subtilisphaera paeminsa
263	Perisseiasphaeridium pannosum	153	Subtilisphaera terrula
240	Perisseiasphaeridium spp.	81	Surculosphaeridium longifurcatum
79	Phelodinium magnificum	14	Systematophora ancyrea
144	Phoberocysta neocomica cruciformis	173	Systematophora areolata
133	Phoberocysta neocomica neocomica	184	Systematophora fasciculigera
154	Phoberocysta neocomica pteridia	259	Systematophora orbifera
37	Phthanoperidinium #LG	211	Systematophora ovata
45	Phthanoperidinium alectrolophum	25	Systematophora placacantha
24	Phthanoperidinium comatum	155	Taeniophora #EA
10	Phthanoperidinium levimurum	165	Taeniophora #ED
207	Polystephanophorus sarjeantii	237	Taeniophora iunctispina
145	Polystephanophorus schindewolfii	82	Tanyosphaeridium variecalamum
247	Polystephanophorus sp. A	104	Tanyosphaeridium xanthiopyxides
260	Prolixosphaeridium mixtispinosum	157	Tanyosphaeridium magneticum
266	Prolixosphaeridium parvispinum	49	Tectatodinium pellitum
148	Pseudoceratium pelliiferum	15	Thalassiphora pelagica
130	Pterodinium aliferum	95	Trichodinium castaneum
198	Pterospermella helios	267	Valensiella ovula
11	Rhombodinium draco	265	Wanaea fimbriata
58	Samlandia chlamydophora	19	Wetzeliiella articulata
113	Scorea tecta	59	Wetzeliiella meckelfeldensis
271	Scrinioicassis dictyotus	46	Wetzeliiella ovalis
245	Scrinioicassis osmingtonense	98	Xenascus ceratioides
250	Scriniodinium crystallinum	105	Xiphophoridium alatum
175	Senoniasphaera jurassica		

APPENDIX A (cont'd)Alphabetical Listing of Species Shown on Occurrence Chart:Pollen and Spores

Index number	Taxon names	Index number	Taxon names
24	Abiespollenites microreticulatus	101	Cicatricosisporites magnumii
1	Abiespollenites spp.	134	Cicatricosisporites magnus
26	Acanthotriletes variespinosus	60	Cicatricosisporites mohrioides
168	Aequitriradites #EB	176	Cicatricosisporites notabilis
125	Aequitriradites baculatus	50	Cicatricosisporites potomacensis
132	Aequitriradites conosimilis	141	Cicatricosisporites purbeckensis
161	Aequitriradites cooksoniae	148	Cicatricosisporites reticicatricosus
56	Aequitriradites spinulosus	20	Cicatricosisporites spp. indet.
167	Aequitriradites subverrucosus	77	Cicatricosisporites sternum
145	Aequitriradites verrucosus	83	Cicatricosisporites striatus
22	Alisporites bilateralis	32	Cicatricosisporites venustus
86	Alisporites grandis	78	Cicatricosisporites versiformis
152	Alisporites thomasi	11	Cicatricosisporites auritus
112	Annulatisporites annulatus	212	Concavissimisporites #EX
23	Araucariacites australis	215	Concavissimisporites #EZ
129	Araucariacites punctatus	140	Concavissimisporites giganteus
82	Auritulinaspores deltaformis	108	Concavissimisporites informis
2	Azolla spp.	102	Concavissimisporites multituberculatus
53	Balmeisporites spp.	119	Concavissimisporites pulcher
203	Callialasporites #EF	40	Concavissimisporites punctatus
214	Callialasporites #EG	92	Concavissimisporites robustus
217	Callialasporites #ER	70	Concavissimisporites variverrucatus
28	Callialasporites dampieri	143	Concavissimisporites verrucatus
123	Callialasporites infrapunctatus	190	Contignisporites dorsostriatus
76	Callialasporites monoalasporeus	69	Contignisporites glebulentus
80	Callialasporites monoalatus	208	Contignisporites dorsostriatus
199	Callialasporites obrutus	210	Convolutispora klukiformis
162	Callialasporites segmentatus	34	Corollina #EA
133	Callialasporites trilobatus	194	Corollina #EV
64	Callialasporites turbatus	173	Corollina chateniensis
54	Camarozonosporites dakotaensis	184	Corollina echinata
10	Camarozonosporites #LA	127	Corollina itunensis
7	Camarozonosporites #LB	198	Corollina sp. V
59	Camarozonosporites dakotaensis	31	Corollina torosa
15	Camarozonosporites insignis	81	Corollina torosa
177	Campania #EA	183	Corollina vignoniensis
179	Cedripites #EA	55	Corollina vignoniensis
98	Cedripites canadensis	174	Coronatipora spp.
178	Cedripites sp. A	115	Coronatipora valdensis
99	Cerebropollenites macroverrucosus	71	Costatoperforosporites #EB
66	Cerebropollenites mesozoicus	84	Costatoperforosporites #EF
205	Chasmatosporites #ER	72	Costatoperforosporites #EG
100	Chasmatosporites major	35	Costatoperforosporites #EH
67	Cicatricosisporites #EAE	111	Costatoperforosporites #ER
110	Cicatricosisporites #EL	48	Costatoperforosporites #ET
65	Cicatricosisporites #EO	43	Costatoperforosporites foveolatus
131	Cicatricosisporites #EP	73	Couperisporites complex
135	Cicatricosisporites abacus	16	Cyathidites australis
154	Cicatricosisporites crassiterminatus	9	Cyathidites spp.
45	Cicatricosisporites delicatus	201	Cycadopites nitidus
13	Cicatricosisporites dorogensis	95	Deltoidospora hallii
117	Cicatricosisporites globatus	61	Densosporites microrugulatus
120	Cicatricosisporites hannoviana	88	Densosporites triradiatus
42	Cicatricosisporites hughesii	171	Distaltriangulatisporites sp. indet.
200	Cicatricosisporites magnus		

## APPENDIX A (cont'd)

Alphabetical Listing of Species Shown on Occurrence Chart:Pollen and Spores

Index number	Taxon names	Index number	Taxon names
27	Plicatella problematica	185	Exesipollenites scabratus
188	Podocarpidites #EA	128	Exesipollenites tumulus
122	Podocarpidites canadensis	157	Exesiporites scabratus
46	Podocarpidites epistriatus	218	Foraminisporis paucispinosus
49	Podocarpidites granulatus	51	Foveotrilletes subtriangularis
36	Podocarpidites potomacensis	182	Gleichenioidites senonicus
164	Podocarpidites sp.	126	Impardecispora sp.A, Dorhofer 1977
62	Podocarpidites tricoeca	137	Inaperturopollenites #EA
206	Reticulatisporites #EA	196	Inaperturopollenites granulatus
38	Rotverrusporites #EA	216	Integricorpus triangularis
63	Rotverrusporites #EC	107	Ischyosporites #EA
166	Rotverrusporites sp. B	213	Ischyosporites amplireticosus
6	Rouseisporites #LA	121	Ischyosporites disjunctus
18	Rouseisporites reticulatus	94	Klukisporites areolatus
96	Rugubivesiculites #EA	21	Klukisporites foveolatus
41	Rugubivesiculites rugosus	106	Klukisporites pseudoreticulatus
192	Saxosporis sp. indet.	191	Klukisporites variegatus
202	Saxosporis variabilis	109	Kraeuselisporites linearis
193	Saxosporites #EB	169	Laevigatosporites mesozoicus
19	Stereisporites antiquasporites	12	Laevigatosporites ovatus
97	Striamonolites auritus	30	Leiotrilletes equiexinus
39	Striatella #EA	87	Leiotrilletes mecklenburgensis
93	Striatella #EF	136	Leptolepidites major
165	Striatella #EH	14	Lycopodiumsporites annotinioides
150	Striatella #EN	52	Lycopodiumsporites austroclavitudites
91	Striatella sp. indet.	104	Maculatisporites #ES
195	Taxodiaceapollenites hiatus	149	Matonisporites equiexinus
170	Todisporites major	103	Microreticulatisporites #EA
181	Todisporites minor	57	Microreticulatisporites uniformis
130	Triangulopsis discoidalis	29	Nodosisporites babsae
159	Trilobosporites aequiverrucatus	3	Osmundacidites claytonites
172	Trilobosporites aornatus	17	Osmundacidites wellmannii
155	Trilobosporites bernissartensis	47	Parvisaccites amplius
146	Trilobosporites canadensis	58	Parvisaccites radiatus
158	Trilobosporites granulatus	44	Parvosaccites rugosus
33	Trilobosporites humilis	114	Perinopollenites elatoides
163	Trilobosporites obsitus	160	Phyllocladites microreticulatus
187	Trilobosporites tuberculiformis	4	Piceapollenites spp.
139	Trilobosporites valangiensis	147	Pilososporites crassangularis
79	Triretilobata marylandensis	89	Pilososporites ericis
153	Triretilobata spp.	138	Pilososporites semicapillosus
8	Tsugaepollenites viridifluminipites	74	Pilososporites trichopapillosus
211	Tuberositrilletes concavus	68	Pilososporites verus
207	Tuberositrilletes grossetuberculatus	5	Pinuspollenites spp.
186	Tuberositrilletes major	85	Pityosporites #EA
204	Tuberositrilletes minutus	105	Pityosporites dividius
175	Tuberositrilletes montuosus	197	Pityosporites sp. indet.
156	Varirugosisporites #EA	90	Platysaccus megasaccus
180	Varirugosisporites #EK	118	Plicatella #EAC
209	Varirugosisporites #EM	116	Plicatella #EB
151	Varirugosisporites granituberosus	75	Plicatella #ED
144	Varirugosisporites mutabilis	124	Plicatella #EO
189	Varirugosisporites planirugulatus	37	Plicatella #ES
142	Vitreisporites minor	25	Plicatella bifurcata
		113	Plicatella cristata



APPENDIX A (cont'd)Alphabetical Listing of Species Shown on Occurrence Chart:Algae and Foraminiferal liners

Index number	Taxon names
3	Cyclopsiella spp.
4	foraminiferal liners
5	Micrhystridium stellatum
2	Paralecaniella indentata
1	Pediastrum boryanum

Reworked Palynomorphs

Index number	Taxon names
2	*Densosporites spp.
4	*Hystrichogonyaulax cladophora
1	*Isabelidium spp.
3	*Ovoidinium verrucosum

APPENDIX BExamined Samples: Terra Nova K-08

695.00 : Cuttings	2900.00 : Cuttings
725.00 : Cuttings	2926.00 : Sidewall core
755.00 : Cuttings	2930.00 : Cuttings
785.00 : Cuttings	2943.00 : Sidewall core
815.00 : Cuttings	2960.00 : Cuttings
845.00 : Cuttings	2965.00 : Sidewall core
875.00 : Cuttings	2990.00 : Cuttings
905.00 : Cuttings	3020.00 : Cuttings
935.00 : Cuttings	3025.00 : Sidewall core
965.00 : Cuttings	3050.00 : Cuttings
1000.00 : Cuttings	3080.00 : Cuttings
1030.00 : Cuttings	3110.00 : Cuttings
1060.00 : Cuttings	3140.00 : Cuttings
1090.00 : Cuttings	3170.00 : Cuttings
1120.00 : Cuttings	3200.00 : Cuttings
1150.00 : Cuttings	3230.00 : Cuttings
1180.00 : Cuttings	3260.00 : Cuttings
1210.00 : Cuttings	3290.00 : Cuttings
1240.00 : Cuttings	3320.00 : Cuttings
1270.00 : Cuttings	3350.00 : Cuttings
1290.00 : Cuttings	3380.00 : Cuttings
1320.00 : Cuttings	3404.00 : Sidewall core
1350.00 : Cuttings	3410.00 : Cuttings
1380.00 : Cuttings	3420.50 : Sidewall core
1410.00 : Cuttings	3440.00 : Cuttings
1440.00 : Cuttings	3455.00 : Sidewall core
1470.00 : Cuttings	3470.00 : Cuttings
1500.00 : Cuttings	3483.00 : Sidewall core
1530.00 : Cuttings	3500.00 : Cuttings
1560.00 : Cuttings	3530.00 : Cuttings
1590.00 : Cuttings	3560.00 : Cuttings
1620.00 : Cuttings	3590.00 : Cuttings
1650.00 : Cuttings	3620.00 : Cuttings
1680.00 : Cuttings	3650.00 : Cuttings
1710.00 : Cuttings	3680.00 : Cuttings
1740.00 : Cuttings	3710.00 : Cuttings
1770.00 : Cuttings	3717.00 : Sidewall core
1800.00 : Cuttings	3721.00 : Sidewall core
1830.00 : Cuttings	3723.00 : Sidewall core
1860.00 : Cuttings	3740.00 : Cuttings
1890.00 : Cuttings	3757.00 : Sidewall core
1920.00 : Cuttings	3770.00 : Cuttings
1950.00 : Cuttings	3800.00 : Cuttings
1980.00 : Cuttings	3830.00 : Cuttings
2010.00 : Cuttings	3860.00 : Cuttings
2040.00 : Cuttings	3885.00 : Sidewall core
2070.00 : Cuttings	3890.00 : Cuttings
2100.00 : Cuttings	3918.00 : Sidewall core
2130.00 : Cuttings	3920.00 : Cuttings
2160.00 : Cuttings	3950.00 : Cuttings
2190.00 : Cuttings	3950.00 : Cuttings
2220.00 : Cuttings	3980.00 : Cuttings
2280.00 : Cuttings	4010.00 : Cuttings
2310.00 : Cuttings	4020.00 : Sidewall core
2340.00 : Cuttings	4030.00 : Cuttings
2370.00 : Cuttings	4040.00 : Cuttings
2400.00 : Cuttings	4070.00 : Cuttings
2430.00 : Cuttings	4090.00 : Cuttings
2460.00 : Cuttings	4100.00 : Cuttings
2490.00 : Cuttings	4130.00 : Cuttings
2520.00 : Cuttings	4160.00 : Cuttings
2550.00 : Cuttings	4190.00 : Cuttings
2580.00 : Cuttings	4220.00 : Cuttings
2610.00 : Cuttings	4250.00 : Cuttings
2640.00 : Cuttings	4275.00 : Sidewall core
2670.00 : Cuttings	4280.00 : Cuttings
2700.00 : Cuttings	4310.00 : Cuttings
2730.00 : Cuttings	4340.00 : Cuttings
2760.00 : Cuttings	4370.00 : Cuttings
2810.00 : Cuttings	4400.00 : Cuttings
2820.00 : Cuttings	4430.00 : Cuttings
2840.00 : Cuttings	4460.00 : Cuttings
2870.00 : Cuttings	4490.00 : Cuttings