CONTENTS ENVELOPE 6758

TENEMENT: Not Related.

TENEMENT HOLDER: Not Related.

II

0142

PALYNOLOGY OF S.E.O.S. BEACHPORT -1,

OTWAY BASIN

BY

ROGER MORGAN

for Ultramar Australia September 1985

PALYNOLOGY OF S.E.O.S. BEACHPORT -1, OTWAY BASIN

by Roger Morgan

CONTENTS

I SUMMARY

1070-80ft.(cutts): upper M.diversus Zone: Early Eocene: marginally marine

L.balmei Zone: not seen

1450-60ft.(cutts): T.longus to upper N.senectus Zones: Maastrichtian to Campanian: non-marine (with heavy Eocene caving)

1840-50ft.(cutts): indeterminate: possibly T.pachyexinus- C.triplex Zones: possibly Santonian to Turonian

1980-85ft.(cutts): A.distocarinatus Zone: Cenomanian: marginally marine (note heavy Eocene caving)

2020ft.(cutts)- 2104ft.(core): P.pannosus Zone: latest Albian: non-marine to brackish

2288ft.- 3169ft.(cores): upper C.paradoxa Zone: late Albian: non-marine to brackish at the top

3400-3675ft.(cores): lower C.paradoxa Zone: mid Albian: non-marine

3928-48ft.(core): C.striatus Zone: early Albian: non-marine

older zones not penetrated

II INTRODUCTION

The palynology of SEOS Beachport -1 was studied by Evans(1962) in a very brief report. The work of Dettmann (1963) provided the vital taxonomic and zonal framework for the basin, and Evans(1966) re-interpreted his observations and expressed them in a zonal framework.

The original slides are presumably housed at the B.M.R. in Canberra and the preparations are probably poor, considering when they were prepared. For this reason new samples were taken from the South Australian Department of Mines and Energy (SADME) for the present study.

The sixteen new samples (11 core, 5 cuttings) are reported herein. The palynomorph range data are presented in Appendix I. The zonation used is basically that of Dettmann and Douglas(1976), although some modifications have proved neccessary. The zonation of Helby et al (in prep.) has been useful in that regard.

III PALYNOSTRATIGRAPHY

A 1070-80ft.(cuttings): upper M.diversus Zone

Assignment to the upper part of the M.diversus Zone or younger is indicated by the baseranges of Proteacidites pachypolus and Myrtaceidites tenuis. Assignment to the Middle Eocene P.asperopolus Zone or older zones is indicated by the toprange of Myrtaceidites tenuis, Intratriporopollenites notabilis and Proteacidites grandis. The scarcity of P.pachypolus and the absence of Proteacidites asperopolus indicate that assignment to the upper M.diversus Zone is much more likely than assignment to the P.asperopolus Zone.

Marginally marine environments are indicated by the presence of scarce low diversity dinoflagellates (Apectodinium homomorph is the most common taxon) in the abundant and diverse spore pollen assemblage.

Evans(1966) did not study samples from this shallow in the well

B middle M.diversus to L.balmei Zones: not seen

These zones were not seen, although closer sampling of the available cuttings may permit recognition of some or all of them, if required.

C 1450-60ft.(cutts): T.longus to upper N. senectus Zones

This assemblage is abundant and diverse, but is dominated by Eocene taxa (80%) with an older assemblage (20%). As many species overlap, it is not possible to be certain which specimens are in place, and high precision is not possible. The older assemblage is considered to be "in place" and would be assigned somewhere in the T.longus to upper N.senectus interval. The presence of relatively frequent Tricolpites confessus and T.sabulosus indicate assignment to the T.longus or older zones. The presence of Gambierina rudata, Tricolpites sabulosus and Nothofagididtes senectus indicate assignment to the upper N.senectus or younger zones. The presence of consistent Lygistepollenites balmei suggests that the L.balmei zone may be present in the well, as the species is often otherwise rare. The presence of Stereisporites (Tripunctisporis) punctatus suggests assignment of this sample to the T.longus Zone, but S.punctatus may be caved from the Eocene above. The frequency of Nothofagidites spp. cannot be assessed due to the heavy Eocene caving.

In summary, the sample appears to be of Late Cretaceous age (T.longus to upper N.senectus Zones) but cannot be assigned with any more certainty. Study of more cuttings samples may clarify the uncertainty, if required.

Scarce dinoflagellates are present, but could be caved. The assemblage is probably non-marine.

Evans(1966) assigned samples below this point to the Tertiary. In view of the above data, I consider a Late Cretaceous age to be more accurate, and note the very heavy Eocene caving.

D 1840-50ft.: indeterminate: possibly T.pachyexinus -C.triplex Zones

This assemblage is extremely lean with Cretaceous and Tertiary taxa in about equal proportions. The presence of Clavifera triplex and Phyllocladidites mawsonii with Phimopollenitees pannosus weakly suggests that assignment to the Tricolporites pachyexinus - Clavifera triplex Zone interval (Santonian - Turonian) is likely. However, in view of the very lean assemblages and obvious caving, little confidence can be placed in this tentative assignment.

Evans(1966) assigned samples from this level to the Tertiary. In view of the data discussed above, I consider this section to be of Late Cretaceous age.

E 1980-85ft.: A.distocarinatus Zone

Assignment to the A.distocarinatus Zone of Cenomanian age is indicated by the topranges of Perotriletes majus and Tricolpites variabilis in this sample, and the absence of older indicators. Trilobosporites trioreticulosus also has its toprange in this sample, and is rare above this zone. A.distocarinatus is frequent and is consistent with the assignment. Dinoflagellates include frequent Cribroperidinium edwardsii, which is often a feature of the correlative Palaeohystrichophera infusorioides Microplankton Zone. Eocene caving is common, comprising 50% of the recorded assemblage.

Microplankton are rare and of low diversity, but indicate marginally marine environments.

Evans(1962 and 1966) examined cuttings from this interval and assigned them to "K2b", a unit equivalent to the upper C.paradoxa Zone herein. He thus did not see Phimopollenites pannosus which I have seen down to 2104ft. I thus dispute his assignment.

F 2020ft.(cutts)- 2104ft.(core): P.pannosus Zone

The zonal assignment is indicated at the top by the toprange of Coptospora paradoxa and at its base by the baserange of Phimopollenites pannosus in core at 2104ft. Notably, the toprange of Pilosisporites grandis coincides with that of C.paradoxa, as elsewhere in this project and in contrast with the data of Dettmann and Douglas (1976). Other tricolpate angiosperms occur with P.pannosus at 2020-25ft.(cutts), and Ephedripites sp. A has its toprange at the same point. Minor intra Albian reworking is suggested by the single specimen of Coptospora striata and Triassic taxa at 2020-25ft.(cutts) and by specimens of Cyclosporites hughesi and Dictyotosporites speciosus in the core at 2094-2104ft.

Non-marine to occasionally brackish environments are indicated by rare spiny acritarchs in the diverse spore-pollen assemblages.

Evans(1966) assigned this interval to his K2b unit (= upper C.paradoxa Zone) but failed to record P.pannosus which, although rare, is consistently present.

G 2288-3169ft.(cores): upper C.paradoxa Zone

The zonal assignment is indicated by the presence of Pilosisporites grandis without either younger or older indicators. P.grandis has its baserange at the zone base (core at 3159-69ft.). Minor Permian and Triassic reworking is seen in this interval.

Environments are generaly non-marine, but brackish at the top, as shown by the non-marine microplankton Botryococcus and Schizosporis below 2820ft., and spiny acritarchs (Micrhystridium) above 2705ft.

Evans(1966) assigned this interval to his K2b unit (= upper C.paradoxa Zone) and so is in total agreement with the present study.

H 3400-3675ft.: lower C.paradoxa Zone

The zonal assignment is indicated at the top by the topranges of Dictyotosporites speciosus and Coptospora striata at 3400-10 ft.(core) and at the base by the baserange of Coptospora paradoxa at 3665-75ft.(core). The toprange of Pilosisporites notensis at 3665-75ft.(core) is consistent with the assignment.

Non-marine environments are indicated by the lack of spiny acritarchs, and presence of only rare algal acritarchs with the diverse and common spores and pollen.

Evans(1966) assigned this interval partly to his K2b (= upper C.paradoxa Zone) unit and partly to his K2a (= lower C.paradoxa Zone) unit. The difference is minor.

I 3938-48ft.(core): C.striatus Zone

The zonal assignment is indicated by the baserange of Crybelosporites striatus in this sample, and the absence of younger indicators. The coincident baserange of Balmeisporites holodictyus is consistent.

Non-marine environments are indicated by the presence of only very rare non-spiny algal acritarchs with the abundant and diverse spores and pollen.

Evans(1966) assigned this core to his K1d unit (= C.striatus Zone) and so is in total agreement with the present study.

J C.hughesi and C.stylosus Zones: not seen

These zones were not seen, and the well therefore bottomed in the early Albian and did not drill any older section that may exist at this location.

IV CONCLUSIONS

A Geological

1. The oldest section penetrated is of early Albian age, and so a substantial part of the potential section was not drilled. The Pretty Hill Formation and its equivalents were certainly not drilled.

2. The drilled section comprises a normal sequence, with a thick Albian (non-marine at the base, brackish at the top) a thin non-marine to marginal marine latest Albian to late Cretaceous, and a thin early Tertiary. Resolution in the late Cretaceous is poor, due to the broadly spaced cuttings studied. The lithologies suggest that better resolution would be possible by taking more closely spaced samples, if required.

3. The intra-Albian unconformity lies at 3820ft., where the change in s-p character occurs.

B Palynological

1. Data from this well indicate that P.grandis and P.pannosus have significant range overlap, contrary to previous work. The toprange of P.grandis so far appears to coincide with that of C.paradoxa, and it may prove to be a useful secondary marker for the top of the P.pannosus Zone in the future.

2. Ephedripites sp A so far appears to be restricted to the upper C.paradoxa Zone, although it may extend into the lower C.paradoxa Zone. It may have potential as a secondary marker for the top of the upper C.paradoxa Zone.

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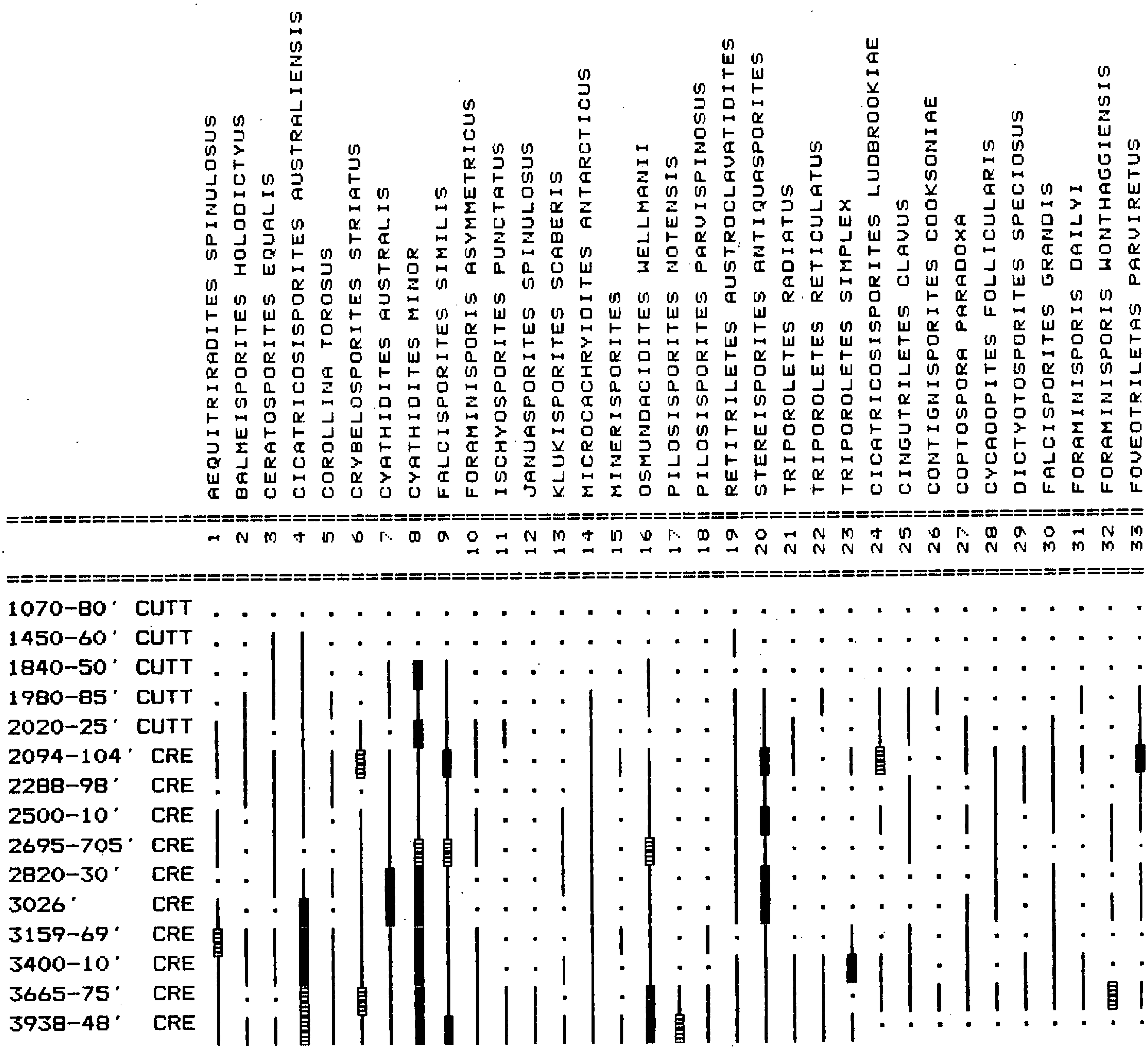
BEACHPORT #1 S/P

CHECKLIST OF GRAPHIC ABUNDANCE BY LOWEST APPEARANCE

= Abundant
= Common
= Few
= Rare
= Very Rare
? = Questionably Present
. = Not Present



		RETITRILETES EMINULUS	ANNULISPORITES FOLLICOLOSA	ARAUCARIACITES AUSTRALIS	BIRETRISPORITES SP.	CICATRICOSISPORITES CUNEIFORMIS	COPTOSPORA STRIATA	GLEICHENIIDITES	TRILOBOSPORITES TRIBOTRYS	AEQUITRIRADITES SP.	CICATRICOSISPORITES HUGHESI	CONCAVISSIMISPORITES PENOLAENSIS	COOKSONITES VARIABILIS	PEROTRILETES MAJUS	PILOSISPORITES GRANDIS	TRILOBOSPORITES TRIORETICULOSUS	LEPTOLEPIDITES MAJOR	FOVEOSPORITES MORTONENSIS	NEORAISTRICKIA TRUNCATA	VITREISPORITES PALLIDUS	LEPTOLEPIDITES VERRUCATUS	RETITRILETES SEMIMURUS	CALLIALASPORITES DAMPIERI	DENSOISPORITES VELATUS	CYCLOSPORITES HUGHESI	DICTYOTOSPORITES COMPLEX	EPHEDRIPITES SP.A	APPENDICISPORITES DISTOCARINATUS	COUPERISPORITES TABULATUS	LYCOPODIACIDITES ASPERATUS	PEROTRILETES JUBATUS	PHIMOPOLLENITES PANNOSUS	ROGALSKISPORITES CICATRICOSUS	RETITRILETES CIRCOLUMENUS
		34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66
1070-80'	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	|	.	.	.	.	.	.	.	.	.
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2020-25'	CUTT	|	|	|	.	.	|	|	.	|	|	.	.	|	|	|	|	.	.	|	|	.	.	.	.	.	|	.	.	.	.	|	.	|
2094-104'	CRE	.	|	.	.	|	.	.	|	|	|	.	.	|	.	|	|	|	|	|	|	.	.	|	|	|	.	|	|	|	|	|	|	.
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2695-705'	CRE	.	|	.	.	.	.	.	.	.	.	.	.	.	|	.	|	|	|	.	|	|	.	.	.	.	.	.	.	.	.	.	.	.
2820-30'	CRE	.	|	.	.	.	.	.	.	.	.	.	.	|	.	.	|	|	|	|	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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3159-69'	CRE	.	.	.	.	.	.	|	.	|	|	|	|	|	|	|	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
3400-10'	CRE	.	|	|	|	|	|	|	|	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
3665-75'	CRE	|	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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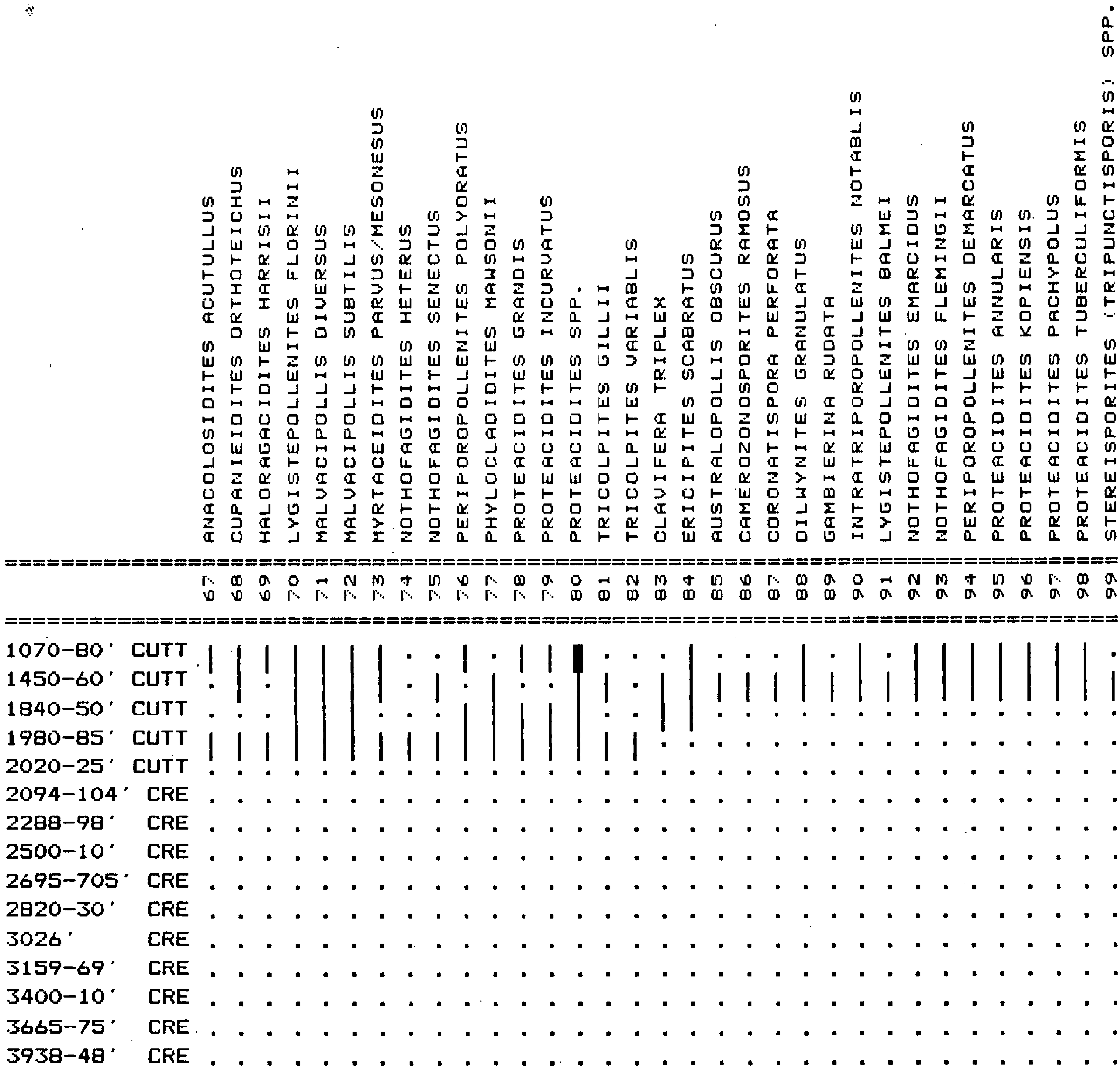

ANACOLOSIDITES ACUTULLUS
CUPANIEIDITES ORTHOTEICHUS
HALORAGACIDITES HARRISII
LYGISTEPOLLENITES FLORINII
MALVACIPOLLIS DIVERSUS
MALVACIPOLLIS SUBTILIS
MYRTACEIDITES PARVUS/MESONESUS
NOTHOFAGIDITES HETERUS
NOTHOFAGIDITES SENECTUS
PERIPOROPOLLENITES POLYORATUS
PHYLOCLADIDITES MAWSONII
PROTEACIDITES GRANDIS
PROTEACIDITES INCURVATUS
PROTEACIDITES SPP.
TRICOLPITES GILLII
TRICOLPITES VARIABLIS
CLAVIFERA TRIPLEX
ERICIPITES SCABRATUS
AUSTRALOPOLLIS OBSCURUS
CAMEROZONOSPORITES RAMOSUS
CORONATISPORA PERFORATA
DILWYNITES GRANULATUS
GAMBIERINA RUDATA
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LYGISTEPOLLENITES BALMEI
NOTHOFAGIDITES EMARCIDUS
NOTHOFAGIDITES FLEMINGII
PERIPOROPOLLENITES DEMARCATUS
PROTEACIDITES ANNULARIS
PROTEACIDITES KOPIENSIS
PROTEACIDITES PACHYPOLUS
PROTEACIDITES TUBERCULIFORMIS
STEREISPORITES (TRIPUNCTISPORIS) SPP.
67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99
1070-80' CUTT
1450-60' CUTT
1840-50' CUTT
1980-85' CUTT
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2820-30' CRE
3026' CRE
3159-69' CRE
3400-10' CRE
3665-75' CRE
3938-48' CRE

		100 TRICOLPITES CONFESSUS	101 TRICOLPITES LONGUS	102 TRICOLPITES PHILLIPSII	103 TRICOLPITES SABULOSUS	104 TRIPOROPOLLENITES AMBIGUUS	105 VERRUCOSISPORITES KOPUKUENSIS	106 BEAUPREAIDITES VERRUCOSUS	107 MYRTACEIDITES TENUIS	108 POLYCOLPITES ESOBALTEUS	109 PROTEACIDITES LEIGHTONII
1070-80'	CUTT	.	.	.	.	.	|	|	|	|	|
1450-60'	CUTT	|	??	|	|	|	|	.	.	.	.
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2695-705'	CRE	.	.	.	.	.	.	.	.	.	.
2820-30'	CRE	.	.	.	.	.	.	.	.	.	.
3026'	CRE	.	.	.	.	.	.	.	.	.	.
3159-69'	CRE	.	.	.	.	.	.	.	.	.	.
3400-10'	CRE	.	.	.	.	.	.	.	.	.	.
3665-75'	CRE	.	.	.	.	.	.	.	.	.	.
3938-48'	CRE	.	.	.	.	.	.	.	.	.	.

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15	MINERISPORITES
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BEACHPORT #1 DINOS

CHECKLIST OF GRAPHIC ABUNDANCE BY LOWEST APPEARANCE

= Abundant
= Common
= Few
= Rare
= Very Rare

? = Questionably Present
. = Not Present