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PE990008

PALYNOLOGY OF TWO FOLLOWUP SWCS FROM BHPP ERIC THE RED-1

OTWAY BASIN, AUSTRALIA

BY

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for BHPP

May 1994

I SUMMARY

1455.0m(swc) - 1520.0m(swc) : *distocarinatus* Zone (*infusorioides* Dino Zone at 1520m) :
Cenomanian : marginally marine (<1% dinos and 4% dinos respectively).

II INTRODUCTION

These two swc samples were submitted by Simon Horan to clarify ambiguous cuttings based data. Appendix I comprises full quantitative data for the well including the present and all previous work. Zonation and maturity frameworks are as described in Morgan and Hooker 1993.



III PALYNOSTRATIGRAPHY

Assignment to the *Appendicisporites distocarinatus* Zone of Cenomanian age is indicated by the presence of *A. distocarinatus* without younger or older markers. Common are *Cyathidites minor*, *Dilwynites granulatus*, *Falcisporites similis*, *Gleicheniidites circinidites* and *Microcachyidites antarcticus*. Frequent are *Laevigatosporites ovatus* and *Podosporites microsaccatus*. Rare but significant are *A. distocarinatus*, *Phyllocladidites eunuchus*, *Trilobosporites trioreticulatus* and *Triporoletes reticulatus*.

Dinoflagellates are very rare and include *Cribroperidinium edwardsii* at 1520m, indicating the *Palaeohystrichophora infusorioides* Dinoflagellate Zone. *Heterosphaeridium* and *Botryococcus* continue to be the most consistent microplankton.

Environments are marginally marine, as shown by very rare dinoflagellates (<1% and 4% downhole) and their very low diversity. Significant lacustrine influence is indicated by freshwater algae (2% and 3% *Botryococcus* downhole). Spores and pollen are abundant and diverse.

Light brown spore colours indicate marginal maturity for oil but immaturity for gas/condensate.

IV REFERENCES

Morgan RP and Hooker NP (1993) Final palynology of BHPP Eric the Red-1, offshore Otway Basin, Victoria, Australia (unpubl. rept. to BHPP).

WELL NAME: ERIC THE RED-1

TOTAL DEPTH: _____

AGE	PALYNOLOGICAL ZONES	HIGHEST DATA				LOWEST DATA			
		Preferred Depth	Rtg	Alternate Depth	Rtg	Preferred Depth	Rtg	Alternate Depth	Rtg
NEOGENE	Plei	T. pleistocenicus							
	Plio	M. lipsus							
	Mio	C. bifurcatus							
		T. bellus							
	Olig	P. tuberculatus							
PALEOGENE	C.Ed	upper N. asperus							
		mid N. asperus δ/\star	374	0		388	0		
	Mid	lower N. asperus							
		P. asperopolus							
	Earl	upper M. diversus δ	467	2		467	0		
		mid M. diversus							
		lower M. diversus							
	Pale	upper L. balmei							
		lower L. balmei							
LATE CRETACEOUS	Maas	upper T. longus $\delta - \delta$	553	0					
		lower T. longus				599	0		
	Camp	T. lillei							
		N. senectus \star/δ	665	2		813	0		
	Sant	up T. apoxyxinus δ	876	2		970	2		
		mid T. apoxyxinus δ	1010	1		1025	5		
	Con	low T. apoxyxinus δ	1080	3		1080	4		
Tur	P. mawsonii δ/δ	1097	?	1220	1	1437	0		
	A. distocarinatus δ/\star	1455	2			1719	0		
EARLY CRETACEOUS	Alb	P. pannosus							
		upper C. paradoxa							
		lower C. paradoxa							
	Act	C. striatus							
		upper C. hughesi							
	L.Ne	lower C. hughesi							
		F. wonthaggiensis							
E.Ne	up C. australiensis								

Environments :

- 0 lacustrine (algal acritarchs).
- δ non-marine (no or very few 5% algal acritarchs).
- \star brackish (spiny acritarch, no or very few dinoflagellates 1%).
- \star/δ marginal marine (1-5% very low diversity dinoflagellates).
- δ nearshore marine (6-30% low to medium diversity dinoflagellates).
- δ/δ intermediate marine (31-60% medium diversity dinoflagellates).
- δ/δ offshore marine (61%-80% medium to high diversity dinoflagellates).
- δ far offshore marine/oceanic (81%-100% high diversity dinoflagellates and/or planktonic forams).

Confidence Ratings :

- 0 : good to excellent with numerous zone fossils in core/swc.
- 1 : fair with rare zone fossils in core/swc.
- 2 : poor with non-diagnostic assemblage in core/swc. Often occurs next to a distinctive 0 to 1 rating, lacking the zone fossil seen adjacent.
- 3 : good with extinction event (top range) in cuttings.
- 4 : poor to fair with inception event (base range) in cuttings and therefore may be picked too low if caved or too high if swamped by cavings.
- 5 : poor with non-diagnostic assemblage in cuttings. Usually seen adjacent to a higher rating and picked on the absence of key zone fossil.
- ? : no confidence. Picked as a best guess in very poor data.

Data recorded by : Roger Morgan and Nigel Hooker June 93

Data revised by : Roger Morgan May 94

26th May, 1994

NOTE TO: FILE
FROM: SIMON HORAN
OUR REF: sth.012:tt
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PALYNOLOGICAL SAMPLES PROCESSING AND SAMPLE EXAMINATION METHODOLOGY

Following discussion with Roger Morgan, the sample processing techniques and sample examination methodology used in palynological studies of the Fergusons Hill-1, Ross Creek-1, Mussel-1, Pecten-1A, Triton-1ST, La Bella-1, Eric the Red-1, Minerva-1, Minerva-2A and Loch Ard-1 is listed below.

Sample processing usually involves the following steps. Extra techniques are only used if required:

- a) digest about 10gm of crushed rock in 50% HF overnight
- b) wash out several times over 10 micron polyester sieve. Acidify with conc HCl if fluorosilicate gel forms
- c) heavy liquid separation used concentrate $ZnBr_2$ with SG of 2.0
- d) wash out float fraction over 10 micron polyester sieve. Acidify if $Zn(OH)_2$ precipitate forms
- e) mount a sieved kerogen slide
- f) oxidise in Schutze Solution (conc 30% HNO_3 with crystalline $KClO_3$)
- g) wash out over 10 micron polyester sieve
- h) add 5% KOH to dissolve humic acids
- i) wash out over 10 micron polyester sieve
- j) examine under microscope for satisfactory oxidation. Repeat steps (f) to (g) if required
- k) heavy liquid separation using $ZnBr_2$ solution (SG of 20.)
- l) wash out float fraction using polyester sieve. Acidify if $Zn(OH)_2$ precipitate forms
- m) dehydrate onto coverslip
- n) mount microscope slides using Eukitt medium

Sample examination usually involved the following steps:

- a) scan two traverses at a x10 to log the bulk of the assemblage and get some idea of age
- b) scan at x40 and count the first 100 specimens to get percentage contents for each species. From this, saline "Microplankton Content" (%) can be developed to provide an index of marine influence. Where the sample is too lean to provide 100 specimens, frequency is estimated from the specimens

26th May, 1994

- seen with A = abundant, C = common, F = frequent, R = rare
- c) return to x10 to scan at least two large coverslips to log rare species, and finalise age conclusions. Log more slides if required
 - d) develop "Salines Microplankton Diversity" by counting up total species identified of dinoflagellates plus spiny acritarchs, as a second index of marine influence. This count includes species seen both inside and outside the court
 - e) develop "Freshwater Microplankton Content" by totaling all freshwater algal elements (*Botryococcus*, *Schizosporis*, *Paralecaneella*, *Leiosphaeridia*, *Nummus*)
 - f) examine sieved kerogen slide for specimens of *Cyathidites* to establish spore colour for Spore colour Maturity Index

ERIC THE RED #1

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C L I E N T: BHP Petroleum Exploration

W E L L: Eric the Red

F I E L D / A R E A: Otway Basin

A N A L Y S T: Roger Morgan

D A T E : March '93

N O T E S: all sample depths are in metres

RW = reworked * = caved CF = comparable to

? = questionable identification X = present outside count

figures are percentages based on 100 specimen count

RANGE CHART OF OCCURRENCES BY LOWEST APPEARANCE (by groups)

0373.5 SMC
0388.0 SMC
0429.0 SMC
0467.0 SMC
0553.5 SMC
0562.0 SMC
0569.0 SMC
0599.0 SMC
0612.5 SMC
0642.0 SMC
0664.5 SMC
0689.5 SMC
0720.5 SMC
0746.0 SMC
0812.5 SMC
0876.0 SMC
0893.5 SMC
0970.0 SMC
1010.0 SMC
1025 CUTTS
1080 CUTTS
1097.0 SMC
1151.0 SMC
1177.0 SMC
1180 CUTTS
1219.5 SMC
1250.5 SMC
1275.0 SMC
1306 CUTTS
1316.0 SMC
1328.5 SMC
1334.0 SMC
1336.0 SMC
1364.5 SMC
1437.0 SMC
1452 CUTTS
1455.0 SMC
1515 CUTTS
1520.0 SMC
1575.0 SMC
1602.0 SMC
1630.0 SMC
1667.0 SMC
1678.0 SMC
1703 CUTTS
1719.0 SMC
1749.5 SMC
1754.5 SMC
1790.0 SMC
1813.5 SMC

66 CANNINGIOPSIS BRETONENSIS
67 ISABELIDIINIUM KOROJONENSE
68 ISABELIDIINIUM PELLUCIDUM
69 AREOLIGERA SEMOHENSIS
70 AREOLIGERA CORONATA
71 CERATIOPSIS SPECIOSUS
72 CORDOSPHAERIDIUM SP
73 MANUMIELLA CORONATA
74 CORDOSPHAERIDIUM INODES
75 DYPHES COLLIFERUM
76 OPERCULODINIUM CENTROCARPUM
77 APECTODINIUM HOMOMORPHA (SH. SP)
78 AREOSPHAERIDIUM ARCUATUM
79 AREOSPHAERIDIUM AUSTRALICUM
80 DEFLANDREA PHOSPHORITICA
81 HYSTRICHOSPHAERIDIUM TUBIFERUM
82 HILLIODOIDIINIUM TENUITABULATUS
83 VOZZMENNIKOVIA EXTENSA
84 CEREBROCYSTA SP
85 DEFLANDREA TRUNCATA
86 OPERCULODINIUM
87 PHTHAMOPERIDIINIUM COMATUM
88 SYSTEMATOPHORA PLACACANTHA
89 ARAUCARIACITES AUSTRALIS
90 CALLIALASPORITES TURBATUS
91 CERATOSPORITES EQUALIS
92 COROLLINA TOROSUS
93 CYATHIDITES AUSTRALIS
94 CYATHIDITES MINOR
95 FALCISPORITES GRANDIS
96 FALCISPORITES SIMILIS
97 FORAMINISPORIS DAILYI
98 GLEICHENIIDITES
99 MICROCACHRYDITES ANTARCTICUS
100 OSUNDACIIDITES MELLHANI
101 RETITRILETES AUSTRORAUATIDITES
102 CALLIALASPORITES DANPIERI
103 CONTIGNISPORITES COOKSONIAE
104 LEPTOLEPIDITES MAJOR
105 PODOSPORITES MICROSACCATUS
106 STERIESPORITES ANTIQUASPORITES
107 ARAUCARIACITES FISSUS
108 CICATRICOSISPORITES LUDBROOKIAE
109 COUPERISPORITES TABULATUS
110 CRYBELOSPORITES STRIATUS
111 CYCADDITES FOLLICULARIS
112 DICTYOPHYLLIDITES
113 DICTYOTOSPORITES COMPLEX
114 DILUVNITES GRANULATUS
115 LEPTOLEPIDITES VERRUCATUS
116 RETITRILETES NODOSUS
117 AEQUITRIRADITES SPINULOSUS
118 AEQUITRIRADITES TILCHAENESIS
119 CICATRICOSISPORITES AUSTRALIENSIS
120 CYCLOSPORITES HUGHESI
121 DICTYOTOSPORITES SPECIOSUS
122 FORAMINISPORIS ASYMMETRICUS
123 FOVEDTRILETES PARVIRETUS
124 ISCHYOSPORITES PUNCTATUS
125 NEVESISPORITES VALLATUS
126 PERINOPOLLENITES ELATOIDES
127 POLYCYNGULATISPORITES CREMULATUS
128 RETITRILETES CIRCOLUMENUS
129 TRIPOROLES RADIATUS
130 APPENDICISPORITES DISTOCARINATUS

0773.5 SMC	191	PEROTRILETES MAJUS
0788.0 SMC	192	ERICIPITES SCABRATUS
0429.0 SMC	193	GAMBIERINA RUDATA
0167.0 SMC	194	LILIACIDITES PERORETICULATUS
0553.5 SMC	195	MUROSPORA FLORIDA
0562.0 SMC	196	POLYPOROPOLLENITES POLYORATUS
0569.0 SMC	197	TRICOLPITES SABULOSUS
0599.0 SMC	198	TRICOLPITES VARIUERRUCATUS
0612.5 SMC	199	NOTHOFAGIDITES SEMECTUS
0642.0 SMC	200	TRICOLPITES CONFESSUS
0664.5 SMC	201	NOTHOFAGIDITES ENDURUS
0689.5 SMC	202	PROTEACIDITES PALISADUS
0720.5 SMC	203	PEROTRILETES LINEARIS
0746.0 SMC	204	PHYLLOCLADIDITES VERRUCATUS
0812.5 SMC	205	NEORAISTRICKIA
0826.0 SMC	206	TETRACOLPORITES VERRUCOSUS
0893.5 SMC	207	TRICOLPITES LONGUS
0970.0 SMC	208	TRICOLPORITES APOYENINUS
1010.0 SMC	209	TRICOLPORITES LILLIEI
1025.0 SMC	210	TRIPOROPOLLENITES SECTILIS
1097.0 SMC	211	GEPHROPOLLENITES HAMODENSIS
1151.0 SMC	212	LYGISTIPOLLENITES BALHEI
1171.0 SMC	213	PERIPOROPOLLENITES POLYORATUS
1187.0 SMC	214	STERIESPORITES REGIUM
1219.5 SMC	215	TETRACOLPORITES RETICULATUS
1229.5 SMC	216	TRICOLPITES DEYTHANNIAE
1250.5 SMC	217	TRICOLPITES MAIPANAENSIS
1273.0 SMC	218	CAMERAZONOSPORITES SP
1306.0 SMC	219	NERKOSPORITES ELLIOTTII
1316.0 SMC	220	NOTHOFAGIDITES BRACHYSPINULOSUS
1328.5 SMC	221	PILOSISPORITES GRANDIS
1334.0 SMC	222	PROTEACIDITES GRANDIS
1336.0 SMC	223	PROTEACIDITES RETICULOCONGAVUS
1364.5 SMC	224	TRIPOROPOLLENITES AMBIGUUS
1437.0 SMC	225	TRIPUNCTISPORIS PUNCTATUS
1452.0 SMC	226	ANACLOSIDITES ACUTULLUS
1455.0 SMC	227	CYATHIDITES SPP
1515.0 SMC	228	DILMYNITES TUBERCULATUS
1520.0 SMC	229	HALDRAGACIDITES HARRISII
1575.0 SMC	230	INTRATRIPOROPOLLENITES NOTABILIS
1602.0 SMC	231	HALVACIPOLLIS SUBTILIS
1630.0 SMC	232	NOTHOFAGIDITES EMARCIDUS
1667.0 SMC	233	NOTHOFAGIDITES FLEMINGII
1678.0 SMC	234	PERIPOROPOLLENITES DEMARCATUS
1703.0 SMC	235	PROTEACIDITES ASPEROPOLUS
1719.0 SMC	236	PROTEACIDITES OBESOLABRUS
1749.5 SMC	237	PROTEACIDITES PACHYPOLUS
1754.5 SMC	238	PROTEACIDITES SCABRATUS
1790.0 SMC	239	PROTEACIDITES TUBERCULIFORMIS
1813.5 SMC	240	TRICOLPORITES ESTOUTUS
	241	VERRUCOSISPORITES KOPUKUENSIS
	242	MYRTACEIDITES PARVUS
	243	NOTHOFAGIDITES DEMINUTUS
	244	POLYCOLPITES ESOBALTEUS
	245	PROTEACIDITES ANNULARIS
	246	PROTEACIDITES LEIGHTONII
	247	BEAUPREADITES VERRUCOSUS
	248	CAMERAZONOSPORITES LATROBENSIS
	249	HALVACIPOLLIS LARGE
	250	TRIORITES MAGNIFICUS
	251	DIPORITES SP.
	252	KUYLISPORITES WATERBOLKII
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151	CICATRICOSISPORITES HUGHESI	115	LEPTOLEPIDITES VERRUCATUS	215	TETRACOLPORITES RETICULATUS
108	CICATRICOSISPORITES LUDBROOKIAE	168	LILIACIDITES KAITANGATAENSIS	206	TETRACOLPORITES VERRUCOSUS
170	CICATRICOSISPORITES RADIATUS	194	LILIACIDITES PERORETICULATUS	62	TRICHODINIUM
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156	CORONATISPOA PERFORATA	61	NELSONIELLA TUBERCULATA	129	TRIPOROLETES RADIATUS
109	COUPERISPORITES TABULATUS	205	NEORAISTRICKIA	149	TRIPOROLETES RETICULATUS
3	CRIBROPERIDINIUM EDWARDSII	125	NEVESISPORITES VALLATUS	150	TRIPOROLETES SIMPLEX
16	CRIBROPERIDINIUM sp	220	NOTHOFAGIDITES BRACHYSPINULOSUS	226	TRIPOROPOLLENITES AMBIGUUS
144	CRYBELOSPORES MAGNIFICA	245	NOTHOFAGIDITES DENINUTUS	210	TRIPOROPOLLENITES SECTILIS
145	CRYBELOSPORES MEGASTRIATUS	234	NOTHOFAGIDITES EMARCIDUS	227	TRIPUNCTISPORIS PUNCTATUS
110	CRYBELOSPORES STRIATUS	201	NOTHOFAGIDITES ENDURUS	12	TRITHYRODINIUM FINE GRANULES
179	CYATHEACIDITES TECTIFERA	255	NOTHOFAGIDITES FALCATA	34	TRITHYRODINIUM MARSHALLII
93	CYATHIDITES AUSTRALIS	235	NOTHOFAGIDITES FLEMINGII	45	TRITHYRODINIUM PUNCTATE
94	CYATHIDITES MINOR	199	NOTHOFAGIDITES SENECTUS	46	TRITHYRODINIUM SUSPECTUM
229	CYATHIDITES SPP	265	NUMMUS MONOCULATUS	47	TRITHYRODINIUM THICK PSILATE
111	CYCADOPITES FOLLICULARIS	264	NUMMUS SP	48	TRITHYRODINIUM THICK RETICULATUS
26	CYCLONEPHELIUM COMPACTUM	43	ODONTOCHITINA COSTATA	243	VERRUCOSISPORITES KOPUKUENSIS
120	CYCLOSPORES HUGHESI	44	ODONTOCHITINA CRIBROPODA	2	VERYHACHIUM
80	DEFLANDREA PHOSPHORITICA	10	ODONTOCHITINA OPERCULATA	161	VITRESISPORITES PALLIDUS
85	DEFLANDREA TRUNCATA	51	ODONTOCHITINA FORIFERA	83	VOZZHENNIKOVIA EXTENSA
146	DENSOISPORITES VELATUS	55	ODONTOCHITINA STUBBY	63	XENIKOON AUSTRALIS
112	DICTYOPHYLLIDITES	4	OLIGOSPHAERIDIUM COMPLEX		
113	DICTYOTOSPORITES COMPLEX	19	OLIGOSPHAERIDIUM PULCHERRIMUM		
121	DICTYOTOSPORITES SPECIOSUS	65	OLIGOSPHAERIDIUM SP		
114	DILWYNITES GRANULATUS	86	OPERCULODINIUM		
230	DILWYNITES TUBERCULATUS	76	OPERCULODINIUM CENTROCARPUM		
253	DIPORITES SP.	180	ORNAMENTIFERA SENTOSA		
		100	OSMUNDACIDITES WELLMANII		
		11	PALAEOPERIDINIUM CRETACEUM		
		266	PARALECANIELLA		
		126	PERINOPOLLENITES ELATOIDES		
		236	PERIPOROPOLLENITES DEMARCATUS		
		213	PERIPOROPOLLENITES POLYORATUS		
		148	PEROTRILETES JUBATUS/MORGANII		
		203	PEROTRILETES LINEARIS		
		191	PEROTRILETES MAJUS		
		176	PEROTRILETES SP		
		182	PHIMOPOLLENITES PANNOSUS		