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UPDATED PALYNOLOGY OF BUS SWAMP #1,

OTWAY BASIN, VICTORIA, AUSTRALIA

BY

ROGER MORGAN

for VICTORIAN GEOLOGICAL SURVEY

August 1993

REF:W.OTW.RPUPPSWMP

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I SUMMARY

Seventeen samples were studied (two repeated) and yielded the following results

215m(cutts), 300.0m(swc) : lower *paradoxa* Zone : mid Albian : non-marine but with significant lacustrine influence : immature for hydrocarbons : usually Middle Eumeralla Formation in the sense of Kopsen and Scholefield

465.0m(swc) : very lean apparently *striatus* Zone without the key marker and with significant Triassic reworking : early Albian : slightly brackish : immature for hydrocarbons : usually upper part of thre lower Eumeralla Formation in the sense of Kopsen and Scholefield

756.0m(swc), 862.0m(swc) : lower *hughesi* Zone : early Aptian : non-marine : marginally mature for oil, but immature for gas/condensate : usually basal Eumeralla Formation

870m(cutts), 886.0m(swc) : apparently lower *hughesi* Zone but in cuttings : early Aptian : non-marine marginally mature for oil, but immature for gas/condensate : usually basal Eumeralla Formation

1190.0m(swc), 1325.0m(swc), 1560.0m(swc), 1640.0m(swc), 1730.0m(swc), 1765m(cutts) : lower *wonthaggiensis* Zone : late Neocomian : non-marine with some lacustrine influence at 1325 and 1640m : marginally mature for oil but immature for gas/condensate : usually Crayfish Formation including lower Laira Shale and upper Pretty Hill Sandstone. The absence of the upper *australiensis* Zone at the base suggests an incomplete section. The absence of the upper *wonthaggiensis* Zone at the top suggests significant erosional truncation of the topmost Crayfish Group including the Katnook Sandstone and upper Laira Shale equivalents

1787.0m(core) : lower *australiensis* to *watherooensis* Zones : early Neocomian to ?late Jurassic : non-marine : usually lower Pretty Hill Sandstone and Casterton Beds

1840.0m : extremely lean and indeterminate : very rare fossils are not significantly darker than those overlying and are attributed to minor mud contamination.

II INTRODUCTION

Cliff Menhennitt of the Victorian Geological Survey submitted 10 swcs from Bus Swamp #1 for palynological analysis initially. Later, Greg Parker submitted a further seven samples including repeats of 886.0m and 1840.0m.

Palynomorph occurrence data are shown as Appendix I and form the basis for the assignment of the samples to five spore-pollen units of Neocomian and Albian age. The Cretaceous spore-pollen zonation is essentially that of Dettmann and Playford (1969), but has been significantly modified and improved by various authors since, and most recently discussed in Helby et al (1987), as shown on Figure 1 and modified by Morgan (1985) for application in the Otway Basin.

Maturity data was generated in the form of Spore Colour Index, and is plotted on Figure 2 Maturity Profile of Bus Swamp #1. The oil and gas windows on Figure 2 follow the general consensus of geochemical literature. The oil window corresponds to spore colours of light-mid brown (Staplin Spore Colour Index of 2.7) to dark brown (3.6). These correspond to vitrinite reflectance values of 0.6% to 1.3%. Geochemists argue variations on kerogen type, basin type and basin history. The maturity interpretation is thus open to reinterpretation using the basic colour observations as raw data. However, the range of interpretation philosophies is not great, and probably would not move the oil window by more than 200 metres.

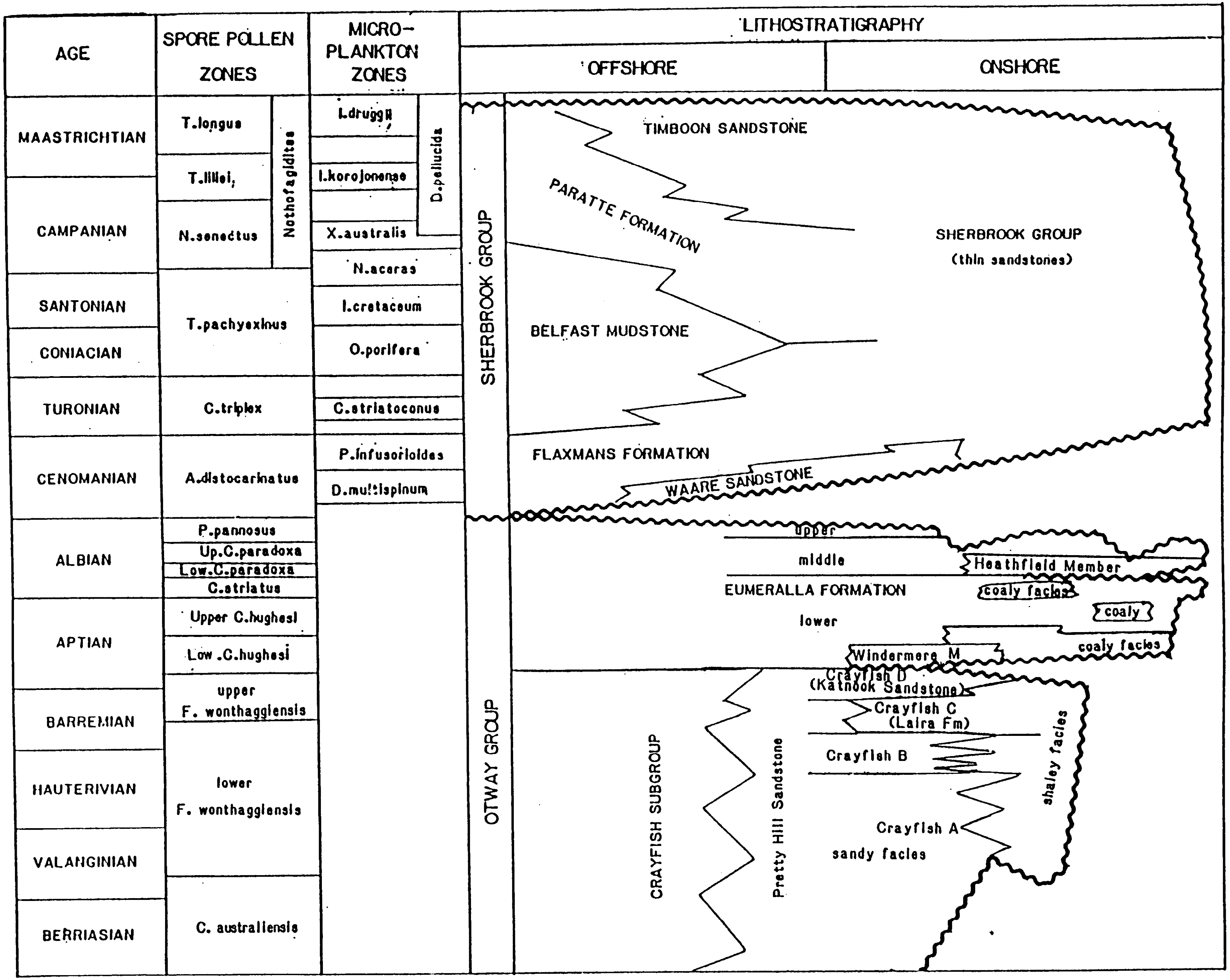

FIGURE 1. CRETACEOUS REGIONAL FRAMEWORK, OTWAY BASIN

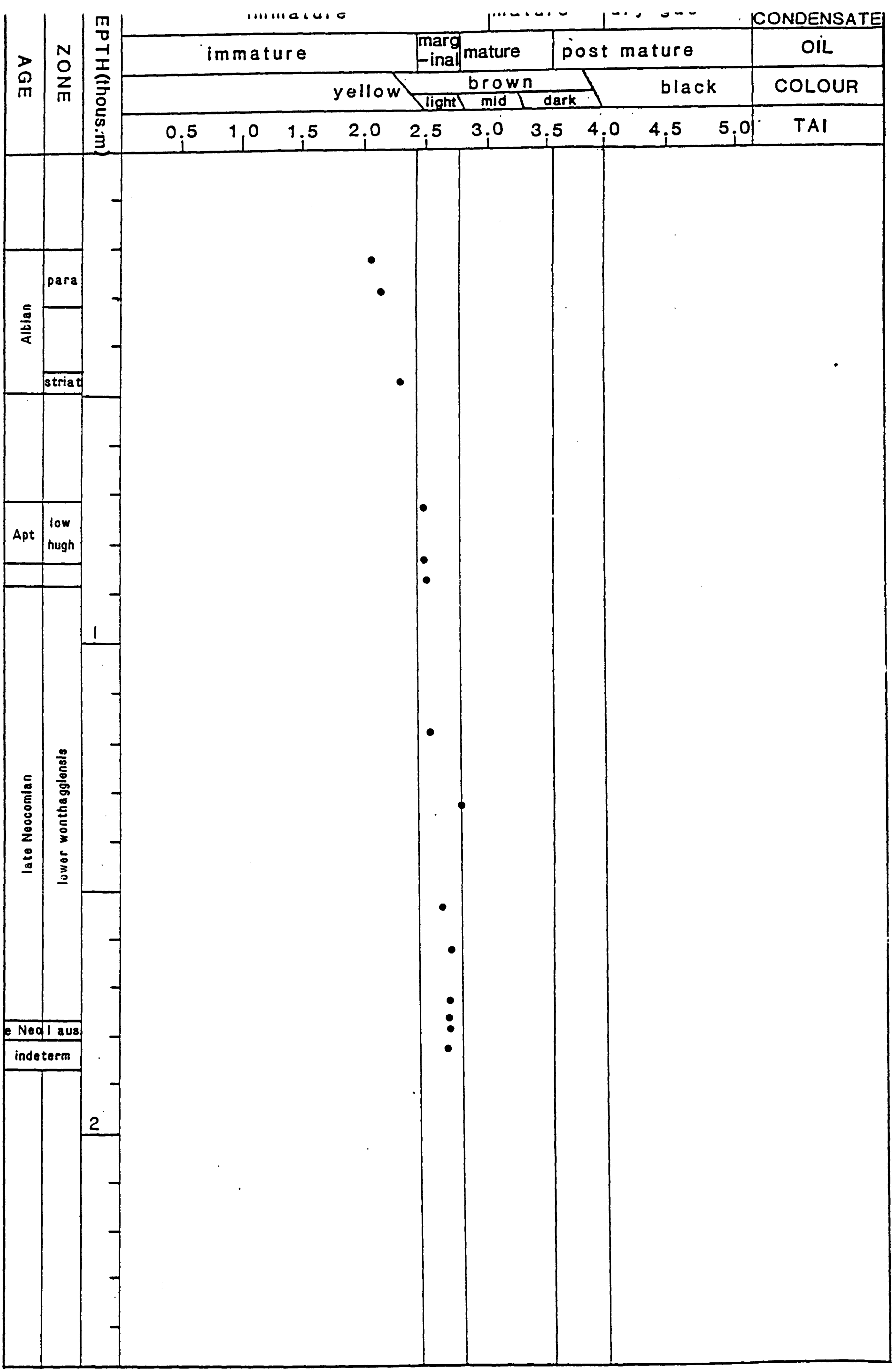

FIGURE 2 MATURITY PRROFILE : BUS SWAMP

III PALYNOSTRATIGRAPHY

A 215m(cutts), 300.0m(swc) : lower *paradoxa* Zone

Assignment of the lower *Coptospora paradoxa* Zone of mid Albian age is indicated at the top by youngest *Dictyotosporites speciosus* and *Coptospora striata* and at the base by oldest *C. paradoxa*. The assemblage at 300.0m was very lean due to small sample size. At 215m, *Pilosisporites grandis* occurs, suggesting the upper *paradoxa* Zone, but must be caved, given the other data. Common taxa are *Falcisporites similis*, *Osmundacidites wellmanii* and *Cyathidites minor* with frequent taxa being *Microcachyidites antarcticus* and *Cyathidites australis*. Rare Triassic reworking was seen.

Non-marine environments are indicated by the dominant and diverse spore-pollen and absence of saline indicators. The freshwater algae *Botryococcus* comprises 1% of the assemblage at 215m and 5% at 300m and suggests significant lacustrine influence.

Yellow spore colours indicate immaturity for hydrocarbon generation.

These features are normally seen in the Middle Eumeralla Formation in the sense of Kopsen and Scholefield 1990.

B 465.0m(swc) : apparently *striatus* Zone

This assemblage is also very lean with abundant cuticle and significant Triassic (6%) and Permian (1%) reworking. Assignment to the *Crybelosporites striatus* Zone of early Albian age is most likely on oldest consistent *Foraminisporis asymmetricus* without *Cyclosporites hughesi*. Normally, *C. striatus* is seen at this level, but its absence from this sample may be due to the small yield and so few spore-pollen seen. The *striatus* Zone is most likely but cannot be proven beyond doubt. Common taxa are *F. similis* and *O. wellmanii* with *Cyathidites* spp frequent. The Triassic reworking is remarkable and suggests proximity to an erosional unconformity.

Slightly brackish environments are indicated by the extremely rare spiny acritarchs (*Veryhachium* sp) amongst the dominant and diverse spore/pollen. Lacustrine influence is very minor.

Yellow spore colours indicate immaturity for hydrocarbon generation.

These features are normally seen in the upper part of the Lower Eumeralla Formation of Kopsen and Scholefield (1990).

C 756.0m(swc), 862.0m(swc) : lower *hughesi* Zone

Assignment to the lower part of the *Cyclosporites hughesi* Zone of early Aptian age is indicated at the top by youngest *Cooksonites variabilis* and at the base by oldest *Pilosisporites notensis* (supported by oldest *P. parvispinosus*). *Cicatricosisporites australiensis*, *Foraminisporis wonthaggiensis* and *Triporoletes reticulatus* occur to the interval base but not in swcs beneath. Common taxa include *Cyathidites minor*, *F. similis* and *C. australis* with frequent taxa including *Retitriletes austroclavatidites*, *M. antarcticus* and *O. wellmanii.*

Non-marine environments are indicated by the dominant and diverse spore-pollen and absence of saline indicators. Very rare *Botryococcus* and *Schizosporis* indicate only minor lacustrine influence.

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

These features are normally seen in the lower part of the Lower Eumeralla Formation, often in coaly facies.

D 870m(cutts), 886.0m(swc) : apparently lower *hughesi* Zone

The cuttings sample contains *C. australiensis*, *F. wonthaggiensis*, *T. reticulatus* and *P. notensis* without *Microfasta evansii* and therefore appears to be lower *C. hughesi* Zone. It is possible, however, that *P. notensis* is caved along with other obvious caving including *C. paradoxa*, and that the sample might belong to the *F. wonthaggiensis* Zone. The swc is extremely lean but contains two specimens of *P. notensis* in the repeat preparation, suggesting the lower *hughesi* Zone. The original very lean preparation lacked *P. notensis* and so was assigned to the lower *wonthaggiensis* Zone and since this was the first sampling of the swc, it may be more reliable. The yield is so poor that mud contamination of the second preparation of the swc is quite possible. *M. evansii* was not seen.

Non-marine environments are indicated by the abundant and diverse spore-pollen, and absence of saline indicators. Rare *Schizosporis* indicates only minor lacustrine influence.

Light brown spore colours indicate marginal maturity for oil generation.

These features are normally seen in the basal Eumeralla Formation although topmost Crayfish Formation is possible if caving has confused the assignment.

E 1190.0m(swc), 1325.0m(swc), 1560.0m(swc), 1640.0m(swc), 1730.0m(swc), 1765m(cutts) : lower *wonthaggiensis* Zone

Assignment to the lower part of the *Foraminisporis wonthaggiensis* Zone is indicated by the consistent presence of *Dictyotosporites speciosus* without younger or older indicators. Common taxa include *O. wellmanii*, throughout, with *C. australis*, *F. similis*, *C. minor*, *M. antarcticus* and *R. austroclavatidites* intermittently common. *Murospora florida*, *Couperisporites tabulatus*, *D. speciosus* and *Foraminisporis dailyi* occur in most samples. Rare Triassic reworking was noted at 1640m only. *C hughesi* and *D. speciosus* are consistent to the base, although they could be caved at 1765m in cuttings. The absence of *M. evansii* is consistent with truncation of the Crayfish Group, as it is most common in the upper Crayfish Group in the upper *wonthaggiensis* Zone.

Non-marine environments are indicated by the common diverse spore-pollen and absence of saline indicators.

Cuticle fragments are common at 1190m, 1325m, and 1560m while rare *Botryococcus* suggests minor lacustrine influence at 1325m and 1640m.

Light brown spores colours indicate marginal maturity for oil but immaturity for gas/condensate. The lean sample at 1325m is light to mid brown suggesting higher maturity but this may be a local deviation caused by the organic facies.

These features are normally seen in the middle part of the Crayfish Formation. The absence of the upper *wonthaggiensis* Zone suggests the loss by erosional truncation of equivalents of the Katnook Sandstone and upper

Laira Shale. The absence of the upper *australiensis* Zone beneath suggests the absence of the basal Crayfish Formation by onlap onto a basement high.

F 1787.0m(swc) : lower *australiensis* to *watherooensis* Zones

Assignment to the lower *Cicatricosisporites australiensis* Zone or the *Retitriletes watherooensis* Zone is indicated at the top by the absence of younger markers (especially *D. speciosus* or *C. hughesi*) and at the base by oldest *Foraminisporis dailyi* and *R. watherooensis*. Other distinctive taxa include *Murospora florida*, *Matonisporites cooksoniae* and *Anapiculatisporites pristidentatus*. Common taxa are *F. similis* and *O. wellmanii* while frequent taxa are *Cyathidites* and *M. antarcticus*.

Non-marine environments are indicated by the abundant and diverse spore-pollen, common cuticle, and absence of saline indicators. Rare *Schizosporis* indicate only very minor lacustrine influence.

G 1840.0m(swc) : extremely lean and indeterminate

The first preparation yielded very rare fossils which are light brown and consistent of long ranging Mesozoic taxa common in overlying strata. These are attributed to minor mud contamination of barren rocks. No older indicators were seen. The repeat preparation was totally barren of palynomorphs.

V REFERENCES

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BUS SWAMP #1

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C L I E N T:VICTORIAN GEOLOGICAL SURVEY
W E L L:BUS SWAMP #1
F I E L D / A R E A:OTWAY BASIN, VICTORIA

A N A L Y S T:ROGER MORGAN D A T E: AUGUST 1993
N O T E S:ALL DEPTHS IN METRES
NUMBERS ARE % BASED ON 100 SPECIMEN COUNT
"X" INDICATES RARE PRESENCE OF SPECIMEN OUTSIDE THE COUNT

RANGE CHART OF OCCURRENCES BY LOWEST APPEARANCE: Dinos & S/P

No.	Species	0210-15 cutts	0300.0 swc	0465.0 swc	0756.0 swc	0856-70 cutts	0862.0 swc	0886.0 SWC	0886.0 swc	1190.0 swc	1325.0 swc	1560.0 swc	1640.0 swc	1730.0 swc	1760-65 cutts	1787.0 core 3	1840.0 swc
1	SCHIZOSPORIS RETICULATIS	X	.	.	.	1	X	.	.	.	.	.	.	.	.	X	.
2	SCHIZOSPORIS PSILATUS	3	.	.	.	X	3	X	.	.	1	.	.	.	X	.	.
3	BOTRYOCOCCUS	1	.	.	1	.	X	.	.	.	1	.	2	.	.	.	.
4	VERYHACHIUM	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
5	PARALECANIELLA	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
6	SCHIZOSPORIS PARVUS	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
7	CALLIALASPORITES DAMPIERI	.	1	2	.	.	.	2	1	X	1	1	2	1	2	1	1
8	CALLIALASPORITES TURBATUS	X	1	3	.	2	.	.	.	1	.	6	5	4	1	1	1
9	CERATOSPORITES EQUALIS	1	2	2	4	1	7	1	4	4	10	1	2	6	3	1	1
10	COROLLINA TOROSUS	1	4	1	3	3	1	1	3	2	1	.	2	2	3	2	1
11	CYATHIDITES AUSTRALIS	2	6	5	15	15	6	11	25	7	5	9	8	10	7	5	16
12	CYATHIDITES MINOR	15	12	5	23	19	16	23	11	6	6	4	3	2	5	7	2
13	FALCISPORITES GRANDIS	10	5	11	7	8	8	4	.	5	3	7	5	7	6	11	1
14	FALCISPORITES SIMILIS	20	26	30	15	14	19	16	.	20	12	24	18	20	21	23	10
15	LEPTOLEPIDITES VERRUCATUS	.	.	.	2	2	2	1	2	3	5	X	1	1	2	X	1
16	MICROCACHRYIDITES ANTARCTICUS	20	8	.	10	11	6	2	1	12	.	1	4	6	12	7	1
17	OSMUNDACIDITES WELLMANII	4	17	24	7	6	7	27	24	25	6	25	22	17	20	22	3
18	RETITRILETES AUSTROCLAVATIDITES	2	2	1	9	3	10	8	7	9	28	8	8	15	9	11	1
19	RETITRILETES NODOSUS	X	.	.	.	X	1	.	.	X	1	.	.	X	X	X	1
20	ANAPICULATISPORIS PRISTIDENTATUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
21	ARAUCARIACITES AUSTRALIS	.	1	1	.	1	2	X	.	1	2	8	6	2	2	1	.
22	CONTIGNISPORITES COOKSONIAE	X	.	.	.	.	.	1	.	.	X	.	.	X	X	X	.
23	CORONATISPORA PERFORATA	.	.	.	.	.	.	X	.	.	X	.	X	.	.	X	.
24	CYCADOPITES FOLLICULARIS	1	.	2	X	2	X	1	2	X	2	1	3	1	1	2	.
25	DICTYOPHYLLIDITES	.	.	.	.	.	.	.	.	.	2	.	.	.	.	2	.
26	DICTYOTOSPORITES COMPLEX	X	1	.	.	.	.	.	.	X	.	.	2	X	.	X	.
27	FORAMINISPORIS DAILYI	.	2	.	1	1	1	.	.	.	.	.	X	X	X	1	.
28	GLEICHENIIDITES	X	1	2	1	.	X	X	.	X	2	X	2	X	.	1	.
29	KLUKISPORITES SCABERIS	X	.	.	.	1	1	X	.	.	3	X	X	.	.	X	.
30	LEPTOLEPIDITES MAJOR	.	.	.	X	X	1	X	.	X	7	X	X	3	1	X	.
31	LYCOPIACIDITES ASPERATUS	.	.	.	.	.	.	.	.	.	.	.	X	.	.	X	.
32	MATONISPORITES COOKSONIAE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
33	MUROSPORA FLORIDA	.	.	.	.	.	.	.	.	X	X	1	X	X	.	X	.
34	NEORAISTRICKIA	.	.	.	.	1	.	.	.	4	1	2	2	2	.	2	.
35	PERINOPOLLENITES ELATOIDES	1	.	.	.	.	.	.	.	.	.	1	X	.	.	1	.
36	RETITRILETES CIRCOLUMENUS	.	.	.	1	2	1	1	.	.	X	.	X	X	X	X	.
37	RETITRILETES EMINULUS	.	.	.	.	.	2	.	.	.	.	.	.	.	X	X	.
38	RETITRILETES WATHAROOENSIS	.	.	.	.	.	.	X	.	.	.	X	X	1	X	X	.

1840.0 swc	1787.0 core 3	1760-65 cutts	1730.0 swc	1640.0 swc	1560.0 swc	1325.0 swc	1190.0 swc	0886.0 swc	0886.0 SWC	0862.0 swc	0856-70 cutts	0756.0 swc	0465.0 swc	0300.0 swc	0210-15 cutts	No.	Species
.	X	.	X	.	.	.	.	.	X	.	.	.	.	.	.	39	SESTROSPORITES PSEUDOALVEOLATUS
.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	40	CONCAVISSIMISPORITES PENOLAENSIS
.	.	X	.	.	.	1	.	.	.	.	.	.	.	.	.	41	CONTIGNISPORITES GLEBULENTUS
.	.	X	X	X	.	1	X	.	.	X	1	X	.	.	.	42	CYCLOSPORITES HUGHESI
.	.	X	X	1	.	X	.	1	1	1	X	X	.	.	X	43	DICTYOTOSPORITES SPECIOSUS
.	.	2	.	.	.	X	.	.	.	.	.	.	.	.	X	44	FOVEOTRILETES PARVIRETUS
.	.	X	X	.	1	X	X	1	.	.	.	X	.	.	.	45	RETITRILETES FACETUS
.	.	.	X	.	.	.	.	1	X	.	.	.	.	.	.	46	ISCHYOSPORITES PUNCTATUS
.	.	.	X	.	.	.	1	.	X	.	.	.	.	.	.	47	NEVESISPORITES VALLATUS
.	.	.	X	1	X	.	.	.	X	X	2	1	.	3	X	48	STERIESPORITES ANTIQUASPORITES
.	.	.	X	.	.	.	X	.	.	.	.	.	.	.	X	49	VELOSPORITES TRIQUETRUS
.	.	.	X	1	.	.	X	.	.	X	.	.	.	.	.	50	VITREISPORITES PALLIDUS
.	.	.	.	X	.	.	.	.	.	.	.	.	1	1	.	51	TRIASSIC REWORKING
.	.	.	.	.	X	.	X	.	.	.	X	1	.	.	.	52	COUPERISPORITES TABULATUS
.	.	.	.	.	.	.	X	.	.	.	.	.	.	X	3	53	AEQUITRIRADITES VERRUCOSUS
.	.	.	.	.	.	.	X	.	.	.	1	.	.	.	5	54	PODOSPORITES MICROSACCATUS
.	.	.	.	.	.	.	.	.	X	1	X	X	.	.	.	55	COOKSONITES VARIABILIS
.	.	.	.	.	.	.	.	.	X	1	X	X	.	.	.	56	PILOSISPORITES NOTENSIS
.	.	.	.	.	.	.	.	.	.	1	3	.	2	2	2	57	CICATRICOSISPORITES AUSTRALIENSIS
.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	58	CRYBELOSPORITES STYLOSUS
.	.	.	.	.	.	.	.	.	.	1	X	.	.	.	.	59	FORAMINISPORIS WONTHAGGIENSIS
.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	60	PILOSISPORITES PARVISPINOSUS
.	.	.	.	.	.	.	.	.	.	X	X	.	.	.	X	61	TRIPOROLETES RETICULATUS
.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	1	62	COPTOSPORA PARADOXA
.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	63	FORAMINISPORIS RETICULOWONTHAGGIENSIS
.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	1	64	LAEVIGATOSPORITES OVATUS
.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	65	STOVERISPORITES LUNARIS
.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	66	AEQUITRIRADITES TILCHAENESIS
.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	1	67	TRIPOROLETES RADIATUS
.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	1	68	TRIPOROLETES SIMPLEX
.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	69	CICATRICOSISPORITES CUNEIFORMIS
.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	70	FORAMINISPORIS ASYMMETRICUS
.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	71	PERMIAN REWORKING
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	72	AEQUITRIRADITES SPINULOSUS
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	73	BALMEISPORITES HOLODICTYUS
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	74	CICATRICOSISPORITES LUDBROOKIAE
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	75	COPTOSPORA STRIATA
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	76	COPTOSPORA WRINKLY

No.	Species	0210-15 cutts	0300.0 swc	0465.0 swc	0756.0 swc	0856-70 cutts	0862.0 swc	0886.0 SWC	1190.0 swc	1325.0 swc	1560.0 swc	1640.0 swc	1730.0 swc	1760-65 cutts	1787.0 core 3	1840.0 swc
77	CRYBELOSPORITES STRIATUS	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
78	FOVEOSPORITES CANALIS	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
79	PHYLLOCLADIDITES MAWSONII	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.
80	PILOSISPORITES GRANDIS	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.
81	PROTEACIDITES	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.
82	TRILETES TUBERCULIFORMIS	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
83	TRILOBOSPORITES TRIORETICULOSUS	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.

0210-15 cutts
0300.0 swc
0465.0 swc
0756.0 swc
0856-70 cutts
0862.0 swc
0886.0 SWC
1190.0 swc
1325.0 swc
1560.0 swc
1640.0 swc
1730.0 swc
1760-65 cutts
1787.0 core 3
1840.0 swc

SPECIES LOCATION INDEX

Index numbers are the columns in which species appear.

INDEX NUMBER	SPECIES
72	AEQUITRIRADITES SPINULOSUS
66	AEQUITRIRADITES TILCHAENESIS
53	AEQUITRIRADITES VERRUCOSUS
20	ANAPICULATISPORIS PRISTIDENTATUS
21	ARAUCARIACITES AUSTRALIS
73	BALMEISPORITES HOLODICTYUS
3	BOTRYOCOCCUS
7	CALLIALASPORITES DAMPIERI
8	CALLIALASPORITES TURBATUS
9	CERATOSPORITES EQUALIS
57	CICATRICOSISPORITES AUSTRALIENSIS
69	CICATRICOSISPORITES CUNEIFORMIS
74	CICATRICOSISPORITES LUDBROOKIAE
40	CONCAVISSIMISPORITES PENOLAENSIS
22	CONTIGNISPORITES COOKSONIAE
41	CONTIGNISPORITES GLEBULENTUS
55	COOKSONITES VARIABILIS
62	COPTOSPORA PARADOXA
75	COPTOSPORA STRIATA
76	COPTOSPORA WRINKLY
10	COROLLINA TOROSUS
23	CORONATISPORA PERFORATA
52	COUPERISPORITES TABULATUS
77	CRYBELOSPORITES STRIATUS
58	CRYBELOSPORITES STYLOSUS
11	CYATHIDITES AUSTRALIS
12	CYATHIDITES MINOR
24	CYCADOPITES FOLLICULARIS
42	CYCLOSPORITES HUGHESI
25	DICTYOPHYLLIDITES
26	DICTYOTOSPORITES COMPLEX
43	DICTYOTOSPORITES SPECIOSUS
13	FALCISPORITES GRANDIS
14	FALCISPORITES SIMILIS
70	FORAMINISPORIS ASYMMETRICUS
27	FORAMINISPORIS DAILYI
63	FORAMINISPORIS RETICULOWONTHAGGIENSIS
59	FORAMINISPORIS WONTHAGGIENSIS
78	FOVEOSPORITES CANALIS
44	FOVEOTRILETES PARVIRETUS
28	GLEICHENIIDITES
46	ISCHYOSPORITES PUNCTATUS
29	KLUKISPORITES SCABERIS
64	LAEVIGATOSPORITES OVATUS
30	LEPTOLEPIDITES MAJOR
15	LEPTOLEPIDITES VERRUCATUS
31	LYCOPIACIDITES ASPERATUS
32	MATONISPORITES COOKSONIAE
16	MICROCACHRYIDITES ANTARCTICUS
33	MUROSPORA FLORIDA
34	NEORAISTRICKIA
47	NEVESISPORITES VALLATUS
17	OSMUNDACIDITES WELLMANII
5	PARALECANIELLA
35	PERINOPOLLENITES ELATOIDES
71	PERMIAN REWORKING
79	PHYLLOCLADIDITES MAWSONII
80	PILOSISPORITES GRANDIS
56	PILOSISPORITES NOTENSIS
60	PILOSISPORITES PARVISPINOSUS
54	PODOSPORITES MICROSACCATUS
81	PROTEACIDITES
18	RETITRILETES AUSTROCLAVATIDITES
36	RETITRILETES CIRCOLUMENUS
37	RETITRILETES EMINULUS
45	RETITRILETES FACETUS
19	RETITRILETES NODOSUS
38	RETITRILETES WATHAROOENSIS
6	SCHIZOSPORIS PARVUS
2	SCHIZOSPORIS PSILATUS
1	SCHIZOSPORIS RETICULATIS
39	SESTROSPORITES PSEUDOALVEOLATUS
48	STERIESPORITES ANTIQUASPORITES
65	STOVERISPORITES LUNARIS
51	TRIASSIC REWORKING
82	TRILETES TUBERCULIFORMIS
83	TRILOBOSPORITES TRIORETICULOSUS
67	TRIPOROLETES RADIATUS
61	TRIPOROLETES RETICULATUS
68	TRIPOROLETES SIMPLEX
49	VELOSPORITES TRIQUETRUS
4	VERYHACHIUM
50	VITREISPORITES PALLIDUS