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PALYNOLOGICAL EXAMINATION OF SAMPLES FROM THE GIPPSLAND AND OTWAY BASINS, VICTORIA

BY

V ARCHER

UNPUBLISHED REPORT 1982/4

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PALYNOLOGICAL EXAMINATION OF SAMPLES FROM THE GIPPSLAND AND OTWAY BASINS, VICTORIA

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ABSTRACT

This report contains the results of palynological dating of VMD Bores, Warrion Warrion 5 in the Otway Basin and the following bores in the Gippsland Basin : Alberton East 5 and 9; Alberton West 159, 182, 197 and 202; Bruthen 10, Devon 22, Gippsland 1, 2 and 3; Welshpool 31 and 32; Won wron 84 and 85, Woranga 4, 5, 7, 8, 10 and 12; Woundellah 12, Yarram Yarram 14 and 15, Cranbourne 51, and several outcrop samples from the yallourn coal.

The majority of these samples were studied at the request of the Basin Studies Section.

APPENDIX

1 Species Lists
2 Biostratigraphic Zoration

ABSTRACT

RESULTS

APPENDIX 1 - Sepcies Lists
APPENDIX 2 - Biostratigraphic Zonation
REFERENCES

BORE	DEPTH (m)	LITHOLOGY	CONFIDENCE	SPORE-POLLEN ZONE
Yarram Yarram 14	198.1	Lig. clay	2	Mid - Upper N.asperus Zone
" 15	155	Lig. clay	2	P.tuberculatus Zone
Woranga 4	64.7 - 66.1	Carb. sandstone	2	T.bellus Zone
"	118.8	Brown coal	2	Upper P.tuberculatus - T.bellus Zone
"	171.1	Carb. clay	1	P.tuberculatus Zone
Woranga 12	88 - 94	Carb. sandstone	1	Upper T.bellus Zone
"	270	Dark clay		Indet.
"	285	Carb. sandstone	2	Mid - Upper N.asperus Zone
"	290	Sandy clay	2	"
"	346.9 - 349.7	Brown coal	2	"
"	400.8 - 403.8	"	1	Middle N.asperus Zone
"	509.4 - 512	Lig. clay	2	Lower N.asperus Zone
"	565 - 567.5	"	1	L.balmei Zone
"	825	Grey sandstone		Indet.
Warrion Warrion 5	417 - 422.5	Coarse Lig. sand	1	Mid - Upper N.asperus Zone
"	454.7 - 458.5	Lig. sand	1	Mid. N.asperus Zone
Cranbourne 51	165 - 175	Lig. sand	1	P.tuberculatus Zone
YALLOURN OUTCROP SAMPLES				
Subseam clay	443500E 577100W Zone 55	Carb. clay	1	T.bellus Zone
Near top of open cut	44300E 577100W	Brown coal	2	"
Above tree stump horizon	44300E 577100W	"	2	"
Yallourn North Ext. Level 13		"	2	"
2m from bottom 4 cut		"	2	"

BORE	DEPTH (m)	LITHOLOGY	CONFIDENCE	SPORE-POLLEN ZONE (Stover & Partridge 1972, Partridge 1975 rev.)
Alberton East 5	57.2	Coaly sand		Indeterminate
Alberton East 9	76.1	Lig. clay	1	T.bellus Zone
"	80.0	Sandy coal	1	"
"	87.0	Lig. clay	1	"
"	100.5	Brown coal	1	"
"	193.0	"	1	"
Alberton West 159	31.1	Carbonaceous clay	1	L.balmei Zone
"	34.2	"		Indet.
" 182	23.4 - 24	Brown coal	2	Upper N.asperus Zone
"	43.4 - 44	"	1	"
"	66.3 - 66.7	"	1	"
" 197	50.7	Carbonaceous clay		Indet.
"	54.8	Lig. clay	1	Upper T.bellus Zone
"	83.6	Brown coal	2	Upper P.tuberculatus Zone
"	118	Carbonaceous clay	1	Mid - Upper P.tuberculatus Zone
"	141.6	Brown coal	2	Late Mid N. asperus - P.tuberculatus Zone
" 202	35.6	Lig. clay	2	T.bellus Zone
"	68.3	"	1	P.tuberculatus Zone
Bruthen 10	161.0	Grey, clayey sandy silt	1	T.bellus Zone
Devon 22	122.7	Sandy coal	1	P.tuberculatus Zone
"	155.9	Carbonaceous sand	1	Upper N.asperus Zone
"	201.5	"	1	Lower - Upper N.asperus Zone
Gippsland 1	55 - 58	Fossiliferous marine sand		Indet.
"	135 - 137	Fine marine sand		Indet.

BORE	DEPTH (m)	LITHOLOGY	CONFIDENCE	SPORE-POLLEN ZONE
Gippsland 2	156 - 159	Coaly sand		Indet.
"	183 - 186	"	1	T.bellus zone
" 3	146 - 149	Coaly sand	1	"
"	165 - 168	"	2	"
Welshpool 31	68	Brown coal	1	Late Mid N.asperus - Upper N.asperus Zone
"	163.3	Carb. gravely sand	1	"
" 32	43	Carb. silt	1	P.tuberculatus Zone
"	74.5	Carb. sand	2	"
Won wron 84	117.6 - 120.8	"		Indet.
"	161 - 163.6	Brown coal	1	Upper N.asperus
" 85	28.8	Lig. clay	1	T.bellus Zone
"	39.4	"	1	"
"	42.3	Carb. sand	1	Upper P.tuberculatus Zone
Woranga 5	103.9	Brown coal	2	P.tuberculatus Zone
"	173.5	"	1	"
" 7	90.85	Carb. clay	2	T.bellus Zone
"	141.5	"	1	"
" 8	80.0	" clayey sand		Indet.
"	115.1 - 118.3	Carb. sand	2	Upper N.asperus Zone
" 10	204	Brown coal	1	P.tuberculatus Zone
Woundellah 12	96.99	"	1	C.bifurcatus Zone
"	120	Coaly sandstone	1	"
"	236	"		Indet.
Yarram Yarram 14	66.6	Lig. clay	1	T.bellus zone
"	130	Brown coal	2	Upper N.asperus Zone

Appendix 1 / 1982/4

0; SWC or CORE, EXCELLENT CONFIDENCE, assemblage with zone species of spores, pollen and microplankton.

1; SWC or CORE, GOOD CONFIDENCE, assemblage with zone species of spores and pollen or microplankton.

2; SWC or CORE, POOR CONFIDENCE, assemblage with non-diagnostic spores, pollen and/or microplankton.

3; CUTTINGS, FAIR CONFIDENCE, assemblage with zone species of either spore and pollen or microplankton, or both.

4; CUTTINGS, NO CONFIDENCE, assemblage with non-diagnostic spores, pollen and/or microplankton.

Appendix 1. / 1982/4

Well Name	Alb 6	Alb 6	"	"	"	"	Alb W159	"	Alb W158	"	"	Alb W197	"	"	"	"	"	Alb W200	"	Bathurst	Dev 200	"	"	C. Pt 1	C. Pt 2	"
SAMPLE TYPE *	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
DEPTHS / PALYNOMORPHS	526	76	120.0	87.0	100.5	123.0	81.1	34.2	334-24	473-44	86.5-86.7	50.7	54.8	53.6	118	41.6	35.6	65.3	164.0	122.7	155.9	221.5	55-58	135-137	136-138	183-186
A. [illegible]																										
A. quadrilatus																										
A. [illegible]																										
A. australis																										
A. [illegible]																										
B. discontortus																										
D. arcuatus																										
D. elongatus																										
D. minutus																										
B. elongaeformis																										
B. triquetralis																										
B. [illegible]																										
B. emaciatus																										
C. besnermensis																										
C. [illegible]coides																										
C. orthotrichus																										
C. [illegible]																										
C. [illegible]																										
C. [illegible]																										
C. sphaeroides																										
C. subtilis																										
Cyperaceae sp.																										
D. australiensis																										
D. simplex																										
D. granulatus																										
D. tuberculatus																										
D. Torrellus																										
D. tholus																										
F. notensis																										
F. [illegible]																										
F. scabratus																										
F. [illegible]																										
F. crater																										
F. lacunosus																										
F. [illegible]																										
G. calathus																										
G. major																										
G. [illegible]																										
G. nebulosus																										
Guertlerdiites sp.																										
H. [illegible]																										
H. balmoraoides																										
H. barrettii									C	C	C			A	A	A	A	A		A	C	C				
H. elliottii																										
I. [illegible]																										
I. circulatus																										
K. waterloiki																										
L. crassus																										
L. florinii																										
M. gracilis																										
M. subtilis																										
M. robustus																										
M. spinysporis																										
M. antarticus																										
M. [illegible]																										
M. hypolaenoides																										
Dorogoritis sp.																										
P. austus																										
R. [illegible]																										
R. [illegible]																										
R. eucalyptoides/anthus																										
R. parvus/microcosmus																										
R. verrucosus																										
R. asperus																										
R. [illegible]																										
R. [illegible]																										
R. [illegible]																										
R. [illegible]																										
R. [illegible]																										
R. [illegible]																										

*C = core, S = sidewall core, T = cuttings

AB - abundant > 5% of total RW - reworked

C - common 1 - 5% R - rare

Well Name	AKS	AGS	"	"	"	"	AW 159	"	AW 182	"	"	AW 197	"	"	"	"	AW 222	"	Bull 1C	DEU 22	"	"	Cipos 1	"	Cipos 2	"
SAMPLE TYPE*																										
DEPTHS / PALYNOMORPHS	572	761	800	87	100.5	103.0	311	342	432-34	634-46	663-667	507	554.8	836	118	1476	356	683	1859	1227	1559	281.5	55-58	135-137	158-158.5	183-186
N. vanstoeniali		/																		/	/					
P. ochesis																										
P. cistantus																										
P. polyporatus																										
P. vesicus					/				/		/					/				/	/	/				
P. dimorphus																										
P. velatus							/																			
P. mawsonii									/	/	/											/				
P. polygonalis																			/				/			
P. nanus				/						/																
P. octentatus										/	/		/							/	/					
P. microsaccatus											/															
P. esobalteus														S			S	S	/							
P. simplex																										
P. tumulatus																										
P. phenanthrenes (Proto.)																										
P. annulatus									/	/	/			/	/	/					/					
P. clavatus									S																	
P. obscurus					/					/										/						
P. plexus																										
P. pseudomonilis									S																	
P. tessaculi																										
P. tectomurginis																					/					
P. reticulatus																										
P. stellatus										/	/									/						
P. tequisexionis																										
P. truncatus																										
P. tuberculatus		/		S										/		/	/	/			C					
P. micus				/	/									/												
R. escharus																										
R. minisporus																										
R. mollatus																										
R. microalaxus		/	/			/							/		/		/	/								
S. cylindroleus																										
S. rotundus					/				/					/		/				/	/					
S. oblatus										S																
S. (Triporat.) punctatus																/										
S. austrelius		/	/	/	/																					
T. polyinus																										
T. wilkinsii (C3)																										
T. rimatus																										
T. thomsii																										
T. adelaidensis									/											/	/					
T. geranioides																										
T. leuros									/	/	/			/		/			/		/					
T. pumostriatus																										
T. heteropetrus																										
T. scabratus										S																
T. sphaerica		/	/	/	/	/			/	/	/		/	/	/	/	/	/		/	/					
T. [illegible] (P3)																										
T. [illegible]																										
T. ambiguus																			S							
T. bellus					/							/														
T. chorus																										
T. scabratus																										
T. antipodica																										
V. alienus																										
V. attinatus																										
V. crisatus		/										/						S	/							
V. [illegible]									/					/	/						/					
M. [illegible]		/		/																						
P. [illegible]																										
P. pedatus										S										/		/				
P. subtetraedrus										/													/			
P. (Triv.) ensis										/																
P. [illegible]											/															
S. [illegible]		/	/									/							/							
P. [illegible]		/		/	S																					
P. lanceolatus			/	/																	/	/				
Total Identified sp.																										

* Core; Sidewall core, Cuttings

Well Name	AE5	AE9					AW15		AW18			AW19					AW20		Bentley	Dev22			Cuppa 1		Cuppa 2	
SAMPLE TYPE *																										
DEPTHS / PALYNOMORPHS	272	74	800	550	1005	1930	31.1	34.2	234-24	634-44	665-667	507	548	534	118	144.5	335.6	683	1410	122.7	155.6	221.5	55-58	135-137	135-139	185-186
L bilaea																										
C cuneata																										
C [illegible]																										
T [illegible]																										
P verrucosus																										
C [illegible]																										
T verrucosus																										
A [illegible]																										
C [illegible]																										
P [illegible]																										
T [illegible]																										
T [illegible]																										
T [illegible]																										
M [illegible]																										
P [illegible]																										
P [illegible]																										
S antiquasperata																										
D [illegible]																										
P [illegible]																										
T tuberculiferus																										
Microcorlatosporites sp																										
Tetracolporites sp																										
C [illegible]																										
Longapyrimonites																										
V species																										
T [illegible]																										
C [illegible]	Rh																									
[illegible] symphoromonites																										
Retimonocolpites																										
Tetracolporites sp																										
E [illegible]																										
O [illegible]																										
MICROPLANKTON																										
Hystrichosphaeridium sp																										
Spiniferites sp																										

* Cuttings, Sidewall core, Tailings

Appendix 1 / 1982 / 4

Well Name	Cupps 3	"	Webbpool 31	"	" 32	"	Warner 34	"	" 85	"	"	Wongan 5	"	" 7	"	" 8	"	" 10	Warakilla 10	"	"	Yarraloola 1	"	"	" 15	Wongan 4
SAMPLE TYPE *	C																									
DEPTHS / PALYNOMORPHS	160-149	105-116	68	183.3	43	74.5	1176-1208	1611-1636	288	324	423	1039	1733.5	90-85	141.5	80	115-116.5	20	96.8	122	234	66.4	130	198.4	155	64.7-66.4
A. matorbiculatus																										
A. quadrimis															/				/	/						/
A. scitus																										
A. australis																										
A. grandis																										
B. discordoides																										
B. arcuatus																										
B. elongatus	/											/							/							
B. minimus																BARREN					BARREN					
B. cleomansiformis								/															/			
B. trigonalis																										
B. yelarbonensis			/			/				/		/							/							
B. emarginatus																										
C. bacteroides																										
C. discoidaceoides																										
C. orthotriletes						/			/	/									/	/						
C. orbiculatus																										
C. polyporus																										
C. granulatus									/	/	/		/					/				C			C	/
C. splendens																										
C. subtilis											/															
Cyperaceae sp.																										
D. australiensis			/	/		/		/	/						/				/							/
D. simplex																										
D. granulites																										
D. tuberculatus																										
D. turiellus						/																				
D. tholus																										
E. notensis																										
E. [illegible]	/			/		/									/								/			
E. scabratus																										
F. barcoo			/																							/
F. crater									/	/	/				/				/	/						
F. lucanosus									/															R	/	
F. palaeguttus					/	/																				
G. calatum									/						/				/							
G. major																										
G. bassensis																										
G. nebulosus						/												/								
Gauttardidites sp.									/	/					/										/	
H. anglicus																										
H. balmoraensis	/								/																	
H. barrisii		/	/	/	/	C	/	C	A	/	A	A	A	C	/		/	A	A	A		/	A	/		/
H. elliottii			/	/																						
I. amyloplaveatus			/	/	/														/	/						
I. [illegible]																										
K. waterbolkii																										
L. crassus				R																				R		
L. [illegible]	/	/	/			/		/	/	/							/	/	/	C			/			
M. [illegible]																										
M. subtilis			/	/	/			/		/								/		/			/			
M. robustus																										
M. spinyscutus																										
M. antarcticus															/											
M. [illegible]							/																			
M. hypolaenoides	C	C							/					/	/		/		C	/						
Hypoperlites sp.																										
M. [illegible]																										
M. [illegible]																										
M. eucalyptoides concinnus	/											/		/					C							
M. eucalyptoides oculus																										
M. latrus/[illegible]		/							/		/								/	/						
M. verrucosus													/						/	/						
M. asperus					/														/	/						
M. [illegible]			/	/	/					/									/	/						
M. densus			/	/	/														/	/		/				
M. [illegible]	/	/	/	/	/		/		/	/	/	/	/		/		/		/	/		/	/	/		/
M. [illegible]				C	A		/	C	/	A	C	/	/	C	/		/		C	/		/	/	/		/
M. [illegible]			/	/	/			/		/	/			/				/	/	/		/	/	/		/
M. [illegible]			/	/	/			/		/	/							/	/	/		/	/	/		/
M. [illegible]			/	/	/			/		/	/							/	/	/		/	/	/		/

*C = core, S = sidewall core, T = cuttings

AB - abundant >5% of total RW - reworked

C - common 1 - 5% R - rare

Well Name																							
SAMPLE TYPE*	C	"	Wells 31	"	" 38	"	Lbrook 84	"	" 85	"	"	Lbrook 5	"	" 7	"	" 8	"	" 10	Lbrook 10	"	"	Lbrook 14	"	"	Lbrook
DEPTHS / PALYNOMORPHS	44-149	65-149	67	143.3	43	74.5	1176-1208	161-163.6	28.8	39.4	42.3	102.9	172.5	90.85	141	80	153-165	204	94.90	120	7.96	49.4	180	108	155	61.7-62
H. vanstrentii																										
P. ochesis																										
P. crassus																										
P. polygratus																										
P. vesicus																										
P. densus																										
P. velosus																										
P. wiggsii				C			C																			
P. polaromonicus																										
P. nanus																										
P. octentatus																										
P. microsaccatus																										
P. esobalteus																										
P. simplex																										
P. tenuletus																										
P. atensiatheides (Prot.)																										
P. annulatis																										
P. classus																										
P. obscurus																										
P. plexmelus																										
P. pseudomoides																										
P. recaeci																										
P. rectomurinus																										
P. reflexus																										
P. stirulatus																										
P. tequiexinus																										
T. truncatus																										
P. tuberculatus																										
P. micus																										
R. cochirus																										
R. sinisteros																										
R. mollatus																										
R. microcleros																										
S. cylindroicus																										
S. rotundus																										
S. oblatus																										
S. (Triquet.) ponderatus																										
S. austelius																										
T. polynus																										
T. thallensis (C)																										
T. rimatus																										
T. thomasii																										
T. microsporasis																										
T. geraniodes																										
T. leuros																										
T. pumecistatus																										
T. telequetrus																										
T. scabratus																										
T. sphaerica																										
T. mamillatus (C)																										
T. contraverticoides																										
T. ambiguus																										
T. bifidus																										
T. clavisus																										
T. scabratus																										
T. antipodica																										
V. altenus																										
V. alternatus																										
V. cristatus																										
V. longipilis																										
M. monoschis																										
P. [illegible]																										
C. costatus																										
Neogenomodes																										
Sporites																										
Y. spectrosus																										
P. scellorcutus																										
T. crenulatus																										
Quintinia sp																										
Cassia																										

*Core, S=sidewall core, T=cuttings

Well Name

SAMPLE TYPE *

DEPTHS / PALYNOMORPHS	[illegible]	[illegible]	48	[illegible]	63	74.5	176-185	217-163	258	354	423	105.9	173.5	90.85	14.5	80	151-163	200	96.5P	128	216	246	130	198	155	167-210
C. [illegible]																										
~~[illegible]~~																										
Cribatocysts																										
D. [illegible]																										
F. [illegible]																										
V. [illegible]																										

MICROPLANKTON

Spiniferites sp.
Hystrichosphaeridium sp.
Lingulodinium sp.
Pyxidinopsis [illegible] sp.

* Core, Sidewall core, TT cuttings

Well Name	Kilbrings 4	"	"	"	"	"	"	"	"	"	"	"	"	"	Cambarong 51	Pilliga 1 top of K	" 8 upper coal	"	"	North Extl 3	Flinders Forest 1
SAMPLE TYPE *	C	C	C	Jnc	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
DEPTHS / PALYNOMORPHS	119 0	121 0	122 5	127 0	128 5	290	346-348	400 5-402 5	504-506	565-567 5	582 5	621-622 5	734-736	165-175							
A. mutabilis																					
A. qualomis																					
A. scitus																					
A. australis																					
A. genialis																					
B. discontortis																					
B. arcuatus																					
B. elongatus																					
B. minimus																					
B. cf. vestiformis																					
B. trigonalis																					
B. verrucosus																					
B. emarginatus																					
C. bacculiferus																					
C. [illegible]																					
C. orthoteichus																					
C. [illegible]																					
C. [illegible]																					
C. granulata																					
C. sphaerus																					
C. subtilis																					
Cupressacea sp.																					
D. australiensis																					
D. [illegible]																					
D. granulatus																					
D. tuberculatus																					
D. variellus																					
D. [illegible]																					
E. notensis																					
E. classicostatus																					
E. scabratus																					
E. balteus																					
E. crister																					
E. lucomosus																					
E. [illegible]																					
G. calatus																					
G. major																					
G. basinosus																					
G. nebulosus																					
Gnetaceidites sp.																					
H. [illegible]																					
H. balmoraensis																					
H. burnsii																					
H. elliottii																					
L. amplexiversus																					
L. incertatis																					
L. waterloensis																					
L. crassus																					
L. florinii																					
H. gracilis																					
H. subtilis																					
H. robustus																					
H. spinosus																					
H. anticticos																					
H. homeomorphus																					
H. hypolaenoides																					
Hoegisporites sp.																					
H. ovatus																					
H. [illegible]																					
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H. [illegible]																					

* C core, S sidewall core, T cuttings

AB - abundant >5% of total RW - reworked

C - common 1 - 5% R - rare

Well Name	Wbrangy	″	″ 12	″	″	″	″	″	″	″	″	Labyrinth 5	″	Cooba 51	Yullawuntoga old	[illegible] subseamclog	[illegible] the Strophe	″ North Extra 13	[illegible]
SAMPLE TYPE *	C	c	C	C	C	C	C	C	C	C	C	C	C	C	V/C	V/C	V/C	V/C	V/C
DEPTHS / PALYNOMORPHS	118.8	171.1	88.94	270	285	290	465-467	1008-1038.5	509-512	565-567.5	925	417-422.5	464.7-468	465-475					
N. vansteenisii																			
P. ochesis								/											
P. citastus																			
P. polyoratus																			
P. vesicus						/		/	/	/		/							
P. dinaus																			
P. velosus																			
P. mawsonii					/		/	/					/		/	/	A		/
P. palaeogenicus																			
P. nanus												/				C			
P. orientatus																			
P. microsaccatus								/		/						/			
T. esobalteus																			
P. simplex																			
P. tenulatus																			
P. adenanthoides (Prot.)																			
P. annularis						/	/	/							/			/	/
P. crassus										/									
P. obscurus						/	/												
P. pleasedus																			
P. pseudomoides																			
P. recavus																			
P. rectomarginis						/						/		/					
P. reflexus																			
P. stipulatus																			
P. tenuiexinus																			
T. truncatus							/												
P. tuberculatus															C		C		
P. micus															/				
R. oscharus																			
R. minisporus																			
R. mallatus												/							
R. micraulaxus																			
S. cainozoicus													/						
S. rotundus														/	/	/	/	/	/
S. oblatus																			
S. (Tripunct.) punctatus										/									
S. australis			/													/			
T. palynus																			
T. chillinsii (C1)										/									
T. rimatus																			
T. thomasii													/						
T. adelaidensis							/							/	/	/			
T. geranioides																			
T. leuros														/	/	/			
T. pionestriatus																			
T. retequetrus																			
T. scabratus																			
T. sphaerica					/				/				/		/	/		/	/
T. magnificus (P1)						(		/					/						
T. confessus																			
T. ambiguus							/												
T. bellus																/			
T. chnosus																			
T. scabratus						/													
T. antipodica																			
V. alienus																			
V. attinatus																			
V. cristatus			/									/							
V. kaiparaensis														/					/
M. [illegible]			/																
P. [illegible]																			
Dilwynites sp.			/																
V. speciosus			/		/														
S. antiquasporites			/											/					
D. sphaerica			/																
C. bifurcatus			/																
F. ellipticus					/														
F. holmei					RW														
F. latrobensis									/	/									

* C = core, S = sidewall core, T = cuttings

Well Name	[illegible] 4	"	" 10	"	"	"	"	"	"	"	"	[illegible] 5	"	[illegible] 5L	[illegible]	[illegible]	[illegible]	North [illegible]	[illegible]
SAMPLE TYPE *																			
DEPTHS	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	565-567.5	[illegible]	[illegible]	[illegible]	[illegible]					

PALYNOMORPHS

C. caudata
P. kopanus
C. [illegible]
C. [illegible]
D. [illegible] sp.
[illegible]
[illegible]
[illegible]
P. [illegible]
W. [illegible]
N. [illegible]
[illegible]
P. [illegible]
P. [illegible]
C. [illegible]
D. [illegible]
M. [illegible]
G. [illegible]
C. [illegible]
P. exiguus
T. [illegible]
S. [illegible]
B. [illegible]
S. [illegible]

Rw

KW RW

RW

MICROPLANKTON

Deflandrea phosphoritica
[illegible]
[illegible]

* C=core, S=sidewall core, T=cuttings

REFERENCES

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