APPENDIX

PALYNOLOGICAL ANALYSIS OF WHIPTAIL-1A, GIPPSLAND BASIN

by

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INTERPRETATIVE DATA

INTRODUCTION

Thirty eight sidewall core samples were processed and analysed for spore-pollen and dinoflagellates. Recovery and preservation were good only in the Middle-Late Eocene *N. asperus* Zone section (1120.0 to 1383.5m). Below this depth few samples provided confident dates.

Lithological units and palynological zones from the base of the Lakes Entrance Formation to T.D. are summarized below; anomalous and unusual occurrences of taxa are listed in Table 2. Basic data are given in Table 3.

SUMMARY

AGE	UNIT	ZONE	DEPTH (m)
Early Oligocene	Unnamed marl unit A	*P. tuberculatus*	1120.0m
	log break at 1125m		
Late Eocene	Unnamed marl unit B	Middle *N. asperus*	1128.5-1134.7m
	log break at 1147m		
Late Eocene	Gurnard Fm. Equivalent	Middle *N. asperus*	1147.8m
	log break at 1152.0m		
Middle Eocene	Latrobe Group coarse clastics	Lower *N. asperus*	1154.7-1383.5m
Early Eocene		*P. asperopolus*	1409.5-1571.8m
Early Eocene		*M. diversus*	1635.2-1698.0m
Paleocene		Upper *L. balmei*	1811.0-2060.8m
Maastrichtian		Upper *T. longus*	2218.2m
Maastrichtian		Lower *T. longus*	2415.0m
Late Cretaceous		*T. lilliei*	2547.0-2780.9m

GEOLOGICAL COMMENTS

1. Although no Lower L. balmei Zone sediments were recorded and the M. diversus Zone interval could not be confidently subdivided in Whiptail-1A, biostratigraphic data from the adjacent Barracouta Field indicate that Whiptail-1A does contain a continuous sequence of zones from the Late Cretaceous T. lilliei Zone to the Early Oligocene basal P. tuberculatus Zone.

2. The highest unit within the Latrobe Group coarse clastics is a carbonaceous siltstone occurring between (log data) 1152 and 1166m. This interval contains the highest coal recorded in Whiptail-1A (at approx. 1157m). The unit represents a coastal plain environment, developed during Lower N. asperus Zone times.

3. Lithological and palynological data indicate this coastal plain facies is overlain, probably conformably, by three calcareous units. Although cited here as unnamed marls, the upper two units appear to be equivalent to the "Bullseye Marl" glauconitic marl unit recognized by Rexilius (1985a). Interval boundaries are log picks:

   (a) Gurnard Formation equivalent, 1147-1152m

   This unit, sampled by one sidewall core at 1147.8m, is a slightly (5%) calcareous, very fine siltstone containing moderate amounts of pelletal glauconite. Visual inspection suggests that the amount of glauconite is less than is usually present within the Gurnard Formation in inner shelfal wells. However, the age of the sample (Middle N. asperus/C. incompositum Zone) and abundance of the dinoflagellate Vozzhenikovia extensa demonstrate the unit is the time-equivalent of thick (22-26.5m) greensands present in Barracouta-4 and -5 (see Macphail 1985).

   (b) Unnamed marl unit A, 1125-1147m

   This unit, comprising a number of small, upward coarsening parasequences, was sampled at 1134.7m and 1128.5m. These samples are moderately calcareous (12.2, 17.6% respectively), very fine siltstones containing low amounts of glauconite. The sidewall cores at 1134.7 and 1128.5m contain excellent Middle N. asperus Zone spore-pollen and dinoflagellate assemblages. This age is supported by the occurrence of sparse Zone K forams in both samples (M.J. Hannah, pers. com.). The presence of the dinoflagellate Corrudinium

incompositum and an abundance of Vozzhenikovia extensa in the sample at 1134.7m suggests that this unnamed marl unit A is conformable with the underlying "Gurnard equivalent" unit between 1147 and 1152m and also a time-equivalent of the Gurnard Formation facies in the Barracouta Field.

(c) Unnamed marl unit B, above 1125m

This unit is distinguished from the underlying marl on the basis of (i) its relatively subdued log character and (ii) the basal P. tuberculatus Zone date of the calcareous (14.4%) siltstone sample at 1120.0m. This sample lacks datable forams but contains Cyatheacidites annulatus (the zone indicator species of the P. tuberculatus Zone). Otherwise the assemblage is typical of the Upper N. asperus Zone. This association which is dominated by spore-pollen (rather than dinoflagellates as is mostly the case with P. tuberculatus Zone sediments in offshore wells) is rarely encountered in Gippsland wells and is likely to have been deposited relatively close to the paleoshoreline. An Early Oligocene age is indicated. Early Oligocene P. tuberculatus Zone sediments in Barracouta-5, identified (Rexilius 1985b) as the basal member of the Seaspray Group (the "Fortescue Shale") are dominated by dinoflagellates and therefore likely to have been deposited further away from the Early Oligocene shoreline than was the Whiptail-1A sample at 1120.0m.

4. The data confirm a Lower N. asperus Zone age for the thick coal between 1372 and 1379m (the Lower N. asperus seismic marker), used to datum Whiptail-1A with the Barracouta Field wells. Similarly, a thin sequence of P. asperopolus Zone coals in the Barracouta wells is present between approx. 1410 and 1530m in Whiptail-1A. Given the strength of these coal correlations, either the P. asperopolus Zone date for the sample at 1409.2m in Whiptail is anomalously old or the Lower N. asperus Zone age for the sample at 1492.0m in Barracouta-5 is anomalously young. As both dates are of good to high confidence, the section is likely to be transitional between the Lower N. asperus and P. asperopolus Zones.

5. The relatively shallow depth and low thicknesses of Late Cretaceous Upper I. longus to I. lilliei Zone in Whiptail-1A is consistent with the shallow depth of Late Cretaceous sediments in Flying Fish-1. Both wells are structurally higher at the Late Cretaceous level than the Barracouta wells. Although the I. lilliei Zone for the basal sidewall core (2780.9m) is of low confidence, the sample is highly unlikely to be younger than Lower I. longus Zone.

BIOSTRATIGRAPHY

Zone boundaries were established using the criteria of Stover & Partridge (1973) and subsequent proprietary revisions.

Tricolporites lilliei Zone: 2476.5-2780.9m

Samples within this interval are dominated by *Nothofagidites* and, below 2547.0m, contain frequent to common *Tricolpites labrum*. The lowest sample, 2780.9, lacks the nominate species but contains *Gambierina rudata* and *Triporopollenites sectilis*, species which first appear in this zone. *Tricolporites lilliei* is first recorded at 2547.0m. The upper boundary is picked at 2476.5m, based on *T. lilliei* and frequent *Tricolpites remarkensis*.

Lower *Tricolpites longus* Zone: 2415.0m

One sample is provisionally assigned to this zone, based on an abundance of *Gambierina rudata*. *Triporopollenites sectilis* is frequent in this sample. The sample at 2292.8, contains a sparse, general *T. longus* Zone palynoflora.

Upper *Tricolpites longus* Zone: 2218.2m

This sample contains *Stereisporites punctatus* and, relative to the (low) yield, frequent *Gambiera rudata*. However only one species is present that is not known to range above the *T. longus* Zone - *Proteacidites palisadus*.

Upper *Lygistepollenites balmei* Zone: 1811.0-2060.8m

Two samples are assigned to this zone. The lowermost lacks *L. balmei* but contains rare specimens of *Apectodinium homomorpha*, a dinoflagellate that first appears in the upper part of the Lower *L. balmei* Zone. The date is therefore provisional. The upper sample at 1811.0m contains a good Upper *L. balmei* Zone palynoflora, with common *Lygistepollenites balmei*, *Polycolpites langstonii* and *Proteacidites annularis* in gymnosperm-dominated assemblage.

Malvacipollis diversus Zone: 1635.2-1698.0m

Samples within this interval contain general Early Eocene palynofloras, lacking more specific zonal indicator species. Nevertheless *Crassiretitriletes vanraadshoovenii* indicates the sample at 1698.0m is no older than Lower *M. diversus* Zone, and *Proteacidites tuberculiformis* that the

sample at 1635.2m is no older than Middle M. diversus Zone. A possibly freshwater Palaeoperidinium species is abundant in this latter sample.

Proteacidites asperopolus Zone: 1409.5-1571.8m

The majority of samples within this interval contained sparse to very sparse palynofloras although most included the nominate species. The base of the zone is picked at the first occurrence of Proteacidites asperopolus (1571.8m). Homotryblium tasmaniense occurs at 1501.5m and Myrtaceidites tenuis (in a coal) at 1447.0m. The upper boundary is well-defined by occurrences of Proteacidites asperopolus and Conbaculites apiculatus associated with species which range no higher than this zone, e.g. Proteacidites leightonii and Myrtaceidites tenuis.

Lower Nothofagidites asperus Zone: 1154.7-1383.5m

Samples within this interval are characterised by Nothofagidites-dominated assemblages, mostly including Proteacidites asperopolus. The base is provisionally picked at 1383.5m, a sample containing common P. asperopolus. The first appearance of Nothofagidites falcatus is at 1381.5m. Tricolpites delicatus and T. leuros first appear at 1375.5m and 1344.0m respectively. The upper boundary is placed at 1154.7m, the highest sample containing a general N. asperus Zone assemblage lacking Middle N. asperus Zone indicators. The sample at 1164.0m contains a general Lower N. asperus Zone palynoflora and provides an alternative, slightly more confident upper boundary.

Middle Nothofagidites asperus Zone: 1128.5-1147.8m

Age-determinations of samples within this zone are highly confident since all samples contained the indicator species Triorites magnificus and Corrudinium incompositum. Tricolpites thomasii and Proteacidites pachypolus occur at 1147.8m, Agloareidia qualumis at 1134.7m and Proteacidites rectomarginis at 1128.5m. The dinoflagellate Vozzhenikovia extensa is present throughout the interval and abundant at 1134.7m and 1147.8m

P. tuberculatus Zone: 1120.0m

Cyatheacidites annulatus in the highest sidewall core taken, at 1120.0m confirms a P. tuberculatus Zone age for this sample. Proteacidites stipplatus shows the sample is no older than Upper N. asperus Zone. The dominance of the palynoflora by spore-pollen, in particular Nothofagidites species, and lack of dinoflagellate species such as Protoellipsodinium simplex, indicate that this sample belongs to the lower subdivision of the P. tuberculatus Zone.

REFERENCES

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PALYNOLOGY DATA SHEET

BASIN: Gippsland ELEVATION: KB: +21.0m GL: 39.0m

WELL NAME: Whiptail-1A TOTAL DEPTH: 2815.5m

AGE	PALYNOLOGICAL ZONES	HIGHEST DATA					LOWEST DATA				
		Preferred Depth	Rtg	Alternate Depth	Rtg	Two Way Time	Preferred Depth	Rtg	Alternate Depth	Rtg	Two Way Time
MIOCENE	*T. pleistocenicus*										
	M. lipsis										
	C. bifurcatus										
	T. bellus										
EOCENE	*P. tuberculatus*	1120.0	0				1120.0				
	Upper *N. asperus*										
	Mid *N. asperus*	1128.5	0				1147.8	0			
	Lower *N. asperus*	1154.7	2				1383.5	2	1381.5	1	
	P. asperopolus	1409.5	0				1571.8	1			
	Upper *M. diversus*										
	Mid *M. diversus*										
	Lower *M. diversus*										
	Upper *L. balmei*	1811.0	1				2060.8	2			
	Lower *L. balmei*										
CRETACEOUS	Upper *T. longus*	2218.2	2				2218.2	2			
	Lower *T. longus*	2415.0	2				2415.0	2			
	T. lilliei	2476.5	1				2780.9	1			
	N. senectus										
	T. apoxyexinus										
	P. mawsonii										
	A. distocarinatus										
EARLY CR...	*P. pannosus*										
	C. paradoxa										
	C. striatus										
	C. hughesi										
	F. wonthaggiensis										
	C. australiensis										

COMMENTS: M. diversus Zone undiff. 1635.2-1698.0m

C. incompositum Zone 1128.5-1134.7m

CONFIDENCE RATING:
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 spores and pollen or microplankton, or both.
4: Cuttings, No Confidence, assemblage with non-diagnostic spores, pollen and/or microplankton.

NOTE: If an entry is given a 3 or 4 confidence rating, an alternative depth with a better confidence rating should be entered, if possible. If a sample cannot be assigned to one particular zone, then no entry should be made, unless a range of zones is given where the highest possible limit will appear in one zone and the lowest possible limit in another.

DATA RECORDED BY: M.K. Macphail DATE: 24/12/1985

DATA REVISED BY: _____ DATE: _____

TABLE 1: SUMMARY OF INTERPRETATIVE PALYNOLOGICAL DATA

WHIPTAIL-1A

SAMPLE NO.	DEPTH (m)	SPORE-POLLEN ZONE	DINOFLAGELLATE ZONE	AGE	CONFIDENCE RATING	COMMENTS
SWC 60	1120.0	Upper N. asperus	-	Late Eocene	2	A. qualumis, abund. Nothofagidites
SWC 59	1128.5	Middle N. asperus	C. incompositum	Late Eocene	0	T. magnificus, P. rectomarginis, C. incompositum
SWC 58	1134.7	Middle N. asperus	C. incompositum	Late Eocene	0	A. qualumis, T. magnificus, abund. V. extensa and S. speciosus, C. incompositum
SWC 56	1147.8	Middle N. asperus	-	Late Eocene	0	T. magnificus, T. thomasii, P. pachypolus, abund. V. extensa
SWC 55	1154.7	N. asperus	-		-	P. recavus, abund. Nothofagidites
SWC 54	1164.0	Lower N. asperus	-	Middle Eocene	2	N. falcatus
SWC 53	1202.0	Lower N. asperus	-	Middle Eocene	2	N. falcatus
SWC 52	1228.6	Lower N. asperus	-	Middle Eocene	1	N. falcatus, T. delicatus, T. leuros
SWC 51	1257.5	Lower N. asperus	-	Middle Eocene	1	Freq. P. asperopolus
SWC 50	1278.0	Lower N. asperus	-	Middle Eocene	1	P. asperopolus, T. leuros, N. falcatus
SWC 49	1312.0	No older than P. asperopolus Zone				P. asperopolus, abund. H. harrisii
SWC 48	1344.0	Lower N. asperus	-	Middle Eocene	1	P. asperopolus, T. delicatus, T. leuros, abund. Nothofagidites
SWC 46	1375.5	Lower N. asperus	-	Middle eocene	1	P. asperopolus, T. delicatus, P. rugulatus
SWC 45	1380.0	Indeterminate	-	-	-	Barren sample
SWC 44	1381.5	Lower N. asperus	-	Middle Eocene	1	P. asperopolus, N. falcatus
SWC 43	1382.5	Lower N. asperus	-	Middle Eocene	2	P. asperopolus, common Nothofagidites, V. extensa
SWC 42	1383.5	Lower N. asperus	-	Middle Eocene	2	P. asperopolus common, P. recavus, P. rugulatus

TABLE 1: SUMMARY OF INTERPRETATIVE PALYNOLOGICAL DATA

WHIPTAIL-1A

SAMPLE NO.	DEPTH (m)	SPORE-POLLEN ZONE	DINOFLAGELLATE ZONE	AGE	CONFIDENCE RATING	COMMENTS
SWC 40	1409.5	P. asperopolus	-	Early Eocene	0	P. asperopolus, P. leightonii, M. tenuis
SWC 38	1447.0	P. asperopolus	-	Early Eocene	2	M. tenuis, P. pachypolus
SWC 37	1451.8	Indeterminate	-	-	-	-
SWC 36	1478.0	Indeterminate	-	-	-	P. pachypolus
SWC 35	1501.5	P. asperopolus	-	Early Eocene	1	P. asperopolus
SWC 34	1571.8	P. asperopolus	-	Early Eocene	1	P. asperopolus
SWC 31	1635.2	No older than Middle M. diversus	-	Early Eocene	-	P. tuberculiformis, abund. M. diversus
SWC 30	1660.0	Indeterminate	-	-	-	-
SWC 29	1698.0	No older than Lower M. diversus	-	Early Eocene	2	C. vanraadshooveni, freq. C. splendens
SWC 27	1811.0	Upper L. balmei	-	Paleocene	1	L. balmei common, P. langstonii, P. annularis
SWC 23	2060.8	Upper L. balmei	A. homomorpha	Paleocene	2	A. homomorpha
SWC 19	2126.0	Indeterminate	-	-	-	-
SWC 17	2218.2	Upper T. longus	-	Maastrichtian	2	G. rudata freq., S. punctatus, P. palisadus
SWC 15	2292.8	T. longus	-	Maastrichtian	2	G. rudata freq. in sparse assemblage
SWC 13	2415.0	Lower T. longus	-	Maastrichtian	2	Abund. G. rudata
SWC 11	2476.5	T. lilliei	-	Late Cretaceous	1	T. lilliei, freq. T. remarkensis, common Nothofagidites
SWC 10	2547.0	T. lilliei	-	Late Cretaceous	1	T. lilliei, T. sectilis, freq. T. labrum
SWC 9	2600.0	T. lilliei	-	Late Cretaceous	2	Abund. Nothofagidites, freq. T. labrum

TABLE 1: SUMMARY OF INTERPRETATIVE PALYNOLOGICAL DATA

WHIPTAIL-1A

SAMPLE NO.	DEPTH (m)	SPORE-POLLEN ZONE	DINOFLAGELLATE ZONE	AGE	CONFIDENCE RATING	COMMENTS
SWC 3	2712.0	T. lilliei	-	Late Cretaceous	2	Abund. Nothofagidites, freq. T. labrum
SWC 2	2715.0	T. lilliei	-	Late Cretaceous	2	Freq. Nothofagidites and T. labrum
SWC 1	2780.9	T. lilliei	-	Late Cretaceous	1	G. rudata, T. sectilis

TABLE 2

ANOMALOUS AND UNUSUAL OCCURRENCES OF SPORE-POLLEN TAXA IN WHIPTAIL-1A

SAMPLE NO.	DEPTH(m)	ZONE	TAXON	COMMENTS
SWC 60	1120.0	Upper *N. asperus* (2)	*Aglaoreidia qualumis*	Rare sp.
SWC 58	1134.7	Middle *N. asperus* (0)	*Aglaoreidia qualumis*	Rare sp.
SWC 58	1134.7	Middle *N. asperus* (0)	*Foveosporites palaequetrus*	Rare sp.
SWC 58	1134.7	Middle *N. asperus* (0)	*Proteacidites grandis*	Not prev. recorded above Lower *N. asperus* Zone
SWC 58	1134.7	Middle *N. asperus* (0)	*P. reticulatus*	Rare sp.
SWC 58	1134.7	Middle *N. asperus* (0)	*Peromonolites vellosus*	Rare sp.
SWC 56	1147.8	Middle *N. asperus* (0)	*Proteacidites grandis*	Rare sp. in this zone
SWC 56	1147.8	Middle *N. asperus* (0)	*Tricolpites thomasii*	Rare sp.
SWC 56	1147.8	Middle *N. asperus* (0)	*Simplicepollis meridianus*	Planar tetrad form
SWC 56	1147.8	Middle *N. asperus* (0)	*Stoveripollis*	Rare ms.
SWC 56	1147.8	Middle *N. asperus* (0)	*Polyorificites oblatus*	Rare sp. (=*Helicporites astrus*)
SWC 55	1154.7	(Lower *N. asperus*)	*Banksieaeidites elongatus*	Uncommon sp.
SWC 52	1228.6	Lower *N. asperus* (1)	*Helicporites astrus*	Uncommon sp.
SWC 52	1228.6	Lower *N. asperus* (1)	*Proteacidites pachypolus*	Unusually frequent occurrence
SWC 51	1257.5	Lower *N. asperus* (1)	*Tricolpites reticulatus* Cookson	Uncommon sp.
SWC 51	1257.5	Lower *N. asperus* (1)	*Tricolporites paeneretequetrus*	Uncommon ms. sp.
SWC 51	1257.5	Lower *N. asperus* (1)	*Cyathidites paleospora*	Unusually frequent occurrence in this zone
SWC 50	1278.0	Lower *N. asperus* (1)	*Dryptopollenites semilunatus*	Rare sp.
SWC 50	1278.0	Lower *N. asperus* (1)	*Triporopollenites delicatus*	Rare sp.
SWC 50	1278.0	Lower *N. asperus* (1)	*Plicodiporites crecsentis*	Very rare sp.
SWC 50	1278.0	Lower *N. asperus* (1)	*Proteacidites plemmelus*	Uncommon in this zone. Also at 1344.0m

TABLE 2

ANOMALOUS AND UNUSUAL OCCURRENCES OF SPORE-POLLEN TAXA IN WHIPTAIL-1A

SAMPLE NO.	DEPTH(m)	ZONE	TAXON	COMMENTS
SWC 50	1278.0	Lower *N. asperus* (1)	*P. reticulatus*	Rare sp.
SWC 50	1278.0	Lower *N. asperus* (1)	*Gambierina rudata*	Reworked in (?) non-marine sample
SWC 49	1312.0m	Lower *N. asperus* (2)	*Gyrostemonaceae*	Modern taxon
SWC 49	1312.0m	Lower *N. asperus* (2)	*Cranwellia striatus*	Very rare sp.
SWC 49	1312.0m	Lower *N. asperus* (2)	*Santalumidites cainozoicus*	Unusually frequent occurrence
SWC 40	1375.5	Lower *N. asperus* (1)	*Micrantheum spinyspore*	Very rare sp.
SWC 40	1375.5	Lower *N. asperus* (1)	*Proteacidites callosus*	Uncommon sp.
SWC 44	1381.5	Lower *N. asperus* (2)	*Elphedripites notensis*	Uncommon sp.
SWC 44	1381.5	Lower *N. asperus* (2)	*Proteacidites grandis*	Uncommon in this zone
SWC 43	1382.5	Lower *N. asperus* (2)	*Polycolpites simplex*	Very rare sp.
SWC 43	1382.5	Lower *N. asperus* (2)	*Conbaculites apiculatus*	Uncommon sp. in this zone
SWC 42	1383.5	Lower *N. asperus* (2)	*Conbaculites apiculatus*	Uncommon sp. in this zone
SWC 42	1383.5	Lower *N. asperus* (2)	*Elphedripites notensis*	Uncommon sp. in this zone
SWC 42	1383.5	Lower *N. asperus* (2)	*Proteacidites xestoformis*	Rare sp.
SWC 42	1383.5	Lower *N. asperus* (2)	*Umbelliferae*	Modern taxon
SWC 40	1409.5	*P. asperopolus* (0)	*Dryptopollenites semilunatus*	Rare sp.
SWC 40	1409.5	*P. asperopolus* (0)	*Tricolpites reticulatus* Cookson	Rare sp.
SWC 38	1447.0	(*P. asperopolus*)	*Proteacidites reticulatus*	In coal palynoflora with *M. tenuis*, *T. heleosus* and *T. reticulatus* Cookson
SWC 31	1635.2	(Middle *M. diversus*)	*Haloragicidites verrucatoharrisii*	Rare ms. sp.
SWC 13	2415.0	Lower *T. longus* (2)	*Stoveripollis* sp.	Rare ms. sp.

TABLE 2

ANOMALOUS AND UNUSUAL OCCURRENCES OF SPORE-POLLEN TAXA IN WHIPTAIL-1A

SAMPLE NO.	DEPTH(m)	ZONE	TAXON	COMMENTS
SWC 11	2476.5	T. lilliei (1)	Tricolpites remarkensis	Frequent.
SWC 10	2547.0	T. lilliei (2)	Tricolpites labrum	Freq. in this sample and at 2600.0, 2712.0, 2715.0 and 2780.9m
SWC 3	2712.0	(T. lilliei)	Stoveripollis	Rare ms. sp.
SWC 2	2715.0	(T. lilliei)	Stoveripollis	Rare ms. sp.
SWC 1	2780.9	T. lilliei (1)	Nothofagidites brachyspinulosus	Uncommon in this zone
SWC 1	2780.9	T. lilliei (1)	Tricolpites confessus	Abundant in sample

TABLE 3: SUMMARY OF BASIC PALYNOLOGICAL DATA

WHIPTAIL-1A

DIVERSITY - low medium high
S & P less than 10 10-30 greater than 30
D 1-3 3-10 10

SAMPLE NO.	DEPTH (m)	YIELD		DIVERSITY		PRESERVATION	LITHOLOGY	PYRITIZATION	COMMENTS
		SPORE-POLLEN	DINOS	SPORE-POLLEN	DINOS				
SWC 60	1120.0	Good	Fair	Medium	Medium	Poor	Slst., carb	-	
SWC 59	1128.5	Good	Good	High	Medium	Poor	Slst., carb.	Moderate	
SWC 58	1134.7	V. good	Good	High	Medium	Good	Slst., carb.	-	
SWC 56	1147.8	Good	Good	High	High	Good	Slst., carb.	-	
SWC 55	1154.7	Good	Low	Medium	Low	Good	Slst., carb.	-	
SWC 54	1164.0	Fair	V. low	Medium	Low	Fair	Ss., carb.	-	
SWC 53	1202.0	Fair	-	Medium	-	Fair	Slst. carb.	minor	
SWC 52	1228.6	Fair	Low	Medium	Medium	Fair	Clyst., carb.	-	
SWC 51	1257.5	Low	-	Medium	-	Good	Clyst.	-	spore-dominated
SWC 50	1278.0	Low	-	High	-	Good	Slst., carb.	-	
SWC 49	1312.0	Low	-	Medium	-	Fair	Slst., carb.	-	
SWC 48	1344.0	Good	-	High	-	Good	Slst., carb.	-	
SWC 46	1377.5	Good	Low	High	Low	Good	Slst., carb., coaly	minor	
SWC 45	1380.0	-	-	-	-	-	Ss.	-	Barren
SWC 44	1381.5	Fair	Low	Medium	Low	Poor	Slst., carb.	-	
SWC 43	1382.5	Good	V. low	High	Low	Fair	Slst., coaly	minor	
SWC 42	1383.5	V. good	-	High	-	Good	Ss.	-	
SWC 40	1409.5	Good	-	High	-	Good	Ss./Slst.	-	

TABLE 3: SUMMARY OF BASIC PALYNOLOGICAL DATA

WHIPTAIL-1A

DIVERSITY - low medium high
S & P less than 10 10-30 greater than 30
D 1-3 3-10 10

SAMPLE NO.	DEPTH (m)	YIELD SPORE-POLLEN	YIELD DINOS	DIVERSITY SPORE-POLLEN	DIVERSITY DINOS	PRESERVATION	LITHOLOGY	PYRITIZATION	COMMENTS
SWC 38	1447.0	Low	-	Medium	-	Fair	Coal	-	
SWC 37	1451.8	V. low	-	Low	-	Fair	Slst., coaly	-	
SWC 36	1478.0	V. low	Low	Low	Medium	Poor	Clyst.	moderate	
SWC 35	1501.5	V. low	V. low	Low	Low	Good	Slst.	-	
SWC 34	1571.8	Low	V. low	Medium	Low	Fair	Slst.	minor	
SWC 31	1635.2	V. good	Low	Medium	Low	Good	Clyst.	minor	freshwater?
SWC 30	1660.0	Low	-	Low	-	Good	Ss.	-	
SWC 29	1698.0	V. low	-	Low	-	Good	Ss., carb.	-	
SWC 27	1811.0	V. good	Fair	Medium	?Medium	Poor	Slst., carb.	-	
SWC 23	2060.8	V. low	V. low	Low	Low	Fair	Ss., carb.	-	contaminated
SWC 19	2126.0	V. low	-	Low	-	Poor	Ss.	moderate	contaminated
SWC 17	2218.2	Low	-	Medium	-	Poor	Clyst.	-	
SWC 15	2292.8	Low	-	Low	-	Fair	Ss., carb.	-	
SWC 13	2415.0	Fair	-	Medium	-	Fair	Slst.	-	
SWC 11	2476.5	Fair	-	Medium	-	Poor	Clyst.	-	
SWC 10	2347.0	Fair	-	Medium	-	Poor	Slst. carb.	-	
SWC 9	2600.0	Good	-	Low	-	Fair	Clyst.	-	
SWC 3	2712.0	Low	-	Medium	-	Fair	Slst., coaly	-	
SWC 2	2715.0	Low	-	Medium	-	Fair	Slst.	-	