Backhouse Biostrat Pty Ltd

Report BB490

GSWA Harvey 2
Palynology Report

by

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BB490. GSWA Harvey 2 Palynology Report

Summary of results from Harvey- 2

Depth (m)	Sample type	Palynological Spore-pollen Zone	Age
213.90	Core	*Corollina torosa*	Early Toarcian-Hettangian
219.30	Core	*Corollina torosa*	Early Toarcian-Hettangian
248.95	Core	*Corollina torosa*	Early Toarcian-Hettangian
283.10	Core	*Corollina torosa*	Early Toarcian-Hettangian
344.75	Core	Barren	
377.00	Core	*Corollina torosa*	Early Toarcian-Hettangian
450.90	Core	*Corollina torosa*	Early Toarcian-Hettangian
552.20	Core	*Corollina torosa*	Early Toarcian-Hettangian
610.95	Core	*Corollina torosa*	Early Toarcian-Hettangian
644.9	Core	Barren	
686.9	Core	Barren	
732.50	Core	?*Ashmoripollis reducta*	?Rhaetian
793.10	Core	?*Ashmoripollis reducta*	?Rhaetian
821.20	Core	Indet contaminated	
821.25	Core	?Triassic indet.	?Triassic
908.25	Core	Indet. contaminated	
908.26	Core	?Triassic indet.	?Triassic
1006.95	Core	Barren	
1111.90	Core	?lower *S. speciosus – Staurosaccites quadrifidus*	Carnian-Ladinian
1242.50	Core	?lower *S. speciosus – Staurosaccites quadrifidus*	Carnian-Ladinian
1315.70	Core	?lower *S. speciosus – Staurosaccites quadrifidus*	Carnian-Ladinian
1348.25	Core	?lower *S. speciosus – Staurosaccites quadrifidus*	Carnian-Ladinian

INTRODUCTION

Samples. Twenty samples were processed in total. However, after the initial processing of samples 18 samples it was realised that 2 samples were badly contaminated (821.2 m and 908.25 m). Subsequently 2 more samples were collected and processed from almost the same depths. The contaminated samples are not included inthe range chart.

Location. Easting 392052.65, Northing 6347141.74

The Triassic zonation used in this report was initially formulated by Dolby and Balme (1976) and modified by Helby et al. (1987). The Jurassic zonation follows Filatoff (1975) and Helby et al. (1987).

Tables

1. GSWA Harvey 2 Summary Palynology

2. GSWA Harvey 2 Jurassic palynology range chart

3. GSWA Harvey 2 Triassic palynology range chart.

PALYNOSTRATIGRAPHY

Corollina torosa Spore-pollen zone: 213.9 m to 610.95 m

Yields. One sample barren, othe samples extremely low to high.

Zone. The abundance of *Corollina*, probably nearly all *C. torosa*, and the absence of *Callialasporites turbatus* and index species for younger spore-pollen zones indicates the *C. torosa* Spore-pollen zone. The few spore species present are consistent with this zone. In particular, *Anapiculatisporites dawsonensis* is consistently present. The bisaccate pollen recorded are small forms similar to others previously recorded from the lowest Jurassic.

Age. The *C. torosa* Zone is currently dated as Early Toarcian to Hettangian.

Barren interval: 644.9 m to 686.9 m

Two samples in the interval between the Jurassic and Triassic samples contained only somewhat rounded inertinite and in the lower sample some cuticular plant material.

?Ashmoripollis reducta Spore-pollen zone: 732.5 m to 793.1 m

Yields. Low to Moderate.

Zone. Bisaccate pollen consistent with the broad Triassic taxon *Falcisporites australis* are abundant in both samples. The higher sample has low diversity and also contains a numer of small sub-spherical to sub-circular forms that sometimes appear to be trilete that are here referred to as *Punctatisporites* "small". The same forms are present down to 908.26 m.

The 793.1 m sample displays greater diversity and notably contains fairly common Ashmoripollis reducta, which suggests it may belong in the *A. reducta* Spore-pollen zone. Other spores are consistent with this assignment, but other index species for this zone on the North West Shelf are not recorded here and the sample may be slightly older than the *A. reducta* Zone. However, no index species for older zones are recorded.

Age. The *A. reducta* Zone is currently dated as Rhaetian.

?Late Triassic: 821.25 m to 908.26 m

Yields. Extremely low and low.

Zone. The two samples originally processed from this interval, at 821.2 m and 908.25 m were small and fragmentary, and after processing it became evident that they were contaminated by drilling mud. They are therefore discounted in this report and just listed in Table 1.

Both reported samples produced low yields with very restricted diversity. The 908.26 m sample is richer and slightly more diverse than the 821.25 m sample. It is dominated by small *Dictyophyllidites harrisii* and *Punctatisporites* "small". Saccate pollen are rare in both samples. The 908.26 m sample also contains the acritarchs *Quadrisporites horridus* and *Circulisporites* spp., but unfortunately these are not age diagnostic.

Age. These are extremely unusual assemblages and suggest some sort of restricted depositional environment. The absence of *Corollina* spp. suggests they are from below the Jurassic, but this is not completely certain. They are not similar to any other Triassic assemblage that has been recorded. If they are from the Jurassic, the presence of more normal Late Triassic assemblages at higher levels in the well needs to be explained. The samples are provisionally assigned to the Triassic.

?lower *Samaropollenites speciosus* to *Staurosaccites quadrifidus* Spore pollen zones: 1111.9 m to 1242.5 m

Yields. Extremely low to moderate.

Zone. The 1315.7 m sample contains several *Corollina* spp. (not included in the count) and this is attributed to minor contamination. With this exception, the samples from this interval are broadly similar. Specimens counted as *Falcisporites australis* show a range of morphologies, particularly in the 1111.9 m sample. This variety of bisaccate type and the presence of *S. quadrifidus* and the acritarch *Plaesiodictyon mosellanum* suggest the sample is no younger than the lower *S. speciosus* Zone and it may be older. Unfortunately many specimens in this sample are quite dark and difficult to indentify with confidence. Below 1111.9 m, there is no record of *S. quadrifidus* or index species for older zones. In summary, all four samples are consided to lie in the lower *S. speciosus* to *S. quadrifidus* Zone range.

It is considered that there may be a time break between this interval and the overlying Late Triassic interval.

Age. The lower *S. samoilovichii* Zone is considered to be Late Ladinian to Carnian in age and the *S. quadrifidus* Zone is possibly entirely Ladinian in age.

THERMAL MATURITY

Kerogen slides were prepared for each sample and Thermal Alteration Index levels (TAI) are indicated in Table 1. There is little change in thermal maturity over the sampled interval. The Triassic interval appears to be slightly more mature, but many individual specimens are still rated as TAI 2.

REFERENCES

Dolby, J.H. and Balme, B.E., 1976, Triassic palynology of the Carnarvon Basin, Western Australia. Review of Palaeobotany and Palynology, 22, 105-168.

Filatoff, J., 1975, Jurassic palynology of the Perth Basin, Western Australia: Palaeontographica , Abt B, v. 154, p. 1–120.

Helby, R., Morgan, R., and Partridge, A. D., 1987, A palynological zonation of the Australian Mesozoic, in P. A. Jell (ed.) Studies in Australian Mesozoic Palynology, Assoc. of Australasian Palaeontologists, Memoir 4, 1–85.

TABLE 1. GSWA HARVEY-2 SUMMARY PALYNOLOGY

DEPTH	SAMPLE TYPE	YIELD	PRESERV.	SPORE-POLLEN ZONE	ENVIRONMENT	TAI	AGE	EVENTS & COMMENTS
213.90	CORE	MOD	GOOD	*Corollina torosa*	Non-marine	2	Early Toarcian-Hettangian	
219.30	CORE	HIGH	GOOD	*Corollina torosa*	Non-marine	2	Early Toarcian-Hettangian	
248.95	CORE	LOW	GOOD	*Corollina torosa*	Non-marine	2	Early Toarcian-Hettangian	
283.10	CORE	EX LOW	GOOD	*Corollina torosa*	Non-marine	2	Early Toarcian-Hettangian	
344.75	CORE	BARREN		Indet.				
377.00	CORE	HIGH	GOOD	*Corollina torosa*	Non-marine	2	Early Toarcian-Hettangian	
450.90	CORE	EX LOW	FAIR	*Corollina torosa*	Non-marine	2	Early Toarcian-Hettangian	
552.20	CORE	HIGH	FAIR	*Corollina torosa*	Non-marine	2	Early Toarcian-Hettangian	
610.95	CORE	LOW	FAIR	*Corollina torosa*	Non-marine	2	Early Toarcian-Hettangian	FAD abundant *Corollina*
732.50	CORE	LOW	GOOD	?*Ashmoripollis reducta*	Non-marine	2 to 2+	?Rhaetian	LAD abundant *F. australis* type pollen
793.10	CORE	MOD	GOOD	?*Ashmoripollis reducta*	Non-marine	2 to 2+	?Rhaetian	Several *A. reducta*
821.20	CORE			Sample contaminated		2 to 2+		
821.25	CORE	EX LOW	FAIR	?Late Triassic indet.	Non-marine	2 to 2+	?Triassic	Abnormal assemblage
908.25	CORE			Sample contaminated		2 to 2+		
908.26	CORE	LOW	FAIR	?Late Triassic indet.	Non-marine	2 to 2+	?Triassic	Abnormal assemblage
1006.95	CORE	BARREN		Indet.				
1111.90	CORE	MOD	FAIR	?lower *Samaropollenites speciosus* – *Staurosaccites quadrifidus*	Non-marine	2 to 2+	Carnian-Ladinian	*S. quadrifidus* present
1242.50	CORE	LOW	FAIR	?lower *Samaropollenites speciosus* – *Staurosaccites quadrifidus*	Non-marine	2 to 2+	Carnian-Ladinian	
1315.70	CORE	EX LOW	FAIR	?lower *Samaropollenites speciosus* – *Staurosaccites quadrifidus*	Non-marine	2 to 2+	Carnian-Ladinian	Minor contamination
1348.25	CORE	LOW	FAIR	?lower *Samaropollenites speciosus* – *Staurosaccites quadrifidus*	Non-marine	2 to 2+	Carnian-Ladinian	

TABLE 2. GSWA HARVEY 2 JURASSIC PALYNOLOGY RANGE CHART

		Spores and pollen																														Acritarchs		
Depth (m)	Sample tyle	Spores indet.	Anapiculatiporites dawsonensis	Araucariacites australis	Baculatisporites comaumensis	bisaccate pollen	Cadargasporites reticulatus	Cadargasporites spp.	Calamospora mesozoica	Callialasporites dampieri	Camarozonosporites clivosus	Concavissimisporites spp.	Corollina spp.	Dictyophyllidites "large forms"	Dictyophyllidites spp.	Exesipollenites spp.	Falcisporites cf australis	Foveosporites cf. irregulatus (of Filatoff)	Foveosporites moretonensis	Gleicheniidites spp.	Ischyosporites variegatus	Limatulasporites cf. limatulus	Microcachryidites antarcticus	Neoraistrickia spp.	Nevesisporites vallatus	Perinopollinites elatoides	Punctatisporites spp.	Retitriletes austroclavatidites	Retitriletes rosewoodensis	Rugulatisporites spp.	Staplinispporites mathurii	Trilobosporites antiquus	Circulisporites spp.	Lecaniella foveolatus	Total
213.9	co		x								x		88		3	5	2				1					x	x						1		100
219.3	co		1	1	1	3							84	1	5						2			1				1				x			100
248.95	co		1	4	1	7				1		x	68	x	10	5					1	x	1	x	1			x		x					100
283.1	co	1		2									90		2	4								1				x							100
344.75	co	Barren																																		0
377	co	1	x	x		4							93		1											1	x				x				100
450.9	co		1		1	6							85		6												1								100
552.2	co		x	1	1	1	x		x				84	x	10	2		x				x	x	x	x		x		1		x			x	100
610.95	co	2	x	1	x	5		x	1				79		8	1			x	x				1	x		1	1		x					100
644.9	co	Barren																																		0
686.9	co	Barren																																		0

TABLE 3. GSWA HARVEY 2 TRIASSIC PALYNOLOGY RANGE CHART

		Spores and pollen																																													Acritarchs							
Depth in m	**Sample type**	**Spores indet.**	**Alete spore indet.**	**Apiculatisporis cf. clematisi**	**Aratrisporites spp.**	**Ashmoripollis reducta**	**Baculatisporites spp.**	**Cadargasporites spp.**	**Calamospora tener**	**Camerosporites secatus**	**Converrucosisporites cameroni**	**Converrucosisporites spp.**	**Corollina spp.**	**Cycadopites follicularis**	**Densoisporites spp.**	**Dictyophyllidites harrisii**	**Dubrajisporites triassicus**	**Falcisporites australis**	**Hamiapollenites insculptus**	**Helby SP 682**	**Horriditriletes sp.**	**Kraeuselisporites cf. saeptatus**	**Limatulisporites limatulus**	**Lunatisporties acutus**	**Neoraistrickia spp.**	**Neoraistrickia taylorii**	**Platysaccus queenslandii**	**Playfordiaspora velata**	**Polycingulatisporites mooniensis**	**Protohaploxypinus cf. microcorpus**	**Protohaploxypinus cf. samoilovichii**	**Punctatisporites spp.**	**Punctatisporites small**	**Reticulatisporites spp.**	**Retitriletes sp.**	**Rugulatisporites spp.**	**Samaropollenites speciosus**	**Staurosaccites quadrifidus**	**Staurosaccites? Sp.**	**Striatella seebergensis**	**Taeniate pollen indet.**	**Thymospora ipsviciensis**	**Vitreisporites signatus**	**Bartenia communis**	**Circulisporites spp.**	**Lecaniella sp. A**	**Lecaniella spp.**	**Pilasporites crateraformis**	**Plaesiodictyon mosellanum**	**Quadrisporites horridus**	**TOTAL COUNT**
732.50	CO												2			2		81														12		x									1			2				100
793.10	CO					4	x					x	1	1	1	12		73	x				1			1	1	x	x				2	x		2				x		1	x	x		x	x	x			100
821.25	CO	2													2	1		1			1											92												1							100
908.26	CO	2													3	47		4			1											38									x			3				2	100
1006.95	CO	Barren																																																	
1111.90	CO	4	4				1			1			1					78		2				2			x		2	2							1	x	2												100
1242.50	CO	3	2		x		1	1	x						x	1	x	77		10		x		1	x		1	x				2				1													100
1315.70	CO	2					4									10		77		1										1	4				1															100
1348.26	CO			2			6		5		x	1		x		7		76						1			x		x		1					x					1									100