

Fingal Tier Drillcore Rationalisation Project

Introduction

A nominal aim of 50% of drillholes was initially set for the culling of historical coal exploration drillholes on Fingal Tier held in the MRT core store, in order to alleviate a space shortage. A TIGER search turned up 82 drillholes held in the core library from the area most intensively drilled for coal exploration (Fig. 1). These holes, the focus of this project, comprise:

- 71 holes drilled by the Department of Mines between 1959 and 1986 (prefixed “DOM” or left unprefixed below), on a nominal 1 km grid,
- nine drilled by the HEC in the 1960’s (prefixed “C”)
- two holes drilled by Pure Energy in 2007, prefixed “Fingal”.

46 holes (56%) are suggested for disposal (Table 1). It should be noted that the holes suggested for disposal tend to be the shorter ones, that are in many instances rendered redundant by nearby, more stratigraphically complete holes. A more accurate indication of space taken up in the core library is provided by considering the number of core trays. Using this measure, 51% of core trays are recommended for disposal (1356 out of a total 2673).

It should be noted that a number of drillholes from the DOM series appear to have already been culled: holes 3, 14, 15, 16A, 35, 46A, 47, 48, 63A, 63B (these are not shown on Fig. 1). Pure Energy’s Fingal 59B and 82B have also been culled.

Recommendations for disposal (Table 1) were made taking into account spatial separation, stratigraphic completeness and more specific considerations (below). A lack of time precluded the ability to physically check the condition or completeness of the drillcore, except for DOM7b and 86.

Points of interest in the Fingal Tier drillcore

Coal Measures: The drilling encompasses a major part of Tasmania’s coal reserves (Threader & Bacon, 1983). The coal measures comprise a late Triassic fluvial sandy succession up to about 400 m thick. This is the thickest and most complete late Triassic in the State. It should be noted that this sequence is generally poorly exposed, being relatively erodable and mantled nearly everywhere by dolerite talus. There are eight recognised coal seams (or coaly intervals) designated (from top down) A to H. A non-coaly interval up to 160 m thick occurs above the A seam. Stratigraphic range preserved in the drillholes is indicated in Table 1 using this framework. A thick sheet of Jurassic dolerite overlies the coal measures in most holes, and the stratigraphic position of the contact is highly variable. Most holes targeted the top of the Permian; consequently the higher parts of the coal measures tend to be under-represented, overall, in the drillcore collection, having been displaced by dolerite in many holes. Holes with more complete stratigraphic coverage (which generally means a stratigraphically high dolerite contact) were weighted in favour of retention.

Coal: In most drillholes, the drillcore of the thicker seams has been removed for destructive analysis. Thinner seams may remain. In some holes the coal has apparently not been sampled (i.e. not shown on the logs; “no analytical data” indicated in Table 4 of Threader & Bacon, 1983). These include 60, 64, 75, 77B, 78, 83, and 84. (I have not checked this by visual inspection of the drillcore). Given that the coal is potentially of interest for various reasons, these holes are favoured for retention.

Dolerite: Most of the holes intersected up to ~450 m of dolerite before reaching the coal measures. No upper contact of the sill is known, but most of it is thought to be preserved in the thicker sections. As such, this core is of some interest for petrological, etc. reasons. In most holes the dolerite core was discarded on site, or a 10 cm sample was kept from each drill run (ca. 3 m). This latter mode of sampling was done on most DOM holes post-1979 (DOM38 onwards), and retains a useful record of petrological variation while reducing the storage requirements by ~97% (indicated as “Jd subsampled” in Table 1). Many dolerite sections sampled this way appear to have been discarded, however, from looking at depths held as recorded in the database, although this may be hard to judge without physical inspection. In DOM holes 17, 19, 31, 32(?), 67 and 86, the entirety of the dolerite drillcore was retained (433 m in 67). DOM31 and 67 are here recommended for retention, in part for their thick preserved dolerite sections.

Tuffs: Rare felsic tuffs (volcanic ash beds) are found in the upper part of the coal measures. These can be precisely dated radiometrically by U-Pb on zircon, and so are of interest for reasons of correlation, basin evolution and calibration of palynostratigraphy. Two tuffs have been dated from this area, both from Pure Energy’s Fingal 82b (Calver et al., 2021). Palynology was also undertaken on Fingal 82B (Calver et al., 2021). Unfortunately this hole seems to have been culled from the core library at some time in the last 7 years. The adjacent DOM82 is recommended for retention. Tuffs have also been noted in DOM 51, 55, 56, 58, 60, 73, 78, 80, 81, 82, 83, 84, 85, and Fingal 55B (for full details, see supplementary data table in Calver et al., 2021). However, the tuffs were not recognised as tuffs until 1980, so older holes (DOM 1 to 44; C1-C9) are likely to contain unrecognised instances.

Dalmayne Conglomerate: Pebbly horizons and conglomerate beds occur in the upper parts of the coal measures. These consist of extrabasinal clasts, including undeformed rhyolitic volcanics, of enigmatic provenance. A correlatable conglomerate unit up to a few m thick is found in many holes, about 60 m above the A seam, and is known as the Dalmayne Conglomerate. This marker bed coincides (approximately, at least) with a palynological zone boundary, and it may represent a stratigraphic break (Calver et al., 2021). These conglomerates are an additional point of interest in the uppermost parts of the coal measures. Although rare outcrops of the Dalmayne Conglomerate are known, the drillholes provide the stratigraphic context.

Middle Triassic: The lithic sandstone-dominated coal measures grade down into around 30 m of dominantly quartz sandstone with thin coal, mudstone, and conglomerate. This is equivalent to much thicker early to middle Triassic sequences elsewhere in the State.

Permian (Lower Parmeener Supergroup): Most holes targeted the top of the Permian as an aid to correlation, this being a horizon easily recognisable as an abrupt disconformable contact of the quartz sandstone-dominated unit upon dark grey marine poorly sorted mudstone. In DOM4, drilling continued through the top-Permian mudstone into the underlying limestone. DOM85 was extended through the whole Permian (172 m thick), and bottomed in Mathinna beds. DOM85 is recommended for retention in its entirety, for stratigraphic and sedimentological interest.

Some remarks on specific drillholes

DOM6 and 7b: DOM6 drillcore held starts at 239 m even though the base of the dolerite is logged at 129 m. The hole bottomed in Permian at 458 m. The coal measures from 129 m to 239 m appear to be missing. In DOM7b, the core library only holds 30 to 187 m, all in coal measures (visually checked by me on 14/05/2025), but the log records a further 126 m of coal measures and the hole bottoming in Permian at 312 m. DOM6 and 7b, about 0.7 km apart, thus roughly complement each other and both are recommended for retention.

DOM83: This hole intersected about 160 m of sedimentary rock above the A seam, greater than any other hole, and thus representing the youngest Triassic known in the district and possibly the State. The topmost Triassic unit is a mudstone (93.4-134.6 m) which would be of interest for

palynological, dating and other reasons. Unfortunately, the corresponding interval (from 5 – 133 m) is missing from the core library (email from Lia Unwin to Mark Duffett, 28/04/2025). Nonetheless it is recommended that (the remainder of) this hole be retained. Nearby VR15 may provide an intersection of this interval, but appears to have not yet been submitted.

DOM86: This, the final hole of the DOM series, lacks any scanned log. Consequently I had it laid out, and logged it on 14 May 2025 (see Appendix to this report). The hole is similar to nearby DOM44, and the base of dolerite and F and G seams were intercepted at a slightly higher RL. In DOM86 the F seam (Duncan seam) appears to have been fully sampled, but other seams remain intact. The hole ends in coal measures below the G seam. This hole is recommended for retention.

Fingal 41B, 55B, 59B, 82B (Pure Energy) These holes were drilled by coal seam gas explorer Pure Energy to obtain fresh coal for analysis. They are “twins” (drilled adjacent) to DOMs 41, 55, 59, and 82. The Pure Energy holes did not continue to the top of the Permian, as was the norm with the DOM holes. Coal seams can be expected to have been fully sampled. Of the four Pure Energy holes, only two, Fingal 41B and 55B remain in the core store. They are HQ core, and thus take up more space than the DOM holes, i.e. a total 188 trays vs. 104 for DOM 41 and 55. Fingal 41B and 55B are recommended for disposal.

A Further Recommendation

When holes are partially or wholly culled, this should be noted in the database, perhaps in the “Comments” section. This would help remove any doubt about what might have happened to missing core that one would normally expect to find in the collection.

References

Calver, C.R., Mantle, D.J., Crowley, J.L., & Nicoll, R.S., 2021. Triassic coal measures, Tasmania: new U–Pb CA-TIMS ash bed dates and numerical calibration of palynostratigraphy. *Australian Journal of Earth Science*, 68: 1005-1016.

Threader, V.M. & Bacon, C.A. 1983. The Department of Mines coal exploration program, Fingal Tier. UR 1983/46.

Appendix: Summary Log of DOM86

0-12 m: No core

12-16 m: Weathered (pale brown) dolerite.

16-128.0 m: Dolerite. Medium to fine-grained, becoming finer very gradually with depth. Two, near-vertical veins filled with white powdery ?zeolite and beige clay, 2-4 cm wide, 82-84.5 m, 87-88 m.

128.0 – 152.8 m: Fine-grained lithic sandstone, and minor pale grey hornfels. Sandstone coarsens towards base (becoming medium-grained). SBC (Sharp bottom contact).

152.8-162.0 m: Dark grey carbonaceous siltstone and mudstone, with minor thin coal beds. GBC (Gradational bottom contact).

162.0-169.5 m: Fine-med grained lithic sandstone, coarser towards base. SBC.

169.5 – 171.5 m: dominantly pale grey mudstone.

171.5 – 185.0: Fine-med grained lithic sandstone.

185.0-189.6: Dominantly pale grey mudstone passing down into carbonaceous mudstone.

189.6 -208.0 (approx.): Lithic sandstone; intraclastic conglomerate 201.3-201.6 m; common coaly wisps 206 m- 208 m.

208 m-213.7 m: Most of the core is missing. Numerous cardboard markers, recording collection of “siltstone” (X6) and “clayey mudstone” (X1). What remains in tray is dark grey silty mudstone. Note: This interval may be the “F” (Duncan) seam, by correlation of stratigraphy and RLs with nearby DOM44.

213.7 – 245.2 m: Uniform, medium-grained lithic sandstone. Wisps of bright coal here and there.

245.2- 249.5 m: Dark grey mudstone, laminated in places. GBC.

249.5 – 251.0 m: Sandstone, laminated and fine-grained at top and coarsens downwards. SBC.

251.0 – 253.2 m: Medium to dark grey mudstone. GBC.

253.2 – 255.1 m: Coal. SBC. Note: This may be the “G” (East Fingal) seam, by correlation with the nearby DOM 44.

255.1 – 257.0 m: Grey mudstone. GBC.

257.0 – 259.0 m: Sandstone. SBC.

259.0 – 263.6 m: Grey mudstone and siltstone. Two calcite concretions, 0.15 – 0.2 m across. GBC.

263.6 – 264.6 m: Dominantly fine-grained sandstone. SBC.

264.6 -265.4 m: Coal. GBC.

265.4 – 270.7 m: Mudstone and siltstone.

270.7- 276.1 m: Fine-med grained lithic sandstone. SBC.

276.1 – 277.7 m: Mudstone, with minor thin beds of fine-grained sandstone and siltstone. GBC.

277.7 – 281.8 m: Lithic sandstone. GBC.

281.8 – 286.5 m: Carbonaceous mudstone. GBC.

286.5 – 295.8 m: Uniform, medium grained lithic sandstone. SBC.

295.8 – 296.3 m: Mudstone. GBC.

296.3 – 296.8 m: Sandstone. SBC.

296.8 – 299.0 m: Mudstone, siltstone and cross-laminated fine sandstone.

299.0 – 301.0 m: Dominantly carbonaceous mudstone.

301.0 m: end of hole.

Clive Calver 20/05/2025

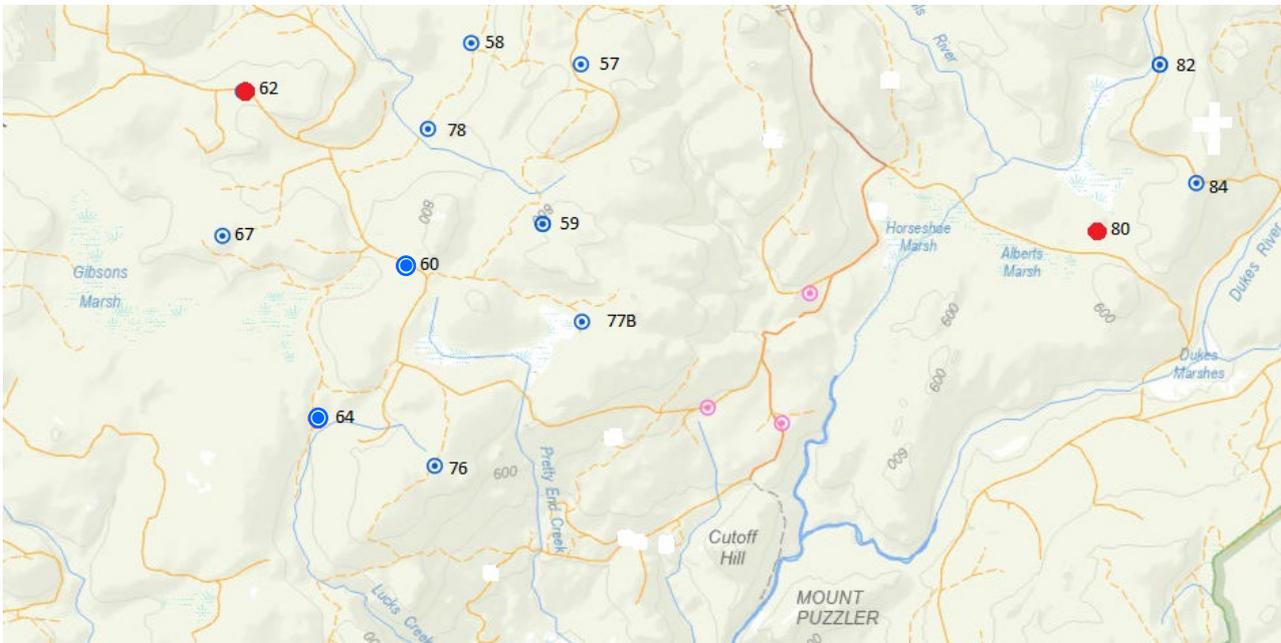
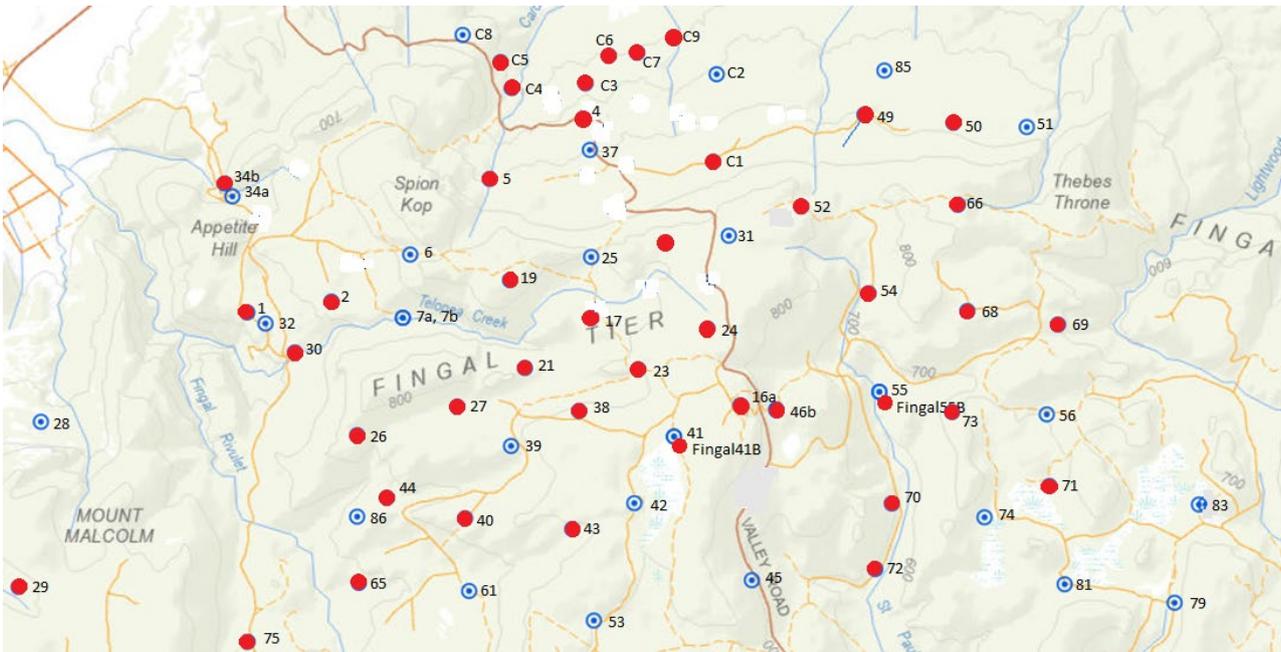


Figure 1: Map showing distribution of drillholes under consideration; holes recommended for disposal are shown with red symbols.

Table 1 (overleaf): Drillholes with stratigraphic range, comments, tray numbers and recommended treatment.

DOM#	base	top	Jd~	comments	trays	cull?	DOM#
1	Rq	D			22	discard	1
2	F-	B		talus discarded	21	discard	2
4	P	A			19	discard	4
5	H-	A		talus discarded	14	discard	5
6	P	A+		Jd and upper R core is missing.	25	retain	6
7a				short hole	8	retain	7a
7b	P	A+		lower half of hole is missing. Complements DOM6	25	retain	7b
16a				Jd discarded	20	discard	16a
17	Rq	D	~300	Jd retained	72	discard	17
19	F-	A+		Jd retained	31	discard	19
20	G-	A+		Jd discarded	29	discard	20
21	P	C		Jd discarded	30	discard	21
23	P	C	~350	Jd discarded	26	discard	23
24	H	D+	386	some Jd kept? Units inconsistent in TIGER	20	discard	24
25	P	A+		Jd discarded	38	retain	25
26	Rq	C		Jd discarded	44	discard	26
27	P	C		Jd discarded	40	discard	27
28				talus discarded	22	retain	28
29				Jd discarded	15	discard	29
30	P	D		talus discarded	29	discard	30
31	P	A+	~300	Jd retained	89	retain	31
32	P	D			34	retain	32
34a				short hole nr Duncan mine	10	retain	34a
34b				short hole nr Duncan mine	5	discard	34b
37	P	A		talus discarded	41	retain	37
38	P	C	~350	Jd subsampled (log)	33	discard	38
39	P	C		Jd subsampled (log)	38	retain	39
40	P	C		Jd subsampled (log)	38	discard	40
41	P	A+		Jd subsampled (log)	50	retain	41
42	P	C+	~350	Jd subsampled (log)	27	retain	42
43	Rq	C	~300	Jd subsampled (log)	28	discard	43
44	P	C		Jd subsampled (log)	39	discard	44
45	P	A+		Jd discarded?	45	retain	45
46B	P	A+		Jd discarded?	84	discard	46B
49	P	C+		thick C; talus discarded	35	discard	49
50	P	B+		Jd subsampled (log)	29	discard	50
51	G-	A		tuff; Jd discarded	28	retain	51
52	P	F	~400	Jd discarded?	21	discard	52
53	G-	A+		congl at top; Jd discarded	31	retain	53
54	P	E	~400	Jd discarded?	20	discard	54
55	P	A+		congl at top; tuffs in A; 60m supra A	64	retain	55
56	E-	A+		82 m supra A; tuffs	35	retain	56
57	P	A+		Jd discarded?	41	retain	57
58	P	A+		congl; 80m supra A; tuffs	49	retain	58
59	Rq	A+	~225	Jd subsampled; 60 m supra A, congl, tuff	44	retain	59
60				Jd discarded? tuff (139.3-140.4)	39	retain	60
61	P	C		Jd discarded?	31	retain	61
62				Jd discarded?	17	discard	62
64	P	C+		Jd discarded	37	retain	64
65				Jd subsampled	19	discard	65
66	P	E+	~400	Jd discarded	22	discard	66
67	Rq	H-	432	Jd retained	64	retain	67
68	P	E	~450	Jd discarded	24	discard	68
69	H-	G	~450	Jd discarded	16	discard	69
70	Rq	G	~350	Jd discarded	13	discard	70
71	Rq	A+		Jd subsampled	37	discard	71
72	P	H	350	Jd subsampled	10	discard	72
73	H-	A+		Jd subsampled; 60 m supra A; tuff	45	discard	73
74	P	A+		Jd subsampled	46	retain	74
75				Jd + 8 m R discarded? Retains coal	22	discard	75
76	P	C+		Jd subsampled?	28	retain	76
77b	H-	A		summary log only; retains coal	39	retain	77b
78	B-	A+		summary log only; tuff at 53.8-54.8; retains coal	14	retain	78
79	P	A+		Jd discarded; possibly 102m supra- A	45	retain	79
80				Jd subsampled; tuffs	27	discard	80
81	G-	A+		Jd subsampled; dal congl 172m, 120 m supra A; tuff	43	retain	81
82	P	A+		dal congl 101, 105 m supra-A, tuffs	45	retain	82
83	B-	A+		160 m supra A (mudst 93.4-134.6, but core missing)	22	retain	83
84	C-	A+		Jd subsampled; tuffs, coal retained	16	retain	84
85	P	B		tuff, includes whole Permian but scanned log only to 271m	54	retain	85
86	G-	D+		For log see Appx 1 of report	38	retain	86
C1	F-	A		No Jd	30	discard	C1
C2	P	A		No Jd. Thicker	37	retain	C2
C3	P			No Jd	21	discard	C3
C4	P			No Jd	15	discard	C4
C5	P			No Jd	12	discard	C5
C6	P			No Jd	10	discard	C6
C7	P			No Jd	14	discard	C7
C8	P			No Jd Relatively thick	12	retain	C8
C9	P			No Jd	13	discard	C9
Fingal41b				twin of DOM41	105	discard	Fingal4
Fingal55b				tuffs. Twin of DOM55	83	discard	Fingal5