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1984/10. The Dalmayne Coalfield

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Abstract

The Dalmayne coalfield lies eleven kilometres south of St Marys, and may be considered to be an easterly extension of the Fingal coalfield.

One coal seam has been exploited in the area, although several seams exist within a fluvial sequence of lithic sandstone, siltstone and mudstone. The coal-bearing sequence is of Triassic age and belongs to the Upper Division of the Upper Parmeener Super-Group.

Sediments of the underlying Lower Division of the Parmeener Super-Group have been divided into four mappable units. Jurassic dolerite has intruded the sedimentary pile and now caps the higher ground. Talus thickly mantles hill slopes and obscures dolerite-sediment contacts.

The Dalmayne Colliery first opened in 1915, with extensive infrastructure such as bins and an aerial ropeway which transported the coal to Piccaninny Point. These operations closed in 1917. The mine was re-opened in 1939 and coal transported to St Marys by road until the mine closed in 1955.

An indicated reserve of 190 million tonnes of black coal exists in one seam. The area has much potential for future exploration.

LOCATION AND ACCESS

The Dalmayne coalfield lies eleven kilometres south of St Marys and five kilometres west of Piccaninny Point, on the east coast of Tasmania, and extends from the coastal plain to the eastern margin of the central eastern highlands.

Access is obtained from a series of rough tracks bulldozed for forestry and exploration activities. An unsealed road runs from Gray past the old colliery and joins the forestry 'E' road which joins the Tasman Highway near Piccaninny Point. Most of the roads are only suitable for four-wheel drive access.

GENERAL GEOLOGY

The geology of the Dalmayne coalfield and environs has been mapped by Turner *et al.* (in prep.) (fig. 1). The essentially flat-lying Parmeener Super-Group unconformably overlies basement of folded and cleaved Siluro-Devonian quartzwacke turbidite and Devonian granite. The Lower Division of the Parmeener Super-Group is wholly Permian in age and is about 120 m thick in the Dalmayne area. The Lower Division consists of four mappable units, being from oldest to youngest:

(i) Dominantly quartz arenite with minor basal conglomerate, passing up into interbedded fine quartz arenite and shale;

(ii) Poorly sorted, sparsely pebbly, usually richly fossiliferous marine sandstone, siltstone, mudstone, and bioclastic limestone;

(iii) A thin (2-4 m) unit of pebbly glauconitic sandstone;

(iv) Poorly bedded, grey, gritty mudstone, sparsely pebbly and unfossiliferous except for rare foraminifera.

The oldest unit is equivalent to the Lower Freshwater Sequence, the upper three to the Upper Marine Sequence (see Forsyth *et al.*, 1974).

The Upper Division of the Parmeener Super-Group comprises the coal measures of economic interest. Here, as elsewhere in north-eastern Tasmania, the Upper Division is wholly Triassic in age and disconformably overlies the Lower Parmeener Super-Group. Erosion preceded deposition of the coal measures, causing variable thinning of the Permian sequence; for example, the uppermost Permian formation is about 20 m thick over most of the area, but only two metres thick where it is exposed on 'E' Road at FP047831.

At the base of the Upper Parmeener Super-Group is a thin unit of dominantly quartz arenite, only 2-3 m thick over most of the area, but at least 12 m thick at 'E' Road [FP047831]. The rest of the Triassic sequence, about 350 m thick, consists dominantly of medium-grained lithic arenite, interbedded with mudstone, carbonaceous mudstone and coal. The lithic arenite is typically thick-bedded, often showing trough cross-bedding. Intraformational breccia, with rip-up clasts of mudstone and coal, is common at the base of sandstone beds. Sparse, rounded, bed-load pebbles and cobbles of extrabasinal provenance are occasionally seen. A pebble-conglomerate bed occurs at FP008891, and 3.52 m of conglomerate was intersected high in the sequence in IMI DDH2 (Edyvean, 1975). Clast lithologies in the pebbly bands and conglomerate include rhyolite, quartzite, schist, and granite. Contemporaneous volcanic activity is indicated by a vitric tuff cropping out at FP012890. A low-sinuosity meandering-stream flood-plain is the probable environment of deposition for the coal measures.

Jurassic dolerite caps the Parmeener Super-Group. The configuration of the base of the sill is complex and is not accurately mappable due to talus cover. The base of the sill is at about 500±100 m a.s.l. in the Dalmayne area, allowing a Triassic section 200-350 m thick. Isolated bodies of fine-grained dolerite mapped at lower levels [*e.g.* FP030830, FP030818, FP033879], are probably minor feeders.

Geophysical surveys largely aimed at defining the base of the sill on Fingal Tier (Leaman and Richardson, 1981) revealed a major feeder system under, and extending south of, Bare Rock [EP963884], but the surveys do not extend further east into the Dalmayne area.

Dolerite boulder talus mantles the eastern slopes of Fingal Tier and obscures most outcrop in the vicinity of the Dalmayne colliery. The talus attains a maximum known thickness of 51 m in DOM Dalmayne DDH4.

A series of faults, probably of Tertiary age, trend approximately NW-SE through the area, and downthrow to the south-west. These faults, together with a gentle southward prevailing dip, result in a change in elevation of the base of the Parmeener Super-Group from about 200 m a.s.l. north of the Dalmayne colliery, to below sea level south of Piccaninny Point.

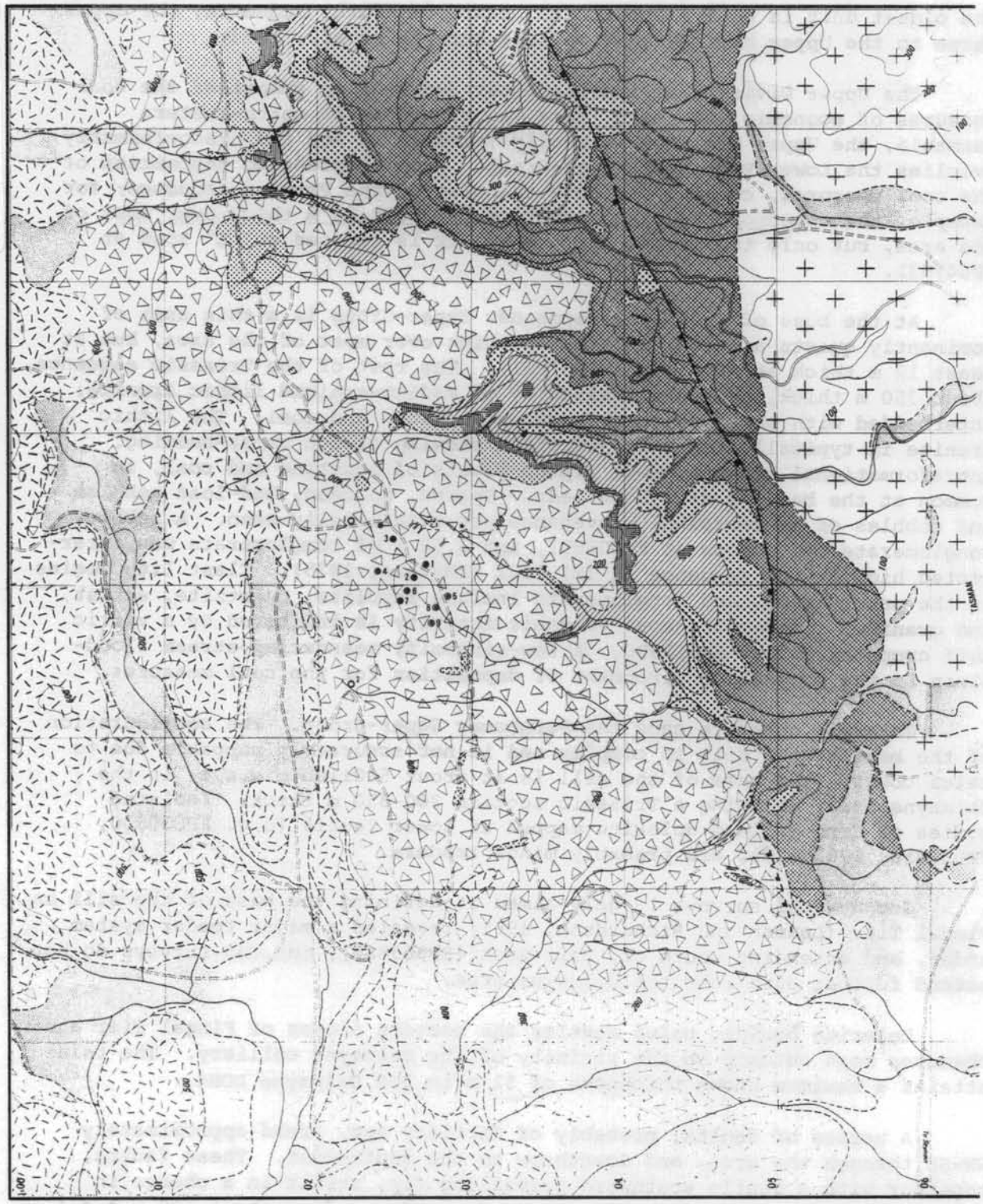
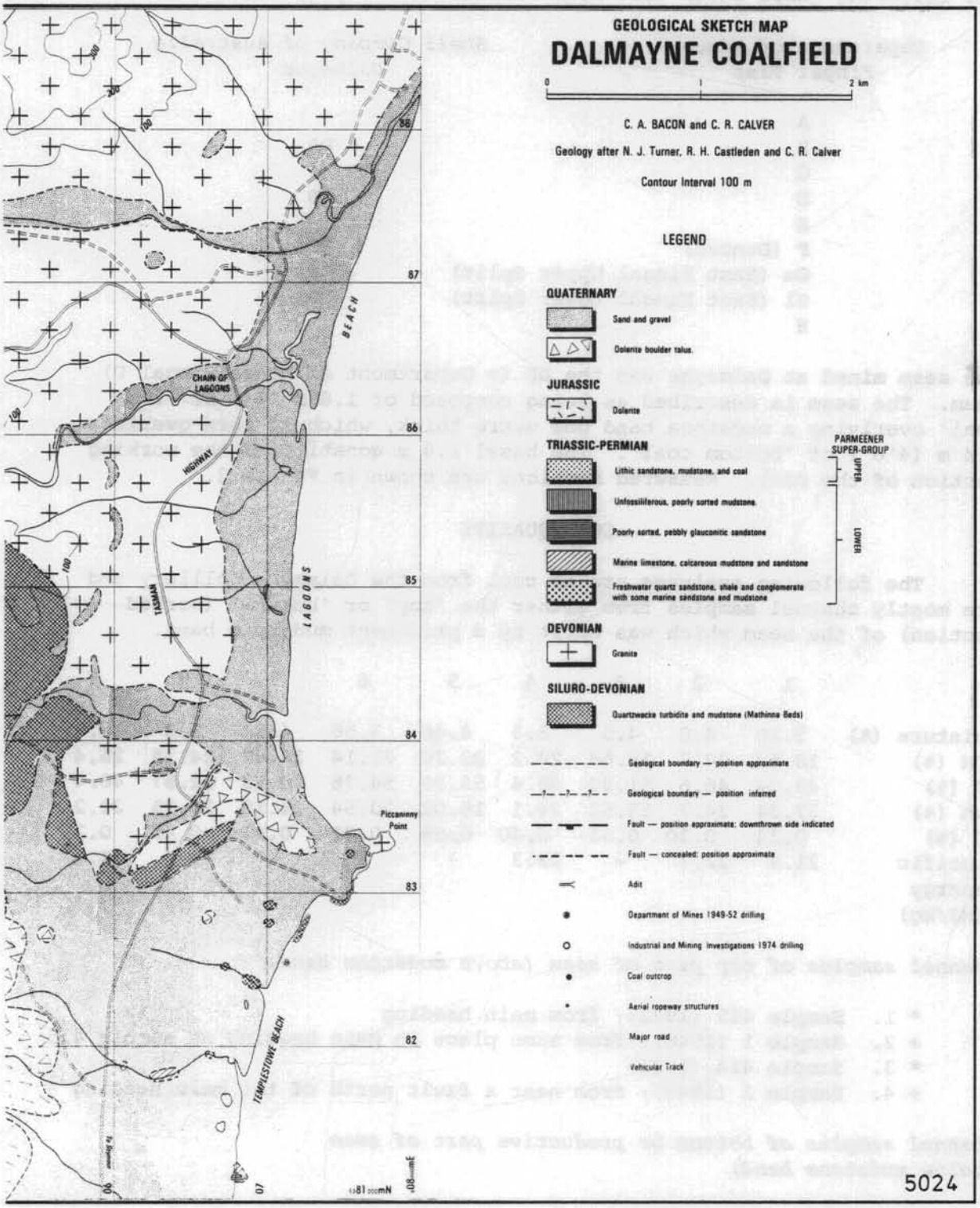


Figure 1


GEOLOGICAL SKETCH MAP
DALMAYNE COALFIELD
0
1
2 km
C. A. BACON and C. R. CALVER
Geology after N. J. Turner, R. H. Castleden and C. R. Calver
Contour Interval 100 m
LEGEND
QUATERNARY
Sand and gravel
Dolerite boulder talus
JURASSIC
Dolerite
TRIASSIC-PERMIAN
PARMEENER SUPER-GROUP
UPPER
LOWER
Lithic sandstone, mudstone, and coal
Unfossiliferous, poorly sorted mudstone
Poorly sorted, pebbly glauconitic sandstone
Marine limestone, calcareous mudstone and sandstone
Freshwater quartz sandstone, shale and conglomerate with some marine sandstone and mudstone
DEVONIAN
Granite
SILURO-DEVONIAN
Quartzwacke turbidite and mudstone (Mathinna Beds)
Geological boundary — position approximate
Geological boundary — position inferred
Fault — position approximate; downthrown side indicated
Fault — concealed; position approximate
Adit
Department of Mines 1949-52 drilling
Industrial and Mining Investigations 1974 drilling
Coal outcrop
Aerial ropeway structures
Major road
Vehicular Track
BEACH
CHAIN OF LAGOONS
HIGHWAY
TASMAN
LAGOONS
Piccaninny Point
TEMPLESTONE BEACH
86
87
85
84
83
82
5024

5 cm

COAL GEOLOGY

The Dalmayne coalfield is an easterly extension of the Fingal coalfield. Some coaly intervals may be traced from Fingal to Dalmayne. The following table shows coal seam correlations between the two areas:

Department of Mines Fingal Tier	*Shell Company of Australia Dalmayne*
A	
B	DA
C	
D	DB
E	
F (Duncan)	DC
Gu (East Fingal Upper Split)	DDu
Gl (East Fingal Lower Split)	DDl
H	

The seam mined at Dalmayne was the DB (= Department of Mines Fingal D) seam. The seam is described as being composed of 1.8 m (6') of 'top coal' overlying a mudstone band one metre thick, which in turn overlies 1.4 m (4'6") of 'bottom coal'. The basal 1.4 m constituted the working section of the coal. Measured sections are shown in Figure 2.

COAL QUALITY

The following analyses are of coal from the Dalmayne Colliery and are mostly channel samples from either the 'top' or 'bottom' (worked section) of the seam which was split by a prominent mudstone band.

	1	2	3	4	5	6	7	8	9
Moisture (%)	5.10	4.0	4.5	3.3	4.46	3.56	4.81	3.3	3.0
VCM (%)	18.52	24.7	18.68	24.2	22.20	21.14	20.47	24.15	26.4
FC (%)	49.04	46.6	51.40	48.4	55.30	54.76	50.53	52.57	48.4
Ash (%)	27.34	24.7	25.52	24.1	18.02	20.54	24.19	20.25	22.2
TS (%)	0.34	0.30	0.33	0.40	0.69	0.41	0.41	0.43	0.29
Specific energy (MJ/kg)	21.4	22.7	-	23.3	-	-	-	25.6	24.3

Channel samples of top part of seam (above mudstone band)

* 1. Sample 415 (1922); from main heading
\+ 2. Sample 1 (1948); from same place in main heading as sample 415
* 3. Sample 414 (1922)
\+ 4. Sample 2 (1948); from near a fault north of the main heading

Channel samples of bottom or productive part of seam (below mudstone band)

* 5. Sample 411 (1922)
* 6. Sample 412 (1922)
* 7. Sample 413 (1922)
\+ 8. Sample of lower 1.4 m (4'6") of seam (1943)
\+ 9. Sample 3 (1948); from working face

* Hills *et al.*, 1922
\+ Department of Mines records

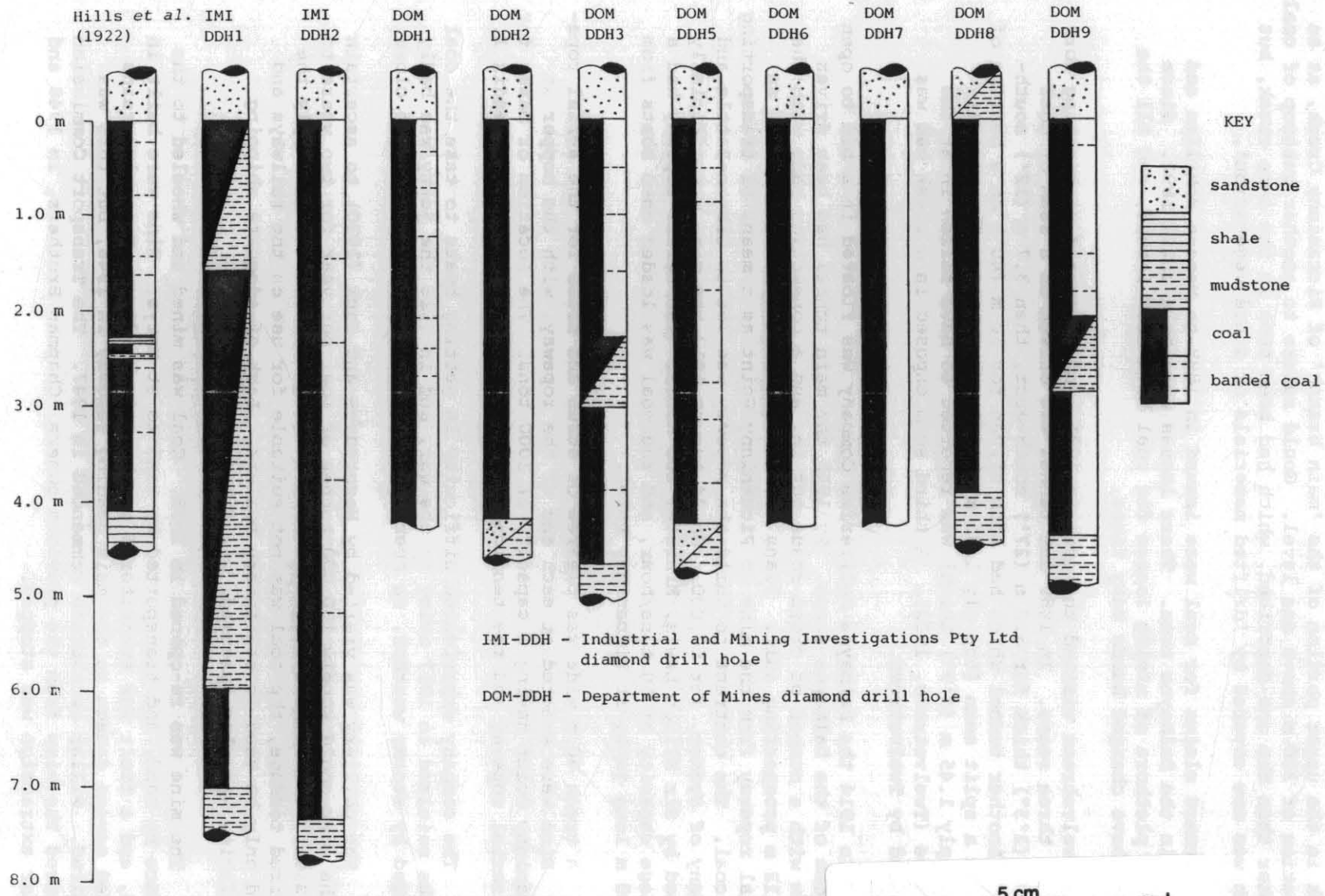


Figure 2. *Seam sections of the DB (mined) seam, Dalmayne.*

PREVIOUS MINING HISTORY

Gould (1861) inspected an outcrop of shaly coal about 600 mm (2') thick in the upper portion of the 'main branch' of Piccaninny Creek, at an elevation of 300 m above sea level. Gould refers to another outcrop of coal, thicker than the one described, which had been seen in the same creek, but which was now covered by 'drifted materials or dense vegetation'.

Reward claims for coal were issued in 1887 to Messrs McMillan and Inglis in the Dalmayne area. These leases were held until 1892. Since then, a plethora of mining leases for coal have been issued, and all the leases have changed hands many times.

Twelvetrees visited the area in 1901, and inspected prospecting work down on three seams. In 1889 one tunnel was driven on a seam of coal 680 mm (2'3") thick for 8.2 m (27') south-east, then 3.7 m (12') south-west. Another tunnel which had been driven for 12 m (40') on a bearing of 350° in a split seam [top ply 1.35 m (4'5"); clay band 1.35 m (4'5"); bottom ply 1.45 m (4'9") thick] was reported to have fallen in at the entrance (Twelvetrees, 1902). A third seam exposed in a creek bed was examined by Twelvetrees.

In 1914 the Dalmayne Collieries Company was floated in a bid to open up some of the Dalmayne seams. By 1915 the main tunnel had been driven 120 m with a number of cross roads put in, and a connection made with the old 12 m prospecting adit. Plans were underway for the erection of an aerial ropeway from the mine to Piccaninny Point as a means of transporting the coal. The contract to build the ropeway was let to Gibson-Battle and Company of Sydney, for £9,000. On 24 August 1917 the mine was officially opened by Sir Elliot Lewis, Minister for Mines. The aerial ropeway had a haulage capacity of 50 tons/hour, and the coal was loaded onto boats from a 180 m long jetty at Piccaninny Point.

A track 40 m wide was cleared of scrub and trees for the aerial ropeway. Bins were erected at each end of the ropeway, with the hopper at Piccaninny Point having a capacity of 1000 tons. The location of bases for the aerial ropeway and the tensioner for the rope are given in Appendix 1.

The company experienced difficulty in getting boats to take the coal to the mainland in 1917 owing to the war, and in 1918 the jetty was badly damaged by stormy weather, so operations at the mine were forced to close.

The colliery was visited by Hargreaves and Jack (1920) to ascertain if the mine could supply 150 000 tonnes of coal per year for two years to Adelaide. The authors suggested that although the mine could supply the required tonnage, the coal was not suitable for use on the railways and could only be used in stationary boilers. Lack of adequate shipping facilities was also stressed.

The mine was re-opened in 1939. Coal was mined and wheeled to the surface by hand, and transported by road to St Marys. Bins were built in 1944, and a fault was encountered in the main heading. Excessive rains caused severe damage to the main heading roadway in 1946, but this was repaired. Pillar extraction commenced in 1947. The Transport Commission acquired the mine from the previous owners, Chapman Brothers, in 1948 and pillar extraction was stopped.

Development to the south was started, and in 1950 a second drive (through sandstone) began. The second drive was finished in 1952 and

replaced the old main heading which had become unfit for use. The mine closed in 1953.

RECENT EXPLORATION

The Department of Mines drilled nine holes near Dalmayne from 1949-1952. The exploration proved the existence of multiple block faulting of sufficient magnitude to dislocate the continuity of mining horizons. Beatson (1951) defined three fault blocks in the vicinity of the colliery.

Industrial and Mining Investigations drilled two holes near Dalmayne in 1974 (Edyvean, 1975). Details of coal intersected in drillholes near Dalmayne are given in Appendices 2 and 3.

Keid (1920) reported on a possible railway route from Piccaninny Point to Coles Bay. Nye (1926*a*, *b*) investigated the occurrence of limestone to the east of Dalmayne, as did Everard (*in* Hughes, 1957, p.205).

The Permian rocks to the east of Dalmayne were described by Voisey (1938). The entire area has been mapped by McNeil (1965), and by Turner *et al.* (in prep.). The area is currently held under Exploration Licence 5/61 by the Shell Company of Australia Limited.

FUTURE POTENTIAL

The Shell Company of Australia Limited have an indicated *in situ* reserve of 190 million tonnes of coal in one seam in the Dalmayne area. The possibility of additional reserves in other seams also exists.

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[9 February 1984]

APPENDIX 1

AMG references and surface elevations of boreholes and adits in the Dalmayne Coalfield.

DEPARTMENT OF MINES 1949-1952 DRILLING

Hole No.	*AMG reference*	*Elevation (m)*
1	FP027851	380
2	FP026850	380
3	FP025853	390
4	FP024851	410
5	FP028849	365
6	FP026850	390
7	FP025849	400
8	FP028849	360
9	FP027848	370

INDUSTRIAL AND MINING INVESTIGATIONS 1974 DRILLING

Hole No.	*AMG reference*	*Elevation (m)*
1	FP022854	420
2	FP022844	410

ADITS

AMG reference	*Elevation (m)*
FP026854	340
FP026854	340
FP027854	330
FP029853	320

AERIAL ROPEWAY STRUCTURES

AMG reference		*Elevation (m)*
FP027854	Cement base near pit top	320
FP027854	Tensioner	
FP028854	Wooden base with bolts, iron cylinders etc.	310
FP029854		300
FP032852		290
FP034852		265
FP035851		260
FP038850		180

APPENDIX 2

Coal seam intersections from IMI drilling near Dalmayne

DDH No.	Seam	From (m)	To (m)	Ply thickness (m)	Seam thickness (m)	Moisture (%)	Ash (%)	Volatiles (%)	Fixed carbon (%)	Specific gravity	Total Sulphur (%)	Specific energy (MJ/kg)
IMI-1	DB	74.52	74.93	0.41		6.0	61.3	15.3	17.4	1.97		
		75.04	78.03	2.99		3.6	60.5	14.9	21.0	1.90		
		78.03	79.05	1.02		4.0	51.5	20.3	24.2	1.77		
		79.05	80.28	1.23		4.1	37.8	22.0	36.1	1.63		
		80.28	81.53	1.25	7.01	3.4	27.7	28.8	40.1	1.47	0.42	23.6
		94.49	95.42	0.93		6.4	72.9	12.9	7.8	2.18		
		95.73	97.15	1.42		6.6	63.2	14.2	16.0	1.98		
		97.15	98.96	1.81		5.0	47.6	18.5	28.9	1.78		
		98.96	99.18	0.52	4.69	3.4	50.7	25.4	20.5	1.79		
	DD	159.59	161.14	1.55		3.9	31.0	21.7	43.4	1.56	0.23	
		161.14	162.53	1.39		3.3	35.0	23.3	38.4	1.56	0.30	
		162.59	164.15	1.56	4.56	3.5	25.3	24.1	47.1	1.49	0.33	24.9
IMI-2	DB	104.89	105.30	0.41		4.8	49.3	15.8	30.1	1.79		
		105.47	107.52	2.05		4.8	50.0	16.7	28.5	1.77		
		107.52	108.76	1.24		3.8	43.0	22.4	30.8	1.68		
		108.84	111.15	2.31		4.3	58.5	15.3	21.9	1.88		
		111.15	112.24	1.09	7.35	3.1	28.9	26.9	41.1	1.49	0.57	21.6
		127.45	129.12	1.67		6.4	57.3	15.0	21.3	1.90		
		129.21	130.44	1.23		4.9	44.2	19.7	31.2	1.71		
		130.44	131.66	1.22	4.21	4.0	35.8	23.2	37.0	1.60		
	DD	192.94	193.86	0.92		3.2	19.2	25.6	52.0	1.42	0.46	25.2
		193.86	194.76	0.90	1.82	2.3	20.0	28.0	49.7	1.43	0.28	25.4

1/12

APPENDIX 3

Coal seam intersections from DOM drilling near Dalmayne

DDH	From (m)	To (m)	Seam	Thickness (m)	Description
1	9.46	10.06	DA	0.60	Coal
	68.89	70.10	DB	1.21	Coal with three stone bands
	70.10	70.71		0.61	Coal
	70.71	71.62		0.914	Coal with clay bands
	71.62	73.15		1.53	Coal
2	10.67	11.94		1.27	Coal
	70.71	74.90		4.9	Coal with clay bands
3	89.35	91.61		2.26	Coal with mudstone bands
	91.61	92.38		0.77	Band of coal and mudstone
	92.38	94.03	DB	1.65	Coal
4	126.47	127.84		1.37	Banded coal and mudstone (50:50)
5	13.71	14.32	DA	0.61	Coal
	73.84	76.20	DB	2.36	Coal with few bands
	76.20	78.08	DB	1.88	Coal with few stone bands
6	28.95	29.56	DA	0.61	Soft coal
	29.56	30.48		0.92	Soft coal and mudstone
	83.21	87.47	DB	4.26	Coal
7	37.19	38.71		1.52	Dirty coal
	92.53	96.83		4.30	Coal with normal Dalmayne seams
8	73.08	74.98	DB	1.90	Coal
	74.98	75.64	DB	0.66	Coal band
	75.64	76.99	DB	1.35	Coal
9	70.05	72.14		2.09	Coal, good quality
	72.14	72.92		0.78	Coal-mudstone band
	72.92	74.39		1.47	Coal