

1983/4. The Cygnet coalfield.

C.A. Bacon

Abstract

Coal in the Cygnet Coal Measures is of Late Permian age and has been intermittently worked from 1880 until 1940. In 1981 one company undertook minor exploration of the area and drilled four holes. The seams are not extensive, thin (usually <1 m thick) and faulted. The inferred reserve is very small (less than one million tonnes) and the potential for future exploration negligible.

LOCATION AND ACCESS

The Cygnet coalfield is situated on the western flanks of Mount Cygnet [EN133173] and Heeneys (also spelt Heaneys) Bluff [EN147197] about eight kilometres east of the township of Cygnet, which is about 55 km by sealed road south of Hobart.

GENERAL GEOLOGY

The geology of the coalfield is shown in Figure 1. The coal seams at Cygnet are part of the Cygnet Coal Measures, which is the lowest of three divisions of the Upper Parmeener Super-Group.

The upper division of the Upper Parmeener Super-Group in south-eastern Tasmania is a lithic sandstone sequence with mudstone, siltstone, claystone, workable coal seams, and rare tuff. A Triassic age has been established for these strata by the floral assemblages described by Townrow (1962). Vertebrate remains from these rocks are described by Cosgriff (1974) and Banks *et al.* (1978). These rocks do not crop out in the Cygnet area.

The middle division of the Upper Parmeener Super-Group consists of massively bedded, white, clean, well-sorted sparkling quartz sandstone which often shows features such as ripple marks and large-scale cross-bedding.

The lowest division of the Upper Parmeener Super-Group is the Cygnet Coal Measures, which are "of variable thickness consisting of massive, well-sorted, current-bedded, poorly-cemented, feldspathic arenite layers with subordinate beds of mudstone, carbonaceous mudstone and, in places, thin workable coals" (Farmer, 1979a). A Permian age is indicated for these rocks by the presence of *Glossopteris* and a *Dulhuntyspora* microflora (Lewis, 1940; Banks and Naqvi, 1967; Balme, 1962).

The Cygnet Coal Measures is underlain by a series of glaciomarine and freshwater rocks belonging to the Lower Parmeener Super-Group. The divisions are from the base: A lower glaciomarine sequence (Lower Marine Sequence); a lower freshwater sequence (Lower Freshwater Sequence); and an upper glaciomarine sequence (Upper Marine Sequence). The Lower Freshwater Sequence is not present in the Cygnet area (Farmer 1979b) where the Upper Marine Sequence (Abels Bay Formation, Risdon Sandstone, Minnie Point Formation, Deep Bay Formation) paraconformably overlies the Lower Marine Sequence (Bundella Mudstone, Woody Island Siltstone).

The Abels Bay Formation consists of siltstone, sandy siltstone, and minor sandstone beds with frequent dropstones and rare fossil horizons.

The Risdon Sandstone is a thin bed of coarse-grained quartz-rich sandstone with minor beds of pebble and granule conglomerate. The Minnie Point Formation is a very variable, fossiliferous, marine siltstone and sandstone with many dropstones. The Deep Bay Formation is an interbedded sequence of highly fossiliferous marine mudstone, siltstone, and sandstone with many dropstones.

The Bundella Mudstone is a fossiliferous marine mudstone with siltstone layers and numerous dropstones. The Woody Island Siltstone is a dark grey, poorly-bedded, sparsely fossiliferous, friable, glendonitic siltstone (Farmer, 1981). Cretaceous syenite has heavily intruded rocks in the Cygnet area, although no syenite is known close to the mine workings. Jurassic dolerite caps Mount Cygnet and is faulted against the sedimentary sequence to the east of Heeneys Bluff. The small area of Cygnet Coal Measures outcrop is badly disrupted by faulting.

PREVIOUS MINING ACTIVITY

At the time of Thureau's visit in 1881 only minor mining activity was present on the slopes of Mount Cygnet. The next inspection appears to have been by Twelvetrees (1902), when a dip tunnel had been advanced 270 m into the slopes of Mount Cygnet. By 1922 a number of operators had prospected the area and a large number of trenches, adits and shafts had been dug at points widely spaced along the outcrop for a distance of five kilometres, although not always in a methodical manner.

The Mount Cygnet mine was opened around 1881, and worked intermittently until 1897 when a Robert Harvey took over the running of the mine, and in 1901 produced 3000 tons of coal. Two seams were reported near the mine, the main one being worked was 3'6" (1.0 m) thick with a lower seam 1' (0.3 m) thick 25' (8.3 m) below the main seam. Two main dip tunnels (or pits) were in use by 1923, dip tunnel or Pit no. 2 being referred to as 'Gordon's Workings'. Pillars had been pulled from Pit no. 1 by 1922 (Hills et al., 1922) and most of the coal was mined from Pit no. 2. Roof rolls were reported to be common.

Heaney mine

Two 'strike tunnels' were reported to have been driven into coal in the early 1900's on the western slopes of Heaney Bluff. The first tunnel (Heaney No. 1) worked a seam of coal 30" (0.9 m) thick and was separated by a fault from Heaney No. 2 workings some 300 m to the north-east (Hills et al., 1922).

Berry's mine

Approximately 1.3 km north-west of the Heaney No. 2 tunnel a seam 12-14" (0.30 m) thick was exploited in minor workings known as Berry's. Mining had apparently ceased here some years before the 1922 inspection (Hills et al., 1922).

Gordon's workings

A new adit close to the old 'Gordon's Workings' and given the same name was opened in 1939. A small tonnage of coal was mined, reportedly for metallurgical purposes. The mine closed in 1940.

RECENT EXPLORATION

In 1979 the Department of Mines drilled a borehole in the vicinity of the old Mount Cygnet mine. Detailed results of the drilling are given in Farmer (1979b). The hole proved the Cygnet Coal Measures to have a minimum thickness of 35.20 m at that point and the following coal intersections were noted:

From (m)	To (m)	Thickness (m)	Description
16.76	17.77	1.01	Old workings
19.30	19.35	0.05	Coal
20.13	20.18	0.05	Coal
21.76	21.94	0.18	Coal

In 1981 General Geological Services carried out a brief exploration programme on behalf of Capricorn Mining Limited. Four holes were drilled in the Mount Cygnet area.

No coal intersections were noted on the lithologic logs although indications of seams are claimed on some of the geophysical logs.

Two holes were collared below the coal-bearing Cygnet Coal Measures in the marine Abels Bay Formation. The logs are given by General Geological Services (1981a).

COAL QUALITY

	1	2	3
Moisture	1.4	9.29	9.99
Ash	16.4	17.71	18.77
Fixed carbon	69.5	54.47	51.48
Volatiles	<u>12.7</u>	<u>18.52</u>	<u>19.76</u>
	<u>100.0</u>	<u>100.00</u>	<u>100.00</u>

1. Twelvetreets (1902) Mount Cygnet mine.
2. General Geological Services (1981b), Heaney mine.
3. General Geological Services (1981b), Heaney mine.

The above analyses would be spot samples of seams rather than whole seam sections.

POTENTIAL FOR FUTURE EXPLORATION

Due to the apparent small area of potential reserves, the faulted nature of the terrain, and the thin seams (1.0 m thickness of the main seam worked) the potential for further exploration of this field is poor. The quality of the coal would appear to be reasonable, although mudstone bands occur and cause the coal to be 'dirty'. Steamships used a mixture of Cygnet coal and wood to reduce the ash problem (Hills *et al.*, 1922). There may be enough coal for local consumption but not for any large scale mining venture. The *in situ* reserves are classed as very small inferred reserves, probably less than one million tonnes.

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[3 February 1983]

APPENDIX 1

AMG references of boreholes and mines, Cygnet coalfields

Department of Mines 1979 drilling

DOM CYGNET DDH NF85 EN126182

Capricorn Mining 1981 drilling

C-01 EN142197

C-02 EN144202

C-03 EN127188

C-04 EN130185

Mine workings

Mount Cygnet mine EN126183

Gordon's Workings EN130184

Heaney No. 1 EN141195