

1st July, 1930

26

J. C. Hudson Esq.,  
Chief Inspector of Mines,  
HOBART.

Dear Sir,

In accordance with your direction I beg to furnish the following report upon an application by the Seymour Coal Mines Limited for a loan of £7,000 to enable the Company to complete the equipment of the mine and to extend its pier a further distance of 400 feet:

#### SEYMOUR COAL MINES LIMITED

Registered in Tasmania as a Foreign Company, the Seymour Coal Mines Limited was constituted in Melbourne, Victoria, with a registered capital of £80,000, in 80,000 shares of £1 each, to acquire and exercise the mineral rights of freehold lands owned by R. W. Wardlaw and others and situate at Seymour on the East Coast of Tasmania.

The Company appears to hold no tenure under the Mining Act of Tasmania, the right of occupancy for mining purposes being secured by an agreement for 99 years at a nominal rental and a royalty of one penny per ton of coal marketed.

56,269 shares have been allotted, leaving a balance of 23,731 shares which represents a capital value of £23,731.

#### AREA

The holding of the Seymour Coal Mines Limited occupies approximately 3208 acres of freehold lands, as shown on the accompanying chart.

For the purposes of this report, the area is regarded as two sections, one of approximately 1875 acres north of Doctor's Creek and one, designated the southern section, of 1333 acres east and south of that creek.

The southern section embraces an area of 285 acres previously held by the Seymour Coal Company Limited and from which an appreciable quantity of coal was marketed in the early history of coal mining on the East Coast. Operations are being pursued by the Seymour Coal Mines Limited on this area and in the locality of the old workings.

#### SITUATION

The mine is situate at the township of Seymour on the main East Coast road and approximately 17 road miles southerly from St. Marys which is the terminus of the branch line, serving the East Coast, from the Hobart Launceston railway system.

#### TRANSPORTATION FACILITIES

The East Coast is well served by a road system but as a means for the transportation or assisting in the transportation of coal from the Seymour Colliery to

projected markets this system is excessively expensive and untenable.

Naturally sheltered and deep-water port conditions and other features suitable for the establishment of economical and permanent facilities for sea-transportation do not exist in the immediate locality of Seymour and one of the projects of the Company has been and is the construction of a wooden pier, at the northern end of Maclean's Bay and under the partial shelter of Long Point, to provide the necessary facilities for the transportation of coal by sea.

#### HISTORICAL

After acquiring the areas of coal-lands, the Seymour Coal Mines Limited committed itself to an appreciable expenditure of money in installing a small pumping plant and other machinery, in dewatering the old colliery workings, in purchasing additional machinery not yet delivered at the mine, in driving a dip-heading to the coal seam at the 165' level, in constructing a wooden pier 1110 feet in length, and in attaining a partial productive stage.

In addition to coal used for local power requirements, several small lots have been marketed but shipping disabilities and incomplete mine equipment have operated against the attainment of an economic productive stage.

The Company states that a sum of approximately £40,000 has already been expended and the Board of Directors now seeks assistance to an amount of £7,000 to complete the equipment of the colliery and to extend the pier to 1500 feet.

The constructional design of the pier provides for a length of 1500 feet and it is considered, by the Company, that a completion of the structure, to that distance, will eliminate shipping and other transport difficulties and enable the Company to cater for export trade.

#### ECONOMIC GEOLOGY

The general geology of the East Coast has been reviewed by the Geological Survey in Mineral Resources No. 7 and, in that bulletin, the coal-measures of the East Coast have been related to the Trias-Jura system. The economic geology of the coal series does not, however, strictly correspond with that bulletin consequently it will be necessary to elaborate upon this feature.

The Seymour holding embraces the northern area of the low horizon measures of the East Coast series, conforming with a coastal plain between Picaniny Point and Bicheno.

Topographically, this coastal plain is of low relief, the surface elevation being limited to a few feet above sea-level, whilst the seam of coal being developed by the Seymour Coal Mines Limited is actually below sea level.

Cambro-Ordovician slates and Devonian granites appear as a regularly defined plane of contact and constitute the eastern limitation of the Trias Jura sedimentaries. The coal strata lie between that plane and the foothills of the igneous diabase which ranges as the western extremity of the coal measures.

pronounced irregularity in the contour of the diabase, in conjunction with the eastern limitation and other strata incidences, has developed a marked effect upon the coal series and has resulted in the ultimate persistence of basinal, contracted, and fragmental areas of coal.

A comprehension of the above features is desirable for economic deductions, as the fragmental areas are not of economic importance and the contracted areas are of importance only where there is a proved uninterrupted continuity of coal from or to the basinal areas. Both of the latter conditions ensue in the area occupied by the Seymour Coal Mines Limited and the result will be reflected in the observations recorded upon the reserves of coal.

### Coal Series

The Seymour series appears to be characterised by numerous veniets and three seams of coal. The seams maintain a reasonably uniform thickness of separating strata and occur at varying depths from the surface, the depths bearing a direct relationship with a gentle southerly dip, geological variations, and undulating topographical features.

Outcrops of the uppermost seam occur in the rivers and creeks in the locality of Seymour and, at the mine workings, the vertical depth to this seam is approximately 35 feet. The mid-seam occurs at a vertical depth of 165 feet, at the colliery workings, and the depth to the bottom seam is uncertain but from historical records there appears to be not more than 20 to 25 feet of strata separating the bottom and mid seams.

### No. 3 Seam

The bottom seam is not open for examination and the available data are insufficient to justify a definite conclusion being recorded upon the width, quality and commercial possibilities of this seam. Pilot shafts were sunk to the seam, in the old workings at the Seymour Colliery, and it has been alleged that an exploitable width of marketable coal was revealed but the records of boring, carried out in 1888, do not confirm this information and, in the absence of more reliable data, any possibilities of the No. 3 seam must be excluded from the economic aspects of this report.

### No. 1 Seam

Within narrow limits, the width of the uppermost seam is variable. It approximates 4' 6" at the colliery workings but the thickness of coal does not appear to exceed 50 per cent of the distance between the roof and pavement strata, the balance of the infilling being shale, stone and coaly matter. The clean coal is of average quality and although the quantity in situ would add appreciably to the theoretical reserves of the occupied area it is not considered that the exploitation of this seam, under the existing economic conditions, would be relied upon for the establishment of future operations at Seymour, and it is reasonable to assume that a commercial failure in respect to the mid-seam would terminate the project of the Seymour Coal Mines Limited. Little consideration need, therefore, be given to the commercial aspects of the uppermost seam of coal.

Exploitation of the mid-seam is the immediate project of the Seymour Coal Mines Limited and the commercial and economic aspects of this mining venture are to be based on the possibilities of this seam of coal.

It is rather characteristic of the seam that the coal is not of constant quality but exhibits variations on both the horizontal and vertical planes. A comparative perusal of the features and analyses, as charted, clearly illustrates the variations occurring with different coal widths and seam distances.

The full width between the roof and pavement strata is not, generally, occupied by clean coal, the three infillings of waste matter being roof, centre, and floor bands of stone and stony coal. These bands however, are not of regular persistency and frequently give place to a full seam of coal.

The roof band appears as erratics of small area and, being a firm grey stone, is distinguishable and separable during normal hewing operations. It does not interfere with the quality of the coal nor has it any material bearing upon the economics of production.

The centre and floor bands also occur infrequently but the former has the greater persistency and characterises the seam. Both of these bands have a direct influence upon the quality of the produced coal and any indiscretions in regard to separation will readily court disfavour from industrial consumers.

The centre or mid-band consists of grey to dark brown stone and coal veinlets. It is neither uniform in thickness, persistency, nor in parallelism with the roof and floor planes. It has not noticeably exceeded 6" in width and being of a firm nature with free parting planes it should be readily separable during hewing and picking operations. The absence of uniformity and the fact that it frequently commences and terminates in small or penny bands gives rise, however, to the possibility of, where any indiscretion ensues in selection, a small proportion escaping with the marketed product thereby increasing the percentage of ash and correspondingly reducing the calorific value of the coal.

It is typical of the seam that, where the band occurs as a mid-band, the upper and lower coals are of different quality and, as the band does not regularly conform with the roof and floor planes, a variation ensues in the upper and lower coal-widths and a corresponding variation results in the quality of the coal passed to the consumer. Occasionally, the band passes to the roof plane and the coal retains the quality of the lower section. Where it disappears, as a mid-band, the coal face assumes an approximate average quality.

The pavement band is strictly an infilling of inferior coal occurring as erratics on the floor of the seam. The volatile and fixed carbons are well balanced but the calorific value is low and the ash content is excessive, vide Analysis "A3". The physical character of this inferior coal is such that, other than to a thorough experienced person, it may be confused as average coal and where it occurs as in Section "A" it may pass to the market with the general run of mine coal. More than ordinary care is necessary in the elimination of this band and any dissociation of care in picking or in any process

applied for the exclusion of waste matter or the allocation of that work to inexperienced individuals will result in the marketing of a coal unduly high in ash and proportionately low in calorific value.

#### COAL QUALITY AND VALUE

The "Feature and Analysis Plan" illustrates the relative quality of the coal at the faces.

##### Ash

The percentage of ash is one of the factors governing the quality of a coal for industrial purposes as not only does it influence the percentage of combustible matter but it also reflects upon the calorific value.

Seymour coal suffers the same disability as the majority of native coals in as much as the ash content is relatively high when compared with coals produced in other states and countries. The percentage of ash in Seymour coal is less than that in other coals being produced from the East Coast Series and it may vary between 15 and 18 with average production but with any dissociation of care from the possible exclusion of waste bands the percentage will exceed this theoretical anticipation and will reflect adversely upon the future of the mine.

Disintegration and mechanical treatment would ensure a clean coal with a minimum combined ash content, but, innovations in regard to classification are not anticipated and it becomes encumbent upon the Company to make ample provision for skilled hand-picking to ensure against the percentage of ash exceeding the 15-18 variation.

Objections have already been recorded against the marketed quality of the coal owing to the ash content exceeding the percentage anticipated and it seems fair to remark that these objections would not have been so pronounced if full provision had been made for the exclusion of the possible maximum of waste matter.

The fusibility of the ash is relatively high and the coal ashes with comparative freeness and without the formation of objectionable degrees of clinkering, all of which factors favour the quality of the coal. Commercially, however, there must exist an assurance against excessive variations in the ash content before it can be expected that the coal will become reliably attractive.

##### Sulphur

In chemical combination as the sulphide of iron - Pyrites - sulphur becomes a component factor in chemical reactions which ensue with the combustion of coal and which result in the formation of clinker and objectionable fumes of sulphur-dioxide. Comparatively small percentages of sulphur are sufficient to condemn an otherwise good coal.

Pyrites occurs sporadically and in a fine state of crystallisation on coal facings and on the roof plane at Seymour but the percentage of sulphur in the run of mine coal is relatively low, being less than one per cent, and the sulphur factor is not an objectionable feature in the quality of the coal.

### Heating Value

Other properties being equal, the quality of a coal, for general industrial and domestic purposes, varies directly as the calorific value and where the calorific value exceeds 11,000 British Thermal Units the heating value of a coal merits favourable comment.

Although not quite equal to Catamaran coal and test parcels of coal that have been produced from isolated Tasmanian areas, the calorific value of Seymour coal ranges from 11,380 to 12,480 B.T.U.'s and is superior to other coals being produced from the East Coast series.

The calorific value is on a lower plane than the first quality coals of the Hawkesbury series but it comes favourably and more than favourably within the range of many coals that are being used for steaming and domestic purposes.

The calorific value bears a distinct relationship with the ash content and balance of combustible components, and the average run of Seymour coal should not fall below 11,750 B.T.U.'s but any dissociation of care from the exclusion of waste matter will increase the ash content, reduce the percentage of combustible matter, and decrease the available calorific value.

### Commercial Quality

Seymour coal has been tested and used on the Tasmanian railways and the results have shown it to be superior to other coals being produced from the Mount Nicholas - East Coast series; the general steaming properties, consumption per ton-mile, and percentage of residual ash being better but it would be quite erroneous to assume from these results that Seymour coal could be used as a substitute for Newcastle-Maitland coals in railway fuel requirements.

The proportion of clean Seymour coal, as against other East Coast coals, could be increased and Seymour coal would respond to a heavier running duty but, as a single fuel unit, it is not certain that Seymour coal would wholly satisfy the requirements of the service, with the existing furnace and steaming arrangements, as the factor of rapid heat acceleration may be barely sufficient to meet the demands of peak gradients on fast schedules.

Average coals from the East Coast series are relatively slow-ignition coals and this property in combination with the non-cooking characteristic slightly disfavors the coal where rapid heat acceleration is essential, consequently, infusions of bituminous coals, such as the better grade Hawkesbury series, become necessary to produce an equitable fuel-ratio to meet the peak points of irregular running duties.

The preceding remarks do not infer that Seymour coal could not be successfully used as a single fuel-unit as it is believed that as a pulverised fuel or with innovate furnace and steaming arrangements, where accommodation for a pulverised fuel is not practicable, the clean coal would meet the full fuel requirements of the service. However, infusions of Seymour Coal with other native coals would not produce the requisite fuel-ratio and it would follow, as a natural consequence, that any extended use of Seymour coal must result in a proportional decrease in the use of other native coals, although not in the same proportion as would be the case with any extended use of a coal equal in grade to the other coals being produced from the East Coast series.

Under the regular steaming duties attached to maritime transportation, the clean coal appears to have been favourably received by one firm of shipowners and the current opinion is that, whilst not equal to the better grade Newcastle coal, Seymour coal is slightly superior to other coals being produced from the East Coast Series. The residual ash is higher than that from Newcastle but less than that from the other coals, and less loss of steam ensued when firing as compared with the other native coals. Results of a recent trial, however, suggested that the consumption would range from 25 to 33 per cent above the consumption of Newcastle coal. No greater disabilities ensued from sulphur and clinkering than with other coals.

#### Resume

Sections of the seam exhibit a distinct coking characteristic and the balance of the fixed and volatile combustible components, in those sections, is closely allied with some gas-coals but the average Seymour coal is neither a commercial gas-coal nor a coke producer.

In the essential features of ash content, combustible matter, and calorific value, it is superior to other coals being produced from the East Coast series but it is on a lower quality-plane than the better grade coals of the Hawkesbury series. As a matter of fact, it would be an injustice to the coal to commit it to a qualitative relationship with the high grade coals of that series.

Seymour coal would not serve as a substitute for Newcastle-Maitland coals which are proportionately infused with native coals to meet the necessary factor of heat acceleration on peak gradients nor is it yet certain that it would wholly satisfy the irregular running duties, on fast schedules, of the Tasmanian railways with the current furnace and steaming arrangements but with innovations in regard to the latter arrangements there is a possibility that the clean coal would serve as a single fuel unit.

For regular steaming purposes, for duties slightly higher than those imposed upon other coals being produced from the same series, and for domestic purposes the clean coal has merited favourable comment.

Objections have been recorded against the quality of the coal owing to a high percentage of ash and it appears that those objections were justified as one instance has come under observation where the ash content was 22 per cent, which is excessive and unnecessarily excessive for Seymour coal. The 15-18 variation conveys an impression of the ash content and it should be practicable to maintain a variation within those limits. The seam is not a complete infilling of clean coal and the possibilities of an unnecessarily high ash content have been enumerated but it is essential to again emphasise that with any dissociation of care from the exclusion of waste matter, or failure to make ample provision for picking or treatment, or the allocation of that work to inexperienced individuals, a normally high ash content will become unduly excessive and will result in a revulsion against the quality of the coal and adversely affect the economic position of the mine.

Some objection has been recorded against a high percentage of "breeze" and "dust" in the marketed "large" or "lump" coal. Seymour coal is a characteristically firm coal and with a correctly directed policy of mining and with average care in handling, during transportation, there should be no cause for adverse comment owing to excessive "dust". Current mining and loading practices

distress rather than preserve the physical character of the coal.

Where marketing conditions involve comparisons with interstate and foreign coals, for regular steaming and domestic purposes, it is essential to vary the selling-price in ample proportion to the percentage of ash and calorific value. It will be uncumbent upon the Seymour Coal Mines Limited to observe that principle, and this will become apparent upon perusing the attached tabulation of some typical coal analyses as announced by the Standards Association of Australia.

#### COAL AREAS AND RESERVES

The aggregate area of occupied land has been approximated at 3208 acres but it cannot be conceded that the total area is coal-bearing.

The southern section is situated clearly within the coal series and it is reasonable to anticipate that the 1333 acres are coal-bearing.

Owing to the situation of the Cambro-Ordovician slates and the igneous rocks, the northern section is not completely occupied by coal-measures and an exclusion of not less than 400 acres must be made for valueless strata, leaving 1475 acres to be considered in relation to the coal-bearing possibilities.

Assuming that the conceded areas are uninterruptedly coal-bearing, the theoretical reserve in the northern section would approximate 9,823,500 tons and in the southern section 8,877,780 tons, aggregating a theoretical maximum reserve of 18,701,280 tons of coal in No. 2 seam.

If 50 per cent is allowed for coal in the uppermost seam, the maximum theoretical reserve would approach 28,051,920 tons.

It would appear as though the Company theorised when assessing the reserve of coal at 30,000,000 tons, as the above reserve is essentially theoretical and is not to be regarded as the probable, proved or economic reserve.

Eastern and western extremities of the coal-measures and characteristics of basinal and contracted areas have been featured in the preceding parts of this report and the extent to which these features affect the area becomes apparent.

The southern section of the property occupies the northern portion of a basinal area of coal and it is reasonable to allow that within this section there is a relatively settled area of coal in the No. 2 seam. Under normal strata and seam conditions, the possible reserve would approach 8,658,000 tons with a productive capacity of 5,627,700 tons. Existence of the seams within this area is definite but the section has not been thoroughly prospected and the estimate is based purely on the assumption that the mid-seam persists uninterruptedly throughout the section. There is a possibility of minor geological interferences on the west and in the locality of Doctor's Creek, and although it may be reasonable to assume a possible reserve it would be technically incorrect, in the absence of systematic exploration, to make a definite assertion upon the proved, economic, or commercial reserve of coal.

A contracted coal area occurs on the northern side of Doctor's Creek and although some scattered exploration has been done within this area, nothing of a systematic nature has been carried out to enable a correlation to be made of the continuity of the No. 2 seam or to enable a reliable estimation to be made of the reserve of coal. The theoretical capacity of the mid-seam, within this area, would be 9,823,500 tons but it is very doubtful if this quantity of exploitable coal exists as geological interferences ensue in the locality of Doctor's Creek and strata waving suggests seam irregularities. In the absence of systematic exploration or a reasonable amount of scout-boring, it is imperative to refrain from recording an estimate of the probable coal reserve or of the productive capacity of this contracted area of 1875 acres.

#### Resume.

The areas occupied by the Seymour Coal Mines Limited have not been proved on principles of exploration applicable to colliery practices and the small expenditure necessary to attain the essential result should have been incurred before developmental work was proceeded with.

Some scout-boring was done in 1888, by persons connected with the early history of coal mining on the East Coast, and the records of that boring tend to distract from the value of the possibilities of the area, but full credence is not attached to those results because the records of one bore were definitely disproved by developments in nearby workings.

Several shafts were sunk, at appreciable distances and by different parties, but complete particulars of the results attained are not available and the current data are insufficient to serve any useful purpose in estimating the probable or economic coal reserves.

The Company assumes that there is an available reserve of 30,000,000 tons but this appears to cover both the Nos. 1 and 2 seams and it is a theoretical anticipation that both seams persist regularly throughout the property, no allowance being made for valueless strata, geological breaks and interferences, and old workings.

It is conceded that there is a substantial area of coal-measures and it would be allowed that there is a sufficient commercial reserve to warrant the establishment of operations but the deductions upon coal reserves are largely a matter of theorising and this cannot be accepted as a reliable indication of probable, proved, economic or commercial areas of coal.

An assumption within reasonable limits, of the possible reserve of coal in No. 2 seam, in the southern section, may prove correct but it is considered that the Company ignored the principles of mining by not systematically exploring the area, as the prospecting data would have definitely fixed the stability of the undertaking in regard to reserves and production.

For similar and additional reasons, there must be constraint in regard to the expression of an opinion upon the probable reserves in the contracted area, and there can be no immediate assurance that the initial cost incurred in developing the area south of Doctor's Creek would serve for the purpose of economically

exploiting any coal in the contracted area north of that creek.

An excessively irregular nature of the area, acquired by the Company, is not conducive to economical mining practices and it is considered that the Company, committed tactical and engineering errors by, apparently, losing sight of the fact that, if systematic exploration had been pursued and had proved the coal seams to extend with reasonable continuity in a southerly direction acquisition of sections of land adjoining the irregular southern boundary would have been of greater value, economically and otherwise, than the contracted area north of Doctor's Creek.

#### MARKETS

The question of markets is of importance in matters governing the establishment of a colliery and unless there is a reasonable assurance of a market equal to a minimum economic output the initial success of a venture in coal mining becomes a matter for conjecture.

In the early stages of operations by the Seymour Coal Mines Limited much credence was attached to opportunities for exploiting mainland markets and it was inferred that there were excellent marketing possibilities in South Australia. Little importance was then attached to the sale of coal in Tasmania.

Since the Company commenced productive operations all coal, excepting a small quantity despatched to the mainland, has been placed on the Tasmanian market. Disabilities in regard to shipping and mine equipment have been presented as the factor operating against export trade.

On the assumption that export trade is the principal market project of the Company, the following questionnaire was submitted for the consideration of the Board of Directors:-

"Could you furnish me with some definite information in respect to the names of persons, firms, or companies who would be prepared to purchase and use Seymour coal in competition with Newcastle or other mainland coals? Have you any assurance of immediate consumers and the quantities of coal that would be purchased or are you assuming that Seymour coal would find a ready sale in the open market?"

The opening up of an export trade is regarded as a big factor in the future of Seymour and I am anxious to have as much information upon this factor as you can furnish me."

The Secretary of the Company responded to the questionnaire in the following terms:-

"I desire to inform you that, at this juncture, I cannot furnish you with any definite information as to the names of persons or firms, on the Mainland, who are likely to become purchasers and users of Seymour coal also that it would be impolitic on the part of the Company to open up

negotiations in respect thereto until the projected works are or are about to be completed and the Company is in a position to supply."

If there is any assurance of a mainland market it was incumbent upon the Company to furnish some definite information in regard thereto, particularly in view of the fact of the request to the Government for a loan of £7,000 to further the interests of the venture but the particulars received only allows the matter of market possibilities to remain in a state of conjecture.

I differ from the contention of the Company that it would be impolitic to open up negotiations until the projected works are or are about to be completed and the Company is in a position to supply.

When marketing a coal which is not equal to first grade coals, such as referred to in preceding parts of this report, a first essential to the successful establishment of operations is the passing of trial samples through anticipated market avenues and obtaining an assurance of custom at a selling price not to exceed an amount equal to the fuel-ratio of other coals already being consumed in those markets. This procedure would not have been impolitic and would not have involved the Company in any obligation to supply.

Reliable information has been received that one firm of shipowners was prepared to transport a quantity of coal to the mainland, sufficient to enable a fair distribution to be made for testing purposes, provided the Company placed the coal at a suitable intra-state port, for bunkering purposes, but the offer was not accepted.

It is considered that the above proposal should have been embraced irrespective of the initial cost of placing the coal on the market and, further, it is considered that the Company has committed a tactical error by not prospecting the market possibilities with Seymour coal.

Since productive operations were commenced, practically the total output has been passed to the local markets and, as a consequence, the question of Tasmanian market possibilities has a direct bearing upon the future of Seymour and upon the value of the venture to the State.

Authentic information reveals that, over a period of five years, the average annual importation of mainland coal, into Tasmania, has not exceeded 50,000 tons. If Seymour coal were of a quality that it could wholly replace the imported coal, the future of Seymour would be assured as in addition to capturing the import trade the quality of the coal would justify market exploitation on the mainland and on a full competitive basis with mainland coals, but Seymour coal is not a recognised gas-coal nor is it likely to be used in substitution for quantities of coal imported for other industrial purposes.

It is apparent, therefore, that productive operations would be of a restricted nature if the Seymour Colliery is to be established on a local market possibility unless a portion of the trade, already being satisfied by existing mines, is diverted to Seymour.

It has been conceded that the quality of the coal is superior to other coals being produced from the East Coast series and this creates the possibility of Seymour coal, of a clean and constant quality, being used by a

The absence of naturally sheltered and deep-water port conditions, suitable for the economic establishment of facilities for the transportation of coal to projected markets, has been one of the factors operating against coal mining developments along the East Coast.

Several years ago, the East Coast Development Company undertook the construction of a railway from Coles Bay, on the south, to the Dalmayne Collieries at Picaninny Point, on the north, but the project was abandoned in the early stages of road works.

Coles Bay affords desirable port conditions and an inauguration of the proposed railway would have eliminated all obstacles in regard to transportation from and to the East Coast.

Situate approximately 18 miles northerly from Coles Bay and at the southern end of Macleans Bay, Bicheno appears to offer the best port facilities, next to Coles Bay, for serving the coal areas. In the early history of coal mining on the East Coast, quantities of coal were shipped from Vaugh's Harbour at Bicheno, but only a remnant of the jetty now remains. Bicheno, however, is subject to the vagaries of ocean conditions and there could be no assurance of continuous loading conditions at this port.

Port facilities are less suitable north of Bicheno and the destructive effect of ocean conditions is to be observed in remnants of jetties between Long Point and Picaninny Point. It must be conceded, however, that the constructional features were or are not suggestive of permanent structures.

Whilst the proposed East Coast Railway would have solved the problem of transportation as applicable to the East Coast generally, the construction of the necessary 26 to 30 miles of roadway and the provision of rolling stock would be beyond the economic capacity of a single company such as the Seymour Coal Mines Limited. There would be a danger of over-capitalisation in making similar provision for port facilities at Bicheno with the additional disadvantage of possible interruptions of loading conditions by inclement seas.

After due consideration, the Seymour Coal Mines Limited undertook the construction of a pier at the northern end of Macleans Bay and under partial shelter of Long Point. The completed pier is to be 1500 feet in length and it is expected that this will afford a low-water depth of 27' 6" at the pier end. The pier is already built to 1110 feet and portion of the loan of £7000 would be applied to constructing the remaining section of 390 feet.

An appreciable expenditure of money has, thus, been incurred in making provision for the bunkering of vessels and, irrespective of any opinion upon port conditions or loading disabilities, it seems that the matter of export facilities should be considered from the aspect of a completion of the existing arrangements.

The pier has been correctly directed at right angles to general ocean pressures and it is conceded that, north of Bicheno, the most suitable site has been selected. However, the arrangement will suffer disabilities of open roadstead conditions, particularly with inclement weather or seas from the east-south-east and south easterly

proportion of the consumers now using other coals from the East Coast.

Entrance of the Seymour Coal Mines Limited into competition for the whole or portion of the trade being met by the existing Tasmanian producers is a matter which concerns the Company and not the State, but, if the Seymour Coal Mines Limited establishes full productive operations by exploiting local markets, the success of Seymour would reflect adversely upon operations at the other mines owing to the limited scope of the Tasmanian market.

If the Seymour Coal Mines Limited is unable to acquire an appreciable and constant export trade and succeeds in gaining an economic proportion of the trade already being satisfied by local mines, the establishment of a mine at Seymour would not be of material value to the State and any application for financial or other assistance from the State should not be entertained.

If, however, productive operations could be established on export trade, with the concession of adding to the Tasmanian market if operations at the existing mines were not to be adversely affected, the Seymour Coal Mines Limited would become of immense importance to the State and, other things being equal, an application for financial assistance would automatically commend itself.

It seems desirable to mention that the recent industrial trouble on the northern coalfields of New South Wales appreciably benefited coal mining in Tasmania and it is ~~far~~ to opine that, unless Tasmanian consumers combine to use native coal in the same proportion as when the trouble existed or unless innovations are made to furnace and steaming arrangements to produce an extended use of native coal, there will be a slight reduction in productive activities at the local collieries now that the industrial trouble has terminated. An opinion of this nature is supported by peak production during industrial troubles in New South Wales in past years.

In addition, there is the outstanding fact that the industrial trouble in the mainland State terminated with a pronounced reduction of three shillings and three pence (3/3) per ton in the selling price of coal. This reduction has already had an adverse effect upon operations at mainland mines not within the affected area and the effect that it will have upon local trade conditions is a factor that cannot be ignored as there is the possibility that it may ultimately compel the institution of a balance in trade conditions or in distribution and production costs.

Those factors must necessarily affect the contemplated economics of mining at Seymour and such have been elaborated upon to illustrate and support the recorded opinion that the Seymour Coal Mines Limited committed tactical errors in not thoroughly prospecting mainland market possibilities at the inception of operations.

Although the application stresses the project of export trade and although the Company may be satisfied in regard to market possibilities and yet may be disinclined to reveal the probable consumers, the response to my questionnaire is not convincing and I am compelled to regard the possibilities of export trade as still prospective and to conclude that the company assumes that the coal will find a ready market in competition with other mainland coals.

directions. It is to be anticipated that ocean conditions will interfere with the bunkering of vessels and cause delays in shipping and export but with proper mooring and loading facilities the difficulty will not be as pronounced as might ordinarily be expected with open roadstead bunkering. Owing to the vagaries of ocean conditions it is not possible to actually forecast whether the possible period of loading will be more or less than 80 per cent of the year and, for this reason, it will be an essential policy for the Company to counter-balance the disability; so as to provide against added costs arising from vessels idling and waiting to berth for loading, and to ensure against periodical interruptions of productive operations; by the erection of storage bins of a capacity greater than would be normally required and by providing loading arrangements that will give the best possible results.

The pier has been completed to 1110 feet but this section is little more than the approach to the section that is to provide the contemplated facilities for loading. The low-water depth at the end of the present section is approximately 14 feet and, although several small lots of coal have been lifted, the position and conditions of loading are deplorably adverse as even with a relatively calm sea the pier-end is in the swell preceding the breakers and vessels are unable to berth.

The deck of the pier is 19 feet above water-level. The coal is stacked on the pier-end and is dropped into the holds of small vessels by the aid of "U" steel chutes, the total drop into the bottom of the holds being more than 20 feet. This drop is destructive to the grade of the coal as, although the stacked coal may be coarse nut and lump coal, the bunkering coal, owing to the excessive drop, usually contains an undesirable percentage of smalls and dust.

It is immediately apparent that if the pier is to, in any reasonable degree, meet the economic requirements of operations it must be extended to the contemplated distance of 1500 feet.

The structure is a substantial one and commendably more substantial than previous jetties constructed along the East Coast.

The present section consists of 3-pile piers, and the remaining section is to comprise of 4-pile piers with 3 batter piles at regular intervals, and cushion piles at each bay to keep the vessels clear of the main structure.

At the entrance of the pier the sand penetration of the piles varied from 8 to 10 feet and this gradually increased until, at the end of the completed section, a penetration of 21' 6" was obtained. A penetration of this extent is very satisfactory and favours the stability of the structure. If a penetration equal to that attained at the end of the completed section could be ensured for the remaining section any condition that would destroy the stability of the structure would be an abnormal one. This would also be provisional in regard to an incursion of the toredo-borer which, ordinarily, is alleged to be not indigenous to open roadstead conditions.

Whilst it is reasonable to anticipate that a satisfactory pile-penetration will be attained to the end of the remaining section no assurance can be given in this regard as the sea-floor has not been pricked or

bored and, owing to the position of the slates and granite, it is considered that this should be done, to remove any possible doubt, before the necessary expenditure is incurred in completing the pier to the preconceived distance.

A sum of £5,000 must be allowed for an extension of the pier to 1500 feet.

An extension of the pier to 1500 feet will not complete the loading arrangements as mooring-buoys must be provided to relieve stresses on the structure and to facilitate loading during moderate seas. Complete provision must also be made either for crane loading, or for a chute or belt system with telescope extensions or outloaders for the reception, delivery and rapid bunkering of vessels. Whichever loading unit is adopted it must be sufficient to eliminate excessive "drops", which create an undesirable percentage of slack and dust in the exported large or lump coal.

The pier is ideally situated for the economic handling and transportation of coal from the mine or storage bins to the vessels, the alignment of the pier corresponding with the alignment of the dip-tunnel and the distance from the pier-entrance to the mouth of the dip-tunnel being not more than 125 yards.

#### MINING, MACHINERY AND GENERAL ARRANGEMENTS

Exploitation of the No. 2 seam of coal is the current project of the Seymour Coal Mines Limited.

The characteristics of the seam and the quality of the coal have been reviewed in the preceding parts of this report.

The roof strata are of firm shales and sandstones. The roof and floor are well featured for safe and economical mining practices. Although the seam is not a "high seam" the thickness, as shown on the Feature Plan, is sufficient to meet the demands of economical mining.

The colliery is being developed on the Panel System and, although there is a difference of opinion in respect to the method of mining most suited, economically, to the conditions, the preconceived system is an approved one and is one that affords ample facilities for safe working.

Situate northerly from the old workings of the Seymour Coal Company Limited, the current productive workings are served by a dip-tunnel driven 759 feet on a gradient of approximately 1 in 5.

The seam workings are being developed on a full productive scale but the dip-tunnel is in a state of partial completion only. The bottom section of the tunnel requires to be enlarged and timbered to carry the proposed and necessary double roadway. Irregularities in the gradient should be corrected and it is necessary to complete the system of safety recesses. The cost of this work must be added to the cost of equipping the mine.

The mine is not provided with sufficient ventilation to meet the requirements of operating conditions and adequate ventilating machinery must be purchased and installed.

The workings are almost on the coastline and the distance from the mouth of the tunnel to the pier-entrance being not greater than 375 feet places the Company in a favourable position in regard to railage and pre-shipment costs, more favourably than the majority of collieries catering for export trade.

The existing pit-head and screening arrangements are of a temporary and crude nature, no desirable provision has been made for picking and rejection of waste matter from the produced coal, and no storage bins have been erected.

Pit head arrangements, complete with weighing tipler, screening and picking units are essential, and the cost of these arrangements must also be added to the cost of equipping the mine.

Storage bins are to be erected between the dip-tunnel and the pier entrance. The proposed capacity is 1400 tons but this is not sufficient if shipping disabilities are to be counterbalanced and interruptions of productive operations are to be evaded. It is considered that bins of a capacity of not less than 3000 tons should be erected.

Expeditious bunkering of vessels is a desirable condition at all times and more so with the port facilities at Seymour. A loading capacity of less than 100 to 150 tons an hour would be undesirable and an endless belt conveyor system with chutes and extensions or outloaders, or a crane system with large capacity bottom discharge waggons would satisfy requirements provided the latter system was not arranged to overburden the pier-end. It seems to be considered that the initial expense of providing either of these systems would be inadvisable at the inception of productive operations and the proposal is to install an endless rope haulage system with a full complement of standard mine waggons. The efficiency of this system would be less but the initial cost of installation would also be less than either of the other systems.

At present, there is a single track from the pit-head and all coal is hand-trucked and stacked on the pier-end for loading into vessels. Irrespective of the facilities contemplated or most suitable for the purpose, it is immediately obvious that the current system must be drastically altered and the cost of the alteration must be added to the cost of equipping the mine.

The existing mine-haulage is crude, inefficient and almost worthless. An endless rope-haulage system should be installed.

A plant for operations on the proposed scale should be essentially electrical and any steam generation, for electrification purposes, should be derived from mechanically fired boiler units provided with an automatic return system from the screens, for the utilisation of rejected slack, so as to minimise fuel costs.

The Company has purchased a quantity of second-hand machinery and there is to be a combined use of both steam-driven and electrically-operated machines.

A first motion second-hand steam engine has been partially installed and is to be fitted with intermediate gear and converted into an endless haulage engine.

The present operating plant comprises one Lancashire boiler; "donkey" engine, used for haulage purposes in the dip-tunnel; an air compressor, used for the purpose of driving a "popper" machine engaged in boring the coal faces; a small electric-generating set for lighting purposes; steam-pumping gear for keeping the workings unwatered; and a sawmilling bench and engine.

The air compressor and "popper" machine are unnecessary in the application of correct engineering principles and the existing plant is totally inadequate to meet the power requirements for the proposed productive scale. It is understood that the Company has purchased a second Lancashire boiler, a 225 K-W generating set, and two Sullivan coal-cutting machines but these are in different parts of the State and on the mainland, and have yet to be delivered at the mine.

Only part of the plant units, purchased, is desirable for correct colliery practices but as such have been purchased it might be considered that the most economical use should be made thereof.

The foregoing comments are not intended as a deliberate criticism of the plant units as installed or purchased by the Company but principally to convey the impression that, irrespective of any opinion upon purchased equipment, an appreciable expenditure of money must still be incurred in the delivery and installation of additional units and in the purchase and installation of subsidiary machines, gear, structures and general equipment if the colliery is to be placed on an economically productive scale.

#### Economics

The Company contemplates making provision for a daily output of 300 to 500 tons. A market that would warrant this output would justify operations at Seymour.

As stated, the loan of £7,000 is intended to cover the cost of extending the pier to 1500 feet and completing the equipment of the mine.

After deducting the probable cost of the pier extension there would be a balance of £2000 to complete the equipment of the mine. This amount would be totally inadequate as it is considered that a minimum of £10,400 should be provided, making a total of £15,400, to initially place the mine on an economic productive scale. Even this amount would be insufficient to provide the suggested loading facilities and the full equipment of other units. An amount of £20,000 would be more acceptable but having fixed a minimum it may be allowed that the succeeding and final stages of a full and efficient productive scale could be met from productive revenue. Difficulties may arise from inefficient loading facilities and, ordinarily, it would be advisable to regard the higher amount as a desirably available capital to extend the pier and equip the mine for export trade.

Probably, there is an assumption that, as the productive stage has already been entered upon, sufficient could be accomplished with the £2000 to enable the output of coal to be increased and that the further equipment of the mine could be met from productive revenue. A policy of this nature is fraught with uncertainties and it is considered and emphasised that if the market possibilities are sufficient to justify operations at Seymour, the mine

and surface arrangements should be adequately equipped.

With a reasonably equipped mine, suitable hewing conditions and on the basis of a daily output of 300 tons, production costs at Seymour should range within the vicinity of 12/9 to 13/- per ton. The introduction of coal-cutting machines, with special rates, may reduce the early production costs to the vicinity of 10/- to 10/6 per ton.

The manager states that under the present operating conditions coal has been placed on the pier at a cost of 13/9 per ton and into the vessels at a cost of 1/1.5 per ton, making the total cost, at Seymour, 14/10.5 per ton. He considers that, with a reasonably equipped mine and a daily output of 250 tons, the production cost will not exceed 13/6 per ton at the ordinary hewing rate, and that with coal-cutting machines the cost will not exceed 9/- per ton on the basis of a daily output of 500 tons.

Costs of transportation would vary between 10/- and 12/- for intra-state ports and range within the vicinity of 15/- to 16/- for near inter-state ports per ton of coal shipped from Seymour.

#### SHIPPING

Regularity of callings and capacities of vessels available for sea-transport constitute an essential factor in the successful establishment of operations at Seymour.

Owing to open roadstead conditions and ocean disabilities it is to be anticipated that natural conditions will interfere with the continuity of shipping and for these reasons it has been considered advisable to cite a storage bin capacity of 3000 tons, more than would ordinarily be required, so as to counterbalance periods of impossible loading, meet the possibility of two vessels berthing in close succession for bunkering, and avoid interruptions of productive operations that would ensue with a small bin-capacity and interrupted shipping. For similar and additional reasons, it has been considered advisable that efficient and expeditious bunkering facilities should be provided, to do which would add to the cost apparently anticipated by the Company.

It has been feared that difficulties would be encountered in obtaining suitable vessels to lift the coal and that an absence of "back-loading" would react excessively upon transport charges.

The Company has advised that J.M. Fisher and others have given an assurance that no difficulties would be experienced in providing vessels for the transportation of coal to the mainland.

Inquiries have been made into this matter and one firm of shipowners has advised that if adequate port and loading facilities are provided one vessel, with a loading capacity of 800 tons, can be listed for lifting coal from Seymour and that additional shipping would be provided if trade conditions warranted it.

#### GENERAL AND CONCLUSIONS.

According to the Standards Association of Australia, the average price of coal exported to Australian ports from New South Wales was, in 1928 £1 - 3 - 5.94 per ton

at the port of shipment.

The pit-top selling price, to the public, of screened coal from the State Mine at Wonthaggi was £1 - 7 - 6 per ton.

It has already been pointed out that with the termination of the industrial trouble on the northern coalfields of New South Wales, the selling price has fallen 3/3 per ton, and it appears, from inquiries, that "A" grade coal can be purchased at port prices of 19/6 to 20/- per ton.

Seymour coal has been sold at Seymour as bunkered coal, at about 20/- per ton but only for marketing in Tasmania.

The question of advancing money to further the interests of the Seymour Coal Mines Limited for the exploitation of the Tasmanian market has been dealt with and need be submitted to no added comment.

On the assumption that South Australia is the objective market, there seems to be an impression that the greater distance from New South Wales would favour Seymour in the matter of transport costs. Of this there is no certainty and, on the contrary, inquiries suggest that there would be no material difference in favour of Seymour.

Seymour coal is regarded as being superior to other coals produced from the East Coast series and the clean product has received favourable comment for regular steaming and domestic purposes, but, the coal is not equal to "A" grade coal from the Hawkesbury series and it is clear that the selling price of Seymour coal must be varied in ratio to the ash content and calorific value and in proportion to the higher consumption-ratio. It is also clear that, with equal transport costs, the selling price of Seymour coal at Seymour must be appreciably less than 19/6 to 20/- per ton for the purposes of export trade.

Costs of distribution might be attacked and reduced to a minimum but it would be injudicious to anticipate a material benefit on large or extended contracts.

It is, therefore, clear and important that Seymour coal must be produced as a "cheap-coal" and of the constantly clean grade and maximum quality reviewed in the preceding parts of this report.

"Cheap coal" is purely an economic expression and not a suggestion of complete inferiority as it is to be observed that a product of the grade and Quality stated would be quite comparable with "B" grade coals from New South Wales, which coals are classified with ash contents ranging from 15 to 20 per cent and calorific values from 10,000 to 11,500 British thermal units.

Information indicated that there was a possibility of the Company selling the entire output of the mine as a bunker-price of 15/- per ton. This price would be an economic one for Seymour conditions but with the recent fall in the price of Newcastle coal the source of that information could extend no assurance of a contract price without a trial shipment of a quantity sufficient for general distribution through market avenues.

With machine-cutting and industrial rates specially apportioned to machine-cutting, a selling price of slightly less than 15/- per ton would still be within the realms of possibilities but it is clear that the colliery must be equipped for efficiency, low-cost production, minimum overhead and administrative expenses, and a relatively small profit per ton of coal marketed.

As the possibility of attaining the above result with an amount of £7,000 has not been entertained, it is clear that any financial assistance must be sufficient to extend the pier and furnish it with adequate loading facilities and to completely equip the mine, or, in the alternative, such assistance must be on a proportional contributing basis that would ensure ample capital for those purposes.

There are 23,731 unallotted shares, representing a capital of £23,731 which would be sufficient to meet economic requirements but the Company is either unable or desires not to place further shares and has made application for a loan which is regarded, by the Company, as sufficient for the purpose of attaining an economically productive stage.

If operations could be expanded on export trade, the Seymour Colliery and the incidental establishment of a township on the East Coast would be of immense importance to the state and that aspect of industrial development would warrant the State extending assistance in all matters that would tend to the permanent establishment of operations but such assistance could only be advanced on the basis of assured factors or factors outside the regions of uncertainty.

The absence of an assurance in regard to the export market, distracts from the merits of the case and, beyond the deductions to be made from the preceding figures, it is difficult to present the probable selling-price of the coal when placed in competition with coals already on the projected markets. Exploration of market possibilities would not have been impolitic and would not place the Company under any detrimental obligation. It is considered that this is still a necessary factor in regard to the establishment of operations at Seymour. The cost of prospecting the market would be proportionately high, under existing conditions, but such would be immaterial when compared with the result that would be obtained. Arrangements could be made for this and, having regard for all circumstances, it would be reasonable for the State to extend assistance in the production and placing of a quantity of coal for prospect purposes. The Company may be perfectly satisfied in regard to future prospects but, in the present absence of definite factors upon market possibilities and upon the possible selling price of the coal, it would be difficult for the State to become involved in the advance of a substantial loan to further the interests of the Seymour Coal Mines Limited.

The Company has expended an appreciable sum of money, directly and indirectly, in the pursuance of mining operations and, irrespective of any opinion upon the existing and proposed arrangements or the applied policy, it would be regrettable if measures are not prosecuted to definitely determine the commercial possibilities of this coal on markets foreign to Tasmania.

The conditions of occupancy of the area are reasonable. Matters of proving the commercial area of the coal to place it beyond the pale of theoretical assumptions, of further investigating natural features to ensure the stability of the pier-structure, and of finalising other features reviewed in this report would involve a relatively small cost only. Ordinarily, such investigations should be carried out and met from preliminary expenses but, in view of the stage to which operations have been advanced and the favourable geological features south of Doctor's Creek, the initially correct procedure may be departed from and no expense incurred in those directions until the factors of market possibilities are determined. If it so happened that market possibilities warranted an expansion of operations at Seymour, the State would be justified in assisting in any of the other directions as a matter concerning the development of mining within the State.

In this report there has been an adherence to the technical and economic aspects of mining operations at Seymour but if the Honourable the Minister for Mines desires information upon any other matters I shall be pleased to furnish it. Further, if the Honourable the Minister for Mines deems the case of sufficient moment to submit it to a Select Committee I would be pleased to advise that Committee upon any technical or practical issues that may be involved.

The plans and other particulars mentioned, herein, are forwarded separately.

Yours obediently,

INSPECTOR OF MINES

SOME TYPICAL COAL ANALYSES AS ANNOUNCED BY THE  
STANDARDS ASSOCIATION OF AUSTRALIA

| Colliery                   | Moisture | Volatile<br>Matter | Fixed<br>Carbon | Ash   | Sulphur | Calorific<br>Value -<br>British<br>Thermal<br>Units |
|----------------------------|----------|--------------------|-----------------|-------|---------|---|
| <b>NEW SOUTH WALES</b>     |          |                    |                 |       |         |   |
| <b>Northern Coalfields</b> |          |                    |                 |       |         |   |
| Aberdare                   | 2.70     | 40.56              | 50.14           | 6.60  | 0.80    | 12998   |
| Aberdare                   | 2.06     | 41.74              | 50.58           | 5.62  | 0.85    | 13237   |
| Ayrfield                   | 3.00     | 36.88              | 50.82           | 9.30  | 1.06    | 12805   |
| Bellbird                   | 1.74     | 40.93              | 53.35           | 3.98  | 1.00    | 13422   |
| Central Greta              | 2.55     | 37.00              | 49.70           | 10.75 | 0.89    | 12231   |
| Glebe Valley               | 2.95     | 34.02              | 53.23           | 9.82  | 0.30    | 12164   |
| Glen Ayre                  | 1.89     | 38.54              | 52.02           | 7.55  | 0.96    | 13138   |
| Great Greta                | 1.83     | 39.92              | 47.20           | 11.05 | 1.55    | 12234   |
| Greta Main                 | 2.54     | 37.57              | 51.73           | 8.16  | 1.06    | 12536   |
| Gunnedah                   | 4.28     | 34.60              | 53.47           | 7.65  | 0.55    | 12074   |
| Hebburn                    | 1.98     | 37.68              | 50.02           | 10.32 | 0.76    | 12682   |
| Merewether                 | 2.54     | 34.00              | 52.99           | 10.47 | 0.28    | 12205   |
| Muswellbrook               | 3.33     | 38.53              | 53.41           | 4.73  | 0.71    | 13095   |
| <br>                       |          |                    |                 |       |         |   |
| New Greta                  | 1.91     | 38.79              | 47.10           | 12.20 | 2.05    | 11979   |
| Northumberland             | 2.41     | 29.80              | 50.45           | 17.34 | 0.43    | 11149   |
| Nundah                     | 2.00     | 36.30              | 54.26           | 7.44  | 0.86    | 12743   |
| Nundah Extended            | 1.80     | 38.54              | 54.69           | 4.97  | 0.70    | 13193   |
| Overton                    | 5.08     | 36.65              | 47.81           | 10.46 | 1.07    | 11849   |
| Pelaw-Main                 | 2.00     | 40.33              | 52.41           | 5.26  | 1.00    | 13270   |
| Preston                    | 2.81     | 33.47              | 53.45           | 10.27 | 0.36    | 12018   |
| Redhead                    | 1.89     | 34.69              | 51.04           | 12.38 | 0.52    | 11997   |
| Richmond-Main              | 1.58     | 42.92              | 51.16           | 4.34  | 1.04    | 13565   |
| Rosedale                   | 2.26     | 37.89              | 50.31           | 9.54  | 0.71    | 12352   |
| St. Heliers                | 3.15     | 38.95              | 52.55           | 5.35  | 0.67    | 12816   |
| South Greta                | 1.50     | 38.80              | 51.10           | 8.60  | 0.41    | 12829   |
| <br>                       |          |                    |                 |       |         |   |
| Stanford-Merthyr           | 1.92     | 40.61              | 51.42           | 6.05  | 0.71    | 13184   |
| Stockton-Borehole          | 1.53     | 32.94              | 56.59           | 8.94  | 0.52    | 12713   |
| Werris Creek               | 6.57     | 24.18              | 63.75           | 5.50  | 0.39    | 12067   |
| <br>                       |          |                    |                 |       |         |   |
| <b>Western Coalfields</b>  |          |                    |                 |       |         |   |
| Brown's                    | 3.02     | 29.93              | 56.11           | 10.94 | 0.59    | 12002   |
| Clandulla                  | 2.80     | 30.60              | 54.90           | 11.70 | 0.56    | 12050   |
| Commonwealth               | 4.13     | 27.07              | 55.69           | 13.11 | 0.52    | 11445   |
| Hermitage                  | 1.84     | 30.34              | 56.51           | 11.31 | 0.59    | 12377   |
| Hoskins'                   | 2.55     | 32.05              | 53.40           | 12.00 | 0.59    | 12199   |
| Invincible                 | 3.25     | 32.71              | 52.48           | 11.56 | 0.50    | 12078   |
| Kandos                     | 3.44     | 29.65              | 54.05           | 12.86 | 0.50    | 11831   |
| Kandos-Coomber             | 4.15     | 30.95              | 52.70           | 12.20 | 0.49    | 11752   |
| Lithgow Valley             | 2.65     | 32.10              | 53.23           | 12.02 | 0.56    | 12083   |
| Main Range                 | 2.95     | 29.98              | 55.01           | 12.06 | 0.48    | 11934   |
| Oakley Park                | 2.10     | 32.48              | 52.89           | 12.53 | 0.64    | 12195   |
| Renown                     | 2.50     | 31.81              | 54.04           | 11.65 | 0.54    | 12100   |
| State                      | 1.98     | 32.47              | 52.38           | 13.17 | 0.63    | 12002   |
| Zig Zag                    | 2.44     | 31.59              | 52.49           | 13.48 | 0.59    | 11996   |
| <br>                       |          |                    |                 |       |         |   |
| <b>Southern Coalfields</b> |          |                    |                 |       |         |   |
| Bulli                      | 0.92     | 23.39              | 64.46           | 11.23 | 0.30    | 12801   |
| Coalcliff                  | 1.28     | 17.16              | 66.35           | 15.21 | 0.32    | 12292   |
| Coalcliff                  | 0.90     | 20.27              | 65.42           | 13.41 | 0.33    | 12602   |
| Corrimal-Balgownie         | 0.75     | 20.44              | 68.09           | 10.72 | 0.35    | 13195   |
| Excelsior                  | 0.93     | 21.74              | 63.32           | 14.01 | 0.36    | 12391   |

| Colliery       | Moisture | Volatile<br>Matter | Fixed<br>Carbon | Ash   | Sulphur | Calorific<br>Value -<br>British<br>Thermal<br>Units |
|----------------|----------|--------------------|-----------------|-------|---------|---|
| Metropolitan   | 0.65     | 18.61              | 70.39           | 10.35 | 0.31    | 13204   |
| Metropolitan   | 1.00     | 18.65              | 68.60           | 11.75 | 0.27    | 12793   |
| Mount Kembla   | 0.90     | 23.74              | 63.57           | 11.79 | 0.33    | 12796   |
| Mount Pleasant | 1.70     | 25.50              | 61.40           | 11.40 | 0.36    | 13002   |
| North Bulli    | 0.65     | 19.94              | 66.14           | 13.27 | 0.35    | 12598   |
| South Clifton  | 1.17     | 22.13              | 65.28           | 11.42 | 0.32    | 12974   |
| South Kembla   | 0.80     | 22.81              | 56.72           | 19.67 | 0.62    | 11671   |
| Tongarra       | 1.21     | 22.68              | 61.78           | 14.23 | 0.47    | 12495   |
| VICTORIA       |          |                    |                 |       |         |   |
| State Mine     | 5.28     | 28.78              | 57.10           | 8.84  |         | 12222   |
|                | 8.43     | 27.56              | 56.08           | 7.93  |         | 12038   |
|                | 5.76     | 31.86              | 56.87           | 5.51  |         | 12694   |
| Outtrim        | 4.87     | 29.58              | 60.25           | 5.26  |         | 12822   |
| Jumbunna       | 4.04     | 27.25              | 62.94           | 4.77  |         | 13029   |