

EXAMINATION OF
COAL AREAS AT
LEPRENA

Leprena Coal Mining Co. Ltd.: G. H. Smith

23-028

Leprena Coal Mining Co.

8/10/23.

by
G. H. Smith

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Brisbane
8th. March 1923.

The Hon. Chas. F. Nielson,
Bundaberg.

Dear Sir,

I beg to report that by courtesy of the Queensland Mines Dept., I have now made an examination of the coal areas held by the Leprena Coal Mining Company Ltd., at Leprena, Recherche Bay, Southern Tasmania and submit the appended notes for your information.

LOCATION: The village of Leprena, at which timber milling is conducted is situated near the head of the Western shore of Recherche Bay in latitude $43^{\circ} 70'$ south,; together with the southerly adjoining village of Ramsgate (Catamaran) Leprena constitutes the southernmost settlement in Tasmania. The leases held by your Company are located on and in the vicinity of the D'Entrecasteau River, a short distance Westerly of Leprena. From the Capital (Hobart) it is distant ≈ 50 miles by sea route south-south-westerly. The areas (in the name of G.H. Smith) controlled by your company comprise the following blocks:- 8835M of 70 acres; 8749M of 200 acres, 8834M of 500 acres and 8853M of 320 acres. Of these areas all but the first mentioned 70 acre block lie within the coal bearing section of the Mesozoic formations. No coal has hitherto been located on this Block (8835M) but its position immediately to the East of the known outcrops on 8749M make it advantageous for the construction of a tram line to the suggested jetty on Recherche Bay.

METEOROLOGY: As might be expected from its geographical position Leprena enjoys a cool climate throughout the year, the result being a relatively higher labour efficiency being obtained than would be the case on the mainland. The annual rainfall at Catamaran is 58.04 inches and the same figure can be taken at Leprena. The number of rainy days in a year is however much greater than the 58 inches would suggest, owing to the fact that the individual falls are usually slight.

TIMBER RESOURCES: Both on your Company's areas and also on the adjoining blocks there is an abundance of excellent hardwood suitable for jetty and tramline construction and also for mine buildings bins and mining requirements. Excellent pile timber is available from your 70 acre block (8835M) The chief hardwoods noticed were peppermint and stringy bark.

TRANSPORT: From the site of the proposed tunnel in the east central position of Block 8749M to the suggested jetty site in the north eastern portion of Lot 350 (Hy. Jones & Coy) a fairly good tramline can be constructed through your Block 8835M and Lot 350 to the water front. The length of this line would be approximately $1\frac{1}{2}$ miles. A jetty of about 500 yards in length in the same south easterly direction would provide 20ft of water at low water spring tides, whilst a slightly longer jetty would afford 24ft. Recherche Bay is a land locked harbour in which ships can lie in safety during any weather; a large sailing ship is at present anchored in the Bay close to the end of the suggested jetty and has been there for the past twelve months without having dragged her one anchor. A large reef extends easterly for 13 chains from the western entrance to the harbour followed by Shag Rock opposite Bennett Point at the eastern entrance. These rocks protect the bay from south easterly gales which latter constitute the sole troublesome winds. A clear entrance - about 8 chains in width with deep water is available between Shag Rock and Bennett Point for ships drawing up to 24ft of water, this depth at low tide being available up to the end of the suggested coal loading jetty.

GEOLOGY: The strata occupying the Leprena - Catamaran area consist essentially of Trias-Jura (Mesozoic) sandstone shales and coal seams intruded (?) by an igneous rock known locally as diabase. Much of

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The time spent by me on this field was necessarily devoted to the elucidation of the actual relationship existing between the upper coal measures and the diabase. Unfortunately owing to the absence of rock outcrops over most of the area and also the extreme difficulty of traversing the country by reason of the dense high cutting grass, fallen timber, swamps etc., it was not possible to definitely determine whether the diabase does actually intrude the coal measures or not. Mr. J. O. Hudson Chief Inspector of Mines for Tasmania who kindly accompanied me throughout the inspection, is firmly convinced after an examination of all the known coal fields of the Island that the coal measures were laid down upon a pre-existing irregular diabase floor. This view appears to have been more or less held by Mr. Twehetrees, late Government Geologist of Tasmania as he could not arrive at a definite conclusion and left the problem open. The present Government Geologists make the definite statement that the diabase intrudes the upper coal measures, but in the latest work issued by them entitled "The Coal Resources of Tasmania" they do not adduce what I would consider conclusive evidence in support of their statement. A close examination however of the strata exposed at sea level along Recherche Bay rather supports their assumption concerning the intrusive nature of the diabase, though the entire absence of contact metamorphism in the shales and soft porous sandstone abutting on the diabase bluffs is truly remarkable and strongly supports Mr. Hudson's above quoted hypothesis. There is apparently not a single instance recorded throughout Tasmania of natural coking having taken place in coal seams in contact with the diabase, and a further significant fact is the frequent thinning out of the seams as they approach the diabase masses. The opinion formed by me is that the diabase does actually intrude the upper coal measures but not in the form of rounded invasions but rather along narrow lines and from small plugs from which extensive intrusive sheets were forced laterally into the sediments much in the same way as similar sills of basic igneous rock have invaded the Permo-Carboniferous coal measures of the south coast of N.S. Wales. By the courtesy of Mr. Nye, one of the Tasmanian Government Geologists in Launceston, I was provided with a copy of a recently prepared sketch geological map of the Leprena-Catamaran area. As this as yet unpublished map is to be issued in the near future is the official opinion concerning the area in question, I explored the country as far as was humanly possible in such a difficult area and came to the conclusion that a very much greater area had been shown as being occupied by intrusive diabase than is actually the case. The map referred to showed a very large area of diabase occupying most of the extensive belt between the western half of your 8749M block westerly and north westerly to the vicinity of the Government (calyx) bore being sunk by the Mines Department in the southerly eastern portion of your 8853M block. Had this been a correct diagnosis of this area then the seams proved in the two shallow shafts on 8749M would have been valueless as a commercial enterprise and any future operations would have been limited to the exploitation of a much reduced area on 8853, the whole of the other blocks being quite useless; it would also have entailed the building of a much longer and more expensive tramline than that proposed from Block 8749M. After a very strenuous trip over the area involved I was convinced that Mr. McIntosh Reid, the Government Geologist who, I understand prepared the map, had not given anything other than a very cursory look at the country between Catamaran and the Government Bore. For instance, I discovered coaly shales at the roots of trees towards the south western corner of 8749M in an area shown by him as diabase. In order to settle the question as far as possible in the limited time available, I requested your representative Mr. Deely to run down a couple of shallow bores with his hand boring plant across the area supposed by Mr. Reid to be diabase, and in every instance my previously formed opinion was confirmed, the borings which I closely examined showing sediments in every instance. Near the north-west corner of 8749M a patch of diabase boulders is certainly seen but a hand bore was commenced here for me by Mr. Deely who has since wired me stating that my interpretation has been proved correct and that the diabase occurring here is merely floating boulders. I arranged with him before leaving Leprena to carry out a further system of shallow hand bores in order to make as certain as possible that no serious intrusions of diabase occur to the west of the test shafts in the direction of the future tunnel workings. My interpretation of the diabase occurrence hereabouts is shown on the litho accompanying this report, and while not making claim to complete accuracy, I am confident that future

boring and close examination of the country will show that it much more closely approximates the correct condition of affairs than does the highly unfavourable map prepared by the Tasmanian Geologists. I may mention that in their recently prepared work on the Tasmanian Fields the reference to the Leprena areas are decidedly unfavourable probably having been based on early Government bores on the former Moss Glen property; for instance they state "Drilling shows that the coal seams here are not of any considerable economic value", also "This coal is dull and soft, having been greatly affected by weathering agents. The ash content is high, even in picked samples it exceeds 20%. It ignites slowly and burns fairly well on the open fire, but it cannot be regarded as a good domestic coal".

Another item on which I hold an opposing view is that of the roofs of the seams, and I may state that Mr. Chief Inspector Hudson whose official duties include an examination of the stability of coal roofs agrees entirely with my opinion that the strata forming the roof of the seam on your property is excellent, in fact he considers that the prospecting tunnel will not require timbering after about the first 50ft from the entrance.

To the westward of the Government bore on 8853M the country assumes the character of a practically open plain to as far as the high country at La Perouse. The sediments ascend this range for a considerable altitude and strongly suggests that the Leprena district measures have been faulted downwards. If this be correct then it may be assumed that drag faults will be seen towards the range but that would not militate against successful coal mining operations being carried on by your Company seeing that the Leprena area is distant between three and four miles easterly. The average dip of the beds is west north westerly at 1 in 5, hence the depth at which the seams might be expected to occur to the westward of your areas would be far too great for shaft-sinking. Your Company clearly holds the key to the position seeing that the coal in this neighbourhood - which is the only one convenient to a deep water port - must outcrop on or very close to the eastern boundaries of your blocks and dips west north-westerly and therefore attains too great a depth along the western sides of the blocks to permit of being profitably mined by shafts. On the plain country to the westward it is highly improbable that any serious discolation of the strata or extensive diabase invasions occur, otherwise a very different surface topography would have been presented. The probability is that the measures will be found to assume a flatter dip when followed in westerly. It is of interest to record that the Catamaran seam, met with at 157 feet in depth, shares a similar 1 in 5 dip to that exhibited by the two seams exposed on your 8749M block.

BORING: The No.1 Government Calyx Bore now being sunk by the Mines Department for your Company is located at the terminus of the old (wooden) tramline to Leprena timber mill. The country thereabouts is extremely difficult to negotiate and the site is about the best that could have been selected under the circumstances. Its location is roughly 75 chains north-north westerly of the two best shafts. At the request of Mr. Loftus Hills, Chief Geologist of Tasmania who selected the bore site, Mr. Deely has carried out much shallow hand-boring in order to confirm the sedimentary nature of the strata in the immediate vicinity of the bore; a couple of shallow bores were also put down a few chains westward of the bore along a newly cut track made expressly for the purpose of enabling me to examine the plain country westwards of Smiths Gully. All these hand-bores as well as the Calyx Bore itself have proved the existence of shales and sandstones. Mr. Deely is now boring for me on the tramline at the centre of the eastern boundary of the block (8853M) and it would not be surprising if he succeeds in proving the existence of the seams here as the strike of the beds seen on 8749M would cause the seams to be at a shallow depth along the eastern boundary of 8853. It should soon be possible to determine fairly closely the depth at which the seams will be met with in the Government bore. I have shown as accurately as possible the position of the various bores put

down by Mr. Deely, as also the Government bore so as to make these notes more readily followed.

COAL SEAMS: Two principal seams of coal have been located, of which one is a composite seam which could be considered as forming two separate seams, making three in all. Of these seams the indications at present, in my opinion, are that the lowermost (No. 3) will be found to be the only one worth spending money upon at present to test at depth. The workings are all on the eastern half of 8749M.

No. 3 SEAM: Aneroid readings give the height of this outcrop at about 270 feet above sea level. A shallow shaft was sunk and showed the seam to total 5 ft 9 ins in thickness and dipping WNW at 1 in 5. The seam was then followed in for 2 ft on the dip, and a sample taken of the coal exposed in the face of this dip, omitting three small stone bands totalling 4 inches, thus making 5 ft 5 ins of coal sampled. This sample has been handed to Mr. E. A. Derrick, Analyst, Brisbane, for proximate analysis, determination of sulphur, thermal value and analysis of the coal ash (to determine liability to clinkering). The coal is dull with occasional thin bright bands; it is fairly hard, although the sample is little better than outcrop material owing to its shallow depth and should make a good export coal. In this regard it is better than the coal being won at Catamaran, the latter being distinctly "tender" (friable). The ash content could be readily reduced both by hand picking on a belt, or by "washing". I am strongly of opinion that your company should expend the roughly £800 required to drive a prospecting tunnel 6 ft X 4 ft following this seam in on the dip for 500 feet. This tunnel would not require timbering for more than the (probably) first 50 ft., and could have an arched roof both on the score of economy and safety. In order to obviate the necessity of handling surface water it would be advisable to cut this seam with the prospecting tunnel at about 30 ft. from the surface. A "Buffalo" blower would provide air both for the sinking of the underlie and also the forge.

No. 1 SEAM: is located approximately 25 ft above No. 3 seam; it is composed mainly of carbonaceous shales and small bands of poor quality coal. I did not sample this seam, as it is clearly worthless at the surface.

No. 2 SEAM: in reality forms the lower portion of No. 1 seam, shallow prospecting shaft has exposed a total of 5 ft 2 ins including 1 ft 2 ins total of bands which were omitted from the sample leaving 4 ft of dull poor quality coal. I would not advise the expenditure of money on this seam at present, but it would be a simple matter to test it by a stone drive or a rise from the suggested prospecting tunnel on the No. 3 seam. The No. 2 seam has an excellent sandy shale roof and floor, and providing that the drive from the tunnel on No. 3 seam shows the No. 2 seam to have improved sufficiently to warrant exploitation, there is fortunately sufficient strong strata between these seams to permit of their being worked simultaneously from the ~~same~~ same main dip haulage.

GAS AND COAL DUST: etc. The coal seams on your Company's property are excellent as regards safety from gas and dust explosions, owing, firstly to the low gas content, secondly to the permanent dampness of both the coal and the enclosing strata, and thirdly to the amount of stone dust that would be produced during the winning of the coal. The only danger that need be apprehended would be from possible "shelling" of the roof due to the percolation of water through the roof towards the surface. By having a barrier of 100 yards to the dip, then working hord and pillar with 10 yard pillars, and 7 yard hords no danger need be anticipated from extracting the coal; as work progresses you could adopt 8 yard pillars and 8 yard hords. For the protection of the main haulage, it would be advisable here to leave a 40 yard pillar. The local law provides for a 100 yard barrier being left between the outcrop and the dip workings until the collieries are depleted.

LABOUR: There would be no difficulty in obtaining efficient labour locally. The rates of pay existing at Catamaran being 19/9d per day for coalminers and 14/- per day for wheelers. Should you decide to put in the prospecting tunnel suggested, I can supply you with the name of an excellent experienced local man who could carry out the work as working manager. I made extensive private enquiries, as I recognised that an experienced man with the knowledge of the peculiar local conditions obtaining, would be the best suited for this work.

OVERSEAS EXPORT: Apart from a good local demand in Southern Tasmania for domestic fuel, there is a keen demand for coal in South Australia as the latter state has no deposits of good quality coal. Your Company could doubtless arrange with the Electrolytic Zinc Co. (Risdon, Hobart) to call at Leprena, seeing that their ships return to Port Pirie empty and would be glad of the back loading. In view of the rather high ash content it would be imperative to "wash" the coal intended for export to Adelaide.

CEMENT PRODUCTION: Both near Leprena and at Ida Bay occur extensive deposits of limestone which may well prove suitable for cement making in the future, in which case a considerable tonnage of coal would be required to meet the demands of that industry. In the probable event of your area providing suitable coal your Company would be well advised to have an investigation made of the Leprena limestone seeing that the location of limestone coal and shale near an excellent harbour is ideal for economic cement manufacture.

RECOMMENDATIONS: In addition to driving the dip tunnel on No.3 seam and opening levels along the strike of the seam at the 500 ft. mark on the underlie, the following campaign of hand-boring should be carried out, to test the nature of the strata:-

- (a) A series of bores along the eastern boundary of 8749M
- (b) Another series along the northern boundary of the same block.
- (c) Bores at intervals along the western boundary of R.D. Cuthbert's block (99)
- (d) To the dip ahead of the proposed tunnel.

I requested Mr. Deeley to carry out the above hand bores and also to trench the surface in proximity to the No.2 shaft.

In order to ensure a full understanding of the seams before embarking upon expensive colliery workings and tram jetty &c. construction, it would be desirable to:-

- (a) Complete the present No.1 Government Bore.
- (b) Sink further deep bores to the dip as follows:-
 - (1) In the centre of 8749M;
 - (2) At the crossing of the old tramline over the western boundary of that block; and

(3) On the western boundary of 8834M.

Of these three last mentioned deep bores, the No.2 on the western boundary of 8749M is the most urgent, though, owing to the difficulty of transporting the drill, I would strongly urge your Board to proceed immediately with the suggested dip tunnel.

FUTURE PROSPECTS: Whilst odd diabase dykes and small faultings may possibly be found later on to disturb the measures, I am confident that no really serious difficulties will be encountered from those causes, and consider that your Company has acquired what will soon prove to be a very valuable coal property, and I have not the slightest hesitation in advising them to push on at once with the prospecting work outlined above. In addition to the seams already exposed there is every probability of locating at least two other important seams on your areas, viz: the Catamaran seam and the 2 ft seam of anthracite recently found on the latter property. Allowing for the usual mining losses and estimating that the No.3 seam maintains its present thickness there should be approximately 5,000,000 tons of coal available on your areas from this seam alone.

CONCLUSION: I am indebted to Messrs. Hudson Deeley and H.G.Smith for valuable assistance during the inspection of your Company's Blocks.

During the driving of the prospecting tunnel it would be advisable to take carefully averaged samples and also measure the thickness of coal and bands at regular intervals alternately on either side to the bottom.

For obvious reasons I would advise that this report be not made public in its present form and would suggest that before issuing a prospectus for the larger company necessary later on when the field has been sufficiently prospected that a further inspection be made when a detailed report suitable for public information could be drawn up.

PLAN: A litho showing the location of the diabase &c. is attached. Coal analysis from Mr.Derrick herewith.

Yours faithfully,
E.Cecil Saint-Smith F.S.T.C.
Government Geologist
BRISBANE.

102 Elizabeth Street
Brisbane
March 8th 1923.

Certificate No.1015

E.C.Saint-Smith Esq.,
a/c Leprena Coal Mining Company
Brisbane.

Sample No.1 (No.3 Seam)

Moisture	4.79	per cent
Volatilo Hydrocarbons	17.25	"
Fixed carbon	52.99	"
Ash	24.97	"
Sulphur	0.40	"

Does not cake nor coke Ash Brown

B.T.U. (calculated) 11188

Analysis of Ash No.1.

Silica	61.13	per cent
Ferric Oxide	9.16	"
Alumina	25.21	"
Lime (Cao)	3.18	"
Magnesia (Mgo)	0.69	"
Alkalies & Loss	0.63	"

Sample No.2. (No.2 Seam)

Moisture	6.37	per cent
Volatile Hydrocarbons	17.56	"
Fixed carbon	28.44	"
Ash	53.63	"

E.A.Derrick.