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ZEEHAN,

21st May, 1913.

Report on the Supply of
Electric Power
from the Waters of
Lake Rolleston District.

Following on the preliminary inspection of the Stanley River as a source of water power an examination has been made of the country to the South East of Mt. Read in the vicinity of Lake Rolleston.

The District is shown on the two mineral charts entitled Tyndall and Murchison.

The area examined by drained towards the North by the Anthony River, which flows into the Murchison River and so into the Pieman, and so to the South and the West by the River Henty. It includes five Lakes; one so far unnamed which I call the Black Lake, Lakes Rolleston, Selina, and Westwood, all emptying into the Anthony River, and Lake Julia emptying into the Henty River. The Anthony River flows out of the Black Lake and through Lake Rolleston and is joined about two miles further down by the waters from Lake Selina and Westwood.

Black Lake has an area of possibly ten acres, Rolleston 196 acres, Westwood 72 acres, Selina 53 acres, or a total of 321 acres. Lake Julia occurs further West and draining into the Henty River has an area of 80 acres.

The dividing Range between the waters of the Anthony and Henty is high except at one point just to the South of Newton Peak: here the divide is cut by a narrow valley which I have called the Newton Gap. The gap is about the level of Lake Selina and lower than Rolleston, Westwood, or Julia. Through it the waters of these Lakes and the headwaters of the Henty and Anthony can be turned into either of these two rivers as seems more suitable.

It will require considerable work before finally deciding in which direction these waters should be turned, and it is impossible at the present stage to determine what would be the best scheme to adopt to use them to the fullest advantage. In this report a scheme is set out which will secure a considerable amount of power at a moderate capital outlay. It involves the loss of a certain amount of head in order to obtain a greater volume of water and smaller

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capital expenditure. It is quite possible that a closer examination of the country may entail a complete revision in order to obtain larger results but the scheme, as outlined, in itself fully justifies the expenditure required.

Normal Flow:

The normal flow of water available consists of the Anthony River flowing from the Lakes named above and a stream I call Red Hills Creek draining the Eastern Fall of Mt. Murchison. The flow in the Anthony was roughly measured after a spell in dry weather in April, and gave about 50 sluice heads of water. The other stream has not yet been measured but carries a considerable amount of water. It seems probably that the volume of the two streams together will seldom drop below 50 head. Any fall of rain will at once bring up the volume to many times this amount since the waters run very rapidly down the steep mountain sides.

Catchment:

The catchment area for the Anthony alone without including the Red Hills Stream mentioned above and without touching the Henty Fall comes to 13.08 square miles. The rainfall is estimated at 120 inches per annum; the records at Mt. Lyell show that there is more than this in these mountains but 120 inches is a safe figure for the delivery from the catchment basin after allowing for percolation and evaporation. This amount of rainfall over the catchment area is equivalent to a continuous discharge of 289 Tasmanian sluice heads of 24 cu. ft. per minute each.

Fall:

The Anthony River between the outlet of Lake Rolleston and the point where the waters of Lake Selina and Westwood join it flows for over a mile along a wide valley with but little fall. It then drops down rapidly so that a fall of about 600 feet can be secured in a distance of about $1\frac{1}{2}$ miles of watterrace. With 600 feet of fall 200 head of water will develop 4000 horse power from a Pelton wheel or turbine giving only 75% efficiency.

Storage:

To secure this supply constantly the

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waters will need to be stored up to carry over a period of dry weather. The storage regarded as sufficient contemplates the supply of water to provide enough to bring the minimum flow of 50 head up to 200 head during 30 days of no rainfall.

A head of water flowing continuously will lower the surface of an acre $9\frac{1}{2}$ inches in 24 hours. Lake Rolleston has an area of 179 acres; hence in 30 days it would be lowered 20 feet by a constant drainage of 150 head which is required to supplement the minimum and maintain the continuous supply of 4000 horse power. Lake Rolleston is not suited at its outlet for the erection of a high dam but a dam of the above dimensions could be safely erected.

Safeguards:

If from fear of loss of water during floods or any other reason the above estimate appears dangerous, the following safeguards are available.

(1) Lakes Selina and Westwood with areas of 50 and 70 ac. can be conserved by dams of moderate dimensions.

(2) The upper waters of the Henty River with the storage of Lake Julia can be turned through Newton Gap into the Anthony River and make available about eight more square miles of catchment and considerable constant flow.

(3) At the spot where it is proposed to pick up the water there is a good site for a high dam which could be made to conserve practically all the water that falls into the catchment area.

The above safeguards are put forward to show that the 4000 H.P. are available; they are more likely to be employed to increase the supply to 6000 H.P. when it is required in the future.

Details of Scheme:

The waters of the Anthony are picked up by a main waterrace which will traverse the western side of the river valley and in about a mile and a half will deliver the water about 600 feet above the river. Another race of smaller dimensions coming from Red Hills Creek will join the Main Race at its point of delivery.

The pipe line will be about 1200 feet long and the power stations will be placed just above river level almost due east of the top of the pipe line.

The transmission line will run from the power house a distance of about $7\frac{1}{2}$ miles to Williamsford; thence 4 miles to Renison; thence 9 miles to Zeehan or a total of $20\frac{1}{2}$ miles. A branch line of 4 miles would convey the power to Rosebery.

Cost of Scheme:

It is premature to do more than outline the cost of the undertaking. The following are given as rough estimates of the outlay required.

The construction of tramways to give access and convey machinery etc. either from Mt. Read or Rosebery as appeared more suitable would amount to about £5000; if the tramway could be constructed from Rosebery it would open up much good mineral land South and East of Mt. Murchison.

The main water race would be about $1\frac{1}{2}$ miles long and could probably be constructed for £3000. Another £1000 would complete the auxiliary race.

For the Lake Rolleston Dam only a rough estimate of £1000 can be made. There would be no need to build this up to the full height until the consumption power required it.

The pipe line of 1200 feet with 30 inch pipe, which could be duplicated later, would amount to about £3000. This would give a loss of 5.4 feet of head with a flow of 100 sluice heads.

It would not be necessary to install the whole power plan at first but some of the work would require to be put in of sufficient dimensions to provide for a full capacity.

The provision of 1300 electrical horse power would cost with turbines, dynamos, transformers, switchboard, etc. about £10,000. One set would be sufficient to start with; three to complete the scheme. Permanent work for the full total which would need to be incurred at the beginning would amount to about £3,000.

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Transmission line can be estimated at about £20,000.

This makes a total of:-

Tramways	5,000
Water Races	4,000
Dam	1,000
Pipe Line	3,000
Construction work	3,000
Transmission Line	20,000
Power Plant, one unit	<u>10,000</u>
	Total 46,000
Add for 2 more units	<u>20,000</u>
	Total <u>66,000</u>

For all the sundry costs and accessories of such a scheme the sum of £24,000 should suffice making a grand total of £90,000 for the whole scheme, while £70,000 should complete the first unit of 1300 horse power.

These figures have been carefully examined but would need to be checked and revised before definite action was taken in any direction.

Revenue:

The present production of power by steam in the district extending from Zeehan to Rosebery probably amounts to between 1000 to 1500 horse power. With all the potentialities of a revival at Zeehan, development at the Five Mile and the erection of Plants at Renison and Rosebery there should be a demand for 1200 horse power as soon as the scheme is completed with a gradual increase up to the maximum.

The present cost of a horse power used continuously for a year is estimated at £36. The Mt. Lyell Co. with the most perfect modern machinery and large plant estimated their cost at £24 per annum. With small plants the cost amounts up very rapidly so that the above estimate is not a high one.

The revenue is based on a selling price of £10 per horsepower per annum giving a saving to the consumer of £26 per horsepower per annum. With 1200 H.P. this gives a revenue of £12000; interest at 4½% with 1% sinking fund requires £3850 per annum, leaving £6150 for management and upkeep. The working costs of a scheme selling power in bulk

are very small. I believe the above sum will be sufficient to maintain not only the first output but the whole maximum output when it is required and that any growth of revenue can be applied to the reductions of the cost per H.P. to the consumer.

Further the above 1% sinking fund with a payment of £3850 per annum would repay the whole cost of the scheme in 40 years.

A charge of £10 per H.P. per annum is equivalent to a little over one third of a penny per unit. One eighth of a penny is quite a common charge for power in bulk from water installations.

When it is considered that on the present production of power this installations would effect a saving of over £30,000 per annum it will be realised what it means to the District. The benefit to the growing Districts of Renison Bell and the large works - wherever they be - that will ultimately deal with the complex zinc ores of Williamsford and Rosebery need not be emphasised.

HYDRO ELECTRIC COMMISSION:-

This is one matter which has an important bearing upon the question of this scheme and that is the possibility of power being brought to the Coast from the works of the Hydro Electric Commission at the Great Lake. In a small country such as Tasmania there is no object in duplicating work and if power at the same cost is available from these works, the scheme could well remain in abeyance. Under their Act the Company can supply power to Municipalities at a cost not exceeding that charged by the Municipal Council in Launceston. The ordinary charge for power by that Council is, I believe, 2d. per unit for power and is equivalent to £54 per horsepower per annum. This is, of course totally out of the question and has probably never been contemplated by the Hydro Electric Commission. The transmission line from the Great Lake to Zeehan would be some 80 miles long and would probably cost about £1000 per mile or a total of £80,000. Unless the Company was prepared to supply at £10 per annum for the first 1000 horsepower supplied with charges falling proportionately at £4 per horsepower at the consumption grew to 4000 horsepower, I consider the West Coast would do better to instal its own plant.

Control:

I would suggest that the development of a scheme and its ultimate control be vested in the Municipal Council of Zeehan. This body handles the affairs of the whole district that would be affected by the scheme, and as Zeehan itself already

has an electric plant under its control and management. They are in the position to approach the Hydro Electric Commission at once and obtain from them the terms on which they would supply the Coast. If these terms are not satisfactory the present scheme could be pushed forward.

Promptitude:

Finally I would emphasise most strongly the importance of prompt action. The only excuse for delay would be a complete despondency as to the future of the West Coast and that, to all who know it, is inconceivable. If, as we hope, we are on the eve of a revival, then the engineers who will produce this should be in the position to design their plants for electric power rather than steam and to estimate their costs on that basis. If for any reason the revival does not take place promptly, there is all the more need for facilities for cheap power to give every economy that man can devise to enable us to win through in the struggle to more prosperous times. Almost every future problem, concentration at Renison Bell, drainage at the Five Mile, treatment of the complex ores, the possibility of deep sinking at Zeehan are vitally affected by this one question of the supply of cheap motive power.

Summary:

I believe that by an expenditure of £70,000 1300 horsepower can be secured from the waters of the Lake Rolleston District and that by an additional expenditure of £20,000 the supply could be increased to 4000 horsepower.

I consider the power could be supplied at a maximum rate of £10 per horsepower per annum as against a present cost of about £36.

This price would leave ample margin for interest and payment of cost of scheme and could be reduced as consumption increased.

I suggest that the Municipal Council of Zeehan should approach the Hydro Electric Company and enquire at what rate they are prepared to supply current.

If satisfactory terms cannot be arranged, then the Council should approach the Government and take steps to inaugurate a scheme on the basis of that outlined here with such improvements as further work may reveal.

I consider prompt action as of the most vital importance to the whole district concerned.

A plan of the Rolleston District is forwarded and a similar plan is on view at the Zeehan office.

(Signed) HARTWELL CONDER.

State Mining Engineer.