APPENDIX D.

ANNUAL REPORT OF CHIEF ELECTRICAL ENGINEER.

The Chief Electrical Engineer to the Hon. the Minister of Public Works.

Sir,—

I have the honour to submit herewith the annual report on the development of electric power within the Dominion for the year ending 31st March, 1920.

Lake Coleridge Hydro-electric Supply.

The year under review is the fifth year of operation, and marks a stage when the earnings of the plant have met all expenses, leaving a credit balance on the year's operation. Though no emergencies comparable with the previous year's snowstorm and the influenza epidemic have been experienced during the past year, all branches of electrical work are still suffering from the effects of the war, both as regards difficulty in obtaining material and the high prices. A severe winter was again experienced, with considerable transmission-line trouble as the result of snow, but the operation of the plant was carried on satisfactorily, and an urgent demand was experienced in many directions for the supply of power. The revenue for the year was £45,831, being an amount of £3,585 in excess of all charges, thus allowing the first contribution to be made towards the accumulated loss of the past four years.

Capital Outlay.

The capital outlay at the end of the year was £422,076, as compared with £403,156 at the end of the previous year. This outlay is analysed in Table B herewith.

Financial Results of Operation.

General and detailed results of financial operation and load records are given in Table A, showing an increase of 20 per cent. in power-house maximum load during the year, and of 20 per cent. in the units output. The total generating-cost per kilowatt sold and per unit sold show a further reduction on those of previous years.

The increase in working-costs for the year under various heads, as compared with those for the previous year, is shown in Table C. This table covers only the figures relative to the Department's operations, but in order fully to appraise the operations of the whole of the Lake Coleridge supply it is necessary to include the activities of the local bodies who purchase in bulk from the Department and carry out independent supply systems. These figures have been tabulated in Table D.

Extensions.

Some progress has been made with the long-overdue extensions at the power-house. No. 5 unit was ordered in May, 1916. The turbine was received and has been erected during the year. The generator has recently been delivered, but cannot be put into operation until the third pipe-line is installed. The material for this pipe-line was also ordered in May, 1916, but owing to the action of the Imperial authorities during the war the work has been repeatedly delayed, and the prospects are that it is unlikely that it will be installed before the winter of 1921.

Work has been in progress on the whole of the concrete piers and anchor blocks for both third and fourth pipe-lines, and these are now nearing completion.

Additional switch-gear for the power-house and substation has been purchased for extensions, but at prices ranging from four to six times the cost of similar material in the original contracts.

Extensions to Addington Substation are required before further installations can be completed, but the lack of material has hampered all work of this kind.

Owing to the inability to supply power no vigorous policy of extensions to the distribution system could be carried out during the year. The 11,000-volt lines have been increased from 65¼ to 72¾ miles, the 3,000-volt lines from 10½ to 11 miles.

In spite of the shortage of power several consumers were connected for temporary supply or supply under special conditions, and the low-tension reticulation has been extended in several districts to meet such cases.

Connected Load.

Every effort has been made during the year to discourage additional consumers owing to the shortage of power, but in spite of these endeavours the total connected load (Table E) has increased 32 per cent.—from 23,192 kw. to 30,584 kw. This connected load has been supplied by a total demand at the substation of 6,260 kw., giving a diversity factor of 4·86, slightly higher than that of last year's figures of 4·35, due to the steel furnace coming on during the year and restricted to night supply. This satisfactory diversity factor is due largely to the restrictions imposed with a view to giving a greater supply without increasing the maximum demand on the power-house.

Operation.

Owing to the overloaded condition of the plant its operation during the past year has been a matter of great anxiety. The maximum load recorded at the power-house was 7,066 kw., representing an overload of 18 per cent. on each of the four generators. With a view to obtaining the maximum output from the plant, instructions have been issued for the generators to be worked up to a definite limiting temperature before load is cut off at the substation. It is usual that heavy peak loads occur on cold days, and this fortunately ensures the generators being overloaded when best able to carry the higher loads without overheating.