

The following additional 11,000-volt lines have been put into operation during the year :—

	Number of Circuits.	Size of Wire.	Length (Miles).
Horahora-Leamington	2	7/14	12.54
Leamington-Hamilton	2	7/16	15.86
Hamilton-Frankton	4	7/16	3.47
Total route-miles			31.87

The following 50,000-volt lines have been constructed but are not yet in operation, though portions are being used temporarily at 11,000 volts :

	Number of Circuits.	Size of Wire.	Length (Miles).
Waiorongomai-Waihou	1	7/12	5.22
Horahora-Leamington	1	7/12	11.24
Leamington-Mystery Creek	1	7/12	9.60
Mystery Creek-Te Awamutu	1	7/14	9.50
Total route-miles			35.56

In addition to the above, a section of 50,000-volt line from Mystery Creek to Hamilton, 6.52 miles long, to complete the line from Horahora to Hamilton, is nearly completed, and it is proposed to build a 50,000-volt line to connect up from Hamilton to Waihou. When completed the 50,000-volt system will consist of a ring main from Horahora via Hamilton, Waihou, Te Aroha, and Matamata back to Horahora, with single-line branches to Waikino and Te Awamutu, thus giving the advantage of an alternative line to Te Aroha and Hamilton in case of trouble. This will assist substantially in ensuring continuity of supply to Waihi and Waikino. The 11,000-volt lines from Horahora to Hamilton via Cambridge and Matangi will then become 11,000-volt distributors for Cambridge, Matangi, and other consumers *en route*, as well as providing a third emergency feed of limited capacity from Horahora to Hamilton.

In addition a 50,000-volt line is being surveyed from Horahora to Arapuni and on to Te Kuiti, which will probably be joined up later on to Te Awamutu, giving another ring main and an alternative route for that district.

The 50,000-volt to 11,000-volt substations at Hamilton, Te Awamutu, and Waihou are well in hand, the buildings being completed and the transformers and switch-gear all delivered. In the meanwhile supply is being given temporarily at each point at 11,000 volts.

Operation.—The power-house was shut down from 7 a.m. to 3 p.m. on the 28th, 29th, and 30th December to examine the race and to enable alterations to the screens to be completed. These alterations have been effective in preventing blockage of the screens, and no trouble has been experienced in operating the plant at practically full load. During the above hours of shut-down, power was supplied to essential industries from the Grand Junction Company's steam plant at Waihi and dairy factory steam plant at Hautapu. The breakdown of condenser-bushings on the 50,000-volt oil switches necessitated these being cut out of service, causing some inconvenience in operation.

The only line breakdowns during the year consisted of three pin insulators and two sets of strain insulators, which was replaced. In order to reduce the electrostatic strain on the insulators, which are now over ten years old, the transformer neutral at the power-house has been earthed, and four elements instead of three inserted in the strain insulators. It is expected that these changes will render the service still more reliable.

The painting of all towers from the ground up to the telephone cross-arm was completed during the year. Examination of the towers showed that they were generally in good order. A number were painted from the telephone cross-arm up to the top during the three days shut-down at Christmas week, but the time available for cutting power off for this work is small, and bad weather made it impossible to do much this year.

Apart from the shut-down for overhaul for three days during the Christmas holidays for a total time of 31 hours 20 minutes, power was off the 50,000-volt lines owing to accidental interruptions on seventeen occasions for a total period of 35 hours 6½ minutes, and on five occasions, at prearranged hours, for minor repairs for a total time of 11 hours 16 minutes. Most of the above accidental stoppages were momentary, only two being of more than one hour's duration. One on the 2nd January was for a period of 11 hours 46 minutes, and one on the 2nd March for 22 hours 12 minutes. The Grand Junction Company's steam plant provided standby service on both these occasions.

There was only one interruption on the 11,000-volt lines due to insulator failure, one strain insulator having broken down, due to lightning. There were a number of momentary interruptions due mainly to lightning and birds causing grounds, and thus opening the circuit-breakers; and also a number of prearranged stoppages, amounting in all to about fifty hours, to allow of work being done on the lines, new consumers being connected, or new apparatus installed.

MANGAHAO ELECTRIC-POWER SUPPLY.

This plant will have an ultimate capacity of 24,000 h.p., the whole of which is included in the first installation, consisting of three 6,000 h.p. and two 3,000 h.p. pelton wheels, operating at a head of 825 ft., and driving generators operating at 11,000 volts, three-phase. The energy from these will be stepped up to 110,000 volts by means of two banks of transformers, each of 12,000 kw. capacity, for transmission to Wellington, Bunnythorpe, Marton, Dannevirke, Pahiataua, and Masterton. In Wellington the distribution will be undertaken by the City Council, which is already supplying 11,000 lighting and 7,000 heating and power consumers with a maximum load of 3,500 kw. on the A.C. system, and 3,300 kw. on the D.C. tramway-power system. In the other districts the distribution