

Substations.—Penrose (110,000 volts): A contract was let for the building (two bays of the complete substation), and it has been erected. The transformers (four 5,000 K.V.A.) arrived in February, and have since been erected and are now in operation.

Hamilton Substation (50,000 volts): Arrangements have been made and transformers ordered to substitute three 500 K.V.A. transformers for the six 250 K.V.A. transformers now in service, and to allow for increasing the substation to 3,000 K.V.A. capacity when required.

Ngongotaha, Hangatiki, Arapuni, and Bombay Substations (50,000 volts): Transformers and most of the switch-gear are to hand or on order for these substations.

Operation.

Headworks and Power-house.—Until the new 2,000 kw. unit was placed in service in March, 1925, some difficulty was experienced in carrying the total load on Horahora, and from October, 1924, onwards it was found necessary to get the Grand Junction steam plant to run, first in the afternoons (3.30–7.30 p.m.) only, and later on both mornings and afternoons, in accordance with their contract with the Department, supplying power up to 700 kw., as a rule. In addition, the Grand Junction plant was called on for emergency or overhaul purposes on eleven occasions during the year, supplying 97,200 units, with a maximum of 1,800 kw. On eight out of these eleven times the power was required to enable the Horahora plant to be shut down and the race emptied to remove part of the old head-race wall and enlarge the head-race for the extended power-house.

As for last year, this co-operation between the two plants was of great value, and credit is due to the Junction Company and their staff for the manner in which it has been carried out. Credit is due also to the Superintendent and staff at Horahora for having maintained good service on a plant which has now been on almost daily overload for nearly three years.

Transmission-line, Horahora-Waikino (50,000 Volts).—There were eleven accidental stoppages on this line, for a total time of 44 hours 33 minutes. The worst of these was for 27 hours 25 minutes, on the 27th May, when a gale of exceptional severity blew the roof off the half-way switch-house. A temporary connection was made, with the assistance of men lent by the Thames Valley Power Board, over the top of the remains of the building until more permanent repairs could be effected. Eight of the stoppages were for two minutes each or less.

On this line during the year four insulators were replaced on breakdown, and five pin and one strain disc on overhaul. On the Waiorongomai-Waihou section no insulators were replaced on breakdown, and four were replaced on overhaul.

Horahora-Hamilton Line (50,000 Volts).—There were seventeen accidental interruptions on this line, for a total time of 15 hours 10 minutes. Fourteen of these were of duration of nine minutes or less. One insulator was replaced on breakdown during the year and twelve on overhaul. A considerable number of insulators on this line are showing slight cracks, and new insulators of different make have been ordered to replace these. The possibility of getting supply from the Auckland Power Board to Hamilton in the near future will minimize the inconvenience to consumers involved in shutting down this line to replace insulators.

50,000-volt Substations.—Owing to increase of load at Hamilton, the capacity of this substation was increased from 750 K.V.A. to 1,500 K.V.A. by connecting three additional transformers of 250 K.V.A. each in parallel with the three existing. Arrangements have now been made for installing new transformers—three of 500 K.V.A. each. Waihou Substation also has been overloaded, and arrangements are being made to double its capacity.

11,000-volt Lines and Substations.—Little trouble has been experienced on these during the year, except that two poles have had to be replaced. In one case a tree fell across the line, breaking the wires, but all other interruptions have been momentary only. One or two insulators, damaged probably by being shot at, have been replaced, but there have been no interruptions due to defective insulators.

Power purchased.—During the year, at times of interruption or overload, power to the amount of 573,014 units was purchased, at a total cost of £1,256. Of this amount the Grand Junction Company supplied 547,500 units, with a maximum of about 1,500 kw., and the remainder was supplied by the dairy companies.

MANGAHAO ELECTRIC SUPPLY.

The past year has seen the scheme brought into operation, the plant having been officially opened by the late Prime Minister on the 3rd November, when supply was given to the Horowhenua Power Board.

Construction.

Headworks.—Mangahao No. 1 and Arapeti dams, both tunnels, surge-chamber, pipe-lines, and power-house were completed, as detailed in the report of the Engineer-in-Chief.

Power-house.—In the power-house the erection of bus-pipes and valves was completed, and, although the valves at present are not satisfactory, they have operated without mishap. The contractor for this section is supplying new operating mechanism for these, and this will be to hand shortly and installed. The five turbines and generators were erected, and have operated satisfactorily. Switch-gear was completely erected, and instruments and relays tested out. Transformers were dried out and successfully put into operation. During the year the work inside the power-house was practically completed, the only work remaining to be done being the drying-out of the spare 110,000/11,000-volt transformer, painting of machines, and efficiency tests on the machines. The power-house roof has been covered, and the floors painted.