

The alteration of the Horahora-Waikino line—mounting the top insulator on a short wooden extension of the tower, and the two side insulators on wooden cross-arms instead of steel—has been tried out on a number of towers, and promises to be effective in preventing trouble caused by birds. As soon as practicable the whole of the line from Horahora to Half-way will be changed in this manner. From Half-way a new section of line will be constructed to Waihou and on to join the Bombay-Waikino line at Paeroa.

Live-line testing has been carried out on all lines throughout the year, and a considerable number of defective insulators have been discovered.

Six poles which had been weakened by decay were replaced on the Mystery Creek-Te Awamutu section.

On the 29th June pole 256 on the wood-pole line near Huntly West was blown over at about 45° without interruption to service, and had to be straightened up.

At the same time steel tower No. 254, alongside this pole, was blown over and had to be rebuilt, about one-quarter new members being required for this purpose.

A fair amount of tree-cutting has been done during the year, principally on the Mystery Creek-Te Awamutu, Arapuni-Ngongotaha, and Horahora-Waiorongomai sections of line.

Fences and gates were erected to prevent danger to stock on bridges on Waiorongomai-Waikino section.

On the Te Awamutu-Hangatiki section a pole was found with the top burnt, but with no insulators damaged, the cause of this being presumably a flash-over due to lightning.

Substations.

Penrose.—The temporary 50/6.6 kv. substation remained in service throughout the year. After the fire at Horahora, cables of greater capacity were put in to enable supply back up to 5,600 kw. to be given by the Auckland Power Board. The necessary connections were made to enable the Diesel plant to supply.

Bombay.—The temporary gear supplying the Franklin Power Board remained in service until the 16th December, when the permanent equipment was put into service.

Hamilton No. 1.—An additional bank of transformers, 1,500 kv.a. was installed, making the total substation capacity 3,000 kv.a. A flash-over on two pin-insulators on the 11,000-volt structure occurred in bad weather in April.

Waikino.—The existing two banks of 3,615 kv.a. each of water-cooled transformers were replaced with two banks of 3,000 kv.a. each, self-cooled, and delta-star connected instead of star-star. A new lighting installation was put in. A rat caused a short circuit in the condenser switch-gear. New metering equipment was installed on Thames Valley supply. One of the 50 kv. wall entrance bushings broke down during the year. Two hydrants for fire protection were put up.

Waihou.—The existing two banks of 750 kv.a. each were replaced with one of 2,250 kv.a., delta-star connected instead of delta-delta.

Arapuni.—Nothing to report.

Mamaku.—The 150 kv.a. transformer broke down on the 29th October, the failure being between H.T. and L.T. windings on one phase. It was replaced with a spare transformer from Hamilton after two and a half days' interruption.

Ngongotaha.—Nothing to report.

Edgecumbe (Rangitaiki).—A temporary substation was erected, and supply given to the Bay of Plenty Power Board by it on the 30th June, 1928, and the change-over to the permanent substation gear was made in stages. On the 2nd February a failure in a trifurcating-box caused earth-leakage relays to operate incorrectly, and made service intermittent at intervals for two days until the fault was repaired. Supply was given to the whole Bay of Plenty area from this substation. The Department's line from Edgecumbe to Waiotahi was used as an 11,000-volt feeder, with an induction-regulator to regulate voltage. On the 15th February a lightning-discharge damaged the arrester slightly.

Te Awamutu.—Nothing to report.

Hangatiki.—On the 17th January a current-transformer broke down and blew out the back of the incoming panel, setting fire to the compound and causing a short circuit on the incoming cable. This fused the transformer-leads under the oil. Repairs were effected on two transformers, and, using the spare transformer, service was restored after 18 hours 3 minutes. The third transformer was later repaired. The switchboard being out of service, supply was given through temporary connections to the Board's lines.

Henderson.—A rat caused a short circuit on P.T. fuses on the 15th April. The spare transformer which had been in use at Kerepeehi was returned to Henderson.

Takapuna.—Nothing to report.

Grand Junction Plant and 11,000-volt Substation.

This plant has been in regular operation throughout the year, running usually from 6 a.m. to 10 p.m. daily.

A considerable amount of work has had to be done to the brickwork, grates, and mechanical stokers, to keep them in order, and the boiler-drums have been treated with zinc-white to arrest pitting action.

A new rotor for one of the turbines was installed early in the year, and this turbine was again placed in service.

Additional 11 kv. switch-gear and transformers, to bring the total capacity up to 3,750 kv.a. (two banks of three 625 kv.a. each), were installed. One of the older transformers, which had broken down on the previous December, was repaired, and another, which broke down in much the same way on the 19th January, was repaired and placed in service again on the 15th March.