

To provide distribution facilities for increasing quantities of power, new substations are being planned at Dargaville, New Plymouth, Waverley, Longburn, Fernhill, Reefton, Papanui, and Studholme, and specifications covering transformers, switchgear, and associated equipment for these were prepared. Additional transformer capacity was also planned at Maungatapere, Henderson, Takapuna, Bombay, Ongarue, New Plymouth, Stratford, Wanganui, Stoke, Ashburton, Oamaru, Half-way Bush, and Invercargill, and this required the design and specification of the necessary switchgear and steelwork. The re-design of the Maungatapere Substation on a new site was necessary to provide the switchgear required at the termination of the new 110 kV. Henderson-Maungatapere line.

Switchgear alterations and additions were also designed for Edgecumbe, Lichfield, Te Awamutu, Upper Takaka, Temuka, Gore, and Edendale.

A specification for a voltage-regulating transformer was prepared for Blenheim Substation. To facilitate the control of the transmission system, specifications were prepared and tenders called for a second 15,000 kVA. synchronous condenser for Hororata.

The ratings of existing oil circuit-breakers were investigated in view of the increased capacity of the transmission system and new equipment specified as found necessary.

Designs for new equipment or designs of new substations included in this report affect thirty-two substations.

Communications.—Basic design work proceeded on system communications, and installations were made in substations and power-stations. Carrier-current-telephone equipment which came to hand is being installed, and further installations in the North and South Islands have been planned. Investigations are being made into the use of mobile radio services, and orders were placed for equipment for an emergency radio network in the South Island.

Protection.—Detailed short-circuit calculations were undertaken to determine probable future circuit-breaker duties and current distributions for the following conditions:—

(a) North Island—

(1) With Maraetai and Whakamaru Power-stations complete—i.e. approximately 600,000 kVA. in the Waikato development.

(2) With Waikato development complete—i.e., approximately 850,000 kVA.

(b) South Island—

(1) With Coal Creek Power-station partly complete, 166,000 kVA. and 220 kV. transmission-line, Coal Creek-Christchurch, complete.

(2) With Coal Creek Power-station completed, 333,000 kVA. and Lake Rotiti development partly complete, 33,000 kVA.

Other calculation work included solution of inductive interference and miscellaneous switchgear problems.

Specifications and drawings were prepared for carrier-current and pilot-wire protective relay equipment for the Otahuhu-Whakamaru-Maraetai-Bunnythorpe 220 kV. and the Otahuhu-Penrose 110 kV. transmission-lines.

Analyses were made of system interruptions.

(d) TRANSMISSION-LINES

Contracts were placed for towers, insulators, and conductors for the 220 kV. lines Whakamaru-Otahuhu and Whakamaru-Bunnythorpe. Due to delays in the supply of machines and galvanizing-plant the New Zealand contractors for the supply of towers were not able to commence production.

Specifications were drawn for the insulators and conductors for the above-mentioned 220 kV. lines and for towers, insulators, and conductors for the Henderson-Maungatapere line.

Conductor tensions for the 110 kV. line Henderson-Maungatapere were investigated and stringing charts prepared. Strength charts for the towers and charts for the control of the swing of suspension insulators were prepared and supplied to field parties.