

Substation design work included Standard 110 kV., 66 kV., and 50 kV. switchgear structures, which have already had considerable application, 110 kV. wood-pole switchgear structure to enable erection at Milton to proceed and the new remote control-room panels for Khandallah 11 kV. switchgear were designed. Drawings for new Otahuhu 220 kV./110 kV. substation were advanced as far as possible pending decision regarding site. Layout drawings for the new Bunnythorpe 220 kV./110 kV. substation site were prepared to enable taking of land, levelling, and provision of rail access to proceed. Specification drawings were made for new 10 MVA. transformer banks, 11 kV. 250 MVA. switchgear, and control panels for Ashburton and Oamaru. Drawings for extension to Halfway Bush involved a new 20 MVA. 110 kV./33 kV. transformer bank, new 33 kV. structure, and a two-bay extension to the 110 kV. structure. In connection with the possible link-up of the South Island system and duplication of the Cobb-Stoke 66 kV. transmission line, preliminary investigations were made for extension to Stoke, Motueka, Upper Takaka, Motupipi, and Blackwater substations. The proposed new Gore-Invercargill 110 kV. transmission-line necessitated designs for extensions involving two-bay structures for Gore and Edendale and a three-bay structure with two new 10 MVA. 110 kV./11 kV. T.C.O.L. transformer banks for Invercargill.

Drawings were prepared for communication trunk line and cable entries at Penrose, Bombay, Hamilton, Karapiro, Ongarue, Hawera, and Khandallah. Transposition designs were prepared for the new telephone circuits being erected between Hamilton and Karapiro with ultimate extension to Arapuni and Maraetai, for the complete reconstructed Khandallah-Bunnythorpe line, and for the Bunnythorpe-Stratford line, on which reconstruction is in progress. A survey of the South Island system was made to increase the efficiency of trunk lines. New telephone-exchanges were designed for Penrose, Hamilton, Arapuni, Karapiro, Tuai, Bunnythorpe, Mangahao, and Khandallah, the last-named being in operation. Preliminary plans were made for installation of carrier equipment at Khandallah, Bunnythorpe, Hamilton, Penrose, and repeater equipment at Ongarue. Specifications were drafted for a twenty-line cordless switchboard for use at power-stations and major substations. A.C. and voice-frequency impulsing was investigated for Penrose supervisory control, and the establishment of standard equipment was advanced with the design of component units and parts.

(d) TRANSMISSION-LINES

The specification for steel towers for the 220 kV. lines was prepared and tenders called for the manufacture and supply of the towers.

Conductor and earth-wire tensions for the 220 kV. lines were investigated and stringing charts prepared for both normal conditions and parts of the line where snow is encountered. Strength charts were prepared for the towers, and also charts for controlling the swing of suspension insulators.

An examination was made of the designs submitted with tenders for the 220 kV. steel towers, and an order for the towers has been placed for their manufacture in New Zealand.

For the Tuai-Bunnythorpe 110 kV. line an investigation was made of a clearance strip required through a State forest reserve.

Structure drawings and stringing charts for the conductors for the Gore-Invercargill 110 kV. line were supplied to the field for survey and other purposes.

Stringing data for the conductors on the Nelson-West Coast line was investigated and charts supplied for use in the field.