

The following design work has been carried out for this system :—

Arahura.—Detail drawings and specifications for building contract for substation buildings. Layout drawing of buildings and equipment on site. Drawing and specification for traverser truck for handling main transformers. Drawing and specification for oil-storage tanks. Preliminary layout drawing of synchronous condenser and its switchgear.

Dredge Substations.—Specification for switchgear and metering cubicles.

For the most part the detail design work for the other substations is being undertaken by District Office.

Mangahao-Waikaremoana System.

To provide a standby for the two main generating-units at Waikaremoana Power-station, which carry the base load of the system, and have been in fairly continuous operation for some years, a third generating-unit, of slightly larger output than the existing units, is to be installed.

To avoid instability in the electrical operation of the system, quick-response excitation equipment is being provided for this unit, and new excitation and voltage regulating equipment having similar characteristics will replace the present equipment on the existing main units.

An additional bank of transformers of 20,000 kVA. capacity, and controlling switchgear is to be installed at Khandallah Substation to carry the increasing load of Wellington City and surrounding district.

The following design work has been carried out for this system :—

Waikaremoana.—Drawings and specifications for tendering purposes for third generating-unit and its switchgear and voltage-regulating equipment. Specifications and drawings for tendering purposes for new excitation and voltage-regulating equipment for existing main and auxiliary alternators. Specifications for motor-driven standby exciter for the main alternators. Specifications and drawings for tendering purposes for new 400-volt switchgear. Drawings and specifications for building contracts for combined wagon, garage, and workshop of reinforced concrete, and for communal motor-car garage, also of reinforced concrete.

Khandallah.—Preliminary layout drawing of proposed extensions to provide for additional switchgear and transformers. Specifications and drawings for tendering purposes for 20,000 kVA. bank of 110/11 kV. transformers.

Paraparaumu.—Foundations for 110 kV. outdoor switchgear and steelwork.

Arapuni-Horahora System.

The extensions to Arapuni Power-station and outdoor station called for a large amount of detail design work. The structural design of the power-station building and of the foundations for main units and auxiliaries was completed. At the outdoor-station building the crane-room has been extended over the access roadway to provide better facilities for handling heavy apparatus. The shaft and run-way details for the new automatic lift from the power-station to the outdoor station called for special design on account of its being inclined at an angle of $15\frac{1}{2}^\circ$ to the vertical. To eliminate the dust nuisance in the windings, the new generators are cooled by closed air-circulating systems. The cooling water for the air-coolers and all other cooling-water requirements for the new generating-units and transformers are supplied from the tailrace by centrifugal pumps, all pumping-equipment being in duplicate and of sufficient capacity to provide for future extensions.

Duplicate drainage-pumps are also being installed for the building extensions, and provision is made for utilizing these for pumping out draught-tubes.

An oil-filtering system is provided in the power-station for handling and filtering transformer and switch oil, and a separate system for lubricating oil.

Extensive additions and some modifications to the low-tension A.C. and D.C. switchgear were necessary to provide for the various machine auxiliaries and additions to the station lighting, heating, and power services generally.

A CO₂ fire-protection system is provided for the new generating-units, with provision for extension to the two future generating-units.

The following design work has been carried out for this station :—

- (a) Completion of structural design of power-station and machine foundations.
- (b) Drawings and specifications for stop-log gates for draught-tube, gantry crane for stop-logs, wall crane for workshop, steel doors and other interior fittings for power-station, and water rheostat for testing main units.
- (c) Design of lift and cable shaft.
- (d) Design of retaining-wall at south end of power-station.
- (e) Drawings and specifications for fire-protection system.
- (f) Drawings and specifications for motor-driven pumping-sets and design of cooling-water system.
- (g) Design of oil filtering and piping systems for transformer and lubricating oil.
- (h) Design of foundations, concrete structures, traverser tracks, cable trenches, and climb-proof fencing for outdoor station, and extension to crane-room of outdoor station building.
- (i) Drawings and specifications for extensions and modifications to low-tension A.C. and D.C. switchboards, power and control cables, cable-boxes, miscellaneous switchgear, and voltage-regulating equipment for station generators.
- (j) Design of blank ends for hydraulic testing of scroll cases.

Other design work carried out for the Arapuni-Horahora system included the following :—

Tahereroa, Mareretu, and Maungatapere.—Drawings and specifications for tendering purposes for building contract for reinforced-concrete switchroom and cottages. Layout and foundation drawings for indoor and outdoor switchgear, main transformers, and 11 kV. cables.

Penrose.—Drawings of proposed 20,000 kVA. condenser for tendering purposes. Foundation details for new 110 kV. oil-circuit breakers for 15,000 kVA. transformer-banks.