

3. General.

Units generated and purchased by the Department for the period 13th October, 1936, to 31st March, 1937, were: Generated at Monowai, 15,110,950; purchased for resale, 73,660: a total of 15,184,610. Of these units, 7,997,208 were sold to retail consumers, 3,068,261 to bulk consumers, while 112,935 were accounted for in departmental use. The balance, representing losses, totalled 4,006,206 units, or 26.38 per cent. of units generated and purchased for resale. The number of active consumers on 31st March, 1937, was 10,638.

DESIGN OFFICE.

(A) Electrical Section.

In the year under review a large amount of design work was involved and it was found necessary to further augment the Design Office staff to cope with it.

For the North Island systems the principal design work carried out was that connected with the extensions to Arapuni Power-station. As the peak load on these systems exceeded the installed generating-capacity in the winter of 1936, it was apparent that the installation of additional generating-capacity must proceed apace if the ever-increasing demand for electric power is to be met.

In the South Island the peak load to date is less than the present installed generating-capacity, but the extension of the Department's activities into Westland and Southland, and the growth of load in areas already served, all point to the need for further generating-plant at an early date. The principal design work carried out for these systems was that involved in these extensions.

Now that most of the large manufacturing firms have facilities for testing their switchgear under actual short-circuit conditions it is found that the ratings assigned to most of the older switchgear installations cannot be sustained by test. With recent increases and projected future increases in the installed generating-capacity, particularly in the North Island, and the interconnection of the systems, the switchgear at most stations will have to withstand far more exacting service under short-circuit conditions in the future than in the past. To meet this service inadequate switchgear is to be replaced at several stations, the displaced equipment being utilized where suitable for smaller stations where the duty is not so severe.

Extensive additions to housing accommodation for operating and maintenance staff involved a considerable amount of design work. Some of the new staff accommodation is to replace existing temporary accommodation which has reached the end of its useful life, whilst the remainder is to provide for the additional staff required on account of the extensions to the systems and the introduction of a shorter working-week. In some cases the drawings and specifications were prepared by District Offices.

Lake Coleridge - Waitaki System.

To provide for the increasing load on the Southland electric-power supply, which already exceeds the installed capacity of the Monowai Power-station, an interconnecting transmission-line to operate at a pressure of 110 Kv. is to be run from Half-way Bush Substation to Gore Substation to supply the excess load from the Lake Coleridge - Waitaki system. At the latter station the voltage will be stepped down to the operation transmission voltage of the Southland system by a bank of 110/66 Kv. auto-transformers.

The extension of the main South Island system into Westland involves the construction of a double-circuit 66 Kv. transmission-line over Arthur's Pass from Lake Coleridge Power-station to Arahura Substation. This transmission-line rises to high altitudes and traverses exceptionally rough country, so it has been designed to withstand the severe climatic conditions under which it will operate.

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

Half-way-Bush.—Drawings and specifications for tendering purposes for outdoor steelwork and switchgear extensions.

Ashburton.—Specification and drawing for tendering purposes for rectifier charging equipment.

The detail design work for the controlling switchgear for the West Coast line at the Lake Coleridge Power-station is being done by Christchurch Office.

Southland System.

The interconnection of the Lake Coleridge - Waitaki system with the Southland system involves extensive additions to Gore Substation buildings and equipment. The additions to this station and equipment include a bank of 110/66 Kv. auto-transformers, controlling switchgear for auto-transformers and the 110 Kv. transmission-line, workshop building with 25 ton crane, and oil filter-house with its oil-purifying and handling equipment.

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

Gore.—Preliminary layout of building and equipment on site. Specification for 25 ton electric overhead crane. Drawings and specifications for tendering purposes for 110 Kv. outdoor switchgear and steelwork.

Westland System.

The terminal station for the main transmission-line from Lake Coleridge Power-station will be Arahura Substation, which will also be an important distributing centre for the Westland system. From Arahura a 66 Kv. line is being run to Dobson Substation, and thence to Blackwater Substation, with a branch line to Kaimata Substation. From Dobson, an 11 Kv. line will supply Ngahere Substation. To minimize the voltage fluctuations due to the surging nature of the load of the gold-dredges, which will form a large part of the system load, a 5,000 kVA. 11,000-volt synchronous condenser will be installed at Arahura Substation.