During the year 88,216 insulators were tested under live-line conditions, and 761 or approximately 0·86 per cent. were found defective. Forty-two insulators were replaced on the Southern 33 kv. line without interruption to supply.

The laying of all the 11 kv. feeders at Addington in concrete ducts was completed.

Interruptions to 110 kv. and 66 kv. Supply (excluding all prearranged Shutdowns).—To Coleridge, Point, Hororata, and Addington Supplies: There were no outages at any of these stations throughout the year.

To Ashburton Supply: There were three accidental interruptions, the aggregate period of which amounted to 51½ minutes.

To Timaru Supply: There were eight accidental interruptions, the aggregate duration of which amounted to 25½ minutes.

To Glenavy Supply: There were eight accidental interruptions, the aggregate duration of which amounted to 32 minutes.

To Waitaki Supply: The total duration of the ten accidental interruptions amounted to 1 hour 9½ minutes.

To Oamaru Supply: There were eleven accidental interruptions, the total duration being 53½ minutes.

(d) Testing.

During the year 275 tests and investigations were recorded, and maintenance and repairs were carried out on meters, relays, telephone apparatus, &c.

The system frequency has been satisfactorily controlled, and daily time signals are transmitted to Waitaki Station.

New construction at Addington, Southbrook, Timaru, Waitaki, and Halfway Bush entailed a considerable amount of testing and checking of wiring connections.

(e) General.

A fire broke out in the oil store at Coleridge and some damage was done to the building and its contents.

Work undertaken during the year at Addington substation includes the rewinding of two transformers for the Railways Department at Darfield, repairs to the Sumner Borough Council's main transformer, rewinding of current transformers for the Heathcote County Council, of an earthing transformer for Stoddart's Corner Substation, and of a relay testing transformer for the Testing Department. A bank of 66/11 kv. transformers was converted from indoor to outdoor type for erection at Timaru Substation. Alterations to the winding of a 100 kv.a. transformer were carried out for the Banks Peninsula Power Board. A burnt-out regulator has been repaired and awaits testing. Several electric motors have been rewound.

A memorial tablet to Michael Faraday, presented by the Municipal Electricity Department, of Christchurch, was erected in the Coleridge Power-house. It was unveiled in May, 1934, by the late Councillor E. McCombs in the presence of the Mayor and members of the Christchurch City Council and departmental officials.

Rainfall.—For the calendar year 1934 the rainfall at Coleridge Power-house was 25·80 in., which is about 5¼ in. below the average annual fall for the past twenty years. Rain fell on 113 days.

DESIGN OFFICE.

In the year under review the amount of investigation and design work entailed was greater than in the two preceding years, and it was found necessary to augment the staff to cope with the increasing work. Particulars of the principal work done are scheduled hereunder:—

A. Electrical Section.

(1) North Island Electric-power System.

(a) Power-stations.

Arapuni.—The extensions to Arapuni Power Station called for a large amount of design work. As the penstock tunnels for Nos. 7 and 8 units had already been driven, it was decided to put in these units at this stage. The extensions to the buildings will provide for four additional units space being left for the addition of Nos. 5 and 6 units at a later date. Considerable investigation was necessary before the size of the new units was finally fixed, as the width of the generator-room and the distance between centre of units are fixed by existing works. The turbines are being provided with relief valves to obtain better governing, and the governor spindles are provided with synchronous motor drive. The generators are of a type known as the umbrella pattern, in which the weight of the rotating parts is carried below the main rotor—an arrangement which results in a saving in first cost and simplifies erection and maintenance. The generators will have closed-circuit ventilating systems to eliminate the dust nuisance in the windings. Quick response excitation is being provided to ensure stability in the electrical operation of the system. The main transformers are being placed immediately outside the west wall of the generator-room. This arrangement results in a large saving in insulated cables and minimizes the possibility of interruption due to cable breakdowns. Improved access is being provided between the power-station and outdoor station by an automatic electric lift, which will run