

4. Construction, Operation, and Maintenance.

A. HAMILTON DISTRICT.

(1) CONSTRUCTION.

(a) *Power-stations.*

Arapuni.—The most important work in hand is the extension of the station to take two additional 20,000 kw. units.

At the end of the year the main excavation work was about 96·6 per cent. complete, the excavation for piers, &c., about 89 per cent. complete, and the tail-race excavation was complete.

The transformers for the extensions (48,000 kv.a. capacity) arrived and were stored at Putaruru.

(b) *Substations.*

Hamilton.—Erection of new 25-ton crane was completed. A new garage and store were built, and a workshop added to the old garage, and extensions were made to the test-room.

Henderson.—Earthing-switches and O.C.B.s were erected on the two incoming 50 kv. circuits, and preliminary work was done for switch-gear for the North Auckland line.

Te Awamutu.—A 50 kv. O.C.B. was installed controlling the outgoing line to Hangatiki.

Ngongotaha.—Building of a third cottage was completed.

Edgecumbe.—Building of a fourth cottage was started.

(c) *Transmission-lines.*

North Auckland Line (50 kv.).—Detailed survey of this line proceeded throughout the greater part of the year. Substation sites were selected at Tahekeroa, Mareretu, and Maungatapere. Cartage of poles was commenced in December, 1935, and erection of poles in February, and, at the end of the year, 100 pole structures (9·8 miles) had been erected.

Arapuni-Stratford Line (110 kv.).—Construction of three cottages, garage, and workshop for linemen at Ongarue was completed, and the Tahora depot buildings (two cottages, garage, and workshop) were practically completed.

(2) OPERATION AND MAINTENANCE.

No. 1 unit at Arapuni being out of service for rewinding the generator, it was necessary to run Horahora continuously throughout the year, and occasional assistance over the winter peak load was obtained from the Penrose Diesel plant from May to July, and from McLaren's Falls from June to August. King's Wharf plant and the Diesel plant had to be run on 19th December for a short time when a hot terminal necessitated a shut-down on No. 3 unit at Arapuni, and again between 3rd and 7th of February owing to trouble caused by salt on the 110 kv. transmission-lines.

The Arapuni and Horahora plants were run normally throughout the year in parallel with Mangahao and Waikaremoana without any difficulty.

(a) *Power-stations.*

Arapuni.—Turbines: The lower guide bearing of No. 2 unit was found to have rather large clearance, and was replaced by the spare bearing. The brass sleeves on the pilot distributor valves of Nos. 3 and 4 were found to be worn, and were replaced, and on No. 2 the whole valve was replaced. On No. 4 rings were fitted to the piston of the pilot servomotor.

Generators: No. 1 rotor was put in good condition and the stator rewound (after the burn-out on 15th February, 1935) and the unit restored to service on 11th March, 1936. No 2 unit was taken out of service for general overhaul on completion of repairs to No. 1. The brakes on all four units were provided with a new independent air-pipe connection to the compressor.

Transformers: Blow-out vents were fitted to the main transformers. One 110 kv. bushing failed in service, and another was found defective and removed, both of them on the 110/50 kv. bank.

Switch-gear: New larger 110 kv. bushings were installed in O.C.B. No. 58. Three 110 kv. pillar insulators failed in service, one of them during a lightning-storm. Nearly all the work of replacing these pillar insulators with others of a better type was completed during the latter part of the year. Two 50 kv. O.C.B. bushings were found with lower porcelain cones cracked, and were replaced.

Horahora.—Generators: Some new coils and laminations were put in on No. 5 generator, which had been damaged by short-circuit late in the previous year, and the unit was restored to service on 8th January, 1936.

Transformers: A new 5 kv. winding was installed in one of the 5/50 kv. transformers which had been burnt out on a short-circuit in December, 1934.

Switch-gear: New 50 kv. bushings were fitted to the O.C.B.s, replacing all the old style defective bushings. Seven cracked 50 kv. insulators of old type were replaced.

(b) *Substations.*

Penrose.—Sixty eye-bolts were fitted to strain insulators connected to the structure to strengthen the existing steel cable connections. Two 110 kv. capacitor bushings broke down in service, and one 110 kv. O.C.B. bushing which caused radio interference was replaced.

Bombay.—New de-Ion contacts were fitted to the two 50 kv. O.C.B.s. A 110 kv. O.C.B. bushing found faulty by a radio-interference detector was replaced.