

was made between the No. 3 anchor-block and the Larner-Johnson valves. All pedestals were grouted after the filling of the pipe. Between No. 3 anchor-block and the power-house the area was concreted, and retaining-wall built for drainage purposes: 106 cub. yd. of concrete were poured here. Surface drains were cut across the pipe-line bench to pick up storm-water and prevent scouring.

The power-house was completed during the period. The following were the main items of construction: Completion of the shell of the building; concreting of Nos. 1 and 2 machine foundations; Larner-Johnson valves; workshop and unloading-bay floors; construction of concrete-block partition walls; plastering walls; completing of roofing; all plumbing; glazing; joinery; drains; test tank, &c. Under the annexe and at the southern end of the power-house 6,363 cub. yd. of filling was placed, and the tail-race side of the filling has been protected with stone. Total concrete placed, 8,298 cub. yd.; steel, 160 cub. yd.; and excavation, 12,403 cub. yd.

At the outdoor station all traverser tracks and turntables (three) were completed. All concrete pads for the steelwork were completed, 665 cub. yd. being poured. An oil-filter house in concrete was erected. The following earthenware pipes were laid: 12-in.-diameter cable-ducts, 12 in. by 6 in. diameter cooling water drains, and 9-in.-diameter storm-water drain fed by 6 in. tile and concrete surface drains. A 12 in. tile and concrete drain was laid along the western side of the site for surface drainage.

Several slips were cleared away from the western side of the site. The whole site has been trimmed, metalled, and fenced. The cable-tunnel from the power-house to the station has been completed. The length of this tunnel is 557 lin. ft., and concrete required amounted to 570 cub. yd., and excavation to 2,080 cub. yd. The total excavation for the site amounted to 16,165 cub. yd.

As conditions now existing are favourable, a culvert and small dam have been constructed across the Kahutangaroa Stream in connection with the lower development. The culvert has a waterway of 150 sq. ft. and a length of 114 ft. Concrete required amounted to 325 cub. yd. A small clay-fill dam of 3,442 cub. yd. was constructed to divert the stream through the culvert. Stone pitchings amounted to 719 sq. yd.

WAITAKI RIVER POWER DEVELOPMENT.

This scheme provides for the construction of headworks, power-house, outdoor switch-gear, and transmission-lines for an ultimate development of 100,000 h.p. The work involves a dam 1,800 ft. long, containing 170,000 cub. yd. of concrete, 40,000 cub. yd. of which have to be placed below water-level of the Waitaki River. The power-house will be constructed on the down-stream face of the dam, at the Otago end, and will ultimately house five units, each consisting of a 23,000 h.p. turbine coupled to a 16,666 kv.a. generator.

At the beginning of this period a commencement had just been made with the setting-up of the construction camp and of getting plant on to the ground, so that the twelve-months period covered by this report practically includes all work done to the 30th June last. Test borings and similar investigation work were continued till September, 1928, by which time sufficient information was available to enable the exact location of the dam to be finalized.

The first essential for construction purposes was the provision of power and light, facilities for transport, and the provision of housing for staff and workmen.

Power and light were provided by the construction of an 11,000-volt transmission-line 4 m. long from the terminus at Kurow of the Lake Coleridge system to the works, and the erection of the necessary substation and reticulation. Regarding transport, an investigation showed that requirements would be best served by an extension of railway facilities from the railway terminus at Kurow right on to the site of the works. Accordingly the necessary four miles of service railway were built, and opened for goods service in December last and for passengers in the following February. The formation was generally light, including some rock-cuttings and two bridges. The railway has already proved to be of great value for transport of heavy plant, and when regular consignments of cement have to be handled will prove a great asset to construction operations.

The provision of living-accommodation is a big and expensive feature of the work. At the end of the period under review, 100 married workmen's houses and 145 single men's huts had been built, and building is being continued. Other features now provided include a fully equipped Y.M.C.A. social hall, cookhouses, bathhouses, &c. Cottages for staff, workshops, offices, and stores have been built.

Regarding the works proper, although the Waitaki River is a powerful stream, subject to seasonal floods, it is considered imperative that not only shall the utmost possible use be made of the low-river stages, but that construction work on the river itself be carried on irrespective of the flood season. The layout of the coffer-dams has been fixed having this need in view, and work is being planned and done to the following programme: Firstly, to construct, under the protection of a central coffer-dam, a section of dam 25 ft. long in mid-stream, carrying concrete to a suitable safe level; secondly, to extend the coffer-dam from the central section of dam on to the Canterbury bank, and build the dam therein to a level above the temporary sluices that must be provided for passing the river while the section of dam on the Otago side is being built; thirdly, to construct the coffer-dam from central section of dam on to the Otago bank of river and continue with that portion of the dam. The remainder of the work will follow in routine order. At the same time the excavation for and concreting of the power-house section of the dam is to be pushed ahead to make room for power-house construction and erection of machinery.

The river has been bridged with a strong steel trestle located on the line of the up-stream end of the coffer-dam. This trestle is 540 ft. long and carries two rail-tracks, and is built to withstand the fierce floods that the river is subject to. The steel-sheet piling, 45 ft. long, for the coffer-dam for the central section of dam is all driven, enclosing an area 243 ft. long up and down stream, and 33 ft. wide. The next operation is to dewater and excavate for this section of the concrete dam, the coffer-dam