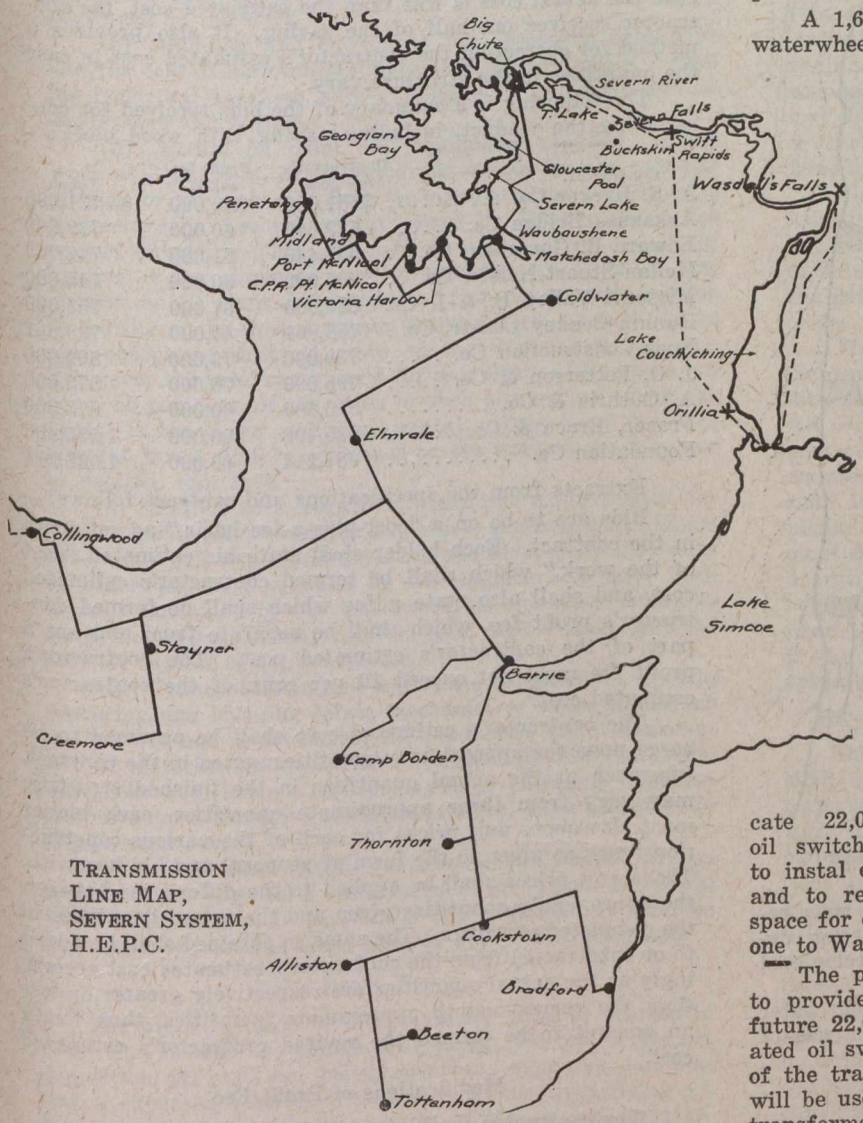
ture and generator rheostats, which are operated by shafts in a straight line between rheostat handle and the face plate on the rheostats.

Matchedash Bay is about 2,000 ft. across, and two spans were made, 1,153 ft. and 858 ft. respectively, in the 22,000-volt transmission lines between the generating station and Midland. The longer span also crosses the ship canal and necessitated a 175-ft. tower; the centre and east shore towers are each 88 ft. high.

When the Commission took over the Simcoe Railway and Power Co. in 1914, a number of minor changes were made in the metering equipment in Big Chute generating station to make it conform with the commission's requirements.



TRANSMISSION LINE MAP, SEVERN SYSTEM, H.E.P.C.

In 1917 some 2,200-volt equipment was installed to supply the Department of Railways of Canada with power and light for the marine railways installed at Big Chute.

In view of the rapid increase in the power demands of the Severn System, it became necessary, early in 1917, to proceed with the extension of the Big Chute generating station.

To secure the additional capacity, a new penstock and a fourth turbine were required, together with two new valves, head gates and the necessary power-house sub-structure and superstructure.

The Dominion Bridge Co., of Montreal, secured the contract for the steel penstock, which is 9 ft. in diameter and about 170 ft. long. A contract was placed with the Wellman-Seaver-Morgan Co. for a double-runner spiral case turbine of 2,300 b.h.p. under a 56-ft. head, running at 300 r.p.m. The contract for two 66-in. diameter gate-valves, together with two head-gate mechanisms, was awarded to the Boving Hydraulic & Engineering Co., of Lindsay. The extension is 38 by 60 by 30 ft. high over the generator room, and 40 ft. high over the transformer and high tension rooms.

The building will be reinforced concrete throughout, whereas in the original station the roof over the generator room consisted of wooden purlins, ¼-in. matched pine, and covered with several layers of asbestos felt, installed by the Johns-Manville Co. That part of the excavation and concrete work carried out in the fall of 1917, was done by Wells & Gray, of Toronto. This work was held up during the severe winter season of 1917 and 1918, and in the spring it was proceeded with by the Commission's Construction Department.

A 1,600 k.v.a., 300 r.p.m., 2,200-volt, 3-phase, 60-cycle, waterwheel type horizontal generator was purchased from the Canadian General Electric Co., who were also to deliver and erect it. A fly-wheel effect of 300,000 lbs. ft. squared was required in the rotor of this generator, and this necessitated a large diameter machine and was the reason for it being set so low in the foundations, as the generator shaft had to line up with the turbine shaft. The specifications for this generator permitted a minimum temperature rise of 40 degs. C., with a continuous load of 1,600 k.v.a., at 80% power factor, normal speed and voltage. This generator was tested in the factory at an overspeed of 185% normal speed for 15 minutes. An insulation test of 10,000 volts between the armature windings and frame was withstood for one minute. The field windings and the field rheostat resistances withstood 1.500 volts for one minute.

A heat run was made on this generator in the factory, also the necessary measurements were taken to calculate the efficiencies, regulation, etc. No tests were required after installation.

This fourth unit, together with the second penstock as mentioned above, were placed in service and power fed into the system on January 28th, 1919.

When making these extensions to the station, it was decided to remodel the high tension switching room by installing duplicate 22,000-volt busses and making all 22,000-volt oil switches electrically operated. It was also decided to instal equipment for one new 22,000-volt out-going line and to remodel the 22,000-volt arresters, and to provide space for equipment for two future lines, one to Orillia and one to Waubaushene.

The present switchboard is to be rearranged in order to provide space for the panels to control the new and future 22,000-volt lines. New 2,200-volt, electrically-operated oil switches will be installed for the low tension sides of the transformers, and the present transformer switches will be used for the new generator and for station service transformers on the low tension side of each bank of transformers. A second set of disconnecting switches will be installed and the oil switch rearranged so that each bank can be connected to either bus, whereas at present each bank can be connected to only one bus. This extension includes a second transformer pocket, and one bank of transformers will be removed from No. 1 pocket to No. 2 pocket and the transformers in No. 1 pocket will be rearranged. Space is provided in No. 2 pocket for a possible future bank of transformers, also space for a machine shop and an oil storage tank.

A spare 600 k.v.a. transformer has been purchased from the Canadian Westinghous Co., and will be delivered this summer. It will be brought up the river in a scow. This spare transformer will be installed in No. 1 pocket with permanent 22,000-volt connections and 2,200-volt connections carried to each transformer in No. 1 and No. 2 banks, so that with short temporary connections it can be