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High Pressure Plant Used As Standby

Steam Standby for Motor⁴Driven Domestic Pressure Pumps Proved too Costly to Maintain in Condition for Quick Operation, So Two Generators Were Connected to Producer-Gas Engines at Winnipeg High Pressure Pumping Plant and Tied to Booster Pumps at Main Station

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THE city of Winnipeg derives its present water supply from artesian wells, four of which (with a capacity of about 8½ million Imperial gallons) pump directly into the distribution system, the remainder (having a capacity of about 5 million Imperial gallons) pumping into reservoirs which have a total capacity of 24 million Imperial gallons. The main pumping station is utilized entirely for boosting purposes, deriving its supply from the reservoirs. In this station there are installed five 1 M.I.G. Mather & Platt pumps, one 5 M.I.G.

One 250 h.p. boiler with 50 lbs. steam and banked fire; and one 250 h.p. boiler with fire ready to light and water at a temperature between 200 and 212° F.

Under summer conditions minimum time required was 45 minutes and in extreme winter conditions minimum time required was from $1\frac{3}{4}$ to 2 hours. This was unsatisfactory, as the city would be entirely without a water supply for altogether too long a period.

As it was considered too expensive to maintain this plant in a condition which would allow the steam turbines to be oper-

Allan pump and one 5 M.I.G. Worthington Pump. All these capacities are on basis of 24 hours' continuous service. Each pump is driven by directconnected motor taking current at 2,200 volts.

In the same station there is a stand-by steam plant consisting of six 250 h.p. and five 135 h.p. Babcock & Wilcox boilers, with 135 lbs. maximum allowable steam pressure; one 500 kw. Curt is



tion was looked for, and after thoroughly considering all phases, the following scheme was undertaken and is now completed :--The city has in operation a special pumping plant and mains for fire protec-

ated at a mo-

ment's notice,

some other

method of meet-

ing the condi-

plant and mains for fire protection only. The plant is constructed n e a r the centre of the city, on the bank of the Red

View of Winnipeg High Pressure, Producer-gas Plant, Showing Belted Unit, Slow Speed Generator. Photo, July 23rd, 1917

steam turbine, and one 1,000 kw. Westinghouse steam turbine.

In case of interruption to the supply of electric current to the pump motors, it is necessary to have the turbines above-mentioned operating in the shortest possible time, but to effect this desirable condition, the expense involved in keeping the requisite number of boilers under pressure, and the steam piping, auxiliaries and turbines warm at all times, runs into a large figure, especially during the long and extremely cold winters in Winnipeg. Tests were made, under special conditions, of the laying and preparation of fires under the boilers, to determine the time required to operate one turbine under working conditions, with the steam plant maintained as follows:— River, which is the source of its water supply. The pumps are driven by gas engines, the gas being supplied by pressure producers.

The plant includes four 500 h.p. and two 250 h.p. two-cylinder, tandem, single-acting Crossley engines, with speed of 120 r.p.m.

These engines are started under air pressure of 200 lbs. per sq. in. Each engine drives its pump through a Hele-Shaw friction clutch on the extension of the crank shaft. Each crank shaft had been extended in the opposite direction a distance of 22 ins. beyond the bearing, and provided with key seat, for an arrangement somewhat similar to that which has been now undertaken.