

One of the serious conditions that exist at Niagara Falls is the ice question, and the site selected is believed, for reasons hereafter explained, to offer less trouble from ice than any of the plants hitherto constructed or now under process of construction at Niagara. In the preparation of the designs that are now being followed for the construction of your plant, the site selected has afforded every opportunity for the construction of a plant that will provide the elements set down in the foregoing general statement as necessary for said results, and the territory secured from the Government does not offer to the engineer serious obstructions or expensive designs. The length of the tail race turned in your plant is 450 feet shorter than the shortest of the two existing tail race tunnels at Niagara Falls, and has, added to this, the advantage of being without curvature. The location of the power house in its present position is a particular advantage, when consideration is given to the expense and difficulty of operation attending where the power house is situated in close proximity to the constant humidity existing close to the Falls proper.

The selection of the site has resulted in the securing of an operating head of at least 15 feet greater than that obtained by the Niagara Falls Company, either on the American or the Canadian sides. The value of these 15 feet of extra head finds particular expression in the fact that each foot of increased head serves to reduce the cost per H.P. of the hydraulic and electrical apparatus. The reason of this is found solely in the higher spouting velocity due to the increased head.

In dismissing this portion of the discussion it is not amiss to say that one of your principal assurances should be found in the fact the design employed does not invade the field of experiment, but rather follows precedent, with such improvements as are dictated by past failures and partial successes.

GENERAL DESCRIPTION OF DESIGNS.

A brief general description of the design adopted requires the following statements:

In order to appropriate to the permanent use of plant a reliable quantity of water, the gathering dam shown on the plans has been designed, the purpose of which is to introduce upon the bed of the Niagara River a gathering dam, opening up the stream, and at the mouth of which dam there shall always be an area that will naturally receive a sufficient amount of water for the necessities of the plant, and at the same time divert these waters to the conduits leading to the wheel pit. In the location of this gathering dam, due consideration has been given to the natural currents of the river and to the small changes that may result in the same due to the construction of the works of the Ontario Power Company situated above our site. The gathering dam above referred to will be built of masonry, properly founded and so designed that the possibility of future attention to this structure should be dismissed.

This gathering dam changes the original rapids in front of the site into a ponded condition and raises the old water level approximately 18 feet under normal conditions. Connecting to this gathering dam and a part thereof, will be constructed a system of masonry diverting booms with submerged orifices, the office of all of which will be to divert approaching ice and debris to suction weirs and overflow capacities provided for in the crest of the gathering dam. The manipulation of ice and debris is best accomplished where the structures involved offer the least obstruction to the ice, and in the designs adopted the gathering dam and diverting booms will be so nearly parallel to the direction of the flow of the Niagara River as to reduce annoyance of this kind to a minimum. The point of land above our intake is so situated as to in itself act as a huge natural fender in the diversion of ice from our headworks.