

Wisconsin Rapids

In late 1902 CWP&PCo began construction on a new dam, paper machine and pulp manufacturing mill between the Green Bay & Western RR trestle and the present Grand Avenue Bridge. (Grand Avenue was named Cranberry Street those days) This was on and near the sites of several of the original "water power developments" which were party to the 1894 agreement. The present Rapids Mill straddles a channel that once passed water through a guard lock, the Bensley Pulp Mill and the Wisconsin Wood Pulp Mill owned by Mack and Spencer.¹⁴ The outlet of this channel was between the present Jackson Street and Grand Avenue bridges. The Main Office was built on the south end of an island. The crews used up 30,000 pounds of dynamite to excavate the granite river bottom "to set the footings for the wheels."¹⁵ The dam was finished in 1904.

"Truly the work is a noble achievement, one that our citizens as well as the projectors should be proud of, and it means that the Old Wisconsin that has for so many years flowed by our door, will henceforth be compelled to contribute a share toward the wealth of our little city."¹⁶

After the start up of the Wisconsin Rapids mill and dam, some water power was still reserved or committed to a few of the original partners to the consolidation. The Grand Rapids Milling Company for milling flour, the Pioneer Wood and Pulp Company had rights for 600 to 800 horsepower, and the Grand Rapids Foundry. The foundry needed about 40 horsepower. Both the foundry and milling company took their portion in the way of electrical power from Consolidated. The Pioneer company was allowed water "when the stage of the river will permit."¹⁷

A local paper noted the starting of the first hydro units, double horizontal Francis turbines with paired 40" Sampson runners.¹⁸ These were built by the James Leffel Company of Springfield, Ohio and were a standard turbine for driving pulp grinding stones, very typical of that time.

¹⁴ W.E. Mack and C.A. Spencer were also original parties to "the consolidation".

¹⁵ *The Grand Rapids Tribune*, Wednesday, July 27, 1904

¹⁶ Ibid.

¹⁷ *The Water Powers Of Wisconsin*, Wisconsin Geological and Natural History Survey, page 137, Madison, WI, 1908

¹⁸ Named after the inventor, Mr. Sampson. Runner is another term for water wheel.

"As the spectator stood in the wheel house of the new mill on Tuesday and watched the revolving dynamos, it was hard to appreciate that only a few feet separated the visitor from the waters of the Wisconsin river, that lay banked up ready to exert their mighty force of eight thousand horse power".¹⁹

The location of the three present hydro-mechanical units on the east end of the line up, (now called #8,9 & 10) represented the first "power or wheel house" at the Wisconsin Rapids Grinder room. These units were excited by 2-20" Sampson turbines turning 40 KW DC generators,²⁰ controlled by Lombard governors and were operated from a 50 foot long marble switchboard. Today, only the original turbine cases exist, the marble switchboard is long gone, the exciter flumes were filled in and the turbines were used to grind wood for many years.

After the Kraft Mill was built and the Wisconsin Rapids Mill began making a free sheet, the old grinders were remodeled to generate electrical power only. The original 40" turbines mentioned in 1904 are still using the power of the Wisconsin to generate electricity. All the remaining turbines have had new water wheels installed within the last 30 to 40 years. The latest sets, were installed in the late 1980's. These have a life expectancy of 30 - 50 years, with proper maintenance.

At the present site of the "C" section gates, near 1st Street, an old rock & crib gate section remained for a few years. This section was replaced in 1916, about the time of similar expansions and improvements at Biron. Also at this time, the old needle²¹ and wooden gate section closest to the Grinder Room and Power House were removed and an overflow or spillway section put in. These sections remained until 1941, when 10 taintor gates²² and concrete gravity walls replaced the whole overflow area. Through the masonry wall near the street passed the water that was supplied to the Pioneer mill for a few years. Later after the first swimming pool was built, water was piped from this wall to the pool. When the present pool was constructed and chlorinated water used, this practice was abandoned.

In 1920 a large expansion began at Wisconsin Rapids and Biron. In February of 1920, excavation started on the east end of the grinder room for the addition of a new Power

¹⁹ *The Grand Rapids Tribune*, Wednesday, April 27, 1904.

²⁰ *General Floor Plan*, Drawing No.9797, June 25, 1903

²¹ Needle gates were made up of vertical timbers braced to withstand the force of the impounded water. Needles could be removed or placed to control flow. Very hard and hazardous manual labor.

²² Taintor gates are the circular steel flood gates used at all CWPCo dams, named after the inventor, Mr. Taintor.

House. A stylish building was erected to house two vertical Allis-Chalmers hydro turbines. The building was set on a concrete foundation deep into the granite bedrock and the riveted steel superstructure was overlaid with brick. The building was a standard for hydro plants built in the mid-west at that time and is still a tribute to the craftsmanship of the builders. The decade of 1920 to 1930 saw the greatest construction boom in hydro before or since in the United States.²³ Allis-Chalmers, located in West Allis, Wisconsin in those days, supplied the turbines, generators, governors and switch gear. In April of 1921, the head water above the dam and grinder room was lowered 10 feet and a portion of the 1903 masonry wall was blasted out to "water up" the new turbines.²⁴ Since neither the local media nor the company archives mention the event in detail, one can only assume that the new hydros started generating without much difficulty.

In 1941 CWPCo removed the flash board section²⁵ between the present substation and "B" section gates. Portions of the "B" gate piers are original construction from 1903-4, although they have been modified since then. Originally there were 4 gates in that section, but when the new "A" gates and the concrete gravity wall was built, one of the "B" gates was removed. The pier from that gate and the old flashboard section still exists. The dam tender shack sets on that area now. A guard lock section was built straight out upstream from the existing masonry wall by the substation. That section, built of stone cribs went out into the forebay and turned west, where it terminated by the hot pond and woodroom. Deadheads and snags hang up on the remains of that section and when the pond is lowered for maintenance, portions of the old cribs can be seen. Before the flashboard section was removed, 10 new taintor gates and a concrete gravity wall was installed downstream. These are called the "A" gates today. One of these gates has a "house" built on it, heated with steam and fans, and is designed to be used anytime of the year. During times of winter high water or emergencies, this gate will be used.

The original A-C governors were replaced in 1991, after 70 years of service, when the Power Company moved the Operations Department to the present location at 610 High Street. This closed the last chapter on remote controlled plants for CWPCo which started in 1964. While the generators have been rewound at least twice, the turbines are original. They are inspected every five years, but their actual life expectancy is unknown, being over engineered and built to a duty factor almost unheard of in today's

²³ Duncan E. Hyde, *Hydroelectric Development in the US, 1880-1940*, New York State Museum

²⁴ *The Wisconsin Rapids Tribune*, April 1921

²⁵ Flash boards are designed to allow some overflow of water to maintain pond elevation, but will break out with high flows increasing the dam's capacity. All CWPCo dams use taintor gates for regulating high flows. Flash boards must be replaced after flows return to normal.

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The masonry portion of the dam was remodeled and the head raised to make use of the more efficient hydro plant. To wheel the power generated by the new hydro plant, a substation and a 44,000 volt line was built to Biron and Stevens Point. The actual line construction history is shrouded in the past. The line was rebuilt and a new substation added in the late 1940's. The line from Wisconsin Rapids to Biron and Stevens Point was remodeled again in the early 1950's to join the new Petenwell to Stevens Point line when the Petenwell Hydro Project was built by Wisconsin River Power Company. Today, four important substations exist on that original line; Saragtoga (WP&L), Baker (WW&L Commission), Coyne/Grand Rapids (CWP Co and WPS) and Plover (WPS).