

## Dubay

Throughout the 1920's and 30's, George Mead pursued a plan which would harness the power of the Wisconsin even further than what had been done by the Wisconsin Valley Improvement Company on the upper river system. The plan was to capture more of the spring runoff, early summer and fall flood waters, place it in additional large reservoirs where it would be used to further supplement the low summer and winter flows on the lower river. Above Stevens Point two large reservoirs and one flowage would be formed to store high flows and release during low flows. Below Wisconsin Rapids, two more large flowages would do the same. At the city of Portage, some of the water of the Wisconsin would be channeled into the Fox to be routed downstream through cities such as Appleton on to Green Bay and into Lake Michigan. This plan was conceived in the days when there was little concern for possible ecological changes that might occur.

The two reservoirs were to be the Big and Little Eau Pleine.<sup>49</sup> In 1937 the Big Eau Pleine reservoir came into existence, the latter was never built, the land donated to the State of Wisconsin and is now the Mead Wildlife Refuge. Waters from the Wisconsin were to be channeled down a canal above Mosinee and into the Big Eau Pleine. Excess water from the BEP would be passed through a diversion tunnel into the Little Eau Pleine. Further details of this project can be found in a recent book, *Stewards of the Wisconsin*, a history of the Wisconsin Valley Improvement Company, written by Michael J. Goc.

The upper flowage was to be built near the village of Knowlton and was to be called the Knowlton Dam. A point in the Wisconsin River near Knowlton called Battle Island was, at the turn of the century, considered to be an ideal place for a dam.<sup>50</sup> By the time CWP Co was ready to build a dam, powered equipment to build dikes, local cement manufacturing facilities and improved concrete allowed the actual site to be moved downstream and be constructed with a relatively long dike to form a much larger lake. After the discovery of an old trappers cabin and trading post, owned and operated by Jaques Dubay, the development's name was changed to honor old Jack, creating the present Lake Dubay.<sup>51</sup>

Shortly before the United States entered into World War II work was started on the Dubay Project. A 46,000 volt transmission line was built from the Biron Hydro Plant, north past the village of Junction City to the present site of the Dubay Dam. This line

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<sup>49</sup> Often referred to as the Mead Reservoir.

<sup>50</sup> *The Water Powers of Wisconsin*, Wisconsin Geological and Natural History Survey, Madison, WI, 1908

<sup>51</sup> Letter from Max Andrae stating George W. Mead's interest in the history of Jaques Baptiste Dubay.

provided power for the cement plant, lighting and other necessary electrical loads while the dam was built. A new road was built from the present County Highway E east across a lowland. This road, now called Dam Road joins River Road very near the dam. The portion of river road that followed the river north of this point and around a sweeping bend is now under water. After the hydros began generating electrical power, the power line then transferred this energy to the Biron mill, terminating at the Biron Hydro Plant. Today the power flows onto the CWPCo grid at the Biron Turbine (Steam) substation, the old hydro sub having been abandoned in 1993.

The new Dubay hydro facility was designed to use some of the latest technology. Fixed pitch propeller water wheels were purchased from the James Leffel Company of Springfield, Ohio.<sup>52</sup> Three of the original water wheels, originally made of cast iron, failed within a few years. The replacements were made of cast steel. On one unit, a rubber coating was applied, the thinking being that it might reduce cavitation.<sup>53</sup> Much of the rubber still exists on that water wheel. The fourth runner failed and was replaced in 1959. That original wheel was repaired and reinstalled in 1981. The Leffel turbines turn alternators built by General Electric to generate about 8,000 kilowatts of power per hour at a full net head of 25 feet, river flow permitting. The speed and thus the frequency of the generators were controlled by Woodward Gate Shaft Governors, built in George Mead's former hometown of Rockford, Illinois. Woodward Governor, which moved its hydro division to Stevens Point in 1984, still maintains and even has upgrades for these units after 54 years of service. Given proper care, the life expectancy of these units is unknown.

The Dubay dam was designed with eleven taintor gates to pass flood waters or high flows in excess of what the turbines can handle. Two of the gates have heated structures on them to allow winter operation. These gates can be operated by remote control from the Power Dispatch Center at Wisconsin Rapids.

Shortly after the plant began operation, severe erosion was noticed below the gate section. In 1944 a coffer dam was built downstream of gates 7-11 and the area was dewatered. A concrete apron with difusers was constructed to break up and diminish the power of the water passing through the gates. To further reduce erosion, a plan was devised to release water onto the apron first, building up a good tail before opening other gates.

West of the dam is an earthen dike about 6,800 feet long. In the 1950's a 3 foot parapet was added to give the dike more freeboard. This raised the freeboard from maximum

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<sup>52</sup> Leffel supplied the turbines at WRP&PCo (WRIV) in 1892 and CWP&Co (Rapids) in 1904 also.

<sup>53</sup> Under certain conditions, small bits of metal are removed from the water wheels by cavitation. Severe cavitation can completely destroy a water wheel.

**head to about 8 feet. Based on standard engineering factors for dike construction, the Dubai Dike is very sound and safe.**

**Upstream of the Dubai dam, to the west, the river originally made a wide bend to the north. It was in this area, now completely submerged, that the trading post of Jaques Dubai stood.**