



Architectural Resources Survey for the River Falls Hydroelectric Project (FERC No. 10489), Pierce County, Wisconsin

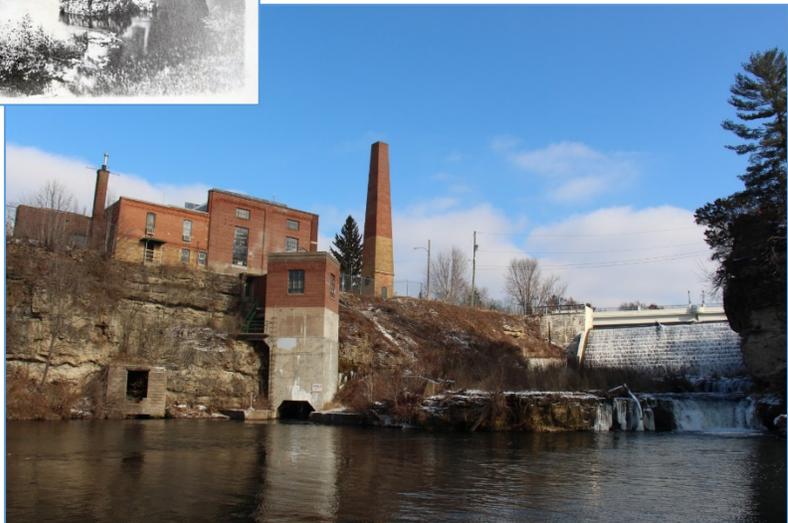
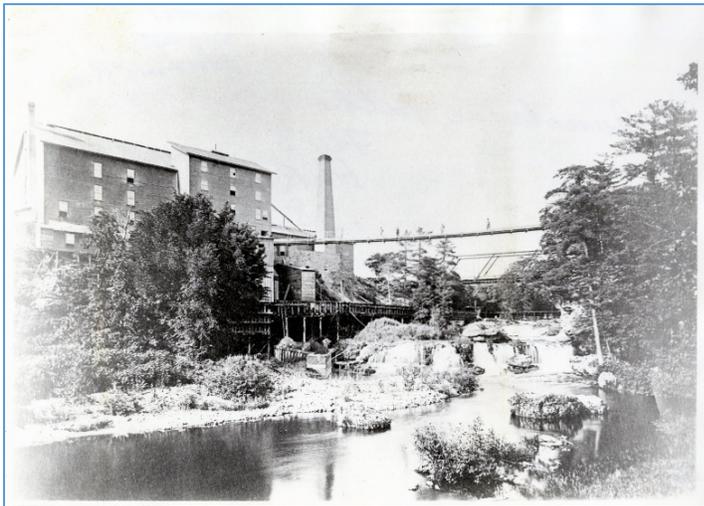
January 2020

Prepared For:

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A handwritten signature in blue ink that reads "David L. Price".

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January 2020

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Abstract

Under contract to the City of River Falls Municipal Utilities (RFMU), TRC Environmental Corporation (TRC) completed an architectural resources survey and evaluation of the River Falls Hydroelectric Project (FERC No. 10489) (Project) on the Kinnickinnic River in River Falls, Pierce County, Wisconsin. The Project consists of two separate hydroelectric developments, including the Junction Falls development and the Powell Falls development. The architectural survey was completed in compliance with Section 106 of the National Historic Preservation Act of 1966 (as amended) as part of the Federal Energy Regulatory Commission (FERC) License Application for the Project. As part of the licensing effort, the RFMU intends to relicense the Junction Falls development and proposes to decommission and remove the Powell Falls development.

The purpose of this survey was to document historic architectural and engineering resources aged 50 years or older within the Project's area of potential effects (APE), including both Project-related and non-Project-related facilities; to evaluate their eligibility for listing in the National Register of Historic Places (NRHP); and to complete a Section 106 assessment of effect on any resources that are listed or eligible for listing in the NRHP. At the request of the Wisconsin State Historic Preservation Office (WI-SHPO) due to the separate relicensing actions at Junction Falls and Powell Falls developments, the Project was assigned two APEs that include all lands enclosed by their individual Project boundaries.¹ The APEs also include attached or associated buildings and structures extending beyond the Project boundaries that may contribute to the eligibility of the Project developments for listing in the NRHP; and lands or properties outside the Project boundaries, where the Project may cause changes in the character or use of historic properties, if any historic properties exist.

Based on the results of the background research and field survey, TRC documented two resources in the APEs consisting of the Junction Falls and Powell Falls developments. TRC recommends neither development is eligible for listing in the NRHP due to their lack of historical significance and/or loss of integrity. As a result, TRC recommends the proposed FERC licensing and decommissioning will have No Effect on historic architectural resources in the Project APE. TRC recommends no additional investigation of above-ground resources in connection with the proposed Project.

¹ The Licensee submitted a request for review of the proposed APE on October 2, 2019. The Wisconsin SHPO concurred with the APE in a letter dated October 10, 2019.

Acknowledgements

TRC would like to thank the staff of the City of River Falls Municipal Utilities, which provided background information and a site tour during the architectural survey. At TRC, Lesley Brotkowski, Senior Consultant, acted as Project Manager, and this report was reviewed and edited by Ted Karpynek, Senior Architectural Historian.

1. Introduction

Under contract to the RFMU, TRC completed an architectural resource survey and evaluation of the River Falls Hydroelectric Project (FERC No. 10489) (Project) on the Kinnickinnic River in River Falls, Pierce County, Wisconsin. The Project is currently licensed as a two-development project that includes the Junction Falls development and Powell Falls development. The original hydroelectric development at Junction Mill was built in 1900 and later altered and expanded several times in the twentieth century. Powell Falls was constructed in 1903 to provide additional power production and was later completely rebuilt after a flood in 1965. The architectural survey was completed in compliance with Section 106 of the National Historic Preservation Act of 1966 (as amended) as part of the FERC License Application for the Project. The current license for the Project expires on August 31, 2023. As part of the licensing effort, the RFMU intends to relicense the Junction Falls development and proposes to decommission and remove the Powell Falls development.

The purpose of this survey was to document historic architectural and engineering resources aged 50 years or older within the Project's APE, including both Project-related and non-Project-related facilities; to evaluate their eligibility for listing in the NRHP; and to complete a Section 106 assessment of effect on any NRHP listed or eligible resources. At the request of the WI-SHPO due to the separate undertakings at Junction Falls and Powell Falls developments, the Project was assigned two APEs that include all lands enclosed by their individual Project boundaries. The APEs also include attached or associated buildings and structures extending beyond the Project boundaries that may contribute to the eligibility of the Project developments for listing in the NRHP; and lands or properties outside the Project boundaries, where the Project may cause changes in the character or use of historic properties, if any historic properties exist. A map showing the Project boundaries and APEs is shown below in Figure 1.

To complete this study, TRC conducted background research, an architectural survey, and data analysis, the results of which are presented in the following report. This report continues in Chapter 2 with the research and survey methods, followed by a historic context in Chapter 3. The survey results are presented in Chapter 4, followed by a conclusion in Chapter 5.

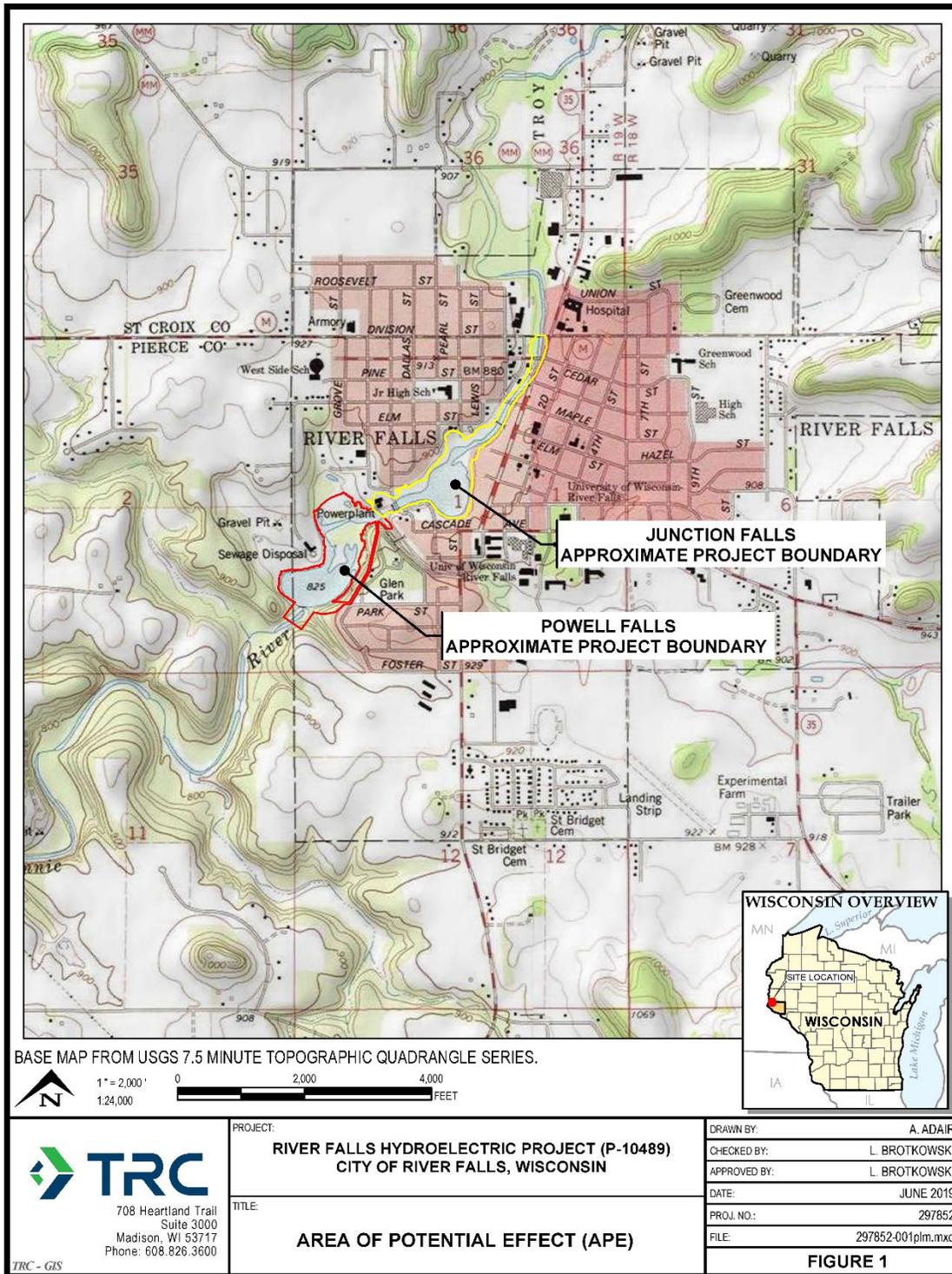


Figure 1. River Falls Hydroelectric Project Location and APEs.

2. Survey Methods

Background Research

Prior to the architectural field work, TRC completed background research in the WI-SHPO online Wisconsin Historic Preservation Database (WHPD) and Architecture and History Inventory (AHI) to identify previously surveyed resources within the APEs and those that are listed or eligible for listing in the NRHP. Research showed the Junction Falls development (AHI No. 25348, identified in the AHI as “Junction Mill”) was previously surveyed by the WI-SHPO and found not eligible for listing in the NRHP due to extensive modern alterations and lack of historical integrity. The Powell Falls development has not been previously surveyed. No other previously surveyed resources are located in the APEs.

Additional background research on the history of the Project and the APE was conducted at the Wisconsin Historical Society Library and Archives in Madison, in the RFMU files stored at the Junction Falls development, at the University of Wisconsin-River Falls – University Archives and Area Research Center, and at the River Falls Public Library. Sources gathered in these locations included construction drawings, technical documents and reports, historic photographs, historic maps, news clippings, and secondary histories of River Falls and the Project.

Architectural Survey

Using the results of the background research, TRC conducted the architectural survey of the Project APEs during the week of November 11, 2019, under the direction of David L. Price, Senior Architectural Historian, with the assistance of RFMU employees. The survey consisted of visiting all of the Project-related resources associated with the Junction Falls and Powell Falls developments. Attention was also paid to identifying non-Project-related resources aged 50 years or older in the APEs. All Project-related resources were photographed with a high-resolution digital camera, including multiple views of the dams, powerhouses, and other supporting infrastructure. At the powerhouses, all accessible interior spaces, equipment, and architectural details were documented with digital photographs and written notes on their functions and histories. Information recorded in the field included a brief description of the main resource, identification of secondary or related structures, dates of construction, physical integrity, and historic context. Survey information maintained throughout the course of the inventory included field notes, sketch maps, and photographs.

NRHP Eligibility Criteria

Sufficient data were compiled during background research and survey to make recommendations regarding eligibility for listing in the NRHP for each resource addressed during this study. According to 36 CFR 60.4, cultural resources eligible for listing on the NRHP are defined as buildings, structures, objects, sites, and districts that have “integrity,” and that meet one or more of the criteria outlined below (Government Printing Office [GPO] 2012).

- Criterion A (Event). Association with one or more events that have made a significant contribution to the broad patterns of national, state, or local history.
- Criterion B (Person). Association with the lives of persons significant in the past.
- Criterion C (Design/Construction). Embodiment of distinctive characteristics of a type, period, or method of construction; or representation of the work of a master; or possession of high artistic values; or representation of a significant and distinguishable entity whose components may lack individual distinction.
- Criterion D (Information Potential). Properties that yield, or are likely to yield, information important in prehistory or history. Criterion D is most often (but not exclusively) associated with archaeological resources. To be considered eligible under Criterion D, sites must be associated with specific or general patterns in the development of the region. Therefore, sites become significant when they are seen within the larger framework of local or regional development.

For a property to be eligible for listing in the NRHP it must exhibit qualities of physical integrity. This rule also applies to historic districts. The seven NRHP aspects of integrity are as follows:

- Location: the place where the historic property (or properties) was/were constructed or where the historic event(s) occurred;
- Design: the combination of elements that create the form, plan, space, structure, and style of a property (or properties);
- Setting: the physical environment of the historic property (or properties);
- Materials: the physical elements that were combined to create the property (or properties) during the associated period of significance;
- Workmanship: the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory;
- Feeling: the property's (or properties') expression of the aesthetic or historic sense of the period of significance; and
- Association: the direct link between the important historic event(s) or person(s) and the historic property (or properties).

3. Historic Context

Settlement of River Falls

The first Euro-American to explore the Kinnickinnic River Valley and the site of River Falls was Joel Foster (Figure 2), an entrepreneur and veteran of the Mexican-American War who arrived in 1848 looking for opportunities to buy land. Foster was impressed with the area’s scenic beauty and recognized the potential to develop the falls at the junction of the Kinnickinnic River and the South Fork of the Kinnickinnic River. Foster built a log house he called “Fort Foster” and filed a claim for the land that forms what is now the western part of River Falls. Foster’s house was the first permanent settlement in River Falls and soon attracted other settlers (Pierce County Historical Association 2019; City of River Falls 2009).

Significant among the early settlers were brothers Nathaniel N. and Oliver Stanley Powell (Figure 2), who arrived in 1850 and claimed land on the east side of the river. By 1854, the Powell brothers had built the area’s first saw mill, built a general store known as “Pioneer Store,” and platted 60 acres on the east side of the river to develop into a village they called Kinnickinnic. Pioneer Store was located at the corner of Main and Maple Streets and soon developed into a community center with a hotel and post office. In 1856, the Powell brothers platted an additional 120 acres on the west side of the river (Pierce County Historical Association 2019).

The settlement grew quickly during the 1850s, driven by opportunities created by the river’s water power. Joel Foster built a second sawmill and feed store, and a brickyard was built on the south side of the village. In 1855, G. W. Cairns built the Greenwood House hotel. By the late 1850s the community included 10 businesses, as well as several flour mills and sawmills. The first of the village’s four flour mills was the Prairie Mill, built in 1855 by C. B. Cox on the west side of North Main Street. Population growth and development led to a drive for formal incorporation as a township in 1854. Villagers determined the original village name of Kinnickinnic was too difficult to spell so it was first incorporated under the name Greenwood Township. When it was discovered there was already another town in Wisconsin called Greenwood, the Pierce County Board changed the name to River Falls in 1858 (Pierce County Historical Association 2019; City of River Falls 2009).

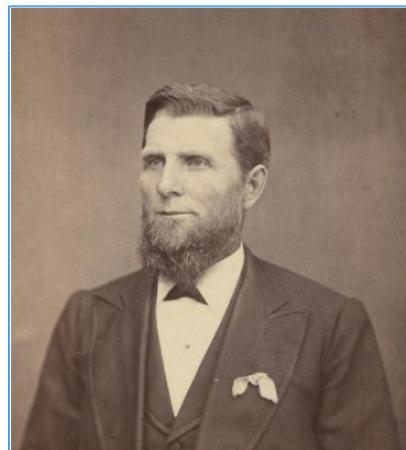
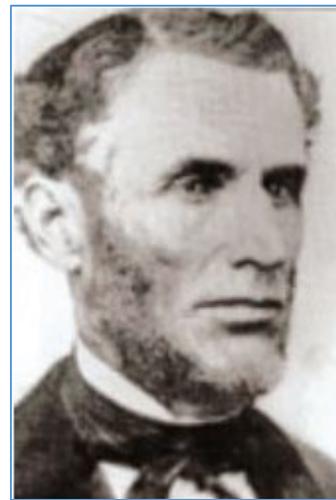


Figure 2. Joel Foster (top) and Oliver Stanley Powell (bottom) (Source: City of River Falls 2019).

Junction Mill

River Falls enjoyed a period of rapid industrial growth between the 1860s and 1880s that capitalized on agricultural production and water power from the Kinnickinnic. Wheat grown on the prairies of the surrounding Kinnickinnic and St. Croix River valleys was ground by local water-powered mills into flour for export to regional markets. The flour industry also needed barrels to ship the flour, which led to the construction of saw mills and associated cooper shops at many mills. The largest flour mill in River Falls was Junction Mill, built in 1867 by Charles B. Cox above the falls at the junction of the Kinnickinnic and South Fork rivers (Figures 3 and 4). It quickly rose to become the “pride of the city” producing 600 barrels of flour daily, with shipping barrels made at the on-site cooper shop. The mill employed some 50 full-time employees, far more than any other local flour maker (Ericson 1981). The historic bird’s-eye-view of River Falls in Figure 5 shows the extent of the town’s growth in 1880, with Junction Mill anchoring its western end.

Soon, however, a tide of adverse circumstances rose to close the mill. In 1877, a severe drought dried the Kinnickinnic River and idled area mills. In response, the owners of Junction Mill installed a coal-fired engine, three boilers, and a brick smokestack to continue grinding flour. Additional problems included a multi-year infestation of chinch bugs in the region’s wheat crops, as well as frost, high freight rates, and a stagnating economy. The final blow to Junction Mill came in 1891 when its owner, New York-based Charles Haight and Company, went bankrupt and closed the mill. The mill deteriorated for the next five years until it was destroyed by fire in August of 1896. All that survived was the limestone and brick smokestack, which remains on the site today (Ericson 1981; City of River Falls 2019).



Figure 3. Junction Mill, circa 1880 (Source: City of River Falls 2019).



Figure 4. Junction Mill, west elevation looking east, circa 1890 (Courtesy of University of Wisconsin-River Falls, University Archives and Area Research Center).

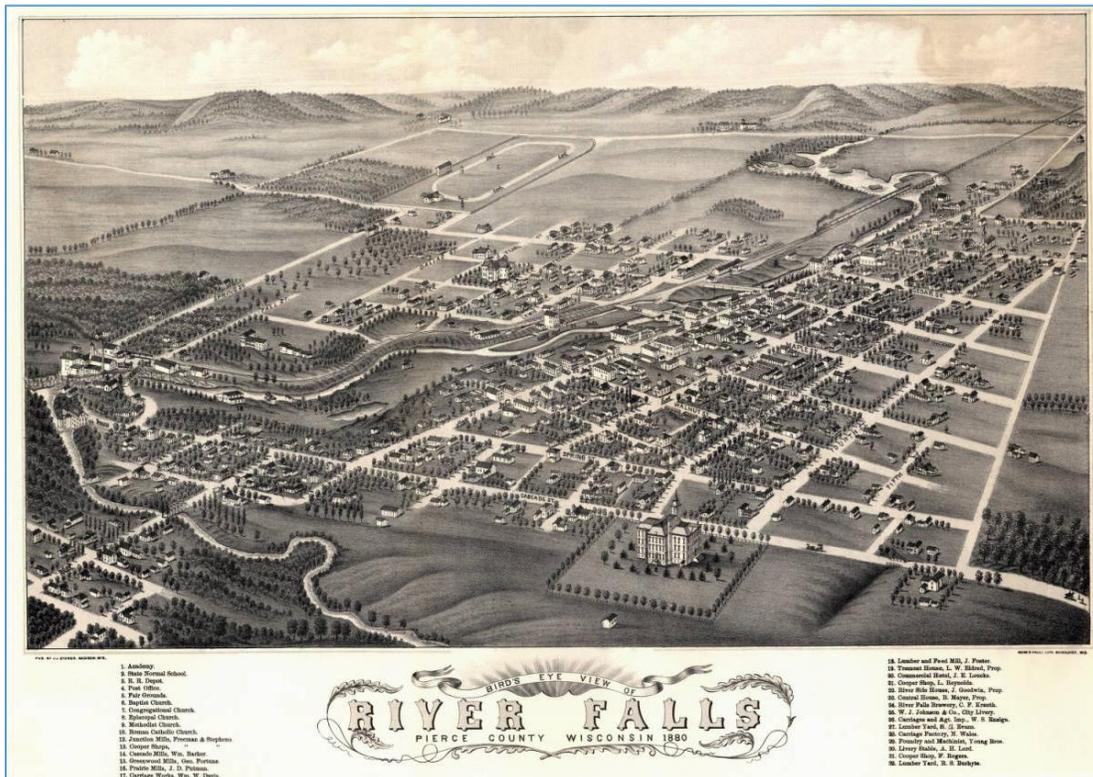


Figure 5. 1880 Bird's-Eye-View of River Falls, Junction Mill is shown at far left (Source: Stoner 1880).

Hydroelectric Power in River Falls

The destruction of Junction Mill in 1896 created an opportunity for the city of River Falls to build a new hydroelectric plant at the mill site and provide electricity for the growing community. Municipal hydroelectric development had already begun sweeping the country by this time, beginning with Thomas Edison's pioneering work with electricity in the 1870s and 1880s. The earliest hydroelectric plants were direct current (DC) stations built to power arc and incandescent lighting. The first hydroelectric development in America was completed in 1880, when a dynamo was connected to a water turbine by Michigan's Grand Rapids Electric Light and Power Company to power arc lights. By the mid to late 1880s, there were approximately 50 electrical generation plants operating or under construction in the U.S. and Canada to meet the demand for electricity for lights and motors. As was the case at River Falls, many of these early plants used retrofitted mill dams to supply water power to dynamos and early Francis-type turbines and generators (Hess E-4).

Hydroelectric development in River Falls was preceded by a privately-owned gas lighting company formed in 1891 that provided a limited amount of lighting to the city's downtown. A general economic downturn and local interest in replacing gas with electricity, which offered seemingly limitless practical uses, drove River Falls leaders to explore the construction of a hydroelectric plant. In 1900, after considerable debate on ownership and financing, the town council voted to build a municipally-owned hydroelectric plant at the former site of Junction Mill, which was recently freed from bankruptcy litigation (Ericson 1981).

Construction proceeded quickly as the town awarded construction contracts and site work commenced. The old Junction Mill dam was replaced with a new rock-crib and timber dam with a flume leading to a new, one-story brick powerhouse where the mill formerly stood. The powerhouse contained a single dynamo generating unit that was connected to newly-installed street lamps throughout the city. On November 29, 1900, the dynamo was started, and electric light illuminated River Falls for the first time (Ericson 1981). The circa 1900 photograph in Figure 6 shows the new powerhouse and timber crib dam shortly after construction, as well as the remaining Junction Mill smokestack.

The impact of electricity was swift for River Falls as citizens and businesses replaced older gas and steam-powered machines with electric motors. "Grain elevators, printing presses, meat markets, grocery stores, the public school," wrote one local historian, "everyone found a use for some new-fangled electrical motor" (Ericson 1981). The rapid increase in demand for electricity outpaced the supply from the plant's single generating unit. By 1903, the city had to suspend installation of new infrastructure until it developed a second generating plant at Powell Falls, just downstream from the Junction Mill site. Also powered by a single dynamo, the Powell Falls development was built with a timber crib dam and a wood-frame powerhouse as shown in the 1912 Sanborn Fire Insurance Company map in Figure 7. This map identifies Junction Falls as the "City Light & Pumping Station No. 1," and Powell Falls as the "Sub Power Ho. [House], City Light Plant."



Figure 6. Junction Falls hydroelectric plant, circa 1900 (Courtesy of University of Wisconsin-River Falls, University Archives).

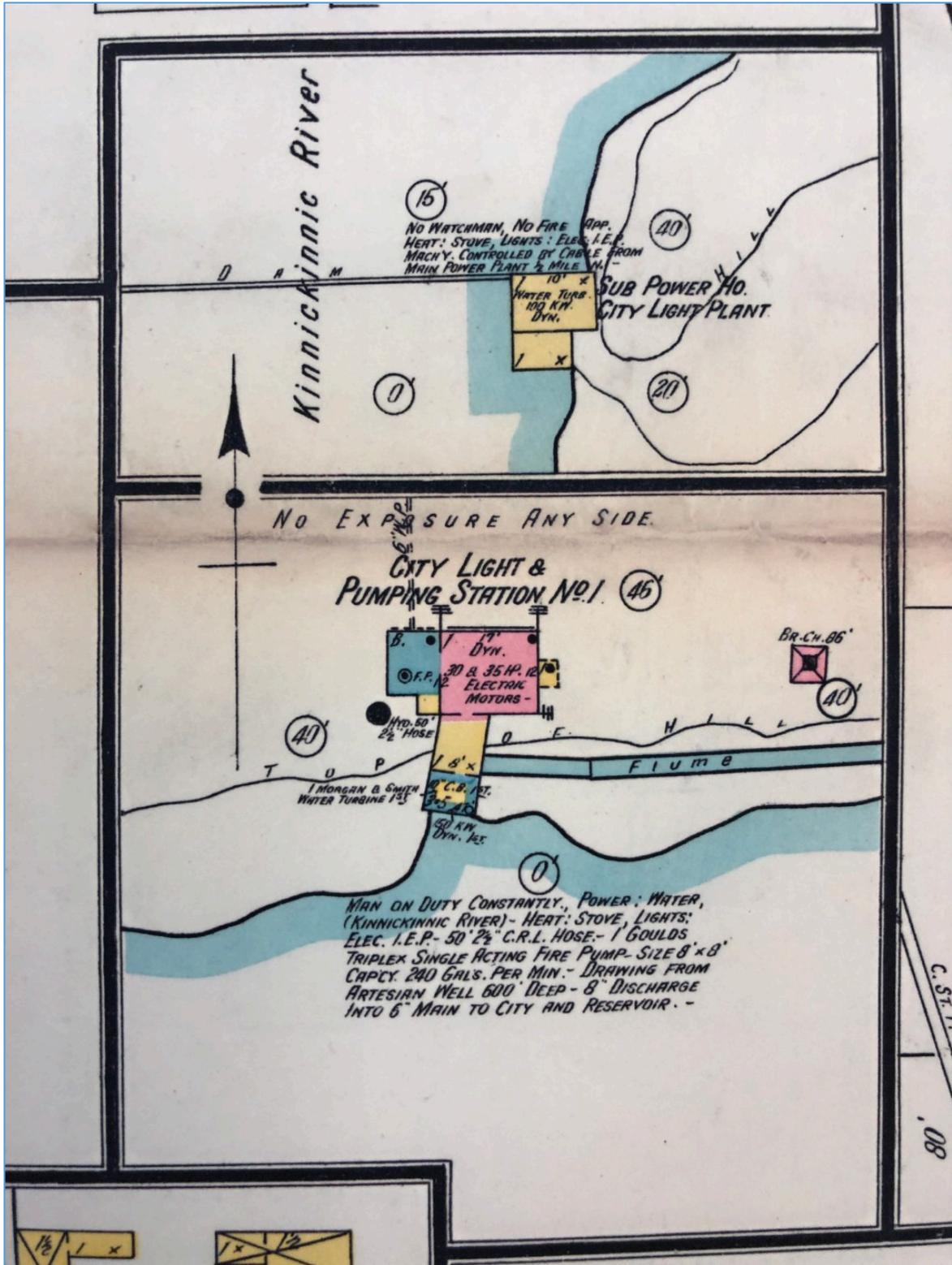


Figure 7. 1912 Sanborn Map showing original configurations of Powell Falls (top) and Junction Falls (bottom) developments (Courtesy of University of Wisconsin-River Falls, University Archives).

The city's demand for additional electricity continued to grow through the twentieth century, resulting in several additions and renovations to both the Junction Falls and Powell Falls developments. In 1912, the city raised the height of the Junction Falls timber-crib dam, creating what is now known as Lake George. In 1920, the city built a new, taller concrete gravity dam located 30 feet downstream from the old timber-crib dam, using the old structure as a coffer dam to divert water flow during construction. The new dam's height and construction were designed to better withstand annual flooding of the Kinnickinnic (City of River Falls 2019). Unable to keep pace with demand for electricity in the 1920s, the powerhouse was enlarged in 1928 to house two diesel-powered generating units to augment the plant's hydroelectric production. Room for additional diesel and natural gas-powered generators was created with more powerhouse additions in 1948, 1962, 1971 and 1998. (City of River Falls 2019).

Floods continued to cause havoc for the city's hydroelectric plant, including a 1964 flood that destroyed the original Powell Falls timber-crib dam and wood-frame powerhouse. The entire Powell Falls development was rebuilt in 1965 with a concrete gravity dam and new concrete block powerhouse, which is what remains at the site today. The circa 1975 photograph in Figure 8 shows the Powell Falls development after its reconstruction.

In 1988, the city began the process to license the hydroelectric plant with FERC, which determined the 1920 Junction Falls dam was unsafe and required significant repairs or replacement. Ayers Engineering developed a plan to leave the dam's foundation in place and install 60-foot post-tensioned rock anchors extending into the underlying bedrock. Using a unique stepped design, the dam was rebuilt and upgraded in 1989 to withstand a 500-year flood at a cost of approximately \$650,000. During the construction process, the remains of the plant's original timber-crib dam, long submerged by Lake George, were exposed and again used as a coffer dam (City of River Falls n.d.).

After 2010, the five remaining diesel fuel engines in the Junction Falls development were removed while the single remaining hydroelectric unit and its recently-rebuilt dam remained in operation. Today, the River Falls hydroelectric facilities continue to provide renewable energy and generate positive cash flow for the RFMU (City of River Falls n.d.).

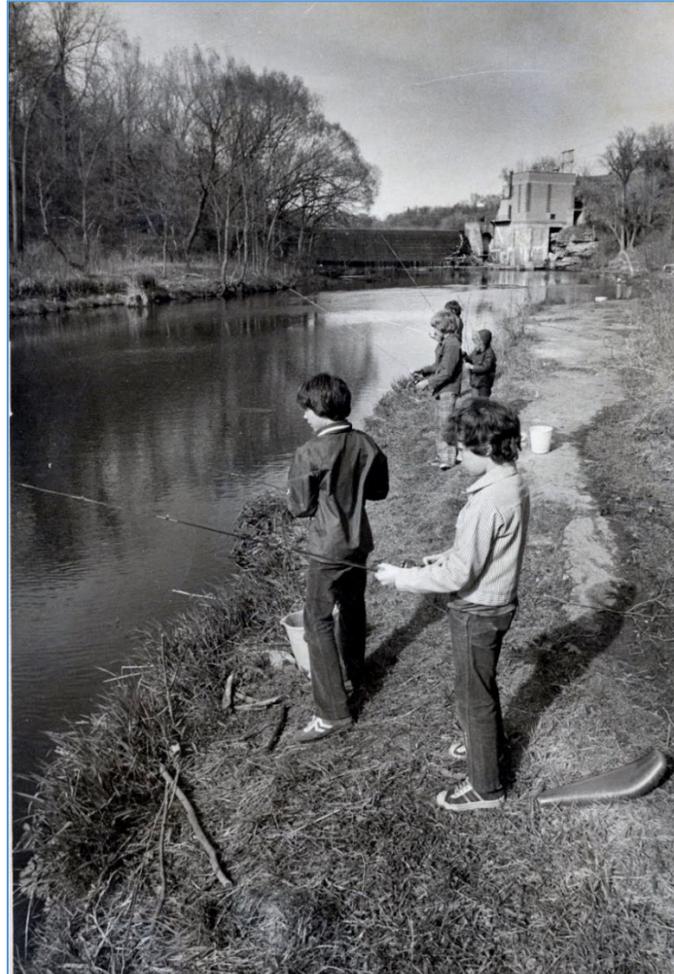


Figure 8. Children fishing below the Powell Falls development, circa 1975 (Courtesy of University of Wisconsin-River Falls, University Archives).

4. Survey Results

The architectural survey documented the current conditions of the Project, including the Junction Falls development (AHI No. 25348) and the Powell Falls development. No other non-Project related architectural resources were identified within the two Project APEs. Table 1 below summarizes the survey results. NRHP eligibility evaluations of both developments follow the descriptions below.

Table 1. Surveyed Resources in the Project APE.

AHI Number	Name	Construction Date(s)	NRHP Status/Recommendation
25348	Junction Falls	1867; 1900; 1928; 1947; 1962; 1971; 1989; 1998; 2017	Not Eligible
240830	Powell Falls	1965	Not Eligible

Junction Falls

AHI 25348
Not Eligible

Description

The original section of the Junction Falls development was built in 1900 on the site of the former Junction Mill. The Junction Falls powerhouse now consists of a multi-part, multi-story brick superstructure above a concrete substructure that was enlarged and altered in several phases over the twentieth century. Dates of significant additions are listed above in Table 1 and illustrated below in the aerial map in Figure 8. Current interior and exterior survey photographs of the development are shown in Figures 9-13.

The original 1867 Junction Mill smokestack rises on the east side of the hydroelectric development. On the west side of the smokestack is the original 1900 portion of the powerhouse, which has a one-story brick superstructure containing the plant control room built over a masonry basement level. This portion features a corbelled cornice and arched window openings containing replacement one-over-one windows. On the riverbank below the original powerhouse is the generator house, a cube-shaped brick building set on a concrete foundation with a flat, cast-concrete roof and cornice. It contains a single General Electric generator rated at 250 kilowatt (kW) coupled to a Leffel hydraulic turbine. The generator house is connected to the basement of the powerhouse by a brick and concrete block corridor.

The 1928 and 1947 Art Deco-style portions of the powerhouse are attached to the east side of the original building. They join to create a one-story, high-bay structure with brick masonry and concrete block walls, a cast concrete foundation, a flat roof, and metal casement windows. The south and east exterior elevations of the building are divided into bays by brick pilasters topped with a corbeled cornice. There are modern solar panels on the roof of the building. On the north

side of the building are additions constructed in phases between 1962 and the 1990s to house auxiliary diesel and natural gas generators, equipment rooms, and office/administrative spaces, as well as a one-story maintenance garage with four overhead bay doors.

The powerhouse is connected to a concrete gravity dam measuring 140 feet long and 32 feet high, with an uncontrolled overflow spillway and a crest length of 115 feet. The water intake headworks section of the dam is at the right abutment and has two gated waterway openings; one 5-foot square for discharging excess flows; and a 200-foot long concrete encased pipe leading from the penstock to the powerhouse generator house.

The impoundment of the Junction Falls development, known as Lake George, has a surface area of approximately 15.5 acres at the normal pool elevation of 865.3 feet mean sea level (MSL). The spillway is approximately 32-feet high and 115-feet long and has a 21-foot wide base. The designed head is approximately 42 feet high. The storage capacity of the impoundment is 142.7 acre feet. The Junction Falls development is operated in a run-of-river mode. The adjacent switchyard on the northwest side of the powerhouse was built in 2017. It is not owned by RFMU nor is it located inside the Project APE.

NRHP Evaluation

The Junction Falls hydroelectric development (AHI 25348) was previously surveyed in 2014 by the WI-SHPO and found not eligible for listing in the NRHP due to extensive alterations and lack of historical integrity. TRC agrees with this conclusion and finds the development lacks sufficient integrity to express its association with historic events due to multiple modern alterations and additions. In particular, the Junction Falls development lacks four NRHP aspects of integrity, including design, materials, workmanship, and feeling. The Junction Falls development is therefore recommended not eligible under NRHP Criterion A. Background research did not reveal any association with a historically significant person or persons and TRC recommends the Junction Falls development not eligible under Criterion B. Background research and field survey showed the development is a typical example of a small hydroelectric facility from the early twentieth century that does not exhibit distinctive architectural or engineering characteristics and is recommended not eligible under Criterion C.



Figure 9. Overview map of the Junction Falls development.



Figure 10. Junction Falls development showing (L-R) powerhouse, smokestack, and dam, looking northeast.



Figure 11. Junction Falls development showing water intake headworks in foreground and powerhouse in background, looking southwest.



Figure 12. Junction Falls powerhouse showing modern additions on east (left) and north (right) elevations, looking south.



Figure 13. Junction Falls powerhouse showing modern additions at left and rear maintenance garage, looking southeast.

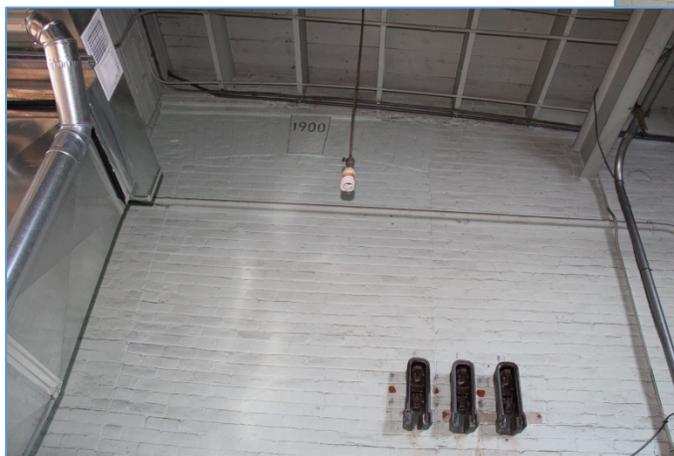


Figure 14. Interior views of the Junction Falls powerhouse, including the control room (top), original 1900 keystone (left), and the generator (right).

Powell Falls

AHI 240830

Not Eligible

Description

The Powell Falls development consists of a concrete gravity dam with an integrated powerhouse at its left (east) abutment. The dam measures 110 feet long and 16.5 feet high with an uncontrolled overflow spillway on the right (west) abutment. The block-shaped powerhouse has a combination brick and concrete block superstructure on a cast concrete substructure. The building has a flat roof, clerestory windows on the north elevation that are boarded up, and metal pedestrian entrances on the east and west elevations. On the north side of the powerhouse are the water intake headworks. Wrapping around the exterior of the powerhouse is a wood and metal access platform with metal safety rail. There is a cast concrete addition on the north elevation that contains an equipment storage area and a heat furnace that vents up through a brick chimney. The main generator floor contains a single General Electric generator rated at 125 kW coupled to a Leffel hydraulic turbine. A transmission line leads from the powerhouse to the control room of the Junction Falls powerhouse. Current photographs of Powell Falls are shown below in Figures 15-19.

NRHP Evaluation

TRC evaluated the Powell Falls development under Criteria A, B, and C. The development was constructed in 1903 as a secondary hydroelectric facility to provide additional power to River Falls and was completely reconstructed in 1965 following a flood. Background research did not reveal that Powell Falls has any association with a significant historic event or pattern of events, and TRC recommends it not eligible for listing under Criterion A. Background research did not reveal any association with a historically significant person or persons and TRC recommends the Powell Falls development not eligible under Criterion B. Background research and field survey showed the development is a typical example of a small hydroelectric facility from its construction period that does not exhibit distinctive architectural or engineering characteristics and is recommended not eligible under Criterion C.



Figure 15. Powell Falls dam and powerhouse, view northeast.

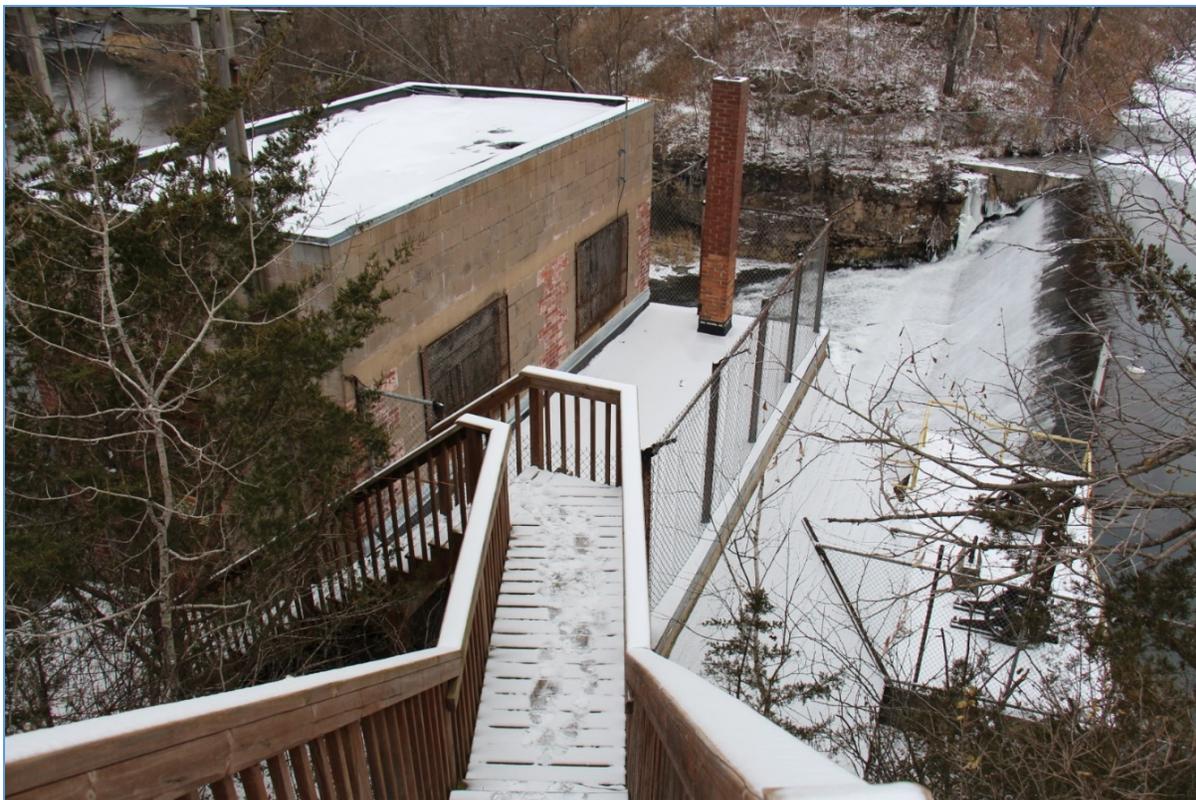


Figure 16. Powell Falls powerhouse and dam, looking west.



Figure 17. Powell Falls powerhouse, looking southeast from water intake headworks.



Figure 18. Powell Falls powerhouse interior showing roof structure.

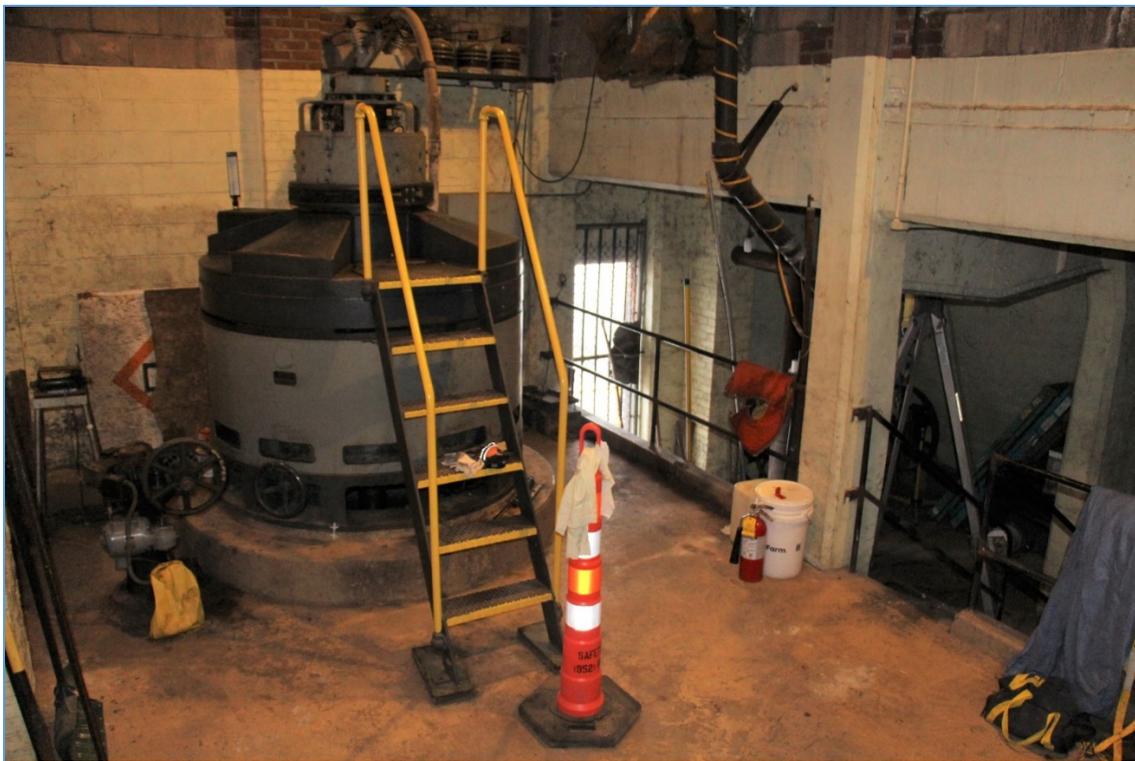


Figure 19. Powell Falls powerhouse interior showing single generator unit, looking west.

5. Conclusion

TRC completed an architectural resource survey and evaluation of the River Falls Hydroelectric Project (FERC No. 10489) on the Kinnickinnic River in River Falls, Pierce County, Wisconsin. The principal Project works consist of two developments, including the Junction Falls development and Powell Falls development. The purpose of this study was to survey historic architectural and engineering resources aged 50 years or older within the Project APEs, including both Project-related and non-Project-related facilities, and to evaluate their eligibility for listing in the NRHP.

Based on the results of the background research and survey, TRC recommends the Junction Falls and Powell Falls developments are not eligible for listing in the NRHP due to lack of historical significance and/or loss of integrity. As a result, TRC recommends the proposed FERC relicensing and decommissioning actions will have No Effect on historic architectural resources. TRC recommends no additional investigation of above-ground resources in connection with the proposed Project.

6. References

City of River Falls

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