

REVIEW OF APPLICATION FOR RE-CERTIFICATION BY THE LOW IMPACT HYDROPOWER INSTITUTE OF THE WARE HYDROELECTRIC PROJECT, LIHI #47

Prepared by Stephen Byrne

May 1, 2020

I. INTRODUCTION

This report summarizes the review findings of the application submitted by Ware River Power, Inc. (Applicant) to the Low Impact Hydropower Institute (LIHI) for re-certification of the Ware River Hydroelectric Project FERC P-3127 (Project). The Project was first Low Impact Certified as LIHI #47 on August 24, 2009. The Project is located on the Ware River at river mile 12 in Ware, MA, along Route 9. The Project operates in a run-of-river mode.

On February 21, 2020 LIHI received a complete application for Low Impact Recertification of the Project. Since the previous certification in 2014, a material change at the Project included replacing the then 250-kW unit with a new 280-kW unit and installing a new minimum flow unit (unit 6) in early 2020. There have also been material changes in the LIHI Criteria and certification process since the Project was last certified, in that an updated Certification Handbook has been published by LIHI. This current review was made using the new 2nd Edition LIHI Certification Handbook (Revision 2.04, April 1, 2020).

II. PROJECT'S GEOGRAPHIC LOCATION

The Ware River Project is located beside Route 9 in the town of Ware and consists of two dams (one upstream and one downstream dam), three powerhouses (two upstream and one downstream), and 6 turbines – three units in one upper dam powerhouse, one unit in the adjacent upper dam powerhouse and two units including a new minimum flow unit in the lower powerhouse (Figure 1).

The Ware River flows southwest through the middle of the state and joins the Quaboag River at Three Rivers, Massachusetts, to form the Chicopee River on its way to the Connecticut River. There are five dams upstream of the Project with the closest dam (the Wheelwright Pond Dam) located about 7 miles upstream in the village of Wheelwright. There are approximately nine dams downstream of the project before the Connecticut River confluence. Two of these dams are on the Ware River and six are on the Chicopee River, including the LIHI Certified Red Bridge #96, Collins #88, Putts Bridge #102 and Indian Orchard #112.

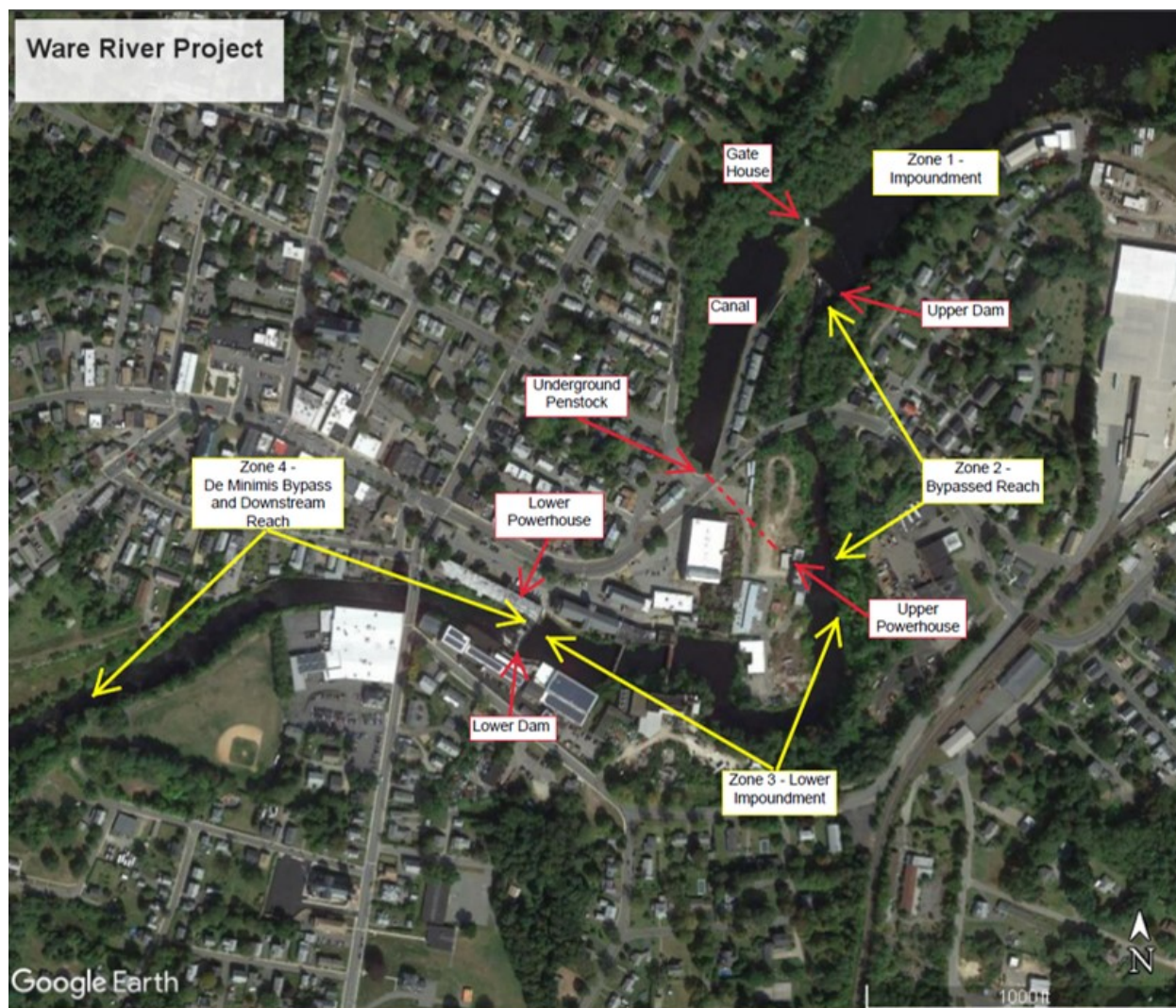


Figure 1 – Ware Hydroelectric Project

III. PROJECT AND IMMEDIATE SITE CHARACTERISTICS

The upper dam was built between 1880 and 1882 and is approximately 115 feet long and 34 feet high with 1-foot tall flashboards and a spillway crest elevation of 463.8 feet median sea level (MSL). The upper impoundment has a surface area of 39.5 acres with a storage capacity of 746 acre-feet. The dam consists of a concrete-capped main spillway with a higher concrete spillway extension to the right (facing downstream) separated by a concrete wall. There is an emergency spillway left of the dam and an outlet gate house to a canal at the right of the dam, all connected by either concrete or stone walls. The concrete emergency spillway left of the main spillway is 16 feet in length with a crest elevation of 466.9 feet MSL. A wooden gate house is located at the right of the spillways and forms the inlet to a 45-acre-foot capacity holding pond. Water in the holding pond is conveyed through two penstocks to the two powerhouses associated with the upper development. Units 1, 2 and 5 are contained in a single powerhouse while unit 4 is in a separate

adjacent powerhouse. Trashrack clear spacing at the upper development is 1.75 inches.

The lower development consists of a 110-foot-long 15-foot-high concrete capped cut granite dam, a 10-acre reservoir with a total storage capacity of approximately 90-acre feet, two 6-foot diameter, 70-foot-long steel penstocks, a mill/powerhouse containing two turbine generators, the tailrace canal and a 23-kV transmission line that is shared with the upper development. The lower dam is seated on top of a natural falls with a combined head of about 17 feet. The intake structure is located adjacent to the right abutment, perpendicular to the river flow and conveys water into two 7-foot diameter penstocks and the two turbines. The two penstocks convey the flow into the first pressure case (Unit 3), where a portion of the flow passes through the first unit and flows out its draft tube. The remaining water flows through a short, 3-foot 5-inch diameter spool piece, into the second pressure case. It flows through the second unit (Unit 6, the new minimum flow unit) into its draft tube. The two flows combine and pass out of the discharge pit through a tailrace archway, back into the Ware River, near the base of the lower dam. Trashrack clear spacing at the lower development is 1.5 inches. The Project generates approximately 5,000 MWh annually.

IV. ZONES OF EFFECT AND STANDARDS SELECTED

Four Zones of Effect (ZOE) were designated by the Applicant and were determined to be appropriate. Their locations are shown in Figure 1.

Table 1 shows the Standards selected for each criterion for the four ZOE's. Where applicable, reviewer recommendations for alternate standards are shown in **red**.

V. REGULATORY AND COMPLIANCE STATUS

The Project was issued an exemption from the licensing requirements of part I of the Federal Power Act by the Federal Energy Regulatory Commission (FERC) in 1982. The Applicant is required however, to adhere to the standard license articles listed in the exemption order and any mandatory terms and conditions filed by state and federal resource agencies. By letter dated September 11, 1981, the U.S. Fish and Wildlife Service (FWS) required a minimum instantaneous bypass reach flow of 20 cubic feet per second (cfs). FERC issued a Compliance Order on November 23, 1994 in response to apparent insufficient minimum flow releases at the Project and required the modification of Project operations in a manner that would ensure the release of an instantaneous flow of 83 cfs below the Project, or inflow whichever is less, and an instantaneous flow of 20 cfs in the bypassed section of the Ware River.

Since the initial LIHI certification and as a result of an agreement with Massachusetts Division of Fisheries and Wildlife (MDFW), minimum stream flow at the Project has been voluntarily increased by the Applicant over and above the FERC required 20 cfs to 26.8 cfs. This represents a 34% increase. The continuous release of 26.8 cfs over the upper dam plus leakage flow from the four turbines in the upper development and flashboard leakage ensures the release of 90-100 cfs downstream of the Project at all times, including during full station shutdown.

Table 1. Standards Matrix for the Ware River Hydroelectric Project.

		<i>CRITERION and STANDARD SELECTED</i>							
Zone No., Zone Name, and Standard Selected (including PLUS if selected)	River Mile at upper and lower extent of Zone	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>	<i>G</i>	<i>H</i>
		Ecological Flows	Water Quality	Upstream Fish Passage	Downstream Fish Passage	Shoreline and Watershed Protection	Threatened and Endangered Species	Cultural and Historic Resources	Recreational Resources
1: Upper dam impoundment	12.5 - 12.0	1	1	1	1	1	1, 2	1	1
2: Upper dam bypassed reach	12.0 – 11.75	2	1	1	1	1	2	1	1
3: Lower dam impoundment	11.75 – 11.5	2	1	1	1	1	2	1	1
4: Lower dam tailrace/downstream area	11.5 – 10.9	2	1	1	1	1	2	1	1

From 2016 to 2017, the Applicant filed amendment applications with FERC that proposed upgrades at the lower development including replacing the then 250-kW turbine/generator unit with a new 280-kW unit and installing a new minimum flow unit (Unit 6). By order dated August 18, 2017, FERC approved the proposed amendments and in part, required that the Applicant comply with the terms and conditions filed by FWS on January 27, 1982 as amended by a letter filed on July 6, 2016, that include: (1) a provision to provide fish-passage facilities at the Project when MDFW implements plans to restore anadromous fish runs through the Project area; (2) operation of the Project in an instantaneous run-of-river mode; (3) provide angler access to the Project waters; (4) conduct a post-amendment water quality monitoring survey; (5) develop an instantaneous run-of-river operations and monitoring plan; and (6) comply with the terms and conditions filed by the MDFW filed on April 22, 2016 that include a state-listed species protection plan.

VI. PUBLIC COMMENT RECEIVED OR SOLICITED BY LIHI

The application was posted for public comment on February 25, 2020 and the notice was forwarded to agencies and stakeholders listed in the application. The deadline for submission of comments on the LIHI certification application was April 25, 2020. No formal comments were submitted. No additional outreach to agencies or stakeholders was conducted.

VII. DETAILED CRITERIA REVIEW

A. ECOLOGICAL FLOW REGIMES

Goal: The flow regimes in riverine reaches that are affected by the facility support habitat and other conditions suitable for healthy fish and wildlife resources.

Assessment of Criterion Passage: The Applicant has appropriately selected Standard A-1, Not Applicable/De Minimis Effect for the impoundment ZOE and Standard A-2 Agency Recommendation for the bypassed reach, lower impoundment, and downstream reach ZOEs.

The Project operates in a run-of-river mode. Water levels above the dam are not drawn down for purposes of generating power. Run-of-river operations may be modified temporarily if required by operating emergencies beyond the operator's control or for short periods upon mutual agreement between the owner and FWS and MDFW. Units 4 and 5 on the upper dam and Unit 3 on the lower dam are controlled automatically with direct pond leveling controls.

As mentioned previously, the minimum bypass flow of 20 cfs at the facility has been voluntarily increased by the Applicant to 26.8 cfs. Minimum stream flow is met at the upper dam by a 10-foot wide x 12-inch high opening in the upper flashboards that is monitored by pond leveling sensors that control turbine actuation. The continuous release of 26.8 cfs over the dam plus leakage flow from the four turbines in the upper development and flashboard leakage ensures the release of 90-100 cfs downstream of the Project at all times, including a full station shutdown. The minimum required base flow below the Project is 83 cfs, the approximate aquatic base flow. In case of low pond levels, an automatic dialer notifies operators via cell and pager

communications of a low pond level scenario. If a response is not delivered manually, the station trips offline before a violation of minimum stream flow occurs.

In 2015 FERC issued a memorandum that informed the exemptee that FERC no longer required annual certification of minimum flows but that the exemptee must continue to file reports, with the Commission, of all deviations that occur throughout the year, within the required reporting time. A review of the Project's eLibrary record during the current LIHI certification period (August 24, 2014 – present) did not identify any non-compliance issues related to ecological flows. Similarly, a review of annual LIHI compliance letters did not identify any non-compliance issues related to ecological flows.

In response to the Applicant's 2016 and 2017 amendment application, FWS filed conditions pursuant to Section 30(c) of the Federal Power Act. Condition 5 requires the Applicant to develop a plan to monitor and maintain instantaneous run-of-river operations at the Project for the purpose of minimizing impoundment fluctuations and thereby protecting littoral habitats and maintaining the natural magnitude and periodicity of flows in the Ware River downstream of the Project's two developments. The Applicant reported to LIHI that there were no changes to their existing run-of-river maintenance monitoring plan as a result of the amendment. The upper development still operates under the agreed upon stipulations between MDFW and the Applicant, as a result of the original LIHI application and approval.

Based on my review of the application, supporting documentation, and publicly available information, the Project is operated in a manner that flows support habitat and other conditions suitable for healthy fish and wildlife resources. As such, the Project continues to satisfy the Ecological Flow Regimes criterion. However, because the 2017 FERC amendment incorporated FWS' Section 30(C) Condition 5, a condition is warranted (see Section VIII).

B. WATER QUALITY

Goal: Water Quality is protected in waterbodies directly affected by the facility, including downstream reaches, bypassed reaches, and impoundments above dams and diversions.

Assessment of Criterion Passage: The Applicant appropriately selected Standard B-1, Not Applicable/De Minimis Effect for all ZOE's.

Project waters are designated as Class B waters by Massachusetts Department of Environmental Protection (MDEP). The 2016 Massachusetts Integrated List of Waters Report¹ lists the Ware River segment ID No. MA36-05 (Wheelwright Pond Dam to Ware Dam) as impaired due to *Escherichia Coli* (*E. Coli*) and segment ID No. MA36-06 (Ware Dam downstream to Thorndike Dam) as impaired due to *E. Coli* and fecal coliform.

The Project was not issued a Water Quality Certificate at the time of FERC exemption. By letter dated October 19, 2019, Robert Kubit of MDEP informed the Applicant that the Department does not possess water quality data collected from the immediate Project area, but does have data

¹ <https://www.mass.gov/doc/final-massachusetts-year-2016-integrated-list-of-waters/download>

collected from the river segment extending 7.7 miles upstream of the dam and he does not believe the Ware Project causes or contributes to the presence of pathogens in the river. He additionally stated that the Department believes that the presence of illicit connections and/or hook-ups to storm sewers and urban stormwater runoff is likely the cause for the upstream waters Primary Contact Recreational Use assessment being considered impaired due to pathogens.

The run-of-river operation and continuous minimum flow releases minimize the potential for Project-related water quality impacts and the noted impairments are not due to Project operations.

In response to the Applicant's 2016 and 2017 amendment application material, FWS filed conditions pursuant to Section 30(c) of the Federal Power Act. Condition 4 requires the Applicant to conduct post-upgrade water quality monitoring for up to three years beginning during the first low-flow season after the new and replaced turbines become operational, which occurred in early 2020. If results indicate that the Project is not meeting water quality standards, Condition 4 also requires that the Applicant implement mitigation measures sufficient to achieve applicable standards.

Based on my review of the application, supporting documentation, and publicly available information, the Project continues to satisfy this criterion. However, because the post-upgrade water quality monitoring data would be collected during the next LIHI certification period and could lead to currently undescribed mitigation measures to achieve applicable water quality standards, a condition is warranted (see Section VIII).

C. UPSTREAM FISH PASSAGE

Goal: The facility allows for the safe, timely, and effective upstream passage of migratory fish. This criterion is intended to ensure that migratory species can successfully complete their life cycles and maintain healthy, sustainable fish and wildlife resources in areas affected by the facility.

Assessment of Criterion Passage: The Applicant appropriately selected Standard C-1, Not Applicable/De Minimis Effect for all ZOE's.

The only migratory species that may exist in the Project area is American eel. However, there are numerous hydropower projects downstream of the Project in the Chicopee River Watershed before the confluence with the Connecticut River, and none have upstream fish or eel passage. The Ware River Project is required under the 2017 FERC amendment to implement fish passage if, and when, MDFW determines a need for passage. To date, MDFW has not indicated a need for passage at the Project.

Based on my review of the application, supporting documentation, and publicly available information, the Project continues to satisfy the Upstream Fish Passage criterion.

D. DOWNSTREAM FISH PASSAGE AND PROTECTION

Goal: The facility allows for the safe, timely, and effective downstream passage of migratory fish. For riverine (resident) fish, the facility minimizes loss of fish from reservoirs and upstream river reaches affected by Facility operations. All migratory species are able to successfully complete their life cycles and to maintain healthy, sustainable fish and wildlife resources in the areas affected by the Facility.

Assessment of Criterion Passage: The Applicant appropriately selected Standard D-1, Not Applicable/De Minimis Effect for all ZOE's.

Fish species in the Project area generally are representative of a warmwater fishery and include stocked trout, fallfish, yellow perch, yellow bullhead, common shiner, golden shiner, spot-tailed shiner, bluegill, redbreast sunfish, pumpkinseed, longnose dace, black nose dace, tessellated darter, chain pickerel, rock bass, white sucker, eastern and largemouth bass. None of these species require passage to complete their lifecycle. As noted for the Upstream Fish Passage criterion, the only migratory species that may occur in the Project area is American eel, but none of the dams upstream of the Project have fish passage structures.

Since the previous LIHI certification there has been a material change at the Project that included replacing the then 250-kW unit with a new 280-kW unit and installing a new minimum flow unit (unit 6) and well as replacement trashracks at the lower development. The new 50-foot-wide, 10-foot-deep trashrack with 1.5-inch clear-spacing replaced the previous 30-foot-wide, 10-foot-deep trashrack, also with 1.5-inch clear-spacing. The new trashrack is 200 square feet larger than the previous trashrack, and the approach velocity is 0.85 feet per second, compared to the previous approach velocity of 0.90 feet per second, both of which are lower than the FWS guideline of 2 feet per second. The slightly decreased approach velocity further minimizes fish entrainment at the Project. As noted in FERC's 2017 amendment order:

“The larger trashrack structure and new orientation would enhance the trashrack’s ability to shed debris by increasing the sweeping velocity across the face of the trashrack while maintaining essentially the same approach velocity. The increased sweeping velocity and the low approach velocity may enhance the effectiveness of the structure at preventing fish from entering the power canal, thereby reducing the potential for fish entrainment and subsequent potential for turbine mortality.”

In addition, the bypass minimum flow provides a route for downstream passage through the Project. Based on my review of the application, supporting documentation, and publicly available information, the Project continues to satisfy the Downstream Fish Passage criterion.

E. SHORELINE AND WATERSHED PROTECTION

Goal: The Facility has demonstrated that enough action has been taken to protect, mitigate and enhance the condition of soils, vegetation and ecosystem functions on shoreline and watershed

lands associated with the facility.

Assessment of Criterion Passage: The Applicant appropriately selected Standard E-1, Not Applicable/De Minimis Effect in all ZOE's.

There are no specific agency recommendations and the Project does not have, nor is it required to have, a watershed or shoreline protection plan. There are no lands of ecological significance in the Project boundary. The upper powerhouses are located in a small metal building with little to no land surrounding it and the lower powerhouse is located within a mill building. Land use in the bypassed reach, lower impoundment and downstream reach ZOE's is considered non-residential. Land use in the upper impoundment ZOE consists of residential and non-residential uses immediately upstream of the dam on the left descending bank and forests along both shorelines of the remaining portion of the impoundment. The run-of-river operations also minimize shoreline impacts including erosion. Since the Project is in the center of the Town of Ware, terrestrial wildlife resources are limited. The Applicant reported that no large mammals and some populations of small mammals consisting of rabbits, muskrats and mice.

Based on my review of the application, supporting documentation, and publicly available information, the Project continues to satisfy the Shoreline and Watershed Protection criterion.

F. THREATENED AND ENDANGERED SPECIES PROTECTION

Goal: The facility does not negatively impact federal or state listed species.

Assessment of Criterion Passage: The Applicant appropriately selected Standard F-2, Finding of No Negative Effects for the bypassed reach, lower impoundment and downstream reach ZOE's. The standards matrix included in the recertification application lists Standard F-1, Not Applicable/De Minimis Effect for the impoundment ZOE, however the narrative in section 3.7 of the application applies Standard F-2 to the impoundment ZOE. This review finds Standard F-2 is appropriate for the impoundment ZOE.

Based on a FWS IPAC review of the Project area, the Northern long-eared bat is the only federally-listed species (Threatened) potentially in the area. However, due to the urban nature of the Project area, the species is unlikely to be present and Project operation and maintenance activities are likely to have minimal if any effect on Northern long-eared bat.

By a letter dated April 22, 2016, MDFW filed comments on the Applicant's proposed turbine upgrades and stated that the Lower Ware Dam and the Ware River downstream of the dam are mapped as Priority and Estimated Habitat for three freshwater mussel species: Creeper (*Strophitis undulatus*), Brook Floater (*Alasmidonta varicosa*), and Triangle Floater (*Alasmidonta undulata*), that are protected pursuant to the rare species provisions of the Massachusetts Wetlands Protection Act (310 CMR 10.59) and the MA Endangered Species Act (MESA, 321 CMR 10.00). Brook floater is state-listed as endangered, creeper is an unlisted species of special concern and triangle floater is also unlisted but included as a species of greatest conservation

need in the Massachusetts Wildlife Action Plan².

In the 2017 FERC amendment proceedings, MDFW recommended a state-listed species protection plan be developed to protect the state-listed mussel species during any impoundment drawdown events. MDFW recommended the following provisions be included in plans associated with any future drawdown events: (1) develop maximum allowed outflow during drawdowns from the Lower Ware Dam to ensure downstream habitats are not impacted; (2) ensure the dam passes minimum flow from Lower Ware Dam during drawdowns; and (3) if state-listed species are detected in the lower or upper impoundments, then the [Applicant] shall engage a qualified mussel-biologist to develop and implement a protection plan to salvage and relocate state-listed species associated with drawdowns. MDFW also noted that the increase in the Project’s hydraulic capacity will reduce spill over the lower dam, but because the Project tailrace is at the toe of the dam this will have no adverse effect on the fish or wildlife resources downstream.

Based on my review of the application, supporting documentation, and publicly available information, I find that the Project continues to satisfy the Threatened and Endangered Species criterion. However, because the downstream ZOE is considered Priority and Estimated Habitat for state-listed mussel species that could be affected by future Project drawdown events during the next LIHI Certification period, a condition is warranted (see Section VIII).

G. CULTURAL AND HISTORIC RESOURCE PROTECTION

Goal: The facility does not unnecessarily impact cultural or historic resources that are associated with the Facility’s lands and waters, including resources important to local indigenous populations, such as Native Americans.

Assessment of Criterion Passage: The Applicant appropriately selected Standard G-1, Not Applicable/De Minimis Effect for all ZOE’s.

The Ware Historic Mill Yard was listed on the National Register of Historic Places in 1986. There are no archeological sites of historic value in the area of the hydro plants according to the Massachusetts Historical Commission (MHC). In its 2017 comments on the Applicant’s proposed turbine upgrades, the MHC recommended that FERC make a finding of “no adverse effect” while evaluating the potential impacts of the proposed upgrades. There are no exemption requirements related to cultural or historic resources.

Based on a review of the FERC eLibrary and the annual compliance submittals to LIHI, there do not appear to be any concerns about Project operation and maintenance on cultural or historic resources. Based on my review of the application, supporting documentation, and publicly available information, the Project continues to satisfy the Cultural and Historic Resource Protection criterion.

² <https://www.mass.gov/service-details/state-wildlife-action-plan-swap>

H. RECREATIONAL RESOURCES

Goal: The facility accommodates recreation activities on lands and waters controlled by the facility and provides recreational access to its associated lands and waters without fee or charge.

Assessment of Criterion Passage: The Applicant appropriately selected Standard H-1, Not Applicable/De Minimis Effect for all ZOE's.

No formal recreation facilities are included in the Project. Greenville Park (owned and maintained by the Town of Ware) is located in the impoundment ZOE and provides recreation opportunities via a boat ramp to the impoundment. The park also provides residents, including handicapped residents with access to fishing piers, scenic trails, picnic areas, a ball field, basketball court and playgrounds. Veterans Memorial Field (also owned and maintained by the Town of Ware) is located on Monroe Street adjacent to the downstream ZOE and provides residents with access to a ballfield.

The recertification application notes that the Project area has limited recreational value and the stretch of the river immediately downstream of the upper dam is too steep with a rocky embankment that precludes access. The pond in the Ware Industrial Mill Yard is not accessible as it is surrounded by industrial buildings and shops. Other areas of the Project are restricted due to public safety.

In its exemption amendment order, FERC concluded that the 2017 proposed turbine upgrades would have no effect on recreational resources.

Based on my review of the application, supporting documentation, and publicly available information, the Project continues to satisfy the Recreational Resources criterion.

VIII. GENERAL CONCLUSIONS AND REVIEWER RECOMMENDATION

Based on my review, I believe that the Project meets the requirements of Low Impact Certification and recommend it be re-certified for a five-year period with the conditions noted below.

Condition 1: The facility Owner shall, within 6 months of recertification, consult with the U.S. Fish and Wildlife Service to determine if the instantaneous run-of-river monitoring and maintenance plan recommended by the Service per Section 30(C) of the Federal Power Act, and required by the FERC August 2017 Order Amending Exemption, is still necessary. The results of consultation shall be provided to LIHI in annual compliance submittals until the issue is closed. If the plan is not required, the Owner should file the agency concurrence with FERC within 3 months of that determination. If the plan is still required, the Owner shall, develop a draft plan for agency review and provide a copy of the final plan including any agency comments on the draft to LIHI within 60 days of plan completion.

Condition 2: The three-year post turbine upgrade water quality monitoring is scheduled to be performed beginning in 2020. The results of the monitoring studies along with any resource agency comments and any proposed mitigation that may be needed shall be provided to LIHI within 60 days of each annual study report's issuance. LIHI reserves the right to reassess or revoke certification based on the information provided.

Condition 3: Should drawdown events occur at the facility during the term of LIHI Certification for maintenance or emergency reasons, the facility Owner shall consult with MDFW and develop the required state-listed mussel species protection plan to protect state-listed mussels and their habitat. The Owner shall file copies of the plan and all agency consultation to LIHI within 60 days of MDFW approving the plan.

APPENDIX A – AGENCY CORRESPONDENCE



Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

Central Regional Office • 627 Main Street, Worcester MA 01608 • 508-792-7650

Charles D. Baker
Governor

Karyn E. Polito
Lieutenant Governor

Kathleen A. Theoharides
Secretary

Martin Suuberg
Commissioner

Nancy A. Brown
Ware River Power, Inc.
20 Common Street
PO Box 512
Barre MA 01005
Re: Request for Water Quality and Minimum Flow Status
Ware Upper and Lower Project, FERC #3127

October 21, 2019

Dear Ms. Brown,

In order to achieve certification from the Low Impact Hydropower Institute, Ware River Power, Inc. seeks a letter from the Massachusetts Department of Environmental Protection (Department) that discusses the water quality and the minimum flows at the Ware Upper and Lower Project impoundment, bypassed reach and tailrace.

Water Quality of Ware Upper and Lower Project Impoundment

The Department does not possess water quality data collected at the Project site; however, the Department does have data collected in the Project vicinity (river segment extending 7.7 miles upstream of the dam) and believes the presence of illicit connections and/or hook-ups to storm sewers and urban stormwater runoff is the likely cause for the upstream waters Primary Contact Recreational Use assessment being considered impaired due to pathogens. The Department believes the Project does not cause nor contribute to the presence of pathogens in the Project area.

Water Quality of Bypassed Reach to the confluence with the tailrace and Ware River

The Department does not possess water quality data collected at the Project site; however, the Department does have data collected in the Project vicinity (river segment extending 7.7 miles upstream of the dam) and believes the presence of illicit connections and/or hook-ups to storm sewers and urban stormwater runoff is the likely cause for the upstream waters Primary Contact Recreational Use assessment being considered impaired due to pathogens. The Department believes the Project does not cause nor contribute to the presence of pathogens in the Project area.

This information is available in alternate format. Contact Michelle Waters-Ekanem, Director of Diversity/Civil Rights at 617-292-5751.

TTY# MassRelay Service 1-800-438-2370

MassDEP Website: www.mass.gov/dep

Printed on Recycled Paper

Water Quality of Tailrace to the confluence with the bypassed reach and the Ware River

The Department does not possess water quality data collected at the Project site; however, the Department does have data collected in the Project vicinity (river segment extending 7.7 miles upstream of the dam) and believes the presence of illicit connections and/or hook-ups to storm sewers and urban stormwater runoff is the likely cause for the upstream waters Primary Contact Recreational Use assessment being considered impaired due to pathogens. The Department believes the Project does not cause nor contribute to the presence of pathogens in the Project area.

Minimum Flows of Bypassed Reach to the confluence with the tailrace and Ware River

The Department understands that the minimum flow is 20 cfs or inflow if less. We have no record that the Project has operated in non-compliance of the Project's minimum flow. The Department believes the Project complies fully with its FERC-mandated minimum flow requirement.

Minimum Flows of Ware Upper and Lower Project Impoundment and/or Tailrace to the confluence with the bypassed reach and the Ware River

The Department is unaware of any minimum flow requirement for the Ware Upper and Lower Project impoundment or the tailrace to the confluence with the bypassed reach and the Ware River. Accordingly, the Department expresses no position on these minimum flows.

If you have any questions, please contact me at 508-767-2854.

Sincerely,



Robert Kubit, P.E.
MA Department of Environmental Protection
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Commonwealth of Massachusetts

Division of Fisheries & Wildlife

Jack Buckley, Director

April 22, 2016

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E., Room 1A
Washington, DC 20426

Pioneer Hydroelectric Project, FERC No. 3127
Comments of the Massachusetts Division of Fisheries and Wildlife
INITIAL CONSULTATION DOC/DRAFT AMENDMENT APPLICATION (2/24/2016)

Dear Secretary Bose:

The Massachusetts Division of Fisheries and Wildlife (Division) is the agency responsible for the protection and management of the fish and wildlife resources of the Commonwealth. The Division is also responsible for the regulatory protection of imperiled species and their habitats as codified under the Massachusetts Endangered Species Act (M.G.L. c.131A). The MESA provides a framework for review of projects or activities that occur within mapped areas of the state, called *Priority Habitat*, and published in the Natural Heritage Atlas. The purpose of MESA is to conserve and protect state-listed rare species and their habitats. The MESA prohibits the “take” of any state-listed species, which is defined “in reference to animals, to harass, harm, pursue, hunt, shoot, hound, kill, trap, capture, collect, process, disrupt the nesting, breeding, feeding or migratory activity or attempt to engage in any such conduct, or to assist such conduct, and in reference to plants, to collect, pick, kill, transplant, cut or process or attempt to engage or to assist in any such conduct” (M.G.L. c. 131A § 1). As such, we monitor operations at hydroelectric projects within the Commonwealth, as well as comment on proposed hydroelectric facilities. The Division offers the following comments on the INITIAL CONSULTATION DOC/DRAFT AMENDMENT APPLICATION FOR THE PIONEER HYDROELECTRIC PROJECT (FERC No. 3127) dated February 24, 2016.

PROJECT DESCRIPTION

Pioneer Hydropower consists of an upper and lower project both of which are authorized under the same exemption, P-3127. No modifications to the upper project are proposed. The lower project is located on the Ware River in the Town of Ware, Hampshire County, Massachusetts. The project currently consists of (1) an existing 110 ft long 15 ft high concrete capped cut granite dam with 2 ft flashboards, (2) an existing 10-acre reservoir

www.mass.gov/masswildlife

Division of Fisheries and Wildlife
Field Headquarters, One Rabbit Hill Road, Westborough, MA 01581 (508) 389-6300 Fax (508) 389-7890

with a total storage capacity of approximately 90- acre ft, (3) two existing 6-ft diameter, 70 ft long steel penstocks, (4) a mill/powerhouse containing one turbine generator set, (5) tailrace canal and (6) an existing 23-kV transmission line that is shared with the upper project. The dam section is seated on top of a natural falls with a combined head of about 17 ft. The intake structure is located adjacent to the right abutment perpendicular to the river flow. The intake structure conveys water into two 7 ft diameter penstocks delivering it to the single existing unit. Following passage through the unit, flow exits directly back into the Ware River at the base of the dam. The mill/powerhouse is located immediately downstream of the dam on the right side of the river. Power is conveyed from the existing generator through a transmission line to the Upper Project. The existing generating equipment at the lower site consists of a single vertical Francis type turbine rated at approximately 250 kW.

PROJECT OPERATIONS

PROPOSAL

Proposed modifications to the lower project include:

- Upgrading the existing turbine
- Installing a minimum flow turbine
- Upgrading the trashrack

No modifications to the dam, reservoir, headgates, penstocks, tailrace, or transmission line will be made as part of this project.

The new proposed main turbine will consist of a 42 inch Leffel A Francis turbine. The turbine will have a maximum power output of approximately 280 kW and a hydraulic capacity of 220 cfs. The proposed minimum flow turbine will consist of a 24 inch Leffel Z Francis turbine. The turbine will have a maximum power output of approximately 110 kW and a hydraulic capacity of 121 cfs. The current authorized capacity of the Pioneer Hydroelectric Project (P-3127) is 1,800 kW. The upgraded project will have a total capacity of 1,940 kW.

The trashrack structure is approximately 30 ft wide and 10 ft deep with a 1.5 inch clear space. The proposed trashrack structure will be 50 ft in length, 10 ft deep and maintain the 1.5 inch clear spacing. There is a potential that a new automatic trashrack will be installed to further assist with debris handling. A one-time, 8 foot drawdown is proposed to facilitate installing the trashrack and other maintenance activities.

Endangered or Threatened Species, Critical Habitats

The Lower Ware Dam and the Ware River downstream of the dam are mapped as *Priority and Estimated Habitat* for the following state-listed and tracked species that are protected pursuant to the rare species provisions of the Massachusetts Wetlands Protection Act (310 CMR 10.59) and the MA Endangered Species Act (MESA, 321 CMR 10.00). These species are an important part of the 'aquatic ecosystem' in Waters of the United States.

Common Name	Scientific Name	Taxonomic Group	State Status	Location
Creeper	<i>Strophitus undulatus</i>	Freshwater Mussel	Special Concern	In Upper Impoundment*; Immediately Downstream of Lower Ware Dam
Brook Floater (Swollen Wedgemussel)	<i>Alasmidonta varicosa</i>	Freshwater Mussel	Endangered	Immediately Downstream of Lower Ware Dam
Triangle Floater	<i>Alasmidonta undulata</i>	Freshwater Mussel	SGCN, delisted from MESA**	Upper Impoundment*

*Observation of state-listed species greater than 25 years old

**SGCN species are Species of Greatest Conservation Need as described in the Massachusetts State Wildlife Action Plan (SWAP, <http://www.mass.gov/eea/agencies/dfg/dfw/wildlife-habitat-conservation/state-wildlife-conservation-strategy.html>). All species on the MESA list are SGCN, but the SGCN list includes many species that are not on the MESA list.

FISH AND WILDLIFE RESOURCES

The Ware River supports fish and aquatic resources, including a number of resident fish species. No anadromous or catadromous fish are known to be in the project area.

IMPACTS AND MITIGATION

The project operates in a true run-of-river mode, with inflow equal to outflow on an instantaneous basis. Maintaining natural flow through the project will continue protect the existing habitat which benefits fish and wildlife species. Downstream habitats also benefit from run-of-river operation. The resulting stable flow regime supports the riverine assemblage in the free-flowing sections of river below the project.

Although the hydraulic capacity of the project will increase, the velocity of water approaching the trashrack will decrease due to the new trashrack structure. The existing trashrack has an approach velocity of about 0.9 ft/sec. The approach velocity of the new intake structure (with increase in flow) is estimated at about 0.85 ft/sec, both are lower than the USFWS recommendation of 1.5 ft/sec or less.

As the tailrace discharges flow to the river channel at the toe of the dam, the project does not have a bypass reach or a bypass flow requirement. The proposed increase in project hydraulic capacity will reduce spill over the dam, but because the project tailrace is at the

toe of the dam this will have no adverse effect on the fish or wildlife resources of the Ware River.

COMMENTS

The only potential concerns with the proposed amendment relate to outflow rates and bypass minimum flow during any drawdowns (routine/maintenance or emergency) for state-listed species.

During the proposed, one-time 8 foot drawdown to install the new trashrack structure and conduct maintenance, Division staff will salvage and relocate any freshwater mussels exposed during the drawdown. Based on recent email correspondence with Hydropower Consulting Specialists, LLC on behalf of the Licensee, the initial drawdown can be conducted with an outflow that does not exceed generation flows. However, once the water surface is within 6-inches of the substrate, then the drawdown will need to slow down or pause to allow for the Division staff to salvage mussels. At this time, the Division anticipates allocating two days of search effort by three Division staff to conduct a salvaging operation. Pioneer Hydropower LLC has also offered to allocate several staff to assist in the mussel salvage effort.

For any future drawdowns, the Licensee shall develop a STATE-LISTED SPECIES PROTECTION PLAN with Division-consultation and approval to:

- a. Develop maximum allowed outflow during drawdowns from the Lower Ware Dam to ensure downstream habitats are not impacted.
- b. Ensure the dam passes minimum flow from Lower Ware Dam during drawdowns, and
- c. If state-listed species are detected in the lower or upper impoundments, then the Licensee shall engage a qualified mussel-biologist to develop and implement a protection plan to salvage and relocated state-listed species associated with drawdowns¹.

With these items addressed, the Division does not believe that the proposed changes to the project will adversely impact the fish and wildlife resources of the Ware River, and therefore does not oppose the proposal.

General

The Draft application is complete and provides the information required.

Specific

The flow duration curve (figure 1.) on page 5 is blank.

¹ Crescent Street Dam (FERC 14447) and the Holyoke Canals (Holyoke No. 1, No. 2, No. 3, FERC 2386, 2387 and 2388), among others, routinely conduct mussel sweeps associated with drawdown to protection and relocate mussels in dewatered areas.

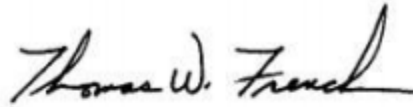
Thank you for this opportunity to comment.

Sincerely,



Caleb Slater, Ph.D.
Anadromous Fish Project Leader

Sincerely,



Thomas W. French, Ph.D.
Assistant Director for the Natural Heritage
& Endangered Species Program

cc: Melissa Grader, USFWS
Robert Kubit, MA DEP

 ORIGINAL



United States Department of the Interior

FISH AND WILDLIFE SERVICE

New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5087
<http://www.fws.gov/newengland>



In Reply Refer To: Pioneer Hydropower, LLC
Ware River Project; FERC No. 3127
COMMENTS ON PROPOSED TURBINE REPLACEMENT,
MINIMUM FLOW TURBINE INSTALLATION,
AND TRASHRACK UPGRADES

June 30, 2016

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E., Room 1A
Washington, DC 20426

FILED
SECRETARY OF THE
COMMISSION
2016 JUL - 6 P 3:06
FEDERAL ENERGY
REGULATORY COMMISSION

Dear Ms. Bose:

This is in response to the Federal Energy Regulatory Commission's (FERC) Notice of Application Accepted for Filing, dated May 24, 2016, for the Ware River Project (Project), located on the Ware River in Hampshire County, Massachusetts. This notice is being issued in response to an application by Pioneer Hydropower, LLC (Pioneer) to amend the project license to conduct turbine replacement, install a minimum flow turbine, and upgrade the existing trashrack structure at the Ware Lower development. The comments provided below are based on information contained in the January 27, 2016 amendment application, as well as Pioneer's April 22, 2016 response to FERC's Request for Additional Information, issued on March 22, 2016. We have reviewed the application and all relevant documents and offer the following comments.

BACKGROUND

Two project developments, Ware Lower and Ware Upper, are under the same FERC license number, although Ware Upper was issued an exemption on October 15, 1981, while Ware Lower was issued an exemption on February 12, 1982. By letter dated January 20, 1982, the U.S. Fish and Wildlife Service (Service) issued three mandatory terms and conditions for Ware Lower. Service conditions include: providing fish passage when prescribed by the Service and/or the Massachusetts Division of Fisheries and Wildlife; providing an instantaneous minimum discharge below the Project of at least 83 cfs, or inflow, whichever is less; and requiring the Exemptee to provide access to project waters for anglers, except where such access would risk personal safety.

Kimberly D. Bose, Secretary
June 30, 2016

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PROPOSAL

Existing Facilities

Ware Lower facilities include an existing 110-foot-long, 15-foot-high concrete dam with two-foot-high flashboards, two 6-foot-diameter, 70-foot-long steel penstocks, a mill/powerhouse containing a single Francis turbine generator with a maximum hydraulic capacity of 247 cfs, and a tailrace canal. The Project operates run-of-river and because the tailrace discharges at the base of the dam, there is no bypass reach.

Proposed Facilities

Pioneer would like to modify Ware Lower by replacing the existing vertical Francis turbine with a 42-inch Leffel A Francis turbine that would have a maximum hydraulic capacity of 220 cfs. The existing installed capacity is 250 kW and the capacity of the new Francis turbine is 280 kW. Additionally, Pioneer proposes to install a 24-inch Leffel Z minimum flow turbine, which will have a maximum hydraulic capacity of 121 cfs and a maximum power output of 110 kW.

In addition to replacing the existing turbine and installing a new minimum flow turbine, Pioneer proposes to install a new trashrack structure to replace the current one. The existing trashrack is 30 feet wide by 10 feet deep, whereas the proposed trashrack structure would be 50 feet long by 10 feet deep, but the new rack would maintain the same 1.5-inch-clear spacing. Pioneer also proposes to alter the rack orientation due to debris build-up, with the riverside end remaining in its existing location and the shore side end moved upstream. Further, Pioneer proposes to install a new automatic trashrake to assist with debris handling.

COMMENTS

General

While some issues with the amendment proposal have been clarified by Pioneer's response to FERC's request for additional information issued on March 22, 2016, the following still needs to be addressed:

- the turbine summary table indicates the maximum hydraulic capacity of both the existing and proposed turbine units; however, the minimum hydraulic capacity is needed and should be included for both the existing and proposed turbines.

Description of Operations

Automatic Control System

Pioneer proposes to use an electronic process controller and sensor to automatically maintain run-of-river operation. The controller sends proportional open and close commands to the turbine gate actuator to provide turbine flow rates that maintain an impoundment elevation equal to or

Kimberly D. Bose, Secretary
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greater than the set point. The Service supports this type of system, as presently the exemption does not include flow monitoring and compliance provisions.

As part of a prior amendment of exemption proceedings for Ware Upper, Pioneer was required to develop a flow monitoring and compliance plan and the Service believes that a similar plan should be developed as part of this amendment proceeding. Herein, the Service is providing a condition requiring Pioneer to develop an Operations and Flow Monitoring Plan that specifies how the system operates, how it will be maintained, how data will be recorded and stored, and the process for providing those data to resource agencies.

Water Quality and Quantity

A review of 102 years of flow data from USGS Gage No. 01173500 (Gibbs Crossing) was completed to understand how spill conditions over the Lower Ware Dam would change under Pioneer's proposal. Under existing conditions, spill occurs 254 days per year, on average. However, due to the wider operating range of the two proposed turbines, spill would only occur 75 days per year, on average. Given the dramatically reduced percentage of time the Project would be spilling water, the Service believes water quality could be impacted at this site (i.e., lower dissolved oxygen levels due to reduced re-aeration created via spill). Therefore, the Service is adding a condition requiring Pioneer to conduct a post-upgrade water quality monitoring study.

Run-of-River Operation

The original exemption application and a number of post-exemption submittals have maintained that the Project operates in an instantaneous run-of-river manner. However, the existing terms and conditions do not explicitly require this mode of operation. In order to avoid confusion, as well as to better align with the proposed and actual mode of operation, we hereby modify mandatory Condition No. 2 to clarify that the mode of operation should be instantaneous run-of-river.

MODIFIED TERMS AND CONDITIONS

Pursuant to 18 CFR 4.106(b), any case-specific exemption from licensing granted for a small hydroelectric power project requires inclusion in the exemption of all terms and conditions that are prescribed by state and Federal fish and wildlife agencies to prevent loss of, or damage to, fish and wildlife resources, and to otherwise carry out the purposes of the Fish and Wildlife Coordination Act.

By letter dated January 20, 1982, the Service provided terms and conditions for the Project. However, based upon the proposed changes Pioneer is seeking through this amendment to exemption proceeding, the Service has determined that one condition (Condition 2) should be amended and two more added (new Conditions 4 and 5) to any amendment issued by FERC for the Ware Lower Project.

Kimberly D. Bose, Secretary
June 30, 2016

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2. The Exemptee shall operate the Project in an instantaneous run-of-river mode, whereby inflow to the Project will equal outflow from the Project at all times and water levels above the dam are not drawn down for the purpose of generating power. Run-of-river operation may be temporarily modified if required by operating emergencies beyond the control of the Exemptee, or for short periods upon mutual agreement between the Exemptee, the U.S. Fish and Wildlife Service, and the Massachusetts Division of Fisheries and Wildlife.
4. The Exemptee shall conduct a post-upgrade water quality monitoring survey. The survey protocol shall be developed in consultation with, and require approval by, the U.S. Fish and Wildlife Service and the Massachusetts Department of Environmental Protection. Data shall be collected for up to three (3) years, and shall be initiated the first low-flow season after the turbines become operational. If results indicate that the Project is not meeting water quality standards, the Exemptee shall implement mitigation measures sufficient to achieve applicable standards.
5. The Exemptee shall, within six (6) months of the date of issuance of an amendment of the exemption, develop a plan for maintaining and monitoring instantaneous run-of-river operation at the Project. The plan shall be developed in consultation with, and require approval by, the U.S. Fish and Wildlife Service and the Massachusetts Department of Environmental Protection. The plan shall include a description of the mechanisms and structures that will be used, the level of manual and automatic operation, the methods to be used for recording data on run-of-river operation, an implementation schedule, and a plan for maintaining the data for inspection by the U.S. Fish and Wildlife Service, the Federal Energy Regulatory Commission, and the Massachusetts Department of Environmental Protection.

In conclusion, we note that the Service, in general, supports replacing or upgrading old units with newer, more efficient turbines that typically have wider operating ranges and can better track inflow conditions. Further, we do not object to increasing capacity at existing projects if it can be done without adverse environmental impact, as that represents an opportunity to increase renewable energy while improving the ability of the Project to maintain true (i.e., instantaneous) run-of-river operation. Our concern here (and at all hydropower projects) is that the Project operate with minimal environmental impact. Our amended terms and conditions address the concerns we describe above relative to potential impacts of the proposed project upgrade. Costs associated with implementing these reasonable measures should be more than offset by the increased generation potential of the site under the new configuration (i.e., increased capacity and wider operating range).

Kimberly D. Bose, Secretary
June 30, 2016

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Please feel free to contact Ms. Julianne Rosset of this office at (413) 548-8002, extension 8120, if you have any questions regarding this matter.

Sincerely yours,



Acting
for:

Thomas R. Chapman
Supervisor
New England Field Office