

October 19, 2023

FERC Project 2572

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

Electronically Filed

Subject: Ripogenus Project, FERC No. 2572; Interim Plan for Aquatic Resource Protection during McKay Station Outages

Dear Secretary Bose:

Great Lakes Hydro America, LLC (GLHA), licensee for the Ripogenus Project (Project) located on the West Branch of the Penobscot River in Maine (West Branch), submits this letter in reply to Commission correspondence dated August 22, 2023, in which the Commission requests that GLHA propose interim protection measures for West Branch aquatic resources that would prevent or minimize adverse environmental effects at the Project. Specifically, the Commission requests that GLHA:

“consult with the FWS, Maine DIFW, Maine DEP, and Maine LURC to identify measures aimed at reducing the instances of fish and macroinvertebrate strandings downstream of McKay Station during downramping events, such as unit outages, until the current relicensing process is concluded.”

The Commission further requests that GLHA submit the proposed interim protection measures (as agreed upon by the resource agencies) within 90 days (or by November 20, 2023), including a plan and schedule for implementing the measures.

Background

The issue of providing flows to the West Branch during outages of McKay Station is not new, and dates back to at least the early 1990's and the previous relicensing of the Project. On May 3, 1991, and following extensive consultation with resource agencies, Great Northern Nekoosa Corporation (“Great Northern”, licensee for the Project at the time) filed a *Plan for Providing Minimum Flow* (“1991 Plan”) to the Commission that detailed the proposed use of a braking system to provide a flow of approximately 400 cfs during outages at McKay Station. Prior to that, the Ripogenus Project FERC license (dated December 20, 1968) only required that a minimum flow of 200 cfs be provided below McKay Station to protect fishery resources. As detailed in the 1991 Plan, the braking system operated by automatically closing the wicket gates when a station trip occurred, which in turn slowed the turbines until the brakes (which were clamped to the turbine shaft discs) could bring them to a complete stop. Once the turbines stopped, the wicket gates automatically reopened to 8 – 9% gate, which allowed approximately 400 cfs to pass while the brakes held the turbines in a stationary position. Testing of the system, as detailed in the 1991 Plan, demonstrated that it took approximately 20 minutes for this system to release the full 400 cfs to the West Branch below McKay Station following a station outage.

The 1991 Plan described six station outages that occurred between 1988 and 1990 at the Ripogenus Project, which in large part prompted the development of the automated system for providing flows from McKay Station during an outage. Great Northern promoted this method of providing a 400 cfs outage flow to the West Branch as a significant improvement over historical practices, which for many years had involved dispatching a dam tender to open a gate at Ripogenus Dam, a process that typically took much longer than 20 minutes to restore flows to the river below McKay Station (especially if the dam tender was not in the immediate area). This was due to the time needed for the dam tender to drive to Ripogenus Dam, conduct the siren procedure (to warn any recreationists in the Upper Gorge), and then open a gate. Additionally, water travel time was entailed with this process, as flow releases from the dam must first pass through the ¾-mile long Upper Gorge before they reach McKay Station in order to benefit downstream aquatic resources.

Great Northern detailed the benefits of the braking system in the 1991 Plan, first and foremost pointing out that it was an automated system that was able to release flows directly into the West Branch at McKay Station, rather than manually from the upstream dam using a dam tender. In addition, the system greatly enhanced public safety (specifically for any recreationists that may be in the Upper Gorge downstream of Ripogenus Dam) and the protection of West Branch aquatic resources. Great Northern further stated in the 1991 Plan that its fisheries consultants supported the proposed system as a significant enhancement over existing conditions, with the consultants stating that it would not adversely affect the West Branch fishery if the system operated as described. The 1991 Plan also indicated that the Maine Department of Inland Fisheries and Wildlife concurred with the assessment of Great Northern's fisheries consultants regarding the benefits of the automated flow release system to the West Branch fishery. The Commission approved this enhanced system for providing minimum flows and incorporated the 400 cfs minimum outage flow as a requirement in the 1996 FERC license.

As detailed in correspondence to the Commission dated December 30, 2016, GLHA implemented remedial measures in 2016 to improve the braking system after it malfunctioned during a May 13, 2016, outage at McKay Station. GLHA stated that a high-water level in the Ripogenus impoundment likely contributed to the malfunction due to the increased forces needed to brake and stop the units under the greater head. The remedial measures included the addition of a second braking system to increase the clamping forces on the turbine units, replacement of all air and oil piping to the units, and periodic cleaning and inspection of the brake pads and discs. In addition, GLHA stated that it would keep a sluice gate open at Ripogenus Dam until testing could be performed at a high impoundment level to demonstrate that the system would function properly during subsequent station outages.

On June 29, 2017, GLHA provided an update to the Commission after testing was performed at a high impoundment level. The testing demonstrated that the minimum flow braking system passed about 350 cfs at an impoundment level that was just under one foot below full pond. In order to ensure that the 400 cfs minimum flow would be passed during a station outage, GLHA stated that it would open the dam's log sluice when the impoundment level exceeded 930.8 feet (about 10.8 feet below full pond). The Commission accepted these modifications for providing the 400 cfs outage flow on September 18, 2017.

Since the modified operational procedure for braking the units required that flow be released from the dam, and since the use of the braking system was undesirable due to the significant forces that must be overcome to stop the units, GLHA began working in 2017 to develop and test an alternative system for providing the 400 cfs minimum flow during an outage. This system, which involved spinning (rather than braking) of the units to pass flow, was successfully tested and found to provide higher outage flows (an estimated 479 cfs) versus the 350 cfs released using the modified braking system. Thus, and as a result of the successful testing that was performed on all three hydro units at McKay Station, the modified system to pass minimum flows at the Ripogenus Project by spinning (rather than braking) the units was implemented on February 9, 2018, and the log sluice gate was closed.

On February 16, 2018, GLHA provided an update to the Commission regarding this improved system for releasing minimum flows during outages of McKay Station. On February 26, 2018, the Commission acknowledged (via e-mail) the improvements that GLHA had made to the outage flow system and stated that the release of minimum flow by spinning (rather than braking) the units met the outage flow license requirement. Since then, minimum outage flows (calculated at around 500 cfs, depending on the Ripogenus impoundment water level) have been successfully provided during station trips via the automated method of spinning the units.¹

Agency Consultation

The required agency consultation to identify measures aimed at reducing the instances of fish and macroinvertebrate strandings downstream of McKay Station during unit outages was initiated with a Teams call on October 4, 2023 between GLHA, the Maine Department of Environmental Protection (Maine DEP), the Maine Land Use Planning Commission (Maine LUPC, formerly the Maine Land Use Regulation Commission), and the United States Fish and Wildlife Service (USFWS). The Maine Department of Inland Fisheries and Wildlife was invited, but was not able to participate. GLHA emphasized the following points during this call:

- Public safety must continue to be the foremost consideration for any protection measures for fish and macroinvertebrates that are identified.
- The 1991 Plan should be utilized as a basis for identifying protection measures, as it evaluated various options for providing outage flows and had the same basic purpose (i.e., how to protect West Branch aquatic resources during McKay Station outages) that the Commission is requesting of GLHA today.
- The current Commission and agency-approved approach of providing flows directly through the units at McKay Station during an outage has been in place for over 30 years; the initial implementation of this approach in 1991, coupled with the improvements made in 2018, have enhanced the licensee's ability to quickly release outage flows into the West Branch, and thus, they have presumably enhanced protection measures for fish and macroinvertebrates during station outages over pre-1991 conditions.
- Since the October 2022 fish stranding study (which simulated a station outage) demonstrated that fish and macroinvertebrate impacts still do occur when McKay Station trips offline, GLHA intends to continue its focus on reducing the frequency and durations of these station outages.

¹ GLHA notes that the flow being passed through the units during an outage cannot be further increased due to the risk of the units going into a speed no load condition, which would damage the units.

The resource agencies were in general agreement with these points, especially the need to prioritize public safety for any interim protection measures that are identified. They further suggested that GLHA consider a continuous flow release from Ripogenus Dam as an interim protection measure and a synchronized bypass valve at McKay Station as a potential long-term measure. GLHA expressed concern with a continuous flow release, noting that (1) the amount of flow necessary to protect fish and macroinvertebrates during an outage is unknown and unproven, (2) a continuous flow release could potentially attract recreationists into the hazardous Upper Gorge area downstream of Ripogenus Dam, and (3) the water release could result in lower Ripogenus impoundment water levels, thereby potentially impacting impoundment stakeholders. GLHA further noted that the synchronized bypass valve approach was considered and dismissed in the 1991 Plan.

On October 19, 2023, GLHA distributed a draft of this Interim Plan for agency review (see attached).

Interim Plan for Reducing Fish and Macroinvertebrate Strandings

During the current interim period prior to issuance of a new license for the Ripogenus Project, GLHA proposes to (1) continue the current approach of automatically releasing flows directly through the units at McKay Station during an outage, (2) implement measures to improve system reliability, (3) continue its ongoing long-term maintenance and upgrade project for the Ripogenus transmission line, and (4) retain an engineering consultant to update the 1991 Plan based on current technology.

Automatic Unit Flow Releases during McKay Station Outages

When an outage occurs at McKay Station, each of the three units are programmed to automatically pass flows to the West Branch downstream of the Station. The sequence of events when an outage occurs are as follows:

- Each of the units receives a shutdown command via the Station's programmable logic controller (PLC).
- The wicket gates and inlet gate dow valves for each of the units close.
- Once the PLC receives confirmation that the valves have closed, the wicket gates automatically open to a 13% gate position and the dow valves reopen.

Together, these steps take just a few minutes to occur, and they result in an outage flow of approximately 500 cfs (160 cfs through both Unit 1 and Unit 2, and 190 cfs through Unit 3).

System Reliability

Reducing the overall number of system trips would greatly improve existing conditions by directly reducing the number of minimum flow events. GLHA intends to implement a relay coordination study, with the intent being to reconfigure system relays in order to improve transmission and generation protection. This will increase the stability and reliability of the system, thereby minimizing outages at McKay Station due to system trips at other interconnected facilities (which typically result from lightning strikes and local utility outages, either of which can "ripple through" GLHA's generating stations on the upper Penobscot). GLHA proposes to reconfigure the system relays by March 31, 2024.

GLHA also intends to install a back-up PLC system at McKay Station (by September 30, 2024), which will also improve system reliability and reduce station outages by enabling PLC functions to continue should the primary PLC crash or malfunction.

Transmission Line Maintenance

Since 2008, GLHA has implemented a long-term plan for repairing and upgrading the Ripogenus Project transmission line. The primary purpose of this work is to minimize outages of McKay Station caused by transmission line failures. In general, the work is targeted and prioritized to specific support structures (poles and crossarms) based on periodic inspections aimed at identifying wood rot and structure damage (primarily from woodpeckers). GLHA intends to continue this long-term maintenance plan on an annual basis, which has been effective in reducing outages at McKay Station (i.e., no station outages have occurred due to transmission line failure since a cross arm failed on the Ripogenus Project transmission line in May of 2016).

Update of 1991 Plan for Providing Minimum Flow

The 1991 Plan was developed following several unplanned outages at McKay Station that caused flows to drop below the 200 cfs minimum flow that was in place at the time. Great Northern stated that their purposes for developing the 1991 Plan were to improve methods for providing the existing 200 cfs minimum flow and to lay out a means for releasing a higher flow (400 cfs) during unplanned outages for the term of a new FERC license.

The consultants retained by Great Northern evaluated three basic alternatives in the 1991 Plan for providing unplanned outage flows:

- Alternative 1 - automation of a gate at Ripogenus Dam (to reduce the delay caused by the time needed to dispatch a dam tender to manually open a gate).
- Alternative 2 – installation of a bypass pipe and valve, either at the end of the tunnel that provides flows to the station turbines, or off of the penstock for Unit #1.
- Alternative 3 - passing flow through the turbines by using existing Dow valves and wicket gates and by applying brakes to prevent turbine rotation.

Alternative 1 was eliminated, as Great Northern concluded that automated gate operation would create an unacceptable public safety risk, while Alternative 2 was ruled out due to the numerous mechanical and civil limitations, along with significant construction and operation issues. As indicated previously, Alternative 3 was found to be feasible, and it was implemented in 1991.

As indicated during the October 4, 2023, agency consultation meeting, GLHA proposes to reevaluate the 1991 Plan based on current technology to determine if the Alternative 3 approach (i.e., automatically passing flow through the units) remains the preferred option for providing flows to the West Branch during unplanned outages of McKay Station. The results of this updated alternatives analysis will be provided to the Commission by September 30, 2024.

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Sincerely,

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