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May 8, 2017

Dr. Michael J. Sale
Senior Technical Advisor
Low Impact Hydropower Institute

Subject: Recertification Recommendation for the Putnam Hydroelectric Facility (FERC #5645, LIHI #03)

Dr. Sale:

This letter contains my Phase II Recertification Review of the Putnam Hydroelectric Facility, the oldest certified facility in LIHI's portfolio. I completed a thorough review of the application materials and the public record for this Facility, and am recommending recertification for one new, five-year term. I am also recommending removal of the two existing conditions from the certificate, based on the Connecticut Department of Energy and Environmental Protection's approval of the eel passage system installed at the site (the basis for the original conditions.)

Please contact me if you have any questions.

Sincerely,

Peter Drown, President
Cleantech Analytics LLC

I. Background

The 600-KW Putnam Hydroelectric Facility ("Facility") is located on the Quinebaug River in Putnam, Connecticut. Project works include a 14.5 foot-high, 145 foot-long stone block dam, with a powerhouse at the west abutment containing two identical vertical axis Francis Turbines operating in a Run-of-River mode and generating approximately 2,800 MWh annually. There is no bypassed reach as the powerhouse is adjacent to the dam, and the small impoundment has a surface area of approximately two acres. The project is located between two FERC-licensed hydroelectric facilities – 750 feet downstream of MSC Hydroelectric Project (FERC #5689) and 2,500 upstream of Cargill Falls (FERC #13080.) The Facility was initially constructed in 1919, and currently operates under the Terms and Conditions contained in a FERC Exemption issued July 6, 1982 (FERC #5645.) Putnam Hydropower Inc. (the "Owner") owns and manages the site, which consists of the longest continuously-certified Low Impact project in LIHI's portfolio. The Facility was initially certified in April 2002, and was re-certified in May 2007 and August 2012. On December 29, 2016, Putnam Hydropower, Inc. submitted a timely application for Recertification. This application review for recertification was conducted using the new, 2nd Edition Handbook that was published in March 2016.

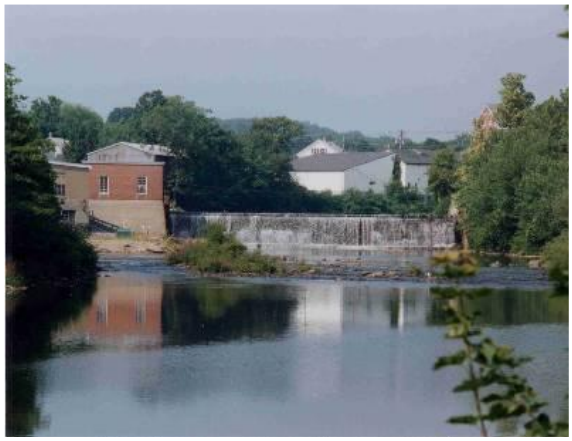


Figure 1 – Putnam Dam and Powerhouse (facing upstream)

Figure 2 - Putnam Facility Aerial View (facing upstream)

II. Recertification Standards

On September 21, 2016, LIHI notified the Owner of upcoming expiration of the most recent term for the Putnam Hydroelectric Facility. The letter included an explanation of procedures to apply for an additional term of certification under the 2nd Edition LIHI Handbook, including the new two-phase process starting with a limited review of a completed LIHI application, focused on two questions:

> "(1) Has there been a material change in the operation of the certified facility since the previous certificate term began? and
> (2) Has there been a change in LIHI criteria since the certificate was issued?

If the answer to either question is "Yes," the Application must proceed through a second phase, which consists of a more thorough review of the application using the LIHI criteria in effect at the time of the recertification application. The letter noted that "because the new Handbook involves new criteria and a new process, the answer to question two for all projects scheduled to renew in 2017 will be an automatic 'YES.' Therefore, all certificates applying for renewal in 2017 will be required to proceed through both phase one and phase two of the recertification application reviews."

This Report comprises the Phase Two Review.

III. Adequacy of the Recertification Package

I completed the Phase I Review of the Recertification Application on February 21, 2017, and noted several deficiencies for the Owner to resolve in the Stage II Application. The Owner provided supplemental documents on March 9, 2017, including supporting data, maps and photographs. The Owner states there have been "no physical changes in the environmental conditions in the facility design or operation…[or] environmental conditions in the project vicinity since the 2012 LIHI review." To verify this, I have reviewed the application package, supporting comments and documentation and public records on FERC e-library posted since the original certification report (McIlvaine, July 2012). I also independently verified the submitted criteria and standards were appropriate given the changes in the 2nd edition LIHI handbook.

The application was public noticed and received no comments. I solicited comments from the Connecticut Department of Environmental Protection on March 22, 2017, and have not received any response as of this date.

IV. There have not been any "material changes" at the facility that would affect recertification, and the Owner successfully met both conditions during the most recent term.

I have reviewed the application package, supporting comments and documentation and public records on FERC e-library posted since the most recent re-certification report (McIlvayne, 2012). I also independently verified the submitted criteria were appropriate given the changes in the 2nd edition LIHI handbook.

In accordance with the Recertification Standards, "material changes" mean non-compliance and/or new or renewed issues of concern that are relevant to LIHI's criteria. Based on my review of materials provided, review of FERC's public records, and consultation with the noted individuals, I found that there are no areas of noncompliance or new or renewed issues of concern. The previous LIHI certificate included two conditions:

- *The Project shall initiate discussions with the USFWS and CTDEEP in 2012 to develop a plan to initiate voluntary nightly (dusk to dawn) shutdown of the units on rainy days between the dates of September 1 and November 15. If necessary to provide safe eel passage, and if consistent with other protection measures required for other facilities on the River, the plan shall also investigate the need for an additional "plus two days" of nightly unit shut-down after the rain event. Annual reports documenting these shutdown periods shall be submitted to the CTDEEP and LIHI.*

- *Within year three of receiving LIHI recertification, the Project shall enter into discussions with CTDEEP and USFWS to review the potential need for additional eel passage protection measures beyond those already established. This review would take into consideration the existence of downstream passage on dams upstream and downstream of the Putnam Project to ensure that any additional eel passage requirements would be consistent with measures required of other dams on the Quinebaug River. LIHI shall be provided a copy of any final agreements established to either remain with the existing measures or to add additional measures.*

These conditions were required in response to requests by resource agencies to provide for safe and effective eel passage at the Facility. In compliance with these Conditions, the Owner has adopted a voluntary operational regime that includes seasonal shutdowns to allow eel passage. Furthermore, Putnam installed a "Delaware-style Eel Pass" at the project at the recommendation by CTDEEP. The as-built installation was approved by Tim Wildman from CTDEEP on October 31, 2016 (see Attachment 1)[1]. Given the measures taken and corresponding

[1] On March 22, 2017, I contacted Steve Gephard and Tim Wildman from CTDEEP to solicit any additional comments on this re-certification, and did not receive a response. As a result, I rely on the October 31, 2016 comment in my review as this consists of the most recent agency communication.

approval from CTDEEP, I believe the Facility has successfully met both LIHI conditions by establishing physical and operational measures to protect eel passage.

V. LIHI certification criteria are satisfied in all zones

In my opinion, the Owner properly selected 1 Zone of Effect for the Facility. There is no bypassed reach, a very minimal impoundment area, and the Facility operates in true run-of-river mode due to both regulatory requirements and physical constraints (i.e., water level is maintained at the flashboard crest and the negligible storage capacity of impoundment maintains equilibrium naturally.)

Figure 3 - Zone of Effect

Criterion	Standard Applied
Ecological Flow Regimes	2 – Agency Recommendation
Water Quality	1 – N/A De Minimis
Upstream Fish Passage	2 – Agency Recommendation
Downstream Fish Passage	2 –Agency Recommendation
Watershed and Shoreline Protection	1 – N/A De Minimis
Threatened and Endangered Species Protection	1 – N/A De Minimis
Cultural and Historic Resources Protection	1 – N/A De Minimis
H Recreational Resources	3 – Assured Accessibility

Table 1 - Standard Selection Matrix

A. *Ecological Flow Regimes* – the Owner properly selected Standard A2 (Agency Recommendation) for this criterion. As mentioned above, run-of-river operation is maintained to protect aquatic life. Head pond levels are logged by a programmable logic controller (PLC) control system, and impoundment level is maintained at the flashboard crests. Upstream Army Corps flood control operations regulate flows to this section of the Quinebaug River. The Owner submitted annual minimum flow compliance statements with FERC up until 2015, when they were informed that they no longer have a requirement to do so.
B. *Water Quality* – the Owner properly selected Standard B2 (Not Applicable/De Minimis) for this criterion. Although the Quinebaug River above and below the Facility are impaired, the Facility is not the cause. Brian Emerick from CT DEEP concluded on August 29th, 2001 letter: "The Quinebaug River above and below the project has been identified and listed as water quality impaired under section 303(d). The Putnam Hydropower project does not contribute to this water quality impairment." Given the date of this letter, I reviewed the Connecticut 2016 Integrated Water Quality Report for this stretch (ID # CT3700-00_05), and confirmed that the impairment is due to other causes (stormwater, remediation, municipal discharges, etc.) and not the existence of the hydropower facility[2].
C. *Upstream Fish Passage* – The Owner properly selected Standard C2 (Agency Recommendation) for this criterion. There are no anadromous fish in this Zone, and state resource agencies have confirmed these species were prohibited from reaching this section of the Quinebaug River by a natural falls located downstream of the Facility. During the most recent LIHI certification term, the Connecticut DEEP recommended the Owner install a "Delaware Style Eel Passage" system to promote upstream eel passage (catadromous species). In addition, the Owner has adopted a voluntary operational regime that includes seasonal shutdowns to promote effective eel passage. The Owner provided a letter from CTDEEP approving the as-built eel passage.
D. *Downstream Fish Passage* – The Owner properly selected Standard D2 (Agency Recommendation) for this

[2] http://www.ct.gov/deep/lib/deep/water/water_quality_management/305b/2016_iwqr_draft.pdf (pg. 214-215)

criterion. The only downstream fish passage recommendation is seasonal shutdowns to promote effective passage. The Owner is in compliance with this recommendation.

E. *Watershed and Shoreline Protection* – The Owner properly selected E1 (Not Applicable/De Minimis) for this criterion. The Owner described the shoreline as following: "The small project area does not have lands of ecological value. The very small impoundment is in an urban area with steep, rocky, and walled sides." It is clear from aerial photographs that the Zone of Effect is indeed in an urban area. There are no Shoreline Management Plans in place under the Exemption.

F. *Threatened and Endangered Species* – The Owner properly selected Standard F1 (Not Applicable/De Minimis) for this criterion, and provided a map showing definitively that there are no State or Federal T&E species present in the Facility's vicinity (see Attachment 1.)

G. *Cultural and Historic Resources Protection* – The Owner properly selected Standard 1 (Not Applicable/De Minimis) for this criterion, and provided a 2002 letter from the State Historic Preservation Officer stating "the proposed undertaking will have no effect on historic, architectural, or archaeological resources listed on or eligible for the National Register of Historic Places."

H. *Recreation* – The Owner properly applied Standard H-3 (Assured Accessibility) for this Zone of Effect, and stated they "allow casual fishing access in the project area, and intend to continue doing so." Boating is not possible due to dams immediately upstream and downstream of the Facility.

VI. Conclusion

In my opinion, the materials provided and referenced above are sufficient to make a recertification recommendation, and no further application review is needed. In conclusion, I recommend Recertification of the Putnam Hydroelectric Facility to one new, five-year term. I also found the Owner has successfully met both conditions from the most recent re-certification and no new conditions are required.

Please contact me if you have any questions.

Sincerely,

Peter R. Drown, President
Cleantech Analytics LLC

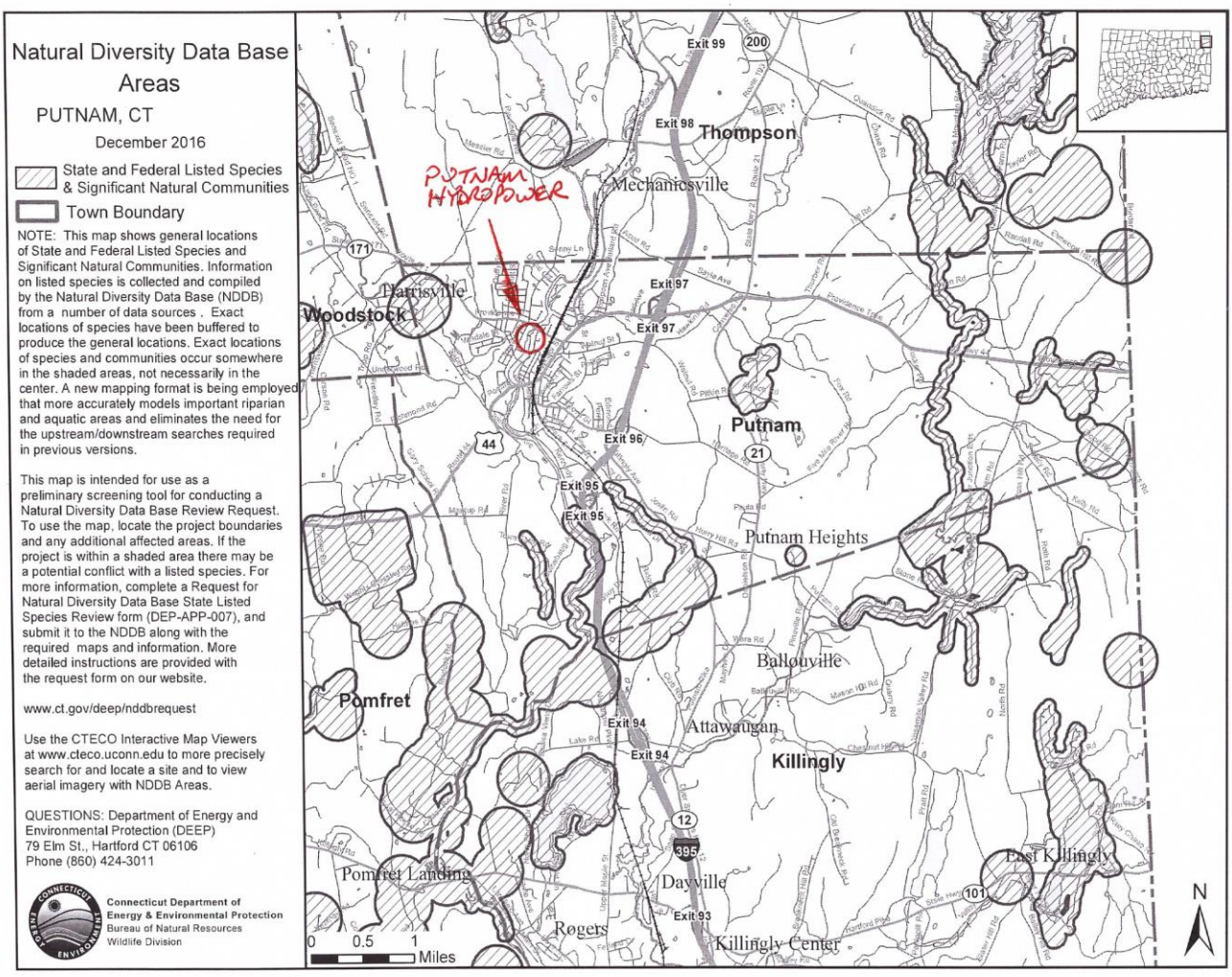
Attachment 1
Agency and Owner Communications

Date: March 22, 2017
Contact: Steve Gephard and Tim Wildman, Inland Fisheries Division
Agency: Connecticut Department of Energy and Environmental Protection

I reached out to Gephard and Wildman to solicit comments on this facility, and as of this date have not received a reply. Wildman did approve the as-built eel passage facility in 2016 (see October 31, 2016 comment below,) and the Owner has adopted a voluntary operational regime that includes seasonal shutdowns to allow eel passage, as requested by Gephard.

Date: December 2016
Contact: None
Agency: Connecticut Department of Energy and Environmental Protection

Upon the Stage I Intake Review request, the Owner conducted a T&E Species evaluation and confirmed there are no T&E species present in the Facility vicinity.



Date: October 31, 2016
Contact: Timothy Wildman
Agency: Connecticut Department of Energy and Environmental Protection

Charles Rosenfield

From: Wildman, Timothy <Timothy.Wildman@ct.gov>
Sent: Monday, October 31, 2016 10:23 AM
To: 'Charles Rosenfield'
Subject: RE: Eel ladder

That looks great Charlie; thanks.

Tim

-----Original Message-----
From: Charles Rosenfield [mailto:putnamhydro@charter.net]
Sent: Sunday, October 30, 2016 11:00 AM
To: Wildman, Timothy <Timothy.Wildman@ct.gov>
Subject: Eel ladder

Tim-
See attached photo of chain eel ladder now installed in Putnam.
Photo was taken at below normal pond level with no flow over the spillway.
I believe this will be superior to netting.
Charlie Rosenfield
Putnam Hydropower