Peter Drown
Cleantech Analytics
6717 Cub Run Court
Centreville, VA 20121

April 3, 2017

Dr. Michael J. Sale
Executive Director
Low Impact Hydropower Institute

Subject: Recertification Recommendation for the Winooski 8 Hydroelectric Facility (FERC #6470, LIHI #77)

Dr. Sale:

This letter contains my recommendation for Recertification of the Winooski 8 Hydroelectric Facility (the "Facility"). I am recommending the Facility be re-certified for one new, five-year term.

However, one comment submitted by Vermont Department of Fish and Wildlife included a statement that gave me some initial pause in this recommendation and should be considered by LIHI in the final certification decision. This comment is provided in Attachment 1 and addressed in Section V of my report.

Please contact me if you have any questions.

Sincerely,

Peter Drown, President
Cleantech Analytics LLC

I. Background

The 890 KW Winooski 8 Hydroelectric Facility ("Facility") is located on the Winooski River in East Montpelier, Vermont. Project works include a 227 foot-long and 26 foot-high dam that forms an impoundment with a surface area of approximately 7 acres, an integrated intake and powerhouse structure containing three submersible adjustable propeller tur bines for a total installed capacity of 890 KW, and appurtenant structures. The Facility is located approximately 21 miles downstream of the Marshfield #6 hydroelectric project, and 10.6 miles upstream of the Middlesex #2 hydroelectric project, both owned by Green Mountain Power. This stretch of the Winooski River is designated as "Good" water quality, and meets all standards for designated uses. The Facility received a FERC License on August 29, 1983, and was originally certified as "Low Impact" on February 28, 2011. Winooski 8 is owned and operated by the Winooski Hydroelectric Company, and generates approximately 3,500 MWh/year. On November 2, 2016, Mathew Rubin submitted a timely application for Recertification. This review for recertification was conducted using the new, 2nd Edition Handbook that was published in March 2016.

Figure 2. Winooski 8 Vicinity (Aerial view)

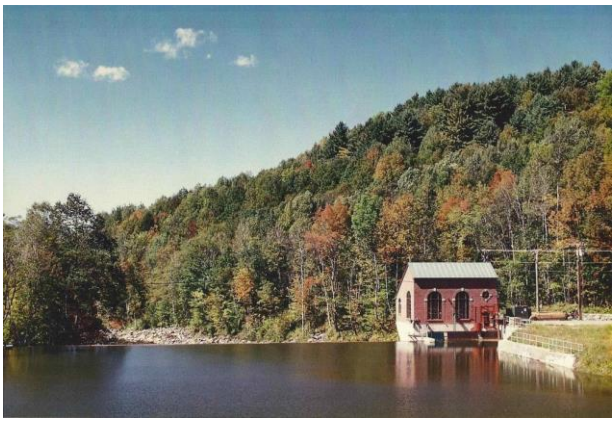
Figure 1. Winooski 8 (Impoundment facing downstream)

II. Recertification Standards

On December 22, 2015[1], LIHI notified the applicant of upcoming expiration of the Low Impact Hydropower Institute certification for the Winooski 8 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?
(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 2016 will be an automatic 'YES.' Therefore, all certificates applying for renewal in 2016 will be required to proceed through both phase one and phase two of the recertification application reviews." I completed the Phase I Review on December 8, 2016, noting several deficiencies and areas to resolve in an updated Phase II Application. This report comprises the Phase II review.

[1] The project was later granted two 3 month extensions, with the final LIHI certificate expiration date occurring in March 31, 2017.

III. Adequacy of the Recertification Package

On February 10, 2017, the Owner provided supplemental information based on the deficiencies I identified during my Phase I Review. I have reviewed the application package, supporting comments and documentation from LIHI conducted during compliance reviews and conducted a full review of public records on FERC e-library since the most recent LIHI recertification (10/03/2011, Jackie Dingfelder). I have also solicited comments from state resource agencies, including Vermont Department of Environmental Conservation and Vermont Department of Fish and Wildlife. In my opinion, the materials provided and referenced above are sufficient to make a recertification recommendation, although I was unable to definitively conclude that Standard D1 – downstream fish passage – was met due to comments provided by VDFW.

The application was public noticed and received no public comments during the comment period.

IV. There have been no "material changes" at the facility that would affect recertification

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. The Applicant provided an updated Recertification Application which stated that there were no material changes in the facility design or operation since the most recent LIHI review, and no changes in environmental conditions for the project. 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.

V. LIHI certification criteria are satisfied in all zones

The Owner appropriately selected three Zones of Effect for this project, including an impoundment zone, bypassed reach zone, and downstream regulated reach zone.

Figure 3 - Zone 1 (Downstream Reach)

Figure 4 - Zone 2 (Bypassed Reach) and Zone 3 (Impoundment)

A. ***Ecological Flows*** – The Facility operates in a strict run-of-river mode where Owner provides 25 cfs minimum flow (or inflow to the reservoir, whichever is less,) to the 200' bypassed reach by a minimum flow turbine, which is designed to protect a fishery associated with a plunge pool at the base of the dam. Although the original License recommended a fish panel excavation channel if project operations are shown to impair passage of fish during periods of low flow, no such modification was ever deemed necessary by the resource agencies. A topographic survey of the bypassed reach conducted during licensing showed that neither the pool depth nor the area around that would be significantly reduced by the passage of lower-than-natural

flows. The VDEC conducted a review of operations records from the Owner as part of this LIHI review, and determined that the project is operating in full compliance with all conditions (See Attachment 1.)

B. ***Water Quality*** – In the supplemental information submitted on February 10, 2017, the Owner appropriately selected Standard 2 – Agency Recommendation for all Zones, for reasons that are substantially the same as the Flows Criterion above. However, in a comment submitted by the Vermont Department of Fish and Wildlife (VDFW), the Agency stated that the Facility created "degraded aquatic habitat conditions, may increase water temperatures, disrupt sediment transport processes, and requires routine drawdown and dredging." However, no conditions were recommended, and the VDEC found the project to be in full compliance with all existing conditions contained in the Water Quality Certificate issued for the Facility. Furthermore, VDFW provided no data to support this conclusion, and in fact the published record arrives at a different conclusion. This section of the Winooski River (VT08-07) is classified as "Good" in the most recent (2014) Waterbody Quality Assessment Report and attaining all uses, including aquatic biota, wildlife and aquatic habitat[2]. In the *Winooski River Basin Water Quality Management Plan* published in May 2012 by the Vermont Department of Natural Resources, the Agency specifically states: *"only the [hydropower] facilities noted on the 2010 List of Priority Surface Waters Outside The Scope of the Clean Water Act § 303(D) Part F (see Table 9) are responsible for an impairment to the river segment used by the facility."* Winooski 8 is specifically excluded from that list (see page 9-10 of the report[3].) In conclusion, I find that the selection of Standard B2 – Agency Recommendation, is appropriate for all Zones. Evidence of compliance is clearly stated by the VDEC (see Attachment 1.)

C. ***Upstream Fish Passage*** – There are no upstream fish passage facilities at the Facility, and none have ever been required. The VDFW did not recommend the Owner install upstream passage in their comments submitted on March 10, 2017. The Owner appropriately selected Standard C1 – Not Applicable/De Minimis for all Zones.

D. ***Downstream Fish Passage*** – There are no downstream fish passage facilities at the Facility, and none have ever been required. The Owner selected Standard C1 – Not Applicable/De Minimis for all Zones. This Standard requires that: *"For riverine fish populations that are known to move downstream, explain why the facility does not contribute adversely to the sustainability of these populations or to their access to habitat necessary for successful completion of their life cycles."* I posed this precise question to VTDEC, who then passed it to VDFW. The VDFW did not recommend the Owner install downstream passage in their comments submitted on March 10, 2017, however they did note that the existence of the dam represents a barrier to resident fish species, including rainbow and brown trout. However, since the Agency did not provide any recommendation, I cannot reach a definitive conclusion on this criterion. I recommend LIHI make a determination about whether this Facility passes this criterion.

E. ***Watershed and Shoreline Protection*** – This Facility occupies ~2 miles of shoreline along the Winooski River, in a developed area. U.S. Route 2 runs along the south side, a Kubota equipment dealer abuts the project in both Zones, and a Ford dealership and regional high school are also in the immediate area. There are no Shoreline Management Plans. The Owner appropriately selected Standard E1 – Not Applicable/De Minimis for this criterion.

F. ***Threatened and Endangered Species Protection*** – I conducted a review using Vermont BioFinder and Vermont Natural Resource Atlas and did not identify any threatened and/or endangered species in the Facility's vicinity. The Owner appropriately selected Standard F1 – Not Applicable/De Minimis for this criterion.

G. ***Cultural and Historic Resources Protection*** – The Owner stated: "*There are no cultural or historic resources present on facility lands that can be potentially threatened by construction or operations of the facility, or facility operations have not negatively affected those that are present, either recently or in the past."* I did not find any record to suggest otherwise in my review of public records. The Owner appropriately selected Standard G1 – Not Applicable/De Minimis for this criterion.

---

[2] https://ofmpub.epa.gov/waters10/attains_waterbody.control?p_au_id=VT08-07&p_cycle=2014&p_state=VT&p_report_type=

[3] http://dec.vermont.gov/sites/dec/files/wsm/mapp/docs/mp_basin8final.pdf

H. ***Recreational Resources*** – The Owner provides free public access to the Facility's land and waters for recreational purposes, as required in Article 13 of the License. This includes an annual "Fiddlehead Slalom," a canoe race on a stretch of Class II+ whitewater stretch of the river in East Montpelier below the Winooski 8 dam. The Owner has committed to "*provide Assured Accessibility at no charge or fee to public interest groups and individuals for recreational use of lands and waters of the Facility."* The Owner appropriately selected Standard H3 – Assured Accessibility for this criterion.

VI. Conclusion

In conclusion, I recommend Recertification of the Winooski 8 Hydroelectric Facility to one new, five-year term. However, I was unable to definitively conclude that Standard D1 – downstream fish passage – was met due to comments provided by VDFW.

Please contact me if you have any questions.

Sincerely,

Peter R. Drown, President
Cleantech Analytics LLC

Attachment 1
Agency and Applicant Communications

Date: March 31, 2017
Contact Person: Eric Davis, River Ecologist
Agency: Vermont Department of Environmental Conservation

Gmail Peter Drown <peter.drown@gmail.com>

2 Vermont Hydro Projects (LIHI Recertifications)

Davis, Eric <Eric.Davis@vermont.gov> Fri, Mar 31, 2017 at 10:28 AM
To: Peter Drown <peter.drown@cleantechanalytics.com>
Cc: "Crocker, Jeff" <Jeff.Crocker@vermont.gov>

Good morning Peter,

I wanted to circle back with you on the Winooski-8 project. The Agency requested and received operations records from the Applicant to evaluate compliance with certification conditions as part of its LIHI review process. As a result of this review, the Agency determined that the project is operated in full compliance with its certification conditions.

In regards to fish passage, the Agency has not requested fish passage measures be implemented at the Winooski-8 project to date. Our regional fisheries biologist provided additional comments regarding the impact of the project on fish movement and aquatic habitat, which are attached.

Thanks,

Eric Davis, *River Ecologist*

1 National Life Drive, Main 2

Montpelier, VT 05620-3522

802-490-6180 / eric.davis@vermont.gov
http://www.watershedmanagement.vt.gov/rivers

(Please note my new e-mail address, effective July 27, 2015)

VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION
WATERSHED MANAGEMENT DIVISION
RIVERS PROGRAM

See what we're up to on our Blog, Flow.

Date: March 10, 2017

Contact Person: Rich Kirn, Fisheries Program Manager
Agency: Vermont Department of Fish and Wildlife

From: Kirn, Rich
To: Davis, Eric; Ladago, Bret
Subject: RE: 2 Vermont Hydro Projects (LIHI Recertifications)
Date: Friday, March 10, 2017 7:30:31 AM

Winooski 8 - Although there are other dams in the vicinity, this project also creates a movement barrier for resident fish species including wild rainbow trout and brown trout. In addition, the large impoundment creates degraded aquatic habitat conditions, may increase water temperatures, disrupt sediment transport processes, and requires routine drawdown and dredging.

Rich Kirn
Fisheries Program Manager
Vermont Department of Fish and Wildlife
3902 Roxbury Road
Roxbury, VT 05669
(802) 485-7566
rich.kirn@vermont.gov

From: Davis, Eric
Sent: Monday, March 06, 2017 1:22 PM
To: Kirn, Rich; Ladago, Bret
Subject: FW: 2 Vermont Hydro Projects (LIHI Recertifications)

Rich and Bret,

We had an inquiry from LIHI regarding fish passage for a pending re-certification of Winooski-8. I've looked through our records, and it doesn't appear that the Agency has ever contemplated fish passage at this project, nor commented on it for the project's initial certification. We really defer to DFW on passage, so I'd be interested in your thoughts on the question posed by the LIHI reviewer below.

Thanks!
-E

From: Crocker, Jeff
Sent: Friday, February 24, 2017 5:35 PM
To: Davis, Eric <Eric.Davis@vermont.gov>
Subject: Fwd: 2 Vermont Hydro Projects (LIHI Recertifications)

FYI-could you follow up on this.

Sent from my iPhone

Begin forwarded message:

From: Peter Drown <peter.drown@cleantechanalytics.com>

Date: February 24, 2017 at 4:09:32 PM EST
To: <jeff.crocker@vermont.gov>
Subject: 2 Vermont Hydro Projects (LIHI Recertifications)

Hi Jeff,

I'm assisting Low Impact Hydro Institute with recertification reviews for 2 projects in your state, and am hoping you can provide a brief comment. In your agency's view, do either of these facilities contribute adversely to the sustainability of local fish populations or to their access to habitat necessary for successful completion of their life cycles?

The projects are:

Winooski 8 (Winooski River, FERC #6470)
Size: 890KW
Town: East Montpelier, VT
No fish passage facilities currently

Slack Dam (Black River, FERC #8014)
Size: 400KW
Town: Springfield, VT
Downstream fish bypass sluice

Your comments are appreciated!

Thanks and have a great weekend.

--
Peter Drown | President
Mobile: (207) 951-3042

Skype: peter.r.drown