Great River Hydro

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March 23, 2018

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

Re: Great River Hydro, LLC's March 8, 2018 Updated Study Results Meeting Summary Project Nos. 1892-026, 1855-045, and 1904-073

Dear Secretary Bose:

Great River Hydro, LLC ("Great River Hydro") is the owner and licensee of the Wilder Hydroelectric Project (FERC No. 1892), the Bellows Falls Hydroelectric Project (FERC No. 1855), and the Vernon Hydroelectric Project (FERC No. 1904). The current licenses for these projects each expire on April 30, 2019. On October 31, 2012, TransCanada initiated the Integrated Licensing Process by filing with the Federal Energy Regulatory Commission ("FERC" or "Commission") its Notice of Intent to seek new licenses for each project, along with a separate Pre-Application Document for each project.

With this filing, Great River Hydro submits its March 8, 2018 Updated Study Results Meeting Summary for the three projects, as required by 18 C.F.R. §5.15(c)(3) and the Commission's current Process Plan and Schedule (dated February 15, 2018). The meeting for the Updated Study Reports filed between May 1, 2017 and February 9, 2018 was held at Great River Hydro's Renewable Operations Center in Wilder, Vermont, with teleconference and call-in capability for participants who could not attend in person.

The attached meeting summary includes points of discussion, the list of meeting attendees, and a copy of the presentation slides used during the meeting. According to the current Process Plan and Schedule, the comment period for these studies will end on April 22, 2018.

If there are any questions regarding the information provided in this filing or the process, please contact John Ragonese at 603-498-2851 or by emailing jragonese@greatriverhydro.com.

Sincerely,

John L. Ragonese
FERC License Manager

Attachment: March 8, 2018 Updated Study Results Meeting Summary

cc: Interested Parties List (distribution through email notification of availability and download from Great River Hydro's relicensing web site www.greatriverhydro-relicensing.com).

UNITED STATES OF AMERICA

BEFORE THE

FEDERAL ENERGY REGULATORY COMMISSION

GREAT RIVER HYDRO, LLC

Wilder Hydroelectric Project (FERC Project No. 1892-026)
Bellows Falls Hydroelectric Project (FERC Project No. 1855-045)
Vernon Hydroelectric Project (FERC Project No. 1904-073)

March 8, 2018 Updated Study Results Meeting Summary

March 23, 2018

GREAT RIVER HYDRO, LLC
UPDATED STUDY RESULTS MEETING
MARCH 8, 2018

The Updated Study Results meeting for study report supplements filed between July 12, 2017 and February 9, 2018 was held on March 8, 2018 at Great River Hydro's Renewable Operations Center in Wilder, VT. Presentation slides were distributed after the meeting and are provided with these notes.

Meeting attendees in person or identified on the telephone:

Name	Affiliation
Bill Connelly	FERC
Brandon Cherry	FERC
Patrick Crile	FERC
Steve Kartalia	FERC
Lael Will	VTFWD
Jeff Crocker	VT ANR
Pete McHugh	VTFWD
Gregg Comstock	NHDES
Melissa Grader	FWS
John Warner	FWS
Mike McCrory	Claremont City Planner
Sue MacKenzie	Lyme Select Board
John Mudge	Town of Lyme
Ross McIntyre	Town of Lyme
Katie Kennedy	TNC
Andrea Donlon	CRC
Kathy Urffer	CRC
Jim McClammer	CRJC
Jim Kennedy	Upper Valley Subcommittee, CRJC
John Bennett	Windham Regional Commission
Rich Holschuh	Representing Elnu Abenaki
John Hart	Gomez & Sullivan
John Ragonese	GRH
Jen Griffin	GRH
Erin O'Dea	GRH
Steve Leach	Normandeau Associates
Christian Gagne	Normandeau Associates
John Field	Field Geology Services
Lissa Robinson	GEI Consultants
Chris Tomichek	Kleinschmidt Associates
Kevin Sahr	Town of Lyme – Lyme roads study committee

Study 18 - American Eel Upstream Passage Assessment

Christian Gagne presented results of the 2017 study conducted at the Vernon Project, report filed 2/9/18. This was the third year assessing upstream eel passage at Vernon.

VTFGD stated that an objective of the study was to determine what happens, in terms of eel collections, after the Vernon fish ladder is closed for the season, but that the ladder was operated for about three weeks longer than the normal mid-April to July 15 season. Reported passage numbers via the fish ladder are therefore greater than what would have been reported if the ladder was shut down earlier. The ladder was operated longer than usual to allow testing of the entrance weir elevation following programming new controls. GHR notes, the study showed that eels were collected in the eel ramp after the ladder was shut down. It's reasonable to conclude this would have occurred regardless of when the ladder was shut down. The critical element is not date, or fish ladder eel count (presumed to be suspect) but environmental conditions and presence of eels. VTFGD notes they are not confident in the accuracy of the Vernon fish ladder eel counts they reported, due to considerable upstream and downstream movement, and the report should reflect this. GRH believes everyone knows this and agrees, hence the need for measure to improve counting accuracy before relying on current observation data as representing numbers of fish.When the ladder is shut down there's no water flowing out of the ladder entrance. The construction sluice did not appear to effect passage, and peak passage timing, which varies from year to year and is dependent on temperature and flow, only lasted a few days downriver and at the Vernon site.

A question was raised suggesting larger eels used the ladder because they were not able to ascend the ramp; however, Normandeau reported that in other locations where the ramp design is the same as the one used at Vernon, yellow eels up to 1 ft long use the ramp.

Study 21 - American Shad Telemetry, Downstream Passage of Adults

Steve Leach presented results of the 2017 supplemental study conducted at the Vernon Project, report filed 2/9/18. The supplemental study was conducted in response to natural resource agency concerns that reasonable conclusions relative to downstream passage could not be drawn from the 2015 study because the number of adult shad for which a downstream passage route could be determined was too low. The study supplement did not address project effects on survival or spawning.

There was a request that gate location (east to west) be notated in Appendix A, followed by discussion of possible patterns in the data or variances suggested by the data, such as more shad passing via the pipe early in the season compared to units and pipe later in the season; and potential for passage predictability based on spill. Flow values in Appendix A are instantaneous to closest time of passage. The focus of the study was on fish passing the project, so didn't relate operations and

flow conditions to fish that didn't pass. VTFGD may have more questions after combining the 2015 and 2017 data sets to look at conditions at time of passage.

FWS recognized that in both years of study there was more spill than expected, perhaps should be looking at a best-case spill protocol when spill occurs. Additional comments will be filed by FWS. GRH promised to provide information regarding spill gate operating protocol should there be any.

Study 2/3 - Riverbank Transect Study / Riverbank Erosion Study

John Field presented results of the 2017 supplemental study report filed 11/15/17.

A request for the model transect cross-section velocity graphs similar to page 27 of the Power Point presented at the meeting for all the monitoring sites be provided as they were not included in the supplemental report. They will be provided.

A number of questions raised prompted GRH to further clarify the scope and focus of the supplemental study specified by FERC's Study Determination letter of July 21, 2017. GRH was asked perform *"an analysis of estimated critical shear stress, near-bank velocity, and the potential correlation of these factors with project operation at the 21 monitoring sites. This discussion should include a table for each monitoring site that lists critical shear stresses and near-bank velocities with respect to water surface elevations corresponding to project operation (e.g., minimum flow, average project operating ranges, maximum hydraulic capacity)".* As noted in the Determination, critical shear stress could be estimated based on grain size/shape or interpreted using the HEC-RAS model; GRH chose to apply both in their comparative analysis. Additionally, "*average operating ranges*" was interpreted as elevations that range in the field based on monitoring location and minimum, middle and maximum operational flows at an average operating elevation at the dam. Maximum elevation and minimum elevations at the dam do not typically occur under normal operations. Both maximum and minimum elevations at the dam typically occur only when flows at the dam exceed station capacity. To estimate critical shear stress based on grain size GRH provided guidance to field crews to identify elevations at each of the 21 sites, from which the soil samples would be collected, that corresponded to the three operating flows based on the HEC-RAS model output. To ensure the full range of project operations was considered in the analysis, additional sediment samples were collected if a different sediment type was identified, outside of the extent of guidance elevations provided to the field crew, but within the overall range of resulting elevations, based on the maximum elevation and overall range of operational flows at the dam.

All soil samples had a sieve analysis performed to determine grain size distribution and D50 particle size. A hydrometer analysis was also conducted on samples that had a combined silt and clay fraction of more than 5 percent to determine the percentage of each component (i.e., clay and silt) in the given sample. John Field explained the use the average grain size (D50) of the sampled soil is a common

practice and reasonable method to calculate the critical threshold velocity and shear stress values representative of the entire soil type; particularly in light of the fact that the values were conservative estimates based on unconsolidated soils, while native bank sediments typically are consolidated and compacted.

A comment was made that a substantial proportion of the sediment was other than average size (D50) and a request for corresponding critical velocity and shear stress values for the other representative grain sizes be provided. GRH responded that it will attempt to provide that information.

Lissa Robinson responded to a comment regarding whether the 2D model examined laminar or turbulent flows: In HEC-RAS the terms "subcritical" and "supercritical" are more commonly used to describe the flow conditions (as opposed to laminar or turbulent, as was asked). Sub and supercritical can be described as follows: If a pebble is thrown into a supercritical flow then the ripples will all move downstream whereas in a subcritical flow some ripples would travel upstream and some would travel downstream. In the Connecticut River flow is typically subcritical. If an eddy existed in the modeled area, the model would pick it up and model it, averaging the flow characteristics vertically across each 2-dimensional cell.

John Ragonese responded to a question about whether the HOBO instruments collected velocity information: The pressure transducers used to collect water surface elevation did not collected velocity, velocity data was collected in the field using an acoustic Doppler current profiler (ADCP). The modeled velocity data was compared with field data and it matched up well.

Gregg Comstock made a request for ADCP measurements of velocity taken across the river be compared with modeled velocities at the 21 monitoring sites. GRH will review to see if ADCP data includes actual measurements of velocity across the transect and if it is available examine whether river conditions at the time of ADCP surveys correspond with conditions modeled in the HEC-RAS 2D model scenarios (in terms of operating elevations at the dam and flow at the monitoring site). If reasonably comparable we will report out the comparison, otherwise indicate why results from both cannot be reasonably compared.

There was a request by Kevin Sahr to see the HOBO pressure transducer data, he indicates WSE fluctuations near Lyme are greater than stated by GRH. [note: these data are posted to GRH's relicensing web site: www.greatriverhydro-relicensing.com]

GRH clarified that the statement on the last page that says "…the presence of vegetation on the banks, wood at the base of the bank, and irregularities in bank shape, not accounted for in the analysis, can increase the critical shear stresses and velocities or result in lower shear stress and velocity values estimated by the

hydraulic modeling." This is meant to indicate that these unaccounted-for variables increase the threshold velocity required to move a particle of soil.

Comments from Ross McIntyre related to groundwater elevation monitoring and piping were made again and acknowledged.

There was a suggestion that GRH should analyze soils located outside the elevation of operational flows because those soils are carried into the zone of operational flows during high flow. While GRH did not specifically sample bank soils affected or directly impacted under high flow conditions, we would have sampled this material in some cases where those soils may have accumulated at the base of the bank as colluvium or transported and deposited downstream as beach sediment and were present and corresponded with the operating range sampling elevations.

Study 2/3 results continue to show that operational flows contribute little to bank erosion.

Modifications at Vernon for Upstream Fish Passage

John Ragonese summarized GRH consultation with USFWS, VTFGD, and USGS Conte Lab relative to modifications of the Vernon fish ladder to potentially improve shad and eel upstream passage, and improve eel count reliability.

VTFGD asked how GRH would know if the modifications were effective. Shad passage effectiveness is monitored as a percentage of the number of shad passing the Cabot station. A consistent increase in that percentage would suggests improved effectiveness. Visual observations of fish moving through the turning pool/weir structures with minimal fall back or milling would also support more effective passage. GRH proposes comparing 2018 Salmonsoft eel counts with counts made from 2015-2017. A discernible reduction in the number of negative counts, may indicate more effective counting and passage estimates.

GRH acknowledged that additional consultation with fishery agencies may be worthwhile to determine whether there is value in continuation of eel monitoring either below the Vernon dam or within the fish ladder or both during the upcoming 2018 season or otherwise. How the ladder operation should be specified to adequately capture and monitor eel passage or use during the 2018 migration season would be included in that discussion and any plan. GRH intends to reach out and consult with agency stakeholders prior to the 2018 migration season.

Studies 9 and 24 - Instream flow, and co-occurring mussels – update of ongoing consultation

John Ragonese summarized the prior series of GRH-Aquatic Working Group consultation meetings and requests for Study 9 IFIM data clarifications or detail.

He outlined updates to the Operations model including 2017 pricing signals that differ from those prepared in 2012 and used in the base case shared with stakeholders at a consultation meeting.

Current status of activities includes:

- Stakeholders to provide GRH with Study 9 habitat-based flow or operating scenarios.
- GRH to provide stakeholders with:
    - template for stakeholders to specify the run (completed),
    - output of base case run and existing graphs (initial completed but update to be provided),
    - an inflow=outflow model run (with other considerations as discussed),
    - additional information on elements of operations

Study 25 - Dragonfly and Damselfly Inventory and Assessment

Jennifer Griffin presented results of the 2017 supplemental report addressing stakeholder comments, filed 7/12/17.

There was no further discussion of this report.

Additional Discussion

ILP Schedule - Brandon Cherry reviewed the Revised Process Plan and Schedule FERC issued on February 15, 2018, noting that GRH is required to file a progress report on May 15, 2018 and every 90 days thereafter until studies 9 and 24 are completed. The progress report is to include the status of study 33 – Cultural and Historic Resources Study.

Study 33 – Cultural and Historic Resources Study - Rich Holschuh concurred that this study is still open and indicated that while the draft TCP includes timetables for consultation, no consultation has taken place. John Ragonese disagreed that no consultation had occurred, citing several meetings with native American tribal leaders and informational resources but recognized the present open status of the study. He said the Programmatic Agreement (PA) and Historical Properties Management Plan (HPMP) are in development and will be shared for comment and review. The PA is a signed agreement among affected parties that usually includes SHPO's, licensee and federal tribe(s). GRH suggests that no federal tribe is affected by this PA, but local tribes are and therefore should be included. The PA will reference the HPMP which includes details of how properties will be managed.

Kathy Urffer requested copies of the existing license for the projects; they were emailed to her after the meeting.