



April 6, 2018

VIA ELECTRONIC FILING

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

Re: FirstLight Hydro Generating Company, Turners Falls Hydroelectric Project (FERC No. 1889) and Northfield Mountain Pumped Storage Project (FERC No. 2485).
Response to FERC's March 13, 2018 letter regarding Downstream Juvenile Shad Study.

Dear Secretary Bose:

On February 28, 2018, FirstLight Hydro Generating Company (FirstLight) filed a letter with the Federal Energy Regulatory Commission (FERC or the Commission) seeking its approval to delay a downstream juvenile shad study until 2019. In its letter, FirstLight proposed to evaluate the feasibility of installing a barrier net in the Northfield Mountain Pumped Storage Project (Project) tailrace in 2018 to protect juvenile shad and other aquatic species from becoming entrained at the Project. With its filing, FirstLight submitted the consultation record with the US Fish and Wildlife Service, National Marine Fisheries Service, Massachusetts Division of Fisheries & Wildlife and the Connecticut River Conservancy, who all supported the delay in conducting the study.

On March 16, 2018, FERC responded to FirstLight's request. FERC requested that within five days of receipt of its March 16 letter, it provide the letter to all agencies. Shown in Attachment 1 is an email sent to all stakeholders having expressed interest in the FirstLight relicensing; FERC's March 16 letter was attached to such email. In addition, FERC noted that before acting on FirstLight's request to delay the juvenile shad study, FirstLight must submit responses to a series of questions in Schedule A of FERC's March 16 letter by April 6, 2018. Below are the questions in Schedule A along with FirstLight's responses.

1. Please describe all downstream juvenile shad passage measures that are currently being discussed with resource agencies and other stakeholders. The measures should be listed separately for the Turners Falls Project and the Northfield Mountain Project.

As noted earlier, FirstLight is currently discussing with the resource agencies and stakeholders plans for evaluating the feasibility of a barrier net near the Northfield Project tailrace starting in the summer of 2018. The net, as currently envisioned, would consist of individual panels. The net would extend to the river bottom and would be anchored to permanent foundations. Additionally, a diversion boom would be deployed upstream of the barrier net to deflect large woody debris from striking the barrier net and causing damage. To determine its feasibility, it is necessary to assess the hydraulic performance of the net when subjected to biofouling and debris accumulation. This information will allow FirstLight to assess operational procedures, maintenance practices and any potential impact to plant operations.

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Moving downstream, FirstLight is considering various options to protect juvenile shad at the Turners Falls Project including a) a potential plunge pool below one of the bascule gates, and b) measures to screen juvenile shad moving downstream in the power canal.

2. *Please explain why it is necessary to wait until August 1, 2018 to begin testing the barrier net and collecting information on biofouling and debris loading.*

The reason for waiting until August 1, 2018 is that, if proven feasible, the actual barrier net would be in place from August 1 to November 15 corresponding with the downstream migration of juvenile shad and adult American eel. It is important to collect biofouling and debris loading data during the time of year when the net is proposed to be operational.

3. *Please explain why FirstLight is proposing to use test panels that are 2-foot by 2-foot in size, and how the test panels will be of sufficient size to provide information about the retention of larger debris and the debris-loading characteristics of a full-sized net for the Northfield Mountain Project.*

The following explains how the test panels are being used to estimate the drag forces on the full barrier net. The question is whether the barrier net can withstand drag forces under full pumping conditions without the net potentially tearing or the support structures on the bottom of the river being compromised.

The test net panels, approximately 2 ft by 2 ft in size¹, will be installed at various depths from August 1 through November 15 corresponding to the period of deployment of the prototype installation. The test panels will provide representative information of the full-size panels and will allow for testing of several configurations and locations. Test panels will be removed at monthly intervals and tested in the laboratory to determine the extent of biofouling over time and to determine the associated drag coefficients and head loss. The study will consist of the following:

- Net test panel size: 2 ft by 2 ft panels supported in a rigid frame.
- Barrier net mesh size: 0.75 and 0.375-inch mesh.
- Panel test depths: near surface, mid depth and near bottom.
- Sampling frequency: A total of four net panel retrieval events will occur between August 1 and November 15. A group of six net panels will be retrieved at a time for laboratory testing. A group of six panels will be retrieved to represent two net meshes (0.75 and 0.375 mesh) and three separate depths. A total of four groups of six net panels (total of 24 net panels) will be deployed by August 1.
- An extra group of six net panels will be kept on hand as a contingency.
- Periodic inspections and debris collection trips will occur.

Net panel samples will be retrieved from the field and transported in the wet for testing. Each panel will be documented with photographs prior to transport and testing. Testing of samples in the laboratory will consist of the following:

Biofouling testing

- Install net panel in a small flume, approximately 2 ft wide by 1.5 ft deep.
- Target velocity: 0.5, 1.0 and 2.0 ft/sec.

¹ The actual net panels would be much larger than 2 ft by 2 ft.

- Barrier net configuration: perpendicular and 45 degrees to approach flow.
- Drag force measurements: Load cells installed to measure force acting on barrier net panel.
- Head loss measurements: Piezometer taps to measure water level upstream and downstream of the net panel.
- Flow measurements: Venturi or orifice flow meter.
- Video documentation.

Debris testing

Debris will be collected from the Connecticut River for use for testing barrier net panels in the laboratory. Timing of debris collection will be closely coordinated with FirstLight staff and dependent on river conditions. Debris will be collected prior to retrieval of each group of six test panels. Locations for debris collections will include the Northfield tailrace area, Turners Falls or other locations identified between Turners Falls and Northfield.

At the conclusion of biofouling testing for a net panel, the net panel will be tested with corresponding river debris for a particular retrieval event. This program should encompass the various loading conditions expected for the prototype installation ranging from aquatic vegetation expected in August and September to woody and leafy debris expected in October and November. Debris testing will include the following:

- Net panel installed in small flume perpendicular to approach flow.
- Target velocity: 1.5 ft/sec.
- Debris loading: gradually introduce debris collected from the river until near net occlusion or to the extent possible. Debris would be quantified volumetrically as it is introduced to the flume. At the conclusion of the test, debris adhered to the net panel would be measured volumetrically.
- Drag force measurements via load cells.
- Head loss measurements via piezometer taps.
- Flow measurements: Venturi or orifice flow meter.
- Video documentation.

Drag force data of barrier net panels under various biofouling and debris loading conditions obtained from these laboratory tests will be used in combination with a computational fluid dynamic (CFD) model to estimate drag forces acting on a full barrier net installation at Northfield Project under various combinations of biofouling, debris loading, river flow and Northfield project operating conditions.

4. *From 1995 to 2014, FirstLight deployed a barrier net from April to June to prevent the entrainment of Atlantic salmon smolts at the Northfield Mountain Project. Please provide any available information collected from the deployment of the salmon barrier net that could be relevant to the proposed barrier net test for juvenile shad, such as the extent and frequency of repairs due to debris damage.*

FirstLight and its predecessors had installed a barrier net from April to early June to exclude salmon smolts from becoming entrained. Because the effort to restore Atlantic Salmon to the Connecticut River Basin was terminated, FirstLight has not installed the smolt barrier net since 2014. When installed, the net mesh size was ¾-inch square. The net was cleaned by divers as needed to remove river-borne debris and biofouling from the mesh. On occasion, large drifting debris (tree trunks, etc.) ripped the net, requiring *in situ* repair, again by divers. Events requiring repair occurred annually, and at times more than once during a migration season. The salmon smolt net comprised one long section, 15 feet deep, attached to a head cable and foot cable. The head cable was attached to flotation, and the foot cable was attached to anchors driven into the river bottom.

The proposed design for the new barrier net will be much different than the salmon smolt net. As noted above, the net itself will be comprised of individual panels which can be replaced if one is damaged. Thus, information regarding the performance of the smolt barrier net installed from 1995 to 2014 is not applicable because the current proposal is a different design.

5. *In its October 14, 2016 study report and its October 31, 2012 pre-application document, FirstLight provided a list of previously-conducted fish passage studies. Please file copies of the following studies, and other prior studies referenced in the study report and pre-application document that are relevant to the effects of the project on downstream juvenile shad passage.*

- Harza Engineering Company (Harza) & RMC Environmental Services (RMC). (1992). Turners Falls downstream fish passage studies: Downstream passage of juvenile clupeids, Fall 1991. Report to Northeast Utilities Service Company. Berlin, CT.
- Harza & RMC. (1993). Turners Falls downstream fish passage studies: Downstream passage of juvenile clupeids, Fall 1992. Prepared for Northeast Utilities Service Company. Berlin, CT.
- RMC. (1994). Emigration of juvenile clupeids and their responses to light conditions at the Cabot Station, Fall 1993. Prepared for Northeast Utilities Service Company. Berlin, CT.
- RMC. (1995). Log sluice passage survival of juvenile clupeids at Cabot hydroelectric station Connecticut River, Massachusetts. Drumore, PA. Report to Northeast Utilities Service Company.

Please find, as separate filings, the above reports.

If you have any questions regarding this filing, please feel free to contact me at the number below.

Sincerely,



Douglas Bennett
Plant General Manager

Attachment 1: Email consultation with Stakeholders regarding FERC's March 16, 2018 letter

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Subject: FERC 3.16.2018 Letter Regarding Juvenile Shad
Date: Friday, March 16, 2018 10:35:00 AM
Attachments: [FERC AIR on Juv Shad Study 3.16.2018.pdf](#)

Dear FERC licensing Participants-

Today, FERC issued the attached Additional Information Request on the Downstream Juvenile American Shad Study (Study No. 3.3.3).

It responds to FirstLight's request to delay the juvenile shad study another year. FERC's letter states the following, among other issues:

"Within 5 days of receipt, please provide a copy of this letter to all agencies you will consult in response to this request. When you file the requested information with the Commission, provide a complete copy of the information to each agency and other entities consulted, as well as to all parties on the service list".

This email serves notice that FirstLight is providing FERC's 3/16/2018 Letter on the same day it was received to all FERC licensing participants (within the 5 days of receipt as required by FERC).

If you have any questions, please feel free to contact me.

Thanks, Mark

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