



The State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES



Thomas S. Burack, Commissioner

August 29, 2013

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

RE: Comments on Revised Study Plan for FERC No. 1889 (Turners Falls) and 2485 (Northfield Mountain)

Dear Secretary Bose:

The New Hampshire Department of Environmental Services (NHDES) is responsible for issuing federal Clean Water Act § 401 water quality certifications (401 certifications) in New Hampshire. State statutory authority for issuing 401 certifications is provided in RSA 485-A:12, III. NHDES is also responsible for establishing and administering surface water quality standards for New Hampshire.

NHDES has reviewed the revised study plan (RSP) filed by FirstLight on August 14, 2013 for the following two hydroelectric projects on the Connecticut River:

Turners Falls Project (FERC No. 1889)
Northfield Mountain Pumped Storage Project (FERC No. 2485)

Comments on the RSP are attached. Please note that NHDES also supports the comments submitted by the New Hampshire Fish and Game Department.

We thank you for the opportunity to comment. Should you have any questions, please do not hesitate to contact either myself (602-271-2983) or Owen David (603-271-0699).

Sincerely,

Gregg Comstock, P.E.
Supervisor, Water Quality Planning Section
New Hampshire Department of Environmental Services

August 29, 2013
New Hampshire Department of Environmental Services(NHDES)
Comments on
FirstLight Power Resources (FL)
Revised Study Plan (RSP) dated August 14, 2013
for
Turner Falls Hydroelectric Project (FERC Project No. 1889) and
Northfield Mountain Pumped Storage Project (FERC Project No. 2485)

NHDES's latest comments and responses are provided below in *bold italics* and are prefaced with the date 8/29/13 (i.e., *8/29/13 NHDES Comment* or *8/29/13 NHDES Response*). In most cases NHDES's comment submitted on 7/15/13 is provided followed by the Applicant's response of 8/14/13 followed by NHDES's response of 8/29/13.

General

(1) 8/29/13 NHDES Comment: *In addition to our previous comments and the comments below, comments submitted by the New Hampshire Fish and Game Department are supported by NHDES and are considered part of this document.*

(2) 7/15/13 NHDES Comment: 1. The extent of FirstLight's and TransCanada's study responsibilities downstream of the Vernon dam should be clarified so that study plan responsibilities can be assigned appropriately. It is our understanding at this time that FirstLight's studies extend upstream to the Vernon dam.

8/14/13 Applicant Response: None specifically found.

8/29/13 NHDES Response: *NHDES requests that FERC render a decision that clearly indicates the extent of TransCanada's and FirstLight's study responsibilities downstream of the Vernon Dam to the NH/MA border to ensure that the area between the Vernon Dam and the NH/MA border is covered by the requested studies.*

(3) 7/15/13 NHDES Comment: 2.NHDES requests to be included on any working groups formed to advise any of the following FL proposed studies.

8/14/13 Applicant Response: Response not found in RSP.

8/29/13 NHDES Response: *To our knowledge, this comment has not been addressed.*

FL Proposed Study #3.1.1: 2013 Full River Reconnaissance Study

Relevant NHDES Study Requests: 21c (partially addressed - also see FL PS #3.1.2 and FL PS # 4.1.1).

(1) 7/15/13 NHDES Comment: p. 3-12. Task 4 Develop Maps, Summary Statistics, Evaluation of Conditions, and Analyze Changes in Condition since Implementation of ECP and from 2008 FRR. It is stated that the purpose of these comparisons is to evaluate trends in river bank erosion. NHDES recommends that the study include any changes in operation of the FL Projects during the study period to see if such changes in operation during the study period are related to any apparent trends.

8/14/13 Applicant Response: "Any change in operations during the study will be tracked and reported in the study."

8/29/13 NHDES Response: To ensure this is done, NHDES requests that the Applicant's response be included in this study plan.

FL Proposed Study #3.1.2: Northfield Mountain / Turners Falls Operations Impact on Existing Erosion and Potential Bank Instability

Relevant NHDES Study Requests: 21c (partially addressed - also see FL PS #3.1.1 and FL PS # 4.1.1).

(1) **7/15/13 NHDES Comment:** p. 26, Study Goals and Objectives. Consistent with NHDES study request 21c, the objectives of this and/or other studies should address the following:

1. determine how water level fluctuations within the minimum and maximum operating range and discharges from peaking operations at the FL hydroelectric projects contribute to shoreline erosion;

8/14/13 Applicant Response: "This is part of the overall study."

8/29/13 NHDES Response: To make it clear that this is part of the study, NHDES requests that language be added to this study plan indicating that the study will evaluate how water level fluctuations within the minimum and maximum operating range and discharges from peaking operations at the FL hydroelectric projects contribute to shoreline erosion.

2. identify and determine the effects of shoreline bank erosion and riverbank failure on other resources (i.e. riparian areas and shoreline wetlands, rare plant and animal populations, water quality, aquatic and terrestrial wildlife habitat, etc.);

8/14/13 Applicant Response: "The mapping and evaluation of sensitive receptors proposed as part of this study will examine this to some extent, however, the majority of this evaluation will occur as part of the other environmental studies proposed in the RSP."

8/29/13 NHDES Response: It is not clear which studies will address this objective. Language should be added to the pertinent studies so that is clear that this objective will be accomplished.

3. identify techniques that could be used to mitigate the effects of project operations or other mitigation techniques that could be developed to reduce riverbank erosion within the impoundment and downstream of the tailrace.

8/14/13 Applicant Response: "An assessment of the success of past riverbank stabilization projects and recommendations for future riverbank stabilization projects is included in Study No. 3.1.1 Full River Reconnaissance."

8/29/13 NHDES Response: Study 3.1.1, Task 5a (p.3-19) and Task 5b (p. 3-20) of the RSP focus on construction of bank stabilization projects. In addition, NHDES requests that the study address how operational changes could mitigate project effects on riverbank erosion.

(2) **7/15/13 NHDES Comment:** p. 3-33, Task 5d. Field Evaluation - Round 2. For transects in New Hampshire the density of the survey points used to define geometry of the river bank should be specified. The density will need to be quite high to detect changes in riverbank geometry that may be primarily attributable to

project operation. In its study request, NHDES proposed installation of horizontal pins into the bank to help measure erosion over the short and long term. If the density of survey points is not considered high enough to detect subtle changes in riverbank geometry, NHDES will likely request that pins be installed at the New Hampshire transects as described in its original study request.

Also, it appears that only one survey of the transects will be taken. Consistent with NHDES study request 21c, NHDES requests that monitoring of bank geometry at transects in New Hampshire be conducted on a biweekly basis to help isolate the potential affects of daily project operation on riverbank erosion and instability.

8/14/13 Applicant Response: "Bank pins have previously been used on specific project sites to monitor monthly and yearly bank stability trends. The current RSP will provide a geotechnical evaluation of the river banks, but does not propose to install and monitor bank pins. Regarding specific bank geometry change, the detailed studies will be utilizing the survey of transects at 22 locations which have been surveyed since the 1990s. Transects for detailed study will be monumented for future reference and survey."

8/29/13 NHDES Response: *This comment was not completely addressed. The study should include a map showing the location and number of the transects in New Hampshire. The study should also indicate how often the surveys in New Hampshire and the accuracy of the surveys. Further the study should indicate the accuracy of the surveys and with specifics on how transect surveys in New Hampshire have been conducted (i.e., are readings taken every foot and at every break in grade?, how are accurate readings of the undercut areas taken?, are readings taken during the day when impoundment levels due to project operation are lowest in order to obtain accurate readings of toe of slope and undercut areas?).*

NHDES therefore requests that in addition to the surveys conducted by FirstLight, biweekly surveys be conducted at all required transects in New Hampshire, for three months (say July through September) when fluctuations in the river are more apt to be primarily due to daily dam operation. This combined with the higher resolution surveys requested above, should help isolate the impact of the dam operation on bank erosion. This should be done for at least two years. Depending on results from the first year, the survey frequency may be increased and/or the number of stations with increased survey frequency may be increased the following year.

(3) 7/15/13 NHDES Comment: p. 3-26. Methodology. The study should compare the water elevations due to project operation to the elevation along the riverbanks below which there is a lack of vegetation, undercutting, etc. and determine if there is a correlation. The study should also address the potential of daily project operations making the riverbanks more prone to erosion (i.e., due to lack of vegetation, undercutting, etc.) and how this may impact the frequency and magnitude of massive erosion when high flows occur.

8/14/13 Applicant Response: "This is part of the overall study."

8/29/13 NHDES Response: *To make it clear in the study that this comment will be addressed, NHDES requests that language be added to this study that clearly indicates that the objectives include comparison of water elevations due to project operation to the elevation along the riverbanks below which there is a lack of vegetation, undercutting, etc. to determine if there is a correlation.*

(4) 7/15/13 NHDES Comment: p. 3-26. Methodology. The study should also address how daily project water level fluctuations may impact groundwater levels and movement within the riverbank and the extent to which this may be destabilizing the banks and making them more prone to erosion failure under higher flows.

8/14/13 Applicant Response: "Pressure transducers were used to measure WSEL fluctuations in the impoundment and groundwater near Bennett Meadow below the Route 10 Bridge in the late 1990's. This data, as well data collected at additional fixed riverbank transects, will be used to analyze the relationship between water level fluctuations and groundwater levels."

8/29/13 NHDES Response: *Based on the description provided on p. 3-42 of the RSP of how the effects of repeated wetting and drying of the river bank, and the relationship between river WSEL and groundwater level will be investigated, it appears our comment will be addressed.*

(5) 7/15/13 NHDES Comment: p. 3-26. Methodology. The analysis should also evaluate how changes in operation of the Projects may affect riverbank erosion along the river.

8/14/13 Applicant Response: "This is part of the overall study."

8/29/13 NHDES Response: *To make it clear in the study that this comment will be addressed, NHDES requests that language be added to this study that clearly indicates that the analysis will evaluate how changes in operation of the Projects may affect riverbank erosion along the river. For example, if the projects were operated in instantaneous run-of-river, how might this impact the extent, frequency and rate of riverbank erosion? Would it likely be more or less and if so to what extent and why?*

FL Proposed Study #3.2.1: Water Quality Monitoring Study

Relevant NHDES Study Requests: 25c

(1) 7/15/13 NHDES Comment: p.3-38, General Description of Proposed Study, last paragraph, last sentence. It is stated that FL is not proposing to collect nutrient parameters in the Connecticut River upstream of the Massachusetts border because it is not consistent with MADEP's request and would not provide useful information if collected from a limited area. NHDES disagrees with this statement for the following reasons. The FL project impounds water approximately 5.5 miles in New Hampshire. Operation of the FL projects therefore impacts New Hampshire surface water quality and must not cause or contribute to violations of New Hampshire surface water quality standards. NHDES uses nutrient parameters in its assessment of waters required by EPA and the Clean Water Act [section 305(b) and 303(d)] for determining designated use support such as aquatic life and primary contact recreation. Further, this is not an unreasonable request as TransCanada is proposing to collect this data in all three of its impoundments. Collection of weekly nutrient parameters (total phosphorus, nitrite/nitrate, Kjeldahl nitrogen and chlorophyll-a) at the sampling site in New Hampshire, as described in NHDES study request # 25c, should therefore be included in the proposed study.

8/14/13 Applicant Response: "Not Adopted. Not requested by MADEP. MADEP has no nutrient standard."

8/29/13 NHDES Response: *The projects impact New Hampshire surface waters. The requested parameters will be used by NHDES to determine if current operation of the projects are causing or contributing to surface water quality impairments in New Hampshire. New Hampshire*

surface water quality regulations include narrative nutrient criteria (Env-Wq 1703.14). These criteria and the nutrient related thresholds included in the New Hampshire Consolidated Assessment and Listing Methodology¹ are used to assess surface waters in New Hampshire. For this and the reasons stated above, NHDES again requests that study include collection of weekly nutrient parameters (total phosphorus, nitrite/nitrate, Kjeldahl nitrogen and chlorophyll-a) at the sampling site in New Hampshire, as described in NHDES study request # 25c.

(2) 7/15/13 NHDES Comment: p. 3-41, Task 1: Develop Sampling Plan. It is stated that a water quality sampling plan will be submitted to MADEP for approval prior to sampling. A sampling plan (including quality assurance procedures) for the monitoring station in New Hampshire should be submitted to NHDES for approval prior to sampling to ensure that data is collected in a manner that can be compared to New Hampshire water quality standards and is of sufficient quality for use in Clean Water Act Section 305(b) / 303(d) assessments.

8/14/13 Applicant Response: "Adopted. The plan will be sent to NHDES for approval."

8/29/13 NHDES Response: *Based on the response above and revised text on p.3-65 of the RSP, it appears this comment has been addressed.*

(3) 7/15/13 NHDES Comment: p. 3-42, Task 3: DO and Temperature Profiles. Weekly profiles should be conducted at the sampling station in New Hampshire as proposed in NHDES study request # 25c to determine if stratification is occurring and the proper depth to set the datalogger. To determine compliance with New Hampshire dissolved oxygen criteria (Env-Wq 1703.07) dataloggers deployed in the impoundment should be set at the bottom of the epilimnion (if stratified) or at 25% depth if not stratified.

8/14/13 Applicant Response: "Not Adopted. Three proposed locations are sufficient to characterize DO and temperature stratification."

8/29/13 NHDES Response: *Figure 3.2.1-6 of the RSP shows the three sampling stations where biweekly vertical dissolved oxygen/temperature profiles are proposed. Station 2 appears to be located in New Hampshire, just upstream of the NH/MA border. If so, this site may be acceptable provided it is located in a relatively deep area of the portion of the impoundment located in New Hampshire. NHDES will make a final determination as to the adequacy of this sampling station when it reviews the Sampling and Analysis Plan.*

FL Proposed Study #3.2.2: Hydraulic Study of Turners Falls Impoundment, Bypass Reach and below Cabot Station

Relevant NHDES Study Requests: 14a (this is also covered in FL PS # 3.8.1)

(1) 7/15/13 NHDES Comment: It is our understanding that the model will predict velocities which will be used in other studies. Considering the importance of velocity on erosion, aquatic habitat, etc., NHDES recommends that calibration of the model include comparison of predicted velocities at several cross sections to measured velocities.

8/14/13 Applicant Response: "Adopted with modification. FirstLight does not propose to calibrate to velocity for the Turners Falls Impoundment model. FirstLight does propose to use data velocity data

¹ See <http://des.nh.gov/organization/divisions/water/wmb/swqa/documents/calm.pdf>

collected as part of the IFIM study to further validate the hydraulic model in the reach between Turners Falls Dam and Holyoke Dam."

8/29/13 NHDES Response: Based on the discussion provided on p. 3-83 of the RSP, it is NHDES' understanding that no velocity data will be collected from the Vernon Dam to the NH/MA line. Based on this understanding, and for the reasons stated above, NHDES recommends that calibration of the model include comparison of predicted velocities at several cross sections to measured velocities.

FL Proposed Study #3.5.1: Baseline Inventory of Wetland, Riparian and Littoral Habitat in the Turners Falls Impoundment, and Assessment of Operational Impacts on Special-Status Species

Relevant NHDES Study Requests: 15b (this is also covered in FL PS # 3.3.14)

(1) **7/15/13 NHDES Comment:** NHDES requests that the study plan 1) indicate use of field GPS units (with accuracy specified) for mapping, 2) that data will be uploaded and annotated in GIS so that plant species and their distribution are all georeferenced, and 3) that the shapefiles generated from the field work will be shared with resource agencies such as NHDES

8/14/13 Applicant Response: "Adopted"

8/29/13 NHDES Response: NHDES requests that the accuracy of the field GPS units be specified in the plan. From p. 3-345 of the RSP, we understand that the inventory will include the area from base of the Vernon dam downstream to the NH/MA border.

FL Proposed Study #3.8.1: Evaluate the Impact of Current and Future Modes of Operation on Flow, Water Elevation and Hydropower Generation

Relevant NHDES Study Requests: 14a (this is also covered in FL PS # 3.2.2)

(1) **7/15/13 NHDES Comment:** The study request submitted by NHDES requested that modeling be conducted to evaluate the potential effects of climate-altered flows on project operations over the course of the license. FirstLight's proposal does not address this objective, but should. Given studies such as those by researchers at the University of New Hampshire² that show that flood and drought frequency in New Hampshire has changed over the past 40 years, and is very likely to continue to change, climate change scenarios are necessary. Much of this type of modeling is already underway around the state, though not in the Connecticut River. NHDES requests that FL address how they will evaluate the potential effects of climate-altered flows on project operations over the course of the license in their study plan.

8/14/13 Applicant Response: No response found.

² Hayhoe, K., C. P. Wake, T. G. Huntington, L. Luo, M. D. Schwartz, J. Sheffield, E. Wood, B. Anderson and J. Bradbury. 2007. Past and future changes in climate and hydrological indicators in the US Northeast. *Climate Dynamics*, 28(4), 381 - 407.

8/29/13 NHDES Response: *For the reasons stated above NHDES requests that FirstLight address how they will evaluate the potential effects of climate-altered flows on project operations over the course of the license in their study plan.*

(2) 7/15/13 NHDES Comment: One of the objectives in our study request was to compare hourly discharge and water surface elevations at various locations in New Hampshire at current and proposed operating conditions to model results assuming instantaneous run-of-river at the Projects. Running the model assuming instantaneous run-of-river will help place bounds on the possible range of results and provide a relative idea of the sensitivity of the model. NHDES therefore requests that this scenario be run.

8/14/13 Applicant Response: The study plan has been updated to conduct up to 15 production runs. If agreed to by the stakeholders then one of the Production Runs could be run of river

8/29/13 NHDES Response: *For the reasons stated above, NHDES once again requests that the model be run assuming instantaneous run-of-river to place bounds on the possible range of results and provide a relative idea of the sensitivity of the model and system. The study should indicate that this will be included as one of the production runs. From p.3-438 of the RSP, we understand that the model will be run from 1960 to 2003 and from 2004-2012 if TNC extends the flow record to include this period.*

Document Content(s)

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