



The State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES

Thomas S. Burack, Commissioner



July 15, 2013

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

RE: Comments on Updated Proposed Study Plan for FERC No. 1892 (Wilder), 1855 (Bellows Falls) and 1904 (Vernon)

Dear Secretary Bose:

The New Hampshire Department of Environmental Services (DES) 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. DES is also responsible for establishing and administering surface water quality standards for New Hampshire.

DES has reviewed the Updated Proposed Study Plan filed by TransCanada on July 8, 2013 for the following three hydroelectric projects on the Connecticut River:

Wilder Project (FERC No. 1892)
Bellows Falls Project (FERC No. 1855)
Vernon Project (FERC No. 1904)

Comments on the Updated Proposed Study Plan are attached. Please note that DES also supports the comments submitted by the New Hampshire Fish and Game Department in a letter dated July 11, 2013.

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,

A handwritten signature in black ink that reads "Gregg Comstock".

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

July 15, 2013
New Hampshire Department of Environmental Services(NHDES)
Comments on
TransCanada Hydro Northeast Inc (TC)
Updated Proposed Study Plan (PSP) dated July 8, 2013
for
Willder Hydroelectric Project (FERC Project No. 1892-026)
Bellows Falls Hydroelectric Project (FERC Project No. 1855-045)
Vernon Hydroelectric Project (FERC Project No. 1904-073)

General Comments:

1. The extent of TransCanada's and FirstLight'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 TransCanada's studies will extend to the NH/MA border.
2. Many studies mention stakeholder workgroups (such as the erosion working group for Study #2) that will be consulted prior to and during various stages of the studies. NHDES requests to be on these working groups.

Relationship Between TransCanada and FirstLight Projects

NHDES Comments:

p.4, last paragraph. It is stated that "... evaluation of Vernon Project impacts to the section below Vernon dam has been included in the updated study plans." The distance downstream of the dam should be stated.

TC Proposed Study #1: Historic Riverbank Position and Erosion Study

Relevant NHDES Study Requests: 21a, 21b, 21c.

NHDES Comments:

p. 17, Analysis. It is stated that this study will attempt to correlate bank loss to a specific period or time frame, historical hydrological events, or other causal agents. NHDES requests that "other causal agents" include historical changes in the operation of the three projects. This information should provide further insight as to how project operations have potentially affected riverbank erosion.

TC Proposed Study #2: Riverbank Transect Study

Relevant NHDES Study Requests: 21a, 21b, 21c.

NHDES Comments:

p. 19, Study Goals and Objectives, 1st paragraph. This section states that the goal is to monitor riverbank erosion at selected sites in the impoundments and project-affected riverine sections below the Wilder and Bellows Falls dams. This sentence should be revised to include sites up and downstream of the Vernon dam which would be consistent with p. 21, Study Area and Study Sites, where it is stated that 4 transects associated with the Vernon dam will be monitored.

p. 22, Establishing Monitoring Sites and Repeat Surveys. The accuracy of the topographic, bathymetric and repeat surveys should be specified. It is stated that data will be collected at sufficient density to accurately describe the slope geometry. This 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 as described in its original study request.

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p. 22 and p 23, Repeat Surveys. On p.22 it is stated that surveys at the 20 sites will be resurveyed and ground photographs retaken at least four times per year for 2 years. On p. 23 it is stated that while NHDES and others requested monitoring of several bank transects on a biweekly basis for one year at 18 monitoring stations (three in each impoundment and three downstream of each dam), this additional monitoring is not incorporated into this study as such information will only be valuable if active soil loss occurs nearly continuously throughout the year. This assumes that soil loss is not occurring continuously with no data to support this assumption. To determine if soil loss is occurring nearly continuously and to help isolate the potential affects of daily project operation on riverbank erosion and instability NHDES requests that biweekly surveys be conducted throughout the year as originally proposed in our study requests.

p. 23, Surface Water Level Monitoring. The accuracy of the pressure transducers used to measure water levels should be specified. This section also states that the pressure transducers will be removed during the winter months to avoid breakage but that since flow variation is generally limited in the winter months, the absence of data collection in the winter months should not alter study results. NHDES disagrees that the absence of water level data in the winter months will not alter results. As shown in the figure provided in our study request that is based on data from the USGS gage located downstream of the Bellows Falls Project in North Walpole, water levels due to project operation fluctuated significantly in January 2013. The study plan should therefore address how water level fluctuation in the river during the winter will be accounted for and how it could potentially impact erosion along the riverbank.

TC Proposed Study #3: Riverbank Erosion Study

Relevant NHDES Study Requests: 21a, 21b, 21c

p. 26, Study Goals and Objectives. Consistent with our study requests, the objectives of this study should address the following:

1. determine how water level fluctuations within the minimum and maximum operating range and discharges from peaking operations at the Wilder, Bellows Falls and Vernon 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.);
3. identify techniques that could be used to mitigate the effects of project operations or other mitigation techniques that could be developed to reduce on riverbank erosion within the impoundment and downstream of the tailrace.

p. 31, Stratigraphic Descriptions, last sentence on this page. The accuracy of the survey grade GPS should be specified.

p. 33, Analysis and p. 34 Deliverables. 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 massive erosion (i.e., due to lack of vegetation, undercutting, etc.) and how this may impact the frequency and magnitude of erosion when high flows occur.

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.

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The analysis should also evaluate how changes in operation of the Projects may affect riverbank erosion along the river.

TC Proposed Study #4: Hydraulic Modeling Study

Relevant NHDES Study Requests: 14a

NHDES Comments:

p. 43, Hydraulic Model Calibration and Verification. It is stated that calibration and verification will be based on a range of observed flows and water surface elevation from USGS gages and water level logger data. Figure 4-1 on p. 40 indicates that the model will be used to 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.

p. 44. Sub-Hourly Flow and Elevation Rate-of-Change. It is stated that 5 modeling scenarios of 24 hours each will be run. The study plan should reflect that additional runs may be needed depending on the results and comments received from the reviewing agencies.

TC Proposed Study #5: Operations Modeling Study

Relevant NHDES Study Requests: 14a

NHDES Comments:

p. 49, Study Goals and Objectives. 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. TransCanada's proposal does not address this objective, but should. Given studies such as those by researchers at the University of New Hampshire¹ 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 TransCanada 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.

p. 50, Methods. It is stated that a 5 year subset of the available 30 years of inflow were selected based on the annual and spring inflow volumes at Vernon and the annual energy production. The study should clarify if the rankings are based on 1 being the lowest or highest inflow volume or annual energy production. To better predict long term continuous impacts, it would be better to run all 30 years rather than a 5 year subset. It would seem that once the various relationships in the model are set up, it would not be difficult to run the model for all 30 years. Based on this understanding, NHDES requests that this be done.

p. 56. Sub-Hourly Model Consideration. Our interpretation of this section is that model runs assuming different project operation will only be run if the erosion, aquatic and terrestrial groups raise concerns based on model results assuming current project operations. One of the objectives in our study request was to compare hourly discharge and water surface elevations at various locations 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.

¹ 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

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TC Proposed Study #6: Water Quality Monitoring Study

Relevant NHDES Study Requests: 22a, 22b, 22c; 25a, 25b, 25c.

NHDES Comments:

General: The information in this study includes some, but not all, of what is typically required in a sampling and analysis plan. DES requests that the Applicant submit a detailed sampling and analysis plan to NHDES for approval, that includes quality assurance provisions, to ensure the data will be useable for water quality standards attainment decisions.

p.62, Table 6-1 Summary of water quality station locations, 2014. This indicates that the most downstream datalogger (V-TR) is at RM 141.8 which is less than two tenths of mile downstream of the Vernon Dam. It is our understanding that TC (and/or FirstLight) will conduct water quality monitoring further downstream to the NH/MA border. Additional stations should be added to the study to ensure that more of the approximate 5.5 mile reach from the Vernon Dam to the NH/MA border is monitored.

p. 63, Figure 6-1. The plan showing the locations of the monitoring stations is illegible. A larger scale plan, as well as aerial photos of each sampling station (mainstem and tributaries) and the approximate water depth at each proposed sampling location should be provided with the sampling and analysis plan.

p. 64, Methods, 1st paragraph. It is stated that turbidity probes will be added to the mainstem Connecticut River multi-parameter datasondes. As stated in our study requests, placement of turbidity dataloggers should also be coordinated with other studies regarding erosion. For example dataloggers located closer to the river bank will be more likely to capture potential plumes associated with erosion. Dataloggers should be placed near shore just below the lower operating elevation of the projects and up and downstream of reference sites (i.e. sites with little potential for erosion) and sites with a higher potential for erosion. NHDES requests that this be addressed in the study. Data collected in this manner will help identify the impact of project operations on sediment movement/ erosion in the Connecticut River.

p.64, Methods. In order to compare results to NH surface water quality criteria for dissolved oxygen in impoundments, and as stated in our study requests (25a, 25b, 25c), "Dataloggers deployed in the impoundment should be set at the bottom of the epilimnion (if stratified) or at 25% depth if not stratified. A vertical dissolved oxygen and water temperature profile should be conducted at the time of deployment of dataloggers in the impounded section to determine if river is stratified and thus the appropriate depth for deployment." This should be included in the sampling and analysis plan.

p.67, Quality Assurance and Quality Control Procedures and Objectives.

The study does not specify the accuracy of all field monitoring equipment, or the laboratory methods and reporting limits for nitrate/nitrite, Kjeldahl nitrogen, total phosphorus and chlorophyll-a. This information should be included in the sampling and analysis plan.

p.68, Instrument Calibration and Frequency, 1st paragraph, 2nd sentence. This section indicates that the sondes at the continuous stations will only be checked halfway through the 10-day low flow period. This appears to contradict the second paragraph on p. 65 which states the continuous monitors will be maintained, calibrated and data downloaded on a weekly basis. All continuous monitors (not just those deployed for the 10-day low flow monitoring) should be maintained, calibrated, and data downloaded at a least every week. The study plan should be revised accordingly.

p 68, Instrument Calibration and Frequency, 1st paragraph, 1st sentence. This section states that calibration will be per the manufacturer's instructions. The calibration standards for dissolved oxygen (we calibrate to

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saturation and zero dissolved oxygen), pH, turbidity, specific conductance, and temperature should be included in the sampling and analysis plan.

p. 69, Analysis. It is stated that results will be compared to impoundment elevation. Results at all stations (not just the impoundment stations) should be compared to water surface elevation measured at or near each station. Also, the sampling and analysis plan should specify how flow in the bypass reach will be determined for the duration of the water quality study.

p. 70. Schedule. Monitoring is proposed for 2014. The study plan should reflect that if river flows in 2014 do not include representative low flow, high temperature conditions, additional monitoring will likely be necessary in 2015.

TC Proposed Study #8: Channel Morphology and Benthic Habitat Study

Relevant NHDES Study Requests: 8
 NHDES Comments:

Please see comments submitted by the New Hampshire Fish and Game Department.

TC Proposed Study #9: Instream Flow Study

Relevant NHDES Study Requests: 5, 10
 NHDES Comments:

General: Minimum flows are mentioned in several sections of this study. NHDES uses the term protective flows which may mean more than one protective flow at each Project. It should be made clear that the study will address the magnitude, frequency, duration, timing and rate of change of a range of flows when determining flows needed to provide suitable habitat for the selected target organisms.

p. 106. Study Reach, Study Site, and Transect Selection, last bullet. It is stated that preliminary river reaches include Vernon dam downstream approximately 1.5 miles. Please specify how was this distance was determined to be the riverine section downstream of the Vernon dam.

p. 108, Hydraulic Data Collection, 2nd paragraph, 1st sentence. It is stated that one complete set of depths and velocities will be taken at each transect at the target high flow or the flow level that can be effectively and safely measured. DES recommends that at a minimum another complete set of velocity and depth measurements be taken at or near the low range of agreed upon study flows so that the model can be properly calibrated. Also please specify the accuracy of the velocity meters.

p.110, Field Data Collection (2-D), 2nd paragraph, 2nd sentence. It is stated that single calibration flow with associated water surface elevations is required for a 2-D site, although additional flows and elevations can assist with model calibration. DES recommends that calibration be based on at least 2 sets of flow and water surface elevation that bracket the range of agreed upon study flows.

p. 105, Methods. As stated in our study requests 5 and 10, "Dataloggers should be deployed in each reach during the study to continuously monitor dissolved oxygen and temperature for comparison to State water quality standards." This should be addressed in the proposed study plan.

Please see other comments submitted by the New Hampshire Fish and Game Department.

TC Proposed Study #10: Fish Assemblage Study

Relevant NHDES Study Requests: 13

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NHDES Comments:

Please see comments submitted by the New Hampshire Fish and Game Department.

TC Proposed Study #14: Resident Fish Spawning in Impoundments Study

Relevant NHDES Study Requests: 14, 16

NHDES Comments:

Please see comments submitted by the New Hampshire Fish and Game Department.

TC Proposed Study #15: Resident Fish Spawning in Riverine Sections Study

Relevant NHDES Study Requests: 12

NHDES Comments:

Please see comments submitted by the New Hampshire Fish and Game Department.

TC Proposed Study #16: Sea Lamprey Spawning Assessment

Relevant NHDES Study Requests: 19

NHDES Comments:

Please see comments submitted by the New Hampshire Fish and Game Department.

TC Proposed Study #17: Upstream Passage of Riverine Fish Species Assessment

Relevant NHDES Study Requests: 20

NHDES Comments:

Please see comments submitted by the New Hampshire Fish and Game Department.

TC Proposed Study #18: American Eel Upstream Passage Assessment

Relevant NHDES Study Requests: 24

NHDES Comments: Please see comments submitted by the New Hampshire Fish and Game Department.

TC Proposed Study #19: American Eel Downstream Passage Assessment

Relevant NHDES Study Requests: 9

NHDES Comments:

Please see comments submitted by the New Hampshire Fish and Game Department.

TC Proposed Study #20: American Eel Downstream Migration Timing Assessment

Relevant NHDES Study Requests: 3

NHDES Comments: Please see comments submitted by the New Hampshire Fish and Game Department.

TC Proposed Study #21: American Shad Telemetry Study - Vernon

Relevant NHDES Study Requests: 2, 4

NHDES Comments:

Please see comments submitted by the New Hampshire Fish and Game Department.

TC Proposed Study #22: Downstream Migration of Juvenile Shad Study - Vernon

Relevant NHDES Study Requests: 26

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NHDES Comments:

Please see comments submitted by the New Hampshire Fish and Game Department.

TC Proposed Study #23: Fish Impingement, Entrainment and Survival Study

Relevant NHDES Study Requests: 18

NHDES Comments:

Please see comments submitted by the New Hampshire Fish and Game Department.

TC Proposed Study #24: Dwarf Wedgemussel and Co-Occurring Mussel Study

Relevant NHDES Study Requests: 12

NHDES Comments:

Please see comments submitted by the New Hampshire Fish and Game Department.

TC Proposed Study #27: Floodplain, Wetland, Riparian, and Littoral Habitats Study

Relevant NHDES Study Requests: 15a

NHDES Comments:

p. 260, Methods and p. 64, Deliverables. 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.

Please see comments submitted by the New Hampshire Fish and Game Department.

TC Proposed Study #29: Northeastern Bulrush Survey

Relevant NHDES Study Requests: 15a

NHDES Comments:

Please see comments submitted by the New Hampshire Fish and Game Department.

TC Proposed Study #30: Recreation Facility Inventory, Use & Needs Assessment

Relevant NHDES Study Requests: 1a, 1b, 1c

NHDES Comments:

Please see comments submitted by the New Hampshire Fish and Game Department.

Comments on Study Requests that TC does not propose to conduct

NHDES Study Request # 27: Climate Change and Continued Project Operations

NHDES Comments:

Please see comments for Study # 5 above.

NHDES Study Request #6, Shad Population Model for the Connecticut River

NHDES Comments:

Please see comments submitted by the New Hampshire Fish and Game Department.

Document Content(s)

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