March 31, 2015

VIA ELECTRONIC FILING WITH FERC

Mr. Toby Stover
Water Quality Branch
US Environmental Protection Agency Region 1
5 Post Office Square Suite 100 (OEP06-2)
Boston, MA 02109-3912

Re: Northfield Mountain Pumped Storage Project Sediment Management Plan – 2014 Summary of Annual Monitoring – Response to EPA Comments

Dear Mr. Stover,

On March 9, 2015, the Environmental Protection Agency – New England (EPA) QA Unit submitted comments to FirstLight Hydro Generating Company (FirstLight) in regard to the *Sediment Management Plan – 2014 Summary of Annual Monitoring* report (2014 Report).[1] During its review, the EPA commented about data collection and quality as presented in the report. It also asked how the data will be used to understand the sedimentation in the Northfield Mountain Pumped Storage Project (the Project) Upper Reservoir; and how that data might be used to propose management measures to prevent future sediment discharges to the Connecticut River. The EPA's 9 specific comments are reproduced in their entirety; FirstLight's responses follow each of EPA's comments.

EPA Comment 1: The [2014 report], which was received as required by December 1, 2014, contains an incomplete evaluation of the data collected from both continuous monitoring instruments (LISST) and the periodic grab samples for laboratory analysis. The results do not describe the particle size distribution, the correlation of LISST data and grab samples for SSC and TSS, the plant operation status in relation to individual TSS/SSC laboratory data results, or flow in relation to individual SSC results. It is unclear how the data can be used to inform decisions on preventing discharges of sediment to the Connecticut River or how it supports the goal of proposing management measures to address entrainment of sediment into the Project works during Upper Reservoir drawdown or dewatering activities to prevent future sedimentation events.

FirstLight Response: As specified in the Sediment Management Plan, the annual reports filed on December 1 of each sampling year are a summary of the monitoring and sampling activities that occurred during that year. They are not in-depth data analysis reports. Data collection results and in-depth data analysis for all QA'd data collected over the course of this study will be presented in the final study

[1] The 2014 Summary of Annual Monitoring report was filed by FirstLight with FERC, EPA, and MADEP on December 1, 2014 in accordance with the requirements of the Northfield Mountain Pumped Storage Project Sediment Management Plan.

John S. Howard
Director FERC Compliance, Hydro

FirstLight Power Resources, Inc.
99 Millers Falls Road
Northfield, MA 01360
Tel. (413) 659-4489/ Fax (413) 422-5900/
E-mail: john.howard@gdfsuezna.com

report. The final study report (Final Report) will address EPA's comments about data quality.

Furthermore, the continuous suspended sediment monitoring and grab sample collection is one piece of a larger effort to inform decisions on preventing discharges of sediment to the Connecticut River and to determine management measures to address the entrainment of sediment into the Project works. The sediment data will not answer all of the study goals in the Sediment Management Plan on their own but they should assist in understanding the sediment loads in the river and the Upper Reservoir.

Among the other actions taken to date in addition to the continuous suspended sediment monitoring and grab sample collection, FirstLight: 1) has developed a 3-dimensional Computational Fluid Dynamics (CFD) model of the Project tailrace to examine and evaluate sediment transport and potential management measures; 2) has developed a 3-dimensional CFD model of the Upper Reservoir to examine and evaluate sediment transport and potential management measures; 3) is exploring the possibility of developing a physical model of the Project works to examine and evaluate sediment transport and potential management measures; and 4) will be conducting a small pilot dredge in the Upper Reservoir in 2015. All aspects of the study will be used to consider management measures to address sediment in the Project works.

EPA Comment 2: Pg. 8, TSS/SSC data: The summary paragraph states that the average holding time was 12 days. All TSS/SSC sample holding times are 7 days from date of collecting. Samples analyzed beyond 7 days should not be included in the data analysis. Additionally, an explanation should be provided to address the missed holding times.

FirstLight Response: During the QA process, which was completed after the 2014 Report was submitted, the results from any grab samples which were analyzed beyond 7 days were discarded and not included in the final dataset that will be used to support the conclusions in the Final Report. Following the conclusion of the 2014 sampling season, sample handling and delivery procedures were reviewed to prevent this issue from reoccurring during the 2015 field season.

EPA Comment 3: Pg. 12-13, Grab Samples: EPA required at least monthly grab TSS samples to be collected; therefore, the in-stream samples on a mostly weekly basis met the requirement. The purpose of the grab samples was as a quality control check for LISST data. Median values are of limited utility – data should be directly correlated. Additionally, the SSC data has not yet been used to convert LISST data, which was a primary purpose for its collection. Please present the individual results for all grab data, provide corresponding LISST data, as appropriate, and place it in context of flow and plant operation status. Only TSS/SSC data that were analyzed within the 7 day holding time should be used.

FirstLight Response: Median values were included in the 2014 Report to provide a high level overview of the data collected in 2014. In-depth data review and analysis was not part of the 2014 Report or prior annual summaries of monitoring reports. Although not included in the 2014 Report, all grab sample data, not just the median values, continue to be reviewed and analyzed.

Grab samples collected at the same time as LISST measurements are reviewed to determine if sediment density patterns can be used to convert volume concentrations (µl/L) to mass concentrations (mg/L) and to determine if there is a linear or non-linear correlation between the LISST volume data and the grab sample data. The results of this analysis (individual results, corresponding LISST data, and flow and plant operation status) will be presented in the Final Report. LISST data values reported as both volume and mass concentrations (when possible) will also be included in the Final Report.

EPA Comment 4: Spring Grab Samples: No grab samples from the LISST instruments were collected during higher flows of the spring runoff. Please provide the explanation. It seems that this data would be

useful for understanding when more sedimentation would occur in the plant works.

FirstLight Response: Grab samples were not collected from the LISST instruments during the first 1-2 months of sampling (spring runoff) due to an oversight on the part of the sampling staff. Sampling procedures were reviewed following the 2014 field season to ensure this issue will not be repeated in 2015. If weather and ice conditions allow, grab samples will be captured over the course of the spring runoff event, as well as throughout the entire sampling season, in 2015.[2]

EPA Comment 5: Figure 3.7: The SSC data from the LISST-HYDRO sampling in the tailrace looks to follow the flow with the highest concentrations in the April. What is believed to contribute to the spike in August?

FirstLight Response: The spike in August 2015 appears to be the result of high flow conditions in the river. Preliminary review of the data suggests that from July 29-July 31 discharge from the Vernon Hydroelectric Plant (Vernon) was at, or greater than, 20,000 cfs (Figure 1). Flows of this magnitude exceed the hydraulic capacity of the Vernon turbines (17,130 cfs), thus resulting in spill conditions. Review of the LISST data collected from 2012-2014 indicates that typically as river flows increase so too does SSC. Based on the Northfield Mountain Project operations data for this period the Project was in pumping conditions for a period of time on both July 29th and July 30th. As such, it appears that the pumping of the turbid water from the Connecticut River to the Upper Reservoir during the high flow event resulted in the spike in SSC observed on the plots.

EPA Comment 6: Pg. 24, Summary: The complete evaluation of the data is needed prior to being able to draw conclusions about its usability. The evaluation is necessary to inform the sampling and analysis strategy for 2015.

FirstLight Response: FirstLight conducted a more detailed evaluation of the data during the winter 2014-2015 to assess the usability of the current dataset and to inform the sampling and analysis strategy for 2015. The results of this analysis will be included in the Final Report. From this evaluation, a number of improvements/refinements were noted for 2015 sampling activities; most notably is the addition of an expanded grab sampling program to supplement/complement the LISST data (see attached).

EPA Comment 7: There is no data or analysis on sediment particle size distribution (except in the Alden report). Is this data being utilized, and if so, how is it being utilized?

FirstLight Response: Particle size data is collected at each LISST instrument (StreamSide, HYDROs, and 100X (2013)) every time a measurement is taken. The final, QA'd dataset, including analysis, will be presented in the Final Report.

EPA Comment 8: What is the modeled concentration of sediment that would be discharged to the CT River be during the periodic drawdown exercises as part of the management scenario? One of the suggested management techniques is to periodically drawdown to flush sediment back into the river. How much sediment will be released, what will the concentration of sediment be and what will the duration be of the discharge?

FirstLight Response: Modeling runs and potential management alternatives are still being evaluated. In-depth discussion of modeling run results, analysis, and potential management measures will be included in the Final Report.

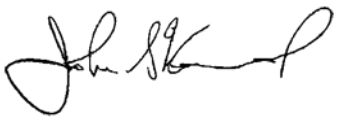
[2] As of this writing, ice remains present throughout the Turners Falls Impoundment and at the Route 10 Bridge.

EPA Comment 9: A suggestion for the 2015 sampling season would be to augment the current sampling program with a robust sampling program of grab samples that would be taken under various conditions: high and low flow, pumping, generating, drawdown, etc.

FirstLight Response: Upon review of the current dataset and the comments provided by EPA, FirstLight has laid out an expanded grab sampling program for the 2015 field season (see attached). The results of this grab sampling program will be used to: 1) provide further data based on standard sample collection and analytical methods to supplement the LISST data; 2) confirm any trends identified during analysis of the LISST data; and 3) develop correlations between the 2015 LISST and grab sample data. These correlations would then be used to confirm the representativeness of the 2015 LISST data or determine any necessary adjustment factors to the 2015 LISST data.

If you have any questions, please feel free to contact me at (413) 659-4489 or via email at john.howard@gdfsuezna.com.

Sincerely,

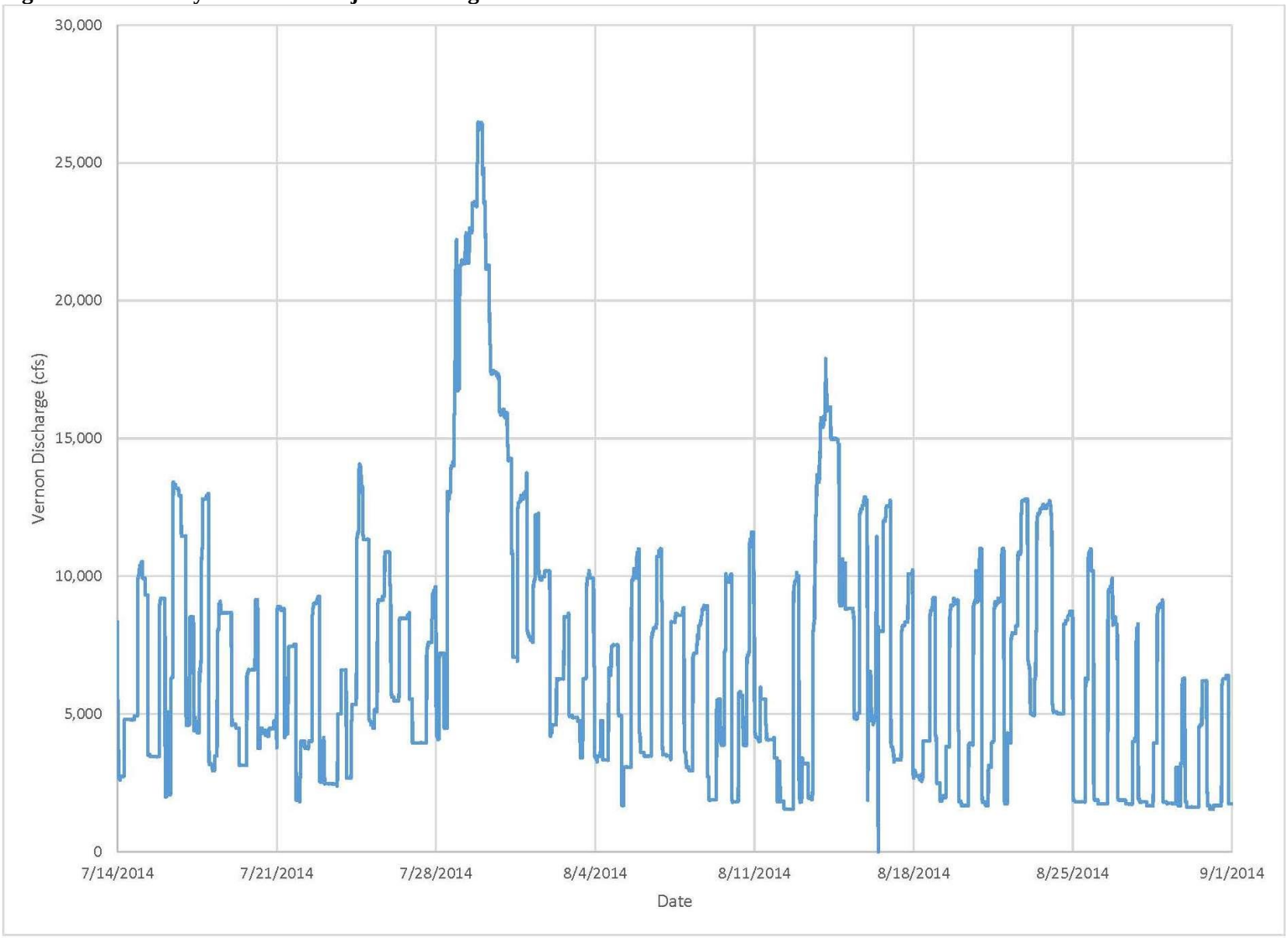


John Howard

Attachments: 2015 Grab Sampling Program

cc: Nora Conlon, EPA (via email)
George Harding, EPA (via email)
Brandon Cherry, FERC (via email)
Chris Chaney, FERC (via email)
Kimberly Bose, Secretary, FERC (via electronic filing with FERC)
Brian Harrington, MADEP (via email)
David Cameron, MADEP (via email)
David Foulis, MADEP (via email)

Figure 1: Vernon Hydroelectric Project Discharge



ATTACHMENT 1 – 2015 GRAB SAMPLING PROGRAM

Task 1: LISST Grab Sample Collection

Grab samples will be collected from the drain hoses of each LISST instrument (StreamSide, HYDRO North, and HYDRO South). In addition, grab samples will also be collected from the edge of water as close to the pumps as possible. Drain hose samples will be collected at the same time a measurement is made at the LISST instrument(s). Grab samples taken from the river will be collected from the shore via a swing sampler. Shoreline and drain hose samples will be collected as close to the same time as possible.

Grab samples will be collected at the LISST-StreamSide whenever a change in flow conditions occurs or bi-weekly, whichever is more frequent. Grab samples will be collected at the LISST-HYDROs over a range of flow and operating conditions or bi-weekly, whichever is more frequent.[3] Emphasis will be placed on collecting additional samples during high flow events. In general, StreamSide and HYDRO grab samples will be collected as close to the same time as possible.

The data collected from these samples will be used to: 1) develop a quantitative dataset over a range of flow and operating conditions; 2) develop a correlation between the 2015 LISST data and the grab sample data to either confirm or adjust the LISST data; and 3) potentially develop a correlation between the grab sample data and the LISST data collected 2012-2014, if possible.

Task 2: Rt. 10 Bridge / Northfield Mtn. Tailrace Boat Barrier Sampling

Data collected in 2013 with the LISST-100X at the Rt. 10 Bridge and at the Northfield Mountain Tailrace boat barrier demonstrated that, in general, under low to moderate flows SSC typically does not vary laterally across the cross-section or vertically throughout the water column. During higher flow events (typically greater than 20,000 to 25,000 cfs) it was observed that SSC typically still does not vary vertically throughout the water column, however, it may vary laterally across the cross-section.

In order to confirm these findings and to develop an independent quantitative dataset, water samples will be collected at the Rt. 10 Bridge on three separate occasions. Rt. 10 Bridge sampling events will include: 1 event during typical flow conditions (low to moderate flows) and 2 sampling events when flows are greater than 20,000 cfs.

Due to safety and logistical challenges associated with sampling at the Northfield Mountain Tailrace boat barrier, and given that the trends observed from the LISST-100X data during low to moderate flow conditions at the Rt. 10 Bridge and Northfield Mountain Tailrace were similar, sampling at the boat barrier under low to moderate flows will not be conducted in 2015. However, if water samples can safely be collected, additional water samples may be collected at the boat barrier during 1-2 flow events between 20,000 to 25,000 cfs.[4] Data collected during these events would be used to further examine SSC variability spanning the cross-section.

Sampling at either location would occur following the Equal-Width Increment (EWI) method at a number of predetermined stations spanning each cross-section (10 stations). For consistency, the same stations used during the LISST-100X sampling would be replicated for this program. Water samples would be

[3] Grab samples representing the range of operating conditions (pumping and generating, varying number of units) will be captured during 2015 efforts.

[4] Cross-section sampling at the Northfield Mountain Tailrace boat barrier would require working from a barge, or similar. As such, sample collection during high flow events may not be possible due to safety considerations.

collected via a Kemmerer sampler, or similar, at three depths per station (~2 ft. off the bottom, middle of the water column, ~1 ft. below the water surface). All water samples would be submitted individually to the laboratory for analysis of SSC, TSS, and PSD (if possible). In addition, one cross-section composite sample will also be submitted to the laboratory for analysis.

Task 3: LISST-StreamSide / Rt. 10 Bridge Alternative

In the event that the LISST-StreamSide cannot be installed in the period of time between the Turners Falls Impoundment being in "ice-out" conditions and the spring freshet occurring, supplemental water samples will be collected from the Rt. 10 Bridge. Water samples will be collected over a range of flow conditions. During typical flow conditions (defined as flows below the hydraulic capacity of Vernon), sampling will occur once per week or whenever flow conditions change, whichever is more frequent. During high flow conditions (defined as flows greater than the hydraulic capacity of Vernon), sampling will occur daily for the duration of the flow event. During a high flow event the goal will be to capture, as closely as possible, the rising limb, peak, and falling limb of the hydrograph; with emphasis placed on the rising limb.

Water samples will be collected following the EWI method via a Kemmerer, or similar. One sample will be collected from the middle of the water column at each station (10 stations total). Samples will then be composited and churn split such that only one sample per sampling event will be provided to the laboratory for analysis of SSC, TSS, and PSD (if possible).

This task would only be necessary if the LISST-StreamSide cannot be installed in April/May due to ice and flow conditions.