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OFFICE OF ENERGY PROJECTS

Project No. 1889-085 – Massachusetts/New
Hampshire/Vermont
Project No. 2485-071 – Massachusetts
FirstLight Hydro Generating Company

Douglas Bennett
Director – Massachusetts Hydro
FirstLight Hydro Generating Company
99 Millers Falls Road
Northfield, MA 01360

**Subject: Determination on Requests for Study Modifications and New Study –
Turners Falls Project and Northfield Mountain Pumped Storage Project**

Dear Mr. Bennett:

Pursuant to 18 C.F.R. § 5.15 of the Commission's regulations, this letter contains the determination on requests for modifications to the approved study plan for the relicensing of FirstLight Hydro Generating Company's (FirstLight) Turners Falls Hydroelectric Project No. 1889 (Turners Falls Project) and Northfield Mountain Pumped Storage Project No. 2485 (Northfield Mountain Project). The determination is based on the study criteria set forth in sections 5.9(b), 5.15(d), (e), and (f) of the Commission's regulations, applicable law, Commission policy and practice, and staff's review of the record of information.

Background

The study plan determination on non-aquatic studies for the projects was issued on September 13, 2013. A subsequent study plan determination was issued on February 21, 2014, to address the proposed aquatic studies.

As of August 10, 2018, when Commission staff issued a revised process plan and schedule for the Northfield Mountain and Turners Falls Projects, First Light had completed 30 of the 39 studies required for the relicensing process. Study determinations requiring additional information for the nine remaining studies were issued on June 29,

2016, February 17, 2017, and June 27, 2017.¹

Between April 3, 2017 and May 1, 2018, FirstLight filed updated study reports for six of the remaining nine studies.² On April 3, 2017, FirstLight filed a revised report for study 3.1.2 (*Northfield Mountain/Turners Falls Operations Impact on Existing Erosion and Potential Bank Instability Study*), and study report addenda to studies 3.3.1 (*Conduct Instream Flow Habitat Assessments in the Bypassed Reach and Below Cabot Station*) and 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*). On May 1, 2017, FirstLight filed a study report addendum to study 3.3.2 (*Evaluate Upstream and Downstream Passage of Adult American Shad*) and a study report errata for study 3.3.1. On July 28, 2017, FirstLight filed a study report addendum to study 3.3.20 (*Entrainment of American Shad Ichthyoplankton at the Northfield Mountain Pumped Storage Project Study*). Finally, on May 1, 2018, FirstLight filed study report addenda to studies 3.3.1 and 3.3.15 (*Assessment of Adult Sea Lamprey Spawning within the Turners Falls Project and Northfield Mountain Project Areas*).

As required in section 5.15 of the Commission's regulations, the updated study reports for the six studies describe FirstLight's progress in implementing the approved study plan, and an explanation of variances from the study plan and schedule. FirstLight held a study report meeting for the six studies on October 9, 2018, and filed a meeting summary on October 24, 2018.

Comments

Comments on the revised study reports and meeting summaries, including requests for study modifications, were filed by the U.S. Fish and Wildlife Service (FWS), National Marine Fisheries Service (NMFS), Massachusetts Division of Fisheries and Wildlife (Massachusetts DFW), and Connecticut River Conservancy (CRC). FirstLight filed reply comments on December 21, 2018.

¹ The June 29, 2016 letter required modifications to study 3.3.9. The February 17, 2017 letter required modifications to studies 3.3.1, 3.3.15, and 3.5.1, and accounted for FirstLight's commitment to provide additional information to stakeholders on studies 3.1.2, 3.3.2, and 3.5.1. In addition, the February 17, 2017 letter clarified the scope of study 3.7.1, including the need to conduct additional field surveys. The June 27, 2017 letter accounted for FirstLight's commitment to provide additional information to stakeholders on studies 3.3.19 and 3.3.20.

² According to the revised process plan and schedule issued on August 10, 2018, FirstLight must file updated study reports for two of the remaining studies (3.3.9 and 3.3.19) by March 15, 2019. On January 18, 2019, staff provided FirstLight with an extension of time until May 14, 2019 to file an updated study report for study 3.7.1.

The CRC filed a new study request on June 8, 2018 involving the evaluation of operational and design alternatives at the Northfield Mountain Project to address project effects.

A number of the comments received do not specifically request additional studies or modifications to the approved studies, and are therefore not addressed herein. For example, some of the comments address the presentation of data; provide additional information; or recommend protection, mitigation, and enhancement measures. In addition to the items listed above, this determination does not address requests for information that FirstLight subsequently provided in its reply comments or requests for study modifications or additional studies that have been addressed in previous Commission letters. This determination only addresses new comments and requests that would require study modifications or additional studies.

Study Plan Determination

Pursuant to section 5.15(f) of the Commission's regulations, any request to modify an ongoing study must be accompanied by a showing of good cause as to why the request should be approved, as set forth in section 5.15(d) of the Commission's regulations. According to section 5.15(d), any proposal to modify a required study must include a demonstration that: (1) the approved study was not conducted as provided for in the approved study plan, or (2) the study was conducted under anomalous environmental conditions or that environmental conditions have changed in a material way.

Pursuant to section 5.15(f) of the Commission's regulations, any proposal for new information gathering or studies that is submitted after the filing of an updated study report is subject to section 5.15(e), except that the proponent must demonstrate extraordinary circumstances warranting approval. As specified in section 5.15(e), requests for new information gathering or studies must include a statement explaining: (1) any material change in law or regulations applicable to the information request; (2) why the goals and objectives of any approved study could not be met with the approved study methodology; (3) why the request was not made earlier; (4) significant changes in the project proposal or that significant new information material to the study objectives has become available, and (5) why the new study request satisfies the study criteria in section 5.9(b).

No modifications are required to the approved study plan for studies 3.1.2, 3.3.2, 3.3.15, 3.3.20, and 3.5.1. As indicated in Appendix A, the requested modifications to study 3.3.20 are not approved, and the requested modifications to study 3.3.1 are

approved in part.³ The requested new study involving an alternatives analysis of the Northfield Mountain Project is not approved. The specific modifications to the studies and the basis for modifying or not modifying the study plan are explained in Appendices B (Requested Modifications to Approved Studies) and C (Requested New Study). Commission staff considered all study plan criteria in section 5.9 of the Commission's regulations; however, only the specific study criteria particularly relevant to the determination are referenced in Appendices B and C.

Pursuant to section 5.15(f) of the Commission's regulations, FirstLight must promptly proceed to complete the undisputed information-gathering for studies 3.3.1 and 3.5.1, and must proceed to complete the additional information-gathering directed herein for study 3.3.1 within 90 days of the date of this letter.

FirstLight has filed multiple study reports for studies 3.1.2, 3.3.1, 3.3.2, 3.3.15, 3.3.20, and 3.5.1, including initial and updated study reports. FirstLight has therefore fulfilled the requirements of section 5.15 of the Commission's regulations for these studies. Accordingly, the study process for studies 3.1.2, 3.3.1, 3.3.2, 3.3.15, 3.3.20, and 3.5.1 is complete, and no additional study modification requests for these studies will be considered by Commission staff.

Please note that nothing in this determination is intended, in any way, to limit any agency's proper exercise of its independent statutory authority to require additional studies.

If you have any questions, please contact Patrick Crile at (202) 502-8042, or via email at Patrick.Crile@ferc.gov.

Sincerely,

for
Terry L. Turpin
Director
Office of Energy Projects

Enclosures: Appendix A – Summary of Determinations on Requested Modifications to Approved Studies and New Studies
Appendix B – Staff's Recommendations on Requested Modifications to Approved Studies
Appendix C – Staff's Recommendations on Requested New Study

³ In its reply comments, FirstLight states that it will file supplemental information for studies 3.3.1 and 3.5.1 by March 1, 2019.

APPENDIX A

SUMMARY OF DETERMINATIONS ON REQUESTED MODIFICATIONS TO APPROVED STUDIES AND NEW STUDIES

Requested Modifications to Approved Studies (see Appendix B for discussion)

Study	Recommending Entity	Adopted	Adopted in part	Not Adopted
3.3.1 - Conduct Instream Flow Habitat Assessments in the Bypassed Reach and Below Cabot Station	Massachusetts DFW		X	
3.3.20 - Entrainment of American Shad Ichthyoplankton at the Northfield Mountain Pumped Storage Project Study	FWS, NMFS, Massachusetts DFW			X

Requested New Studies (see Appendix C for discussion)

Study	Recommending Entity	Approved	Approved with Modifications	Not Required
Northfield Mountain Pumped Storage Alternatives Feasibility Analysis	CRC			X

APPENDIX B

STAFF'S RECOMMENDATIONS ON REQUESTED MODIFICATIONS TO APPROVED STUDIES

3.3.1 - Conduct Instream Flow Habitat Assessments in the Bypassed Reach and Below Cabot Station

Background

The goal of study 3.3.1 was to assess the effects of a range of discharges from Turners Falls Dam, Station No. 1, and Cabot Station on wetted area and aquatic habitat suitability in the Connecticut River between Turners Falls Dam and Cabot Station (the bypassed reach) and downstream of Cabot Station.

As part of the study, FirstLight assessed project effects on aquatic habitat for state and federally listed mussels that occur within the study area. FirstLight conducted mussel surveys in reaches 1-3 (Turners Falls Dam to confluence with Deerfield River)⁴ and reach 4 (Deerfield River to Route 116 Bridge) to document mussel species potentially affected by the project;⁵ however, FirstLight did not observe any extant populations of state or federally listed mussel species. Existing mussel surveys from reach 5 (Route 116 bridge to Dinosaur Footprints Reservation) confirmed the presence of three state-listed species: yellow lampmussel; eastern pondmussel; and tidewater mucket.⁶ Separately, in March of 2014, Massachusetts DFW filed information indicating that the yellow lampmussel may be present in reach 3.⁷ As such, FirstLight proposed to

⁴ Biodiversity. 2012. Freshwater Mussel Survey in the Connecticut River for the Turners Falls and Northfield Mountain Hydroelectric Projects. Report prepared for FirstLight Power Resources, Turners Falls, MA. Available at: http://www.northfieldrelicensing.com/Lists/Document/Attachments/8/503_Turners_Falls_Mussel_Survey_Report.pdf

⁵ Updated Study Report for study 3.3.16, *Habitat Assessment, Surveys, and Modeling of Suitable Habitat for State-listed Mussel Species in the CT River below Cabot Station*; filed September 14, 2015.

⁶ Tighe & Bond. 2014. Rare Mussel Species Survey Report 2013. Report Prepared for Holyoke Gas & Electric Department. Available at: [http://www.northfieldrelicensing.com/Lists/Document/Attachments/251/20140505-5196\(29364224\).pdf](http://www.northfieldrelicensing.com/Lists/Document/Attachments/251/20140505-5196(29364224).pdf)

assess the potential effects of a range of discharges on aquatic habitat for three state-listed mussels in reach 5 and the yellow lampmussel in reach 3.⁸

As detailed in the September 16, 2014 and October 17, 2016 study reports, FirstLight used the Instream Flow Incremental Methodology (IFIM) to quantify the relationship between flow releases and aquatic habitat. However, FirstLight did not include a detailed assessment of project effects on mussel habitat in the initial and updated study reports because the revised study plan required a phased approach where detailed habitat modeling would only occur if an initial assessment of project discharges determined that project operation could affect mussels. After concluding in the October 17, 2016 study report that project discharges could affect mussel habitat, FirstLight conducted additional analyses and filed study addenda for its mussel assessment in reach 3 and reach 5 on May 1, 2018. The reach 3 addendum provides habitat suitability maps and an analysis of weighted usable area (WUA)⁹ versus flow for juvenile and adult yellow lampmussel. The reach 5 addendum contains an assessment of WUA versus flow, persistent habitat,¹⁰ and shear stress for juvenile and adult state-listed mussels at flows between 2,000 cfs and 25,000 cfs.¹¹

To conduct the assessment for reach 5, FirstLight identified and collected data (depth, velocity, and substrate) at 3 to 4 transects in each of the following sub-reaches (from upstream to downstream): (1) Dry Brook; (2) Hatfield; and (3) Mitch's Island. FirstLight used the hydraulic output data (depths and velocities) to run a habitat model and quantify the amount of available habitat per unit length of river for each transect in a sub-reach. In the end, a relationship between WUA per foot of river was developed for each sub-reach. The WUA for each of the three sub-reaches was subsequently added together to yield the WUA for the entire reach and model habitat availability across the range of flows.

⁷ See Massachusetts DFW's March 13, 2014 filing in Docket Nos. P-1889 and P-2485.

⁸ Initial Study Report for Study 3.3.1 – Appendix A, Meeting Minutes for May 15, 2014 Teleconference; filed September 16, 2014.

⁹ Total WUA describes overall habitat suitability within a study area.

¹⁰ FirstLight's persistent habitat (dual flow) analysis consists of an estimate of the total WUA that persists across a range of flows.

¹¹ FirstLight's shear stress analysis evaluates the potential for peaking discharge to create bed shear stresses that could mobilize mussels.

Reach 5 Modeling

Requested Study Modifications

Massachusetts DFW requests that FirstLight model WUA for state-listed mussels within each of the three sub-reaches and provide the modeling results for the range of flows to clarify where reductions in WUA occur within reach 5 at high flows.

Comments on Requested Study Modifications

FirstLight states that five representative reaches were identified in the revised study plan and that the typical IFIM protocol calls for evaluating the overall habitat versus flow relationship for each representative reach, as opposed to evaluating sub-reaches within the reach.

Discussion and Staff Recommendation

In the approved study plan, FirstLight identified reach 5 as a representative reach and indicated that it would conduct a persistent habitat analysis for mussels in this reach. Massachusetts DFW does not provide any evidence that the study was not conducted as approved or that environmental conditions were anomalous or have changed in a material way (section 5.15(d)). While modeling/presenting WUA within each sub-reach could provide some clarification as to where the greatest effects occur within reach 5, this level of precision is not needed to assess the extent of project effects on aquatic habitat for state-listed mussels or inform potential license conditions.

In general, the effects of a peaking project's operation on aquatic resources, including WUA for mussels, are greatest near the powerhouse and attenuate with distance downstream. FirstLight's shear stress analysis presented in the May 1, 2018 addendum for reach 5 supports this. As such, it is unclear why additional WUA modeling would be necessary. FirstLight's study results meet the study objectives (section 5.9(b)(1)) and provide the information required for our analysis (section 5.9(b)(5)). Therefore, we do not recommend that FirstLight model WUA for state-listed mussels within the sub-reaches of reach 5.

Mussel Assessment in Reach 4

Requested Study Modifications

Massachusetts DFW states that FirstLight's study results confirm that project operation affects state-listed mussels in reach 5, but these effects attenuate with increasing distance from Cabot Station. As such, Massachusetts DFW suggests that potential effects on state-listed mussels could be greater in reach 4 than those seen in

reach 5. In addition, Massachusetts DFW notes that relic yellow lampmussel shells have been documented in reach 4 over the last 40 years. In consideration of potential operational effects and the presence of relic yellow lampmussel shells, Massachusetts DFW requests that FirstLight expand the mussel assessment to include reach 4. Massachusetts DFW indicates this assessment would improve its understanding of project effects on shear stress and WUA, and would inform the development of flow recommendations that are appropriately protective of state-listed mussel species.

Comments on Requested Study Modifications

FirstLight states that reach 4 is similar to the upper portions of reach 5 (Dry Brook sub-reach) and does not contain preferred habitat for yellow lampmussel (*i.e.*, stable, level sandbar areas). FirstLight acknowledges that mussels could occasionally colonize limited available habitat areas in reach 4, but states that the higher gradients and lack of sandy substrates in reach 4 limit colonization and population growth in the reach.

Discussion and Staff Recommendation

In the February 21, 2014 study plan determination, Commission staff stated that the need for an analysis of project effects in reach 4 would depend on the results of FirstLight's surveys on state-listed mussels and the availability of suitable habitat for mussels. Although no live state-listed mussels were found within reach 4, relic yellow lampmussel shells have been found in the reach, which indicates that a population of mussels were historically present and may persist in the reach. In addition, FirstLight's September 14, 2015 study report for study 3.3.16 identified several sandbar areas in reach 4 that would provide suitable habitat for yellow lampmussels. FirstLight's study addenda also show that the project is affecting mussels in the adjacent study reaches.

The Commission's January 22, 2015 study modification states that FirstLight was expected to collect transect data in reach 4, and that FirstLight's effects analysis for mussels in reach 4 was contingent not only on the occurrence of state-listed mussels in reach 4, but also on the availability of suitable habitat in reach 4 (section 5.15(d)(1)). FirstLight already collected transect data in reach 4; therefore, the additional cost of evaluating project effects on yellow lampmussel in reach 4 would be minimal (section 5.9(b)(7)). Based on the presence of relic yellow lampmussel shells and the availability of suitable habitat in reach 4, along with known project effects in adjacent reaches, an assessment of project effects on yellow lampmussel is needed for our environmental

analysis (section 5.9(b)(4)). As such, we recommend that FirstLight expand its mussel assessment to include an assessment of project effects on yellow lampmussel in reach 4.¹²

3.3.20 - Entrainment of American Shad Ichthyoplankton at the Northfield Mountain Pumped Storage Project Study

Background

The goal of study 3.3.20 was to quantify entrainment of American shad ichthyoplankton into the Northfield Mountain Project during pump-back operation in a manner that would allow for an evaluation of temporal differences in larval density throughout the pumping cycle and the effects of the number of units pumping on the entrainment rate. The objectives of study 3.3.20 were to: (1) calculate the number of American shad eggs and larvae entrained at the Northfield Mountain Project; (2) estimate the loss of adult and juvenile shad equivalents¹³ based on shad egg and larvae entrainment; (3) compare entrainment rates with one through four units pumping; and (4) determine the temporal distribution of entrainment within the prevailing pumping period.

As detailed in the March 1, 2016 and December 28, 2016 reports for study 3.3.20, FirstLight quantified the entrainment of American shad eggs and larvae at the Northfield Mountain Project by collecting, processing, and analyzing samples from May through July of 2015 and 2016. As part of the study, FirstLight extrapolated the total number of shad eggs and larvae entrained each year based on the density of eggs and larvae collected in the samples and the total volume of water pumped by the project each week. In addition, FirstLight applied life stage-specific mortality rates to the number of shad eggs and larvae entrained to estimate the number of adult and juvenile shad equivalents lost due to entrainment.

In response to stakeholder comments on the March 1, 2016 and December 28, 2016 study reports, FirstLight filed a study addendum on July 28, 2017 that evaluates the

¹² FirstLight should evaluate the 4-variable (depth, substrate, benthic velocity, and shear stress) WUA versus flow relationship, conduct a dual flow analysis using the 4-variable WUA, and conduct shear stress mapping for adult and juvenile yellow lampmussel at the range of flows modeled in reach 4 for other species (1,200 to 37,500 cfs).

¹³ Adult and juvenile shad equivalents represent the number of adult and juvenile shad that would have survived had they not been entrained as eggs or larvae.

effect of the expanded¹⁴ operation of the project's upper reservoir on the entrainment of shad eggs and larvae. FirstLight's analysis of the effects of expanded operation is based on the entrainment data from the 2016 study season, hydrographic data from 2002, and project operation data from 2009.¹⁵

Requested Study Modification

FWS and NMFS request that FirstLight evaluate entrainment variability by using hydrographic data from 2013, 2015, and 2016 (representing wet, normal, and dry years, respectively) to model the effects of expanded operation on entrainment. Massachusetts DFW supports this request.

Comments on Requested Study Modifications

FirstLight states that the timing, magnitude, and duration of water pumped to the upper reservoir are independent of Connecticut River streamflow because pumping is driven by market conditions, irrespective of flow. FirstLight states that, given this information, it did not model entrainment for multiple years.

Discussion and Staff Recommendation

Section 5.15(d) of the Commission's regulations states that any proposal to modify an ongoing study must either demonstrate that the approved study was not conducted as provided for in the approved study plan, that the study was conducted under anomalous environmental conditions, or that environmental conditions have changed in a material way. FirstLight filed sufficient information to satisfy each study objective, and FirstLight's July 28, 2017 study addendum provided sufficient information for an environmental analysis of the effects of expanded operation on the entrainment of shad eggs and larvae. None of the agencies have provided information to show that FirstLight did not conduct the study as provided in the approved study plan or that environmental conditions were anomalous or have changed in a material way.

¹⁴ FirstLight currently operates the upper reservoir of the Northfield Mountain Project between 938 and 1,000.5 feet mean sea level (msl). In its April 29, 2016 license application, FirstLight proposes to expand the operating range of the reservoir to between 920 and 1,004.5 feet msl.

¹⁵ FirstLight also used the 2002 hydrographic data and 2009 project operation data to evaluate the effects of expanded operation on erosion as part of study 3.1.2 (*Northfield Mountain/Turners Falls Operations Impact on Existing Erosion and Potential Bank Instability Study*). FirstLight filed this report on April 3, 2017.

FWS's and NMFS's requests focus on evaluating entrainment variability across a range of hydrologic conditions, which was not an objective of study 3.3.20. The number of eggs and larvae entrained and the timing of entrainment vary from year to year, as shown by the results of the 2015 and 2016 studies. Some of this variability is due to reasons unrelated to project operation, such as annual variations in spawner abundance, shifts in spawning locations, the inherently patchy distribution of ichthyoplankton, and variable environmental conditions that affect egg and larval survival. For these reasons, as well as the reason provided by FirstLight regarding project operation, precisely quantifying entrainment variability with regard to environmental conditions is likely not possible or necessary for staff's environmental analysis.

Because the study results satisfy the study objectives (section 5.9(b)(1)) and provide the information required for staff's analysis and the development of any license requirements (section 5.9(b)(5)), and because the agencies did not provide good cause for modifying the study (section 5.15(d)), we do not recommend requiring FirstLight to conduct any additional entrainment modeling.

APPENDIX C

STAFF'S RECOMMENDATION ON REQUESTED NEW STUDY

Alternatives Analysis of Northfield Mountain Project

Requested New Study

On June 8, 2018, the Connecticut River Conservancy (CRC) filed a letter proposing a new study to evaluate a “reasonable range of alternatives” for operating the Northfield Mountain Pumped Storage Project No. 2485 (Northfield Project). CRC states that its new study request is timely because several environmental study reports have now been completed and there is a clear and sufficient understanding of the environmental effects of the project. CRC states that FirstLight’s December 2, 2015 draft license application and April 29, 2016 final license application were incomplete and did not contain protection, mitigation, and enhancement (PM&E) measures. According to CRC, it has not had an opportunity to comment on proposed PM&E measures or request new studies in response to a draft license application that contains PM&E measures, as provided by section 5.16(e) of the Commission’s regulations. CRC states that the environmental measures put forward by FirstLight to-date do not address the adverse project effects identified through the relicensing study process, and the requested study is needed to provide the tools necessary for a full evaluation of alternatives, as required by the National Environmental Policy Act (NEPA).

The goal of the new study is to provide resource managers, stakeholders, and the licensee with enough information to evaluate a full range of operational and design alternatives at the Northfield Project such that participants can recommend PM&E measures and provide recommended license terms. The objectives of the study request are to determine: (1) the full suite of options for minimizing or eliminating the Northfield Project’s effects, including operational changes and options that require construction; (2) the approximate scale of costs and logistics associated with modifying the current facility for each alternative option; (3) the project effects that would be minimized or eliminated under each alternative; (4) any revenue or generation enhancement associated with each alternative; and (5) “mitigation options” in the event that project effects cannot be minimized or eliminated.

CRC states that information collected from the relicensing studies demonstrates that the Northfield Project is contributing to a number of adverse environmental effects, including: entrainment and mortality of fish and eels; submersion of state-listed dragonfly and damselfly species; submersion of rare plants; bank erosion and sediment transport, which effects archaeological resources; and dewatering of recreational facilities. CRC states that these effects need to be avoided, minimized, or mitigated, but FirstLight has only informally proposed to install a tailrace barrier net to protect juvenile American shad

and other aquatic species from becoming entrained at the project. CRC states that there is a need to be “more creative and pro-active” to mitigate environmental impacts.

CRC suggests that potential alternatives for reducing environmental impacts could include: (1) retrofitting the project to have adjustable speed capabilities that allow for pumping velocities to be adjusted; (2) converting the project to either a closed-loop or a partially closed-loop system; or (3) widening the intake/tailrace area to reduce velocities when pumping. To evaluate these alternatives, CRC suggests that FirstLight: (1) develop an initial list of operating alternatives, in consultation with stakeholders, academic experts, and the Department of Energy (DOE); (2) draft a report that summarizes the effects of each alternative on environmental and developmental interests, in consultation with stakeholders, academic experts, and DOE staff; and (3) develop a final report summarizing all alternatives, including costs associated with construction, maintenance, generation changes, or other costs added or avoided.

CRC estimates that the cost of the study would be between \$100,000 and \$150,000. CRC states that the outcomes of the study would help inform the development of license requirements by providing a suite of options to minimize project effects.

Comments on Requested New Study

FirstLight did not file reply comments on CRC’s proposed new study.

Discussion and Staff Recommendation

Analysis of Extraordinary Circumstances

CRC’s request for an evaluation of operational and design alternatives at the Northfield Project is similar to a previous request that it filed with the Commission on March 1, 2013, which involved the feasibility of converting the Northfield Project to a “closed loop, or partially closed-loop system.” In the September 13, 2013 determination letter, Commission staff rejected the proposed study based on the potential costs of a closed-loop facility and the early stage of the relicensing process for the project, including the fact that the environmental effects of the project were still being studied and mitigation measures were still being developed by FirstLight.

CRC’s new study request involves a broader analysis of operational alternatives than the prior study request that was focused on converting the Northfield Project from an open-loop to a closed-loop system. At this stage of the proceeding, FirstLight has also completed the majority of the studies required for the relicensing process and the environmental effects of the Northfield Project are better understood compared to when the relicensing process began. Based on the availability of significant new information in

the proceeding (section 5.15(e)(4)), additional analysis of CRC's new study request is warranted at this time.

Analysis of Proposed Study

CRC's request for an alternatives analysis is predicated on the assertion that stakeholders have not had an opportunity to comment on proposed PM&E measures and that FirstLight is currently looking at only a "single, unproven" PM&E that "could, in turn, lead to improper constraint of the range of reasonable alternatives to be considered through the NEPA process."

In its December 2, 2015 draft license application and April 29, 2016 final license application, FirstLight explains that it was not able to develop a complete licensing proposal for operating the Northfield Project because many of the relicensing studies were not completed at the time of filing due to reasons outside of its control.¹⁶ In its license application, FirstLight states that it will be in a better position to develop a comprehensive proposal for relicensing the project after it completes the relicensing studies and completes consultation with resource agencies and other stakeholders. FirstLight stated that it would file amendments to its license application at a later date, including an analysis of final study results and a more complete proposal for future project operation and PM&E measures.

Based on FirstLight's commitment to file an amendment to its license application, Commission staff expects that FirstLight will propose additional measures to reduce project effects. However, the Commission's regulations do not require an applicant to propose measures for resolving every adverse project effect. Sections 5.16 and 5.18 of the Commission's regulations require the filing of preliminary and final license applications that include the results of studies conducted under the approved study plan and any PM&E measures that are being proposed by the applicant.¹⁷ Pursuant to section 5.18(b)(5) of the Commission's regulations, a license applicant must: (1) describe how each proposed measure would protect or enhance the existing environment; and (2) include cost estimates for each proposed PM&E measure. These requirements directly address two of the objectives listed by CRC in its study request, for those measures that are proposed by FirstLight.

¹⁶ The initial study season for several aquatic resource studies was delayed for one year due to the anticipated impacts of the Vermont Yankee nuclear power plant decommissioning in 2014.

¹⁷ See section 4.38(c)(4)(2) of the Commission's regulations for the comparable filing requirements for a draft license application.

If FirstLight files an amendment to its license application, Commission staff will comprehensively review the amended application to identify whether there are any deficiencies or additional information needs, in accordance with sections 5.20 and 5.21 of the Commission's regulations. In addition, regardless of whether or not FirstLight amends its license application, Commission staff will assess the need for additional information to conduct the environmental analysis and develop recommendations regarding the licensing proposal. If Commission staff needs further information on any specific measures to complete its environmental analysis and develop recommendations for the licensing proposal, it can require the information to be filed at any time during the licensing proceeding.

After Commission staff determines that an application meets the Commission's filing requirements and all additional information needs have been met, the Commission will notify the public that the application is ready for environmental analysis. At that time, the Commission will provide an opportunity for licensing participants to file comments on the application (including any PM&E measures that have been filed by the applicant), and to recommend additional PM&E measures. To the extent CRC believes that any additional measures are needed to reduce project effects, it can file comments to that effect after the Commission issues its public notice that the project is ready for environmental analysis. Commission staff will consider the need for environmental measures in the environmental impact statement for the project. Therefore, contrary to CRC's concerns, stakeholders will have an opportunity to comment on FirstLight's proposed PM&E measures and the range of reasonable alternatives will not be constrained in the NEPA analysis.

Because additional opportunities are available in the licensing process for alternatives to be proposed by FirstLight, recommended by stakeholders, and evaluated by Commission staff, the information requested by CRC is not needed at this time (section 5.9(b)(4)), and we do not recommend adding the new study to the existing study plan.