129 FERC ¶ 62,111
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Great Bay Hydro Corporation Project No. 2306-143

ORDER AMENDING LICENSE

(Issued November 09, 2009)

1. On February 19, 2009, Great Bay Hydro Corporation (Great Bay), licensee for the Clyde River Hydroelectric Project, FERC No. 2306, filed an application to amend its license to modify the authorized repowering of the project's West Charleston Development. Specifically, Great Bay is proposing to decommission the development's existing penstock and powerhouse and construct and operate a new powerhouse and generating facilities. The filing was supplemented on March 18 and July 7, 2009. The proposed repowering would reduce the nameplate capacity of the Clyde River Project from 4,800 kilowatts (kW) to 4,675 kW. The project is located on the Clyde River near Newport, in Orleans County, Vermont.

Background

2. A new license was issued for the project on November 21, 2003, [1] authorizing the continued operation of the project's Newport 1, 2, 3 and West Charleston developments. These developments include associated impoundments on the Clyde River, and two storage impoundments (Seymour Lake and Echo Lake) on a tributary to the Clyde River.

3. The West Charleston Development, as licensed, consists of: (1) a 196.3-foot-long, 28-foot-high masonry dam consisting of (a) a 107.3-foot-long uncontrolled spillway section, (b) a single 19-foot square forebay extending to 6-foot and 8-foot diameter headgates (c) a 6-foot-diameter sluice gate which has been plugged with concrete and capped, and (d) 18-inch-high flashboards; (2) a 64-foot-long, 19-foot-wide, and 15-foot- high reinforced concrete and brick powerhouse, housing one horizontal twin runner S. Morgan Smith-Francis turbine connected to a General Electric generator rated at 800 kW; (3) a 1,622- foot-long, 6-foot-diameter steel penstock

[1] See, *Citizens Utilities Company*, 105 FERC ¶ 62,119, Order Issuing New License. (2003)

extending from the dam to the powerhouse; (4) a 26-foot-long, 23-foot-wide, and 17-foot- high wood-framed and clapboard-sided gatehouse structure; (5) a 40-acre impoundment with a usable storage capacity of 220 acre-feet; and (6) appurtenant facilities. The West Charleston dam is located in Orleans County, in northern Vermont, just upstream of the village of West Charleston. The dam impounds Charleston Pond, which has a drainage area of about 107 square miles. The dam was originally constructed in 1900 with the last modifications and repairs made in 1997. The plant was remotely operated from the Newport 1, 2, 3 Development powerhouse. The plant has been idle since 1998 due to the poor condition of the penstock.

4. The new license directed Great Bay to perform several enhancements and modifications to the project, including the repair of the West Charleston Penstock and generating equipment to repower the development. The new license also includes provisions to modify the development to comply with the license's run-of-river and minimum flow requirements and the Vermont Agency of Natural Resources (VANR) 401 Water Quality Certification (WQC). [2]

Proposed Amendment

5. In the application Great Bay explains that the new license includes a provision for penstock replacement. Great Bay conducted a feasibility study investigating various options to bring the West Charleston Development back into service. Based on cost and engineering feasibility assessments, Great Bay determined that the construction of a new powerhouse adjacent to the dam, which discharges directly to the tailrace, and the subsequent decommissioning and partial removal of the penstock, is the most favorable option both financially and with respect to license and WQC compliance.

6. Great Bay proposes to repower the West Charleston Development by removing the existing gatehouse and modifying and improving the concrete intake structure at the right abutment of the West Charleston dam. The existing intake would be modified to pass the required minimum flow onto the dam apron when the powerhouse is not in operation. In addition, Great Bay proposes the complete removal of the clapboard gatehouse structure at the dam's right abutment and replacement of the existing gates at the dam.

7. Great Bay proposes to reinstall 18-inch-high flashboards on the dam crest, which were removed in 1998, to raise the effective crest 15 inches (to elevation 1,060.25 feet msl), the same elevation authorized under the original license. The new development

[2] Under the new license, the development is required to be operated run-of-river with a minimum bypass flow of 50 cubic feet per second (cfs) from July 1 through September 30, and 74 cfs from October 1 through June 30.

will operate in a run-of-river mode with the pond elevation maintained at the top of the flashboards.

8. Great Bay proposes to construct a new powerhouse at the downstream side of the existing dam intake to release flows directly to the tailrace, thus eliminating the bypass reach. The new powerhouse would consist of a 26-foot by 28-foot masonry and steel building housing a Vertical Axis Flow Double Regulated Turbine-Generator. The new turbine would be rated at 910 horsepower with a design head of 31.7 feet and maximum hydraulic capacity of 300 cfs, and would be connected to a synchronous generator rated at 675 kW.

9. Great Bay proposes to remove the first 600 feet of the remaining penstock section, all of which is elevated. The portion of the penstock that runs under Durgin Road was previously removed in October 2008 when a partial collapse of the penstock needed repair, and stabilization work was needed for the roadway. The portion of the penstock that extends from Durgin Road to the powerhouse is embedded into a hillside and runs underneath local distribution and transmission lines owned by Vermont Electric Cooperative, Inc. Great Bay proposes to leave this section in place, thus avoiding ground-disturbing activities.

10. Great Bay proposes a new tailrace that would extend out from the new powerhouse about 80 feet at a 45 degree angle to the dam. Excavation would start at a depth of about 12 feet at the powerhouse, tapering to a streambed elevation of about 1,027 feet msl at the downstream end of the tailrace. A concrete training wall would be constructed along the left side of the tailrace. Great Bay indicates in its filing that all flow through the generating unit would be discharged at the dam, thus eliminating the bypass reach and the need for minimum bypass flows. The new tailrace channel and a transverse channel at the toe of the dam would be designed in a manner that would provide a minimum flow in the transverse channel equal to the estimated 7Q10 flow.

11. Great Bay indicates in the filing, that installation of a new powerhouse at the dam would result in more efficient operation than repairing the existing penstock. In addition, Great Bay has determined that this is a more cost-effective option than repairing the existing powerhouse and replacing the existing penstock. Great Bay states that the proposed construction would not conflict with the natural, scenic, and historic values of the project and is consistent with recreational plans, but would reduce the overall capacity of the project. Construction of the new powerhouse is planned to begin by January 2011 and to be completed by January 2013.

Consultation and Public Notice

A. Consultation

12. In accordance with § 4.38(a) of the Commission's regulations, by letter dated July 9, 2008, Great Bay consulted with the VANR, U.S. Fish and Wildlife Service (FWS), and Vermont State Historic Preservation Officer (SHPO) before filing the amendment application. In a letter dated January 20, 2009, the VANR commented that the proposal would require an amendment of its WQC for the project. By letter dated February 19, 2009, Great Bay submitted an application to the VANR requesting an amendment of the WQC to modify repowering of the West Charleston Development. On January 26, 2009, the FWS stated that it has no comments on the amendment application.

B. Public Notice

13. On April 10, 2009, the Commission issued a public notice of the amendment application. The notice set May 11, 2009, as the deadline for filing comments, protests and motions to intervene. In a letter filed on May 5, 2009, the FWS stated that it has no comments on the application. On May 11, 2009, the VANR filed a motion to intervene and issued an amended WQC for the repowering proposal. In addition, on July 7, 2009, Great Bay filed a Memorandum of Understanding (MOU) between Great Bay and the Vermont SHPO regarding repowering of the West Charleston Development. No other responses to the public notice were filed. Staff considered all of the comments from the agencies and prepared an Environmental Assessment (EA) on the proposed action, which is attached to this order.

Statutory Requirements

A. Water Quality Certification

14. Under section 401(a)(1) of the Clean Water Act (CWA),[3] the Commission may not issue a license authorizing the construction or operation of a hydroelectric project unless the state water quality certifying agency either has issued water quality certification for the project or has waived certification by failing to act on a request for certification within a reasonable period of time, not to exceed one year. Section 401(d) of the CWA provides that the certification shall become a condition of any federal license that authorizes construction or operation of the project.[4]

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[3] 33 U.S.C. § 1341(a)(1) (2000).

[4] 33 U.S.C. § 1341(d) (2000).

15. On February 19, 2009, Great Bay applied for an amended WQC from the VANR for the proposed modifications to the West Charleston Development. On May 11, 2009, the VANR issued the amended WQC, which is included in Appendix A of this order. The VANR concluded that the proposed powerhouse, if constructed in accordance with the measures included in the amended WQC, would cause no violation of Vermont Water Quality Standards and would be in compliance with sections 301, 302, 303, 306, and 307 of the CWA.

B. Section 18 Fishway Prescription

16. Section 18 of the Federal Power Act (FPA) states that the Commission is to require construction, operation, and maintenance by a licensee of such fishways as prescribed by the secretaries of the U.S. Department of Commerce or the U.S. Department of the Interior. No fishway prescriptions were made pursuant to this section.

C. Section 10(j) Conditions

17. Under Section 10(j) of the FPA, each hydroelectric license issued by the Commission must include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation of adverse effects to, or enhancement of fish and wildlife resources. No recommendations were filed by any federal or state fish and wildlife agencies pursuant to this section.

D. Threatened and Endangered Species

18. Section 7(a)(2) of the Endangered Species Act (ESA) of 1973 (16 U.S.C. § 1536(a)) requires federal agencies to ensure their actions are not likely to jeopardize the continued existence of federally-listed threatened or endangered species, or result in the destruction or adverse modification of their designated critical habitat.

19. No state or federally- listed rare, threatened, or endangered species of animals are known to inhabit the project area, although transient species (such as the bald eagle) may pass through the area. The FWS identified the sedge wren (Cistothorus platensis) as a threatened vertebrate species possibly occurring within the project boundary. Field surveys, however, did not identify the presence of the sedge wren. The VANR's Nongame and Natural Heritage Program database does not list any rare, threatened, or endangered plant species in the lower Clyde River valley (FERC, 1996).

E. National Historic Preservation Act

20. Section 106 of the National Historic Preservation Act (NHPA) (16 U.S.C. §470 (f)) requires consultation with the State Historic Preservation Officer (SHPO) regarding the status and potential impacts to culturally and historically significant properties. On July 7, 2009, Great Bay filed an MOU between Great Bay and the Vermont SHPO regarding repowering of the West Charleston Development. The agreement defines

appropriate steps to be taken to mitigate any adverse effects on historic properties resulting from repowering the development. The project's Historic Properties Management Plan (HPMP), developed pursuant to the Programmatic Agreement (PA) for the project, and the above MOU, executed pursuant to the HPMP, demonstrates the Commission's compliance with Section 106 of the NHPA. [5]

Other Issues

A. Installed Capacity and Hydraulic Capacity

21. In the February 19, 2009 filing, Great Bay provided the proposed installed capacity of the new powerhouse. Table 1 lists the existing and proposed installed and hydraulic capacities of the Clyde River Project.

Table 1

Development	Units	Turbine Capacity (kW)	Generator Capacity (kW)	Hydraulic Capacity (cfs)	Limiting Capacity (kW)
Newport 1, 2, 3	1	1,800	1,700	149	1,700
	2	1,800	1,700	149	1,700
	3	750	600	63	600
West Charleston (old removed)	1	750	800	206	750
West Charleston (new proposed)	1	682	675	300	675
Total					4,675

22. After the installation of the single generating unit at the new West Charleston powerhouse, the development's turbine output would decrease by 68 kW and its generator output would decrease by 125 kW. However, the development's hydraulic capacity would increase by 94 cfs. The total installed capacity of the West Charleston Development would decrease from 750 kW to 675 kW, limited by the generator output. There are no proposed changes to the Newport 1, 2, 3 Development, which would remain at the authorized capacity of 4,000 kW, with an associated hydraulic capacity of 361 cfs.

[5] The HPMP was approved by Order Approving Historic Properties Management Plan, issued November 14, 2008 (125 FERC ¶ 62,150). The PA, which Great Bay is required to implement under Article 419 of the project license, was executed on February 11, 2002, among the Commission, Advisory Council on Historic Preservation, and Vermont SHPO.

23. This order will approve the proposed new West Charleston powerhouse and revise the authorized installed capacity of the Clyde River Project from 4,800 kW to 4,675 kW. In accordance with 18 CFR §11.1(c)(5), the annual charges for the project, for the purpose of reimbursement to the United States Government for the costs of administration of Part I of the FPA, will be based on an installed capacity of 4,675 kW, effective on the date of commencement of construction of the proposed capacity. As such, we are requiring the licensee, in ordering paragraph (F) of this order, to report the date of commencement of construction of the proposed generating unit within 30 days of that date. We will use the commencement date to revise the annual charges under article 201 of the project license. Furthermore, we are requiring the licensee, in ordering paragraph (E) of this order, to start construction of the proposed unit within two years, and complete construction within four years from the date of this order.

B. Decommissioning of the Old Powerhouse

24. The existing West Charleston powerhouse is part of the West Charleston Hydroelectric Station Historic District, as defined in the project's HPMP. The proposed redevelopment of the West Charleston Development would have an adverse effect on the facilities comprising the historic powerhouse. Under the MOU, signed by the Vermont SHPO on July 1, 2009, Great Bay will consult with the SHPO regarding possible alternatives for rehabilitating the West Charleston powerhouse for a new use. In addition, the MOU stipulates that Great Bay will ensure that the historic West Charleston powerhouse is secured from vandalism and physical deterioration, until is has determined the disposition of the powerhouse in consultation with the SHPO. The MOU also stipulates that in the event that Great Bay determines that rehabilitation of the powerhouse is not practicable and that it must be demolished, Great Bay would further consult with the SHPO regarding measures to resolve any adverse effects on the powerhouse.

C. Revised Exhibits

25. The revised Exhibit A of the project license, submitted with the application, reflects updated information pertaining only to the West Charleston Development. A revised Exhibit A describing the Clyde River Project was previously approved by the Commission in an order issued October 23, 2008. [6] In addition, in the March 18, 2009 filing, Great Bay submitted some corrections to the intake gate location and flashboards details. Our review of the revised Exhibit A found that it includes modifications to the West Charleston dam, including: removal of the existing gatehouse; a new intake structure; partial removal of the existing penstock; a new powerhouse; a new tailrace; and

[6] See, *Great Bay Hydro Corporation*, 125 FERC ¶ 62,082, Order Amending License and Approving As-built Exhibits (2008).

a new generating unit and associated equipment. The revised Exhibit A conforms to the Commission's rules and regulations and will be approved by this order. In addition, this order will amend the project description in the license to reflect the proposed changes to the project, as described in the revised Exhibit A filed on February 19, and supplemented on March 18, 2009.

26. As part of its application, Great Bay submitted for Commission approval two new proposed Exhibit F drawings for the project. The drawings are labeled as TR-1 and TR-2 showing the proposed powerhouse and new tailrace section at the West Charleston Development. The Exhibit F drawings reflecting the proposed changes to the project conform to the Commission's rules and regulations and will be approved by this order.

27. Where new construction or modifications to projects are involved, the Commission requires Great Bay to file revised Exhibits A, F and G, as needed, describing and showing project features as built. In addition, to the as-built drawings, this order will require the filing of contract plans and specifications and cofferdam construction drawings, as shown in ordering paragraphs (R), (S) and (T).

D. License Article Revisions and Deletions

28. The proposed decommissioning of the West Charleston Development's penstock section and existing powerhouse and the installation of the new powerhouse will require revisions to the following articles:

Article 309

29. Article 309 of the license requires the licensee, within 90 days of license issuance, to notify the Commission that the flashboards have been permanently removed from the West Charleston dam, consistent with condition B of the original WQC. In our review of the application, we have found that the 18-inch-high flashboards that were originally part of the project's license were previously removed in 1998. Great Bay is proposing to reinstall them on the dam crest to raise the effective crest 15 inches. Condition B of the original WQC required permanent removal of the flashboards, which had been a feature of the development until operation ceased in 1998.

30. In the amended WQC the VANR states that reinstallation of flashboards would result in inundation of a portion of the riverine habitat in the bypassed reach of the Barton Village Project. However, the amount of coldwater habitat lost would be relatively small, and the habitat was judged as not critical to the Lake Memphremagog salmon program. We agree with the VANR and approve the reinstallation of the flashboards at the project. Therefore, Article 309 of the license will be deleted from the license.

Article 311

31. Article 311 of the license requires the licensee, within 6 months of license issuance, to file with the Commission, for approval, a plan and schedule for repairing the West Charleston Development penstock and generating system, including modifications necessary to provide reliable and efficient run-of-river operations. Article 311 and Condition I of the WQC include design requirements for the replacement of the West Charleston penstock and repairs to the generating units.

32. The existing penstock is 1,622 feet in length and six feet in diameter. An approximately 600-foot-long section of the penstock is located between the West Charleston Dam and Derby Town Highway No. 2 (Durgin Road). The remaining 1,022 feet of the penstock runs under Durgin Road and continues to the West Charleston Powerhouse. In its application, Great Bay is proposing to remove the first 600 feet of the existing penstock, the section within and along the river channel down to Durgin Road. Because Great Bay is proposing to partially decommission the penstock, including removing the sections from the river channel, it believes the design requirements and conditions in the license and the WQC related to the penstock are no longer relevant.

33. In the amended WQC, the VANR states that since Great Bay will be removing the steel penstock within and along the river channel down to Durgin Road, both aesthetics and public access to the river would be enhanced. This action is consistent with the original certification, which requires prior approval of the penstock replacement to reduce the impact on aesthetics under Condition I of the WQC.

34. In the amended WQC, Condition I was revised to provide for a plan for the removal of the penstock and cradles from the dam to Durgin Road and showing any associated clearing for access, with replanting as needed. Therefore, we are revising Article 311 to reflect the requirements of Condition I of the amended WQC, included as Appendix A of this order.

Article 401

35. Article 401 of the license and Condition B of the WQC require that when the project is in operation, Great Bay continuously release the lesser of 50 cfs or inflow from the West Charleston reservoir into the bypassed reach of the Clyde River from July 1 through September 30, and the lesser of 74 cfs or inflow from the reservoir into the bypassed reach from October 1 through June 30.

36. Under the new design, all flow through the generating unit would be discharged at the dam, resulting in the elimination of the bypassed reach and the need for minimum bypass flows. Instead of the previous minimum flow requirement for the West Charleston development, condition X of the amended WQC, included as Appendix A of this order, now requires the release of a minimum flow of 21 cfs in the transverse

channel, from the head of the tailrace and through a scour pool along the toe of the dam. In addition, Great Bay must operate the West Charleston Development in a run-of-river mode in accordance with condition B of the amended WQC. Therefore, to reflect the requirements of the amended WQC, we are revising Article 401 accordingly.

Article 417

37. Article 417 and condition K of the WQC require Great Bay to file design drawings of a proposed trashrack structure at West Charleston to reduce entrainment of resident fish. Therefore, we are revising Article 417 of the license to reflect the proposed design changes by requiring the licensee to file, for Commission approval, detailed design drawings of the licensee's proposed trashrack structure at the West Charleston Development, to reduce the entrainment of resident fish. The proposed design should be included with the design plan for the new powerhouse and generating system. The design plans should be developed together with a schedule to install the trashrack, consistent with condition K of the amended WQC, included as Appendix A of this order.

38. The Commission will reserve the right to require changes to the proposed facilities and schedule. Upon Commission approval, the licensee will be required to implement the facility designs and schedule, including any changes required by the Commission.

Environmental Review

39. The attached EA analyzes the environmental effects of the proposed action. As described in the amendment application, Great Bay proposes to redevelop the West Charleston Development by decommissioning the old powerhouse and penstock and constructing and operating a new powerhouse containing a single generating unit. As described in the EA, Great Bay's proposal, with the conditions of the VANR's amended WQC, would adequately protect, mitigate adverse effects to, and enhance the development's environmental resources.

40. In its amended WQC, the VANR included revised and additional conditions that are included as ordering paragraphs N through P of this order. These conditions included a revised flow management plan, a revised minimum flow and reservoir elevation monitoring plan, a comprehensive erosion prevention and sediment control and water management plan, and a water quality monitoring plan. Additionally, Article 401 of the license is revised to require the release of a minimum flow of 21 cfs in a proposed transverse channel, from the head of the tailrace and through a scour pool along the toe of the dam, to protect aquatic resources in the river bypass immediately below the dam. Finally, we are also revising Article 417 to include a new intake trashrack structure designed to reduce the entrainment of resident fish at the proposed West Charleston powerhouse. The plan for the proposed trashrack should be included with the design plan

for the new powerhouse and generating system. The design plan should be developed in accordance with Condition K of the original WQC.

41. Based on the analyses contained in the EA, and the above information, we agree with the EA's conclusion that approving Great Bay's application would not constitute a major Federal action significantly affecting the quality of the human environment.

Summary

42. This order amends the license of the Clyde River Hydroelectric project, to repower its West Charleston Development as authorized in ordering paragraph (A) of this order. In ordering paragraph (B), we are approving the revised Exhibit A filed with the amendment application, and in ordering paragraph (C), we are revising the project description for the West Charleston Development to reflect the proposed changes to the project. In ordering paragraph (D), we are requiring the licensee to comply with the conditions of the amended WQC, included as Appendix A of this order. In ordering paragraph (E) we are requiring the licensee to start construction of the new powerhouse within two years, and complete construction within four years from the date of this order. In ordering paragraph (F), we are requiring the licensee to report the date of commencement of construction of the proposed unit, within 30 days of that date. In ordering paragraph (G), we are approving the Exhibit F drawings filed with the application, and requiring aperture cards of the approved drawings, as directed in ordering paragraph (H). In ordering paragraph (I) we are deleting Article 309 of the license regarding the flashboards removal. In ordering paragraph (J), we are revising Article 311 of the license by requiring the licensee to file a plan for the removal of the penstock and penstock cradles from the dam to Durgin Road at the West Charleston Development, consistent with Condition I of the amended WQC appended to this order. In ordering paragraph (K), we are revising Article 401 of the license regarding the required minimum flow in the transverse channel. In ordering paragraph (L), we are revising Article 417 of the license regarding the proposed trashrack structure. In ordering paragraph (M), we are requiring the licensee to file design plans for a transverse channel to carry a flow of not less than 21 cfs from the head of the tailrace and through the scour pool along the toe of the dam, to river left as set forth in Condition X of the amended WQC appended to this order. In ordering paragraph (N), we are requiring the licensee to file a revised flow management plan for the West Charleston Development. In ordering paragraph (O), we are requiring the licensee to file a revised minimum flow and reservoir elevation monitoring plan for the West Charleston Development. In ordering paragraph (P), we are requiring the licensee to file, a comprehensive plan to address erosion prevention and sediment control and water management during construction as set forth in Condition Y of the amended WQC appended to this order. In ordering paragraph (Q), we are requiring the licensee to file a water quality monitoring plan for the West Charleston Development as set forth in Condition Z of the amended WQC appended to this order. In ordering paragraphs (R), (S), and (T) we are requiring the filing of contract

plans and specifications, cofferdam construction drawings, and as-built drawings respectively, with the Commission's New York Regional Office and the Division of Dam Safety and Inspections, for any necessary construction.

The Director orders:

(A) The license for the Clyde River Hydroelectric Project, FERC No. 2306, is amended to repower the West Charleston Development, as provided by this order, effective the first day of the month in which this order is issued.

(B) The revised Exhibit A for the West Charleston Development, filed with the application on February 19, and supplemented on March 18, 2009, is approved and made part of the license.

(C) The West Charleston Development, as described in ordering paragraph B(2) of the license, is revised as follows:

The West Charleston Development

The West Charleston Development consists of: (1) a 196.3-foot-long, 28-foot-high masonry dam consisting of: (a) a 106-foot-long uncontrolled spillway section (concrete crest elevation 1,059.0 feet), (b) a tapered concrete transition directing the flow to the new intake with a single gate leading to the turbine, (c) a sluice gate located above the new intake, and (d) 18- inch-high flashboards, which effectively raise the dam crest elevation by 15 inches; (2) a 28-foot-long, 26-foot- wide masonry and steel powerhouse abutting the existing intake, housing one Vertical Axis Flow Double Regulated Turbine rated at 682 kW and connected to a synchronous generator rated at 675 kW; (3) an additional 6-foot diameter sluice gate plugged with concrete and capped; (4) a 40-acre impoundment under instantaneous run-of-river mode and no storage capability; (5) appurtenant facilities.

(D) The license for the Clyde River Project, as amended in ordering paragraph A, above, is subject to the conditions of the amended Water Quality Certification, included as Appendix A of this order.

(E) The licensee shall start construction of the proposed new powerhouse and associated facilities within two years from the date of this order and complete construction within four years from the date of this order.

(F) The licensee must report the date of commencement of construction of the proposed additional generating capacity, within 30 days from that date. This information will be used to further revise the annual charges under Article 201.

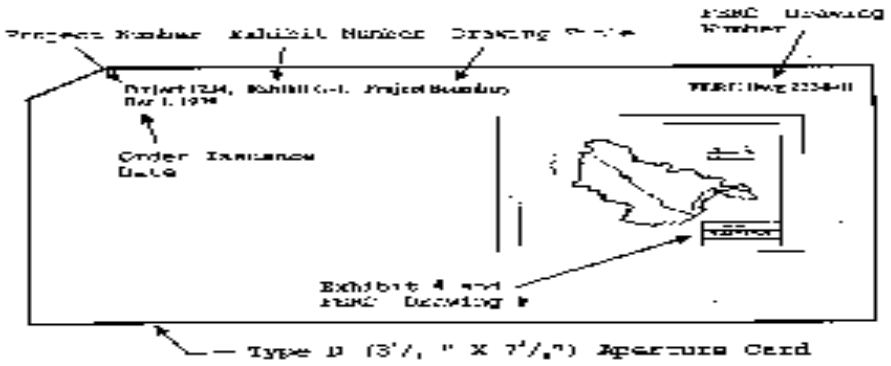
(G) The following Exhibit F drawings, filed on February 19, 2009, are approved and made part of the license.

EXHIBIT	FERC DRAWING No.	FERC DRAWING TITLE	SUPERSEDING
F-30	2306-1043	West Charleston Preliminary Powerhouse Bathymetry and Powerhouse with Tailrace Location Overlay	--
F-31	2306-1044	West Charleston Preliminary Powerhouse New Tailrace Section	--

(H) Within 45 days of the date of issuance of this order, the licensee shall file the approved exhibit drawings in aperture card and electronic file formats.

a) Three sets of the approved exhibit drawings shall be reproduced on silver or gelatin 35mm microfilm. All microfilm shall be mounted on type D (3-1/4" X 7-3/8") aperture cards. Prior to microfilming, the FERC Drawing Number (i.e., P-2306-1043 through P-2306-1044) shall be shown in the margin below the title block of the approved drawing. After mounting, the FERC Drawing Number shall be typed on the upper right corner of each aperture card. Additionally, the Project Number, FERC Exhibit (i.e., F-30, F-31, etc.), Drawing Title, and date of this order shall be typed on the upper left corner of each aperture card. See Fig. 1.

Figure 1 Sample Aperture Card Format



Two of the sets of aperture cards shall be filed with the Secretary of the Commission, ATTN OEP/DHAC. The third set shall be filed with the Commission's Division of Dam Safety and Inspections New York Regional Office.

b) The licensee shall file two separate sets of exhibit drawings in electronic raster format with the Secretary of the Commission, ATTN: OEP/DHAC. A third set shall be filed with the Commission's Division of Dam Safety and Inspections New York Regional Office. Exhibit F drawings must be segregated from other project exhibits, and identified as **(CEII) material under 18 CFR § 388.113(c).** Each drawing must be a separate electronic file, and the file name shall include: FERC Project-Drawing Number, FERC Exhibit, Drawing Title, date of this order, and file extension in the following format [i.e., P-2306, F-30, West Charleston Preliminary Powerhouse Bathymetry and Powerhouse with Tailrace Location Overlay, MM-DD-2009.TIF]. Electronic drawings shall meet the following format specification:

IMAGERY - black & white raster file
FILE TYPE – Tagged Image File Format, (TIFF) CCITT Group 4
RESOLUTION – 300 dpi desired, (200 dpi min.)
DRAWING SIZE FORMAT – 24” X 36” (min), 28” X 40” (max)
FILE SIZE – less than 1 MB desired

(I) Article 309, which requires the licensee to notify the Commission that it has permanently removed the flashboards from the West Charleston Dam, is deleted from the license.

(J) Article 311 of the license is revised to read:

Article 311. The licensee, at least 90 days before start of construction activities related to the penstock removal, or within 6 months of issuance of this order, shall file for Commission approval, a plan for the removal of the penstock and penstock cradles from the dam to Durgin Road at the West Charleston Development. The plan shall be developed consistent with condition I of the amended Water Quality Certificate appended to this order. The plan shall include information on the extent of removal, construction access, associated clearing of vegetation and earthworks, restoration of disturbed areas in the riparian zone, erosion prevention and sediment control and disposal.

The licensee shall prepare the plan in consultation with the Vermont Agency of Natural Resources and the Vermont Division for Historic Preservation. The licensee shall include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies’ comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee’s reasons, based on project-specific information.

The licensee shall submit eight copies of the plan to the Commission, two copies shall be filed with the Director, Division of Hydropower Administration and Compliance, one copy shall be filed with the Commission's New York Regional Director and five copies with the Secretary of the Commission.

(K) Article 401 of the license is revised to read:

Article 401. The licensee shall operate the West Charleston Development in accordance with conditions B and X of the amended WQC appended to this order, subject to the determination of the New York Regional Engineer as specified in Article 305 of the license. Condition B requires a run-of-river operation and Condition X requires the licensee to release a minimum flow of 21 cfs in the transverse channel, from the head of the tailrace and through a scour pool along the toe of the dam, in a manner as designed and approved by the VANR.

Flows and run-of-river operations may be temporarily modified if required by operating emergencies beyond the control of the licensee, and for short periods upon mutual agreement between the licensee and the Vermont Agency of Natural Resources. If the flow is so modified, the licensee shall notify the Commission as soon as possible, but no later than 10 days after each such incident.

(L) Article 417 of the license is revised to read:

Article 417. The licensee, at least 60 days before start of construction, shall file for Commission approval, detailed design drawings of the licensee's proposed trashrack structure at the West Charleston Development, to reduce the entrainment of resident fish. The proposed design shall be included with the plans and specifications for the new powerhouse and generating system. The design plans shall be developed together with a schedule to install the trashrack, consistent with condition K of the WQC. The filing shall include evidence of approval by the VANR.

The Commission reserves the right to require changes to the proposed facilities and schedule. Upon Commission approval, the licensee shall implement the proposal, including any changes required by the Commission.

(M) The licensee, at least 90 days before start of construction or within one year of issuance of this order, whichever comes first, shall file with the Commission a design plan, developed in consultation with the Vermont Agency of Natural Resources (VANR), for a transverse channel to carry a flow of not less than 21 cfs from the head of the tailrace and through the scour pool along the toe of the dam, to river left in accordance with condition X of the amended Water Quality Certification appended to this order.

The licensee shall include with the filing documentation of consultation including

how the VANR's comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the VANR to comment and the plan shall be approved by the VANR, prior to being filed with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

(N) The licensee, within one year of the issuance date of this order, shall file with the Commission a revised flow management plan for the West Charleston Development. The licensee shall prepare the plan after consultation with the U. S. Geological Service, the U. S. Fish and Wildlife Service, and the Vermont Agency of Natural Resources.

The licensee shall include with the filing documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, specific descriptions of how the agencies' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

(O) The licensee, within one year of issuance date of this order, shall file with the Commission a revised minimum flow and reservoir elevation monitoring plan for the West Charleston Development. The licensee shall prepare the plan after consultation with the U. S. Geological Service, the U. S. Fish and Wildlife Service, and the Vermont Agency of Natural Resources.

The licensee shall include with the filing documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Upon

Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

(P) The licensee, at least 90 days before start of construction or within one year of issuance of this order, whichever comes first, shall file with the Commission a comprehensive plan, developed in consultation with the Vermont Agency of Natural Resources (VANR), addressing erosion prevention and sediment control and water management during construction, in accordance with condition Y of the amended Water Quality Certificate appended to this order.

The licensee shall include with the plan documentation of consultation including how the VANR's comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agency to comment and the plan shall be approved by VANR, prior to being filed with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

(Q) The licensee, at least 90 days before start of operation or within one year of issuance of this order, whichever comes first, shall file with the Commission a water quality monitoring plan for the West Charleston Development. The licensee shall develop the plan in consultation with the Vermont Agency of Natural Resources, in accordance with condition Z of the amended Water Quality Certificate appended to this order.

The licensee shall include with the filing documentation of consultation, including how the VANR's comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agency to comment and the plan shall be approved by VANR, prior to filing with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

(R) *Contract Plans and Specifications*. The licensee, at least 60 days prior to start of construction activities, shall file one copy of its plans and specifications and supporting design report to the Commission’s Division of Dam Safety and Inspections (D2SI) – New York Regional Engineer, and two copies to the Commission (one of these

shall be a courtesy copy to the Director, D2SI). The submittal must also include as part of preconstruction requirements: a Quality Control and Inspection Program, Temporary Construction Emergency Action Plan and Soil Erosion and Sediment Control Plan. The licensee may not begin construction until the D2SI – New York Regional Engineer has reviewed and commented on the plans and specifications, determined that all preconstruction requirements have been satisfied, and authorized start of construction.

(S) *Cofferdam Construction Drawings.* Before starting construction, the licensee shall review and approve the design of contractor-designed cofferdams and deep excavations and shall make sure construction of the cofferdams and deep excavations are consistent with the approved design. At least 30 days before starting construction of the cofferdam, the licensee shall submit one copy to the Commission's Division of Dam Safety and Inspections (D2SI) – New York Regional Engineer, and two copies to the Commission (one of these shall be a courtesy copy to the Director, D2SI), of the approved cofferdam construction drawings and specifications and the letters of approval.

(T) *As-built Drawings*. The licensee, within 90 days of completion of all construction activities authorized by this order, shall file for Commission approval, revised exhibits A, F, and G, as applicable, to describe and show those project facilities as built. A courtesy copy shall be filed with the Commission's Division of Dam Safety and Inspections (D2SI) – New York Regional Engineer, the Director, D2SI, and the Director, Division of Hydropower Administration and Compliance.

(U) This order constitutes final agency action. Requests for a rehearing by the Commission may be filed within 30 days of the date of issuance of this order, pursuant to 18 C.F.R. § 385.713.

M. Joseph Fayyad
Engineering Team Lead
Division of Hydropower Administration
and Compliance

APPENDIX A

Water Quality Certification Amendment
(33 U.S.C. §1341)

In the matter of: Great Bay Hydro Corporation
One New Hampshire Avenue, Suite 207
Portsmouth, NH 03801

APPLICATION FOR CLYDE RIVER HYDROELECTRIC PROJECT

The Vermont Department of Environmental Conservation (the Department) has reviewed a water quality certification amendment application dated February 19, 2009 and filed by Great Bay Hydro Corporation (Great Bay), the licensee[7] for the Clyde River Hydroelectric Project (FERC Project No. 2306). Great Bay seeks to reconfigure the West Charleston hydroelectric facility. The Project was granted a water quality certification on August 1, 2002; on July 11, 2003, the certification was modified by the Vermont Water Resources Board on appeal; and a license was granted on November 21, 2003.

The current application is subject to review under the Vermont Water Quality Standards adopted by the Water Resources Board on January 25, 2006 (Standards). Standards became effective on February 9, 2006 (Standards, Section 1-01 Applicability and Definitions).

The application and tentative decision were on public notice from March 17 through April 24, 2009. Written comments were received from the applicant.

The Department, based on the application and record before it, makes the following findings and conclusions.

[7] The original licensee was Citizens Communications Company (formerly Citizens Utilities Company). On April 1, 2004, the license was assumed by Great Bay.

Findings

1. The Clyde River Hydroelectric Project, as licensed, is comprised of two dams with hydroelectric facilities (Newport Dam and West Charleston Dam) and two dams formerly used for storage and flow augmentation (Seymour Lake Dam and Echo Lake Dam). The West Charleston hydroelectric facility has not operated since 1998 due to the poor condition of the 1,622-foot-long steel penstock. The facility is licensed to operate in a true run-of-river mode and maintain minimum bypass flows of 50 cfs (0.47 csm) from July through September and 74 cfs (0.69 csm) from October through June.

2. Great Bay proposes construction of a new powerhouse contiguous with the right dam abutment and partial removal of the existing penstock. A 26 foot by 28 foot masonry and steel powerhouse would contain a vertical axis turbine rated at 910 hp and a 675 kW generator. The hydraulic capacity of the unit would be about 300 cfs, and it can be operated down to 53 cfs. The net design head is estimated at 31.7 feet, with a target tailwater elevation of 1028.2 feet msl at full unit capacity.

3. Under the current proposal, 18-inch-high flashboards would be reinstalled on the dam crest to raise the effective crest 15 inches (elevation 1060.25 feet msl). Condition B of the water quality certification required permanent removal of the flashboards, which had been a feature of the operation until operation ceased in 1998. Article 309 of the license required the licensee to notify the Federal Energy Regulatory Commission (FERC) of compliance with this condition within 90 days of license issuance. Condition B also required the licensee to maintain the headpond no lower than 3.0 inches below the fixed dam crest; bypass flows were to be maintained via a gate release on the west end of the dam.

4. When the project is not operating, Great Bay proposes to either spill the pond inflow or pass it through a sluiceway at the intake. The method of maintaining flows during such conditions would be part of the review under articles 407 and 408 and the associated water quality certification conditions.

5. Pursuant to Article 408 and Condition D of the water quality certification, a flow management plan was filed with FERC on November 22, 2004 and approved on March 9, 2005. Pursuant to license Article 407 and conditions E and F of the water quality certification, a flow and water level monitoring plan was filed with FERC on February 19, 2004; a supplemental filing was made on May 11, 2004, and plan was approved by FERC on July 1, 2004. The proposed changes at West Charleston will necessitate updating these plans.

6. The proposed excavated tailrace extends out from the powerhouse about 80 feet at a 45-degree angle to the dam. Excavation would start at about 12 feet in depth at the powerhouse and taper to the downstream end at the streambed elevation of

about 1027 feet msl. A concrete training wall with a top elevation of about 1026.0 feet msl would be constructed along the left side of the tailrace.

7. To reduce the extent of flow loss and habitat degradation in the main channel of the river between the toe of the dam and the tailrace terminus, Great Bay proposes to direct a portion of the powerhouse discharge (at least 21 cfs, the estimated 7Q10 value) over the upper end of the tailrace training wall and along the toe of the dam to the left (west) side of the river, where the flow would then course back diagonally downstream over the natural riverbed and towards the lower end of the tailrace. Reduction of the loss of aquatic habitat was also a consideration in the tailrace design length, orientation, and outlet invert elevation. Great Bay completed a full topographic survey of the river channel below the dam, except for an area near the dam toe where spillage precluded access, and completed a preliminary design for the transverse channel.

8. With the completion of a facility for upstream passage of fish at the Newport 1,2,3 powerhouse in September 2007, landlocked Atlantic salmon, brown trout, and steelhead rainbow trout from Lake Memphremagog are now trapped at the Newport powerhouse and trucked above Newport Dam to access spawning habitat in the middle portion of the Clyde River basin. Although spawning and nursery habitat is available just upstream of Charleston Pond in the tailrace area of the Barton Village hydroelectric plant, this small amount of habitat is not critical to the Lake Memphremagog salmon program. Consequently, the Agency of Natural Resources (Agency) has agreed not to require the provision of downstream passage facilities at West Charleston Dam. (letter from Jeffrey Cueto, P.E., Agency of Natural Resources to William Rodgers, Great Bay, January 20, 2009)

9. Great Bay proposes to remove the first 600 feet of the existing penstock, the section between the dam and Durgin Road. This section is entirely above ground.

10. As noted in the water quality certification (Finding 108), Charleston Pond has been documented to thermally stratify, creating low dissolved oxygen concentrations in deeper zones of the pond. The database is limited, however. The invert elevation of the proposed station intake is at elevation 1042.0 feet msl, or 17.0 feet below the dam crest and 18.2 feet below the proposed normal pool elevation. The invert is 11 feet higher than the location of the substandard sample collected in August 1982. The intake may be located such that the station would avoid withdrawing oxygen-depleted water from the hypolimnion. Samples collected on the same date in August 1982 closer to the proposed intake elevation met the dissolved oxygen saturation standard. Great Bay has offered to explore this issue further through a post-licensing water quality study. Dissolved oxygen standards were expected to be met by the prior project configuration because the station would not be operating during summer low flow periods and, when operating, the station would

be releasing minimum flows via a free gate discharge twelve feet above the downstream riverbed.

11. Construction is planned to commence by January 2011, with completion within two years of the start.

12. No special drawdown of Charleston Pond or management of outflows is proposed to facilitate construction.

Analysis and Conclusions

13. The original water quality certification application was subject to review under the version of the Standards that became effective on July 2, 2000. There are no subsequent changes to the Standards that would affect the review of the proposed changes. The management objectives for Class B waters and associated criteria remain essentially the same.

14. To maximize power production, Great Bay does not propose to release any flow as spillage at the dam when inflows are within the hydraulic capacity range of the turbine, 53 to 300 cfs. Given the width and topography of the river channel and the orientation of the tailrace under the original proposal that was presented to the Agency in 2007, there would have been a loss of habitat for salmonids and other fish and aquatic organisms. In order to reduce the impact on aquatic habitat, Great Bay agreed to modify the tailrace design to provide for a transverse flow path across the river and parallel to the dam toe. The tailrace would be designed such that a flow of no less than 21 cfs spills over the left-side training wall to enter and flow through the scour pool along the toe of the dam to the opposite side of the river. The conformation of the riverbed below the dam is such that the flow will move diagonally towards the lower end of the tailrace after reaching the opposite side of the river. The alignment of the transverse channel and flow path are shown on Drawing TR-1 in Exhibit B of the application. This certification amendment adds a condition requiring Great Bay to provide the Department with a conceptual engineering design, including plans and supporting hydraulic analysis, for approval before proceeding with project construction.

15. The flow management plan will have to address lag time issues. Condition D of the water quality certification notes this issue. When the station is operating, the run-of-river mode of operation should result in essentially a natural flow condition downstream. However, when the station shuts down, there can be a transient condition when water goes into storage before natural flows are reestablished downstream. This can be addressed through special operational protocols or through the engineering design of the device used to pass flows (e.g., an automated gate). The applicant will be maintaining the pond within 1.5 inches of the top of the flashboards.

16. The use of flashboards on Charleston Pond Dam had been discontinued. Reinstallation of flashboards will result in inundation of a portion of the riverine habitat in the bypassed reach of the Barton Village Hydroelectric Project. The amount of coldwater habitat lost will be relatively small, and the habitat was judged as not critical to the Lake Memphremagog salmon program.

17. Since Great Bay will be removing the steel penstock within and along the river channel down to Durgin Road, both aesthetics and public access to the river will be enhanced. This action is consistent with and goes beyond the provisions of the original certification, which requires prior approval of the penstock replacement to reduce the impact on aesthetics under Condition I. This certification amendment revises Condition I to provide for a plan for the removal of the penstock and cradles from the dam to Durgin Road and showing any associated clearing for access, with replanting as needed.

18. The station will operate down to flows as low as 53 cfs, or 0.50 csm. At lower flows, all discharges at the dam will be via spillage through the sluiceway or over the crest, with the water benefiting from reaeration. Routing of flow through the penstock/turbine closed system eliminates the opportunity for oxygen entrainment if there is a dissolved oxygen deficit. Since the pond stratifies, there is a potential for substandard conditions below the dam when the station is operating. The original project as licensed would not have operated below a flow of 100 cfs, and, when operating during the summer, would have been discharging 50 cfs at the dam in a manner that would have provided for significant reaeration. Since a full evaluation of this issue has not been done, this certification amendment requires water quality monitoring and annual reporting to enable the Department to determine whether remediation is necessary. Remediation can take the form of either a change in operation (e.g., spilling water during critical water quality conditions) or equipment modifications (e.g., turbine aspiration).

19. This amendment is being conditioned to control potential for construction-associated discharges.

Decision and Certification

Based on its review of the applicant's proposal and the above findings, the Department concludes that there is reasonable assurance that operation and maintenance of the Clyde River Hydroelectric Project with the proposed modifications at the West Charleston facility, subject to the following revised or added conditions, will not cause a violation of Vermont Water Quality Standards and will be in compliance with sections 301, 302, 303, 306, and 307 of the Federal Clean Water Act, 33 U.S.C. §1251 et seq., as amended, and other appropriate requirements of state law:

B. **Water Level and Flow Management**. The Project shall be operated in accordance with the minimum flow and water level management schedule detailed below. Minimum flows shall be released on a continuous basis and not interrupted; minimum flows are the values listed below, or instantaneous inflow, if less, unless otherwise noted. True run-of-river operation, or r-o-r, where referenced, means no utilization of headpond storage and that outflow from the facility is equal to inflow to the pond on an instantaneous basis, as further described in Footnote 3, page 11, of the Certificate, incorporated by reference.

Seymour Lake Dam: Except as allowed in conditions C and H below, the dam shall be operated in a true run-of-river mode. A provision will be made in the new dam to pass a minimum flow of 4 cfs.

Echo Lake Dam: Except as allowed in Condition C below, the dam shall be operated in a true run-of-river mode. A minimum flow of 4 cfs shall be released through the gate at all times. The existing flashboards will be removed within one month of license issuance to set the effective dam crest elevation at 1248.33 feet msl. Flashboards shall not be installed unless prior approval is granted by the Department.

West Charleston: The station shall be operated in a true run-of-river mode. The pond shall be maintained at or above 0.13 feet (1.5 inches) below the top of the flashboards when the flashboards are in place and intact. When the flashboards are out or have partially failed, the pond shall be maintained at or above 0.13 feet (1.5 inches) below the fixed dam crest. When the station is not operating, all inflows shall be released at the dam in a manner approved by the Department pursuant to Condition D.

Newport 1,2,3: If flashboards are retained, the station shall be operated at full capacity any time that the pond level rises above the concrete crest. Operation shall be in accordance with the following table. When the station is not operating, all inflows shall be released at the dam, except for any flows necessary to operate fish passage facilities.

Table B. Newport 1,2,3 Operation

Period	Operating Range[1] (feet)		Conservation Flow (cfs)	
	High	Low	Bypass	Downstream
January 1 - March 31	0	-1.0	30	120
April 1 - June 7	0	-1.0	30	363
June 8 - July 15	0	-1.0	30	100
July 16 – September 30	0	-2.0	30	100
October 1 - December 15	0		30	r-o-r
December 16 - 31	0	-1.0	30	120
Notes 1. Operating range is relative to the dam crest.				

I. Replacement of the West Charleston Penstock. The applicant shall develop, in consultation with the Department and the Vermont Division for Historic Preservation, a plan for the removal of the penstock and penstock cradles from the dam to Durgin Road. The plan shall include information on the extent of removal, construction access, associated clearing of vegetation and earthworks, restoration of disturbed areas in the riparian zone, erosion prevention and sediment control, and disposal. The plan shall be submitted to the Department at least 90 days prior to the commencement of construction, and shall be subject to Department review and approval before construction commences.

X. West Charleston Bypass Channel. The applicant shall develop, in consultation with the Department and the Vermont Department of Fish and Wildlife, design plans for a transverse channel to carry a flow of not less than 21 cfs from the head of the tailrace and through the scour pool along the toe of the dam, to river left as shown on drawing TR-1 of the amendment application. The channel shall function for any period that the station is operating or the station is not operating and flows are being routed through the sluiceway. The plan shall include channel cross sections (proposed, with existing ground elevations where survey information is available), the final tailrace design, a supporting hydraulic analysis, and a proposal for post-construction evaluation of whether the transverse channel as designed and constructed functions as intended. In consultation with the Department and the Department of Fish and

Wildlife, the applicant shall modify the tailrace and/or transverse channel as necessary after the post-construction evaluation to insure that the intent of this condition has been met. The plan shall be submitted to the Department at least 90 days prior to the commencement of construction, and shall be subject to Department review and approval before construction commences. The station shall not commence normal operation until written approval is granted by the Department after the post-construction evaluation is completed and the findings filed with the Department. If the post-construction evaluation indicates that the minimum transverse flow requirement of 21 cfs is not met during all flow conditions, the station operation shall be limited to only those conditions that result in a transverse flow of at least 21 cfs, pending any further modifications, filing of a subsequent evaluation report, and written approval by the Department. The applicant shall be responsible for maintaining the functionality of the transverse channel for the term of the license.

Y. West Charleston Construction-Related Pollution Control, Vegetation Management, and Water Management Plan. A minimum of 90 days before the start of construction, the applicant shall file with the Department a comprehensive erosion prevention and sediment control and water management plan to address protection of water quality, cofferdamming methods, pond level management, and downstream flows during construction. The plan will include information on the disposal of construction debris and excess excavated material; all disposal shall be done in conformance with state and local laws. The plan will also include details on the extent of clearing in the riparian area, and such clearing is to be limited to that necessary to properly construct the project. A replanting plan shall be included, and to the extent feasible, disturbed areas will be replanted and hard armoring with rock avoided.

The plan shall be subject to Department approval, and construction may not proceed without an approved plan in place.

The applicant shall insure that every reasonable precaution is taken during construction to prevent the discharge of petrochemicals, wet concrete, and debris into State waters. Machinery shall be fueled away from State waters and shall be maintained in good mechanical condition in terms of integrity of hoses, seals, and gaskets. During concrete pours, water shall not be displaced from forms into State waters.

The Department maintains continuing authority over construction-related activities and may at any time order additional protective measures be taken to protect water quality

Z. West Charleston Dissolved Oxygen Monitoring. At least 90 days before the start of operation, the applicant shall file a water quality monitoring plan for Department approval. The plan shall provide for annual reports to the Department by year's end of prior summer sampling results, including flow and operating information for both the West Charleston station and the upstream Barton Village station. Initially, sampling shall include at a minimum weekly pre-dawn samples for dissolved oxygen and temperature from June through September, collected from the penstock, if operating, or from the pond at the depths representative of the intake. The Department may modify the sampling plan or suspend the sampling at any time based on a review of the data. If the data discloses substandard conditions in the release, the Department may order the applicant to develop a remediation proposal, including an implementation schedule, subject to Department approval.

Dated at Waterbury, Vermont this
_11th_ day of May, 2009

Justin Johnson, Acting Commissioner
Department of Environmental Conservation

By _____/s/_____
Larry R. Fitch, Director
Facilities Engineering Division

c: Distribution List

LRF/JRC

ENVIRONMENTAL ASSESSMENT

APPLICATION FOR REPOWERING OF THE WEST CHARLESTOWN DEVELOPMENT

CLYDE RIVER PROJECT

FERC NO. 2306-143

VERMONT

Federal Energy Regulatory Commission
Office of Energy Projects
Division of Hydropower Administration and Compliance
888 First Street, NE
Washington, DC 20426

November 2009

ENVIRONMENTAL ASSESSMENT

Federal Energy Regulatory Commission
Office of Energy Projects
Division of Hydropower Administration and Compliance
Washington, DC

Clyde River Hydroelectric Project
FERC Project No. 2306-143 VT

A. APPLICATION

1.	Application:	Application to repower the West Charleston Development
2.	Date filed:	February 19, 2009, supplemented on March 18 and July 7, 2009
3.	Applicant:	Great Bay Hydro Corporation
4.	Water body:	Clyde River, West Charleston Development, Charleston Pond
5.	County and State:	Orleans County, Vermont

B. PURPOSE AND NEED FOR ACTION

Great Bay Hydro Corporation (Great Bay), licensee for the Clyde River Project, has filed an application to amend its license to provide for repowering the West Charleston Development by decommissioning the existing penstock and powerhouse and constructing and operating a new powerhouse and associated facilities. The proposed redevelopment would reduce the installed nameplate capacity of the Clyde River Project from 4.8 megawatts to 4.7 megawatts.

In reviewing Great Bay's application, the Commission must determine whether and under what conditions the proposed amendment should be approved. This environmental assessment (EA), which analyzes the environmental effects of the proposed amendment, will be used to support the Commission's decision on the application.

C. PROPOSED ACTION AND ALTERNATIVES

1. Proposed Action

Great Bay seeks to amend the Clyde River Project license to provide for: (1) constructing and operating a new powerhouse and generating facilities at the West Charleston Development; (2) decommissioning the existing powerhouse and penstock at the West Charleston Development; and (3) revising the project description, in ordering paragraph (B)(2) of the license, to include references to the new powerhouse, turbine, and generating unit.[8] The amendment application also addresses proposed procedures related to meeting the license's minimum flow requirements at the West Charleston Development once the development is operational.

Great Bay proposes to reinstall 18-inch-high flashboards on the West Charleston dam to raise its effective crest 15 inches (elevation 1,060.25 feet mean sea level (msl)), which is the same elevation that had been authorized under the original license. The repowered development would operate in a run-of-river mode, with the pond elevation maintained at the top of the dam's flashboards. The existing intake would be modified to pass the minimum flow onto the dam apron when the powerhouse is not in operation.

Great Bay states that the West Charleston Development has been unable to generate electricity since March of 1998 due to the poor condition of the penstock. Great Bay also states that the installation of a new powerhouse at the West Charleston dam would result in more efficient operation than repairing the existing penstock, and is a more cost-effective option than repairing the existing powerhouse and replacing the existing penstock. Great Bay further states that the proposed construction would not conflict with the natural, scenic, and historic values of the project, and is consistent with recreational plans, but would reduce the overall capacity of the project.

Although the new license includes a provision for penstock replacement, Great Bay conducted a feasibility study investigating various options to bring the West

[8] The new license for the project, issued November 21, 2003 (105 FERC ¶ 62,119), directed Great Bay to repair the West Charleston penstock and generating equipment, to repower the development. The new license also includes provisions for modifying the development to comply with the license's run-of-river and minimum flow requirements, and the Vermont Agency of Natural Resources' (VANR) 401 Water Quality Certification (WQC).

Charleston Development back into service. Based on cost and engineering feasibility assessments, Great Bay determined that the construction of a new powerhouse adjacent to the dam, which discharges directly to the tailrace, and the subsequent decommissioning and partial removal of the penstock, is the most favorable option both financially and with respect to license and WQC compliance.

2. Action Alternatives

Commission staff has not identified any action alternatives.

3. No-action Alternative

Under the no-action alternative, the Commission would deny Great Bay's application. The licensee would be required the replace the penstock and rehabilitate the powerhouse, as described in the new license.

D. AGENCY CONSULTATION AND PUBLIC NOTICE

Agency Consultation

In preparing its amendment application for the proposed redevelopment, Great Bay consulted with various Federal, state, and local agencies and provided them a draft copy of the application on July 9, 2008. The following table lists the agencies that provided comments:

Agency	Date of Letter
VANR	May 11, 2009
U.S. fish and Wildlife Service (FWS)	May 5, 2009
Vermont State Historic Preservation Office (SHPO)	February 11, 2009

None of the above agencies objected to Great Bay's amendment application, or raised any issues that need to be addressed. The SHPO stated in its letter that it appreciates Great Bay's extensive consultation on the application.

Public Notice

Commission staff issued a public notice of the application on April 10, 2009, with May 11, 2009, set as the deadline for filing comments, protests, and motions to intervene. In a letter filed on May 5, 2009, the FWS states that it has no comments on the application. On May 11, 2009, the VANR filed a motion to intervene and issued a WQC

amendment for the proposed redevelopment. No other responses to the notice were received.

E. AFFECTED ENVIRONMENT

Existing West Charleston Development

The West Charleston dam impounds a man-made body of water known as Lubber Lake or West Charleston Pond. The dam is approximately 0.5 mile downstream of the Barton Village hydroelectric powerhouse (FERC No. 7725), and approximately 2.3 miles upstream of Salem Pond, on the lower part of the Clyde River, in Charleston, Vermont. The West Charleston dam is a 28-foot-high rock-fill and masonry dam, 196.3 feet long, including a spillway approximately 107.3 feet long. Eighteen-inch-high flashboards would be reinstalled atop the spillway, increasing the pond elevation 15 inches as authorized under the original license. The flashboards were removed from the project at the time that project's operation ceased in 1998. The West Charleston impoundment has a surface area of 40 acres and 220 acre-feet of usable storage, based on a maximum draw-down of 5 feet 6 inches. On the east end of the dam is a single 19-foot-square forebay that extends to a 6-foot- and an 8-foot-diameter headgates. A 6-foot-diameter steel penstock parallels the adjacent bypassed reach and extends 1,622 feet from the dam to the West Charleston powerhouse.

Water Quality and Quantity

The VANR classifies the Clyde River from its headwaters to Lake Memphremagog as a Class B waters. Class B waters are suitable for bathing and contact recreation, irrigation and agriculture, fish habitat, and public water supply with filtration and disinfection. These waters also provide good aesthetic value. Water quality criteria for class B cold water include turbidity (not to exceed 10 Nephelometric Turbidity Units (NTU)) and dissolved oxygen (DO) of not less than 7 milligrams per liter (mg/l) and 75 percent saturation at all times (Water Resources Board 2006).

Presently the West Charleston development is licensed to operate in a run-of-river mode while maintaining a minimum bypass flow of 50 cfs from July through September and 74 cfs from October through June, each year. Condition B of the original WQC requires the permanent removal of the flashboards while maintaining the headpond no lower than three inches below the fixed dam crest. Bypass flows were to be maintained via a gate release at the west end of the dam.

Fish and Wildlife Resources

The riverine fish community in the reach from Clyde Pond to the West Charleston dam includes landlocked Atlantic salmon, trout, and walleye. This reach is home to the greatest quantity of potential salmon spawning habitat in the Clyde River, with salmon populations supported by both stocking and natural reproduction. Upstream of the Barton Village Project, salmon, rainbow trout, brown trout, and brook trout are the primary game species. Both salmon and trout are supported by stocking in this reach. The West Charleston impoundment supports largemouth and smallmouth bass and yellow perch fisheries. There is also potential for brown and rainbow trout and landlocked salmon fisheries. The portion of the Clyde River that is currently authorized to be bypassed by the West Charleston Development comprises about 13 percent of the two-mile reach from the West Charleston Development to Little Salem Lake. This reach is a relatively high gradient section of stream with boulder, cobble, and bedrock substrate. Stream morphology of this section has low sinuosity and is generally plane-bed with some riffle and pool habitats. This reach has the potential for suitable habitat for brown trout and salmon spawning, incubation and rearing (FERC, 1996).

The Vermont Department of Fish and Wildlife (VDFW) currently manages the Two-mile reach of the Clyde River downstream of the West Charleston dam as a stream fishery for resident brown trout, maintained in part by stocking. The reach also contains an excellent habitat for brown trout and rainbow trout in all life stages with sufficient flows. The walleye populations of Big Salem and Little Salem lakes spawn and incubate a short distance downstream of the existing powerhouse at West Charleston Village. This reach is also targeted by the VDFW as critical spawning and nursery habitat for landlocked Atlantic salmon, once fish passage and a suitable flow regime are established downstream of the development. Since the issuance of the 2003 VANR water quality certification, measures to enhance this habitat have been implemented.

Wildlife and wildlife habitat in the project area are typical of those for the region. Habitat is available along the Clyde River for many species of wildlife. Riparian habitats vary from those that are largely independent of project operation influences such as upland hardwood forests to those whose existence depends upon project operation, such as emergent marshes. Wildlife species that use these habitats are equally variable, both in numbers and types. More than 45 mammal species, 25 herpetofauna, and 150 avifauna species may occur in the project area. The FWS National Wetland Inventory maps indicate that the Clyde River Basin contains palustrine, riverine, and lacustrine wetlands. The Clyde River, its tributaries, and project impoundments provide lacustrine wetlands. Palustrine wetlands are dominated by trees, shrubs, persistent emergents, mosses, and lichens (FERC, 1996).

Rare, Threatened, and Endangered Species

No state or federally-listed rare, threatened, or endangered species of animals are known to inhabit the project area, although transient species (such as the bald eagle) may pass through. The VDFW has identified the sedge wren (*Cistothorus platensis*) as a threatened vertebrate species possibly occurring within the project boundaries. Field surveys, however, did not identify the presence of sedge wren. The VANR's Nongame and Natural Heritage Program database does not list any rare, threatened, or endangered plant species in the lower Clyde River valley (FERC, 1996).

Recreation and Aesthetic Resources

The Clyde River Hydroelectric Project is a regionally important recreation area of Northeastern Vermont. More than 500 million people live within 200 miles of the Clyde River and Lake Memphremagog. Local residents are mainly from the northeastern area, Quebec, tourists fishing for salmon, trout, and other species at the project lakes. They also swim, camp, boat and hunt in the project area. Many of these recreational activities occur at project lakes such as Seymour Lake, Echo Pond, Salmon Pond, and Clyde Pond (FERC, 1996).

Downstream of the West Charleston dam, from West Charleston to Salem Lake, is a stretch of Class II whitewater that provides scenic views. Due to the general remoteness of this area, there is limited public use. Specific to the subject proposal, however, the 1,600-foot bypassed reach is not easily accessible to the public due to its remoteness and proximity to private property. The area is characterized as having dense vegetation and arduous terrain (FERC, 1990). The river downstream of the West Charleston powerhouse is used by whitewater boaters and is more accessible than upstream of the powerhouse.

Cultural Resources

In 2004, the West Charleston Development was determined to be eligible for listing on the National Register of Historic Places (Great Bay Hydro Corporation, 2007). The development's dam, powerhouse, penstock, and other associated structures and facilities are contributing elements of this historic property, known as the West Charleston Hydroelectric Station Historic District.

Regarding the protection of historic properties at the project, license article 419 requires the licensee to implement the Programmatic Agreement (PA) that was executed

on February 11, 2002, among the Commission, Advisory Council on Historic Preservation, and SHPO. The PA stipulated that the licensee was to develop an Historic Properties Management Plan (HPMP) for the project. The licensee filed the HPMP with the Commission, for approval, on December 3, 2007, and supplemented the filing on May 30, 2008. The HPMP was approved by Order Approving Historic Properties Management Plan, issued November 14, 2008.[9]

F. ENVIRONMENTAL IMPACTS

In this section, we analyze the environmental effects, beneficial and adverse, of Great Bay's proposal, any agency- or staff-recommended modifications, and the no-action alternative. We present our analyses under specific environmental areas, including water quality and quantity, fish and wildlife resources, recreation and aesthetic resources, and cultural resources.

1. Proposed Action

Water Quality and Quantity

Water quality impacts could occur from construction and demolition of the former penstock and powerhouse facilities. Great Bay proposes to pass all generation flows directly into the river downstream of the dam. All stream flow would remain within the former bypass reach, as compared to the currently licensed scenario of refurbishing the penstock and existing powerhouse where only the bypass flow would remain in the bypass reach. The grade and physical characteristics of the 1,600-foot bypass reach would allow for natural aeration of all stream flow prior to reaching the tailrace of the existing powerhouse. The invert elevation of the intake to the generating unit is at 1,042 feet msl (depth of 15 ft); therefore, it is expected that the water passing through the generating unit will meet VANR's standard for DO saturation. Great Bay would consult with VANR to develop a plan to monitor DO levels and water quality after construction of the new generating unit, as well as develop a plan for erosion and sediment control to protect water quality and maintain downstream flows during construction. These measures were included as Conditions Y and Z in the revised WQC for the project.

[9] 125 FERC 62,150

In order to reduce any potential impact on aquatic habitat as a result of the tailrace design of the new development, Great Bay has consulted with VANR to design the tailrace orientation and to modify the riverbed to provide a transverse flow across the river along the toe of the dam. The tailrace and transverse channel would be designed in manner that would provide a minimum flow equal to the estimated 7Q10 flow of 21 cubic feet per second (cfs). This measure was included as Condition X in the revised WQC for the project. License articles 308, 401 and 417 would be modified to include the revised minimum flow release facility, minimum flow release volume, minimum flow release and reservoir elevation monitoring plan and flow management plan, respectively.

The continued operation of the West Charleston plant as an instantaneous run-of-river facility would reduce the rate of erosion experienced at the development and, thereby, reduce sedimentation and turbidity. Pursuant to license article 405, the licensee filed for and received approval of its erosion monitoring plan.[10] Measures required in the VANR's WQC would mitigate impacts to and protect water quality in the project area.

Fish and Wildlife Resources

With the restoration of the currently authorized bypass segment below the West Charleston dam, there would be a total of 6.57 river miles of restored potential migratory salmon habitat. No fish passage facilities have been proposed or are required for the West Charleston Development. The VDFW's current principal management objective for West Charleston Pond is maintenance of a black-bass fishery supported entirely by natural reproduction (VANR, 2002). Construction of the new powerhouse at the dam, with the subsequent direct discharge of run-of-river flows immediately below the dam, would eliminate the bypass reach. Direct discharge at the dam would result in returning all but 50 feet of the entire two-mile reach of river between the West Charleston dam and Little Salem Lake to a natural flow condition and would improve habitat conditions for fish and other aquatic biota downstream of the dam.

Short term turbidity and noise impacts can be expected during removal of the existing powerhouse and penstock, as well as installation of a new powerhouse at the dam. As noted in the section on water quality, measures required in the VANR's WQC would mitigate impacts to and protect fish and wildlife resources in the project area.

[10] 108 FERC ¶ 62,040 (2004)

Recreation and Aesthetic Resources

The proposed run-of-river regime in the current by-passed reach could enhance boating use in the 1,600-foot section of that reach. Removal of the penstock sections, as proposed, would enhance the natural appearance of this river section.

Overall, however, because the 1,600-foot bypassed reach is not readily accessible to the public due to its remoteness and its proximity to adjacent private property, as well as the presence of thick vegetation and arduous terrain, it is unlikely the proposed action would result in any notable short-term or long-term positive or adverse effects on recreation and aesthetic resources. Also, considering the amount of nearby existing recreation resources, the public already has adequate recreational opportunities in the area. Therefore, no recreation enhancement measures are needed.

Cultural Resources

In 2004, the West Charleston Development was determined to be eligible for listing on the National Register of Historic Places (Great Bay Hydro Corporation, 2007). The development's dam, powerhouse, penstock, and other associated structures and facilities are contributing elements of this historic property, known as the West Charleston Hydroelectric Station Historic District.

Regarding the protection of historic properties at the project, license article 419 requires the licensee to implement the Programmatic Agreement (PA) that was executed on February 11, 2002, among the Commission, Advisory Council on Historic Preservation, and SHPO. The PA stipulated that the licensee was to develop an Historic Properties Management Plan (HPMP) for the project. The licensee filed the HPMP with the Commission, for approval, on December 3, 2007, and supplemented the filing on May 30, 2008. The HPMP was approved by Order Approving Historic Properties Management Plan, issued November 14, 2008.[11]

[11] 125 FERC 62,150

2. No-Action Alternative

Under the no-action alternative, Great Bay would not be able to repower the West Charleston Development, resulting is less overall project generating capacity. This is primarily due to the poor condition of the development's existing penstock and the economic factors of rehabilitating it and the existing powerhouse. However, impacts to the development's environmental resources would potentially still occur, as these facilities would likely need to be removed, causing short-term demolition-related effects.

G. CONCLUSION

Great Bay's proposal to repower the West Charleston Development, by removing the development's existing penstock and powerhouse and constructing a new powerhouse and associated facilities in a new location at the West Charleston dam, would restore generating capacity to the Clyde River Project. Also, with the measures required in the VANR's WQC, the proposal would adequately protect, mitigate adverse effects on, and enhance the development's environmental resources. Approving Great Bay's application would not constitute a major Federal action significantly affecting the quality of the human environment.

H. LITERATURE CITED

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