GLENDALE HYDROELECTRIC PROJECT

LIHI APPLICATION

ATTACHMENT A

FLOWS

LITTLEVILLE POWER COMPANY, INC.
A SUBSIDIARY OF ENEL GREEN POWER NORTH AMERICA, INC.

Green Power

Enel Green Power North America, Inc.

One Tech Drive, Suite 220
Andover, Massachusetts USA 01810
T 978 681 1900 F 978 681 7727

January 25, 2013

Gerald L. Cross, P.E.
Regional Engineer
Federal Energy Regulatory Commission
19 West 34th Street, Suite 400
New York, NY 10001

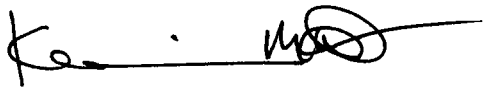
Re: Glendale Hydroelectric Project (FERC No. 2801-MA);
Certification of Minimum Flow Compliance

Dear Mr. Cross:

Based on a review of our operating records I hereby certify that, to the best of my knowledge, the Glendale Hydroelectric Project (FERC No. 2801-MA) was operated in compliance with the project's minimum flow requirements during 2012.

Please do not hesitate to contact me at (978) 681-1900, extension 809 if you have any questions concerning this certification.

Sincerely,
Littleville Power Company, Inc.



Kevin M. Webb
Hydro Licensing Manager

cc: J. Schott, LPC
R. Bartlett, LPC

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENERGY & ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
WESTERN REGIONAL OFFICE
436 Dwight Street • Springfield, Massachusetts 01103 • (413) 784-1100

DEVAL L. PATRICK
Governor

TIMOTHY P. MURRAY
Lieutenant Governor

IAN A. BOWLES
Secretary

LAURIE BURT
Commissioner

SENT ELECTRONICALLY

Mr. Kevin M. Webb
Environmental Affairs Coordinator
Littleville Power Company, Inc.
One Tech Drive, Suite 220
Andover, MA 01810

July 8, 2009

Subject: Water Quality Certification
Glendale Hydroelectric Project
FERC No 2801

Dear Mr. Webb:

As attached, please find a Section 401 Water Quality Certificate as issued by the Department for the above referenced project. Your attention is directed to each of the Certification Provisions contained in the Certificate. If you have any questions please contact Robert Kubit at 508-767-2854 at Robert.Kubit@ma.state.us or myself at 413-755-2138, Robert.J.McCollum@state.ma.us.

Sincerely,

Robert J. McCollum
Program Chief
Wetlands & Waterways
DEP Western Region

W://RM/Stockbridge 401 WQC –r1 Letter
Enclosure

SENT ELECTRONICALLY

Water Quality Certification
Glendale Hydroelectric Project,
FERC License No. 2801-MA
BRPWW11

Applicant: Littleville Power Company, Inc.
Subsidiary of Enel North America, Inc.

INTRODUCTION

In October 2007, the Littleville Power Company, Inc., a subsidiary of Enel North America, Inc. (Project Owner), submitted to the Federal Energy Regulatory Commission (FERC) an Application for Subsequent License for the Glendale Hydroelectric Project, a Minor Project of less than 1.5 MW Capacity located at an existing dam on the Housatonic River in Stockbridge, MA (Project). The Project was self-certified as a Qualifying Facility pursuant to Section 210 of the Public Utilities Resource Protection Act (PURPA) on October 30, 2000, under FERC docket QF01-26. The Project was self-recertified as a Qualifying Facility on May 3, 2006. The Project Owner submitted an application for Water Quality Certification (Certification) to the Massachusetts Department of Environmental Protection (MassDEP) on November 15, 2007. On November 11, 2008, the Project Owner withdrew and resubmitted its Certification application.

PROJECT DESCRIPTION

The Glendale Hydroelectric Project is located within River Segment MA21-19 on the main stem Housatonic River in southwestern Massachusetts. 314 CMR 4.06 of the Massachusetts Surface Water Quality Standards (Standards) classifies this segment as a Class B, Warm Water Fishery. The Housatonic River at the Project has a drainage area of 272 square miles.

The topography of the basin is greatly varied. It is hilly and mountainous in the east, gives way to rolling upland toward the west, and the Massachusetts and New York border region contains a large valley running in a north-south direction. The river reach between the nearest upstream Willow Mill dam and the Glendale dam is predominantly flat water with some areas of quick water and riffles. It meanders through areas of marble-limestone bedrock, wide floodplains, wetlands, meadows, and a golf course. The banks along the Project impoundment, canal, and bypassed reach are relatively steep. The base

of the adjacent Monument Mountain, located to the west of the tailrace, is a flatter area. Below the Project, the river is swift with lots of quick water and several mid-sized rapids. The proposed Project will provide additional recreational access through formal canoe portage facilities and parking.

There are several dams on the main stem of the Housatonic River used for hydropower generation, and others are used for flood storage or water withdrawal. The Willow Mill Project (FERC Project No. 2985), used for hydropower generation and water withdrawals for paper mill processing, is the next upstream dam located about 6 miles from the Project dam. The next downstream dam is at the Risingdale Impoundment, approximately 4 miles from the Project dam in Great Barrington, Massachusetts. On December 15, 2004 FERC granted a three year preliminary permit to the Fox River Paper Company to study the proposed 1,100-kilowatt Risingdale Project No. 12528.

As licensed by FERC, the existing Glendale Hydroelectric Facility consists of:

1. a 250 foot long, 30 foot high concrete gravity dam with a 182 foot long spillway;
2. a 23 acre reservoir;
3. two manually operated 10 foot by 10 foot intake gates;
4. a 1,500 foot long by 40 foot wide intake canal;
5. a fore bay structure and a 250 foot long, 12 foot diameter steel penstock;
6. a powerhouse containing four turbine generating units with a combined installed capacity of 1,140 kilowatts;
7. a 300 foot long tailrace channel;
8. a step-up transformer and an 83 foot long, 13.8 kilovolt transmission line; and
9. appurtenant facilities.

The Housatonic River reach that is bypassed by the Project (measured from the gatehouse to the tailrace channel) is about 2,500 feet long. The Project Owner's Application for Subsequent License proposes significant modifications to the existing hydroelectric facility. General and detailed Project location maps are attached to this Certification as "Attachment A". The proposed Project will include a new 165kW turbine unit in the waste gate slot located at the gatehouse adjacent to the dam. This unit would operate off of a proposed minimum bypassed reach flow of 90 cubic feet per second (cfs) or inflow. The Project will continue to be operated in a run-of-river mode using automatic pond level control. The Project boundary circumscribes the Project's impoundment at elevation 814.9 ft NGVD, or 4.0 ft above the normal pond elevation of 810.9 ft NGVD, corresponding to the extent of the Project Owner's flowage rights. The Project boundary in the vicinity of the Project works follows the Project Owner's existing property lines.

IMPACTED RESOURCES

The Housatonic River originates approximately thirty miles upstream of the Project at the confluence of the West and Southwest Branches of the Housatonic River in Pittsfield. The West Branch Housatonic River originates at the outlet of Pontoosuc Lake in Lanesborough and Pittsfield. The Southwest Branch originates from Richmond Pond in the town of Richmond. The East Branch Housatonic River, which originates from Muddy Pond in the town of Washington, soon joins the main stem Housatonic River. From Pittsfield, the river flows south for 150 miles (approximately 54 river miles in Massachusetts) until it empties into Long Island Sound near Bridgeport, CT.

The Housatonic River is undergoing a process of restoration. MassDEP and the United States Environmental Protection Agency are working with local communities to address ongoing water quality issues at wastewater treatment facilities. The General Electric Corporation has begun an active program to remediate longstanding polychlorinated biphenyl (PCB) contamination issues in the Pittsfield area. Recreational activities in and around the Housatonic River continue to grow in popularity. A new catch and release fishing area created by the Massachusetts Division of Fisheries & Wildlife (MADFW), with brown trout as the target species, includes the Project bypass reach. While the Housatonic River in this reach is classified by MassDEP as a Warm Water Fishery, MADFW has evidence that brown trout do persist through the summer months in these reaches. Additionally, at least fifteen species of fish have been collected from the project impoundment in the recent past, including smallmouth bass, white sucker, yellow perch, pumpkinseed, and shiners. Downstream from the project tailrace many of those same species have been collected, as well as dace and brown trout. At this time, there are no anadromous fish species present within the vicinity of the Project. However, there is an active migratory fish restoration program on the Housatonic River in Connecticut.

Fishery resource agencies are actively involved in diadromous restoration efforts within the watershed. These efforts are based on management goals contained in the following published fishery plans:

1. Interstate Fishery Management Plan for American Eel. April 2000. Atlantic States Marine Fisheries Commission.
2. Fishery Management Plan for the American Shad and River Herring. 1985 (amended in 1998). Atlantic States Marine Fisheries Commission.
3. Diadromous Fisheries Plan for the Upper Housatonic River Basin. 2000. Connecticut Department of Environmental Protection.

These plans call for improved fish passage and other measures to enhance populations of migratory fish. Accomplishing the stated fishery management goals requires providing fish passage using methods such as the installation of fishways along the Housatonic River.

According to the Connecticut Department of Environmental Protection's (CT DEP) Diadromous Fisheries Plan for the Upper Housatonic River Basin (2000), the Housatonic River from Derby Dam in the towns of Derby and Shelton, CT, upstream to the base of Bulls Bridge Dam in the Town of Kent, CT, has been targeted for anadromous fish restoration. The catadromous American eel will be restored up to the base of the Falls Village Dam in the towns of Salisbury and Canaan, CT. The new license issued for the Housatonic River Project (FERC No. 2576) requires fish passage facilities at the Stevenson, Shepaug, and Bulls Bridge dams.

Presently there are no plans to restore anadromous fish to the Massachusetts portion of the Housatonic River. However, once the CT DEP's restoration plan is fully implemented, American eel would have access to the base of the Risingdale Dam (FERC No. 12528) in Great Barrington, Massachusetts. Although no upstream eel passage facilities are required at the Housatonic River Project's Falls Village facility, it is assumed eels will be able to ascend the Great Falls at the Falls Village Dam. Therefore, passage would only need to be provided at the downstream Risingdale dam before eel have access up to the Glendale Project. Therefore, there is a possibility that passage for American eel will be required at this Project before the term of the proposed new license expires.

Upstream passage for eels is fairly well understood, and is relatively inexpensive compared to other upstream fishways. Downstream passage needs for eels are less well understood. Research is ongoing to determine the types of bypass measures that are most effective for upstream eel passage. At some sites a traditional surface bypass may suffice, while at others, temporary station shut-downs may be the only means to ensure safe passage of out-migrating adult eels.

APPLICABLE LAW

The Massachusetts Clean Waters Act (State Act), G.L. c.21, §§ 26-53, delegates responsibility for enhancing the quality and value of water resources within the Commonwealth to MassDEP. The State Act directs MassDEP to take all action necessary or appropriate to secure to the Commonwealth the benefits of the Federal Clean Water Act, 33 U.S.C. §§1251-1387 (Federal Act). The main objectives of the Federal Act are to restore and maintain the chemical, physical and biological integrity of the nation's waters. To meet these objectives, MassDEP adopted the Massachusetts Surface Water Quality Standards, 314 CMR 4.00. The Standards classify each body of water within the Commonwealth; designate the most sensitive uses to be enhanced, maintained and protected for each class; prescribe minimum water quality criteria required to sustain the designated uses; and contain regulations necessary to achieve the designated uses and maintain existing water quality including, where appropriate, the prohibition of discharges into waters of the Commonwealth.

314 CMR 4.06 (5), Figure 2 and Table 2 classify the Housatonic River as a Class B water for its entire length in Massachusetts. All Class B waters are designated as habitat for fish, other aquatic life, and wildlife, including for their reproduction, migration, growth and other critical functions, and for primary and secondary contact recreation (314 CMR 4.05(3)(b)). Class B waters shall also be suitable for irrigation and other agricultural uses, and for compatible industrial cooling and process uses. Class B waters must also consistently exhibit good aesthetic quality (314 CMR 4.05(3)(b)). The minimum criteria applicable to Class B waters are listed within 314 CMR 4.05(3)(b). Additional minimum criteria applicable to all surface waters are listed within 314 CMR 4.05(5). The Antidegradation provisions of 314 CMR 4.04 at minimum require protection of all existing and designated uses of water bodies, and maintenance of the level of water quality needed to protect those uses.

CERTIFICATION PROVISIONS

1. MassDEP APPROVES the application of Littleville Power Company, Inc. and CERTIFIES that there is reasonable assurance that Glendale Hydroelectric Project, as described above and subject to the conditions below, can be operated in compliance with the applicable provisions of §303 of the Federal Act, 33 U.S.C. § 1313.

2. This Water Quality Certification shall become a condition on the FERC License issued to the Project Owner.

3. This Certification shall become effective on the date that the license issued for the Project by FERC becomes effective.

4. The state and federal resource agencies referred to in this Certification include the MassDEP, the Massachusetts Department of Fisheries and Wildlife (MADFW), and the U.S. Department of the Interior, Fish and Wildlife Service (USFWS).

5. The Project shall be operated by the Project Owner in accordance with the conditions contained in this Certification and the information included in the FERC application dated October 2007. Any modifications made to the FERC application during the initial licensing process that would have a significant or material effect on the conclusions or conditions contained in this Certification, as determined by MassDEP, must be submitted to MassDEP for prior review and approval.

6. The Project shall be operated to maintain the existing and designated uses of the Housatonic River as outlined in the Standards at 314 CMR 4.00, and to maintain an integrated and diverse biological community within the Housatonic River.

7. The Project Owner shall obtain and comply with all applicable federal, state and local licenses, permits, authorizations, conditions, agreements and orders required for the operation of the project in accordance with the terms of this Certification.

8. All activities shall be conducted in compliance with the Massachusetts Wetlands Protection Act, including the Rivers Protection Act, G.L. Chapter 131, Section 40, and the implementing regulations at 310 CMR 10.00. A Water Quality Certification shall be obtained from MassDEP prior to initiating any activity that will cause a discharge subject to §404 of the federal Act, 33 U.S.C., §1344. The Project Owner shall comply with all applicable provisions of the Public Waterfront Act, G.L. c. 91, and the implementing regulations at 310 CMR 9.00.

9. Prior to beginning any construction on the Project, the Project Owner shall submit a plan to monitor and control erosion during construction activities to keep impacted waters free from turbidity in concentrations that are aesthetically objectionable or would impair any designated use(s) of such waters. The Project Owner shall implement the plan as approved by MassDEP.

10. All construction, maintenance and repair activities, including disposal of debris and removal of sediments in impounded areas, shall be conducted in a manner so as not to impair water quality, and pursuant to and in compliance with any required approvals.

11. Any proposed change to the Project that MassDEP determines would have a significant or material effect on the findings, conclusions, or conditions of this Certification, including Project operation, shall be submitted to MassDEP for prior review and approval.

12. MassDEP may request, at any time during which this Certification is in effect, that FERC reopen the license to make modifications MassDEP deems necessary to maintain compliance with the Standards at 314 CMR 4.00, or other appropriate requirements of state law.

13. MassDEP reserves the right to add and alter the terms and conditions of this Certification when authorized by law, and as it deems appropriate to carry out its responsibilities during the life of the Project with respect to water quality and the protection of the existing and designated uses of the waters of the Commonwealth.

14. The Project Owner shall operate the project in a run-of-river mode such that inflow to the project equals outflow from the project on an instantaneous basis and fluctuations of the head pond water level are minimized. This operating regime may be temporarily modified by approved maintenance activities, agreement between the Project Owner and appropriate state and/or federal resource agencies, or by extreme hydrologic conditions or emergency electrical system conditions, as these terms are defined below.

15. The Project Owner shall release to the project bypass reach a continuous minimum flow of 90 cfs, or inflow, if less, for the protection and enhancement of fish and aquatic life habitat. Minimum flows may be temporarily modified by approved maintenance activities, by agreement between the Project Owner and appropriate state and federal resource agencies, or by extreme hydrologic conditions or emergency electrical system conditions, as these terms are defined below.

16. "Extreme Hydrologic Conditions" signifies the occurrence of events beyond the Project Owner's control including without limitation, abnormal precipitation, extreme runoff, flood conditions, ice conditions or other hydrologic conditions which render the operational restrictions and requirements contained within this Certification impossible to achieve, or are inconsistent with the safe operation of the Project.

17. "Emergency Electrical System Conditions" signifies operating emergencies beyond the Project Owner's control which require changes in flow regimes to eliminate such emergencies including without limitation, equipment failure or other abnormal temporary operating condition, generating unit operation or third-party mandated interruptions under power supply emergencies, and orders from local, state or federal law enforcement or public safety authorities.

18. During refilling of the project reservoir after dam maintenance or emergency drawdown, the Project Owner shall operate the project such that 90% of inflow to the project is released below the project and the impoundment is refilled on the remaining 10% of inflow.

19. Within three months of completion of turbine installation at the dam, or upon such other schedule established by FERC, the Project Owner shall, submit a plan for monitoring run-of-river operation and flow releases from the Project to MassDEP for approval. The plan shall include: a description and design of the mechanisms and structures that will be used; a description of periodic maintenance and/or calibration that will be conducted to ensure these mechanisms and structures work properly; a description of the method used to record project operation data for verification of proper operations and minimum flow releases; and a description of the manner in which data will be maintained for inspection by MassDEP and the state and federal resource agencies. The Project Owner shall consult with the state and federal resource agencies in developing these plans, shall respond to all agency comments, and shall include agency comment letters when submitting the plans to MassDEP for approval. The Project Owner shall provide the state and federal resource agencies with at least thirty days to respond to a draft plan before it is submitted to MassDEP for approval. The Project Owner shall implement the plan as approved by MassDEP.

20. Within six months of the effective date of this Certification, or upon such other schedule established by FERC, the Project Owner shall submit to MassDEP for approval, an Invasive Species Control Plan (ISCP). The plan shall include a schedule for regularly monitoring invasive species within the project area, including without limitation zebra mussel and water chestnut. The plan shall also identify methods used to control selected

species. The Project Owner shall consult with the state and federal resource agencies and in developing the ISCP, shall respond to all agency comments, and shall include agency comment letters when submitting the plan to MassDEP for approval. The Project Owner shall provide the resource agencies with at least thirty days to respond to a draft plan before submission to MassDEP for approval. The Project Owner shall implement the plan as approved by MassDEP.

21. Within one year of the effective date of this Certification, or upon such other schedule established by FERC, the Project Owner shall install full-depth, one inch clear trash racks with velocities less than or equal to two feet per second ($\leq$2 fps) at the intakes to the main and minimum flow units to reduce impingement and entrainment of fish at the Project.

22. The Project Owner shall, in a manner approved by MassDEP after consultation with the state and federal resource agencies, design, construct, operate, and maintain upstream eel passage facilities within one year of the installation of upstream eel passage facilities at the Risingdale Dam downstream of the Project. Six months prior to initiating operation of these facilities, the Project Owner shall, after consultation with the state and federal resource agencies, submit to MassDEP for approval an American eel passage effectiveness monitoring plan. The Project Owner shall implement the plan as approved by MassDEP. The schedule and other requirements of this condition may be amended with the mutual written agreement of the Project Owner and MassDEP.

23. Within one year of the installation of upstream eel passage facilities, the Project Owner shall submit to MassDEP for approval, a plan for providing safe downstream passage for American eels. The Project Owner shall implement the plan as approved by MassDEP.

24. The Project Owner shall, in a manner approved by MassDEP after consultation with the state and federal resource agencies, design, construct, operate, and maintain upstream and downstream anadromous fish passage facilities within one year of the installation of upstream and downstream anadromous fish passage facilities at the Risingdale Dam. Six months prior to initiating operation of these facilities, the Project Owner shall, after consultation with the state and federal resource agencies, submit to MassDEP for approval an upstream and downstream anadromous fish passage effectiveness monitoring plan. The Project Owner shall implement the plan as approved by MassDEP. The schedule and other requirements of this condition may be amended with the mutual written agreement of the Project Owner and MassDEP.

25. The Project Owner shall allow any employee, agent, consultant, contractor or authorized representative of MassDEP or MADFW to enter the facilities in order to assess compliance with the terms and conditions of this Certification including, but not limited to, entry for the purposes of: (i) investigating, sampling, inspecting, or photocopying documents or other writings, conditions, equipment, practices or property; (ii) interviewing facility personnel and contractors; (iii) making records of field activities;

and (iv) observing any activities undertaken at the facilities under any of the provisions of this Certification.

26. If any event occurs which delays or will delay the Project Owner's performance of work beyond a deadline established by or pursuant to this Certification, which event was beyond the reasonable control and without the fault of the Project Owner or any person or entity subject to the Project Owner's control, and which event could not have been prevented or avoided by the exercise of due care, foresight, or due diligence on the part of the Project Owner (a "force majeure event"), then the time for performance shall be extended for an appropriate period of time, as determined by MassDEP in its sole discretion. The Project Owner shall bear the burden of demonstrating that a force majeure event has occurred or will occur, and that the delay was beyond the reasonable control and without the fault of the Project Owner. Such an extension of time must be in writing to have effect.

27. Submissions under this Certification shall be sent to:

MassDEP: Massachusetts Department of Environmental Protection
Division of Watershed Management
Central Regional Office
627 Main Street
Worcester, MA 01608
(508) 767-2854; FAX (508) 791-4131

Massachusetts Department of Environmental Protection
Bureau of Resource Protection
Western Regional Office
436 Dwight Street
Springfield, MA 01103
(413) 755-2138; FAX (413) 784-1149

MADFW: Massachusetts Division of Fisheries and Wildlife
Field Headquarters
Assistant Director of Fisheries
1 Rabbit Hill Road
Westborough, MA 01581
(508) 389-6331; FAX (508) 389-7890

USFWS: United States Fish and Wildlife Service
New England Field Office
Attention: Supervisor
70 Commercial Street, Suite 300
Concord, NH 03301-5087
(603) 223-2541; FAX (603) 223-0104

Signed on ~~this~~ 8th day of July, 2009.

7/8/09

Robert J. McCollum, Program Chief
Wetlands & Waterways
MassDEP Western Regional Office

135 FERC ¶ 62,138
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Littleville Power Company, Inc. Project No. 2801-032

ORDER MODIFYING AND APPROVING RUN-OF-RIVER AND MINIMUM FLOW MONITORING AND COMPLIANCE PLAN

(Issued May 12, 2011)

1. On March 14, 2011, Littleville Power Company, Inc., licensee for the Glendale Hydroelectric Project, filed for Federal Energy Regulatory Commission (Commission) approval, its run-of-river and minimum flow monitoring and compliance plan, as required by article 401(a) of the project license.[1] The project is located on the Housatonic River, in Berkshire County, Massachusetts.

BACKGROUND

2. Condition no. 19 of the Massachusetts Department of Environmental Protection's (DEP) water quality certification requires the licensee to prepare and implement a run-of-river and minimum flow monitoring plan for approval by the DEP. License article 401(a) requires the plan also be submitted to the Commission for its approval. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

LICENSEE'S PLAN

3. The licensee's plan outlines the project's operational requirements that include operating in a run-of-river mode, discharging a minimum flow of 90 cubic feet per second (cfs) into the project's bypass reach, and releasing 90 percent of inflow during impoundment refilling following drawdown for emergencies or maintenance. A new minimum flow unit will be installed in a new powerhouse downstream of the existing gatehouse. A new 3-foot wide by 4-foot high bypass slide gate will be installed on the river side of the forebay. The gate will automatically open to pass the minimum flow to the bypass reach in the event of a minimum flow unit trip or shut down. The bypass gate will have automatic pond level control capability, allowing it to track the pond level to prevent a partial drawdown of the impoundment during low flow periods.

[1] See Order Issuing Subsequent License, issued August 19, 2009 (128 FERC ¶ 62,123).

4. Run-of-river operational compliance will be assured by passing all inflows either through the project's turbines, over the spillway when the units are offline or via both turbines and spillway when inflow exceeds the capacity of the available units. Compliance with bypass flows will be accomplished by discharging 90 cfs, or inflow, whichever is less, either through the minimum flow unit, through the bypass gate or over the spillway. Until the new minimum flow unit is installed or when the unit is not available, the bypass flow will be discharged over the spillway. The licensee determined the proper impoundment setpoint in the project's control system during operation of the main units (0.35 feet above spillway crest corresponding to 811.25 feet National Geodetic Vertical Datum (NGVD)). The project will operate at this limit until the new minimum flow unit is installed and functional.

5. The project's control system for the existing main units will be modified and expanded to monitor and control the minimum flow unit and bypass gate as well. Once installed, the minimum flow unit will have first on-last off priority. To minimize downstream fluctuations the project's control system starts one unit at 55 percent gate opening then gradually increases output to 80 percent while maintaining the pond level setpoint. Additional units are brought online while maintaining the bypass minimum flow. The minimum flow unit will operate in pond level control at inflows of between 60 and 90 cfs, with the main units offline. As flows increase and the minimum flow unit reaches full load, pond level control will shift to the main units and the control system will bring the units online as described above. When the minimum flow unit is offline, the main units will operate in automatic pond level control. If the bypass gate is open, the control system will maintain the pond level at or above the spillway crest. If the gate is closed, the control system will maintain the pond at elevation 811.25 feet in order to provide the 90 cfs minimum flow over the spillway. The gate will open automatically upon unit shutdown or trip to ensure release of the minimum bypass flow. If all units are offline, all inflow beyond the gate capacity will pass over the spillway.

6. Compliance monitoring will be performed by the project's control system. Project data will be recorded on half-hour intervals and maintained in the powerhouse for record keeping purposes and available for inspection. Compliance with run-of-river operation will be confirmed with measurements of headpond level at above spillway crest and the main units operating. Compliance with the minimum flow release will be documented with operational records of the minimum flow unit, headpond level measurements and/or operation of the bypass gate. Following installation of the minimum flow unit, the licensee will perform streamflow gaging measurements to determine the relationship between unit output (kilowatt hours – kWh) and operating flow to confirm that unit operation meets the 90 cfs minimum flow. For quality control, the pond level transducer will be periodically compared to the pond level staff gage mounted at the gatehouse to confirm pond levels seen by the transducer are accurate.

CONSULTATION

7. The licensee sent the draft plan to the DEP and the Massachusetts Division of Fisheries and Wildlife (DFW), each of whom concurred, by letters dated December 17, 2010, and December 16, 2010, respectively, that the plan meets the DEP water quality certification conditions. In its comment letter of January 16, 2011, the U.S. Fish and Wildlife Service (FWS) noted that the plan had no provision for providing compliance records to the agencies, that the plan should include details on the bypass gate dimensions with calculation showing it will pass 90 cfs and a plan-view drawing of the project be included that depicts the headpond, gatehouse, new forebay with associated structures and the location of the headpond sensor. The licensee noted that it had agreed with these recommendations and included them in its final plan filed with the Commission.

DISCUSSION AND CONCLUSION

8. The licensee's run-of-river and minimum flow monitoring and compliance plan was designed in consultation with the DEP, the DFW, and the FWS and ensures that the appropriate minimum flows will be released into the bypass reach of the Housatonic River as well as compliance with run-of-river project operation. As described in its plan, the licensee plans to perform stream flow gaging measurements to confirm proper minimum flow release from the unit and bypass gate. The licensee should file the results with the Commission to verify that the correct minimum flow is being released. In addition, the licensee should file a report with the Commission anytime the minimum bypass flow falls below 90 cfs, or inflow, whichever is less. The report should identify the cause, severity, and duration of the incident, and any observed or reported adverse environmental impacts resulting from the incident. We conclude that the plan, to include the above-noted modifications, meets the requirements of Article 401(a) and condition no. 19 of the DEP's water quality certification and should therefore be approved.

The Director orders:

(A) The run-of-river and minimum flow monitoring and compliance plan for the Glendale Hydroelectric Project, filed on March 14, 2011, by the Littleville Power Company, Inc. (licensee), as modified by ordering paragraphs (B) and (C), is approved and made part of the project license.

(B) The licensee shall file the results of the testing of the minimum flow unit and the flow through the bypass gate to confirm that operation of the unit and gate meet the 90 cubic feet per second minimum flow with the Commission by December 31, 2011. If the results of the testing indicate that the correct minimum flow is not being released, the licensee shall consult with Massachusetts Department of Environmental Protection, the Massachusetts Division of Fisheries and Wildlife, and the U.S. Fish and Wildlife Service, to determine measures to assure proper minimum flow release in the bypass

reach. The licensee shall submit any proposed changes to project facilities or the run-of-river and minimum flow monitoring and compliance plan to the Commission for approval.

(C) If the minimum bypass flow falls below 90 cubic feet per second, or inflow, whichever is less, the licensee shall file a report with the Commission within 30 days of the incident. The report shall, to the extent possible, identify the cause, severity, and duration of the incident, and any observed or reported adverse environmental impacts resulting from the incident. The report shall also include: (1) any operational data necessary to determine compliance with the approved run-of-river and minimum flow monitoring and compliance plan; (2) a description of any corrective measures implemented at the time of the occurrence and the measures implemented or proposed to ensure that similar incidents do not recur; and (3) comments or correspondence received from the resource agencies regarding the incident. Based on the report and the Commission's evaluation of the incident, the Commission reserves the right to require modifications to project facilities and operations to ensure future compliance.

(D) This order constitutes final agency action. Any party may file a request for rehearing of this order within 30 days from the date of its issuance, as provided in section 313(a) of the Federal Power Act, 16 U.S.C. § 8251 (2006), and the Commission's regulations at 18 C.F.R. § 385.713 (2010). The filing of a request for rehearing does not operate as a stay of the effective date of this order, or of any other date specified in this order. The licensee's failure to file a request for rehearing shall constitute acceptance of this order.

Thomas J. LoVullo
Chief, Aquatic Resources Branch
Division of Hydropower Administration
and Compliance

{ EXCERPTS FROM }

ENVIRONMENTAL ASSESSMENT
FOR
SUBSEQUENT HYDROPOWER LICENSE

Glendale Project

FERC Project No. 2801-027

Massachusetts

Federal Energy Regulatory Commission
Office of Energy Projects
Division of Hydropower Licensing
888 First Street, NE
Washington, D.C. 20426

March 2009

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 NO ACTION ALTERNATIVE

Under the no-action alternative, the project would continue to operate under the terms and conditions of the existing license, and no new environmental protection, mitigation, or enhancement measures would be implemented. We use this alternative as the baseline environmental condition for comparison with other alternatives.

2.1.1 Existing Project Facilities

The existing Glendale Project consists of: (1) a 250-foot-long, 30-foot-high concrete gravity dam with a 182-foot-long spillway and a gatehouse containing two manually-operated 10 by 10-foot-square intake gates and two 8-by 8-foot-square waste gates; (2) a 23-acre reservoir with a normal water surface elevation of 810.9 feet National Geodetic Vertical Datum (NGVD); (3) a 1,500-foot-long, 40-foot-wide intake canal; (4) a forebay structure containing two manually-operated headgates (with trash racks with 1-inch clear bar spacing) and one hydraulically-operated canal waste gate; (5) a 250-foot-long, 12-foot-diameter steel penstock; (6) a powerhouse with four turbine generating units with a combined installed capacity of 1,140 kW; (7) a 300-foot-long tailrace channel; (8) a step-up transformer and 83-foot-long, 13.8-kilovolt transmission line; and (9) appurtenant facilities. The Housatonic River reach that is bypassed by the project (measured from the gatehouse to the tailrace channel) is about 2,500 feet long.

The project boundary encloses all the project facilities described above.

2.1.2 Project Safety

The project has been operating for over 29 years under the current license which was effective November 1, 1979. During this time, Commission staff have conducted operational inspections focusing on the continued safety of the structures, identification of unauthorized modifications, efficiency and safety of operations, compliance with the terms of the license, and proper maintenance. As part of the relicensing process, Commission staff will evaluate the continued adequacy of the proposed project facilities under a subsequent license. Special articles will be included in any license issued, as appropriate. Commission staff will continue to inspect the project during the subsequent license term to assure continued adherence to Commission-approved plans and specifications, special license articles relating to construction (if any), operation and maintenance, and accepted engineering practices and procedures.

2.1.3 Existing Project Operation

Littleville Power currently operates the project in a run-of-river mode using

automatic pond level control (PLC). The powerhouse contains four identical vertical semi-Kaplan turbine/generator units with a total maximum hydraulic capacity of approximately 400 cubic feet per second (cfs), or 100 cfs for each turbine, and a minimum hydraulic capacity of approximately 55 cfs for each turbine. Water discharged through the turbines enters the project tailrace and flows approximately 300 feet before reentering the Housatonic River. All inflow in excess of the project's generating capacity is passed over the dam.

When about 2.5 inches of spill occurs over the dam, the PLC unit is programmed to start one unit beginning at 55 percent gate and then gradually increasing to 80 percent gate. If the level of spill exceeds 2.5 inches with one unit operating, the PLC is programmed to start additional units sequentially as flows become available while maintaining the 10-cfs minimum flow.

Since 2001, in an effort to reduce river level fluctuations observed downstream of the Glendale Project at the U.S. Geological Survey (USGS) gaging station in Great Barrington, Massachusetts, Littleville Power has voluntarily ceased all generation when inflow is below 200 cfs and, when possible, has refrained from taking each turbine unit off line until after it is operating at its minimum hydraulic capacity (55 cfs). The result of this ramping mode of operation is that downstream fluctuations (caused by the time delay that occurs between the decreased flows from the powerhouse when a unit is taken off line and increased spillage at the dam) are minimized or eliminated.

Littleville Power estimates that the project's total average annual generation is 5,000 MWh.

2.1.4 Existing Environmental Measures

Under the current license, Littleville Power is required to operate the project in a run-of-river mode, and provide a continuous minimum flow of 10 cfs or inflow from the dam to protect aquatic resources in the Housatonic River (Article 25). The flow to the bypassed reach is currently passed over the length of the spillway crest, or alternatively, through a 6-foot-wide by 10-inch-deep notch in the spillway crest.

No designated recreation facilities exist at the project.

2.2 APPLICANT'S PROPOSAL

2.2.1 Proposed Project Facilities

Littleville Power proposes to install a new 165-kW minimum flow turbine generating unit, including new trash racks with 1-inch clear spacing, in one of the waste gate slots located at the gatehouse adjacent to the project dam.

2.2.3 Proposed Project Operation

Littleville Power proposes to continue run-of-river operation with minimal impoundment fluctuations and turbine unit ramping.

2.2.4 Proposed Environmental Measures

Aquatic Resources and Operations

To enhance aquatic habitat and protect fish, Littleville Power proposes to:

- continually release 90 cfs or inflow into the bypassed reach. The 90 cfs would be released through the new 165-kW minimum flow turbine generating unit at the dam into the bypassed reach
- install trash racks with 1-inch spacing at the minimum flow unit intake.

Recreation

To enhance recreation opportunities, Littleville Power proposes to:

- provide a canoe portage around the dam, including a new take-out and put-in and a portage trail using an existing access road; and
- provide formal parking, for the public at the bypassed reach, adjacent to the proposed put-in.

2.2.5 Modifications to Applicant's Proposal – Mandatory Conditions

The following mandatory conditions have been provided and are evaluated as part of the applicant's proposal.

Section 18 Prescription

Interior requests that a reservation of authority to prescribe fishways under section 18 be included in any license issued for the project.

2.3 STAFF ALTERNATIVE

Under the staff alternative, the project would include all of Littleville Power's proposed measures plus the following measures: (1) release (downstream of the project) 90 percent of inflow during impoundment refilling following any maintenance and emergency drawdowns; (2) an operation compliance monitoring plan; (3) an erosion and sedimentation control plan; (4) an invasive species control plan; (5) a recreation plan for

Glendale impoundment and one 0.7 mile downstream of the project tailrace. A total of 3,623 fish representing 24 species were collected. Overall, rock bass was the most abundant species collected. At the impoundment site, 207 fish were collected with bluegill, common shiner, largemouth bass, and rock bass being the most abundant. At the tailrace site, 135 fish were collected with longnose dace, smallmouth bass, rock bass, and common carp being the most abundant. Two brown trout were also collected in the tailrace location.

The Massachusetts Natural Heritage and Endangered Species Program (Massachusetts NHESP) lists four aquatic species—longnose sucker, bridle shiner, creeper mussel, and triangle floater mussel—as species of special concern that have been observed within the project area during the last 25 years. Massachusetts NHESP maps indicate the 3-mile-long reach downstream of the Glendale dam as longnose sucker habitat; however, Massachusetts DFW did not collect any longnose sucker during its most recent fish sampling.

Littleville Power conducted a survey for freshwater mussels within the bypassed reach of the Glendale Project on October 12, 2006. Habitats within the bypassed reach were checked for mussel presence using view buckets and an Aqua-Scope II™, however, no live mussels were found. One relic shell of a creeper mussel was found during the survey.

Habitat

Aquatic habitat mapping of the bypassed reach was completed on July 12, 2006, as part of an Instream Flow Incremental Methodology Study. The bypassed reach was characterized by a relatively moderate gradient dominated by riffle and run habitat representing about 39 and 38 percent of the total habitat length, respectively. Side-channel habitat, which was mostly riffle, represented 11 percent of the total habitat, and pool habitat represented 12 percent of the total. The predominant substrate type in the bypassed reach was large and small boulder, with lesser amounts of cobble and gravel. Substrate embeddedness was low (0 to 25 percent) which means that the space between larger rocks was not filled with fine substrate. Low embeddedness is consistent with quality habitat for macroinvertebrates and fish. Overhead cover was limited (0 to 25 percent) but instream cover in the form of boulders and large woody debris was common.

Environmental Effects

Mode of operation

In its license application, Littleville Power proposes to continue operating the project in a run-of-river mode under which impoundment levels would continue to be stable and project outflows would equal project inflows and to provide a 90-cfs minimum

flow in the bypassed reach with a new turbine generator unit (discussed below). To address downstream flow fluctuations, Littleville Power states that it would continue to operate the main turbine units, when possible, such that a unit's output is reduced to its minimum hydraulic capacity before being taken offline ensuring that the magnitude of downstream fluctuations is minimized.

Interior and Massachusetts DFW recommend under section 10(j) that the project be operated in a run-of-river mode such that inflow to the project equals outflow from the project on an instantaneous basis, and fluctuations of the impoundment water level are minimized.

Staff Analysis

Fish species that inhabit and spawn in near-shore areas of project impoundments can be susceptible to stranding as well as egg desiccation from project-related fluctuating water levels.

Operating in a run-of-river mode and limiting impoundment fluctuations as proposed by Littleville Power would continue to reduce the chances of fish stranding and disruption of spawning. Maintaining relatively stable impoundment levels within the control of the Glendale Project (up to flows of about 490 cfs) would continue to benefit aquatic vegetation beds near the shoreline, as well as fish and other aquatic organisms that rely on near-shore habitat for feeding, spawning, and cover. Erosion of shoreline areas and resultant turbidity as well as sediment mobilization (including any contaminated sediments) would also continue to be minimized when the impoundment is held relatively stable. In addition, by not storing water, impoundment water would be less likely to increase in temperature or decrease in DO content.

Fluctuating water levels downstream of hydro projects can cause fish stranding, egg desiccation, and effects to invertebrate populations. We discuss below Littleville Power's proposal to provide a minimum flow to the bypassed reach to protect and enhance water quality and aquatic habitats. Downstream of the confluence of the bypassed reach and the project tailrace channel, run-of-river operation along with Littleville Power's ramping of turbine units prior to taking a unit offline would ensure that any fluctuations occurring in the Housatonic River due to project operation are kept to a minimum.

<u>Water quality effects due to operation of minimum flow turbine</u>

Littleville Power proposes to install a 165-kW turbine generator unit within an existing waste gate slot adjacent to the dam. Because the proposed unit would draw water from the deeper portions of the impoundment, water released from the unit could be low in DO and affect water quality conditions in the bypassed reach.

Interior and Massachusetts DFW state that the likelihood of DO depletion is low given the frequent amount of project spills and the proximity of the minimum flow unit's discharge location to a riffle which would facilitate reaeration.

Staff Analysis

We agree with the agencies' assessment. Water quality profile information from a single sampling day during August 2006 indicated that the impoundment was well oxygenated throughout the water column and not thermally stratified. Because this sample was taken during a typical summer month, if stratification was going to take place we would have expected it to be evident at this time. Therefore, it is likely that operation of the minimum flow unit would not result in the release of poorly oxygenated water during most years. In the event that low DO conditions do set up in deeper portions of the impoundment, spill flows and aeration due to the minimum flow release could ameliorate the low DO conditions in the bypassed reach. Spill flows would occur in the bypassed reach about 30 to 75 percent of the time on a monthly basis, and riffle habitat represents nearly 40 percent of the total habitat in the bypassed reach. Therefore, any potential for the minimum flow unit to release oxygen-depleted water from the deeper strata of the impoundment would likely be offset by increased turbulence and aeration caused by the higher minimum flows and frequent spill flows.

Flow continuation following impoundment drawdown

Hydro project impoundments may need to be drawn down periodically due to scheduled and unscheduled maintenance as well as emergencies beyond the control of the operator. The refill of an impoundment following a drawdown can disrupt flows downstream of a project and affect water quality and aquatic habitat. Littleville Power does not propose a refill protocol following impoundment drawdowns.

Interior and Massachusetts DFW recommend under section 10(j) that Littleville Power use 10 percent of the inflow to the project to refill the project impoundment after dam maintenance or emergency drawdowns and release 90 percent of inflow downstream of the project impoundment for the protection of aquatic resources.

Staff Analysis

Maintaining flow in the bypassed reach and below the project during project maintenance activities is important for the protection of aquatic biota. While most fish successfully move to deeper areas when flow decreases, many macroinvertebrates are not as mobile. Additionally, with lower flows, both fish and macroinvertebrates are more likely to be preyed on or stressed by increased water temperatures and decreased DO levels, especially in the summer. Releasing 90 percent of the project impoundment's

inflow during refill would ensure that downstream flows are kept at near natural flow levels. Releasing the majority of the project's inflow would help maintain water quality conditions by maximizing water turbulence and aeration and preventing desiccation of most aquatic habitats.

Minimum flows in the bypassed reach

Under current conditions, the project's 2,500-foot-long bypassed reach receives a minimum flow of 10 cfs, or inflow, whichever is less. The project impoundment is typically held at elevation 811.0 feet above mean sea level. At this elevation, about 1 inch of flow passes over the dam which is enough to provide the required minimum flow of 10 cfs. When about 2.5 inches of spill occurs over the dam, the pond level control (PLC) unit is programmed to start up one unit beginning at 55 percent gate and then gradually increasing the setting to 80 percent gate. If the level of spill exceeds 2.5 inches with one unit operating, the PLC is programmed to start additional units sequentially as flows become available while maintaining the 10-cfs minimum flow. When the project is not generating, as might occur during scheduled maintenance or unscheduled shutdown, or when inflows to the impoundment are less than 200 cfs, as discussed previously, all inflow to the project is spilled through the bypassed reach.

Littleville Power proposes to increase the minimum flow in the bypassed reach to 90 cfs to enhance water quality and aquatic habitat in the bypassed reach and to minimize the effects of fluctuating water levels downstream of the confluence of the bypassed reach and tailrace due to unit operation. Littleville Power intends to provide the minimum flow through a new 165-kW turbine generator unit to be installed at the project dam.

Interior and Massachusetts DFW recommend under section 10(j) that Littleville Power release a continuous minimum flow of 90 cfs, or inflow, whichever is less in the project bypassed reach for the protection of fish and aquatic habitat.

Staff Analysis

Littleville Power based its minimum flow proposal on an Instream Flow Incremental Methodology (IFIM)[2] study. Littleville Power formed a study team

[2] The IFIM is a tool developed by the U.S. Fish and Wildlife Service (FWS) to evaluate the relationship between flow and habitat. Habitat suitable for a particular species life stage is often expressed in terms of weighted usable area (WUA). WUA is the wetted area of a stream weighted by its suitability for use by aquatic organisms or recreational activity. WUA is usually expressed in units of square feet or square meters of habitat per a specified length of stream.