

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

The Town of Londonderry, et al.

Project No. 8433-000

ORDER ISSUING LICENSE
(Major Project - 5MW or Less)
(Issued February 22, 1988)

The Town of Londonderry, et al. ^{1/} have filed a license application under Part I of the Federal Power Act (Act) to construct, operate, and maintain the Jamaica Project, located in Windham County, Vermont, on the West River. The project would use surplus water or water power from the U.S. Army Corps of Engineers Ball Mountain dam.

Notice of the application has been published. The motions to intervene that have been granted and the comments and protests filed by agencies and individuals have been fully considered in determining whether to issue this license, as discussed below.

Recommendations of Federal and State Fish and Wildlife Agencies

Section 10(j) of the Act, as amended by the Electric Consumers Protection Act of 1986 (ECPA), Public Law No. 99-495, requires the Commission to include license conditions, based on recommendations of federal and state fish and wildlife agencies, for the protection, mitigation, and enhancement of fish and wildlife. The environmental assessment (EA) for the Jamaica Hydroelectric Project addresses the concerns of the federal and state fish and wildlife agencies, except as indicated below, and makes recommendations consistent with those of the agencies.

The Vermont Agency of Natural Resources (VANR), previously the Vermont Agency of Environmental Conservation, states that the licensees should be required to participate in off-setting the expense of operating an Atlantic salmon trap to be constructed at the Townshend dam, located about 9 miles downstream from the Ball Mountain dam. Resource agencies plan to trap adult salmon and truck them above the Townshend and Ball Mountain dams. The Jamaica Hydroelectric Project would not affect upstream migration of adult salmon, currently blocked at Townshend dam, and would not conflict with the proposed plans to trap fish at Townshend dam for upstream distribution. Monetary contribution for future mitigative measures unrelated to the proposed project is considered outside the scope of Section 10(j) of the Act, since

^{1/} The Towns of Londonderry, Windham, Wardsboro, Dummerston, and Newfane are the municipal applicants.

it does not involve specific measures to protect fish and wildlife. The Commission, therefore, finds that the licensees should not be required to partially fund a fishery enhancement project at the Townshend dam, a facility under the jurisdiction of the Department of the Army, Corps of Engineers.

Further, the VANR has requested that no license be issued until an adequate downstream Atlantic Salmon smolt passage plan has been identified and approved by the VANR. The licensees are required by this license order to develop a downstream passage plan after consultation with the VANR and prior to project construction, and to have a fully operational downstream passage facility at the beginning of project operation. Such requirements provide for the development and implementation of an acceptable passage plan with appropriate timing to include the interests of VANR. The Commission, however, must retain the final authority to approve or disapprove plans required to be submitted under the license. Since the VANR's recommendation did not request specific terms and conditions for protection, mitigation, or enhancement of fish and wildlife, this recommendation is considered outside the scope of section 10(j) of the Act.

Comprehensive Plans

Section 10(a)(2) of the Act, as amended by ECPA, requires the Commission to consider the extent to which a project is consistent with comprehensive plans (where they exist) for improving, developing, or conserving a waterway or waterways affected by the project. The plans must be prepared by an agency established pursuant to the federal law that has the authority to prepare such a plan or by the state in which the facility is or will be located. The Commission considers plans to be within the scope of section 10(a)(2), only if such plans reflect the preparers' own balancing of the competing uses of a waterway, based on their data and applicable policy considerations (i.e., if the preparers consider and balance all relevant public use considerations). With regard to plans prepared at the state level, such plans are within the scope of section 10(a)(2), only if they are prepared and adopted pursuant to a specific act of the state legislature and developed, implemented and managed by an appropriate state agency. ^{2/}

^{2/} See Fieldcrest Mills, Inc., 37 FERC ¶ 61,264 (1986).

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The Commission has concluded that comprehensive planning under section 10(a)(2), like comprehensive planning under section 10(a)(1), should take into account all existing and potential uses of a waterway relevant to the public interest, including navigation, power development, energy conservation, fish and wildlife, recreational opportunities, irrigation, flood control, water supply, and other aspects of environmental quality. In order that the Commission may fully understand or independently confirm the content and conclusions of a comprehensive plan, the Commission provided general guidelines for developing such plans, which should contain the following: (1) a description of the waterways that are the subject of the plan, including pertinent maps; (2) a description of the significant resources of the waterways; (3) a description of the various existing and planned uses for these resources; and (4) a discussion of goals, objectives and recommendations for improving, developing, or conserving the waterways in relation to these resources. The more closely a plan conforms to these guidelines, the more weight it will have on the Commission's decisions. The Commission, however, will consider plans that do not meet the criteria for comprehensive plans, as it considers all relevant studies and recommendations in its public interest analysis pursuant to section 10(a)(1), to the extent that documentation supports the plan. 3/

The staff identified no comprehensive plans of the types referred to in Section 10(a)(2) of the Act relevant to this project. The staff reviewed four resource plans 4/ that address various aspects of waterway management in relation to the proposed project, as part of a broad public interest examination under Section 10(a)(1) of the Act. No conflicts were found.

Based on a review of agency and public comments filed in this proceeding and on the staff's independent analysis, the Jamaica Hydroelectric Project is best adapted to a comprehensive plan for the West River, taking into consideration the beneficial public uses described in section 10(a)(1) of the Act.

3/ See Commission Order No. 481, issued October 20, 1987.

4/ Strategic Plan for Restoring Atlantic Salmon to the Connecticut River Basin, 1982, U.S. Fish and Wildlife Service; State Comprehensive Outdoor Recreation Plan, 1983, Vermont Agency of Environmental Conservation; River Study, 1986, Vermont Agency of Environmental Conservation; Windham Regional Plan, 1986, Windham Regional Planning and Development Commission.

Applicants' Energy Management and Energy Conservation Programs

Section 10(a)(2)(C) of the Act, as amended by ECPA, requires that the Commission, in considering license applications submitted by a State or municipal applicant, or by an applicant which is primarily engaged in the generation or sale of electric power (other than electric power solely from cogeneration or small power production facilities), consider the electricity consumption efficiency improvement programs of the applicant, including its plans, performance, and capabilities for encouraging or assisting its customers to conserve electricity, cost-effectively, taking into account the published policies, restrictions, and requirements of relevant State regulatory authorities applicable to such applicant.

The applicants are public bodies (e.g., a City, Village, or Borough; or a County or State agency; etc) which do not sell electric power directly to consumers. The applicants intend to sell the entire project output to a second party but, at this time, have no firm power contract (one that is free of potentially nullifying contingency clauses) with a power purchaser.

Consideration of any electricity consumption efficiency improvement program that the applicants might have, as the result of being customers of the utility serving the applicants, may be irrelevant with regard to the use of project power, since the applicants do not intend to use project power to meet any of their requirements and may not sell the project power to the utility that does. In addition, the applicants could not reasonably be expected to have a program to encourage potential purchasers of project power to conserve electricity in lieu of purchasing project power. Furthermore, since the applicants do not have a firm power sales contract, consideration of a potential purchaser's electricity consumption efficiency improvement program would be based on conjecture and could result in findings totally unrelated to how the power is ultimately disposed of.

Based on the above, further consideration of electricity consumption efficiency in relation to issuing a license for the project is deemed unwarranted.

Summary of Findings

An EA was issued for this project. Background information, analysis of impacts, support for related license articles, and the basis for a finding of no significant impact on the environment are contained in the EA attached to this order. A water quality certificate for this project was issued on July 5, 1985. Issuance of this license is not a major federal action significantly affecting the quality of the human environment.

The design of this project is consistent with the engineering standards governing dam safety. The project will be safe if constructed, operated, and maintained in accordance with the requirements of this license. Analysis of related issues is provided in the Safety and Design Assessment attached to this order.

The Director, Office of Hydropower Licensing, concludes that the project would not conflict with any planned or authorized development, and would be best adapted to comprehensive development of the waterway for beneficial public uses.

The Director orders:

(A) This license is issued to The Town of Londonderry, et al. (licensees), for a period of 50 years, effective the first day of the month in which this order is issued, to construct, operate, and maintain the Jamaica Project. This license is subject to the terms and conditions of the Act, which is incorporated by reference as part of this license, and subject to the regulations the Commission issues under the provisions of the Act.

(B) The project consists of:

(1) All lands, to the extent of the licensees' interests in those lands, enclosed by the project boundary shown by Exhibit G:

<u>Exhibit G-</u>	<u>FERC No. 8433-</u>	<u>Showing</u>
1 (revised)	3	Project Map

(2) Project works consisting of: (1) an outlet control structure and valve system; (2) an 11.5-foot-diameter, 80-foot-long steel penstock extension of the outlet conduit; (3) an 8.0-foot-diameter steel penstock which branches from the outlet penstock to a steel bifurcation that divides the flow among two 4.4-foot-diameter and one 3.6-foot-diameter turbine intake; (4) a powerhouse with 3 turbine-generator units with a total capacity of 3,720 kW; (5) a 12.47-kV and 2,500-foot-long underground transmission line; and (6) other appurtenances.

The project works generally described above are more specifically shown and described by those portions of Exhibits A and F recommended for approval in the attached Safety and Design Assessment.

(3) All of the structures, fixtures, equipment or facilities used to operate or maintain the project and located within the project boundary, all portable property that may be employed in connection with the project and located within or outside the project boundary, and all riparian or other rights that are necessary or appropriate in the operation or maintenance of the project.

(C) The Exhibit G described above and those sections of Exhibits A and F recommended for approval in the attached Safety and Design Assessment are approved and made part of the license.

(D) This license is subject to the following article submitted by the U.S. Department of the Army New England Division Corps of Engineers under section 4(e) of the Act:

Article 101. The New England Division Corps of Engineers (Corps), in cooperation with the licensees, will develop a release plan for operation of the reservoir and powerhouse during flood events or when reservoir levels are above the 65-foot stage (elevation 870.5 NGVD). The licensees' plan of project development does not provide continual year round permanent access to the flood control gates in the proposed powerhouse, which will be located at the downstream toe of the dam. Because operation of the hydropower project is not to affect the Corps' flood control responsibilities, this release plan will include provisions for the Corps to shut down the power plant, raise the new downstream flood control gates, and control reservoir releases with the three existing upstream flood control gates. There is continual, permanent access to these upstream gates. This release plan may be modified when there is continual, permanent access to the downstream gates.

(E) This license is subject to the articles set forth in Form L-2 (October 1975), entitled "Terms and Conditions of License for Unconstructed Major Project Affecting Lands of the United States," except Article 20. The license is also subject to the following additional articles:

Article 201. The licensees shall pay the United States the following annual charge, effective the first day of the month in which this license is issued:

- a. For the purpose of reimbursing the United States for the cost of administration of Part I of the Act, a reasonable amount as determined in accordance with the provisions of the Commission's regulations in effect from time to time. The authorized installed capacity for that purpose is 5,000 horsepower.
- b. For the purpose of recompensing the United States for the use, occupancy, and enjoyment of 11 acres of its lands for transmission line right-of-way, a reasonable amount as determined in accordance with the provisions of the Commission's regulations in effect from time to time.
- c. For the purpose of recompensing the United States for utilization of surplus water or water power from a government dam, a reasonable amount as determined in accordance with the provisions of the Commission's regulations in effect from time to time.

Article 202. The licensees shall clear and keep clear to an adequate width all lands along open conduits and shall dispose of all temporary structures, unused timber, brush, refuse, or other material unnecessary for the purposes of the project which result from maintenance, operation, or alteration of the project works. In addition, all trees along the periphery of project reservoirs which may die during operations of the project shall be removed. All clearing of lands and disposal of unnecessary material shall be done with due diligence to the satisfaction of the authorized representative of the Commission and in accordance with appropriate federal, state, and local statutes and regulations.

Article 301. The licensees shall commence construction of project works within two years from the issuance date of the license and shall complete construction of the project within four years from the issuance date of the license.

Article 302. The licensees shall at least 60 days prior to start of construction, submit one copy to the Commission's Regional Director and to the New England Division Corps of Engineers, and two copies to the Director, Division of Inspections, of the final contract drawings and specifications for pertinent features of the project, such as water retention structures, powerhouse, and water conveyance structures. The Director, Division of Inspections, may require changes in the plans and specifications to assure a safe and adequate project.

Article 303. The licensees shall review and approve the design of contractor designed cofferdams and deep excavations other than those approved according to Article 305 prior to the start of construction and shall ensure that construction of cofferdams and deep excavations are consistent with the approved design. At least 30 days prior to start of construction of the cofferdam, the licensees shall file 2 copies with the Commission, and submit 1 copy each to the Commission's Regional Director, and the New England Division Corps of Engineers, of the approved cofferdam construction drawings and specifications and the letter(s) of approval.

Article 304. The licensees shall within 90 days of completion of construction file, for approval by the Commission, revised Exhibits A, F, and G to describe and show the project as built. The licensees shall also submit one set of as-built drawings to the New England Division Corps of Engineers.

Article 305. The design and construction of those permanent and temporary facilities, including reservoir impounding cofferdams and deep excavations, that would be an integral part of, or that could affect the structural integrity or operation of the Government project shall be done in consultation with and subject to the review and approval of the New England Division Corps of Engineers (Corps). Within 90 days from the issuance date of the license, the licensees shall furnish the Corps and the Commission's Regional Director for their information, a schedule for submission of design documents and the plans and specifications for the project. If the schedule does not afford sufficient review and approval time, the licensees, upon request of the Corps, shall meet with the Corps and the Commission's staff to revise the schedule accordingly.

Article 306. Within 90 days from the issuance date of the license, the licensees shall enter into an agreement with the New England Division Corps of Engineers (Corps) to coordinate plans for access to and site activities on lands and property administered by the Corps so that the authorized purposes, including operation of the federal facilities, are protected. In general, the agreements shall not be redundant with the Commission's requirements contained in this license, shall identify the facility, and the study and construction activities, as applicable, and terms and conditions under which studies and construction will be conducted. The agreement shall set forth reasonable arrangements for access to the Corps site to conduct studies and construction activities, such access rights to be conditioned by the Corps as may be necessary to protect the federally authorized project purposes and operations. Should the licensees and the Corps fail to reach an agreement, the licensees shall refer the matter to the Commission for resolution.

Article 307. The construction, operation and maintenance of the project works that, in the judgment of the New England Division Corps of Engineers (Corps), may affect the structural integrity or operation of the Corps project shall be subject to periodic or continuous inspections by the Corps. Any construction, operation and maintenance deficiencies or difficulties detected by the Corps inspection shall be immediately reported to the Commission's Regional Director. Upon review, the Regional Director shall refer the matter to the licensees for appropriate action. In cases when construction, operation or maintenance practices or deficiencies may create a situation posing imminent danger to the structural integrity and safety of the Corps project, the Corps inspector has the authority to stop construction, operation, or maintenance while awaiting the resolution of the problem.

Article 308. At least 60 days prior to start of construction, the licensees shall submit for Commission approval a regulating plan to the New England Division Corps of Engineers (Corps) describing (a) the designed mode of hydropower operation, and (b) reservoir flow diversion and regulation requirements as established by the Corps for operation of the Corps project during construction. In addition, the licensees, prior to start of power plant operation, shall enter into an operating Memorandum of Agreement (MOA) with the Corps describing the detailed operation of the powerhouse acceptable to the Corps. The MOA shall specify any restrictions needed to protect the primary purposes of the Corps project for navigation, recreation, water quality, and flood control. The Regional Director shall be invited to attend meetings regarding the agreement. The MOA shall be subject to revision by mutual consent of the Corps and licensees as experience is gained by actual project operation. Should the licensees and the Corps fail to reach an agreement, the matter will be referred to the Commission for resolution. Three copies of the regulating plan and signed MOA between the Corps and the licensees and any revision thereof shall be filed with the Commission and one copy submitted to the Regional Director.

Article 309. The licensees shall have no claim under this license against the United States arising from the effect of any changes made in the operation or reservoir levels of the U.S. Army Corps of Engineers' project.

Article 310. The licensees shall provide the Regional Director two copies of all correspondence between the licensees and the Corps of Engineers. The Regional Director shall not authorize construction of any project work until the U. S. Army Corps of Engineers' written approval has been received.

Article 401. The licensees, after consultation with the Department of the Army, New England Division Corps of Engineers, the Vermont Agency of Natural Resources, and the U.S. Fish and Wildlife Service, and before commencing any project-related land-clearing, land-disturbing, or spoil-producing activities, shall prepare and shall file for Commission approval a comprehensive plan to control erosion, dust, and slope stability and to minimize the quantity of sediment or other potential water pollutants resulting from project construction, spoil disposal, and project operation and maintenance. The Commission reserves the authority to require changes to the plan. No project-related land-clearing, land-disturbing, or spoil-producing activities shall begin until the licensees are notified that the plan complies with the requirements of this article. The plan shall be based on actual-site geological, soil, slope, and groundwater conditions and on the final project design, and shall include detailed descriptions of the actual-site conditions, detailed descriptions and functional design drawings of control measures, topographic map locations of all control measures, a specific implementation schedule, specific details of monitoring and maintenance programs for the project construction period and for project operation, and a schedule for periodic review of the plan and for making any necessary revisions to the plan. Before filing the plan, the licensees shall include in the filing documentation of consultation with the agencies before preparing the plan, copies of agency comments or recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how all of the agency comments and recommendations are accommodated by the plan. Before filing the plan, the licensees shall allow a reasonable time frame, in no case fewer than 30 days, for agencies to comment and make recommendations. If the licensees disagree with any agency recommendations, the licensees shall provide a discussion of the reasons for disagreeing, based on actual-site geological, soil, and groundwater conditions.

Article 402. The licensees, after consultation with the Department of the Army, New England Division Corps of Engineers and the Vermont Agency of Natural Resources, and within 1 year from the issuance date of this license, shall file for Commission approval a plan to determine the maximum rate of change in river flow (the ramping rate), downstream of the Ball Mountain dam, caused by project operation. The plan shall include a description of the proposed methods for determining the ramping rate, comments from the consulted agencies, and a schedule for filing the results of this study. The Commission reserves the right to require modifications to the plan and schedule.

The licensees shall file for Commission approval the results of this study and recommendations for the ramping rate, along with comments from the consulted agencies, according to the approved schedule.

Article 403. The licensees shall operate the Jamaica Hydroelectric Project in an instantaneous run-of-river mode for the protection of fish and wildlife resources in the West River. In operating the project, the licensees shall at all times minimize the fluctuations of the reservoir surface elevation by maintaining a sufficient discharge from the project so that the flow, as measured immediately downstream from the project tailrace, approximates the instantaneous sum of the inflow to the project reservoir. Instantaneous run-of-river operation may be modified if required by operating emergencies beyond the control of the licensees and for short periods of time upon mutual agreement between the licensees and the Department of the Army, New England Division Corps of Engineers.

Article 404. The licensees, after consultation with the Department of the Army, New England Division Corps of Engineers, the U.S. Fish and Wildlife Service, and the Vermont Agency of Natural Resources, shall develop a plan to ensure that water released from the Jamaica Hydroelectric Project will at all times maintain the Vermont State dissolved oxygen (DO) standard. The plan shall include but shall not be limited to the following: (1) a description of the project aeration system, including operating procedures; (2) functional design drawings of the aeration facilities; (3) a program and schedule for monitoring the DO concentration immediately downstream of the project to ensure rapid detection of low DO levels; and (4) evidence of consultation with and comments and recommendations from the consulted agencies on the plan. The licensees, within 1 year from the date of issuance of this license, shall file this plan for Commission approval; project construction shall not begin until after the plan is approved. The Commission reserves the right to require modifications to the plan.

Article 405. The licensees, after consultation with the U.S. Fish and Wildlife Service, the Vermont Agency of Natural Resources, and the Department of the Army, New England Division Corps of Engineers, shall develop a downstream fish passage plan that includes the following: (1) functional design drawings of downstream fish passage facilities; (2) quantification of flows, in cubic feet per second, required to operate the facilities; (3) a construction schedule; and (4) a plan for operation and maintenance. The licensees shall file a plan for Commission approval within 6 months from the date of issuance of the license, and shall include documentation of agency consultation and agency comments. The Commission reserves the authority to require changes to the plan. The fish passage facilities shall be fully operational when the Jamaica Hydroelectric Project begins operation. Within 6 months after completing construction, the licensees shall file as-built drawings of the fish passage facilities.

Article 406. The licensees, after consultation with the U.S. Fish and Wildlife Service, the Vermont Agency of Natural Resources, and the Department of the Army, New England Division Corps of Engineers, shall develop a plan to monitor the effectiveness of the downstream fish passage facilities required by article 405, through the full range of flow conditions under which the project will operate. The plan shall identify proposed sampling methods, sampling locations, the frequency and duration of sample collection, methods of data analysis, a schedule for implementing the monitoring plan, and a schedule for filing the results of the monitoring with the consulted agencies and with the Commission. The monitoring plan and schedule shall be filed for Commission approval within 8 months after the date of issuance of this license, and shall include documentation of agency consultation and agency comments on the monitoring plan and the schedule. The Commission reserves the authority to require changes in the plan and the schedule.

The licensees shall file with the Commission and with the consulted agencies a report on the results of the monitoring study, according to the approved schedule, and shall file for Commission approval any recommendations for changes in project facilities or operation. The filing shall include agency comments on the monitoring results and on any recommended changes.

Article 407. The licensees shall mitigate and shall monitor impacts to archeological sites along the reservoir shoreline, as described in the cultural resources management plan, filed by the licensees with the Commission on June 3, 1986, and in the letter from the Vermont State Historic Preservation Officer (SHPO) to the licensees dated May 24, 1985. The plan shall be implemented in a manner satisfactory to the SHPO and to the Department of the Army, New England Division Corps of Engineers (Corps). Within 2 years after the date of issuance of this license, the licensees shall file with the Commission copies of letters from the SHPO and the Corps indicating excavations at site VT-WD-36 have been completed and that monitoring of the site is being implemented satisfactorily in accordance with the plan. If it is determined from monitoring that any site will be affected by shoreline erosion or other aspects of project operation, the licensees, in a manner satisfactory to the SHPO and the Corps, shall develop and shall implement a plan to mitigate these impacts. If any site is so affected, the licensees shall file with the Commission a copy of the mitigative plan and copies of letters from the SHPO and the Corps accepting this plan, within 6 months after determining that impacts will occur. Unless otherwise directed by the Commission, the licensees shall not implement a mitigative plan

for a period of 60 days after filing the plan. Copies of letters from the SHPO and the Corps, accepting the report and the work, shall be filed within 2 years after the date of the filing of the mitigative plan. The licensees shall make funds available in a reasonable amount for implementation of these plans. If the licensees, the SHPO, and the Corps cannot agree on the amount of money to be spent for implementation of the plans, the Commission reserves the right to require the licensees to conduct the necessary work at the licensees' own expense.

Article 408. The licensees, before starting any land-clearing or land-disturbing activities within the project boundaries, other than those specifically authorized in this license, shall consult with the State Historic Preservation Officer (SHPO) and the Department of the Army, New England Division Corps of Engineers (Corps), and shall file with the Commission a cultural resource management plan, prepared by a qualified cultural resource specialist. If the licensees discover previously unidentified archeological or historic properties during the course of constructing or developing project works or other facilities at the project, the licensees shall stop all land-clearing and land-disturbing activities in the vicinity of the properties and consult with the SHPO and the Corps, and shall file with the Commission a cultural resource management plan, prepared by a qualified cultural resource specialist.

Either management plan shall include the following: (1) a description of each discovered property, indicating whether it is listed on or eligible for listing on the National Register of Historic Places; (2) a description of the potential effect on each discovered property; (3) proposed measures for avoiding or mitigating effects; (4) a schedule for mitigating effects and conducting additional studies; and (5) copies of letters from the SHPO and the Corps agreeing to the plan. The Commission may require changes to the plan.

The licensees shall not begin land-clearing or land-disturbing activities, other than those specifically authorized in this license, or resume such activities in the vicinity of a property, discovered during construction, until informed that the requirements to this article have been fulfilled.

Article 409. The licensees, after consultation with the Department of the Army, New England Division Corps of Engineers (Corps), the Vermont Agency of Natural Resources, and the Windham Regional Planning and Development Commission and before beginning project construction, shall file for Commission approval, a plan

for emergency access to the project site when access across the dam crest is impassible. At a minimum the plan shall include the following: (1) a description of the emergency access and a map showing the emergency access; (2) the entity responsible for maintenance of the access; and (3) documentation of consultation with the consulted agencies. The Commission reserves the right to require changes to the plan.

Article 410. The licensees, after consultation with the Department of the Army, New England Division Corps of Engineers (Corps), the Department of the Interior, the Vermont Agency of Natural Resources, and the Appalachian Mountain Club, and before beginning project construction, shall file for Commission approval a plan, for providing water releases for competitive and recreational whitewater boating. The plan, at a minimum, shall include the following: (1) provisions for two water releases, one in the spring and one in the fall; (2) provisions for altering project operation before and after the releases to ensure sufficient water for sustained releases; and (3) documentation of agency consultation. The Commission reserves the right to require changes to the plan.

Article 411. During the first two seasons of project operation, the licensees, in consultation with the Department of the Army, New England Division Corps of Engineers, shall monitor the impacts of project operation on recreational facilities at the project reservoir. Within 6 months after completing the monitoring program, the licensees shall file for Commission approval a report containing the following: (1) the results of the monitoring program; (2) a description of the methods used to monitor the impacts; (3) any plan for reimbursement for damage to recreational facilities caused by hydropower operation; and (4) documentation of consultation with the Corps.

Article 412. The licensees, after consultation with the Department of the Army, New England Division Corps of Engineers (Corps), and the Vermont Agency of Natural Resources, and before beginning project operation, shall design, construct, and maintain the following facilities for public safety and public access at the project: (1) warning devices appropriate to the safety hazard created by the outflow variation caused by hydropower plant operation; and (2) public access to the tailwater area, including any measures to provide for public safety in the vicinity of Ball Mountain dam. Within 90 days after completing these facilities, the licensees shall file with the Commission a written description of the facilities and as-built drawings showing the type and location of the facilities. The filing shall include documentation of agency consultation and copies of agency comments.

Article 413. At least 60 days before the start of land-clearing, land-disturbing, or spoil-producing activities, the licensees shall file for Commission approval a plan to avoid or to minimize disturbances, resulting from constructing and operating project facilities, to the quality of the existing visual resources of the project area. The licensees shall prepare the plan after consultation with the Vermont Agency of Natural Resources. No land-disturbing, or spoil-producing activities shall begin until the licensees are notified that the plan complies with the requirements of this article.

The licensees shall include with the plan documentation of agency consultation and copies of agency comments and recommendations. If the licensees disagree with any agency recommendations, the filing shall include the licensees' reasons for disagreeing, based on visual and landscape conditions at the site. The plan, at a minimum, shall include the licensees' strategy for the following: (1) blending the project works into existing landscape characteristics; (2) revegetating, stabilizing, and landscaping new construction areas and areas immediately adjacent to the project site that have been disturbed by previous construction or that presently affect the visual resources of the surrounding area; and (3) grading, planting grasses, repairing slopes damaged by erosion, and preventing future erosion. The plan also shall include an implementation schedule, monitoring and maintenance programs for project construction and operation, and provisions for periodic review and revision. The Commission reserves the right to require changes to the plan.

Article 414. (a) In accordance with the provisions of this article, the licensees shall have the authority to grant permission for certain types of use and occupancy of project lands and waters and to convey certain interests in project lands and waters for certain types of use and occupancy, without prior Commission approval. The licensees may exercise the authority only if the proposed use and occupancy is consistent with the purposes of protecting and enhancing the scenic, recreational, and other environmental values of the project. For those purposes, the licensees shall also have continuing responsibility to supervise and control the use and occupancies for which it grants permission, and to monitor the use of, and ensure compliance with the covenants of the instrument of conveyance for, any interests that it has conveyed, under this article. If a permitted use and occupancy violates any condition of this article or any other condition imposed by the licensees for protection and enhancement of the project's scenic, recreational, or other environmental values, or if a covenant of a conveyance made under the authority of this article is violated, the licensees shall take any lawful action necessary to correct the

violation. For a permitted use or occupancy, that action includes, if necessary, cancelling the permission to use and occupy the project lands and waters and requiring the removal of any non-complying structures and facilities.

(b) The type of use and occupancy of project lands and water for which the licensees may grant permission without prior Commission approval are: (1) landscape plantings; (2) non-commercial piers, landings, boat docks, or similar structures and facilities that can accommodate no more than 10 watercraft at a time and where said facility is intended to serve single-family type dwellings; and (3) embankments, bulkheads, retaining walls, or similar structures for erosion control to protect the existing shoreline. To the extent feasible and desirable to protect and enhance the project's scenic, recreational, and other environmental values, the licensee shall require multiple use and occupancy of facilities for access to project lands or waters. The licensees shall also ensure, to the satisfaction of the Commission's authorized representative, that the use and occupancies for which it grants permission are maintained in good repair and comply with applicable state and local health and safety requirements. Before granting permission for construction of bulkheads or retaining walls, the licensees shall: (1) inspect the site of the proposed construction, (2) consider whether the planting of vegetation or the use of riprap would be adequate to control erosion at the site, and (3) determine that the proposed construction is needed and would not change the basic contour of the reservoir shoreline. To implement this paragraph (b), the licensees may, among other things, establish a program for issuing permits for the specified types of establish a program for issuing permits for the specified types of use and occupancy of project lands and waters, which may be subject to the payment of a reasonable fee to cover the licensees' costs of administering the permit program. The Commission reserves the right to require the licensees to file a description of its standards, guidelines, and procedures for implementing this paragraph (b) and to require modification of those standards, guidelines, or procedures.

(c) The licensees may convey easements or rights-of-way across, or leases of, project lands for: (1) replacement, expansion, realignment, or maintenance of bridges and roads for which all necessary state and federal approvals have been obtained; (2) storm drains and water mains; (3) sewers that do not discharge into project waters; (4) minor access roads; (5) telephone, gas, and electric utility distribution lines; (6) non-project overhead electric transmission lines that do not require erection of support structures within the project boundary; (7) submarine, overhead, or underground major telephone distribution cables or major electric distribution lines (69-kV or less); and (8) water intake or pumping facilities that do not extract more than one million gallons per day from a project reservoir. No later than

January 31 of each year, the licensees shall file three copies of report briefly describing for each conveyance made under this paragraph (c) during the prior calendar year, the type of interest conveyed, the location of the lands subject to the conveyance, and the nature of the use for which the interest was conveyed.

(d) The licensees may convey fee title to, easements or rights-of-way across, or leases of project lands for: (1) construction of new bridges or roads for which all necessary state and federal approvals have been obtained; (2) sewer or effluent lines that discharge into project waters, for which all necessary federal and state water quality certification or permits have been obtained; (3) other pipelines that cross project lands or waters but do not discharge into project waters; (4) non-project overhead electric transmission lines that require erection of support structures within the project boundary, for which all necessary federal and state approvals have been obtained; (5) private or public marinas that can accommodate no more than 10 watercraft at a time and are located at least one-half mile from any other private or public marina; (6) recreational development consistent with an approved Exhibit R or approved report on recreational resources of an Exhibit E; and (7) other uses, if: (i) the amount of land conveyed for a particular use is five acres or less; (ii) all of the land conveyed is located at least 75 feet, measured horizontally, from the edge of the project reservoir at normal maximum surface elevation; and (iii) no more than 50 total acres of project lands for each project development are conveyed under this clause (d)(7) in any calendar year. At least 45 days before conveying any interest in project lands under this paragraph (d), the licensees must submit a letter to the Director, Office of Hydropower Licensing, stating its intent to convey the interest and briefly describing the type of interest and location of the lands to be conveyed (a marked Exhibit G or K map may be used), the nature of the proposed use, the identify of any federal or state agency official consulted, and any federal or state approvals required for the proposed use. Unless the Director, within 45 days from the filing date, requires the licensees to file an application for prior approval, the licensees may convey the intended interest at the end of that period.

(e) The following additional conditions apply to any intended conveyance under paragraph (c) or (d) of this article:

(1) Before conveying the interest, the licensees shall consult with federal and state fish and wildlife or recreation agencies, as appropriate, and the State Historic Preservation Officer.

(2) Before conveying the interest, the licensees shall determine that the proposed use of the lands to be conveyed is not inconsistent with any approved Exhibit R or approved report on recreational resources of an Exhibit E; or, if the project does not have an approved Exhibit R or approved report on recreational resources, that the lands to be conveyed do not have recreational value.

(3) The instrument of conveyance must include covenants running with the land adequate to ensure that: (i) the use of the lands conveyed shall not endanger health, create a nuisance, or otherwise be incompatible with overall project recreational use; and (ii) the grantee shall take all reasonable precautions to insure that the construction, operation, and maintenance of structures or facilities on the conveyed lands will occur in a manner that will protect the scenic, recreational, and environmental values of the project.

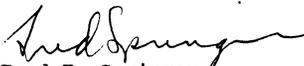
(4) The Commission reserves the right to require the licensees to take reasonable remedial action to correct any violation of the terms and conditions of this article, for the protection and enhancement of the project's scenic, recreational, and other environmental values.

(f) The conveyance of an interest in project lands under this article does not in itself change the project boundaries. The project boundaries may be changed to exclude land conveyed under this article only upon approval of revised Exhibit G or K drawings (project boundary maps) reflecting exclusion of that land. Lands conveyed under this article will be excluded from the project only upon a determination that the lands are not necessary for project purposes, such as operation and maintenance, flowage, recreation, public access, protection of environmental resources, and shoreline control, including shoreline aesthetic values. Absent extraordinary circumstances, proposals to exclude lands conveyed under this article from the project shall be consolidated for consideration when revised Exhibit G or K drawings would be filed for approval for other purposes.

(g) The authority granted to the licensees under this article shall not apply to any part of the public lands and reservations of the United States included within the project boundary.

(E) The licensees shall serve copies of any Commission filing required by this order on any entity specified in this order to be consulted on matters related to that filing. Proof of service on these entities must accompany the filing with the Commission.

(F) This order is issued under authority delegated to the Director and is final unless appealed under Rule 1902 to the Commission by any party within 30 days from the issuance date of this order. Filing an appeal does not stay the effective date of this order or any date specified in this order. The licensees' failure to appeal this order shall constitute acceptance of the license.


Fred E. Springer
Acting Director, Office
of Hydropower Licensing

ENVIRONMENTAL ASSESSMENT

ENVIRONMENTAL ASSESSMENT
DIVISION OF ENVIRONMENTAL ANALYSIS
OFFICE OF HYDROPOWER LICENSING
FEDERAL ENERGY REGULATORY COMMISSION

Jamaica Hydroelectric Project
FERC No. 8433-000 Vermont
January 26, 1988

I. Application

On July 13, 1984, the towns of Dummerston, Londonderry, Newfane, Wardsboro, and Windham, Vermont (applicants) applied for a major license of 5 megawatts (MW) or less for the proposed Jamaica Hydroelectric Project. ^{1/} The applicants supplemented the application on December 12, 1984, June 3, 1985, February 28, 1986, and January 15, 1988.

The proposed project would be located on the West River in Windham County, approximately 3 miles north of the town of Jamaica, Vermont (figure 1).

The project would be located on 11 acres of federally owned lands, administered by the Department of the Army, New England Division Corps of Engineers (Corps).

II. PURPOSE AND NEED FOR ACTION

A. Purpose

The proposed project would provide an estimated average annual generation of 12,147,000 kilowatthours of electrical energy, which would be sold to the Center Vermont Public Service Corporation or another electric utility operating in Vermont.

B. Need for Power

Available data show that growth in demand for electric power and energy will continue. Given load growth and an existing generating resource base, a need for additional generating resources can be projected to exist in the future for any power system at some time, in order to meet projected additional load requirements with the same degree of reliability required by an existing criterion for the system. Timing of the need would vary in different systems depending upon such factors as the rates of load growth, the load characteristics, the available existing

^{1/} This proposed project is also known as the Ball Mountain Dam Hydroelectric Project.

each system. A power generating facility may, however, be added to a system before a generating resource deficit exists, if, over its operating life, the generating addition provides benefits that would not be available through operation of the system without the addition.

The proposed project is located in the New England Power Pool (NEPOOL) area of the Northeast Power Coordinating Council (NPCC) region. NEPOOL, in the April, 1987, Regional Reliability Council Coordinating Bulk Power Supply Program, projects average annual growth rates of 2.5 percent for summer peak demand and 2.7 percent for annual energy requirements. Existing generating resources in the NEPOOL area as of January 1, 1987, include approximately 12,981.7 MW of thermal generating capacity. An additional 2607.8 MW of thermal capacity are projected for installation in the next 10 years to meet load growth in the area.

Because of the small size (3.7 MW) of the proposed project in relation to the existing and projected generating capability of the NEPOOL area, the traditional approach of linking project development with a forecasted need for a specific project is inapplicable to assessing need for the proposed project.

The small size of the project ensures that the project power would be integrated into the existing generating resource base without the temporary overbuilding commonly associated with bringing large power projects on-line (i.e., initiating commercial operation). Moreover, in accordance with the Federal Power Act, the schedule for the project can be made to accommodate uncertain market conditions to some extent by the licensee's delaying commencement of construction for as much as 4 years after the license is issued.

The power from the project would be useful in meeting a small part of the need for power projected by the NEPOOL. From the time the project goes on-line, it would be available to displace fossil-fueled power generation in the NEPOOL region and adjacent areas, thus reducing the emissions of noxious by-products caused by combustion of fossil-fuels.

III. PROPOSED PROJECT AND ALTERNATIVES

A. Proposed Project

1. Project Description

The applicants' proposed project would utilize the existing Corps' Ball Mountain dam and reservoir. The Ball Mountain dam is a rolled earth-fill dam, 915 feet long and 265 feet high, with a top width of 20 feet. The proposed project works would include

the following: (1) a new outlet control structure and valve system; (2) a new 11.5-foot-diameter, 80-foot-long steel penstock extension of the existing outlet conduit; (3) an 8.0-foot-diameter steel penstock, which branches from the outlet penstock to a steel bifurcation that would divide the power flow among three turbine intakes, two 4.4 feet in diameter and one 3.6-foot in diameter; (4) a new powerhouse containing three turbine-generator units with a total capacity of 3,720 kilowatts; (5) a new 12.47-kilovolt, 2,500-foot-long, underground transmission line; (6) other support facilities. Access to the powerhouse during construction and operation will occur either on a tramway to be constructed on the downstream face of the dam from the top of the dam to the powerhouse or on a new 2,700-foot-long access road, located on the north abutment of the dam (figure 2).

In a filing, dated January 15, 1988, the applicants state that the tramway is the optimal alternative for access during and after construction.

2. Proposed Mitigative Measures

a. Soils and water quality

The applicants proposed the following generalized methods controlling erosion and sedimentation during project construction: (1) recontouring and revegetating disturbed areas; (2) using sediment traps, haybale check dams, plastic sheeting, diversion channels, dikes, mulching, matting, and other appropriate measures to control sediment; (3) handling and treating fine material placed or exposed during construction so as to minimize it reaching any stream or other water body; (4) preparing ditches and channels with erosion control measures before diverting water into them; (5) scheduling and performing clearing and grubbing immediately before grading operations and implementing erosion control features; (6) constructing and making top-of-slope berm ditches as functionally complete as possible before beginning excavation; (7) seeding and mulching earthen slopes before the slant height of exposed untrenched slopes reach 20 feet, or when work in the area is suspended; (8) patch seeding and mulching on previously treated areas to maintain or establish protective cover; (9) minimizing wet weather construction, particularly on poorly drained erodible soils that could drain sediment directly to permanent or ephemeral streams; (10) protecting against fill erosion into the upper ends of culverts; (11) extending headwalls beyond fills and installing permanent aprons below them to disperse flows and prevent gullying; (12) using low gradients for haul roads to avoid erosion during heavy runoff; and (13) monitoring project construction for signs of erosion and sedimentation and immediately dealing with any problem areas. The applicants also

propose to use some of the rock from project excavations as riprap lining along the tailrace channel.

b. Fisheries

The applicants propose to install and operate an Atlantic salmon smolt bypass, consisting of either a penstock screening system or an intake collection system.

c. Recreation

During operation, the applicants propose to provide fishermen access to the tailrace and to continue to provide spring and fall flow releases for competitive and recreational whitewater boating.

3. Federal Land Management Conditions

The Corps, in a letter dated September 28, 1987, with clarification in a letter dated October 8, 1987, has provided one license condition for the proposed project (attachment A), under section 4(e) of the Federal Power Act. This condition requires the applicant, in cooperation with the Corps, to abide by the Corps' water release plan for operating the reservoir and powerhouse during flood events or when reservoir levels are above the 65-foot stage (elevation 870.5 feet national geodetic vertical distance) which is the proposed reservoir level for project operation.

B. Alternatives to the Proposed Project

Because the applicants are not an electric utility, no other power-producing action alternatives are available to the applicants. The only available alternative is not to construct the project.

C. Alternative of No Action

No action would prohibit the applicants from constructing the proposed project. No action would involve no alterations to the existing environment and would preclude the applicants from producing electricity at the site.

IV. CONSULTATION AND COMPLIANCE

A. Agency Consultation

Commission regulations require prospective applicants to consult with the appropriate resource agencies before filing an application for license. This consultation constitutes an initial step in compliance with the Fish and Wildlife Coordination Act, the Endangered Species Act, the National

Historic Preservation Act, and other federal statutes. Prefiling consultation must be complete and must be documented in accordance with the Commission's regulations.

After the Commission accepts the application, concerned entities may submit formal comments during a public notice period. In addition, organizations and individuals may petition to intervene and to become a party to any subsequent proceedings.

The Commission makes the comments of the concerned entities part of the record, and the staff considers the comments during the review of the proposed project. After the Commission issued a public notice of the application on March 22, 1985, the following entities commented on the project or petitioned to intervene.

<u>Commenting entity</u>	<u>Date of letter</u>
Environmental Protection Agency	April 30, 1985
Windham Regional Planning and Development Commission	May 2, 1985
Jamaica Water Power Company	May 6, 1985
Department of the Interior	May 11, 1985
Londonderry Historical Society	May 16, 1985
Vermont Agency of Environmental Conservation	May 17, 1985
Department of the Army, New England Division Corps of Engineers	June 19, 1985

<u>Intervenor</u>	<u>Date of intervention</u>
The Attorney General of the State of Vermont	April 19, 1985
Jamaica Waterpower Company	May 6, 1985
Conservation Society of Southern Vermont	May 15, 1985
New England Rivers Center	May 17, 1985

The applicants responded to agency comments in letters dated July 18, 1985, and July 24, 1985.

B. Water Quality Certification

As authorized under section 401 of the Clean Water Act, the Vermont Agency of Environmental Conservation, now known as the Vermont Agency of Natural Resources (VANR), granted a water quality certificate to the applicants on July 5, 1985.

II. ENVIRONMENTAL ANALYSIS

A. Proposed Project

1. General Description of the Locale

The proposed project site is situated within the Green Mountains of the West River watershed of the Connecticut River Basin. Elevations within the project area range from about 784 feet mean sea level (msl) on the West River, at the outlet of Ball Mountain reservoir to 1,760 feet msl at the top of Ball Mountain, immediately south of Ball Mountain dam. Ball Mountain Lake, impounded by the dam, is generally narrow, with steep banks abruptly rising from the edge of the reservoir. The West River below the dam flows through a steep-sided valley around the base of Ball Mountain.

Average annual temperatures in the West River watershed vary from about 40 degrees Fahrenheit (°F) in the mountainous regions to about 45°F in the valleys at lower elevations. Average annual precipitation is 41 inches. Most of the watershed is forested.

Except for transient species, no federally listed threatened or endangered species occur in the project area (letter from Gordon E. Beckett, Supervisor, New England Field Office, Ecological Services, U.S. Fish and Wildlife Service, Concord, New Hampshire, March 28, 1984).

2. Geology and Soils

Affected Environment: Bedrock at the project includes schist in the vicinity of the dam and gneiss in most of the area of the reservoir (Dufresne-Henry, Inc., 1985b). Unconsolidated deposits in the project area include glacial till on valley side slopes and uplands, with glacial outwash, glaciofluvial, and recent alluvial sand, gravel, and boulder deposits in the valley bottom (Dufresne-Henry, Inc. 1985b).

The fine sandy loam soils in the project area and along the reservoir shoreline commonly contain high percentages of boulders, and most of the soils bordering the reservoir are highly erodible (Town of Dummerston et al., 1984c). Bank erosion by the reservoir waters acting on the unconsolidated shoreline deposits have washed away the finer-size (clay and silt) components, leaving sandy gravels and often a bouldery facing along most of the shoreline at the normal project pool elevation of 870.5 feet msl (the proposed operating level). The applicants report that, below that level, for about 4 feet vertically, the shoreline slopes are generally mudflats or are stone-paved. The applicants state further that these exposed mudflats are subjected to erosion by rainfall and surface runoff during

drawdown periods and that some localized sloughing occurs along steeper sections of the shoreline (Town of Dummerston et al., 1984c).

Environmental Impacts and Recommendations: The new project facilities would be constructed on previously disturbed land between the existing outlet channel and the old river channel at the base of the dam. Access to the site would be along the existing Corps access road to the crest of the dam, and then down the downstream face of the dam to the construction site. Excavation of soil and rock for the powerhouse, the 600-foot-long tailrace channel, the access road and other project facilities, as well as disposal of excavated soil materials, burial of the transmission line, and other land-disturbing construction activities would result in increased erosion turbidity and sedimentation. Concentration of flows from the powerhouse on the river banks could cause increased river bank erosion.

The applicants propose several generalized measures for controlling erosion and sedimentation during and after project construction (See section III.A.2.), but did not file a site-specific control plan. The VANR recommends that it be permitted to approve the applicants' detailed construction plans before project construction begins; the applicants agree. The water quality certificate granted by VANR stipulates that during or before the final engineering phase of the project, the applicants must file a comprehensive erosion and sediment control plan, covering temporary and permanent control measures, with the Vermont Department of Water Resources and Environmental Engineering (DWREE.)

The Corps states that repeated fluctuation of the reservoir could lead to instability of the reservoir shoreline slopes and potential sloughing. The Corps says that it would conduct a pre-construction survey of the shoreline to obtain baseline information, would perform periodic surveys during project operation to assess any damages, and would hold the licensee (applicants) responsible for the cost of any repairs or mitigation required by project operations, as determined by the Corps. The applicants respond that they would cooperate with the Corps in preparing the assessments, and would accept the costs of repairs resulting from project operation, but are reluctant to assume responsibility for financing corrective measures for existing problems.

The Corps also states that because the current rate of increase of discharges from the dam are made gradually over a period of time, the applicants would be responsible for downstream turbidity, erosion, and streambank sloughing which might occur if minimum flow releases are increased abruptly to 630 cfs for hydropower generation. Although under the proposed run-of-river mode of operation abrupt flow release increases from

the minimum flow 90 cfs to 630 cfs would be unlikely, the applicants state that they would ramp the increase in half-hour time intervals, similar to the present Corps' regulation scheme, and thus, they anticipate no adverse downstream erosion impacts from hydropower operations.

Any license issued would be conditioned so that any project construction activities on the existing access road, the new access road, and any other areas critical to the structural integrity of the dam would be subject to the Corps' approval. The license would also require the licensees to enter into a memorandum of agreement with the Corps under which the Corps could specify restrictions it would deem necessary to protect the primary purposes of the Corps project, including the reservoir shoreline.

Project-related erosion and sedimentation could be kept to minor levels through careful planning and implementation of appropriate control measures, such as those generally proposed by the applicants, and by basing those controls on the-site specific conditions and on the final project design. To ensure that the interests of the Corps, the VANR, and the DWREE are included in the plan, the applicants, after consultation with those agencies, should file a comprehensive erosion and sediment control plan, based on actual site conditions and on the final project design.

Normally, strict adherence to a run-of-river mode of operation would normally preclude abrupt large magnitude increases in flow releases in the river below the powerhouse and the existing outlet works channel. Rapid water velocity changes, however, whether precipitated by hydropower operations or by increasing flow releases for downstream recreational uses (See section V.A.7), could cause streambank erosion and could pose hazards for downstream recreationists. An appropriate ramping rate, such as suggested by the applicants, would minimize both the erosion and safety hazards associated with large increases of downstream flow releases. The licensees should consult with the Corps and the VANR to develop and implement a study to determine a ramping rate for the project. The proposed plan of study and the results of the study, including comments and recommendations from the consulted agencies, should be filed for Commission approval.

Unavoidable Adverse Impacts: Some minor, short-term erosion and sedimentation would be unavoidable.

3. Water Resources

Affected Environment: The headwaters of the West River originate in the Green Mountains near the town of Weston, Vermont, at an elevation of about 2,400 feet msl. The river then

flows in a southeasterly direction for approximately 45 miles and joins the Connecticut River at Brattleboro, Vermont. The Ball Mountain dam is located approximately 29 miles above the mouth of the West River. The drainage area above the dam is about 172 square miles, accounting for nearly 40 percent of the West River drainage area (Town of Dummerston et al. 1984c).

The conservation pool at the Ball Mountain dam, at stage 65 feet and elevation 870.5 msl, has a surface area of 75 acres and a gross storage of 2,240 acre-feet. During the winter, the reservoir is drawn down to the 25-foot stage at elevation 840.5 msl yielding a surface area of 20 acres with 240 acre-feet of storage. Under high flow conditions, water may crest the spillway elevation of 1,017 msl, creating a reservoir with a surface area of at least 810 acres. Inflow varies seasonally with the highest flow rates occurring in the spring and the lowest flows exhibited during the fall (table 1). To augment river flows for recreational whitewater boating, the Corps provides releases from the dam during two weekends in the spring and one weekend in the early fall (See section V.A.7).

Table 1. Estimated average monthly inflow at the Ball Mountain dam based on the period of record from 1961 to 1982, for the proposed Jamaica Hydroelectric Project, FERC No. 8433, Vermont (Source: Town of Dummerston et al., 1984c).

Month	Inflow (in cubic feet per second)	Storage (in acre-feet)
October	255	15,679
November	311	18,506
December	317	19,492
January	252	15,495
February	266	14,905
March	555	34,126
April	1,249	74,321
May	607	37,323
June	202	12,020
July	138	8,485
August	124	7,624
September	108	6,426

Water in the West River is designated by the Vermont Water Resources Board as Class B, which allows the water to be used for

public water supply when filtered and disinfected, and for irrigation and other agricultural uses, swimming, and recreation. The water must at all times contain a dissolved oxygen (DO) concentration of not less than 7 milligrams per liter (mg/l), or 75 percent saturation.

During the summer, the Ball Mountain reservoir can stratify chemically with the upper portions of the water column that exhibit DO concentrations at or above the state standards, while deep waters can display DO concentrations as low as 0.1 mg/l. When discharged from the dam, these deep waters are reoxygenated as they flow through the conduit gates, the outlet gates, and the outlet channel to the river (letter from Steven B. Sease, Director of Planning, Vermont Agency of Environmental Conservation, Montpelier, Vermont, May 17, 1985).

Environmental Impacts and Recommendations

a. Construction

During project construction, ground-disturbing activities would temporarily increase turbidity and sedimentation in the West River. Nutrients and organic matter, commonly associated with introducing fine sediments into the water column would cause some localized decreases in DO. The licensees should implement a soil and erosion control plan, as recommended in section V.A.2., to minimize the turbidity and sedimentation associated with construction activities.

b. Operation

The applicants propose to continuously maintain the reservoir pool at stage 65 feet and to operate the project in an instantaneous run-of-river mode. An automatic processor, using a "bubbler" pool level sensor, would check the reservoirs stage every 10 minutes, incrementally adjusting the flow through the generating facility to accommodate increasing or decreasing inflow. During minor flood events, when the reservoir stage rises between 65.5 and 70 feet, the project would generate at the maximum operational flow of 630 cubic feet per second (cfs). When the reservoir stage rises above 70 feet, control of flow releases from the dam would shift from the automatic processor to a manual gated release; the Corps would operate the gate from a control panel located within the reservoir control tower. If permitted by the Corps, when the reservoir pool is above the 70 foot stage, the project would be manually operated in conjunction with the Corps' controlled releases.

The Department of the Interior (Interior) recommends that the applicants be required to discharge a minimum instantaneous flow of 90 cfs or the inflow to the reservoir, whichever is less;

when inflow falls below 25 cfs, outflow will be set at 25 cfs, drawing from storage. Interior states that the applicants proposed mode of operation would insure that an instantaneous release of 90 cfs or the inflow, if less, would be maintained. The Corps states that during normal nonflood periods, reservoir outflow equals inflow. During flood periods, the Corps temporarily stores runoff in the reservoir and makes appropriate releases as the West and Connecticut Rivers recede; outflow during moderate or major flood events may be restricted for short periods to a minimum flow release of 25 cfs. In its Section 4(e) comment, the Corps recommends an article for inclusion in the license requiring the licensee to develop a release plan for operation of the reservoir and the powerhouse during flood events or when the reservoir levels are above the 65-foot stage.

The proposed reservoir operational level would eliminate the winter drawdown. Any shoreline erosion that occurs during the drawdown period would be reduced by maintaining this full pool. The development of a reservoir release plan for operation when reservoir levels are above the 65-foot stage, as recommended by the Corps, would insure that the Corps' regulation of flood control operations would be achieved during nonflood periods. Excluding storage and release of water for recreational boating, (See section V.A.7.), the proposed instantaneous run-of-river-mode of operation would generally follow the Corps' present release pattern and would insure that Interior's minimum flow recommendations would be met. The instantaneous run-of-river mode would provide flows similar to the natural river flow pattern, thus protecting fish and wildlife resources below the Ball Mountain dam and, therefore, should be required. When the reservoir level is above the 65-foot stage, project operations and flow releases would be made subject to the flood control regulations as specified by the Corps. Under Section 4(e), the Corps' recommended article requiring the development of a plan for making reservoir releases when the impoundment is above the 65-foot stage would become a condition of the license.

c. Operational impacts on water quality

The applicant proposes to install adequate reaeration facilities to avoid discharging water containing low levels of DO; these facilities could consist of a free overflow weir located downstream of the low flow outlet, a removable weir located downstream of the powerhouse, or a mechanism for destratifying the reservoir's water column. The Corps recommends that the applicants provide further information specifying the method for maintaining the minimum state DO standard.

In issuing the 401 water quality certification for the project, the VANR recognized that no final proposals and designs for reaeration facilities have been made, but that the applicant is committed to providing mitigation. Further, the VANR says

that the technology is available to insure that properly designed and properly maintained facilities will prevent a violation of state water quality standards. The water quality certificate requires that VANR approve the final measures for maintenance of state DO standards, before the start of project construction.

Water quality in tailwater areas is directly affected by the timing of reservoir releases and by the chemical and biological conditions within the reservoir at the depth from which this water is withdrawn. The concentration of dissolved gases in the release water is a function of the amount of aeration the water receives when passing through the reservoir outlet structure and the stilling basin (Nestler et al., 1986). Waters released to the West River from the Ball Mountain dam are aerated when passing through the outlet conduit (Dufresne-Henry, Inc., 1985).

The proposed project would alter the flow regime within the outlet conduit, thereby influencing the DO concentration of the water released to the tailrace. Any increases in the aeration of released water associated with the hydraulic jumps within the outlet structure would be severely reduced during hydropower operations and could cause the release of water containing low levels of DO.

The licensees should design project facilities that maintain state DO standards. Since the provisions for the reaeration facilities are influenced by the final design for the project, the licensees, after consultation with the Corps and other appropriate resource agencies should develop a plan to insure that water released from the project would not violate state DO standards. The plan should include the following: (1) a description of the project aeration system to include operating procedures; (2) functional design drawings of the aeration system facilities; (3) a program and schedule for monitoring the DO concentration immediately downstream of the project to insure rapid detection of low DO levels; and (4) evidence of consultation with and comments and recommendations from the consulted agencies on the plan. Because the final project design could influence the effectiveness of the project aeration system, the licensee should file the plan for Commission approval before the start of project construction.

Unavoidable Adverse Impacts: Project construction would produce short-term increases in turbidity and sedimentation.

4. Fish Resources

Affected Environment: Resident fish found in the West River and the Ball Mountain reservoir include an assemblage of warm, cool and cold water species, such as smallmouth bass (*Micropterus dolomieu*), brown trout (*Salmo trutta*), brook trout (*Salvelinus fontinalis*), largemouth bass (*M. salmoides*), fallfish

(*Semotilus corporalis*), longnose sucker (*Catostomus catostomas*), white sucker (*C. commersoni*), yellow perch (*Perca flavescens*), golden shiner (*Notemigonus crysoleucas*), and common shiner (*Notropis cornutus*) (Town of Dummerston et al., 1984a). The trout are a product of annual stocking, both in the river and the reservoir.

The Ball Mountain reservoir is populated mostly by warm water species (Town of Dummerston et al., 1984). In the fall, however, impoundment experiences severe drawdown, whereby many fish are drawn from the reservoir into the river below the dam. Then, as the reservoir's water level rises each spring, the reservoir is repopulated by the remaining spring and summer spawners (Town of Dummerston et al, 1984).

Anadromous fish present in the West River and Ball Mountain Reservoir include Atlantic salmon (*Salmo salar*). Salmon fry and parr are planted in the river as part of the federal-state effort to restore Atlantic salmon to the Connecticut River Basin (Rideout and Sillas, 1985).

The West River is an integral component of the Connecticut River Basin Atlantic salmon restoration effort, and is one of a few tributaries targeted to support natural reproduction (Stolte, 1982). Currently, the component of the salmon restoration effort directed at the West River involves the planting of hatchery produced fry and parr in the watershed to use available nursery habitat for smolt production. As the restoration program progresses, a fish trap will be constructed at the downstream Townshend dam. Returning adult salmon will be trapped and transported above Townshend and Ball Mountain dams to spawn naturally. In the near term, most salmon smolts migrating from the West River will be of hatchery origin; as adults are released throughout the watershed, an increasing number of smolts will be of wild origin (letter from Kenneth Cox, District Fisheries Biologist, Department of Fish and Wildlife, Vermont Agency of Natural Resources, North Springfield, Vermont, March 4, 1985).

Based on projected salmon statistics for the Connecticut River Basin restoration program, Stolte (1982) estimated that the 24,800 nursery habitat units in the West River watershed are capable of producing 28,200 wild smolts. Stolte further estimated that 630 adult salmon are necessary to maintain this level of production, but because of existing conditions in the Connecticut River Basin, determined that adult escapement to the West River will not be sufficient to utilize all the available nursery habitat. Stolte (1982) states that the number of adult salmon returning to the West River will be influenced by the marine survival (estimated to be 3.0 percent of the smolt production), incidental catch in the lower Connecticut River commercial shad fishery (losses estimated at 4.0 percent), sport harvest take (estimated to be up to 25 percent), and losses from

inefficient fish passage at main stem Connecticut River dams (estimated at 5.0 percent per dam). Thus, it is expected that only 520 adult salmon will be available to spawn naturally in the West River watershed. This deficit will be made up by stocking Connecticut River strain hatchery fish.

About 35 percent of the nursery habitat in the West River Watershed is located upstream of the Ball Mountain reservoir and is capable of producing 10,300 smolts (Town of Dummerston et al., 1984a). 2/ Outmigration of these smolts would be affected by the proposed project.

Environmental Impacts and Recommendations: Construction activities would increase sedimentation and turbidity levels and would have a short-term, adverse effect on fish resources. Construction induced sedimentation and turbidity may reduce visibility, disrupt spawning, and smother aquatic food organisms (Rochester et al., 1984). Implementing appropriate measures to control erosion and sedimentation would reduce the impacts of construction on the fish resources (See section V.A.2).

During project operation, the Corps states that daily fluctuations in discharge releases will increase erosion and turbidity levels downstream, and that turbidity and erosion should increase in the reservoir from fluctuating water levels in the new permanently inundated areas.

Ramping flows, as described in section V.A.2., would minimize downstream erosion. Any increased shoreline turbidity and erosion however, could affect near-shore spawning success. Again, the measures necessary to mitigate project impacts on geology and soils, described in section V.A.2., would minimize potential impacts.

a. Minimum flow releases

Interior recommends that the licensee discharge a minimum flow below the project of at least 90 cfs or the inflow to the reservoir, whichever is less. When inflow falls below 25 cfs, outflow will be set at 25 cfs, drawing from storage. The VANR notes that, based on a 1982 flow needs assessment, it was determined that 90 cfs as a minimum aquatic base flow was necessary to protect the West River for fisheries management purposes and that the proposed project would not artificially regulate flows to less than 90 cfs. The Corps states that an

2/ VANR states that the long-term goal of the restoration program is the production of 7,850 smolts from 7,710 nursery habitat units above Ball Mountain dam (letter from Kenneth Cox, District Fisheries Biologist, Vermont Agency of Natural Resources, North Springfield, Vermont, March 4, 1985).

acceptable minimum flow should be established in cooperation with the VANR, but that with inflow equal to outflow, the aquatic habitat below the project would not significantly differ from existing conditions.

The applicants agree to these flow conditions. Further, the Corps' recommended article under section 4(e) would ensure maintenance of the downstream aquatic habitat.

b. Upstream fish passage

To restore Atlantic salmon to the West River, a fish trap is to be constructed at the Corps' Townshend dam, located 9 miles downstream from the Ball Mountain dam. Adult salmon will be trapped and then trucked to spawning areas above Townshend and Ball Mountains dams (Stolte, 1982). The Connecticut River Atlantic Salmon Commission has requested that the Corps design and construct the fish-trapping facilities at the Townshend dam (letter from David F. Egan, Chairman, Connecticut River Atlantic Salmon Commission, May 22, 1984).

The VANR states that the applicants should be required to participate in off-setting the expense of operating the planned fish trap on a prorated basis and independent of the Vermont Fish and Wildlife's participation in the facility. The applicants are opposed to this request. The applicants say that they are responsible for issues related to the project dam and not to the downstream Townshend dam. The applicants believe that their commitment to install and operate a downstream bypass system for outmigrating smolts is an adequate contribution to the salmon restoration program.

Section 10(j)(1) of the Federal Power Act (Act) requires that each license issued under this part shall include conditions for the protection, mitigation and enhancement of fish and wildlife affected by the development, operation, and management of the project, based on recommendations from the state and federal fish and wildlife agencies. The proposed project, would not affect upstream migration of adult salmon currently blocked at Townshend dam and would not conflict with the proposed plans to trap fish at Townshend dam for upstream distribution. Monetary contribution for future mitigative measures unrelated to the proposed project is considered outside the scope of section 10(j) of the Act, since it does not involve specific measures to protect fish and wildlife. Thus, the applicants should not be required to participate in off setting the expense of operating the fish trap at Townshend dam.

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Winnicki Inc.*

c. Outmigration of smolts

Operation of the proposed project could impair or reduce the outmigration of Atlantic salmon smolts from upstream plantings or

from future natural production. The applicants believe that Ball Mountain dam currently causes some delay and mortality of outmigrating smolts, although no quantitative studies to verify this belief have been performed. To reduce the potential increase in mortality caused by installation of turbines, the applicants have studied various schemes to facilitate smolt movement past Ball Mountain dam. Alternative passage systems studied were upstream collection systems, intake collection systems, penstock screening systems, in-turbine systems, and modified generation patterns (Natural Resource Consulting Services, 1985). Based on the study, the applicants recommend construction of either a penstock screening system or an intake collection system. To date, no specific final proposal and design has been provided by the applicants, or approved by any of the resource agencies.

The applicants proposed intake collection system would be designed to capture smolts near the intake structure with a floating gulper, connected to an inclined screen, and bypass the dam with either a pipe through the dam or by trucking fish downstream. The applicants' proposed penstock screening system would consist of a self-cleaning, wedge-wire screen, located in each penstock. The screens would shunt fish into a pipe, away from the turbines, and would discharge them into the tailrace. The penstock screening system assumes that outmigrating salmon would find and enter the deep outlet structure (Natural Resource Consulting Services, 1985).

Interior recommends an article be included in any license issued that requires the licensees to file functional design drawings for downstream migrant bypass facilities and that the plans be prepared in consultation with, and approved by the U.S. Fish and Wildlife Service (FWS), Corps, and VANR before beginning of construction of the proposed project. The Corps comments that the addition of turbines would likely increase smolt mortality, and the Corps states that it would not oppose methods of providing a means of insuring safe downstream passage of smolts, provided any alternative method chosen be consistent with the Corps' concerns about the integrity of the dam, flood control, and maintenance of the facility. The Corps further considers the applicants' study and choice of alternative bypass designs as conceptual in nature and says that a more detailed analysis of each alternative described in the applicants' study is required. The Corps also states that it will not permit excavation of a tunnel through the embankment or foundation of the dam.

The water quality certificate requires that no construction may commence until DWREE has approved measures to mitigate the

project impacts on outmigration of all the salmon adults and juveniles. The certificate further specifies that the construction schedule for such facilities and the provisions for the applicants to monitor the effectiveness of the facilities and to effectuate changes as needed to ensure their efficiency must be determined by the Vermont Department of Fish and Wildlife. The VANR recommends that no license be issued until an adequate passage plan has been identified and approved by the VANR.

In all probability, the Ball Mountain dam is responsible for some delay and mortality to outmigrating salmon smolts. The installation of a hydropower facility at the dam would further exacerbate this condition. Therefore, the licensees should be required to develop a plan to ensure reasonably safe passage of fish through the project area. The plan should include functional design drawings of any bypass facilities, evidence of consultation with the resource agencies, and a post operational monitoring program.

Because of the importance of the West River to the success of the Connecticut River Atlantic salmon restoration program, the plan must be acceptable to those agencies involved in the restoration of salmon and should be completed prior to the start of construction of the proposed project.

Unavoidable Adverse Impacts: During project operation, it is expected that the smolt outmigration would continue to be impaired by the Ball Mountain dam and that some injury and mortality would result from passage through the hydropower facility.

5. Botanical and Wildlife Resources

Affected Environment: The vegetation of the project area is predominantly northern hardwood forest, characterized by a mixture of sugar maple (Acer saccharum), red maple (Acer rubrum), yellow birch (Betula lutea), beech (Fagus grandifolia), red oak (Quercus rubra), and ash (Fraxinus spp.). Common associated species are hemlock (Tsuga canadensis) and white pine (Pinus strobus) (Town of Dummerston et al., 1984a).

The lands adjacent to Ball Mountain reservoir have been declared of forest vegetation to approximately the 80 foot reservoir stage (885.5 feet msl). Vegetation between stages 65 and 80 feet consists of early successional grasses and shrubs.

Typical wildlife species of the forest habitat of the project area are white-tailed deer (Odocoileus virginianus), Eastern chipmunk (Tamias striatus), and ruffed grouse (Bonasa umbellus). Species common along the river and reservoir and riparian habitats are beaver (Castor canadensis), muskrat (Ondatra zibethica), mink (Mustella vison), Canada goose (Branta

candensis), and great blue heron (*Ardea herodias*). A large number of other bird species occur in the project area on a seasonal or year-round basis (Town of Dummerston et al., 1984a).

Environmental Impact and Recommendations: Most of the proposed project facilities occur in areas that were cleared of vegetation during the development of the Corps' Ball Mountain dam and reservoir. Construction of the powerhouse and use of a spoil disposal area along the north bank of the West River would require the clearing of less than 1 acre of predominantly early successional, shrub-tree-sapling type vegetation. The development of remaining facilities would have little or no effect on vegetation.

Wildlife in the immediate vicinity of project development would be disturbed during the construction period. The loss of wildlife habitat would be insignificant.

Unavoidable Adverse Impacts: The clearing of less than 1 acre of vegetation would be unavoidable with project development.

6. Cultural Resources

Affected Environment: A cultural resources survey of the project impact area was conducted (Thomas and Warren, 1984; Thomas, 1985). Two prehistoric and one historic archeological sites that are eligible for inclusion in the National Register of Historic Places, and that may be affected by erosion from changes in reservoir water levels as a result of project operation were inventoried in the vicinity of the project reservoir. Several other potential National Register eligible sites were inventoried, but the sites are all located outside of the project's impact areas. These sites are situated near a previously proposed access road that is no longer being considered as part of the project. No other sites listed in or considered eligible for inclusion in the National Register of Historic Places would be affected. The Vermont State Historic Preservation Officer (SHPO), the Corps, and the staff agree that the cultural resources survey has been conducted in an adequate manner and that the survey has identified the National Register sites that would be affected by the project (letters from Joseph L. Ignazio, Chief, Department of the Army, New England Division Planning Division, Corps of Engineers, Waltham, Massachusetts, December 5, 1984, and June 19, 1985; letter from Eric Gilbertson, Deputy State Historic Preservation Officer, Vermont Agency of Development and Community Affairs, Montpelier, Vermont, May 24, 1985).

Environmental Impacts and Recommendations: Two of the three National Register sites next to the project reservoir are not in immediate danger from the shoreline erosion that would result from changes in reservoir pool levels, but might be affected by

such erosion on a longer-term basis. The third site would likely be affected by erosion in the near term, resulting in the loss of artifacts and other cultural materials that qualify the site for inclusion in the National Register.

To mitigate any effects of shoreline erosion on the three sites eligible for the National Register, the applicants, at the staff's request, have prepared a detailed cultural resources management plan. Under the plan, the applicants would collect the significant cultural materials through archeological excavations at the one site that is in immediate danger of being affected by erosion; the applicants would monitor erosion at the other two sites, and if erosion is likely to occur, would conduct any investigations necessary to recover the significant cultural materials at these sites (Thomas, 1985). The SHPO, the Corps, and the staff have reviewed the plan, and agree that it would adequately mitigate the effects of the project on these sites (letter from Eric Gilbertson, Deputy State Historic Preservation Officer, Vermont Agency of Development and Community Affairs, Montpelier, Vermont, May 24, 1985; letter from Joseph L. Ignazio, Chief, Planning Division, Department of the Army, New England Division Corps of Engineers, Waltham, Massachusetts, June 19, 1985). Also, because of the significance of the site that would be excavated, the SHPO has asked that the applicants inform archeologists and the public about this site by distributing copies of the archeological report to educational institutions and by making pamphlets describing the site available to schools and other public groups (letter from Eric Gilbertson, Deputy State Historic Preservation Officer, Vermont Agency of Development and Community Affairs, Montpelier, Vermont, May 24, 1985).

The staff concludes that the applicants' cultural resources management plan, with a provision for printing and distributing additional reports and pamphlets, as requested by the SHPO, should be implemented as a condition to any license issued for the project. If the plan is implemented with such a provision, the project would not have an adverse effect on the three National Register eligible sites in the project impact areas. The comments of the Advisory Council on Historic Preservation have been requested.

The results of the survey conducted for the proposed project area, as well as the SHPO's and the Corps' comments on the results of the survey and on the proposed project, are based on the premise that the project would be constructed as described in the application without significant changes. Changes to the project, especially changes in the proposed location and design of a project, are occasionally found to be necessary after a license has been issued, and may require an applicant to amend a license. Under these circumstances, whether or not an application for amendment of license is required, the survey

results and the SHPO's comments would no longer reliably depict the cultural resources impacts that would result from developing the project. Therefore, before beginning land clearing or land-disturbing activities within the project boundaries, other than those specifically authorized in the license and previously commented on by the SHPO and the Corps, the licensee should consult with the SHPO and the Corps about the need to conduct an additional archeological or historical survey and to implement further avoidance or mitigative measures.

Also, land-clearing and land-disturbing activities could adversely affect archeological and historic properties not identified in the cultural resources survey. Therefore, if the licensee encounters such sites or properties during the development of project works or related facilities, the licensees should stop land-clearing and land-disturbing activities in the vicinity of the sites or properties, should consult with the SHPO and the Corps on the eligibility of the properties, and should carry out any necessary measures to avoid or to mitigate effects on the properties.

Before starting land-clearing or land-disturbing activities associated with any changes to the project, both proposed and necessitated, and before resuming land-clearing and land-disturbing activities in the vicinity of the sites or properties discovered, the licensee should file a plan and a schedule for conducting the appropriate studies, along with a copy of the SHPO's and the Corps' written comments concerning the plan and the schedule. The licensees should not start or resume land-clearing or land-disturbing activities, other than those specifically authorized in this license and commented on by the SHPO and the Corps, and should not resume such activities in the vicinity of an archeological or historic property discovered during construction, until informed by the Commission that these requirements have been fulfilled.

Unavoidable Adverse Impacts: There would be none.

7. Recreation and Other Land Water Uses

Affected Environment: Recreational activities in the project area include sightseeing, camping, fishing, hunting, swimming, hiking, picnicking, whitewater boating, and winter sports. Recreational use occurs year-round, but the primary recreation season is June, July, and August. The Corps presently arranges three annual flow releases from Ball Mountain dam to enhance competitive and recreational whitewater boating in an 8-mile-long section of the West River immediately below the dam. These water release events are extremely popular and favorably affect the local economy.

There are three developed recreational areas near the proposed project. The Corps-operated Winhall Recreation Area, located 2 miles upstream of Ball Mountain dam, has an annual use of approximately 20,000 visitor-days (one visitor day equals 12 hours). Facilities include 108 campsites and shoreline access for fishing. The Corps-operated public use area at the dam site includes a parking lot, picnic facilities, and overlook area. Annual visitation at the day use area and elsewhere around the reservoir, excluding the Winhall Recreation Area, is 33,500 visitor-days. Jamaica State Park, located 1 mile downstream of Ball Mountain dam, has an annual visitation of 15,850 persons. Facilities include a camping area, parking and picnic facilities, a large natural swimming hole in the river, and hiking trails. The Old Railroad Bed hiking trail parallels a scenic section of the West River from Jamaica State Park to Ball Mountain dam. Since abandonment of the railroad right-of-way, the Conservation Society of Southern Vermont has purchased lands along the West River from Jamaica to South Londonderry, in an effort to establish a "greenway" (a strip of land along the river set aside as a natural area for public use and enjoyment).

Two sections of the West River, from West Townshend to Ball Mountain and from Ball Mountain to the headwaters, are listed on the Nationwide Rivers Inventory for their outstanding recreational and scenic values. For recreation, both stretches are highly used and regionally unique, and include sections of gradient rated on the International Scale of River Difficulty as class IV.

Besides recreation, land in the immediate project area is used for the flood control dam and open space. The steep terrain and remote location of the project area have limited other land uses. Vermont Route 30, which parallels the West River, serves as the principal artery for the region, and is heavily travelled in the winter by skiers from Massachusetts, Connecticut, and New York on their way to resorts in south-central Vermont.

Environmental Issues and Recommendations: During construction, the noise from machinery, the presence of construction vehicles using the access road, and the intrusion on visual quality would disturb recreationists using the day-use area at Ball Mountain dam. Brief periods of increased turbidity caused by construction activities would adversely affect swimmers, boaters, and fishermen using the West River below the dam. The applicants propose to minimize turbidity by keeping instream construction to a minimum, constructing during low-flow periods, and employing other sediment control measures.

Providing access to the proposed powerhouse at the base of Ball Mountain dam through Jamaica Village, Jamaica State Park, and along the old railroad bed bordering the West River could have a negative effect on village residents and recreationists

using the state park and the greenway. The VANR, the Windham Regional Planning and Development Commission (WRPP), the Londonderry Historical Society, the Conservation Society of Southern Vermont (by motion to intervene), and the Depot Street Committee to Protect Jamaica Village oppose any use of the village and state park roads for access to the construction site. After prolonged negotiation, the applicants have agreed to provide access to the powerhouse during project construction and operation via the Corps' access road to the dam crest and then by tramway to the toe of the dam. Because the proposed access road from the dam crest to the toe would be inaccessible during high flow periods, when the spillway is full, the Corps recommends that emergency access to the powerhouse be provided along the park road (personal communication, Michael Keegan, Department of the Army, New England Division Corps of Engineers, April 14, 1987). The licensee should consult with the Corps, the VANR, and the WRPP to complete plans to provide access to the proposed project during emergency situations.

Operation of the project could affect an existing informal cooperative arrangement between the Corps and the Appalachian Mountain Club (AMC) to release flows to accommodate annual whitewater events held on the river in the spring and the fall. In a motion to intervene, the New England Rivers Center states its concern on this matter. The applicants recognize the importance of the canoe races to the participants, spectators, and local economy, and in keeping with past operating practice, agree to cooperate with the Corps and the AMC to provide water releases for competitive and recreational whitewater boating. Interior and the VANR recommend that the applicants make a formal agreement to ensure continued water releases for existing whitewater events. To ensure the continuation of the recreationally important water releases for whitewater boating below the Ball Mountain dam, the licensee, after consultation with the Corps, Interior, the VANR, and the AMC, should file with the Commission a plan for maintaining water releases for whitewater recreation.

Proposed project operation, which would maintain the 65-foot summer pool year-round, could affect existing and proposed recreational facilities. The Corps states that if the Corps' proposed boat ramp, which would be installed near Death's Bridge, is affected by the new reservoir pool level, the applicants should be responsible for ensuring access to the ramp at all hydropower pool levels. The applicants reply that because the project would operate at reservoir pool levels similar to the Corps' summer recreational level, the boat ramp should be accessible at all hydropower pool levels. The Corps also states that with a permanent pool at the 65-foot stage, there is increased potential for flooding at existing recreational areas. The Corps recommends that the applicant take responsibility for the cost of damage restoration and debris clean-up caused by

raising the pool for hydropower production. The applicant agrees to evaluate the effects of winter flooding on the recreational area and to coordinate with the Corps in developing a plan for evaluating damage at the recreational area attributed to hydropower production. To mitigate any damage to existing or proposed recreational facilities caused by raising the reservoir pool level for hydropower production, the licensee should monitor the impacts of project operation on the recreational facilities and, in cooperation with the Corps, should develop a plan to reimburse the Corps for any damage to recreational facilities resulting from hydropower operation.

The Corps is concerned that an extreme variation in flow during the start-up of hydropower operation would present a safety hazard to recreationists in or near the downstream river channel. The Corps recommends that the applicants construct, operate, and maintain signals and warning devices to provide for the safety of recreationists during hydropower operation. The applicants state that flow variations would be no greater with hydropower operation than with operation for flood control and that a sign warning of rapid fluctuation in river level is already in place at the swimming beach at Jamaica State Park. Nevertheless, the applicants agree to provide and to maintain warning devices appropriate to the safety hazard created by the flow variation of hydropower plant operation. To ensure the safety of the public during hydropower operation, the licensees should design, construct, and maintain warning devices appropriate to the safety hazard created by this flow variation.

Construction and operation of the project could affect the scenic and recreational values for which segments of the West River were identified as a potential National Wild and Scenic River. Interior states that operating the project in a run-of-river mode and burying the transmission line would satisfy its concerns about adverse effects on the natural values of the segment below the dam. Implementing the staff's and the applicants' proposed mitigative measures would ensure the protection of the scenic and recreational values for which the West River was identified as a potential National Wild and Scenic River.

Construction and operation of the proposed project offers the opportunity to enhance public access to the project area. The applicants propose to provide fishing access to the tailwater area. The Corps states that walking access to the tailwater area would improve fishing opportunities in the project area. The Corps further recommends that public safety measures be taken to prohibit public and vehicular access across the spillway and dam (personal communication, Michael Keegan, Department of the Army, New England Division Corps of Engineers, April 14, 1987). Therefore, to insure safe public access to the tailwater area the licensees should consult with the Corps to determine the final

design and location of tailwater fishing access and to determine any measures needed to ensure public safety.

Unavoidable Adverse Impacts: Construction activities would increase noise, dust, exhaust emissions, and vehicular traffic, temporarily disturbing to recreationists using the project area. Construction activities would also increase downstream turbidity, which would adversely affect swimmers, boaters, and fishermen using the West River below the dam.

8. Visual Resources

Affected Environment: The proposed project area has a beautiful natural character that encompasses mountainous land forms, forested expanses, and river canyons. The site area is dominated by the Ball Mountain dam and reservoir. Because of the area's natural beauty and recreational resources, it attracts many recreationists. Aside from the dam, the access road to the dam, abandoned railway bed (used as a trail), and other recreational facilities, the area shows minimal signs of development.

Environmental Impacts and Recommendations: Construction of the proposed project would cause a moderate adverse visual impact on people who use the area when they view the equipment and the disruptive characteristic of a construction site. This disturbance would be temporary. The VANR states that the project should be made to blend with the surrounding area to an adequate level and that VANR approval of visual quality mitigation be obtained prior to construction. The applicants agree.

Construction activities, although short term, would be intensely disruptive to the visual quality of the project area. The licensees should prepare a plan showing how the licensees would maintain visual quality. The licensees should include in the plan architectural elevations of the project facilities and landscape plans necessary to protect the visual quality of the West River Valley.

Unavoidable Adverse Impacts: Construction activities and the presence of additional man-made structures would contrast with the existing character of the area.

9. Socioeconomic Considerations

Affected Environment: The total population of Windham County increased as follows: 29,776 persons in 1960; 33,476 in 1970; 36,933 in 1980; and an estimated 39,500 persons as of July 1, 1985 (personal communication, Audrey Primas, Statistical Information Assistant, Bureau of the Census, Department of Commerce, Suitland, Maryland, March 30, 1987). In addition to its permanent population, the county attracts large numbers of

seasonal residents at three times of the year: in the winter ski season, in the summer recreation season, and in the fall foliage and hunting seasons. The 1980 Census of Housing found that 4,554 housing units located in Windham County are held for seasonal or occasional year-round use as vacation or second homes (personal communication, Robert Bonnette, Survey Statistician, Bureau of the Census, Department of Commerce, Suitland, Maryland, March 30, 1987). In addition, there are 78 transient housing establishments (hotels, motels, lodges, campgrounds) in the county.

The Windham County economy depends heavily on outdoor recreation, tourism, and second-home development. Census data show that during the week of March 12, 1985, 3,708 persons were employed at the ski areas, transient housing establishments, eating and drinking places, and other tourist-oriented retail trade establishments in the county (personal communication, Andrew Pekala, Survey Statistician-County Business Patterns, Bureau of the Census, Department of Commerce, Suitland, Maryland, March 30, 1987). During the mid-winter and summer, the number of tourist-oriented jobs in the county probably reaches 4,500.

Manufacturing is the second most important generator of job opportunities in Windham County. In March 1985, 158 establishments employing a total of 3,984 workers, were engaged in manufacturing lumber and wood products and paper and allied products, such as envelopes, bags, and cardboard (personal communication, Andrew Pekala, Bureau of the Census, Department of Commerce, Suitland, Maryland, March 30, 1987).

Dairy farming also is an important income generator in the county. The 1982 Census of Agriculture shows that 298 farms in Windham County received \$13,838,000 from the sale of agricultural products, including \$9,086,000 for dairy products, \$1,228,000 for cattle and calves, and \$2,762,000 for crops (personal communication, Janet Allen, Statistical Information Assistant, Census of Agriculture, Bureau of the Census, Department of Commerce, Suitland, Maryland, March 30, 1987).

Environmental Impacts and Recommendations: During the proposed 18-month construction period, on-site machinery and project-related vehicles would produce noise, dust, exhaust emissions, and minor delays for motorists in the Jamaica, Vermont, area. The project would not displace any residence or business establishment.

During construction, an average of 30 persons would be employed at the project site. Because most of these workers would commute daily from southern Vermont or the Albany-Schenectady-Troy metropolitan area, the project would not induce the in-migration of families with school-age children to Windham County, and the project would not generate any discernable

impacts to area housing or local government services. The spending of construction personnel at retail trade and service establishments in Windham County would represent a beneficial, albeit short-term impact. Once operational, the project would generate net revenues for the five towns that would operate the project.

Because the socioeconomic impacts of the project would be predominantly beneficial, mitigative measures would not be required.

Unavoidable Adverse Impacts: Project-related construction activities and vehicles would produce noise, dust, exhaust emissions, and minor delays for motorists in the project vicinity.

B. Cumulative Environmental Impact Analysis

Federal, state, and private entities have asserted that development of multiple hydropower projects in the Connecticut River Basin (CRB) would contribute to cumulative adverse impacts on the basin's environmental resources, primarily on Atlantic salmon (Federal Energy Regulatory Commission, 1986). Consequently, the staff examined the proposed projects in the CRB for potential cumulative impacts and concluded that six proposed projects have the potential to contribute to cumulative adverse impacts on the Atlantic salmon (Federal Energy Regulatory Commission, 1986; 1987). Among the six is the Jamaica Project.

The staff concluded that although these six projects have the potential to contribute to cumulative adverse impacts on Atlantic salmon, with appropriate mitigation, the impacts would be minor and would be unlikely to compromise the Atlantic salmon restoration program in the CRB (Federal Energy Regulatory Commission, 1987).

C. Alternative of No Action

Implementing the no-action alternative would not change the existing physical or biological components of the area, but would preclude the use of the renewable water resources of the Jamaica area to generate electricity.

D. Recommended Alternative

The proposed project is the preferred alternative, because electricity generated from a renewable resource would be used, thus lessening the use of existing fossil-fueled, steam-electric plants, and because the environmental effects that would result from constructing and operating the project would be minor and could be adequately mitigated.

VI. FINDING OF NO SIGNIFICANT IMPACT

Construction activities would cause temporary, localized increases in erosion, sedimentation and stream turbidity which would have minor, short-term adverse effects on existing West River water quality conditions and on the recreationists of the area. Noise, dust, exhaust emissions, and additional traffic would have a minor, short-term effect on the human environment. Project construction would cause the removal of less than 1 acre of vegetation with little or no impact on wildlife populations. During project operation, fish resources, including the Atlantic salmon, would suffer minor, long-term, adverse impacts from impingement and entrainment. Implementing the mitigative measures proposed by applicants and by the staff would ensure that the environmental effects of project construction and operation would be insignificant.

This environmental assessment was prepared in accordance with the National Environmental Policy Act of 1969. On the basis of the staff's independent environmental analysis, issuance of a license for the proposed Jamaica Hydroelectric Project would not constitute a major federal action significantly affecting the quality of the human environment.

VII. LITERATURE CITED

- Dufresne-Henry, Inc. 1985a. Response to the dissolved oxygen issue identified by the Vermont Agency of Environmental Conservation regarding issuance of a water quality 401 certificate at the Ball Mountain Dam Hydroelectric Project in Jamaica, Vermont. March 5, 1985.
- _____. 1985b. Additional information for the application for license for the Ball Mountain Dam Hydroelectric Project, FERC No. 8433. January 15, 1985.
- Federal Energy Regulatory Commission. 1986. Environmental assessment for the Connecticut River Basin. docket no. EL85-19-112. Washington, D.C. November 7, 1986. 30 pp.
- _____. 1987. Environmental assessment of cumulative impacts associated with hydropower development at five proposed sites in the Connecticut River Basin in Connecticut, New Hampshire, and Vermont. FERC Nos. 7860, 7960, 8075, 8404, 8433, 10084. Washington, D.C. August 19, 1987. 22 pp.
- Natural Resource Consulting Services. 1985. Response to anadromous fishery questions raised by the Federal Energy Regulatory Commission as additional information to the license at the Ball Mountain Hydroelectric Project in

- Jamaica and Londonderry, Vermont. Concord, New Hampshire. March 22, 1985. 20 pp.
- Nestler, J.M., C.H. Walburg, J.T. Novotny, K.E. Jacobs, and W.E. Swind. 1986. Handbook on reservoir release for fisheries and environmental quality. Department of the Army, Corps of Engineers Waterways Experiment Station, Vicksburg, Mississippi, July, 1986.
- Rideout, S.G., and A.U. Sillas. 1985. Progress report: Connecticut river fish restoration program January 1, 1983-December 31, 1984. U.S. Fish and Wildlife Service, Department of the Interior, Hadley, Massachusetts. October 1985.
- Rochester, H., T. Lloyd, and M. Farr. 1984. Physical impacts of small-scale hydroelectric facilities and their effects on fish and wildlife. U.S. Fish and Wildlife Service. FWS/OBS-84/19. 191 pp.
- Stotle, L.W. 1982. A strategic plan for the restoration of Atlantic salmon to the Connecticut River Basin, revised, U.S. Fish and Wildlife Service, Department of the Interior, Laconia, New Hampshire. September 1982.
- Thomas, P. 1985. Cultural resources management plan, Ball Mountain Dam Hydroelectric Project. Natural Resource Consulting Services. Concord, New Hampshire.
- Thomas, P. and E. Warren. 1984. Reconnaissance survey and site evaluation for VT-WD-36, Ball Mountain Lake, Jamaica, Vermont. report no. 51. Department of Anthropology, University of Vermont, Montpelier, Vermont.
- Towns of Dummerston, Londonderry, Newfane, Wardsboro, and Windham. 1984a. Application for license for the Ball Mountain Dam Hydroelectric Project, a major project, FERC No. 8433, Vermont. July 13, 1984.
- _____. 1984b. Supplement to application for license for the Ball Mountain Dam Hydroelectric Project, FERC No. 8433, volume I. December 12, 1984.
- _____. 1984c. Supplement to application for license for the Ball Mountain Dam Hydroelectric Project, FERC No. 8433, volume II. December 12, 1984.

VII. LIST OF PREPARERS

- Patrick K. Murphy--EA Coordinator, Vegetation and Wildlife Resources (Wildlife Biologist; M.S. Wildlife Management).

- David S. Bryson--Water Resources (Aquatic Ecologist; M.S. Biology).
- Robert Grieve--Fishery Resources, Cumulative Environmental Impact Analysis (Fishery Biologist; B.S. Fishery Biology).
- James Haimes--Socioeconomic Considerations (Economist; B.S. Economics, 60 semester hours for Ph.D)
- Peter Leitzke--Geology and Soils (Geologist; M.A. Geological Sciences).
- John Mitchell--EA editor (B.S., Social Science).
- Ann Miles--Recreation and Other Land and Water Uses (Environmental Protection Specialist; M.A. Recreation Resource Management).
- Edward Slatter--Cultural Resources (Archeologist; Ph.D., Anthropology).
- David Starkie--Visual Resources (Landscape Architect; B.L.A. Landscape Architecture).
- Dennis Tarney--Purpose, Need for Power (Project Engineer; M.S. Civil Engineering).

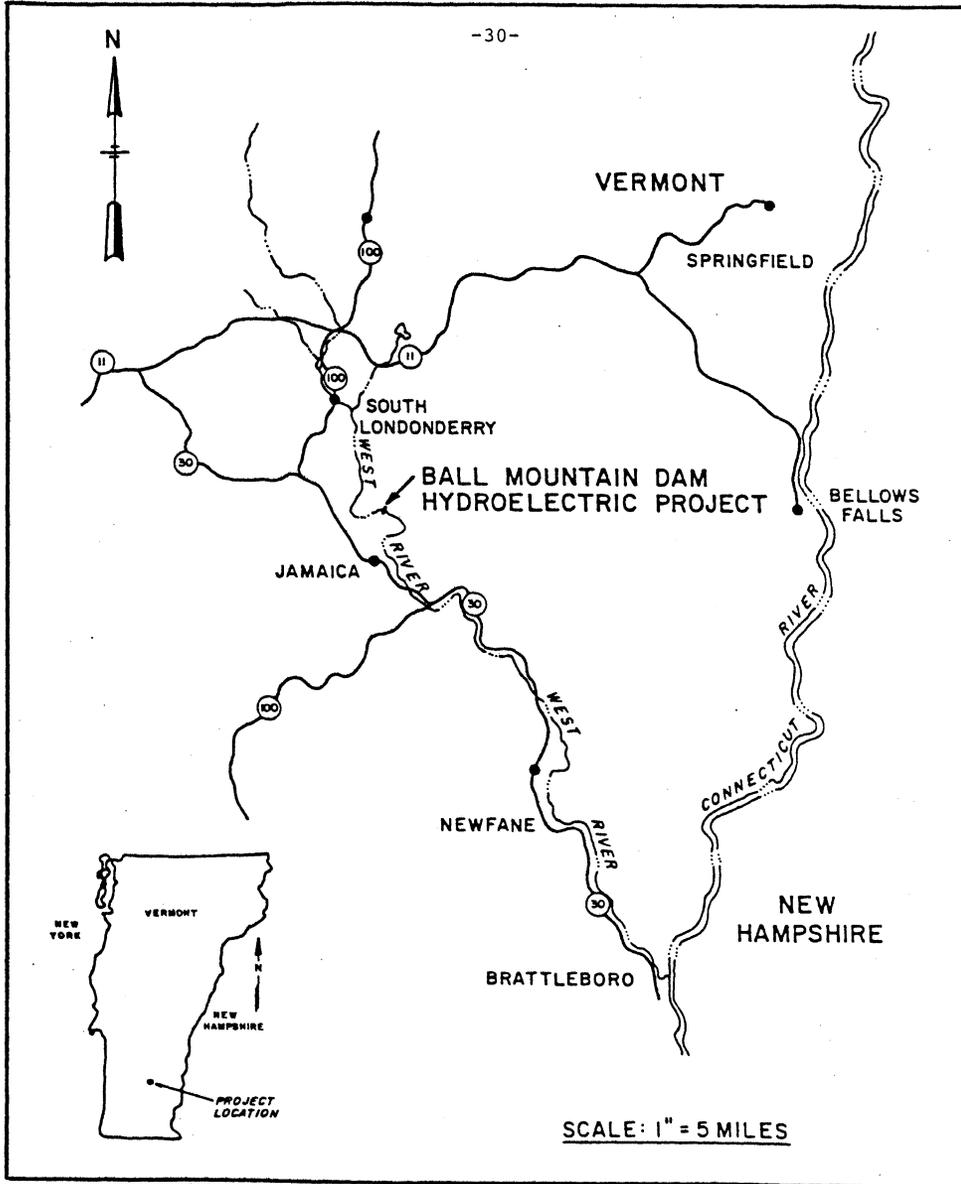


Figure 1. Location of the proposed Jamaica (Ball Mountain Dam) Hydroelectric Project, FERC No. 8433, Vermont (Source: Town of Dummerston et al., 1984a).

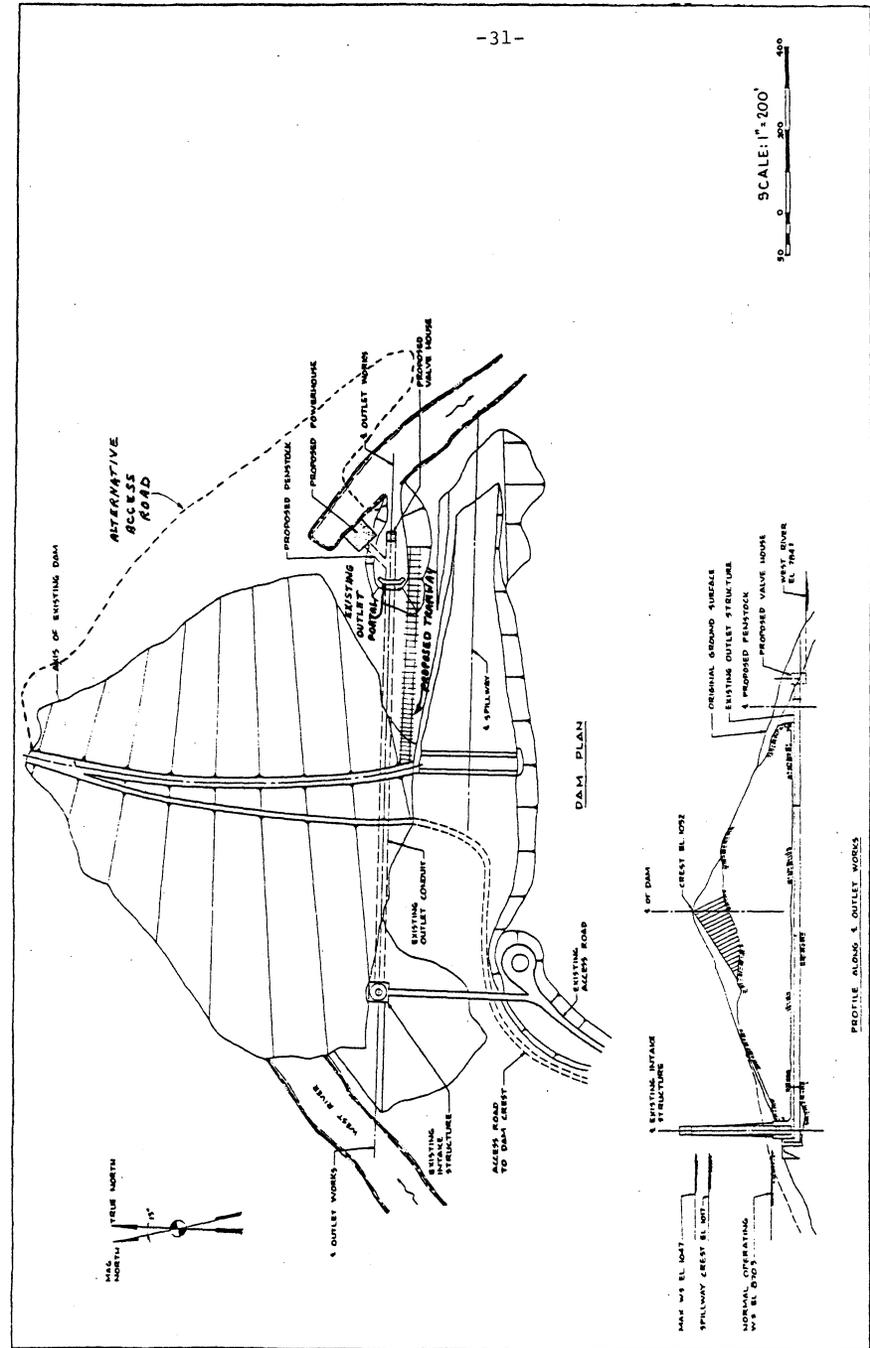


Figure 2. Principal features of the proposed Jamaica (Ball Mountain Dam) Hydroelectric Project, FERC No. 8433, Vermont (Source: Town of Dummerston et al., 1984a, as modified by staff).



DEPARTMENT OF THE ARMY
 NEW ENGLAND DIVISION, CORPS OF ENGINEERS
 424 TRAPELO ROAD
 WALTHAM, MASSACHUSETTS 02254-9149

Attachment A

-2-

REPLY TO
 ATTENTION OF

Planning Division
 Basin Management Branch

September 28, 1987

SUBJECT: Jamaica Dan Project No. 8433-000

Mr. Kenneth F. Plumb, Secretary
 Federal Energy Regulatory Commission
 825 North Capitol Street, N.E.
 Washington, DC 20426

Dear Mr. Plumb:

The New England Division requested, by letter dated May 1, 1987, that the Federal Energy Regulatory Commission delay issuing a license for development of hydropower at the Corps' Ball Mountain Dam in Jamaica, Vermont until an issue of access to the proposed downstream powerhouse and flood control gates is resolved to the satisfaction of this office.

The applicant proposed to operate the power plant while water is being stored in the flood control pool. Since the downstream flood control gates would be in operation during this period we felt that to maintain the structural integrity of the Corps' flood control project that year-round access to the downstream gates was necessary under this plan of operation.

We have had discussions with the applicant's representatives, Hydroelectric Development, Inc. regarding this issue of access. An agreement regarding this issue has been reached to the satisfaction of all parties. We request, under Section 10(a)(2)(B) of the Electric Consumers Protection Act, that the following article be inserted in any license to be issued for hydropower development at Ball Mountain Dam.

Article ____ The New England Division Corps of Engineers (Corps), in cooperation with the licensee, will develop a release plan for operation of the reservoir and powerhouse during flood events or when reservoir levels are above the 65-foot stage (elevation 870.5 NGVD). The applicant's plan of project development does not provide continual year round permanent access to the flood control gates in the proposed powerhouse, which will be located at the downstream toe of the dam. Because operation of the hydropower project is not to affect the Corps' flood control responsibilities, this release plan will include provisions for the Corps to shut down the power plant, raise the new downstream flood control gates, and control reservoir releases with the three existing upstream flood control gates. There is continual, permanent access to these upstream gates. This release plan may be modified when there is continual, permanent access to the downstream gates.

If the requested article is inserted in any proposed license to be issued by your office for the development of hydropower at the Ball Mountain Dam project, we withdraw our request of delay in issuance of a license for reasons relating to access.

If you have any questions regarding this letter, please contact Mr. Michael Keegan of my staff at (617) 647-8241.

Sincerely,

Thomas A. Rhen, LTC, CE
 Colonel, Corps of Engineers
 Division Engineer

Copies Furnished: Attached

RECEIVED
 13
 1-1-1988



DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254-9149

REPLY TO
ATTENTION OF

Planning Division
Basin Management Branch

October 8, 1987

SUBJECT: Jamaica Dam Project No. 8433-000

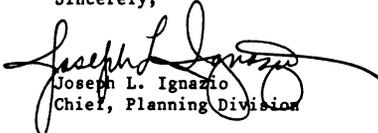
Mr. Kenneth F. Plumb, Secretary
Federal Energy Regulatory Commission
825 North Capitol Street, N.E.
Washington, DC 20426

Dear Mr. Plumb:

This letter is to inform you that the New England Division considers the comments submitted to your office by letter, dated 28 September 1987, regarding an access issue for the Jamaica Dam Project, FERC No. 8433-000 to be Section 4E comments. We request that any license issued for hydropower development at the Corps' Ball Mountain Dam contain the article indicated in the September 28, 1987 letter.

If you have questions regarding this letter, please contact Mr. Michael Keegan of my staff at (617) 647-8241.

Sincerely,


Joseph L. Ignazio
Chief, Planning Division

Copies Furnished:

Mr. William Wakefield, Acting Director
Division of Project Management
Federal Energy Regulatory Commission
Room 208 RB
825 North Capitol Street, N.E.
Washington, DC 20426

Commander
US Army Corps of Engineers
ATTN: DAEN-CWH-Y
Washington, DC 20314

Mr. Paul Nolan
Hydroelectric Development, Inc.
6219 North 19th Street
Arlington, VA 22205

FILED
OFFICE OF THE SECRETARY
1987 OCT 13 PM 3:51
FEDERAL ENERGY REGULATORY COMMISSION

Copies Furnished:

Mr. William Wakefield, Acting Director
Division of Project Management
Federal Energy Regulatory Commission
Room 208 RB
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US Army Corps of Engineers
ATTN: DAEN-CWH-Y
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Arlington, VA 22205

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Supervisor
US Fish & Wildlife Service
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Executive Director
Connecticut River Flood Control Comm.
466 Main Street
Greenfield, MA 01301

State of Vermont
Director of Planning
Agency of Environmental Conserv.
State Office Building
Montpelier, VT 05602

Mr. Ed Tracey, Regional Engineer.
Federal Energy Regulatory Commission
New York Regional Office
26 Federal Plaza, Room 2207
New York, NY 10278

1987 OCT 13 PM 3:51

SAFETY AND DESIGN ASSESSMENT
JAMAICA HYDROELECTRIC PROJECT
FERC NO. 8433-000-VT

-2-

DAM SAFETY

The existing Ball Mountain Dam is owned and operated by the U.S. Army Corps of Engineers (Corps). It is located on the West River at the Town of Jamaica, Windham County, Vermont. The Corps is responsible for the safety of the dam.

PROJECT DESIGN

The applicants' project would utilize the existing U.S. Army Corps of Engineers Ball Mountain Dam and reservoir. The proposed Project works would include: (1) a new outlet control structure and valve system; (2) a new 11.5-foot-diameter, 80-foot-long steel penstock extension of the existing outlet conduit; (3) an 8.0-foot-diameter steel penstock which branches from the outlet penstock to a steel bifurcation that will divide the power flow among two 4.4-foot-diameter and one 3.6-foot-diameter turbine intakes; (4) a new powerhouse with 3 turbine-generator units with a total capacity of 3,720 kW; (5) a new 12.47-kV and 2,500-foot-long underground transmission line; and (6) other appurtenances.

ECONOMICS EVALUATION

Based on 1984 dollars, the applicants estimate that the project would cost \$6,800,000. The cost of the proposed work was checked by staff and found reasonable. The cost was escalated by 4% to an approximately January 1989 on-line date by staff.

A proposed project is economically beneficial so long as its projected levelized cost is less than the project levelized alternative energy cost to any utility in the region. The staff has identified projected long-term levelized alternative energy costs in the region of up to 89.5 mills/kWh. Since the levelized cost of energy from the project is estimated to be 87.1 mills/kWh, the project is estimated to provide a levelized economic benefit or 2.4 mills for each kilowatt hour energy produced, or about \$30,000 annually.

The project will be financed by the Towns of Dummerston, Londonderry, Newframe, Wardsboro and Windham, all located in the vicinity of the Ball Mountain Dam in Vermont, and they have already signed a preliminary power sale contract with the local utility.

WATER RESOURCE PLANNING

The U.S. Army Corps of Engineers requested that an article regarding access to flood control gates in the proposed powerhouse be included in any license. Article 101, which was formulated by the Corps, is included in this order.

The residents of Jamaica, and the Conservation Society of Southern Vermont expressed opposition to use the existing Jamaica State Park road for access to the construction site. As a result, the applicants are proposing an alternative access route from the crest of the existing dam to its toe, thereby eliminating use of the Jamaica State Park road for access to the construction site. The Corps agreed with the applicants' alternative to the use of this access road.

No other comments or recommendations were made by the State or Federal agencies addressing flood control, navigation, or irrigation requirements in the basin.

The Connecticut River Basin Planning Status Report includes no projects, either proposed or constructed on West River that this project would impact. The project would not conflict with any pending applications for exemption, license of preliminary permit.

Staff made an independent study of hydropower potential at the Jamaica site and found that the size of the plant is reasonable for near optimum development of the site. The project's three units would total 3,270 kW and generate about 12,147,000 kWh annually. The plant factor is equal to 37%. The plant would operate run-of-river under a net head of 85 feet and utilize flows ranging from 60 cfs to 630 cfs. A minimum flow of 90 cfs or reservoir inflow, whichever is less, is proposed to be released from the reservoir all the time. This minimum flow release would not adversely affect the power generation, because the released flow will be conveyed through turbines. The stream flow exceeds the hydraulic capacity of the generating units approximately 5% of the time. Installation of additional capacity would not be economically beneficial at this time.

Based on the above, staff concludes that the proposed Jamaica run-of-river Hydroelectric Project adequately utilizes the available flow and head at the site and would not conflict with any other planned development.

EXHIBITS

The following portion of Exhibit A and the following Exhibit F drawings conform to the Commission's rules and regulations and should be included in the license.

Exhibit A. Pages A-1, A-2, and A-4 through A-7 of the application describing the proposed mechanical, electrical and transmission equipment filed July 13, 1984.

<u>Exhibit F</u>	<u>FERC No.</u>	<u>Description</u>
<u>Drawings</u>	<u>8433 -</u>	
1	1	Project Plan and Profile
2	2	Powerhouse Plan and Section

FEDERAL POWER COMMISSION

TERMS AND CONDITIONS OF LICENSE FOR
UNCONSTRUCTED MAJOR PROJECT
AFFECTING LANDS OF THE UNITED STATES

Article 1. The entire project, as described in this order of the Commission, shall be subject to all of the provisions, terms, and conditions of the license.

Article 2. No substantial change shall be made in the maps, plans, specifications, and statements described and designated as exhibits and approved by the Commission in its order as a part of the license until such change shall have been approved by the Commission: Provided, however, That if the Licensee or the Commission deems it necessary or desirable that said approved exhibits, or any of them, be changed, there shall be submitted to the Commission for approval a revised, or additional exhibit or exhibits covering the proposed changes which, upon approval by the Commission, shall become a part of the license and shall supersede, in whole or in part, such exhibit or exhibits theretofore made a part of the license as may be specified by the Commission.

Article 3. The project works shall be constructed in substantial conformity with the approved exhibits referred to in Article 2 herein or as changed in accordance with the provisions of said article. Except when emergency shall require for the protection of navigation, life, health, or property, there shall not be made without prior approval of the Commission any substantial alteration or addition not in conformity with the approved plans to any dam or other project works under the license or any substantial use of project lands and waters not authorized herein; and any emergency alteration, addition, or use so made shall thereafter be subject to such modification and change as the Commission may direct. Minor changes in project works, or in uses of project lands and waters, or divergence from such approved exhibits may be made if such changes will not result in a decrease in efficiency, in a material increase in cost, in an adverse environmental impact, or in impairment of the general scheme of development; but any of such minor changes made without the prior approval of the Commission, which in its judgment have produced or will produce any of such results, shall be subject to such alteration as the Commission may direct.

Upon the completion of the project, or at such other time as the Commission may direct, the Licensee shall submit to the Commission for approval revised exhibits insofar as necessary to show any divergence from or variations in the project area and project boundary as finally located or in the project works as actually constructed when compared with the area and boundary shown and the works described in the license or in the exhibits approved by the Commission, together with a statement in writing setting forth the reasons which in the opinion of the Licensee necessitated or justified variation in or divergence from the approved exhibits. Such revised exhibits shall, if and when approved by the Commission, be made a part of the license under the provisions of Article 2 hereof.

Article 4. The construction, operation, and maintenance of the project and any work incidental to additions or alterations shall be subject to the inspection and supervision of the Regional Engineer, Federal Power Commission, in the region wherein the project is located, or of such other officer or agent as the Commission may designate, who shall be the authorized representative of the Commission for such purposes. The Licensee shall cooperate fully with said representative and shall furnish him a detailed program of inspection by the Licensee that will provide for an adequate and qualified inspection force for construction of the project and for any subsequent alterations to the project. Construction of the project works or any feature or alteration thereof shall not be initiated until the program of inspection for the project works or any such feature thereof has been approved by said representative. The Licensee shall also furnish to said representative such further information as he may require concerning the construction, operation, and maintenance of the project, and of any alteration thereof, and shall notify him of the date upon which work will begin, as far in advance thereof as said representative may reasonably specify, and shall notify him promptly in writing of any suspension of work for a period of more than one week, and of its resumption and completion. The Licensee shall allow said representative and other officers or employees of the United States, showing proper credentials, free and unrestricted access to, through, and across the project lands and project works in the performance of their official duties. The Licensee shall comply with such rules and regulations of general or special applicability as the Commission may prescribe from time to time for the protection of life, health, or property.

Article 5. The Licensee, within five years from the date of issuance of the license, shall acquire title in fee or the right to use in perpetuity all lands, other than lands of the United States, necessary or appropriate for the construction, maintenance, and operation of the project. The Licensee or its successors and assigns shall, during the period of the license, retain the possession of all project property covered by the license as issued or as later amended, including the project area, the project works, and all franchises, easements, water rights, and rights of occupancy and use; and none of such properties shall be voluntarily sold, leased, transferred, abandoned, or otherwise disposed of without the prior written approval of the Commission, except that the Licensee may lease or otherwise dispose of interests in project lands or property without specific written approval of the Commission pursuant to the then current regulations of the Commission. The provisions of this article are not intended to prevent the abandonment or the retirement from service of structures, equipment, or other project works in connection with replacements thereof when they become obsolete, inadequate, or inefficient for further service due to wear and tear; and mortgage or trust deeds or judicial sales made thereunder, or tax sales, shall not be deemed voluntary transfers within the meaning of this article.

Article 6. In the event the project is taken over by the United States upon the termination of the license as provided in Section 14 of the Federal Power Act, or is transferred to a new licensee or to a non-power licensee under the provisions of Section 15 of said Act, the Licensee, its successors and assigns shall be responsible for, and shall make good any defect of title to, or of right of occupancy and use in, any of such project property that is necessary or appropriate or valuable and serviceable in the maintenance and operation of the project, and shall pay and discharge, or shall assume responsibility for payment and discharge of, all liens or encumbrances upon the project or project property created by the Licensee or created or incurred after the issuance of the license: Provided, That the provisions of this article are not intended to require the Licensee, for the purpose of transferring the project to the United States or to a new licensee, to acquire any different title to, or right of occupancy and use in, any of such project property than was necessary to acquire for its own purposes as the Licensee.

Article 7. The actual legitimate original cost of the project, and of any addition thereto or betterment thereof, shall be determined by the Commission in accordance with the Federal Power Act and the Commission's Rules and Regulations thereunder.

Article 8. The Licensee shall install and thereafter maintain gages and stream-gaging stations for the purpose of determining the stage and flow of the stream or streams on which the project is located, the amount of water held in and withdrawn from storage, and the effective head on the turbines; shall provide for the required reading of such gages and for the adequate rating of such stations; and shall install and maintain standard meters adequate for the determination of the amount of electric energy generated by the project works. The number, character, and location of gages, meters, or other measuring devices, and the method of operation thereof, shall at all times be satisfactory to the Commission or its authorized representative. The Commission reserves the right, after notice and opportunity for hearing, to require such alterations in the number, character, and location of gages, meters, or other measuring devices, and the method of operation thereof, as are necessary to secure adequate determinations. The installation of gages, the rating of said stream or streams, and the determination of the flow thereof, shall be under the supervision of, or in cooperation with, the District Engineer of the United States Geological Survey having charge of stream-gaging operations in the region of the project, and the Licensee shall advance to the United States Geological Survey the amount of funds estimated to be necessary for such supervision, or cooperation for such periods as may be mutually agreed upon. The Licensee shall keep accurate and sufficient records of the foregoing determinations to the satisfaction of the Commission, and shall make return of such records annually at such time and in such form as the Commission may prescribe.

Article 9. The Licensee shall, after notice and opportunity for hearing, install additional capacity or make other changes in the project as directed by the Commission, to the extent that it is economically sound and in the public interest to do so.

Article 10. The Licensee shall, after notice and opportunity for hearing, coordinate the operation of the project, electrically and hydraulically, with such other projects or power systems and in such manner as the Commission may direct in the interest of power and other beneficial public uses of water resources, and on such conditions concerning the equitable sharing of benefits by the Licensee as the Commission may order.

Article 11. Whenever the Licensee is directly benefited by the construction work of another licensee, a permittee, or the United States on a storage reservoir or other headwater improvement, the Licensee shall reimburse the owner of the headwater improvement for such part of the annual charges for interest, maintenance, and depreciation thereof as the Commission shall determine to be equitable, and shall pay to the United States the cost of making such determination as fixed by the Commission. For benefits provided by a storage reservoir or other headwater improvement of the United States, the Licensee shall pay to the Commission the amounts for which it is billed from time to time for such headwater benefits and for the cost of making the determinations pursuant to the then current regulations of the Commission under the Federal Power Act.

Article 12. The operations of the Licensee, so far as they affect the use, storage and discharge from storage of waters affected by the license, shall at all times be controlled by such reasonable rules and regulations as the Commission may prescribe for the protection of life, health, and property, and in the interest of the fullest practicable conservation and utilization of such waters for power purposes and for other beneficial public uses, including recreational purposes, and the Licensee shall release water from the project reservoir at such rate in cubic feet per second, or such volume in acre-feet per specified period of time, as the Commission may prescribe for the purposes hereinbefore mentioned.

Article 13. On the application of any person, association, Corporation, Federal agency, State or municipality, the Licensee shall permit such reasonable use of its reservoir or other project properties, including works, lands and water rights, or parts thereof, as may be ordered by the Commission, after notice and opportunity

for hearing, in the interests of comprehensive development of the waterway or waterways involved and the conservation and utilization of the water resources of the region for water supply or for the purposes of steam-electric, irrigation, industrial, municipal or similar uses. The Licensee shall receive reasonable compensation for use of its reservoir or other project properties or parts thereof for such purposes, to include at least full reimbursement for any damages or expenses which the joint use causes the Licensee to incur. Any such compensation shall be fixed by the Commission either by approval of an agreement between the Licensee and the party or parties benefiting or after notice and opportunity for hearing. Applications shall contain information in sufficient detail to afford a full understanding of the proposed use, including satisfactory evidence that the applicant possesses necessary water rights pursuant to applicable State law, or a showing of cause why such evidence cannot concurrently be submitted, and a statement as to the relationship of the proposed use to any State or municipal plans or orders which may have been adopted with respect to the use of such waters.

Article 14. In the construction or maintenance of the project works, the Licensee shall place and maintain suitable structures and devices to reduce to a reasonable degree the liability of contact between its transmission lines and telegraph, telephone and other signal wires or power transmission lines constructed prior to its transmission lines and not owned by the Licensee, and shall also place and maintain suitable structures and devices to reduce to a reasonable degree the liability of any structures or wires falling or obstructing traffic or endangering life. None of the provisions of this article are intended to relieve the Licensee from any responsibility or requirement which may be imposed by any other lawful authority for avoiding or eliminating inductive interference.

Article 15. The Licensee shall, for the conservation and development of fish and wildlife resources, construct, maintain, and operate, or arrange for the construction, maintenance, and operation of such reasonable facilities, and comply with such reasonable modifications of the project structures and operation, as may be ordered by the Commission upon its own motion or upon the recommendation of the Secretary of the Interior or the fish and wildlife agency or agencies of any State in which the project or a part thereof is located, after notice and opportunity for hearing.

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Article 16. Whenever the United States shall desire, in connection with the project, to construct fish and wildlife facilities or to improve the existing fish and wildlife facilities at its own expense, the Licensee shall permit the United States or its designated agency to use, free of cost, such of the Licensee's lands and interests in lands, reservoirs, waterways and project works as may be reasonably required to complete such facilities or such improvements thereof. In addition, after notice and opportunity for hearing, the Licensee shall modify the project operation as may be reasonably prescribed by the Commission in order to permit the maintenance and operation of the fish and wildlife facilities constructed or improved by the United States under the provisions of this article. This article shall not be interpreted to place any obligation on the United States to construct or improve fish and wildlife facilities or to relieve the Licensee of any obligation under this license.

Article 17. The Licensee shall construct, maintain, and operate, or shall arrange for the construction, maintenance, and operation of such reasonable recreational facilities, including modifications thereto, such as access roads, wharves, launching ramps, beaches, picnic and camping areas, sanitary facilities, and utilities, giving consideration to the needs of the physically handicapped, and shall comply with such reasonable modifications of the project, as may be prescribed hereafter by the Commission during the term of this license upon its own motion or upon the recommendation of the Secretary of the Interior or other interested Federal or State agencies, after notice and opportunity for hearing.

Article 18. So far as is consistent with proper operation of the project, the Licensee shall allow the public free access, to a reasonable extent, to project waters and adjacent project lands owned by the Licensee for the purpose of full public utilization of such lands and waters for navigation and for outdoor recreational purposes, including fishing and hunting: Provided, That the Licensee may reserve from public access such portions of the project waters, adjacent lands, and project facilities as may be necessary for the protection of life, health, and property.

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Article 19. In the construction, maintenance, or operation of the project, the Licensee shall be responsible for, and shall take reasonable measures to prevent, soil erosion on lands adjacent to streams or other waters, stream sedimentation, and any form of water or air pollution. The Commission, upon request or upon its own motion, may order the Licensee to take such measures as the Commission finds to be necessary for these purposes, after notice and opportunity for hearing.

Article 20. The Licensee shall consult with the appropriate State and Federal agencies and, within one year of the date of issuance of this license, shall submit for Commission approval a plan for clearing the reservoir area. Further, the Licensee shall clear and keep clear to an adequate width lands along open conduits and shall dispose of all temporary structures, unused timber, brush, refuse, or other material unnecessary for the purposes of the project which results from the clearing of lands or from the maintenance or alteration of the project works. In addition, all trees along the periphery of project reservoirs which may die during operations of the project shall be removed. Upon approval of the clearing plan all clearing of the lands and disposal of the unnecessary material shall be done with due diligence and to the satisfaction of the authorized representative of the Commission and in accordance with appropriate Federal, State, and local statutes and regulations.

Article 21. Timber on lands of the United States cut, used, or destroyed in the construction and maintenance of the project works, or in the clearing of said lands, shall be paid for, and the resulting slash and debris disposed of, in accordance with the requirements of the agency of the United States having jurisdiction over said lands. Payment for merchantable timber shall be at current stumpage rates, and payment for young growth timber below merchantable size shall be at current damage appraisal values. However, the agency of the United States having jurisdiction may sell or dispose of the merchantable timber to others than the Licensee: Provided, That timber so sold or disposed of shall be cut and removed from the area prior to, or without undue interference with, clearing operations of the Licensee and in coordination with the Licensee's project construction schedules. Such sale or disposal to others shall not relieve the Licensee of responsibility for the clearing and disposal of all slash and debris from project lands.

Article 22. The Licensee shall do everything reasonably within its power, and shall require its employees, contractors, and employees of contractors to do everything reasonably within their power, both independently and upon the request of officers of the agency concerned, to prevent, to make advance preparations for suppression of, and to suppress fires on the lands to be occupied or used under the license. The Licensee shall be liable for and shall pay the costs incurred by the United States in suppressing fires caused from the construction, operation, or maintenance of the project works or of the works appurtenant or accessory thereto under the license.

Article 23. The Licensee shall interpose no objection to, and shall in no way prevent, the use by the agency of the United States having jurisdiction over the lands of the United States affected, or by persons or corporations occupying lands of the United States under permit, of water for fire suppression from any stream, conduit, or body of water, natural or artificial, used by the Licensee in the operation of the project works covered by the license, or the use by said parties of water for sanitary and domestic purposes from any stream, conduit, or body of water, natural or artificial, used by the Licensee in the operation of the project works covered by the license.

Article 24. The Licensee shall be liable for injury to, or destruction of, any buildings, bridges, roads, trails, lands, or other property of the United States, occasioned by the construction, maintenance, or operation of the project works or of the works appurtenant or accessory thereto under the license. Arrangements to meet such liability, either by compensation for such injury or destruction, or by reconstruction or repair of damaged property, or otherwise, shall be made with the appropriate department or agency of the United States.

Article 25. The Licensee shall allow any agency of the United States, without charge, to construct or permit to be constructed on, through, and across those project lands which are lands of the United States such conduits, chutes, ditches, railroads, roads, trails, telephone and power lines, and other routes or means of transportation and communication as are not inconsistent with the enjoyment

of said lands by the Licensee for the purposes of the license. This license shall not be construed as conferring upon the Licensee any right of use, occupancy, or enjoyment of the lands of the United States other than for the construction, operation, and maintenance of the project as stated in the license.

Article 26. In the construction and maintenance of the project, the location and standards of roads and trails on lands of the United States and other uses of lands of the United States, including the location and condition of quarries, borrow pits, and spoil disposal areas, shall be subject to the approval of the department or agency of the United States having supervision over the lands involved.

Article 27. The Licensee shall make provision, or shall bear the reasonable cost, as determined by the agency of the United States affected, of making provision for avoiding inductive interference between any project transmission line or other project facility constructed, operated, or maintained under the license, and any radio installation, telephone line, or other communication facility installed or constructed before or after construction of such project transmission line or other project facility and owned, operated, or used by such agency of the United States in administering the lands under its jurisdiction.

Article 28. The Licensee shall make use of the Commission's guidelines and other recognized guidelines for treatment of transmission line rights-of-way, and shall clear such portions of transmission line rights-of-way across lands of the United States as are designated by the officer of the United States in charge of the lands; shall keep the areas so designated clear of new growth, all refuse, and inflammable material to the satisfaction of such officer; shall trim all branches of trees in contact with or liable to contact the transmission lines; shall cut and remove all dead or leaning trees which might fall in contact with the transmission lines; and shall take such other precautions against fire as may be required by such officer. No fires for the burning of waste material shall be set except with the prior written consent of the officer of the United States in charge of the lands as to time and place.

Article 29. The Licensee shall cooperate with the United States in the disposal by the United States, under the Act of July 31, 1947, 61 Stat. 681, as amended (30 U.S.C. sec. 601, et seq.), of mineral and vegetative materials from lands of the United States occupied by the project or any part thereof: Provided, That such disposal has been authorized by the Commission and that it does not unreasonably interfere with the occupancy of such lands by the Licensee for the purposes of the license: Provided further, That in the event of disagreement, any question of unreasonable interference shall be determined by the Commission after notice and opportunity for hearing.

Article 30. If the Licensee shall cause or suffer essential project property to be removed or destroyed or to become unfit for use, without adequate replacement, or shall abandon or discontinue good faith operation of the project or refuse or neglect to comply with the terms of the license and the lawful orders of the Commission mailed to the record address of the Licensee or its agent, the Commission will deem it to be the intent of the Licensee to surrender the license. The Commission, after notice and opportunity for hearing, may require the Licensee to remove any or all structures, equipment and power lines within the project boundary and to take any such other action necessary to restore the project waters, lands, and facilities remaining within the project boundary to a condition satisfactory to the United States agency having jurisdiction over its lands or the Commission's authorized representative, as appropriate, or to provide for the continued operation and maintenance of nonpower facilities and fulfill such other obligations under the license as the Commission may prescribe. In addition, the Commission in its discretion, after notice and opportunity for hearing, may also agree to the surrender of the license when the Commission, for the reasons recited herein, deems it to be the intent of the Licensee to surrender the license.

Article 31. The right of the Licensee and of its successors and assigns to use or occupy waters over which the United States has jurisdiction, or lands of the United States under the license, for the purpose of maintaining the project works or otherwise, shall absolutely cease at the end of the license period, unless the Licensee has obtained a new license pursuant to the then existing laws and regulations, or an annual license under the terms and conditions of this license.

Article 32. The terms and conditions expressly set forth in the license shall not be construed as impairing any terms and conditions of the Federal Power Act which are not expressly set forth herein.

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426



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Don Williams

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