

38 FERC ¶ 62,272

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Diamond Power Corporation

Project No. 5062-000

ORDER ISSUING LICENSE
(Major Project - SMW or Less)
(Issued March 19, 1987)

Diamond Power Corporation has filed a license application under Part I of the Federal Power Act (Act) to construct, operate, and maintain the Quinebaug - Five Mile Pond Project, located in Windham County, Connecticut, on the Quinebaug and Five Mile Rivers. The project would affect the interests of interstate or foreign commerce.

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(i) of the Federal Power Act (FPA), as amended by the Electric Consumers Protection Act of 1986 (ECPA), Pub. L. 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 for the Quinebaug-Five Mile Pond Project addresses the concerns of the federal and state fish and wildlife agencies, and makes recommendations consistent with those of the agencies.

Comprehensive Plans

Section 10(a)(2) of the FPA, 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 that are prepared by an agency established pursuant to 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., consider and balance all relevant public use considerations). With regard to plans prepared at the state level, such plans are within the scope of

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- 2 -

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. 1/

No comprehensive plans of the types referred to in section 10(a)(2) of the FPA relevant to this project have been identified. One resource plan 2/ has been reviewed in relation to the proposed project as part of our broad public interest examination under section 10(a)(1) of the FPA. No conflicts were found.

Based upon our review of the agency and public comments filed in this proceeding and upon our independent analysis, as discussed herein, we conclude that the Quinebaug-Five Mile Pond Project is best adapted to a comprehensive plan for the Quinebaug and Five Mile Rivers, taking into consideration the beneficial public uses described in section 10(a)(1) of the Federal Power Act.

Summary of Findings

An Environmental Assessment (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. The Water Quality Certificate was issued on October 4, 1983, by the Connecticut Department of Environmental Protection. 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.

1/ 99 Cong. Rec. §4140 (remarks by Senator McClure, April 11, 1986).

2/ Statewide Comprehensive Outdoor Recreation Plan, Connecticut - 1983.

- 3 -

The Director orders:

(A) This license is issued to Diamond Power Corporation (licensee), for a period of 40 years, effective the first day of the month in which this order is issued, to construct, operate, and maintain the Quinebaug - Five Mile Pond 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 licensee's interests in those lands, enclosed by the project boundary shown by Exhibit G:

<u>Exhibit G-</u>	<u>FERC No. 5062-</u>	<u>Showing</u>
G-1	12	General Location Map
G-2	13	Detail Location Map
G-3	14	Site Plan
G-4	15	Project Boundary Map
G-5	16	Project Impoundments Map

(2) Project works consisting of:

Quinebaug Development

(a) the 250-foot-long, 14-foot-high Royale Dam; (b) the impoundment having a surface area of 85-acres, a storage capacity of 283 acre-feet, and a normal water surface elevation of 188 feet msl; (c) the gated intake; (d) the 900-foot-long, 30-foot-wide, 7-foot-deep canal; (e) a powerhouse containing 5 generating units with a total installed capacity of 1670-kW; (f) the tailrace; (g) the 2.3-kV generator leads; (h) a 2.3/23-kV transformer; (i) the 250-foot-long, 2.3-kV transmission line; and (j) appurtenant facilities.

Five Mile Pond Development

(a) the 135-foot-long, 16.5-foot-high stone dam; (b) an impoundment having a surface area of 65 acres, a storage capacity of 260 acre-feet, and a normal water surface elevation of 220.75 feet m.s.l.; (c) a gated intake structure; (d) the 450-foot-long, 30-foot-wide, 12-foot-deep canal; (e) the powerhouse containing two generating units with a total installed capacity of 386-kW; (f) the tailrace; (g) the 2.3-kV generator leads; (h) a 2.3/23-kV transformer; (i) the 120-foot-long, 2.3-kV transmission line; and (j) appurtenant facilities.

- 4 -

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.

(B) 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 articles set forth in Form L-11, (October 1975), entitled "Terms and Conditions of License for Major Project Affecting the Interests of Interstate or Foreign Commerce," except Article 20. The license is also subject to the following additional articles:

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

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 2750 horsepower.

Article 202. Pursuant to Section 10(d) of the Act, after the first 20 years of operation of the project under license, a specified reasonable rate of return upon the net investment in the project shall be used for determining surplus earnings of the project for the establishment and maintenance of amortization reserves. One half of the project surplus earnings, if any, accumulated after the first 20 years of operation under the license, in excess of the specified rate of return per annum on the net investment, shall be set aside in a project amortization reserve account at the end of each fiscal year. To the extent that there is a deficiency of project earnings below the specified rate of return per annum for any fiscal year after the first 20 years of operation under the license, the amount of that deficiency shall be deducted from the amount of any surplus earnings subsequently accumulated, until absorbed. One-half of the remaining surplus earnings, if any, cumulatively computed, shall be set aside in the project amortization reserve account. The amounts established in the project amortization reserve account shall be maintained until further order of the Commission.

- 5 -

The annual specified reasonable rate of return shall be the sum of the annual weighted costs of long-term debt, preferred stock, and common equity, as defined below. The annual weighted cost for each component of the rate of return shall be calculated based on an average of 13 monthly balances of amounts properly includable in the licensee's long-term debt and proprietary capital accounts as listed in the Commission's Uniform System of Accounts. The cost rates for long-term debt and preferred stock shall be their respective weighted average costs for the year, and the cost of common equity shall be the interest rate on 10-year government bonds (reported as the Treasury Department's 10 year constant maturity series) computed on the monthly average for the year in question plus four percentage points (400 basis points).

Article 300. The licensee 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 licensee 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 licensee shall file, for approval by the Commission, revised Exhibit F drawings showing the final design of project structures. The revised Exhibit F drawings shall be accompanied by a supporting design report and the licensee shall not commence construction of any project structure until the corresponding revised Exhibit F drawing has been approved.

Article 303. The licensee shall at least 60 days prior to start of construction, submit one copy to the Commission's Regional Director 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.

- 6 -

Article 304. The licensee shall review and approve the design of contractor-designed cofferdams and deep excavations prior to the start of construction and shall ensure that construction of cofferdams and deep excavations is consistent with the approved design. At least 30 days prior to start of construction of the cofferdam, the licensee shall submit to the Commission's Regional Director and Director, Division of Inspections, one copy each of the approved cofferdam construction drawings and specifications and the letter(s) of approval.

Article 305. The licensee 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.

Article 306. The licensee shall within six months from the issuance date of this license submit to the the Director, GNL a report based on stability and dam break analyses, that identifies and quantifies the hazard to downstream life and property of failure of any susceptible project structure(s). The stability analyses shall determine what flood would cause instability of the structure(s). The dam break analyses shall encompass floods which could cause dam failure and flood flows up to and including either the PMF or the flood flow where dam failure would cause no significant increase in hazard to downstream life and property. The report shall fully document all reconnaissance and other studies made in its preparation. In the event that failure of any project structure(s) under flood conditions presents a hazard to human life or would cause significant property damage then the licensee shall simultaneously submit to the Director, GNL, for approval, a plan and schedule for modifying the project to ensure that the project can safely pass floods up to and including the PMF.

Article 401. The licensee, after consultation with the U.S. Fish and Wildlife Service and the Connecticut Department of Environmental Protection, shall file with the Commission, within 1 year from the date of issuance of this license, a plan to control erosion and dust, to stabilize slopes, and to minimize the quantity of sediment or other potential water pollutants resulting from construction and operation of the project, including spoil disposal. The plan shall include descriptions and map locations of control measures, an implementation schedule, monitoring and maintenance programs for project construction and operation, and provisions for periodic review of the plan and for making any necessary revisions to the plan. Documentation of agency consultation on the plan and copies of any agency comments or recommendations shall be included in the filing.

- 7 -

If the licensee does not concur with any agency recommendations, the licensee shall provide a discussion of the reasons for not concurring, based on actual-site geological, soil, and groundwater conditions. The Commission reserves the right to require changes to the plan. Unless the Director of the Office of Hydropower Licensing directs otherwise, the licensee may commence land-clearing, ground-disturbing, and spoil-producing activities at the project 90 days after filing the above plan.

Article 402. The licensee, no later than 6 months after the start of construction of fish passage facilities at the Aspinook Pond Dam, shall file for Commission approval, functional design drawings for upstream and downstream fish passage facilities at Five Mile Pond Dam and Rojak Dam, prepared after consultation with the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, and the Connecticut Department of Environmental Protection. Comments from these agencies on the adequacy of the design drawings shall be included with the filing to the Commission. The licensee shall provide fish passage facilities at Five Mile Pond Dam and Rojak Dam within 1 year after the completion of fish passage facilities at the Aspinook Pond Dam. Further, the licensee shall file as-built drawings of the project fish passage facilities with the Commission within 6 months after constructing the facilities.

Article 403. The licensee shall operate the Quinebaug-Five Mile Pond Project in an instantaneous run-of-river mode for the protection of fish and wildlife resources in the Quinebaug and Five Mile Rivers. The licensee, in operating the project in an instantaneous run-of-river mode, shall at all times act to minimize the fluctuation of the reservoir surface elevation by maintaining a sufficient discharge from the project so that the flows in the Quinebaug and Five Mile Rivers, as measured immediately downstream from each powerhouse tailrace, approximate the instantaneous sum of the inflow to each project reservoir. Instantaneous run-of-river operation may be temporarily modified if required by operating emergencies beyond the control of the licensee and for short periods upon mutual agreement between the licensee and the Connecticut Department of Environmental Protection.

Article 404. The licensee shall maintain in the bypass reaches below Rojak Dam and Five Mile Pond Dam continuous minimum flows of 77 cubic feet per second (cfs) and 15 cfs, respectively, as measured immediately below the project dams, or inflow to the reservoirs, whichever is less, for the protection of fish and wildlife resources in the Quinebaug River and Five Mile River. These flows may be temporarily modified if required by operating emergencies beyond the control of the licensee and for short periods upon mutual agreement between the licensee and the Connecticut Department of Environmental Protection.

- 8 -

Article 405. The licensee, before beginning land-clearing or land-disturbing activities within the project boundaries, shall file with the Commission a cultural resources management plan designed to avoid or mitigate adverse impacts to properties at the Quinebaug-Five Mile Pond Project that are listed on or eligible for listing on the National Register of Historic Places. The licensee shall design a cultural resources management plan for filing with the Commission only after the licensee has conducted the appropriate preliminary studies and investigations and consulted with the State Historic Preservation Officer (SHPO). In performing the appropriate preliminary studies and investigations and in reporting their results, the licensee shall devote particular attention to the disturbance potential of constructing temporary access roads, establishing material storage areas, and imposing operational stresses upon unstable industrial archeological remains.

At a minimum the plan should contain the written results of all preliminary studies and investigations completed for the purpose of designing the cultural resources management plan, and provisions for executing the following functions: (1) modifying, restoring, and rehabilitating existing structures in a manner sympathetic with their historic character; (2) constructing additional buildings, structures, and facilities that do not needlessly conflict with the historic character of the existing structures; (3) documenting historic structures that would be dismantled according to the standards of the Historic American Engineering Record, and other relevant standards; (4) avoiding effects from staging activities on historic structures; (5) minimizing visual effects; and (6) filing with the Commission, within 4 years of the date of issuance of this license, copies of a letter from the SHPO containing its opinion as to whether the facilities have been constructed, modified, restored, rehabilitated, and dismantled consistent with the plan. The Commission may require changes to the plan.

The plan, together with a copy of a letter from the SHPO commenting on the plan, shall be filed with the Commission. If recommendations of the SHPO are not adopted, the plan should state the reasons. The licensee shall not begin modifying, restoring, rehabilitating, or dismantling existing structures, nor constructing new buildings, structures, or facilities, until notified that the plan complies with the requirements of this article. The licensee shall make funds available in a reasonable amount for developing and implementing the plan.

- 9 -

Article 406. The licensee, 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). If the licensee discovers previously unidentified archeological or historic properties during the course of constructing or developing project works or other facilities at the project, the licensee shall stop all land-clearing and land-disturbing activities in the vicinity of the properties and consult with the SHPO. In either instance, the licensee shall file with the Commission a cultural resources management plan prepared by a qualified cultural resource specialist after having consulted with the SHPO.

The management plan shall include (1) a description of each discovered property indicating whether it is listed on or eligible to be listed 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) documentation of the nature and extent of consultation, and (5) a schedule for mitigating effects and conducting additional studies. The Commission may require changes to the plan.

The licensee 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 of this article have been fulfilled.

Article 407. The licensee shall consult with the U.S. Fish and Wildlife Service, the National Park Service, and the Connecticut Department of Environmental Protection to determine any measures necessary to provide public access to project lands and waters and to enhance recreational opportunities at the project. Within 1 year from the date of issuance of this license, the licensee shall file a report on these findings with the Commission, and shall file for Commission approval a plan to implement any measures that have been determined necessary to provide public access and to enhance recreational opportunities at the project. The licensee shall include in the filing documentation of consultation with the aforementioned agencies.

Article 408. (a) In accordance with the provisions of this article, the licensee 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 other types of use and occupancy, without prior Commission approval. The licensee may exercise the authority only if the proposed use and occupancy is consistent with the purposes of

- 10 -

protecting and enhancing the scenic, recreational, and other environmental values of the project. For those purposes, the licensee shall also have continuing responsibility to supervise and control the uses 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 licensee 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 licensee 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 types of use and occupancy of project lands and waters for which the licensee 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 water craft 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 licensee shall also ensure, to the satisfaction of the Commission's authorized representative, that the uses 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 licensee 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 licensee may, among other things, 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 licensee's costs of administering the permit program. The Commission reserves the right to require the licensee 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.

- 11 -

(c) The licensee 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 licensee shall file three copies of a 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 licensee 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 certificates 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 marinas; (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 licensee 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 identity 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 licensee to file an application for prior approval, the licensee may convey the intended interest at the end of that period.

- 12 -

(e) The following additional conditions apply to any intended conveyance under paragraphs (c) or (d) of this article: to the payment of a reasonable fee to cover the licensee's costs of administering the permit program. The Commission reserves the right to require the licensee 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.

(1) Before conveying the interest, the licensee 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 licensee 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 ensure 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 licensee 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.

- 13 -

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

(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 licensee's failure to appeal this order shall constitute acceptance of the license.



Fred E. Springer
Acting Director, Office
of Hydropower Licensing

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

**Quinebaug-Five Mile Pond Project
FERC No. 5062-000--Connecticut
June 20, 1986**

I. APPLICATION

Diamond Power Corporation (applicant) applied on June 22, 1981, for a major license, 5 megawatts (MW) or less, for the Quinebaug-Five Mile Pond Project. The application was supplemented on November 2, 1981, April 10, April 17, and July 1, 1985, and February 24, 1986.

The Quinebaug-Five Mile Pond Project would be located on the Quinebaug and Five Mile Rivers, in the towns of Brooklyn and Killingly, in Windham County, Connecticut (figure 1). The Quinebaug River is a tributary of the Thames River, which discharges into Long Island Sound. No federal lands would be included within the project boundary.

II. RESOURCE DEVELOPMENT

A. Purpose

The proposed project would provide an estimated annual generation of 8,562,000 kilowatthours (kWh) to the Connecticut Light and Power Company, a local utility.

B. Need for Power

Available data show that growth in the demand for electric power and energy will continue. Given positive 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. Additional resources would have to be obtained for any 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 power resources, and the reliability criteria established for 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. In the April 1986, Regional Reliability Council's

- 2 -

coordinated bulk power supply program, NEPOOL projects average annual growth rates of 2.4 percent for summer peak demand and 2.6 percent for annual energy requirements. Existing generating resources in the NEPOOL area as of January 1, 1986, include approximately 17,000 MW of thermal generating capacity. An additional 4,800 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 of the proposed project in relation to the existing and projected generating capability in 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 (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 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 NPCC region thereby conserving nonrenewable fossil fuels and reducing the emission of noxious byproducts caused by the combustion of fossil fuels.

C. Economic Feasibility

Projected avoided costs in the northeast region, identified by the staff, range from a low of 41 mills per kWh to a high of about 85 mills per kWh. Since the levelized cost of energy from the project is estimated to be 72 mills per kWh the staff is reasonably confident that there will be a market for the project power at a price sufficient to support the project's construction and operation.

The applicant anticipates that it will obtain a power sales contract based on Public Utilities Regulatory Policy Act (PURPA) rates. The staff's analysis reaches no conclusion as to the applicant's ability to achieve qualifying facility status for the proposed project under section 201 of PURPA.

D. Comprehensive Development

The proposed Guinebaug Project's five units of 75, 150, 310, 510, and 625 kilowatts (kW), respectively, have a combined maximum

- 3 -

hydraulic capacity of 1,054 cubic feet per second (cfs). The Five Mile development's two units of 193 kW each have a combined hydraulic capacity of 200 cfs. The minimum bypass flows for the Quinebaug and Five Mile developments are 77 cfs and 15 cfs, respectively. The proposed 75-kW unit would generate power from the Quinebaug River bypass flows. The river flows for each of the two developments exceed the hydraulic capacities of the units about 20 percent of the time.

The project develops a gross head of about 26 feet at the Quinebaug site and a gross head of about 30 feet at the Five Mile site. Head losses through the canals result in average net hydraulic heads of about 25 feet and about 29 feet for the Quinebaug and Five Mile sites, respectively.

The applicant estimates that the project would generate about 8,562,000 kwh annually. The staff finds this estimate of annual generation reasonable.

Neither site has a stream gage, so the applicant used stream gages (nos. 01125200 and 01126000) on the Quinebaug and Five Mile Rivers, respectively, upstream of the project sites and prorated the streamflow data based on the size of the drainage basins. The staff agrees with the applicant's methodology for the estimated streamflow.

The Commission's Planning Status Report for the Thames River Basin (Federal Power Commission, 1965) discusses the existing water resource developments and reconnaissance level plans of possible future development within the basin. The project does not conflict with any existing or planned development or with any pending applications for exemption, license, or preliminary permit.

In summary, the staff's analysis shows that the proposed project is properly designed to develop the hydropower potential on the Five Mile and Quinebaug Rivers.

III. PROPOSED PROJECT AND ALTERNATIVES

A. Proposed Project

1. Project Description

Quinebaug River Development

Rojak Dam is located on the Quinebaug River just upstream from its confluence with the Five Mile River (figure 2). The dam is 14 feet high and 250 feet long, and impounds an 85-acre reservoir with a storage capacity of 283 acre-feet. Gates in the right end

- 4 -

of Rojak Dam allow water to flow into the 30-foot-wide, 7-foot-deep Quinebaug Canal. Two tailraces associated with the remains of mills return flows to the river 625 feet and 900 feet downstream from the canal headgates.

The applicant would dredge the canal, repair the masonry walls, and seal off the upper tailrace. The applicant would build a small powerhouse at the Quinebaug Canal intake. This powerhouse would contain one 75-kW bulb turbine that would utilize the minimum flow release for the Quinebaug River Development. The applicant would also build a new concrete powerhouse at the lower tailrace. This powerhouse would contain four vertical Francis turbines with installed capacities of 150, 310, 510, and 625 kW. The total generating capacity of the Quinebaug River Development would be 1,670 kW. A new tailrace would be cut in the bedrock. A new, 2.3-kilovolt (kV) transmission line, approximately 200 feet long, would interconnect with an existing 12.5-kV distribution line owned by the Connecticut Light and Power Company. The applicant would extend the road to Rojak Dam, and would build a new road to the lower powerhouse site (Diamond Power Corporation, 1985).

Five Mile Pond Development

The existing Five Mile Pond Dam is located on Five Mile River about 1,050 feet upstream from the confluence of Five Mile River with the Quinebaug River (Figure 2). The dam is 16.5 feet high and 135 feet long, and impounds a 65-acre reservoir with a storage capacity of 260 acre-feet. Gates located at the end of the dam are inoperable, and allow flows to enter the Five Mile Canal. The canal is 20 to 30 feet wide and 12 feet deep, and extends south for 450 feet to a 10-foot-diameter penstock opening in the Pan-National Mill. A turbine room is located in the basement of the Pan-National Mill. The existing tailrace consists of a concrete box culvert extending underneath the roadbed of Connecticut Route 6 into the Five Mile River. About 280 feet downstream from the canal headgates, a debris sluice, its gate missing, allows canal flows to fall 14 feet to the Five Mile River and a concrete wall blocks the canal, 35 feet beyond the sluice (Diamond Power Corporation, 1981).

The applicant proposes to clean the Five Mile Canal, to construct a low-flow-release gate in the canal wall, and to remove the concrete wall blocking the canal. Two horizontal Francis turbines with a combined generating capacity of 386 kW would be installed in the existing turbine room. The applicant would use the existing tailrace to return flows to the Five Mile River. A new, 2.3-kV transmission line, 120 feet long, would extend to an existing 12.5-kV distribution line owned by the Connecticut Light and

- 5 -

Power Company (Diamond Power Corporation, 1985). The applicant would operate both developments in a run-of-river mode.

2. Proposed Mitigative Measures

The applicant proposes to avoid significant historic sites in the project area (see section V.A.7.) where possible, document historic structures that would be physically altered in accordance with the standards of the Historic American Engineering Record of the Department of the Interior, construct project facilities so as to be visually compatible with significant historic structures in the vicinity, and record any historic archeological remains that may be affected by the project, or that may be discovered during project construction. Documentation of identified sites would be undertaken prior to any construction that would affect such sites (Raber and McBride, 1986).

During project construction, the applicant would use signs, adequate detours, and accommodative construction scheduling to minimize the disruption of local traffic. The applicant proposes to use stone riprap to protect areas having the potential for erosion as a measure to limit increases in turbidity and sedimentation caused by project construction.

The applicant would operate the project in run-of-river mode to protect the aquatic biota upstream and downstream of the project dams from rapid changes in water flow and level. The applicant proposes the installation of trash racks and screens, and the use of an intake design to maintain low approach velocities, as measures to prevent entrainment and turbine-related mortality of fish during project operation.

B. Alternatives to the Proposed Project

Hydroelectric projects are unique in the electric power generation field, because of their rugged machinery, high reliability, low operating and maintenance costs, long life, and use of a renewable resource. These characteristics, plus potential markets based on electric utility avoided costs and tax advantages such as rapid amortization and energy credits, have made small hydroelectric project development an attractive business venture for many and have fostered a considerable amount of competition for the more feasible hydroelectric projects.

The number of undeveloped and economically feasible hydroelectric sites is finite and limited. Generally, the criteria considered in the selection of hydroelectric project sites are: (1) adequate streamflow; (2) favorable topography or maximum hydraulic head (fall) in a short run of the stream (horizontal distance); (3) accessibility; (4) availability of electric transmission system;

- 6 -

(5) minimum water release; and (6) environmental effects. If the applicant is not an electric utility, the alternative is not to construct the project.

If the project is not constructed, the energy of falling water will continue to be wasted and the power that would have been developed will eventually be provided by nonrenewable fuels. With regard to considering other nonpassive generation from renewable resources instead of the project, it is presumed these projects will be installed when commercially and economically feasible. Likewise, whether the project is built or not, the installation of passive devices using renewable resources and energy conservation efforts will both continue until the market is saturated or until these installations become uneconomical.

C. Alternative of No Action

No action would prohibit the applicant from constructing the proposed project. No action would mean no alteration of the existing environment and no use of the potential hydropower that could be derived from the project.

IV. CONSULTATION AND COMPLIANCE

A. Agency Consultation

The Commission's regulations require prospective applicants to consult with the appropriate resource agencies before filing an application for license. This 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, formal comments may be submitted by concerned entities during the public notice period. In addition, organizations and individuals may petition to intervene and become a party to any subsequent proceedings. The comments provided by concerned entities are made part of the record and are considered during the review of the proposed project. The following entities commented on the application subsequent to the public notice, which was issued on January 22, 1982.

- 7 -

Commenting entityDate of letterOffice of the State Historic
Preservation Officer

February 8, 1982

Department of the Army, New England
Division Corps of Engineers

March 19, 1982

Environmental Protection Agency

March 23, 1982

Connecticut Department of Environmental
Protection

April 1, 1982

U.S. Fish and Wildlife Service

April 2, 1982

The applicant responded to the agency comments in a letter dated June 17, 1982.

B. Water Quality Certification

On October 4, 1983, the Connecticut Department of Environmental Protection (DEP) issued a water quality certificate for the proposed project, as authorized in section 401 of the Clean Water Act.

.. ENVIRONMENTAL ANALYSIS

A. Proposed Project

The staff's analysis shows that adverse effects of the proposed project on visual and socioeconomic resources would be insignificant.

1. General Description of the Locale

The banks of the Rojak Dam impoundment are gently sloping, wooded, and undeveloped. Several small areas of forested wetland, scrub shrub wetland, and emergent wetland are located in the impoundment. Downstream from Rojak Dam, the Quinebaug River is lined by steeply sloping, wooded banks.

The banks of Five Mile Pond are moderately sloped, and are lined with lightly wooded areas interspersed with open areas. Some residential and light commercial development has occurred along the lower end of the impoundment. Downstream from the Five Mile Pond Dam, the left bank of the Five Mile River is forested; the right bank consists of a retaining wall between the dam and the Main Street bridge.

- 8 -

2. Geology and Soils

Affected Environment: Bedrock in the project area is Quinebaug Formation Gneiss, which forms outcroppings at or immediately below both dams and at many places in the project area. The Five Mile Pond Dam and Canal area was originally part of a sandy loam hill, developed on stratified drift between the two rivers. Sandy loam soils also occur in the area of Rojak Dam and the Quinebaug Canal, but bedrock is at or immediately below the surface over much of the area (Raber and McBride, 1996).

The banks of the Five Mile Pond and the Rojak Dam impoundment are generally composed of sand, clay, or stony gravel. The river channel is composed of cobbles and ledge for almost all of the distance from the dams downstream to the point where the Quinebaug Canal joins the river, and the banks are rocky (Diamond Power Corporation, 1981).

Environmental Impacts and Recommendations: Renovating the existing power canals and constructing the new powerhouse and tailrace on the Quinebaug River would cause minor, short-term increases in soil erosion, sedimentation, and turbidity. The applicant, after consultation with appropriate resource agencies, and before starting any land-clearing or ground-disturbing activities, should prepare a plan to control erosion and sedimentation at the project.

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

3. Water Resources

Affected Environment: The Quinebaug River originates in southern Massachusetts and flows approximately 40 miles south to its confluence with the Shetucket River, the major tributary of the Thames River. The Quinebaug drainage area at Rojak Dam encompasses 384 square miles of rolling terrain that contains suburban, rural, and urban development. The gradient of the Quinebaug River above Rojak Dam is approximately 50 feet per mile.

The Five Mile River originates in northeastern Connecticut and flows approximately 20 miles to its confluence with the Quinebaug River. The drainage area of Five Mile River encompasses 77 square miles of rural, suburban, and forested lands. The gradient of Five Mile River is approximately 35 feet per mile.

The flow of the Quinebaug River at Rojak Dam is greatest in spring primarily because of rainfall, with maximum monthly average flows of about 1,240 cfs in March and April. Low flows occur in the summer months, with minimum monthly average flows of about 220 cfs in July and August. The mean flow

- 9 -

is 576 cfs and the mean low flow over 7 consecutive days with a 10-year recurrence (7Q10) is 7.7 cfs.

The flow pattern of the Five Mile River is similar to that of the Quinebaug River, with maximum monthly average flows of about 238 cfs in March and April, and minimum monthly average flows of about 58 cfs in August and September. The average flow is 119 cfs, with a 7Q10 flow of 1.5 cfs.

Improved treatment of industrial and sewage discharges over the past 20 years has greatly improved water quality in the Quinebaug River. DEP presently classifies water quality in the Quinebaug River as Class C, which is not considered to be acceptable for swimming. Despite the Class C designation, the Quinebaug River in the project area probably meets the state's minimum dissolved oxygen (DO) standard of 5.0 milligrams per liter (mg/l) for Class B water (personal communication, Arthur Major, Connecticut Department of Environmental Protection, Hartford, Connecticut, May 28, 1986).

DEP classifies the Five Mile River as Class Bc water, which is suitable for swimming and coldwater fish habitat, and which has a DO level higher than 5.0 mg/l.

Environmental Impacts and Recommendations: The repair of the existing facilities and other construction activities would cause increased sedimentation downstream from the project site. The applicant proposes to minimize sedimentation and turbidity by using stone riprap in areas of the streambed that could be eroded. The applicant should incorporate the use of riprap into a comprehensive soil erosion and sedimentation control plan to ensure the protection of the water quality in the Quinebaug and Five Mile Rivers.

Unavoidable Adverse Impacts: A minor, short-term increase in sedimentation and turbidity would occur during project construction.

4. Fishery Resources

Affected Environment: The Quinebaug River supports a mixed coldwater and warmwater fishery. Species inhabiting the Quinebaug River include brook trout (*Salvelinus fontinalis*), brown trout (*Salmo trutta*), rainbow trout (*Salmo gairdneri*), chain pickerel (*Esox niger*), largemouth bass (*Micropterus salmoides*), redbreast sunfish (*Lepomis auritus*), and various members of the minnow family Cyprinidae. Although some natural brook trout populations occur, the major portion of the trout fishery is supported by the stocking of hatchery fish, predominantly brown trout (Connecticut Department of Environmental Protection, 1985).

- 19 -

The Five Mile River supports a coldwater fishery of brook, brown, and rainbow trout. As with the Quinebaug River, hatchery operations support most of the fishery. Other species found in the Five Mile River include white sucker (Catostomus commersoni) and various minnows.

The Thames River Basin, including the Quinebaug and Five Mile Rivers, historically supported populations of anadromous fish, including Atlantic salmon (Salmo salar), American shad (Alosa sapidissima), blueback herring (A. aestivalis), and alewife (A. pseudoharengus). The construction of impassible dams was a major factor in the elimination of Atlantic salmon and American shad from the Thames River Basin. Remnant populations of river herring (alewife and blueback herring) remain downstream from the Greenville Dam (figure 1).

Environmental Impacts and Recommendations: Project operation would reduce flows in the 1,000-foot-long bypass reach below the Rojak Dam and in the 600-foot-long bypass reach below the Five Mile Pond Dam. The reduced flows would reduce the habitat available to fish below the project dams and would interfere with the upstream passage of Atlantic salmon and American shad currently scheduled for restoration to the Thames River Basin.

The U.S. Fish and Wildlife Service (FWS) recommends the discharge of continuous minimum flows of 77 cfs below Rojak Dam and 15.4 cfs below Five Mile Dam in order to maintain suitable aquatic habitat for resident and migratory fish between the dams and tailrace discharges. DEP, in the letter of comment of April 1, 1982, originally recommended that the applicant operate the project in a run-of-river mode and maintain continuous minimum flows of 23 to 77 cfs below Rojak Dam and 12 to 15.4 cfs below Five Mile Pond Dam. However, in the letter dated October 4, 1983, issuing water quality certification, DEP recommends flows of 77 cfs and 15 cfs below Rojak Dam and Five Mile Pond Dam, respectively.

The applicant agrees to provide minimum flows of 77 cfs below Rojak Dam and 15 cfs below Five Mile Pond Dam. The applicant should operate the project in a run-of-river mode and should maintain minimum flows of 77 cfs and 15 cfs in the bypass reaches below Rojak Dam and Five Mile Pond Dam, respectively, to maintain aquatic habitat for fish below the project dams.

Project operation could cause entrainment and turbine-related mortality of fish from the project reservoirs. To prevent fish entrainment, the applicant proposes to install trash racks and fish screens on the powerhouse intakes, and design the intakes to

- 11 -

reduce approach velocities. There is no evidence at this time that the operation of the proposed project would cause significant turbine-related mortality of fish. Resident fish are not known to move downstream past the project dams and trout are not stocked in the project reservoirs. The applicant, therefore, should not be required to install fish screens. If in the future, it is determined that turbine-related mortality of fish is significant, the Commission by its own action or by recommendation from FWS or DEP, may order the installation of fish screens or other structural or operational modifications for the protection of fisheries resources.

The Thames River Basin is scheduled for anadromous fish restoration as part of a cooperative effort between the FWS and DEP. The major target species for the restoration are Atlantic salmon and American shad.

FWS and DEP recommend that the applicant construct fish passage facilities at Rojak Dam and Five Mile Pond Dam after the completion of fish passage facilities at downstream dams. Currently, three impassable dams prevent the upstream migration of anadromous fish to the Rojak Dam and the Five Mile Pond Dam. The construction of fish passage facilities at the Greenville, Tunnel, and Aspinook Pond Dams is scheduled for completion in the 1990's. Fish passage facilities at the Rojak Dam and the Five Mile Pond Dam are also targeted for the 1990's (personal communication, Peter Minta, Fishery Biologist, Connecticut Department of Environmental Protection, Hartford, Connecticut, May 14, 1986). The operation of fish passage facilities at the project dams would allow direct access to 652 acres of shad spawning and nursery habitat in the Quinebaug River and would allow access to substantial spawning and nursery habitat for both salmon and shad (Connecticut Department of Environmental Protection, 1985).

The applicant accepts the obligation to provide fish passage facilities. The successful restoration of Atlantic salmon and American shad to the Thames River Basin necessitates the construction of upstream and downstream fish passage facilities at the Rojak and Five Mile Pond Dams. The applicant therefore should file plans for fish passage facilities at the project dams for Commission approval, within 6 months after the start of construction of fish passage facilities at the downstream Aspinook Pond Dam, and should complete fish passage facilities at the Rojak Dam and the Five Mile Pond Dam within 1 year after the completion of fish passage facilities at the Aspinook Pond Dam.

Unavoidable Adverse Impacts: None.

5. Terrestrial Resources

Affected Environment: The project area is vegetated with a hardwood forest, made up of tree species such as red oak (Quercus rubra), white oak (Q. alba), black oak (Q. velutina),

- 12 -

shagbark hickory (Carya ovata), red maple (Acer rubrum), sugar maple (A. saccharum), and willows (Salix spp.). Conifers present in the project area are white pine (Pinus strobus) and hemlock (Tsuga canadensis) (Diamond Power Corporation, 1981). Wildlife utilizing the lands around the impoundments include raccoon (Procyon lotor), striped skunk (Mephitis mephitis), woodchuck (Marmota monax), cottontail rabbit (Sylvilagus floridanus), gray squirrel (Sciurus carolinensis), and eastern chipmunk (Tamias striatus). Mallard duck (Anas platyrhynchos), black duck (Anas rubripes), and wood duck (Aix sponsa), and blue-winged teal (Anas discors) use the lands and waters of the proposed project as habitat (Diamond Power Corporation, 1981).

Environmental Impacts and Recommendations: Trees and shrubs growing on the dam's abutments and the canal's walls and in the dry section of the Five Mile Pond Canal would be removed to ensure the stability and efficient operation of the existing structures. The applicant would also remove trees to gain access to the headgates of the Rojak Dam for repair work and in order to construct the Quinebaug River powerhouse.

The removal of trees and other vegetation, increased noise, and human activity would cause wildlife to avoid the project area during the 18-month-long construction period.

Unavoidable Adverse Impacts: Wildlife would avoid the project area during the 18-month-long construction period.

6. Threatened and Endangered Species

Affected Environment: No plant or animal species federally listed as threatened or endangered are known to occur in the project area (personal communication, Ron Joseph, Fish and Wildlife Biologist, U.S. Fish and Wildlife Service, Department of the Interior, Concord, New Hampshire, June 4, 1986).

Environmental Impacts and Recommendations: None.

Unavoidable Adverse Impacts: None.

7. Cultural Resources

Affected Environment: The applicant has conducted an archeological and historical survey of the project area (Diamond Power Corporation, 1985; Raber and McBride, 1986). The survey indicates that several historic structures and archeological remains associated with the Quinebaug Mill-Quebec Square Historic District (District) and the Danielson Cotton Company (Company) would be affected by the construction of project facilities. The District is listed on the National Register of Historic Places. The Company is considered eligible for inclusion in the National Register (Raber and McBride,

- 13 -

1986; letter from Ms. Dawn Maddox, Deputy State Historic Preservation Officer, Office of the State Historic Preservation Officer of Connecticut, Hartford, Connecticut, March 10, 1986).

The survey did not produce an inventory of any prehistoric sites. The potential of project construction for affecting any buried prehistoric sites is minimal (Raber and McBride, 1966).

Environmental Impacts and Recommendations: Several historic structures and areas of historic archeological remains within boundaries of the District and the Company would be physically altered or removed by project construction activities. The applicant and the Connecticut State Historic Preservation Officer (SHPO) concur that some of the project's impacts would have an adverse effect on the historical integrity of the District and the Company. Other impacts would not be adverse (Raber and McBride, 1986; letter from Ms. Dawn Maddox, Deputy State Historic Preservation Officer, Office of the State Historic Preservation Officer for Connecticut, Hartford, Connecticut, March 10, 1986).

To minimize impacts to the District and the Company, the applicant should implement the cultural resources management plan recommended by the SHPO, as described in a letter to the applicant (letter from Ms. Dawn Maddox, Deputy State Historic Preservation Officer, Office of the State Historic Preservation Officer of Connecticut, Hartford, Connecticut, March 10, 1986). The plan incorporates the applicant's recommendations for mitigating the effects of the project and includes other measures to ensure the protection of the District and the Company and the proper recording, curation, and dissemination of information about the historic structures and archeological remains that would be affected by the project. If the applicant discovers any previously unidentified archeological or historic sites during the course of constructing or developing project works or other facilities at the project, the applicant should halt construction and development activities in the vicinity of the sites, and should consult a qualified cultural resources specialist and the SHPO about the eligibility of the sites for listing in the National Register of Historic Places and about any measures needed to avoid the sites or to mitigate effects on the sites.

Unavoidable Adverse Impacts: Several component historic structures and archeological areas of the District and the Company would be altered or removed.

8. Recreation and Other Land and Water Uses

Affected Environment: Recreational use of the Rojak Dam impoundment and Five Mile Pond chiefly consists of fishing by local residents (Diamond Power Corporation, 1981). No public access areas or recreational developments exist in the project area.

- 14 -

Environmental Impacts and Recommendations: FWS recommends that the applicant provide access for anglers to all project waters, except where such access would jeopardize personal safety, and DEP recommends that the applicant provide public access to the Quinebaug River portion of the project area. The applicant does not propose any recreational development at the project, citing poor accessibility and poor water quality as reasons for not expecting a substantial increase in recreational use of the project (Diamond Power Corporation, 1981). The applicant states that it would cooperate with the state or with the town of Killingly in the formulation of plans for recreational development.

The applicant, FWS, and DEP identify poor public access to the two impoundments as a major factor in the low recreational use of the impoundments. The applicant therefore should consult with the aforementioned agencies to determine the feasibility of providing public access to project lands and waters, and should implement measures as necessary to provide access and enhance recreational opportunities at the project.

Unavoidable Adverse Impacts: None.

B. Alternative of No Action

Implementation of 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 Quinebaug and the Five Mile Rivers for generating electricity.

C. Recommended Alternative

The proposed project is the recommended alternative, because electricity generated from a renewable resource would be sold to Connecticut Light and Power Company, thus lessening the use of existing fossil-fueled, steam-electric generating plants, and because the environmental effects of constructing and operating the project would be minor.

VI. FINDING OF NO SIGNIFICANT IMPACT

Minor soil erosion and increased sedimentation and turbidity would occur during project construction. Wildlife would avoid the project area during the 18-month-long construction period. Historic structures and archeological components of the District and the Company would be adversely affected by the construction of project facilities, but these impacts would be minimized by implementing a mitigative plan recommended by the SHPO. The plan would also ensure that other effects of the project on the District and the Company would not be adverse.

- 15 -

Implementing the applicant's and the staff's proposed mitigative measures would ensure that the environmental effects of project construction and operation would be insignificant.

In accordance with the National Environmental Policy Act of 1969, this environmental assessment was prepared for the Quinebaug-Five Mile Pond Hydroelectric Project. On the basis of the staff's independent environmental analysis, issuance of a license for the project would not constitute a major federal action significantly affecting the quality of the human environment.

VII. LITERATURE CITED

Connecticut Department of Environmental Protection. 1985. A preliminary plan for the restoration of anadromous fish to the Thames River Basin. 14 pp. August 1, 1985.

Diamond Power Corporation. 1981. Application for license for major water power project, 5 megawatts or less, for the Quinebaug-Five Mile Pond Hydroelectric Reactivation Project, FERC No. 5062, Connecticut.

 . 1923. Cultural resource site survey. Barkan Properties, Chestnut Hill, Massachusetts. 39 pp.

Federal Power Commission. 1965. Thames River Basin: planning status report, Washington, D.C. 13 pp.

Raber, M. S., and K. A. McBride. 1986. Cultural resource assessment of proposed Quinebaug River-Five Mile River hydroelectric reactivation project: Killingly and East Brooklyn, Connecticut. Cobalt, Connecticut. 32 pp. February, 1986.

VIII. LIST OF PREPARERS

Dianne Rodman--EA Coordinator; Geology and Soils, Terrestrial Resources, Threatened and Endangered Species, Recreation and Other Land and Water Uses (Ecologist; M.S., Biology).

Stacy Michaels--Purpose, Economic Feasibility, and Comprehensive Development (Civil Engineer; B.S., Civil Engineering)

John Mitchell--EA Editor (Writer-editor; B.S., Social Science).

Edwin Slatter--Cultural Resources (Archeologist; PhD., Anthropology).

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John Warner--Water and Fishery Resources (Fishery Biologist; M.S., Wildlife and Fisheries Biology).

**SAFETY AND DESIGN ASSESSMENT
QUINEBAUG-FIVE MILE POND PROJECT
FERC No. 5062--CONNECTICUT**

DAM SAFETY

The Commission's New York Regional Director (director), on May 13, 1986, classified the Quinebaug (Rojak) dam as a low hazard structure because there are no residences downstream of the dam and no loss of life would occur as a result of failure of the dam. The director, on the same date, classified the Five Mile Pond dam as a significant hazard because failure of the dam could possibly result in loss of life and damage to residential properties.

The applicant does not own either of the two dams. According to the applicant's sworn statements in the license application, a family estate represented by Roberta Weil and Rachelle Rojak owns the Rojak dam. The Crouse-Hinds Company may also have ownership rights to this dam. The Pan National Fence Company owns the Five Mile Pond dam, but the property on which the dam is located was the subject of a foreclosure proceeding at the time the license application was filed.

The Five Mile Pond dam is classified as a significant hazard structure and the spillway capacity is less than the probable maximum flood. Because the dam is owned by parties other than the applicant and applicant has no control over the safety of the dam at this time, we recommend that the license include an article that requires the licensee to conduct a dam break analysis that identifies and quantifies the hazard to downstream life and property of failure of the Five Mile Pond dam. If failure of the dam would result in loss of human life or cause significant damage to downstream property, the licensee would be required to submit a plan and schedule to modify the dam to make it safe.

PROJECT DESIGN

As a condition to the Connecticut Department of Environmental Protection's issuance of a water quality certificate, the applicant changed the project design and the installed capacity proposed in the original filing of their license application to their present proposal. The Exhibit F drawings presently on file with the Commission do not reflect these design changes. The staff recommends that a special license article be included in the license that would require the licensee to file revised Exhibit F drawings showing the final design of the project along with a supporting design report, for approval by the Commission, prior to the start of construction.

The project consists of two separate developments, one on the Quinebaug River and the other on the Five Mile River.

- 2 -

Quinebaug River Development

Water would be diverted from the Quinebaug River into the existing 900-foot-long canal. The wastegate would regulate flows so that 77 cfs would enter the wasteway to the 75-kw low-flow powerhouse and then be released back into the Quinebaug River.

Those flows diverted into the canal that would not be necessary to maintain the minimum flow of 77 cfs would be conveyed through the 900-foot canal to the new 1595-kw concrete powerhouse. The flow from the four turbines would be discharged through the tailrace back to the Quinebaug River.

Five Mile River Development

Water would be diverted from the Five Mile River into the existing 450-foot-long canal. The canal would convey the flows to the two 193-kw units in the existing powerhouse. Flow released from the two turbines would be discharged through the tailrace back to the Five Mile River.

Many of the project facilities are in disrepair. The applicant proposes to make the necessary repairs and modifications to make the project operational. The proposed powerhouse design and the proposed repairs and modifications to the project canals, headgates, and tailraces comply with acceptable engineering design criteria. The Commission's staff has concluded that the project construction can be completed within two years after commencement of construction.

Economic Feasibility

We have reanalyzed the economic feasibility of the proposed project using the revised 1986 tax code. Staff remains reasonably confident that there will be a market for the project power at a price sufficient to support the project construction and operation.

Conservation

The proposed project is being developed by the Diamond Power Corporation, a private developer, and therefore not subject to the provisions of ECPA.

EXHIBITS

The following portions 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, entitled Project Description, filed with the Commission on June 22, 1981, as amended in the July 8, 1985, filing, pages 18, 19, 20A, 21, 22, 23A, 24A, 25A, 27, 28A, 29, and Figure A.5-1, entitled Electrical Single Line Diagram.

-3-

<u>Exhibit F Drawing</u>	<u>FERC No. 5062</u>	<u>Description</u>
Sheet 1	1	Five Mile Pond dam
Sheet 2	2	Five Mile Pond gatehouse and canal wastegate details
Sheet 3	3	Quinebaug dam wastegate and canal headgate
Sheet 4	4	Quinebaug dam section, and elevations of headgate structure and wastegates

Form L-11
(Revised October, 1975)

FEDERAL POWER COMMISSION

TERMS AND CONDITIONS OF LICENSE FOR UNCONSTRUCTED
MAJOR PROJECT AFFECTING THE INTERESTS
OF INTERSTATE OR FOREIGN COMMERCE

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

- 2 -

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

- 3 -

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

- 4 -

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.

- 5 -

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.

- 6 -

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.

- 7 -

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.

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.

- 8 -

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.

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. 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

- 9 -

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 22. 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 23. 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.

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