

LOW IMPACT HYDROPOWER INSTITUTE

APPENDIX B – QUESTIONNAIRE

April 2014 REVISION

Background Information	
1) Name of the Facility as used in the FERC license/exemption.	Cosgrove Intake and Power Plant
2) Applicant's complete contact information (please use Appendix D, Project Contact Form)	<p>Pamela Heidell (MWRA Liaison with LIHI) Massachusetts Water Resources Authority (MWRA) 100 First Ave, Charlestown Navy Yard Boston, MA 02129</p> <p>Guy Foss, MWRA Western Operations Manager, Transmission and Treatment 266 Boston Road Southborough, MA 01772</p>
3) Location of Facility including (a) the state in which Facility is located; (b) the river on which Facility is located; (c) the river-mile location of the Facility dam; (d) the river's drainage area in square miles at the Facility intake; (e) the location of other dams on the same river upstream and downstream of the Facility; and (f) the exact latitude and longitude of the Facility dam.	<p>The Cosgrove power plant/intake is located in Clinton, Massachusetts on the shore of Wachusett Reservoir. It is a hydroelectric conduit facility associated with the Cosgrove Aqueduct, a 9 mile long deep rock tunnel that conveys water from Wachusett Reservoir to MWRA's water treatment facility in Marlborough Massachusetts. It is not located at a dam.</p>
4) Installed capacity.	2,000-2,400 kW

5) Average annual generation.	4,655,611 kWh
6) Regulatory status.	FERC Conduit Exemption # 10688-000 issued January, 1990. See attached FERC Order Granting Exemption from Licensing.
7) Reservoir volume and surface area measured at the normal maximum operating level.	The facility is not associated with a dam, but is instead located at a water supply intake. The upstream water source is the Wachusett Reservoir; the Reservoir has a 65 billion gallon capacity and a surface area of 4,122 acres.
8) Area occupied by non-reservoir facilities (e.g., dam, penstocks, powerhouse).	The Cosgrove hydroelectric facility is located in the Cosgrove Intake building. The turbine/generator occupies only a small part of this water supply intake facility. Since the intake's primary purpose is water supply, the intake building also has an office, locker room, storage room, operator room and other ancillary facilities to support water supply operations. The intake structure also has bypass lines and equipment to regulate flow, whether or not the hydroelectric turbines are in operation.
9) Number of acres inundated by the Facility.	No inundation is associated with the conduit facility itself. The conduit is part of a water supply transmission system, which includes the Quabbin Reservoir and Wachusett Reservoirs. The Quabbin and Wachusett Reservoirs cover 24,469 and 4,122 acres, respectively.
10) Number of acres contained in a 200-foot zone extending around entire reservoir.	The Cosgrove Intake and Cosgrove Aqueduct do not impound water.

<p>11) Contacts for Resource Agencies and non-governmental organizations</p>	<p>Agency comments during the FERC process appear to be limited to the U.S. Army Corps of Engineers and the US Fish and Wildlife Service.</p>
<p>12) Description of the Facility, its mode of operation (i.e., peaking/run of river) and photographs, maps and diagrams.</p>	<p>Please see attached description of this conduit hydroelectric facility and its mode of operation is based on water demand and other water system operational considerations. The facility harnesses energy as water drops from one elevation in the water supply system (Wachusett Reservoir) to another (Cosgrove Aqueduct). Please see attached pictures and diagrams.</p>
<p>.</p>	
<p>Questions for "New" Facilities Only:</p>	
<p>If the Facility you are applying for is "new" (i.e., an existing dam that added or increased power generation capacity after August of 1998) please answer the following questions to determine eligibility for the program.</p>	
<p>13) When was the dam associated with the Facility completed?</p>	
<p>14) When did the added or increased generation first generate electricity? If the added or increased generation is not yet operational, please answer question 18 as well.</p>	
<p>15) Did the added or increased power generation capacity require or include any new dam or other diversion structure?</p>	
<p>16) Did the added or increased capacity include or require a change in water flow through the facility that worsened conditions for fish, wildlife, or water quality (for example, did operations change from run-of-river to peaking)?</p>	
<p>17 (a) Was the existing dam recommended for removal or decommissioning by resource agencies, or recommended for removal or decommissioning by a broad representation of interested persons and organizations in the local and/or regional community prior to the added or increased capacity?</p>	

<p>(b) If you answered "yes" to question 17(a), the Facility is not eligible for certification, unless you can show that the added or increased capacity resulted in specific measures to improve fish, wildlife, or water quality protection at the existing dam. If such measures were a result, please explain.</p>	
<p>18 (a) If the added or increased generation is not yet operational, has the increased or added generation received regulatory authorization (e.g., approval by the Federal Energy Regulatory Commission)? If not, the facility is not eligible for consideration; and (b) Are there any pending appeals or litigation regarding that authorization? If so, the facility is not eligible for consideration.</p>	
<p>A. Flows 1) Is the Facility in Compliance with Resource Agency Recommendations issued after December 31, 1986 regarding flow conditions for fish and wildlife protection, mitigation and enhancement (including in-stream flows, ramping and peaking rate conditions, and seasonal and episodic instream flow variations) for both the reach below the tailrace and all bypassed reaches?</p>	<p>PASS YES = Pass, Go to B N/A = Go to A2</p>
<p>2) If there is no flow condition recommended by any Resource Agency for the Facility, or if the recommendation was issued prior to January 1, 1987, is the Facility in Compliance with a flow release schedule, both below the tailrace and in all bypassed reaches, that at a minimum meets Aquatic Base Flow standards or "good" habitat flow standards calculated using the Montana-Tennant method?</p>	<p>FAIL NO = Fail</p>
	<p>PASS YES = Pass, go to B NO = Go to A3 Not applicable. The facility is associated with a conduit used to convey water from a water supply reservoir to a water treatment plant. There are no bypassed</p>

	<p>reaches, and there is no flow release schedule associated with the FERC approval. USFWS did not provide flow recommendations related to the facility tailrace or bypassed reaches.</p>	
<p>3) If the Facility is unable to meet the flow standards in A.2., has the Applicant demonstrated, and obtained a letter from the relevant Resource Agency confirming that demonstration, that the flow conditions at the Facility are appropriately protective of fish, wildlife, and water quality?</p>	<p>YES = Pass, go to B Not applicable – facility is a conduit facility.</p>	<p>NO = Fail</p>
<p>B. Water Quality</p>	<p>PASS</p>	<p>FAIL</p>
<p>1) Is the Facility either:</p> <p>a) In Compliance with all conditions issued pursuant to a Clean Water Act Section 401 water quality certification issued for the Facility after December 31, 1986? Or</p> <p>b) In Compliance with the quantitative water quality standards established by the state that support designated uses pursuant to the federal Clean Water Act in the Facility area and in the downstream reach?</p>	<p>YES = Go to B2 Not Applicable- Water Quality Certification was not required.</p>	<p>NO = Fail</p>
<p>2) Is the Facility area or the downstream reach currently identified by the state as not meeting water quality standards (including narrative and numeric criteria and designated uses) pursuant to Section 303(d) of the Clean Water Act?</p>	<p>YES = Go to B3 NO = Pass NA</p>	

<p>3) If the answer to question B.2 is yes, has there been a determination that the Facility does not cause, or contribute to, the violation?</p>	<p>YES = Pass NA = Pass (water, though, is of the highest quality and is a Class A water)</p>	<p>NO = Fail</p>
<p>C. Fish Passage and Protection</p>		
<p>1) Are anadromous and/or catadromous fish present in the Facility area or are they known to have been present historically?</p>	<p>PASS YES = Go to C2 NO = Go to C6 Facility is a conduit facility</p>	<p>FAIL</p>
<p>2) Is the Facility in Compliance with Mandatory Fish Passage Prescriptions for upstream and downstream passage of anadromous and catadromous fish issued by Resource Agencies after December 31, 1986?</p>	<p>YES = Go to C6 N/A = Go to C2</p>	<p>NO = Fail</p>
<p>3) Are there historic records of anadromous and/or catadromous fish movement through the Facility area, but anadromous and/or catadromous fish do not presently move through the Facility area (e.g., because passage is blocked at a downstream dam or the fish no longer have a migratory run)?</p> <p>a) If the fish are extinct or extirpated from the Facility area or downstream reach, has the Applicant demonstrated that the extinction or extirpation was not due in whole or part to the Facility?</p> <p>b) If a Resource Agency Recommended adoption of upstream and/or downstream fish passage measures at a specific future date, or when a triggering event occurs (such as completion of passage through a downstream</p>	<p>YES = Go to C2a NO = Go to C3 YES = Go to C2b N/A = Go to C2b YES = Go to C5 N/A = Go to C3</p>	<p>NO = Fail NO = Fail</p>

<p>obstruction or the completion of a specified process), has the Facility owner/operator made a legally enforceable commitment to provide such passage?</p>		
<p>4) If, since December 31, 1986:</p> <p>a) Resource Agencies have had the opportunity to issue, and considered issuing, a Mandatory Fish Passage Prescription for upstream and/or downstream passage of anadromous or catadromous fish (including delayed installation as described in C.3.a above), and</p> <p>b) The Resource Agencies declined to issue a Mandatory Fish Passage Prescription,</p> <p>c) Was a reason for the Resource Agencies' declining to issue a Mandatory Fish Passage Prescription one of the following: (1) the technological infeasibility of passage, (2) the absence of habitat upstream of the Facility due at least in part to inundation by the Facility impoundment, or (3) the anadromous or catadromous fish are no longer present in the Facility area and/or downstream reach due in whole or part to the presence of the Facility?</p>	<p>NO = Go to C6 N/A = Go to C4</p> <p>NA = Pass (water, though, is of the highest quality and is a Class A water)</p>	<p>YES = Fail</p>
<p>5) If C4 was not applicable:</p> <p>a) Are upstream and downstream fish passage survival rates for anadromous and catadromous fish at the dam each documented at greater than 95% over 80% of the run using a generally accepted monitoring methodology? Or</p> <p>b) If the Facility is unable to meet the fish passage standards in 5.a, has the Applicant either i) demonstrated, and obtained a letter from the U.S. Fish and</p>	<p>YES = Go to C6</p>	<p>NO = Fail</p>

<p>Wildlife Service or National Marine Fisheries Service confirming that demonstration, that the upstream and downstream fish passage measures (if any) at the Facility are appropriately protective of the fishery resource, or ii) committed to the provision of fish passage measures in the future and obtained a letter from the U.S. Fish and Wildlife Service or the National Marine Fisheries Service indicating that passage measures are not currently warranted?</p>		
<p>6) Is the Facility in Compliance with Mandatory Fish Passage Prescriptions for upstream and/or downstream passage of Riverine fish?</p>	<p>YES = Go to C7 <u>N/A</u> = Go to C7</p>	<p>NO = Fail</p>
<p>7) Is the Facility in Compliance with Resource Agency Recommendations for Riverine, anadromous and catadromous fish entrainment protection, such as tailrace barriers?</p>	<p>YES = Pass, go to D N/A = Pass, go to D</p>	<p>NO = Fail</p>
<p>D. Watershed Protection</p>	<p>PASS</p>	<p>FAIL</p>
<p>1) Is there a buffer zone dedicated for conservation purposes (to protect fish and wildlife habitat, water quality, aesthetics and/or low-impact recreation) extending 200 feet from the average annual high water line for at least 50% of the shoreline, including all of the undeveloped shoreline?</p>	<p>YES = Eligible for 3 extra years of certification; Go to D4 The project is a conduit facility associated with water supply and the transmission of drinking water from a reservoir to a downstream treatment plant. There is a buffer zone around the facility intake for water supply protection purposes.</p>	<p>NO = Go to D2</p>

	<p>MWRA has a partnership with the Department of Conservation and Recreation Division of Water Supply Protection, who is responsible for managing the watersheds, and watershed protection activities are funded by MWRA.</p>	
<p>2) Has the Facility owner/operator established an approved watershed enhancement fund that: 1) could achieve within the project's watershed the ecological and recreational equivalent of land protection in D.1, and 2) has the agreement of appropriate stakeholders and state and federal resource agencies?</p>	<p>YES = Eligible for 3 extra years of certification; Go to D4</p>	<p>NO = Go to D3</p>
<p>3) Has the Facility owner/operator established through a settlement agreement with appropriate stakeholders, with state and federal resource agencies agreement, an appropriate shoreland buffer or equivalent watershed land protection plan for conservation purposes (to protect fish and wildlife habitat, water quality, aesthetics and/or low impact recreation)?</p>	<p>YES = Go to D4</p>	<p>NO = Go to D4</p>
<p>4) Is the facility in compliance with both state and federal resource agencies recommendations in a license approved shoreland management plan regarding protection, mitigation or enhancement of shorelands surrounding the project?</p>	<p>YES = Pass, go to E N/A = Pass, go to E</p>	<p>No = Fail</p>

E. Threatened and Endangered Species Protection	PASS	FAIL
<p>1) Are threatened or endangered species listed under state or federal Endangered Species Acts present in the Facility area and/or downstream reach?</p>	<p>YES = Go to E2 <u>NO</u> = Pass, go to F</p>	
<p>2) If a recovery plan has been adopted for the threatened or endangered species pursuant to Section 4(f) of the Endangered Species Act or similar state provision, is the Facility in Compliance with all recommendations in the plan relevant to the Facility?</p>	<p>YES = Go to E3 N/A = Go to E3</p>	<p>NO = Fail</p>
<p>3) If the Facility has received authorization to incidentally Take a listed species through: (i) Having a relevant agency complete consultation pursuant to ESA Section 7 resulting in a biological opinion, a habitat recovery plan, and/or (if needed) an incidental Take statement; (ii) Obtaining an incidental Take permit pursuant to ESA Section 10; or (iii) For species listed by a state and not by the federal government, obtaining authorization pursuant to similar state procedures; is the Facility in Compliance with conditions pursuant to that authorization?</p>	<p>YES = Go to E4 N/A = Go to E5</p>	<p>NO = Fail</p>
<p>4) If a biological opinion applicable to the Facility for the threatened or endangered species has been issued, can the Applicant demonstrate that:</p> <ul style="list-style-type: none"> a) The biological opinion was accompanied by a FERC license or exemption or a habitat conservation plan? Or b) The biological opinion was issued pursuant to or consistent with a recovery plan for the endangered or threatened species? Or c) There is no recovery plan for the threatened or endangered species under active development by the relevant Resource Agency? Or 	<p>YES = Pass, go to F</p>	<p>NO = Fail</p>

<p>d) The recovery plan under active development will have no material effect on the Facility's operations?</p>			
<p>5) If E.2 and E.3 are not applicable, has the Applicant demonstrated that the Facility and Facility operations do not negatively affect listed species?</p>		<p>YES = Pass, go to F</p>	<p>NO = Fail</p>
<p>F. Cultural Resource Protection</p>		<p>PASS</p>	<p>FAIL</p>
<p>1) If FERC-regulated, is the Facility in Compliance with all requirements regarding Cultural Resource protection, mitigation or enhancement included in the FERC license or exemption?</p>		<p>YES = Pass, go to G N/A = Go to F2</p>	<p>NO = Fail</p>
<p>2) If not FERC-regulated, does the Facility owner/operator have in place (and is in Compliance with) a plan for the protection, mitigation or enhancement of impacts to Cultural Resources approved by the relevant state or federal agency or Native American Tribe, or a letter from a senior officer of the relevant agency or Tribe that no plan is needed because Cultural Resources are not negatively affected by the Facility?</p>		<p>YES = Pass, go to G</p>	<p>NO = Fail</p>
<p>G. Recreation</p>		<p>PASS</p>	<p>FAIL</p>
<p>1) If FERC-regulated, is the Facility in Compliance with the recreational access, accommodation (including recreational flow releases) and facilities conditions in its FERC license or exemption?</p>		<p>YES = Go to G3 N/A = Go to G2 There were no recreational access and facilities conditions in the FERC exemption. The hydroelectric facility is located in the Wachusett Reservoir water supply intake zone and access in the immediate area is</p>	<p>NO = Fail</p>

<p>restricted. There is Wachusett Reservoir Public Access plan that provides for passive recreation elsewhere in the watershed. The plan allows for public enjoyment and shore-line fishing and passive recreation, including hiking, walking, nature study, bird watching and snow shoeing.</p>	<p>YES = Go to G3</p>	<p>NO = Fail</p>
<p>2) If not FERC-regulated, does the Facility provide recreational access, accommodation (including recreational flow releases) and facilities, as recommended by Resource Agencies or other agencies responsible for recreation?</p>	<p>YES = Pass, go to H Public access is not allowed in the delineated Intake Protection Zone, but is allowed elsewhere on the Reservoir without fees or charges.</p>	<p>NO = Fail</p>
<p>3) Does the Facility allow access to the reservoir and downstream reaches without fees or charges?</p>	<p>PASS</p>	<p>FAIL</p>
<p>H. Facilities Recommended for Removal</p>		
<p>1) Is there a Resource Agency Recommendation for removal of the dam associated with the Facility?</p>	<p>NO = Pass, Facility is Low Impact</p> <p>NA (facility is conduit facility and there is no dam associated with it).</p>	<p>YES = Fail</p>

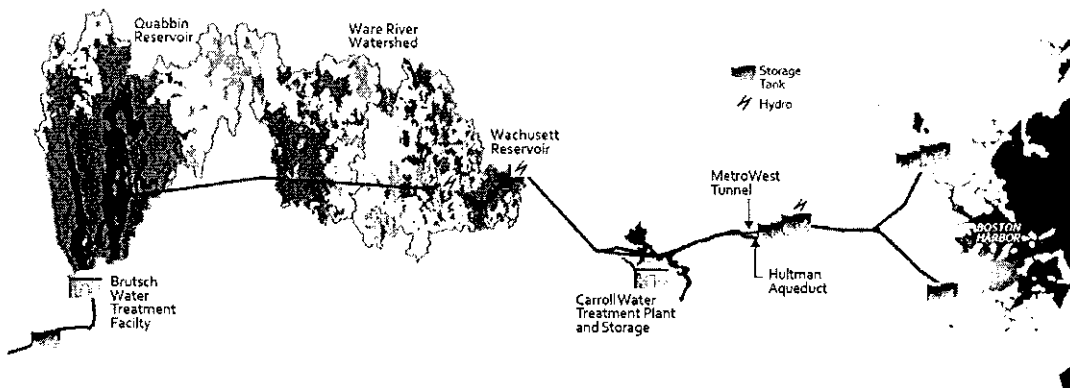
COSGROVE INTAKE AND POWER PLANT DESCRIPTION

The Cosgrove Intake and hydroelectric facility regulated the flow of water from the Wachusett reservoir into the Cosgrove Aqueduct, which is an important transmission leg in the supply of water to the Boston Metropolitan Area. To understand the nature of this hydroelectric facility and its operation, some background on the MWRA water system and operating procedures is helpful. The paragraphs below provide this background, as well as detail regarding the Cosgrove hydroelectric facility.

Background

The MWRA supplies wholesale water to local water departments in 50 communities, primarily in the Boston metropolitan area. On average, MWRA supplies approximately 200 million gallons per day to its water system customers. MWRA's water comes from the Quabbin Reservoir, about 65 miles west of Boston, and the Wachusett Reservoir, about 35 miles west of Boston. Both Quabbin and Wachusett Reservoirs are man-made reservoirs, constructed for water supply purposes. More than 50% of the inflow into the Wachusett Reservoir is transferred from Quabbin Reservoir via the Quabbin Aqueduct; Quabbin Reservoir water is required to meet MWRA's metropolitan demand. The two reservoirs combined supplied an average of 200 mgd to MWRA consumers over the last five years. A transmission system consisting of over 100 miles of active tunnels and aqueducts that transports water largely by gravity to points of distribution within the MWRA service area.

A schematic of the MWRA water system is presented below and the following page provides an orthophoto and more detail on the Cosgrove Intake and Aqueduct.



Cosgrove Hydroelectric Facility Operation

The Cosgrove hydroelectric facility is located at the Cosgrove Intake. There are two sections, the North and South Intakes, and both intakes include a hydraulic turbine and two bypass lines. Each intake has three channels with traveling water screens. Each intake also has an upper intake sluice gate and lower intake sluice gate that allows operational flexibility to draw water from different levels of the reservoir. On the North intake, after the sluice gates, the water enters a common wet-well and from the wet-well,

allowed. Boating activities are prohibited as it is considered an unnecessary threat to water supply due to the likelihood of water contact and the fact that private boats would have the potential to introduce or perpetuate exotic and/or nuisance vegetation.

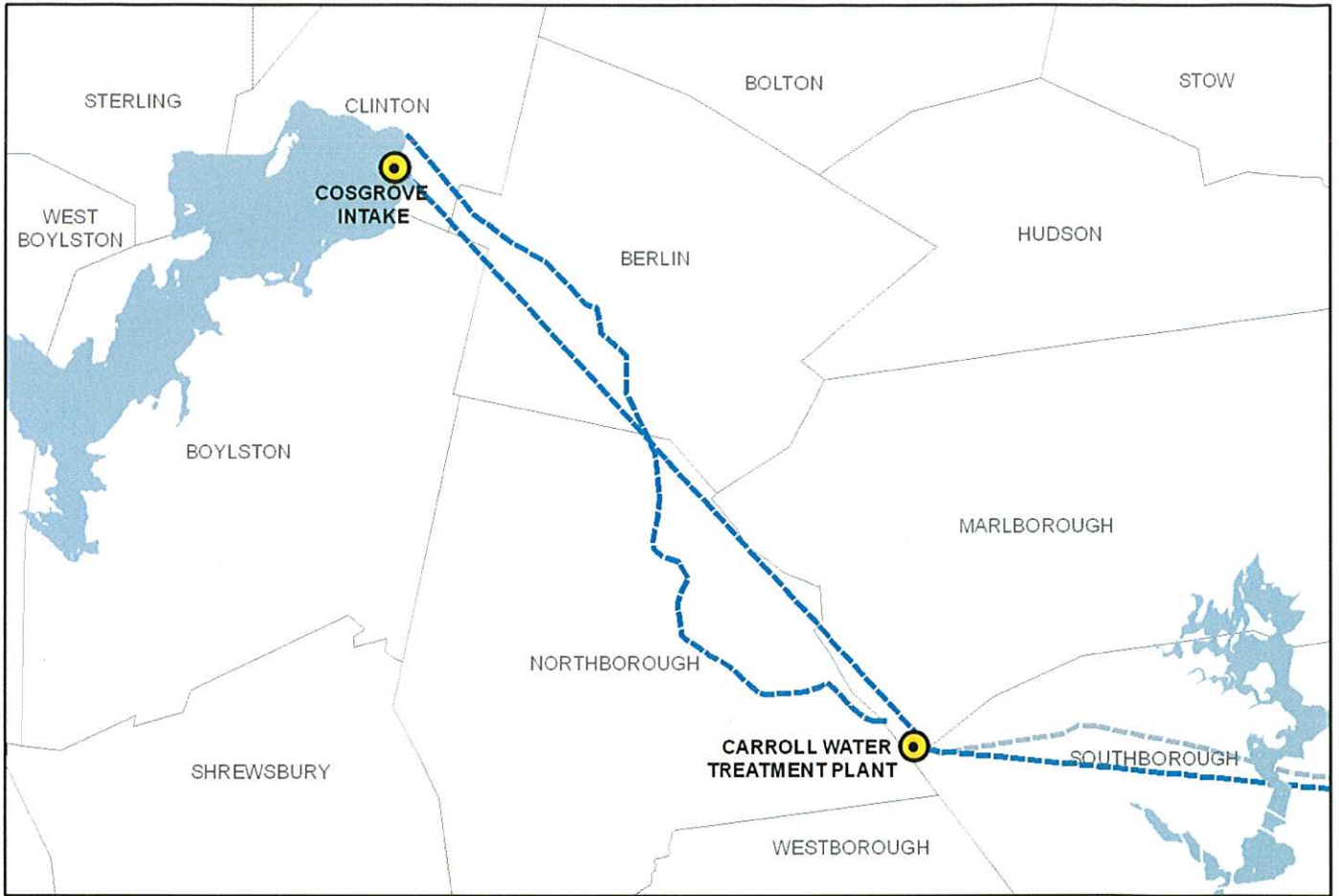
An abundance of fish and wildlife species are found in the Wachusett Reservoir. The Wachusett Reservoir is a large state-designated Natural Heritage and Endangered Species Program Priority Habitat area.

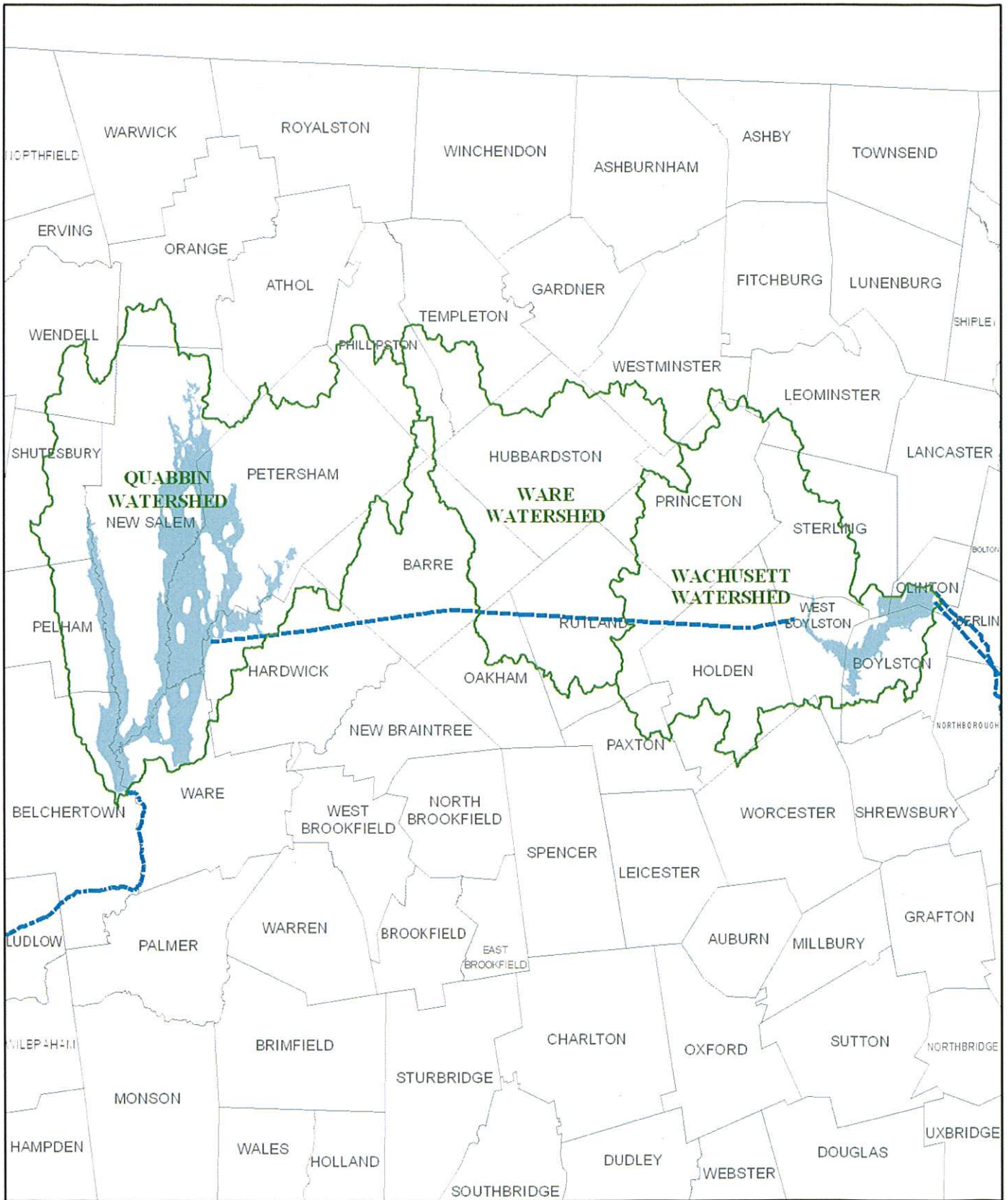
The Cosgrove Aqueduct was constructed in 1965 and is not a historic structure. Nearby or related structures, including a number of aqueducts, dams, dikes, shafts, pumping station and reservoir system components comprise the Metropolitan Water Supply Stem, a National Register Thematic Resource Area. The MWRA and the Massachusetts Historical Commission have entered into a Programmatic Memorandum of Understanding that ensures projects undertaken by MWRA do not have an adverse effects on properties listed on the register.

Federal Energy Regulatory Commission (FERC) Process

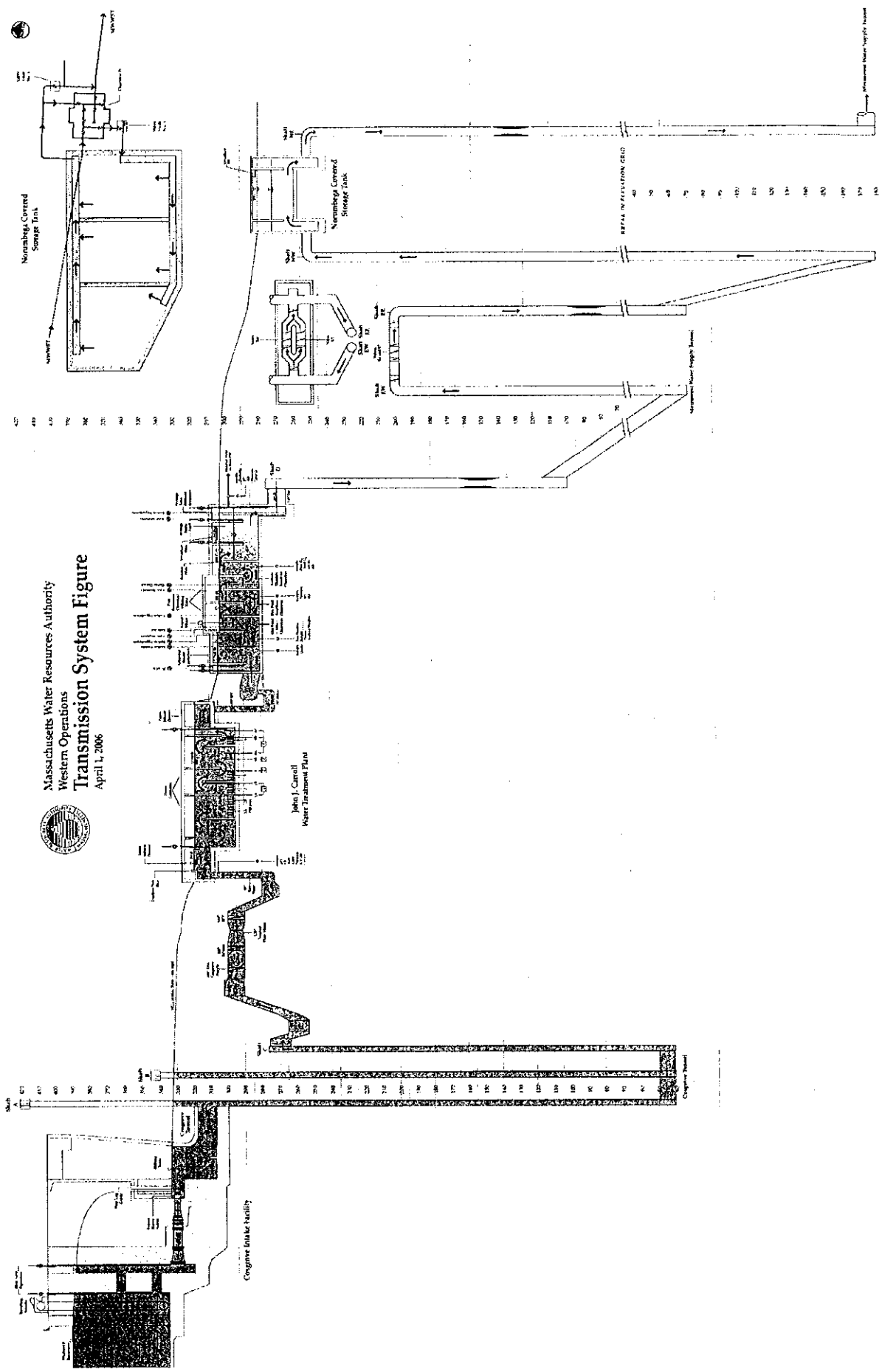
On January 19, 1990 FERC granted the Cosgrove Hydroelectric Facility an Exemption from Licensing (Conduit), Project 10688-000. From what can be discerned from review of FERC's electronic base, few comments on the project were received during the FERC process. Resource agencies that commented included the Army Corps of Engineers and U.S. Fish and Wildlife. The Army Corps of Engineers stated it had no objection to the issuance of a conduit exemption.

USFWS comments and proposed terms and conditions primarily addressed discharges to rivers below Winsor Dam on the Quabbin Reservoir (the Swift River) and Wachusett Dam (to the South Branch of the Nashua River). MWRA discharges to these rivers are a function of MWRA's reservoir operating policies, and the Cosgrove hydroelectric facility has no bearing on discharges to the Swift and Nashua Rivers. FERC found that the terms and conditions suggested by USFWS "... are not related and germane to the project and its operation" and did not attach the USFWS terms and conditions to the Exemption Order.





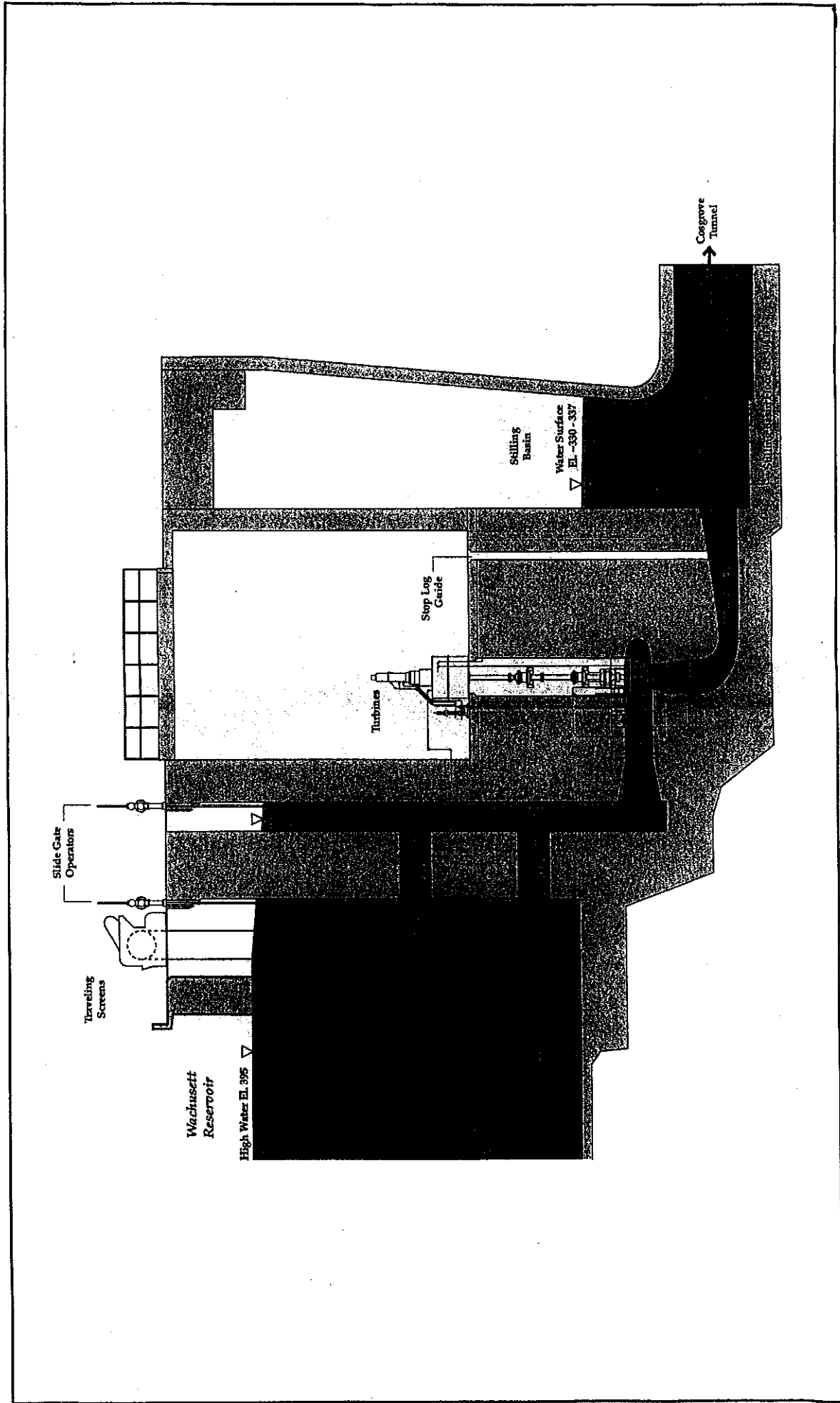
- Watershed Boundaries
- MWRA Aqueducts and Tunnels



Massachusetts Water Resources Authority
 Western Operations
Transmission System Figure
 April 1, 2006



Figure 1-1



Massachusetts Water Resource Authority

Figure 1-6
Cosgrove Intake Facility - Section at Turbines

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UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Massachusetts Water Resources
Authority

Project No. 10688-000
Massachusetts

ORDER GRANTING EXEMPTION FROM LICENSING
(CONDUIT)
JANUARY 19, 1990

On November 4, 1988, the Massachusetts Water Resources Authority filed an application to exempt the Cosgrove Intake and Power Plant Project from the licensing requirements set forth in Part I of the Federal Power Act. The proposed small hydropower project is described in the attached public notice. 1/ The comments of interested agencies and individuals, including the U.S. Fish and Wildlife Service and the state fish and wildlife agency, have been fully considered in determining whether to issue this exemption from licensing.

Article 2 of this exemption requires compliance with the terms and conditions prepared by federal or state fish and wildlife agencies to protect fish and wildlife resources. These mandatory terms and conditions are contained in any attached letters commenting on the exemption application. 2/ If contested, the Commission will determine whether any mandatory term or condition is outside the scope of article 2.

After considering the mandatory terms and conditions designed to protect fish and wildlife resources, the environmental information in the exemption application, the staff's independent assessment, and other public comments, the Director finds that issuance of this order is not a major federal action significantly affecting the quality of the human environment.

- 1/ No protests or motions to intervene were filed.
- 2/ No relevant letters are attached to this order from resource agencies, even though the U.S. Department of the Interior filed on September 5, 1989, terms and conditions that staff has determined are not related or germane to the project or its operation.

-2-

The Director orders:

(A) The Cosgrove Intake and Power Plant Project is exempted from the licensing requirements of Part I of the Federal Power Act, subject to the attached standard articles.

(B) Article 2 of this exemption is amended to include the National Marine Fisheries Service as a fish and wildlife agency that can provide terms and conditions.

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

(D) This order is issued under authority delegated to the Director and is final unless appealed to the Commission within 30 days from the date of this order.

Dean L. Shumway
Director, Division
of Project Review

- a. Type of Application: Conduit Exemption
- b. Project No.: 10688-000
- c. Date Filed: November 4, 1988
- d. Applicant: Massachusetts Water Resources Authority,
Waterworks Division
- e. Name of Project: Cosgrove Intake and Power Plant Project
- f. Location: On the Cosgrove Aqueduct at the Wachusett
Reservoir in Worcester County, Massachusetts
- g. Filed Pursuant to: Federal Power Act, 16 U.S.C. te791(a) -
825(r)
- h. Applicant Contact: Mr. William A. Brutsch
Massachusetts Water Resources Authority
Waterworks Division
100 First Avenue, Charlestown Navy Yard
Boston, MA 02129
(617) 242-6000
- i. FERC Contact: Steven H. Rossi, (202) 376-9814
- j. Comment Date:
- k. Description of Project: The existing operating project
consists of: (1) two turbine-generator units each rated at
1,700 kw for a total installed capacity of 3,400 kw; and (2)
appurtenant facilities. The project generates an average of
23,500 Mwh annually. The project is owned by the
Metropolitan District Commission. The project is operated
and maintained by the applicant.
- l. Purpose of Project: Project power would continue to be sold
to the New England Power Company and Boston Edison Company.
- m. This notice also consists of the following standard
paragraphs: A3, A9, B, C, D3b.

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