NOTICE

**CERTAIN DATA
CONTAINED IN THIS
DOCUMENT MAY BE
DIFFICULT TO READ
IN MICROFICHE
PRODUCTS.**

12
1-29-92 JS①

DOE/ID/12130-1

Small-Scale Hydroelectric Power Demonstration Project

**Pennsylvania Hydroelectric
Development Corporation
Flat Rock Dam**

Project Summary Report

DISSEMINATION OF THIS DOCUMENT IS UNLIMITED

This report has been reproduced directly from the
best available copy.

Available to DOE and DOE contractors from the
Office of Scientific and Technical Information
P.O. Box 62
Oak Ridge, TN 37831
Prices available from
(615) 576-8401, FTS 626-8401

Available to the public from the
National Technical Information Service
U.S. Department of Commerce
5285 Port Royal Rd.
Springfield, VA 22161

Price: Printed Copy A09
Microfiche A01

DISCLAIMER

This book was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product or process disclosed, or represents that its use would not infringe privately owned rights. References herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

Distribution DOE/ID/12130--1
DE92 006581

**SMALL-SCALE HYDROELECTRIC POWER
DEMONSTRATION PROJECT**

**PENNSYLVANIA HYDROELECTRIC DEVELOPMENT CORPORATION
FLAT ROCK DAM**

December 1991

Larry Gleeson^a

Prepared for the
U.S. Department of Energy
DOE Field Office, Idaho
Under Contract No. DE-FC07-80ID12130

a. PA Hydroelectric Development Corporation

MASTER

ABSTRACT

The U.S. Department of Energy Field Office, Idaho, Small-Scale Hydroelectric Power Program was initiated in conjunction with the restoration of three power generating plants in Idaho Falls, Idaho, following damage caused by the Teton Dam failure on June 5, 1976. There were many parties interested in this project, including the state and environmental groups, with different concerns. This report was prepared by the developer and describes the design alternatives the applicant provided in an attempt to secure the Federal Energy Regulatory Commission license. Also included are correspondence between the related parties concerning the project, major design alternatives/project plan diagrams, the license, and energy and project economics.

EXECUTIVE SUMMARY

The DOE-ID Small Scale-Hydropower Demonstration Program was initiated in conjunction with the restoration of three power generating plants in Idaho Falls, Idaho, following damage caused by the Teton Dam failure on June 5, 1976.

The DOE issued two Program Opportunity Notices, and 20 cooperative agreements were awarded, one of which was to Flat Rock. The DOE participated in a cost sharing program for each project. The objectives of the demonstration program were to use institutional aspects associated with small-scale hydropower development and disseminate data on the development, construction, and operation/maintenance of these facilities.

The process to construct, operate, and license the hydroelectric facility faced much opposition and was susceptible to change, adding confusion and cost to the project. The license application for this project was submitted December 23, 1981, and was approved in August 1988. Subsequently, the developer canceled the project because of economic reasons. The process of developing a hydroelectric facility is complex, and the associated development costs and time should be considered a part of obtaining a license.

CONTENTS

ABSTRACT	iii
EXECUTIVE SUMMARY	iv
1. INTRODUCTION	1
2. HISTORY	2
3. PROJECT DESCRIPTION	4
4. DESIGN ALTERNATIVES DISCUSSION	8
4.1 West Side of River, Below Gatehouse--1977, 1000 kW	8
4.2 West Side of River, Above Gatehouse, Single Unit--1981, 3250 kW	9
4.3 West Side of River, As 1.2, Multiple Units--1982, 3250 kW($\pm$)	10
4.4 West Side, As 1.3, With Low-Flow Unit--1982, 3250 kW	10
4.5 East Side, Downsized Capacity--1984, 1500 kW	11
4.6 East Side, Final Design Capacity--1985 and License, 3500 kW . .	11
5. FINDINGS AND CONCLUSIONS	13
5.1 Major Challenges--The Need for the FERC Licensing Process . . .	13
5.2 Disadvantages of the FERC Process	13
5.3 Benefits of The FERC Licensing Process--PA DER Challenges . . .	15
5.4 Problems with the FERC Process--Political Pressure	16
5.5 Summary of Findings--Several Factors Affecting Feasibility . .	17
APPENDIX A--CORRESPONDENCE	A-1
APPENDIX B--CORRESPONDENCE TO OR FROM FERC	B-1
APPENDIX C--MAJOR FLAT ROCK DESIGN ALTERNATIVES/PROJECT PLAN DIAGRAMS . .	C-1
APPENDIX D--LICENSE	D-1
APPENDIX E--ENERGY AND PROJECT ECONOMICS	E-1

FIGURE

1. General views looking across and upstream the dam 3

TABLES

1. Key Flat Rock Dam project data 4
2. Selected project events by year 6

SMALL-SCALE HYDROELECTRIC POWER DEMONSTRATION PROJECT

PENNSYLVANIA HYDROELECTRIC DEVELOPMENT CORPORATION FLAT ROCK DAM

1. INTRODUCTION

This report was written as a requirement of Cooperative Agreement No. DE-FC07-80ID12130 between the Pennsylvania Hydroelectric Development Corporation (PA Hydro) and the United States Department of Energy (DOE) and summarizes the activities that were undertaken by PA Hydro to develop a new hydroelectric generation plant and to demonstrate the economic feasibility of such a plant.

Appendices A through E contain information important to the development of this project. Appendix A contains correspondence relating to this project between the interested parties; Appendix B contains correspondence to or from the Federal Energy Regulatory Commission (FERC) relating to this project. Appendix C contains major Flat Rock design alternatives/project plan diagrams. Appendix D contains the FERC license, and Appendix E contains energy and project economics.

2. HISTORY

The proposed Flat Rock Hydroelectric Project was to be located at the existing Flat Rock Dam (see Figure 1) which is the second dam from the mouth of the Schuylkill River, just upstream from Philadelphia, PA. The project would have represented a continuation of the historic usage of Flat Rock Falls as a source of water-derived energy (usage dates back as early as the 1820s and as recently as the 1950s).

The first major Schuylkill River dam (the Fairmount Dam) was constructed by the City of Philadelphia around 1820. The Fairmount Dam was the cornerstone of Philadelphia's internationally renowned public water supply and distribution system; it served as a source of drinking water and provided the energy needed to pump the water to the elevation of the system's reservoirs. The Fairmount Dam, the works, and the impoundment were also the first segment of the Schuylkill Canal and permitted slackwater navigation around Flat Rock Falls. The Flat Rock Dam, constructed in the 1820s, provided the hydraulic head and flow for the Manayunk Canal, and its impoundment permitted slackwater river navigation upstream to Conshohocken.

Shortly after the Flat Rock Dam and the Manayunk Canal were completed, water-powered mills were constructed on the island separating the canal from the river. By the 1860s development was such that the mills of Manayunk were said to have clothed the Union Army during the Civil War. The capacity of the canal approach and headworks was increased significantly on several occasions, and eventually in excess of 65 intakes drew from the canal. Water was used both for supplying power and for processing.

The present Flat Rock Dam was constructed by the Pennsylvania Department of Environmental Resources (PA DER) and was completed in 1977. The older timber crib dam lies underwater just upstream from the new concrete gravity model.

Figure 1. General views looking across and upstream the dam.

3. PROJECT DESCRIPTION

The project as licensed, FERC Project No. 2803-001 (issued August 16, 1988), was to be located on the Schuylkill River at the existing Flat Rock Dam on the border between the City of Philadelphia and the lower Merion Township, Pennsylvania. The Schuylkill River Drainage at Flat Rock is approximately 1800 square miles, yielding an average annual flow of ~2700 cfs.

The existing Flat Rock Dam is a 525-ft-long concrete gravity dam of recent construction that replaced (in 1977) the timber crib structure of the same name that now lies in submerged retirement just upstream. Key Flat Rock Dam project data are shown in Table 1.

Table 1. Key Flat Rock Dam project data

Location	Schuylkill River, ~16 miles upstream of Delaware River; second dam upstream from river mouth
Drainage area	Approximately 188 square miles
Mean stream flow	Approximately 2700 cfs
Gross head	Approximately 18.2 ft with flashboards (license)
Turbine type	Single unit, propeller, double-regulated (Kaplan) 3.5 M
Design flow range	450 to 3000 cfs
Generator	Synchronous
Licensed capacity	3250 kW
Estimated average annual generation	11,757,000 kWh/FERC (8,500,000 kWh/PA Hydro)
Estimated cost of power	\$67.1 M/kWh/FERC (\$92.8 M/kWh/PA Hydro ... using FERC costs)
Estimated project cost	\$5,061,000--exclusive of fishway (CHI-financing assumptions)
DOE funding	Original Program Opportunity Notice \$835,000; original license loan \$50,000

The initial study of the potential for redeveloping Flat Rock's hydroelectric potential by the future principles of PA Hydro began in 1976. Twelve years later, a license to construct, operate, and maintain the proposed hydroelectric project was issued. (Selected project events by year are shown in Table 2.) Numerous design modifications had been examined during this period. As licensed, the proposed powerhouse, fishway, intake, tailrace, and associated project works were to be located at the right end of the dam in the lower Merion Township. The proposed submerged transmission lines would cross the river just upstream from the dam to the Philadelphia side of the river and on to the point of interconnection with the Philadelphia Electric Company. The approach and headworks for the existing Manayunk Canal are located on the left (Philadelphia) side of the dam.

Generating equipment was to consist of a single, double-regulated turbine of 3.2 MW capacity. This equipment (with consideration of FERC mandated nonpower usage flow requirements and according to license findings) should have had an expected average annual generation of 11,757,000 kWh. The production cost of the project power was estimated by the FERC to be \$67.1 M/kWh and a market value of \$84.1 M/kWh.

Unfortunately, neither Philadelphia Electric nor alternative markets could afford even \$67.1 M/kWh (net of expected wheeling charges/additional transmission expense, in the case of the alternative markets). The license surrender documents were filed in 1989.

4. DESIGN ALTERNATIVES DISCUSSION

Design alternatives, major categories by Powerhouse location/year, were as follows:

- West side of river, below gatehouse--1977 1000 kW
- West side of river, above gatehouse,
single unit--1981 3250 kW
- West side of river, as 1.2, multiple units--1982 3250 kW(±)
- West side, as 1.3, with low flow unit--1982 3250 kW
- East side, downsized capacity--1984 1500 kW
- East side, final design capacity--1985 and license 3500 kW.

4.1 WEST SIDE OF RIVER, BELOW GATEHOUSE--1977, 1000 kW

The original design outlined in the June 1977 preliminary permit application consisted of two units, with an intake located immediately downstream of the existing canal gatehouse discharge. This tentative arrangement, resulting from discussions between Allis-Chalmers Corp. and HED Corp.^a, would have utilized the head developed between the gate discharge and the Schuylkill River ~100 ft downstream of the headworks located on the east bank of the river. While the powerhouse would have been largely underground, it would have been located in close proximity to the Manayunk Canal headworks and a soon-to-be-developed recreational area. It would have involved considerable reconstruction of the existing structures that might have affected flood routing (a concern of a nearby container corporation) and also would have been inefficient under the increased flows required under the proposed second phase of development.

a. Letter from H. Mayo, Allis-Chalmers Corp., to L. Gleeson, HED Corp., 13 June 1977.

Table 2. Selected project events by year

Responsible Group or Function	1977	1978
Federal Energy Regulatory Commission - "FERC."	July 11--PRELIMINARY PERMIT filed for four dams on Schuylkill; one on Lehigh River.	July 3--Preliminary permit complete as of this date.
Interested parties, licensing proceedings, agencies, "Congressmen's Group": a. Congressman Coughlin b. Connelly Container Corp. c. Montgomery County d. Other.	Isaac Walton League Intervenor Status filed for/rcv'd. HED Corp., PaHydro Predecessor... • Site and Concept Analysis • Organizational Analysis • Preliminary Permit • ERDA Submission of "Unsolicited Proposal"	PA Hydro Incorporated.
PA Hydro, Applicant.	• Delco Products Division of G.M. Corp • Allis-Chalmers, Hydro-Turbine Div. • PA DER Support • City of Philadelphia • PA governs Energy C'l. • Sun Corp. Radnor, PA. (Leave of Absence Status to L. Glesson)	• Feasibility Study Proposal Submitted to DOE: ET-78-D-07-1706 • Delco Products Division, of G.M. Corp. • Allis-Chalmers Hydro-Turbine Div. • PA DER support • City of Philadelphia (Co-Proposer w. PA Hydro). • PA Gv'nrs Enrgy C'l • D&R Corp (David Lillienthal) • Roy F Weston • Touch-Ross
Private investors	--	--
Design alternative	--	--

	1979	1980	1981	
State as	January 25--Preliminary permit granted for 3 years.	--	December 23--Application for minor license is filed with the FERC.	February accepted
				January Permit
				June 4 to:
				• CI
				• E1.
				• PA
	--	--	--	October petition filing was Ma
07-1706 G.M.	Participant in Philadelphia Urban Coalition Minority Business Opportunity Study:	August 22--PA Hydro Filed Application for DOE Licensing Loan DE-FM07-31205-3001.	February 27--Effective date of DOE licensing loan DE-FM07-81105-3001.	On or answer 1982 C
re Div.	• February 16, 1979, Proposal/NF	August 26--DOE awards PA Hydro cost share per DE-FC07-801D12130.		
oposer	• July 9, 1979, Proposal/Fund			
1)	Gilbert Commonwealth Synergics Phila Urban coll'tn Department of Commerce funding July 9, 1979, Proposal.			
	--	--	--	All Div the "ha The
	--	--	--	--

	1982	1983	1984	
minor RC.	<p>February 23--License application accepted for filing as of 22.</p> <p>January 1--Expiration date Preliminary Permit No. 2803.</p> <p>June 4--FERC grants intervenor status to:</p> <ul style="list-style-type: none"> City of Philadelphia--Philadelphia Electric Company (PECO) PA DER (filed April 22, 1982). <p>October 20, 1982--Connelly files petition to intervene. (The final filing date, per March 4, 1982 Notice, was May 12, 1982.)</p>	<p>September--Flat Rock license application was scheduled on committee of 28 September--agenda for action, but pulled.</p> <p>January 27--Late-filed petition to intervene if Connelly Corp. is granted.</p> <p>March 18--Ditto to Philadelphia Water Dept.</p> <p>February 3--Connelly Letter FERC Grodinsky responds to PA Hydro's response (filed November 1982) to Connelly's petition to intervene (October 1982).</p>	<p>February 2--FERC letter DOE K. Plumb responds to W. Drake's December 30, 1983 letter requesting FERC action on Flat Rock's license application.... FERC cites further review of historic preservation issues as the delay cause.</p> <p>May 18--Connelly to FERC.</p> <p>February 21--Montgomery County (Bartle/Loeben) letter to Governor Thormburg--requests Government's support in subjecting the Flat Rock Project to a comprehensive state review.</p>	<p>Febr PA H lice gene most the plac</p> <p>Mar (Gro Hydr</p> <p>Nov C. B (Rev the thei Octo</p>
of DOE --3001.	<p>On or about November 1--PA Hydro files answer and response to the October 20, 1982 Connelly petition to intervene.</p>	<p>December 30--DOE letter FERC DOE requests that FERC act as soon as possible on PA Hydro's license application.</p> <p>September--PA Hydro was informed of aspects of delays.</p> <p>September 1983-April 1984--Numerous meetings/ conversations were initiated by PA Hydro to move and project by identifying and resolving concerns in an informal manner where at all possible, even if a quick resolution involved further compromising expected annual generation.</p>	<p>April 16--PA Hydro, with PA DER, holds Harrisburg meeting to identify and quantify specifics within the Interested Parties list of concerns.</p> <p>May 3 and 14--PA Hydro letter PA DER, Coughlin, and FERC 650 cfs.</p> <p>July 25--PA Hydro, USF&W, PA Fish Commission (w/PA DER observer) hold work session suitable for fishery and power usage and no 650 cfs requirement.</p>	<p>June amen at d</p> <p>Nov requ appl Hydr FERC</p> <p>Octo PA H E" f requ June</p>
	<p>Allis-Chalmers Corp., Hydro-Turbine Division and PA Hydro jointly pursued the Flat Rock Project under a basic "hand shake" arrangement for 2 years. The time delay effected this</p>	<p>1. Continued Allis-Chalmers participation</p> <p>2. Continued DOE participation</p>	<p>--</p> <p>August 21 --Draft of design, per July 25 meeting, distributed for comment.</p>	<p>Cons Stoc Prim</p> <p>--</p>

	1985	1986	1987	
Plumb 30. ion on storic y	February 6--FERC informs PA Hydro that PA Hydro must formally amend its license application to include agency generated mods. intended to relieve most concerns cited as the cause for the "political hold" in the first place.	--	April 29--USF&W letter to FERC. confirmed (in writing) PA Hydro's statements that the fishery agencies were satisfied with the PA Hydro-proposed 250 cfs spillway flow (rather than the 650 cfs spillway flow) and correctly noted the extent of flow losses under which the power project would have to operate, even assuming a 250 cfs spillway flow requirement.	August 1 license Septembe Emergenc Feb. 16. October rehearin 1988 req
ior s Rock E	March 5--Connelly letter to FERC: (Grodinsky) FERC should deny PA Hydro's license, etc. November 20--Connelly letter ESI C. Boy comments on Exhibition E (Revised). Connelly wants 400 cfs from the canal (a drop from the 600 cfs per their intervention petition filing of October 1982).	February 3--PA Hydro letter response to Connelly's November 20, 1985. comments re: Exhibit E; what rights to 400 cfs?	October 7--DOE letter to Congressman Coughlin (from Under-Secretary Salgado).	Septembe to consi conditio to prote
holds and erns. A DER. sh hold ry and	June 6--PA Hydro files license amendment, design includes powerhouse at dam, right river bank. November 26--PA Hydro files extension request and waiver from retroactive application of new procedures to PA Hydro's June 6 amendment filing with FERC. October 28--ESI (as agent for PA Hydro) submitted a draft "Exhibit E" for review and comment. This requirement...applies to PA Hydro's June 1985 license amendment filing.	January 3--ESI (as agent for PA Hydro) filed a revised Exhibit E.	August 27--PA Hydro files special report on "Energy and Project Economics." FERC verbal request (Mr. S. Rossi).	October 1 suppleme economic for prot. November for admei Article '
	Consolidated Hydro, Inc., enters into Stock Option Agreement with PA Hydro Principals, 6 mo/6 mo.	--	--	--
July nent.	--	--	--	--

	1988	1989	1990
FERC. Hydro's ary agencies PA Hydro- flow (rather y flow) and it of flow ower project en assuming a quirement.	<p>August 16--FERC order issuing minor license for the Flat Rock Project.</p> <p>September 20--FERC notifies PA Hydro Emergency Action Plan (EAP) due Feb. 16, 89.</p> <p>October 6--FERC Order granting rehearing per PA Hydro September 14, 1988 request.</p>	<p>January 11--FERC order granting time extension per PA Hydro Nov. 10, 1988 Request.</p> <p>February 23--FERC notifies PA Hydro it's in violation of part 12. sub</p> <p>...no EAP received.</p> <p>May 9--FERC sends PA Hydro Compliance Order to get EAP by Jun 8, 1989.</p> <p>June 19--FERC notice requesting EAP revisions, due August 16, 1989.</p> <p>--</p>	<p>March 18--Order issued accepting surrender (filed of Flat Rock Minor License)</p> <p>April 24--FERC notice diss PA Hydro request for rehearing (filed September 14, 1988)....</p> <p>(For 1989 see Footnote b)</p> <p>--</p>
Congressman retary	<p>September 14--PA Hydro petitions FERC to consider and rehear license conditions requiring the flow release to protect "visual resources."</p>		
s special bject request (Mr.	<p>October 17--PA Hydro files supplemental information on the economic impact of the flow releases for protection of "visual resources."</p> <p>November 10--PA Hydro files request for adjournment or time extension Ref: Article 413, Start Construction.</p>	<p>February 9--PA Hydro/FERC Washington, D.C.: Articles 402, 405, and 406.</p> <p>February 14--PA Hydro Files motion to extend compliance dates for Articles 405 and 406.</p> <p>February 14--PA Hydro files D. oxygen study plan per Article 402.</p> <p>May 18--PA Hydro files revised DO study plan</p> <p>PA Hydro and Williams/Broom investigate energy markets looking for more money.</p> <p>July 31--PA Hydro files for license surrender.</p> <p>In a final effort to make the project feasible, alternative energy markets were investigated with participation of Williams and Broom, Engineers.</p>	

4.2 WEST SIDE OF RIVER, ABOVE GATEHOUSE, SINGLE UNIT--1981, 3250 kW

The design, as proposed in the December 1981 FERC license application, consisted of a single unit powerhouse with its intake in the existing riverside wall of the Manayunk Canal approach channel. The powerhouse would have been constructed downstream at an angle to the riverside wall, with its dredged tailrace protected by a curved training wall and its ending tangent almost parallel to the river's course. The length of the powerhouse and the extent of excavation would have been significant. The design would have utilized the head between the river as in the original design and the more efficient intake location above the gatehouse. The location, but not the equipment configuration, would have been the most efficient design from a technical perspective, particularly under the flows associated with capacities more than double that of the original design. The less desirable elements of the proposed location included its ability to be seen from the top of the hill on the Montgomery County (east) side of the Schuylkill River and the return to the dam's historic function of temporarily diverting river flows into the Manayunk Canal and around the river segment downstream of the dam, to return to the river at the location(s) of the various users of canal-supplied water.

The planned diversion would have been far less severe than its precedent and would have been restricted to an ~1000-ft river segment between the dam and powerhouse discharge (under further conditions that guaranteed a minimum watering of this bypassed river segment). There were concerns about the effects of the proposed diversion on the planned fish passage facilities at the right side of the dam and on the whitewater canoe course on the left river segment below the dam. The single unit powerhouse was also projected to be more expensive to develop and less likely to achieve production objectives than multiple unit alternatives. The two design alternatives that were subsequently considered were intended to resolve the most troublesome features of the proposed project without incurring license application problems because of their magnitude. The plan was to first obtain the license and then (following consultations with the affected parties, that is, the fisheries agencies and the canoe club) request FERC approval for modifications to the licensed development plan.

4.3 WEST SIDE OF RIVER, AS 1.2, MULTIPLE UNITS--1982, 3250 kW(+)

Design alternatives considered subsequent to the FERC license submittal almost exclusively assumed a multiple unit design. The design proposed in the license application was not changed because these alternatives were not considered major; the proposed installed capacity and significant environmental impact factors were largely unchanged. From the perspective of power project development, a multiple unit development on the west side of the river, utilizing the maximum available head, was the first alternative. At least six Allis-Chalmers Corp. and one Ingersoll-Rand Corp. equipment design alternatives were laid out in detail and evaluated in 1982 and 1983. In anticipation of project licensure by the FERC, an enormous commitment in time, money, and effort was expended by PA Hydro, Allis-Chalmers Corp., and the DOE to ensure an ambitious development schedule could be implemented upon receipt of the FERC license. Late into the process, a competitive developer, expressing concern about aesthetic and environmental attributes of this location and intervened in the FERC licensing process.

4.4 WEST SIDE, AS 1.3, WITH LOW-FLOW UNIT--1982, 3250 kW

This design includes a separate low-flow release unit at the foot of the west side of the Flat Rock Dam's spillway. The intention was to increase the flow release in the bypassed river segment, under the minimum flow release program, to a flow rate that would benefit the whitewater canoe enthusiasts. The water released would pass through a generating unit into the river. This would reduce scouring at the outlet and enable a portion of the power potential of the released water to be recovered at the same time. The capacity of the main powerhouse, to be located further downstream on the wall of the canal approach, would be reduced in an amount equivalent to the flow to be released through the low-flow unit(s) at the dam. The low-flow release facility could be increased in capacity at low cost and would have only minor impact on the project's estimated annual generation. A major public concern was aesthetics. The project works were of concern to local residents, although the project works had been designed in consultation with historic resource protection agencies and a paper mill scrapyard, two railroads, and the Schuylkill Expressway were also in the same vicinity. Fishery agencies

personnel expressed concern regarding the upstream migrants; however, these agencies would be able to request the installation of a second fishway should a serious postoperational problem have been found to exist under this design alternative.

In response to questions regarding their specific aesthetic flow requirements, interested parties maintained that 650 cfs was the required visible spillway flow. In addition, several other alternative low-flow release suggestions for the river segment below the spillway had been discussed by fishery agencies. Subsequently, an area-specific study led to a tentative agency acceptance of a 250 cfs low flow. In order to avoid delays, PA Hydro came up with a design alternative that would hopefully meet the concerns of the fishery resource agencies. Therefore, FERC determined that the license must be resubmitted. At this point, Allis-Chalmers withdrew their support.

4.5 EAST SIDE, DOWNSIZED CAPACITY--1984, 1500 kW

With the direct participation of the fishery agencies (PA DER and PA Hydro), this plan was chosen as most responsive to the aesthetics and fish passageway concerns. The lower capacity would reduce the average flow diversion and would reduce costs, thereby increasing the leverage of equity remaining (i.e., the loss of Allis-Chalmers participation). The interested parties would not alter the constant 650 cfs that provides an aesthetic spillway flow requirement to the 250 cfs minimum habitat flow for this segment, as required in the fishery agency agreements. Therefore, this alternative could not satisfy this requirement.

4.6 EAST SIDE, FINAL DESIGN CAPACITY--1985 AND LICENSE, 3500 kW

This alternative was selected by a PA Hydro prospective majority shareholder. Because of rising energy prices, development was concentrated at a low capacity factor to maximize energy production. As a consequence, the project cost per installed kilowatt increased. The developer indicated a willingness to construct the collocated fishway at the expense of the project. The licensed project was the alternative, with the provisions that the 650 cfs

visual flow be provided and a special concession that the license include a condition that the 650 cfs flow be studied to ascertain whether a smaller flow might be satisfactory in the future.

Flat Rock Project Expenditures:

	<u>1988</u>	<u>1988</u>	<u>1990</u>
Legal	\$ 7,025	\$10,176	\$ 4,922
FERC Fee	114	2,317	
Consulting and G&A*	<u>18,788</u>	<u>21,461</u>	<u>14,444</u>
TOTAL	\$25,927	\$31,637	\$21,683

***Consultant Support:**

Environmental Research & Consulting, Inc.	Dissolved oxygen study
Williams & Broome emergency action plan (EAP)	Dissolved oxygen study,
Goose River Hydro	EAP, final report DOE, financial reports FERC

5. FINDINGS AND CONCLUSIONS

5.1 MAJOR CHALLENGES--THE NEED FOR THE FERC LICENSING PROCESS

- Because water is a public resource, a rational methodology (as intended by the FERC licensing process) is clearly necessary to define the often competitive uses for the water-related resources available at the site of a proposed hydroelectric project.
- The licensing process is needed in conjunction with the authority to arbitrate in a reasonably consistent manner the competitive uses of the site's resources.
- The process is needed for the licensee to effect acquisition of necessary usage rights to construct and operate the project as licensed; without the ability to secure these rights under reasonable terms, the license to use the public water resource is of little importance.
- The licensing process must include the necessary authority to impose conditions under which the project licensee must develop and operate the project to protect the environment and other watershed users. The process must also take into account the cost of compliance within the project's financial framework and the expected benefit.
- The process must define and protect (over the term of the license) the project's licensed usage of a watershed to protect against future attempts to reduce the project's expected share of available water in favor of competitive water uses.

5.2 DISADVANTAGES OF THE FERC PROCESS

At the outset of the Flat Rock Project effort, it was not anticipated that regulatory approval to put a small hydroelectric power facility at an existing dam would require years rather than months.

The lengthy FERC licensing related process impacted the project in the following ways:

- The original context was often lost, in which a multitude of individual project design elements were considered, proposed, reviewed, modified, and looped again through the project review cycle.
- The governing regulations, including data and coordination requirements, changed several times during the review.
- Key individuals changed in various agencies, including the FERC, and left leaving a cold trail for their successors.
- Deadlines for comment, intervention, and other involvement in the project review process were not enforced. In several instances, this clearly worked to the benefit of parties opposed to the proposed project as well as resulted in major financial losses to the applicant and its financial backers.

Changes in regulatory policy effected changes to project development assumptions that had major cost implications. Examples are the methods of energy valuation (i.e., avoided cost definition per FERC and PA Public Utilities Commission), the increasingly cost-blind regularity weight given the fisheries (and others), and resource protection agency's recommendations. Beginning in 1982, a policy swing toward hydroelectric project applicants was clearly apparent.

The applicant requested, at significant legal expense, a rehearing regarding the conditions of the license issued in 1988. These conditions made development of the project financially unfeasible. No action was taken on the hearing case. While awaiting a response to determine the project's viability, the licensee was still responsible for complying with the conditions of the disputed license, annual fees, and associated incurred fines. Therefore, the licensee has no choice but to surrender the license. In 1990, the request for a rehearing was dismissed.

5.3 BENEFITS OF THE FERC LICENSING PROCESS--PA DER CHALLENGES

One positive aspect of the post-1982 FERC licensing process is in the area of federal versus local preeminence in nonenvironmental matters.

PA Hydro submitted several license applications for projects, in addition to Flat Rock, that were included under Preliminary Permit 2803, which covered projects to be constructed at dams owned by the PA DER. This activity had been encouraged by the DER administration that existed in 1977, and at one point, the agency openly contemplated its possible role as a developer/operator of hydroelectric power projects. Because DER was responsible not only for regulation of dams in the Commonwealth but also in many instances, their actual construction and operation, it challenged the FERC's authority to license PA Hydro's use of DER-owned dams before PA Hydro secured usage rights from PA DER. In each instance, federal versus local preeminence was substantiated. However, this authority was tested in the following arenas:

- Intervention in the license review process
- Request for rehearing in the post-licensing appeal process
- Federal Court
- Federal Appeals Court.

The main points of the changes focused on the authority of the FERC to

- License the use of a DER-owned dam before acquisition of site usage rights from DER
- Control the operation and maintenance of DER-owned dams through conditions imposed on and orders issued to a FERC licensee.

Subsequent to initial discouragements, PA DER was helpful when dealing with other political problems. The challenges were directed specifically toward the FERC authority.

5.4 PROBLEMS WITH THE FERC PROCESS--POLITICAL PRESSURE

- The proposed Flat Rock project was on the FERC Commissioner's Agenda of Wednesday, September 28, 1983, for possible licensing action.
- Also, according to the congressional staff member, the FERC was in error in its process on at least two points (neither of which were the fault of PA Hydro, the license applicant):
 - It had not notified the congressman of the proposed project.
 - It had not provided proper public notice of the proposed project.
- A competitive, sizable, and politically aware entity located in the congressmen's district had previously expressed interest in having water available for the possible reactivation of one of its installed but long inactive hydraulic turbines. The competitive developer retained a consultant for this matter. The consultant, an engineer, and a former deputy director of the Philadelphia Water Department were all politically experienced and familiar with the FERC process.
 - Representatives of the developer suggested that the desired flow could be taken from flow not available to the Flat Rock Project (i.e., environmental or other use) which they suggested they could reallocate to their own use through negotiation. Their flow requirement need was given as ~400 cfs, less than had been publicly stated.
 - PA Hydro's position, as discussed with the developer's representatives, was not to disrupt the FERC process but to resume discussions after a license was issued. At this point, the flow allocation would be known; the license process includes provisions under which revisions to the allocation of flows may be applied for.

- Subsequently, FERC process actions were taken by and on behalf of the competitive developer, and a surprise meeting of the consultant and a PA Hydro principal occurred. The competitive developer, its consultant, or both were not content with PA Hydro's location.

5.5 SUMMARY OF FINDINGS--SEVERAL FACTORS AFFECTING FEASIBILITY

Though many successive design changes addressed the concerns associated with this project, and the project eventually received support from the very state and federal agencies cited as a rationale for congressional involvement, congressional support for the FERC process would only be given if 650 cfs of flow was continuously released over the Flat Rock Dam's spillway.

If PA Hydro had been able to construct the project with the 650-cfs flow condition attached, there would have been flow available for the other developer to appropriate. This flow, with its higher priority than the flows available to the Flat Rock Project for power generation, would provide nearly 600 kW of reliable base load power to the competitive developer. The 20% of Flat Rock's capacity could generate 50% as much energy with far greater reliability.

Under any flow condition, the flows for nonpower uses such as aesthetics, spillway flow, the fishway flow, the attractive flow, the canal environmental flow release, and habitat maintenance flows had to be first and completely accommodated before the balance (if any) could be used to generate power. Only at the times the river flow exceeded ~950 cfs would the excess be available for power generation. The power project would hold the primary risk of losing its flows during any dry weather.

A further setback to power generation potential was the instantaneous run of the river project operating mode licensing condition. Because no water could be ponded at all, the effect required a minimum stream flow (the sum of 950 cfs) plus the minimum flow required for the turbine to operate (450 cfs), totaling 1400 cfs before power could be generated. PA Hydro could expect the

project to be shut down ~45% of the year and to operate at a design capacity ~15% of the year.

PA Hydro estimated the expected annual generation to be closer to 8,500,000 kWh rather than what the FERC had estimated, at 11,757,000 kWh.

The value (to the public) of the energy to be generated at a proposed project should correlate reasonably well with the actual price to be paid. Value should be determined as a function of reliability, location, electrical quality characteristics, environmental cost, load forecast, and term of power purchase contract.

FERC, faced with its charge to provide for the environmentally compatible development of the renewable, clean, native energy resource available at the many existing dams with unused potential, must also recognize and address the issues and interests of other affected groups.

APPENDIX A
CORRESPONDENCE

CONTENTS

Congressman Lawrence Coughlin p. A-5

12/29/83	L. Coughlin	To:	L. Gleeson, PA Hydro
01/26/84	L. Gleeson, PA Hydro		Congressman Coughlin
05/04/84	L. Coughlin		Raymond J. O'Connor, FERC
06/14/84	L. Coughlin		Raymond J. O'Connor, FERC
07/03/84	Charles McManus, FERC		Hon. L. Coughlin
06/18/85	L. Gleeson, PA Hydro		License amendment
09/04/85	L. Coughlin		Raymond J. O'Connor, FERC
11/05/85	Jason James, ESI		File re: Joe Mahoney
12/19/85	Jason James, ESI		Hon. Lawrence Coughlin

Connelly Containers, Inc. p. A-23

02/14/78	L. Gleeson, PA Hydro	To:	Charles Boy, Connelly Container
			Tom Brown, Container Corp. of
			America
10/20/82	Connelly Containers		FERC Petition to Intervene
11/01/82	PA Hydro		FERC Answer to Intervention
02/03/83	Robert Grodinsky, Esq. (a Connelly lawyer)		Kenneth Plumb, FERC
06/12/84	Robert Grodinsky, Esq.		Kenneth Plumb, FERC
03/05/85	Robert Grodinsky, Esq.		Kenneth Plumb, FERC
02/03/86	Thomas Doyle, Esq.		Charles Boy, VP, Connelly
	PA Hydro		

Montgomery County, PA p. A-29

02/21/84	Paul B. Bartle, Chrm. Montgomery County Com- missioners	To:	Hon. Dick Thornburgh, Governor of PA
01/24/85	John Morrison, Twp. Mgr. Lower Marian Twp. (LMT)		Sandra Handford, Director of Planning, LMT
02/22/85	Sandra Handford		L. Gleeson, PA Hydro
08/28/85	Arthur Loeben		L. Coughlin
11/18/85	Arthur Loeben		L. Coughlin
11/19/85	Jason James, ESI		File re: Arthur Loeben
03/14/86	Charles Ward, LMT		Kenneth Plumb, FERC
01/07/87	Arthur Loeben, Mont- gomery County, Petition to Intervene		FERC and all interested parties

CONGRESSMAN LAWRENCE COUGHLIN

~~LAWRENCE~~ COUGHLIN
13TH DISTRICT, PENNSYLVANIA

COMMITTEE ON
APPROPRIATIONS

RANKING MINORITY MEMBER
SUBCOMMITTEE ON
TRANSPORTATION

SUBCOMMITTEE ON
DISTRICT OF COLUMBIA

MEMBER
SUBCOMMITTEE ON
HUD-INDEPENDENT AGENCIES

MEMBER
SELECT COMMITTEE ON
NARCOTICS

Congress of the United States
House of Representatives
Washington, D.C. 20515

WASHINGTON OFFICE:
2467 RAYBURN BUILDING
(202) 225-6111

DISTRICT OFFICE:
607 ONE MONTGOMERY PLAZA
NORRISTOWN, PENNSYLVANIA 19401
(215) 277-4040
596-1755

December 29, 1983

Mr. Lawrence Gleason, President
Pennsylvania Hydroelectric Development Corporation
Post Office Box 814
King of Prussia, Pennsylvania 19406

Dear Larry:

Over the past few months we have been working together to develop a plan for Flat Rock Dam which is in the best interests of the communities surrounding the dam yet economically feasible for the generation of hydroelectric power.

As you know, many concerns have arisen from our meetings. These concerns have come from neighbors, environmental groups, civic associations, Lower Merion Township and myself.

I feel that the major concerns fall into two areas. First is the aesthetic value of the dam. The concerns here center around the amount of water physically going over the dam. It is felt that having just one inch of water passed over the dam will only keep the concrete wet and not give the appearance of a waterfall. I am also concerned that, at low water times, a portion of the basin under the dam could be dewatered. Neither of these situations is desirable. The second area of concern is an environmental one. Agreement should be reached as to what steps, and how much water, is necessary to maintain the fish life in the Schuylkill River.

In the last meeting, which was held at the Lower Merion Township Building, it was proposed that more water be passed over the top of the dam instead of being released through a flow release pipe further downstream. It would seem that this approach goes a long way toward resolving the concerns voiced by all parties. It seems that if this approach is taken, it should not just be undertaken as a short term or test measure but as a commitment of preserving the natural beauty of the waterfall.

Mr. Lawrence Gleason
December 29, 1983
Page 2

I would like to pass along my personal thanks for your business-like approach toward solving this problem. My staff stands ready to work with you to resolve any further outstanding problems. Once these problems are resolved, I am sure that the licensing process can move along expeditiously.

Cordially,

A handwritten signature in black ink, consisting of a stylized 'L' and 'C' joined together.

LAWRENCE COUGHLIN

LC:tasj

cc: Mr. Raymond J. O'Connor
Ms. Sandra Hanford
The Honorable Norma Shapiro
Mr. Michael Stokes

Pennsylvania Hydroelectric Development Corporation

26 January, 1984

Congressman Lawrence Coughlin
Congressional Representative
13th District
607 One Montgomery Plaza
Norristown, PA 19401

I have been pleased to work with you, your staff and others who recently became aware of the proposed Flat Rock project and who have questions regarding the project's possible effects on its surroundings. I have found all involved in this joint effort to be frank, fair and constructive. Through numerous discussions and the two meetings in which I participated, we identified key concerns, clarified the corresponding effects of the proposed project and developed a reasonable plan to further mitigate the effects of the project with only a moderate reduction in the project's energy potential.

I intend to forward this letter with the following proposal to the FERC.

I propose that the suggested 330 cfs minimum flow release to be provided into the river segment between the dam and the tailrace be released over the spillway(s) rather than being divided 100 cfs over the spillway and 230 cfs released from the low flow release facility. Construction of the low flow release facility would be deferred unless interim, minimum flow release requirements, in excess of 330 cfs, were determined by FERC to be necessary during initial project operation. It is further proposed that representation of aesthetic usage interests be included in the proposed two year, post-operational, flow study.

It is clear that the earlier such constructive interchanges take place in planning a project, the better it is for all concerned. Though it would have been better had these discussions occurred earlier, it would have been much more difficult further along in the planning process. I thank you for your assistance.

Yours truly,

Lawrence Gleeson
President

LG/can

Discussion of key concerns expressed regarding the proposed Flat Rock Project . . .

A number of concerns were expressed such as, but not limited to, excessive noise levels, height of structures, consistency of proposed works with existing structures, effects upon upstream parks and boating, appearance of transmission lines, effects upon fishing, appearance of flashboards and dam, possible stagnation of water downstream of dam, value of energy production and the appearance of the flow of water over the spillway.

Most concerns were addressed through discussion of the licensing and supplementary information, clarification of the development process and a video tape of the Barker's Mill project operating under flow conditions similar to those of the proposed Flat Rock project. Final resolution of several topics, such as the fisheries issue, would not occur until the accomplishment of studies of the operational project i.e. need for an additional fishway. Other concerns, such as consistency with surroundings, were lessened when it was made clear that the project's final design could not realistically be accomplished until after receipt of a Federal License and that, following final design, the proposed project would be reviewed by, among others, the Delaware River Basin Commission, agencies responsible for preservation of historic resources, local building/construction permit authorities, the Army Corps of Engineers, the Pennsylvania DER and appropriate agencies of the City of Philadelphia.

The chief concerns remaining related to the visual appearance of the water over the dam and the aesthetic quality of the river segment between the dam and the proposed tailrace. This segment would be affected by the diversion of a portion of the water which now flows over the spillway to pass, instead, through the generating equipment on its way down stream

I. River Segment Affected by Diversion

It was pointed out that the flow in the approximately 700' segment affected by the diversion would clearly be less than it is at present. The persistent concern was that the segment, in no event, should run the risk of becoming a stagnant mud hole. The following points were made:

1. The proposed flow released into the segment would be at least the 7 day, 10 year, recurring low flow of 330 cfs requested by PA DER, or the project's turbines would be shut down. This minimum flow, to maintain water quality, is generally utilized in allowing for adequate dilution of sewage treatment plant effluent. Since no such effluent is discharged into the short river segment in question, the proposed minimum flow release of 330 cfs should more than protect water quality under the worst case operating conditions.

2. The proposed minimum flow exceeds the estimated optimal flow for spawning habitat of two of the three fish species included in the fisheries habitat study conducted by Mr. Taylor. It also approximates the minimum flow suggested for non-migration periods by a representative of the PA Fish Commission.

3. Water coverage of most of the segment would be provided by backwater from the proposed project tailrace in addition to the proposed minimum flow through the segment which would be released at the dam.

4. River flows in excess of project, fishway and canal flow requirements would augment the minimum flow and pass over the spillway under the higher flow conditions such as those which typically occur about 25% of the year.

5. The proposed diversion, unlike another example cited at our meetings, would be nonconsumptive in that all water diverted through the powerhouse would be returned immediately to the river.

II. Visual Appearance of Water over the Dam

Concern was expressed that the attractive appearance of the water falling over the dam would be largely lost under the conditions of the project as proposed. The following points were made:

1. The proposed project, per PA DER's requirement, could not dry out the spillway and 1" of water was proposed to be passed over the length of the spillway or flashboards. A video tape was shown illustrating the appearance of 1" of water passing over flashboards at another project with a dam more than twice the height of Flat Rock. This flow over the length of the Flat Rock spillway would be roughly equivalent to 100 cfs.

2. Though it is my opinion that it takes less water at a lower fall than a higher fall to create an attractive appearance, since the Flat Rock site differed in several respects from the example, there was some feeling that more water over the Flat Rock spillway would better protect its aesthetic value.

3. An approach toward resolving this concern was suggested and generally accepted. The proposed low flow release into the river segment below the dam was to have been supplied as follows: 100 cfs over the length of the spillway plus 230 cfs from a low flow release facility to be located at the foot of the spillway. Instead, it was suggested that all 330 cfs be passed over the length of the spillway.

4. A further point of discussion was the need to include this usage of flow in the proposed study of flows to be undertaken during the first two years following the station's initial operation. Participation of concerned groups and individuals was invited. This participation was suggested because it is believed that those with a strong concern for aesthetics have demonstrated that they represent a significant usage of the water resources at the Flat Rock site.

LAWRENCE COUGHLIN
13TH DISTRICT, PENNSYLVANIA

COMMITTEE ON
APPROPRIATIONS

RANKING MINORITY MEMBER
SUBCOMMITTEE ON
TRANSPORTATION

SUBCOMMITTEE ON
DISTRICT OF COLUMBIA

MEMBER
SUBCOMMITTEE ON
HUD-INDEPENDENT AGENCIES

MEMBER
SELECT COMMITTEE ON
NARCOTICS

Congress of the United States
House of Representatives
Washington, D.C. 20515

May 4, 1984

WASHINGTON OFFICE
2467 RAYBURN BUILDING
(202) 225-6111

DISTRICT OFFICE
607 ONE MONTGOMERY PLAZA
NORRISTOWN, PENNSYLVANIA 19401
(215) 277-4040
596-1755

Mr. Raymond J. O'Connor, Chairman
Federal Energy Regulatory Commission
825 North Capitol Street, N.E.
Washington, D.C. 20426

Dear Mr. O'Connor:

Over the past six months I have been investigating the environmental and aesthetic effects of the proposed hydroelectric generating plant to be located at Flat Rock Dam on the Schuylkill River in Pennsylvania.

During this time, meetings have been held with officials of Montgomery County, Lower Merion Township, concerned citizen and environmental groups, various state agencies and the developer. Several areas of concern have emerged from these meetings, including the possible dewatering of a portion of the river basin below the dam. Other concerns center on unique fish habitat maintenance, water quality, recreation, and aesthetics.

The main problem is the basic issue of water allocation during the low flow periods of August through October. Water must be provided for the three competing uses; river flow over the dam, the fish ladder, and the hydro station. The developer has proposed 100 CFS over the dam. All of the parties involved in our meetings feel that this is insufficient and recommend that 650 CFS, the level proposed by the Pennsylvania Fish Commission, be mandated in the license.

Since all parties agree that more than 100 CFS is needed to pass over the spillway, the two low flow turbines no longer seem necessary. I would also request the FERC examine the proposed two year trial and study period, in effect an interim license. It seems that it will only serve as a vehicle for reducing the flow of water over the dam thus reigniting the environmental controversy.

I am convinced that a hydro facility can be operated efficiently at Flat Rock Dam. I am troubled that no plan for recreational access or use of the facility has been made but feel that with the proper requirements listed within the license, the needs of both my constituents and the developer can be met.

Consequently, I am withdrawing my objections to the license proceedings, contingent upon the condition that the 650 CFS flow over the dam be maintained.

Cordially,

LAWRENCE COUGHLIN

LC:swfj

A-13

LC:cid
PHDC
11/21/84 E4
JLC

LAWRENCE COUGHLIN
13TH DISTRICT, PENNSYLVANIA

COMMITTEE ON
APPROPRIATIONS

RANKING MINORITY MEMBER

SUBCOMMITTEE ON
TRANSPORTATION

SUBCOMMITTEE ON
DISTRICT OF COLUMBIA

MEMBER

SUBCOMMITTEE ON
HUD-INDEPENDENT AGENCIES

MEMBER

SELECT COMMITTEE ON
NARCOTICS

Congress of the United States
House of Representatives
Washington, D.C. 20515

WASHINGTON OFFICE
2407 RAYBURN BUILDING
(202) 225-6111

DISTRICT OFFICE
607 ONE MONTGOMERY PLAZA
NORRISTOWN, PENNSYLVANIA 19401
(215) 277-4040
896-1755

June 14, 1984

RECEIVED
CORRESPONDENCE
JUN 15 1984

P-2803

Mr. Raymond J. O'Connor, Chairman
Federal Energy Regulatory Commission
825 North Capitol Street, N.E.
Washington, D.C. 20426

Dear Mr. O'Connor:

It has recently come to my attention that Connelly Containers, Inc. has filed a Petition to Intervene in connection with the proposed hydro plant at Flat Rock Dam.

While my position on this project remains unchanged, I would hope that the positions of all interested parties would be considered before the Commission renders a final decision.

With all best wishes,

Cordially,

LAWRENCE COUGHLIN

LC:jmt

cc: The Honorable Paul B. Bartle
Robert S. Grodinsky, Esquire
Mr. Mason Kronick
The Honorable Norma L. Shapiro
Mr. Charles F. Ward

09 14 61 NDC 4861

FEDERAL ENERGY REGULATORY COMMISSION

WASHINGTON, D.C. 20426

July 3, 1984

OGC

Project No. 2803

Honorable Lawrence Coughlin
House of Representatives
Washington, D.C. 20515

RECEIVED JUL 19 1984 *JMC*

Dear Mr. Coughlin:

Thank you for your letters of May 4, and June 14, 1984, to Chairman O'Connor regarding the Flat Rock Dam Power Project No. 2803, located on the Schuylkill River in Philadelphia County, Pennsylvania. Your letters have been referred to me for response.

You stated that you have been investigating the environmental and aesthetic effects of this proposed project but are not opposed to the issuance of a license as long as a 650 cfs flow is maintained over the dam. Your June 14, 1984, letter also noted that Connelly Containers, Inc. had filed a petition to intervene in the Flat Rock Dam Project.

In making a decision on applications, the Commission considers all comments, protests and petitions to intervene. Therefore, all information that Connelly Containers, Inc., as an intervenor, has placed before the Commission will be reviewed before a final decision is rendered.

Your letters are being placed in the Commission's file associated with this matter. If I can be of any further assistance to you on this or any other matter concerning the Commission, please do not hesitate to contact me.

Sincerely,

Charles A. McManus, Jr.
Manager
Congressional Liaison Staff

Pennsylvania Hydroelectric Development Corporation

18 June, 1985

To Addressees of PA Hydro's
Proposed Amendment to License
Application for Flat Rock Project:

Paul Bartle, Montgomery County Comm.
Eugene Bradley, Esq., PECO
John Childe, Esq., DER
Lawrence Coughlin, Congressman
Margarite Goodman, Esq., Phila. Water Dept.
Robert Grodinsky, Esq., Connelly Container
Sandra Handford, Lower Merion Twp.
Robert Hesser, PA Fish Commission
Patrick Joyce, Lower Merion Twp. Mgr.
Charles Kulp, U.S. Fish & Wildlife
Arthur Loeben, Montgomery Co. Planning Comm.
Ben Rinehart, EG&G Idaho
Judge Norma Shapiro

Subject: Clarification of 5 June, 1985, Amendment

Based upon discussion with Mr. Joe Mahoney of Congressman Coughlin's office, two areas in the 5 June, 1985, amendment may benefit from further clarification.

The three letters attached to the amendment and endorsing the powerhouse relocation concept are:

1. PA Fish Comm., R. Hesser, August 31, 1984
2. PA DER, T. Weston, October 30, 1984
3. U.S. Fish & Wildlife, E. Perry, September 7, 1984

The other attached letters are presented as documentation of coordination referenced in the amendment background but are not to be taken as an endorsement of the amendment.

The 100 cfs minimum spillway flow was assumption 2-c in the 21 August, 1984, Draft Project Design Modification. As the above referenced letters state, the design modification eliminated the flow diversion which had been the primary cause of agency concern regarding fisheries habitat and the basis for their prior 650 cfs minimum spillway flow requirement. The modification, including benefits and assumptions, was the result of a joint effort which

Clarification of
6/5/85 Flat Rock
Amendment
18 June, 1985
Page Two

included, a workshop meeting between representatives of the
PA Fish Commission, U.S. Fish & Wildlife and PA Hydro; PA
DER, as operator of the dam, participated as an observer
only.

Yours truly,

Lawrence Gleeson
President

LG/cag

cc: J. Mahoney
T. Weston

LAWRENCE COUGHLIN
13TH DISTRICT, PENNSYLVANIA

COMMITTEE ON
APPROPRIATIONS

RANKING MINORITY MEMBER
SUBCOMMITTEE ON
TRANSPORTATION

SUBCOMMITTEE ON
DISTRICT OF COLUMBIA

MEMBER
SUBCOMMITTEE ON
HUD-INDEPENDENT AGENCIES

MEMBER
SELECT COMMITTEE ON
NARCOTICS

Congress of the United States
House of Representatives
Washington, D.C. 20515

September 4, 1985

WASHINGTON OFFICE:
2467 RAYBURN BUILDING
(202) 225-6111

DISTRICT OFFICE:
607 ONE MONTGOMERY PLAZA
NORRISTOWN, PENNSYLVANIA 19401
(215) 277-4040
596-1755

Mr. Raymond J. O'Connor
Chairman
Federal Energy Regulatory Commission
825 North Capitol Street, N.E.
Washington, D.C. 20426

Dear Mr. O'Connor:

I am writing to express my interest in the Amendment to the License Application submitted by the Pennsylvania Hydroelectric Development Corporation concerning the proposed hydro plant to be constructed at Flat Rock Dam (FERC Project 2803-001).

Pennsylvania Hydro has proposed moving the site of the power house and fish passage from the left to the right bank of the Schuylkill River. The applicant is proposing that this, along with other modifications to the application, be judged as a minor revision to their original application.

By moving the site of the power house the applicant has moved the construction site from Philadelphia to Montgomery County. This necessitates new groups to be informed of the project and poses many new questions. Both Montgomery County and Lower Merion Township officials have raised questions about the project and view modification as a material amendment to the license application.

In reviewing the amendment, I find that the proposed design is superior to that originally proposed. I realize, though, that this project will set a precedent for resolution of other hydro proposals on the Schuylkill River.

In light of the comprehensive changes in the amendment, I respectfully request that the proposed modifications be judged as a material amendment to the license application.

Sincerely,

LAWRENCE COUGHLIN

LC:dfwj

cc: Sherrin Hartford
Lm Pl. Comm.
J. E. Lencucha
Ant. in P.R. 19023

Rec'd 9/6/85
Only sent to
26 9/6/85
du

MEMORANDUM

To: File
From: Jason James
Date: 11/5/85
Time: 4:30 p.m.
RE: Flat Rock

Spoke with Joe Mahoney of Congressman Coughlin's staff. He was very, very anti Larry Gleeson; said project wouldn't get through. He viewed the latest submittal as a new packaging created to push Larry through. He wanted to know why we got involved and what our involvement in the future would be. I told him we were acting as PHDC's agent and that Larry's realized that he has alienated too many people and is now taking a backseat.

Mahoney was committed to no flashboards and 650 cfs minimum release. I asked him if he'd read the report. He hadn't. I explained to him the benefit of flashboards and assured him that 250 cfs over the spillway was more than adequate from an aesthetic standpoint. I asked him to read the report with an open mind and informed him that we were a responsible hydroelectric development company who has brought in our experienced, expert engineering (MK) and environmental (TES) consultants.

He told me that he views the project as totally new because it was moved from one county to another by switching over banks; therefore no federal money should be involved.

I again asked him to please review the new packet we sent him and if he has questions to call me back. He said he would.

Honorable Lawrence Coughlin
Congressman, 13th District
Congress of the United States
A-19 One Montgomery Plaza, Suite 607
Norristown, PA 19401

ENERGY SUPPLY INTERNATIONAL, INC.

December 19, 1985

The Honorable Lawrence Coughlin
Congressman, 13th District
Congress of the United States
One Montgomery Plaza, Suite 607
Morristown, PA 19401

Dear Congressman Coughlin:

In the past, you have expressed concern about the proposed use of flashboards at Flat Rock Dam in conjunction with the planned hydroelectric facility. After circulation of the Revised Exhibit E on October 28, 1985, this concern continues to be held by several agencies. The purpose of this letter is to explain the purposes and effects of the proposed flashboards and thereby to correct what appears to be commonly-held misconceptions.

A major misconception is that flashboards will increase the amount of water that passes through the turbines. This is incorrect because it is impossible for flashboards to create water. Instead, flashboards will increase the available head at the site - the difference in elevation between the headpond and the tailrace water. Increasing the head will provide a greater force at the turbine and thereby permitting a greater production of energy with the same amount of water.

Equally important, the proposed twelve inches of flashboards at Flat Rock Dam will maintain the average pool elevation that now exists at the site. This is significant because the proposed mode of operation of the facility is run-of-river, with 50 cfs bypassed into the Manayunk Canal to maintain aquatic life and 250 cfs to be passed over the dam spillway for aesthetic and environmental reasons, with the remaining flow passing through the turbine until the turbine reaches its maximum capacity. At present, under average flow conditions, the Schuylkill River passes over the dam spillway at a height of 15- to 18- inches above the crest, of which the required 250 cfs represents 3- to 3.5 inches, according to engineering computations. In the absence of the proposed flashboards, therefore, operation of the facility would result in reducing the average pool elevation by approximately 12 inches, under average conditions. The proposed flashboards will maintain the pool behind the dam near its present level. Additionally, recreational use will be enhanced below the dam because of more concentrated flows in the tailrace.

Another major misconception about the proposed flashboards is that they cannot be reliably designed to fail during flooding conditions. In fact, such a design is relatively straight forward and simple, and will prevent the maximum pond level in the reservoir from ever exceeding the present flood level.

A-20

Installation of flashboards consists of drilling holes in the crest of the dam at selected distances apart, and inserting steel pins of a selected diameter to support the 12 inch flashboards. Under flood conditions, more water than 250 cfs will pass over the flashboards rather than the turbine. At a pre-determined height or flow, the flashboards will begin to bend downward because of increased stress induced on the steel pins, thus returning the crest elevation to that of the present dam. Therefore, during high flows the crest elevation will be unchanged from its historical elevation.

We are convinced that the installation of the proposed flashboards will be beneficial both to the operation of the facility and to the maintenance of presently existing water level of the pool behind the dam. We hope that the information presented in this letter provides a clearer understanding of the purposes and effects of flashboards at Flat Rock Dam. Please do not hesitate to contact me for further information or clarification of this matter.

Very truly yours,

Jason James

CONNELLY CONTAINERS, INC.

HYDRO-ELECTRIC DEVELOPMENT CORPORATION

Box 45 • Bath, Pennsylvania 19801

Maine Hydro-Electric Development Corporation
P.O. Box 402 Mill Lane, Belfast, Maine 04915
Tel: (207) 338-2131

14 February, 1978

Mr. Charles Boy, Vice President of Engineering
Connolly Container Corporation

Mr. Tom Brown, Plant Manager
Container Corporation of America

Subject: Flat Rock/Manayunk Water Usage.

Representatives of the City of Philadelphia have asked me to see what can be done with respect to bringing ourselves together on the question of water usage at the Flat Rock Dam and Manayunk Canal in Manayunk.

I have attempted, unsuccessfully, to get together with each of you on this question. Perhaps if we sat down in a joint session we could clarify our positions, work out elements of agreement and isolate issues which might require an outside perspective to be resolved.

I am certain that it would serve all of our interests to resolve this at an early date and propose the week of February 27th as an appropriate time for the session.

I ask that you contact Mr. Harold Cramer or Mr. Marc Cornblatt of the firm Mosirow, Golman, Jaffe & Cramer with respect to your availability that week or alternative suggestions by February 22nd. They can be reached at (215) 893-5000.

Yours truly,

Lawrence Gleason
President
Pennsylvania HED Corp.

LG:eg

cc: Harold Cramer
Marc Cornblatt
Francis McGuckin
Daniel McCusker

PIERCE, ATWOOD, SCRIBNER, ALLEN, SMITH & LANCASTER

ONE MONUMENT SQUARE

PORTLAND, MAINE 04101

TELEPHONE 207/773-6411

TELECOPIER 207/773-3419

AUGUSTA OFFICE

77 WINTHROP STREET

AUGUSTA, MAINE 04330

207/622-6311

DANIEL W. EMERY
THOMAS R. DOYLE
CHRISTOPHER E. HOWARD
RICHARD W. MURPHY
JEFFREY D. CURTIS
WAYNE R. DOUGLAS
ANDREA L. CIANCHETTE
ANNE M. PARÉ
JOHN R. McDERMOTT
DENNIS C. KEELER
LAWRENCE S. DELANEY
GERARD O. FOURNIER
KEVIN F. GORDON
GREGORY D. WOODWORTH
PAMELA K. LAWRASON

GORDON K. GAYER
WILLIAM L. HARVEY
JOHN S. BACON*
ELIZABETH R. BUTLER
MICHAEL P. COGSWELL**
EMILY D. DICKINSON
ELAINE S. FALENDER
CHARLES F. GAUVIN
JOHN R. GOLDSBURY
SCOTT T. MAKER***
ELIZABETH T. McCANDLESS
ANDREA C. NAJARIAN
JOHN C. NIVISON
ELIZABETH S. PEARCE
WILLIAM E. TAYLOR

*MEMBER OF NEW YORK BAR ONLY
**MEMBER OF VIRGINIA BAR ONLY
***MEMBER OF DISTRICT OF COLUMBIA BAR ONLY

February 3, 1986

FRED C. SCRIBNER, JR.
CHARLES W. ALLEN
JOTHAM D. PIERCE
SIGRID E. TOMPKINS
WILLIAM C. SMITH
RALPH I. LANCASTER, JR.
JEREMIAH D. NEWBURY
DONALD W. PERKINS
GERALD M. AMERO
DONALD A. FOWLER, JR.
BRUCE A. COGGESHALL
S. MASON PRATT, JR.
DANIEL E. BOXER
JOTHAM D. PIERCE, JR.
WARREN E. WINSLOW, JR.
ALBERT G. AYRE
EVERETT P. INGALLS
MALCOLM L. LYONS
ROBERT G. FULLER, JR.
JAMES B. ZIMPRITCH

JAMES G. GOOD
JOHN J. O'LEARY, JR.
PETER W. GULLEY
JEFFREY M. WHITE
JOSEPH M. KOZAK
GEORGE J. MARCUS
RICHARD E. CURRAN, JR.
LOUISE K. THOMAS
PHILLIP E. JOHNSON
JOHN W. GULLIVER
JOHN D. DELAHANTY
CHARLES S. EINSIEDLER, JR.
PETER H. JACOBS
MICHAEL D. BEITZINGER
DANIEL M. SNOW
RICHARD P. HACKETT
LEE D. URBAN
MICHAEL R. CURRIE
WILLIAM J. KAYATTA, JR.
DAVID E. HUNT

Charles E. Boy
Vice President
Connelly Containers, Inc.
Bala-Cynwcd, PA 19004

Re: Pennsylvania Hydroelectric Development Corporation's Flat Rock
Dam Project, FERC Project No. 2803

Dear Mr. Boy:

On behalf of Pennsylvania Hydroelectric Development Corporation, we have reviewed your letter dated November 20, 1985 to Jason James commenting on Pennsylvania Hydro's revised Exhibit E for the Flat Rock Dam Project. The purpose of this letter is to respond to the issues raised by your November 20, 1985 letter.

In brief, Connelly Containers' proposal to divert approximately 400 cfs of water from the Manayunk Canal presents a number of serious legal and practical problems which we believe have not been adequately addressed by Connelly Containers.

As you know, the Flat Rock Dam Project is located on the Schuylkill River, a navigable waterway subject to the jurisdiction of the Federal Energy Regulatory Commission. As such, it is unlawful for any person to construct, operate or maintain any powerhouse or other work incidental thereto except in accordance with the terms of a license granted pursuant to the Federal Power Act. See 18 U.S.C. §817. Beginning in 1975, Pennsylvania Hydro began to examine the feasibility of restoring the Flat Rock Dam and applied for and received a preliminary permit for the project from the FERC in 1977. Subsequently, on or about December 22, 1981 it filed its license application with the Commission which application was accepted for filing by FERC on February 23, 1982. On June 6, 1985, Pennsylvania Hydro filed an amendment of its pending license

Charles E. Boy
Page 2
February 3, 1986

application. In short, Pennsylvania Hydro has been studying the proposed site for nearly 10 years and has had a license application pending before the Commission for over 4 years. Your proposal to withdraw approximately 400 cfs of water from the Manayunk Canal would divert water which would otherwise be used by Pennsylvania Hydro for the Flat Rock Dam Project and is, therefore, directly in conflict with that Project. To our knowledge, your corporation has not filed a competing FERC license application for the project site and, in fact, waived its rights to do so by not filing such an application in a timely fashion. Consequently, we are not aware of any legal rights which you have to withdraw 400 cfs of water from the Manayunk Canal for your own proposed hydro power project for to do so without a FERC license would be illegal.

Besides the serious legal problem noted above, there are a number of practical problems which arise by virtue of your proposal to withdraw approximately 400 cfs of water from the Manayunk Canal. First, such a diversion of water would significantly impact the economic feasibility of the Flat Rock Project. The applicant is already committed to providing 250 cfs minimum flow to protect fishery resources and has agreed to provide 30 to 50 cfs to the canal and an additional 50 cfs for the fish ladder. Requiring a diversion of an additional 400 cfs, which would otherwise flow through the Project powerhouse, into the canal would simply undermine the economics of the project.

Secondly, diversion of an additional 400 cfs of water into the canal is likely to result in severe damage and erosion to the canal. The Pennsylvania Historical and Museum Commission ("PHMC") has indicated that the Manayunk Canal is a significant historical resource which is being considered for inclusion in the National Register of Historical Places. The PHMC has verbally indicated to Pennsylvania Hydro that a flow in the canal in the range of 30 cfs to 50 cfs may be the maximum flow permissible consistent with preservation of archaeological and historical resources and the mitigation of canal bank erosion. The proposed 400 cfs flow raised in your letter to Mr. James of November 20th is likely to exacerbate erosion of the canal and destruction of this historical resource.

Finally, a diversion of an additional 400 cfs of water from the canal would raise substantial difficulties with operation of the fish passage scheme already proposed for the Flat Rock Project. Such an additional diversionary flow might well result in interference with the expected fish migratory patterns and could result in increased fish mortality rates.

As the foregoing discussion indicates, there are a number of legal and practical problems presented by your proposal to withdraw approximately 400 cfs of water from the Manayunk Canal. We hope

Charles E. Boy
Page 3
February 3, 1986

this letter adequately addresses these issues. In closing, we would note that your November 20th letter to Mr. James indicates that Connelly Containers has completed a feasibility study for the withdrawal of water from the Manayunk Canal and has provided copies of this study to "Senator (sic) Coughlin and the Philadelphia Water Commission". As the applicant with a pending FERC license application to develop the water resources of the Manayunk Canal region, we are at a loss for why such a feasibility study was not provided to either Pennsylvania Hydro or Mr. James particularly in light of your prior willingness to discuss your hydroelectric plans with Pennsylvania Hydro. I would appreciate it if you would be kind enough to forward a copy of this study to either Mr. James or Pennsylvania Hydro at your earliest convenience so that a more detailed review of your proposal can be undertaken.

Very truly yours,

Thomas R. Doyle

TRD:plw
cc: Lawrence Gleeson,
Jason James
Kenneth Plumb
Steve Rossi

MONTGOMERY COUNTY, PA

MONTGOMERY COUNTY

NORRISTOWN, PENNSYLVANIA

COMMISSIONERS
PAUL BAKER BARTLE
ALLAN C. MYERS
RITA C. BANNING

SOLICITOR
FREDERIC M. WENTZ

CHIEF CLERK
ROBERT W. GRAF

February 21, 1984

Hon. Dick Thornburgh, Governor
Commonwealth of Pennsylvania
Room 225 Capitol Building
Harrisburg, Pennsylvania 17121

Dear Governor Thornburgh:

A firm has proposed a small hydroelectric generating project at Flat Rock Dam in the Schuylkill River between Lower Merion Township and the Manayunk area of Philadelphia. The applicant has filed his application with the Federal Energy Regulatory Commission (FERC) and provided copies for review by other federal agencies and your agencies. The proposal is not fully designed nor have the required permits been secured. I am writing to you with our concerns about this project and I am seeking your help in assuring us that the State will address our concerns.

Our major concern is the impact of the proposed hydroelectric facility on the flow of water over the dam and down the river. Our secondary concern is the expenditure of \$2.18 Million of State funds for a fish ladder especially as it relates to the limited success of the existing fish ladder at Fairmount Dam. Thirdly, we are concerned that the federal permit may have leverage on the other required permits before there is an overall coordinated plan acceptable to local governments.

We view the issue around the project as a matter of water quantity for three proposed uses: (1) the hydroelectric generator; (2) the fish ladder; and (3) water flow over the dam and down the river. We are not convinced that adequate studies on this issue have been made. Has the State determined the amount of water that is available for each of the three uses, and has the State established an allocation of the water for each use? The applicant believes this has been done although we find no evidence of such allocation or agreement.

We have no desire to unilaterally stop the construction of the hydroelectric generator nor the fish ladder. We recognize that both can achieve desirable goals. However, we are very much concerned that the only overall plan at the dam is the one the applicant submitted to FERC. There has been almost no opportunity for local government review and comment, with only the distribution of informational material. Your State agencies involved have not kept us fully informed, and we have had to pursue information and originate contacts. If the project is to proceed there must be a higher level of inter-

governmental review and cooperation.

We were alerted to the fact that the FERC was preparing to issue their permit for the facility. The federal government has already made a favorable grant to the applicant to help finance his plan. Through the support of Congressman Lawrence Coughlin a delay on the granting of that permit has been secured. This delay is a holding action until many of our concerns can be addressed. The faster we address the matter the sooner the hold can be released. It is our understanding that the applicant must obtain at least six permits or agreements before he can proceed as follows:

1. Federal Energy Regulatory Commission (FERC) must grant a license for the facility.
2. The Delaware River Basin Commission (DRBC) must approve.
3. A lease between the applicant and Pennsylvania Department of Environmental Resources (DER) must be signed for the use of the State-owned dam property.
4. The final design of the facility must be approved by the Federal Energy Regulatory Commission (FERC).
5. The fish ladder must be designed and integrated into the hydroelectric facility and approved by the Fish Commission.
6. The Pennsylvania Department of Environmental Resources (DER) must approve a water quality permit.
7. The applicant and the Philadelphia Electric Company (PECO) must agree to terms for the electric energy subject to the Public Utilities Commission (PUC).

To the best of our knowledge none of these has been secured by the applicant. It is the applicant's strategy, as we understand it, to obtain the federal license first and then proceed with the others. However, in the meantime the PUC is proceeding to set rates for electricity; the Fish Commission has conducted some preliminary studies on the fish ladder; Pennsylvania DER has apparently negotiated with the applicant concerning terms of a lease; and DRBC is considering a possible surcharge for use of the water and has met with the applicant. But the overriding fact is that no agency is looking at the overall project other than the applicant, and his interests are necessarily limited.

It seems to us that the State should be the focal point for a coordinated review and such a review should be based on thorough comprehensive studies of the three uses of the water. It also seems proper that such a comprehensive plan should be submitted to the three local governments involved for their review prior to any action by any State agency indicating concurrence or approval. Currently the applicant believes that he has tacit approval and encouragement from the State agencies and is proceeding along those lines.

Hon. Dick Thornburgh, Governor

-3-

February 21, 1984

I do hope that you will coordinate the work of your agencies and assure us that a comprehensive State review will be conducted and that you will provide us the opportunity to see it before any approvals of permits are granted. It is my feeling that with proper planning facilities can be developed at the Flat Rock Dam that can be an asset to our State.

Sincerely,

Paul Baker Bartle
Chairman
Montgomery County Commissioners

PBB:mrr

cc: Hon. Lawrence Coughlin
Hon. Norma L. Shapiro
Mr. Charles F. Ward
Mr. Allan C. Myers
Mrs. Rita C. Banning
✓ Mr. Arthur Loeben

TOWNSHIP
OF
LOWER MERION
MONTGOMERY COUNTY

TOWNSHIP ENGINEER

75 E. Lancaster Ave
Ardmore, Pa. 19003
Telephone: (215) 649-4000

MEMORANDUM

January 24, 1985

RECEIVED

JAN 29 1985

800-129.08

OFFICE OF PLANNING

TO: Sandra B. Handford, Director of Planning
FROM: John S. Morrison, Jr., P. E., Township Manager
SUBJECT: Pennsylvania Hydro-electric Development Corporation

Before any decisions can be made regarding approval of the Power Plant at the Flat Rock Dam, the following information should be supplied:

1. Water surface elevation calculations for a full range of flows. The HEC-2 or other water surface profile program should be used. Include pre-construction and post-construction conditions.
2. Determine whether or not the construction will be located on Township property.
3. There has been no indication of an application for easement or access rights to the site over Township Park property. Access rights will have to be determined.
4. The proposal indicates that fishing and other recreational facilities will be improved. A plan indicating how this will be accomplished should be supplied to the Township.

HD:sdg

cc: Patrick J. Joyce, Township Manager
Robert J. Koegel, Assistant Township Manager
Bert L. Williams, Director of Public Works
Thomas J. Lafferty, Assistant Director of Public Works

TOWNSHIP
OF
LOWER MERION
MONTGOMERY COUNTY

*Art Logan -
Monty Co. Planning*

DEPARTMENT OF PLANNING

75 E. Lancaster Ave.
Ardmore, PA 19003
Telephone: (215) 649-4000

PLANNING COMMISSIONERS

MORRIS C. KELLETT, ESQ., *Chairman*
DAVIS PEARSON, *Vice Chairman*
LITA INDZEL COHEN, ESQ.
JOHN C. DONLEVIE, ESQ.
WILLIAM H. LOESCHE, JR.
FRANK J. TRAVASCIO
ELEANOR W. WINSOR

PLANNING DIRECTOR

SANDRA B. HANDFORD, AICP

February 22, 1985

Lawrence Gleeson
PA Hydroelectric Development Corp.
P. O. Box 814
King of Prussia, PA 19406

Dear Mr. Gleeson,

I asked the Township Engineer to look at your proposal for a hydroelectric plant at Flat Rock Dam and a copy of his memo is enclosed. Obviously, the Township will need considerably more information to assess the impact of such a plant. As far as I am concerned, satisfactory answers to questions 1, 2 and 4 of Mr. Morrison's memo need to be obtained before an application for an access easement would be considered.

If you have any questions, please call me.

Very truly yours,

Sandra B. Handford
Sandra B. Handford AICP
Director of Planning

SBH:bh
Encl.

cc: Patrick J. Joyce, Township Manager
Robert J. Koegel, Assistant Township Manager/Operations
Congressman Coughlin
Judge Shapiro
M. Kronick
Commissioner Van Brott
Montgomery County Planning Commission

MONTGOMERY COUNTY PLANNING COMMISSION
courthouse ■ norristown, pennsylvania 19404 ■ 215-278-3722
Offices One Montgomery Plaza, Swede and Airy Streets, Norristown

August 28, 1985

*Rec'd 9/3/85
6 mg to LG
9/4/85*

The Honorable Lawrence Coughlin
Congress of the United States
Suite 607
One Montgomery Plaza
Norristown, Pennsylvania 19401

Re: Flat Rock Dam;
Amendment to License Application

Dear Congressman Coughlin:

Pennsylvania Hydro has submitted a request with FERC to amend their license application. In our view, there are still three major issues to be resolved: 1) the final design plan; 2) spillway flow allocation; and 3) FERC licensing.

Design Plan

The applicant's latest proposal calls for the power plant and fish passage facility to be relocated to the right bank, or west end of the dam. The design of these facilities is far better than that originally proposed and would avoid the flow diversion and dewatering of a downstream river segment. A number of channel improvements would be made which would enhance fish migration and habitat. Public recreational access would be provided through the installation of railings on the concrete weir, for the use of fishermen, and the construction of a canoe launch.

Overall, the design is one which is responsive to our concerns. However, one concern remains: the assumption of the use of flashboards. We share DER's reservations permitting their use. Until otherwise convinced, we believe the potential adverse impacts upon the public far outweigh the benefits of their use. A decision on the use of flashboards should be made before final facility design approval or as a condition of license.

Spillway Flow Allocation

A 100 cfs minimum spillway flow will be provided from sunset to sunrise with an additional 300 cfs to augment this flow during daylight hours. The additional flow results from the reduction of flows into the power plant. During the day-time this would provide a 400 cfs spillway flow under stabilized ponding conditions, seemingly an aesthetically attractive amount. However, this flow can be expected to fluctuate; during the low flow period the spillway flow may frequently be less.

Congressman Coughlin
Flat Rock Dam; Amendment to License Application
Page 2

Dissolved oxygen monitoring will be the key to assuring environmentally responsive flows to the remaining uses.

The spillway flow is less than we previously supported and may not be an acceptable compromise. Apparently, the Fish Commission is pushing for a higher minimum nighttime flow. This issue requires further discussion and cannot be satisfactorily resolved until conditions and assurances are detailed more clearly in black and white.

FERC Licensing

The applicant has requested that FERC accept this newest proposal as being a minor revision of its license application, a finding which would be a step toward concluding the licensing process.

Although we do not wish to delay the project unnecessarily, this project will set a precedent for resolution of the other hydroelectric proposals on the Schuylkill, many which are in Montgomery County. It is important, therefore, that this project be reviewed, a good design plan prepared and, when built, carefully monitored.

We feel that the proposed modifications constitute a material amendment to the applicant's license application which warrants a re-opening of the review and licensing process.

Sincerely,

Arthur F. Loeben
Director

AFL/SFN/lq

cc: Ralph W. Abele, Exec. Dir., PA Fish Comm.
Lawrence Gleeson, Pres., PA Hydro Develop. Corp.
Sandra B. Handford, Dir., Planning, Lower Merion Twp.
Kenneth Plumb, Sec., FERC
R. Timothy Weston, Assoc. Dep. Sec., Commonwealth of PA

MONTGOMERY COUNTY PLANNING COMMISSION

court house • norristown, pennsylvania 19404 • (215) 278-3722

offices: one montgomery plaza, swede and airy streets, norristown

*File
cc: [unclear]*

November 18, 1985

The Honorable Lawrence Coughlin
U.S. Congress
2467 Rayburn Building
Washington, DC 20515

Re: Amendment to License Application
Flat Rock Dam
FERC #2803-002

Dear Congressman Coughlin:

We have reviewed the referenced application submitted by Energy Supply International for licensing of the proposed hydroelectric project. We forward this letter as a report of our review and recommendations.

The applicant's submittal proposes a design which has become increasingly responsive to concerns of the various agencies. However, we still feel that the proposal does not adequately address our four remaining concerns: 1) the use of flashboards; 2) spillway flow allocation; 3) aesthetic impacts; and 4) recreational opportunities.

Flashboards

The documentation is not sufficient to convince us that the use of flashboards, increasing the elevation of the dam pool, will not adversely impact upstream areas. The impact of the increased water level on the canal must also be examined in greater detail. In addition, the proposal does not offer adequate proof that the "fail-safe" mechanism will ensure downstream safety in the event of a flood. The sole benefit from the use of flashboards appears to be more water through the turbine thus a greater water flow. Until the hydrologic evidence is more persuasive, we remain in position that the installation of flashboards not be permitted.

Spillway Flow Allocation

The proposed spillway flow of 250 cfs is far less than we previously supported and is not an acceptable compromise. Earlier this year the applicant proposed a 400 cfs spillway flow during daytime hours but is now proposing less. Again we advocate a minimum spillway flow of 650 cfs, in accordance with our original position.

Aesthetic Impact

In our view, the use of flashboards would present an aesthetic disturbance to the scenic and historic resources of the area. The graceful appearance of the cascade as it flows over the spillway will be greatly altered, and in our view unnecessarily.

Recreational Opportunities

We would like to see detailed plans and elevations of the project, including a definitive design of the recreational facilities. We would like absolute assurance that the recreational amenities of the area will be enhanced and that opportunities for recreational enjoyment of the dam pool, canal, river banks, and downstream stretches will not be impaired by this project; the continuity of the river greenway must be addressed through proper design. Furthermore, the design of these facilities should be coordinated with Lower Merion Township and the City of Philadelphia.

It is our belief that further refinements to the proposal can achieve our goals, and meet the needs of the applicant. We urge further design changes to this amended application.

Sincerely,

Arthur F. Loeben
Director

AFL/SFN/rlm

cc: Paul Baker Bartle, Chairman, Montgomery County Commissioners
Ralph W. Abele, Exec. Dir., PA Fish Commission
R. Timothy Weston, Assoc. Dep. Sec., PA DER
Jason D. James, Operations Manager, ESI
Sandra B. Handford, Dir. of Planning, Lower Merion Township
Stewart R. Cades, Montgomery County Planning Commission Board

MONTGOMERY COUNTY PLANNING COMMISSION

court house • norristown, pennsylvania 19404 • (215) 278-3722
offices: one montgomery plaza, swede and airy streets, norristown

CC = L. Gleason
(2)

January 7, 1987

TO: Flat Rock Interested Parties
FROM: Arthur F. Loeben, Director
RE: Montgomery County's Petition to Intervene before FERC

Arthur F. Loeben

Enclosed is a copy of Montgomery County's Petition to Intervene before the Federal Energy Regulatory Commission in the matter of the Flat Rock Dam Hydroelectric Project (Project No. 2803-001). As per the Commission's Rules of Procedure, this Petition is being sent to all prior intervenors in this proceeding (Attachment B) and to other interested parties as well. If you have any comments or questions concerning Montgomery County's action, please feel free to contact me.

*Received
1-13-87
John K. Lin
PHDC*

BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Project No. 2803-001

MOTION TO INTERVENE
BY
COUNTY OF MONTGOMERY

Notice of Application for License
(March 4, 1982)

Filed by the
County of Montgomery
Through the Planning Commission

FREDERIC M. WENTZ
Solicitor
County of Montgomery
Courthouse
Norristown, Pennsylvania 19404

Attachment B

Pennsylvania Hydroelectric Development Corporation
P.O. Box 814
King of Prussia, Pennsylvania 19406

R. Timothy Weston, Associate Deputy Secretary
Office of Resources Management
Department of Environmental Resources
P.O. Box 1467
Harrisburg, Pennsylvania 17120

John E. Childe, Jr.
Asst. Counsel
Department of Environmental Resources
P.O. Box 2357
Room 518 - Executive House
Harrisburg, Pennsylvania 17120

William J. Marrazzo
Water Commissioner
Philadelphia Water Department
1180 Municipal Services Building
Philadelphia, Pennsylvania 19107

Marguerite R. Goodman
General Counsel
Philadelphia Water Department
1180 Municipal Services Building
Philadelphia, Pennsylvania 19107

John Z. Cannon
Beveridge & Diamond
1333 New Hampshire Ave., N.W.
Washington, D.C. 20036

Eugene J. Bradley
Philadelphia Electric Co.
2301 Market Street
Philadelphia, Pennsylvania 19101

Peyton G. Bowman III
Reid & Priest
1111 19th St., N.W.
Washington, D.C. 20036

Robert Grodinsky
Franklin, Grodinsky and Boonin
Suite 1200, 2000 Market Street
Philadelphia, Pennsylvania 19103

Joseph J. Donahue
President, Connelly Containers, Inc.
Richters Ferry Road & Schuylkill River
Bala Cynwyd, Pennsylvania 19004

BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Project No. 2803-001

MOTION TO INTERVENE
BY
COUNTY OF MONTGOMERY

Pursuant to Rule 214 of the Commission's Rules of Practice & Procedure, 18 C.F.R. Section 385.214, the County of Montgomery hereby petitions to intervene out of time in the above-captioned proceedings. In support of this petition the County states as follows:

1. Petitioner is the governing body of the jurisdiction (Montgomery County, Pennsylvania) within which the powerhouse and access roads of Project 2803-001 are to be constructed. Petitioner is also the owner of 31 acres of county parkland directly upstream from the proposed project. Therefore, Petitioner has an interest in the license proceeding which is separate and distinct from any party.

2. Communications with respect to this Petition should be addressed to:

Arthur F. Loeben, Director
Montgomery County Planning
Commission
201 One Montgomery Plaza
Norristown, PA 19404

Frederic M. Wentz, Solicitor
County of Montgomery
Courthouse
Norristown, PA 19404

3. Petitioner has been involved in this project for more than five years in an advisory capacity. Petitioner has attended numerous meetings with state and local agencies and the Applicant, and has offered suggestions for design modifications to the proposed facility in response to concerns of these agencies and other interested parties. Petitioner did not intervene during the original intervention period because at that time the applicant proposed to locate the powerhouse on the north side of the river, in Philadelphia County, and thus did not directly affect County lands.

4. Petitioner's position with respect to this project changed when the Applicant filed a Draft Project Modification re-locating the powerhouse and fish passage facility to the south end of the dam within Montgomery County. The modification was incorporated into the application in June of 1986, along with a waiver

by the Commission of the finding that the proposed modification constituted a material amendment to the application. Because of these actions, it is now appropriate for Petitioner to become a party to the Project 2803 proceeding.

5. Petitioner objects that several major issues concerning the proposed modifications have not been adequately addressed. These include:

- a. The impact of construction of the powerhouse on the riverbank and adjacent lands;
- b. The impact of construction on lands owned by Lower Merion Township, including River Road, which is a gravel drive over Township-owned property adjacent to the dam;
- c. The impact of changes in water level on the lands of Spring Mill Park, owned by Montgomery County, approximately two miles upstream from the dam, and on the fishery resources of the park;
- d. The impact of the proposed flashboards across the top of the dam on the scenic quality of the dam and pool;
- e. The impact of the entire project upon the public use and enjoyment of the riverbanks adjacent to the dam.

6. Petitioner is not adequately represented by existing parties to the license proceeding, and may be adversely affected by the Federal Energy Regulatory Commission's action.

7. Petitioner is an interested party to the licensing proceeding within the meaning of Section 308(a) of the Federal Power Act, and its intervention will be in the public interest.

WHEREFORE, Petitioner respectfully requests that its participation in the license proceeding of Project 2803-001 be authorized by order of the Commission.

Respectfully submitted:

FREDERIC M. WENTZ
Counsel for Petitioner

Dated:

VERIFICATION

I, Arthur F. Loeben, Director of the Montgomery County Planning Commission, do hereby affirm that I am duly authorized to execute, verify and file with the Federal Energy Regulatory Commission the foregoing document on behalf of the County of Montgomery, and that I have read the contents thereof and that the statements contained therein are true and correct to the best of my knowledge or information and belief.

Arthur F. Loeben

Sworn to and subscribed
before me this 6th day
of January, 1987.

Notary Public

ROSE LASORDA, Notary Public
Norristown Borough, Montgomery County, Pa.
My Commission Expires May 14, 1987

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon all parties of record in this proceeding in accordance with the requirements of Section 1.17 of the Rules of Practice and Procedure, on

Arthur F. Loeben

APPENDIX B
CORRESPONDENCE TO OR FROM FERC

CONTENTS

- 10/20/82 - Petition to Intervene B-5
- 03/24/82 - Commonwealth of Pennsylvania-Pennsylvania Historical and Museum Commission B-12
- 10/08/82 - Commonwealth of Pennsylvania-Pennsylvania Historical and Museum Commission B-14
- 11/01/82 - Application of Pennsylvania Hydroelectric Development Corporation -- Flat Rock Project - Exhibits B-15
- 03/04/82 - Notice of Application for License B-16
- 11/02/82 - Verification B-17
- 11/01/82 - Certificate of Service B-18
- 11/01/82 - Application of Pennsylvania Hydroelectric Development Corporation -- Flat Rock Project - Answer and Response of Pennsylvania Hydroelectric Development Corporation to Petition to Intervene of Connelly Containers, Inc. B-20
- 02/03/83 - Kenneth F. Plumb, Secretary, FERC B-28
- 02/03/83 - Certificate of Service B-31
- 02/22/84 - The Honorable Ray J. O'Connor, Chairman, FERC B-32
- 05/14/84 - Mr. Lawrence R. Anderson, Director, Office of Electric Power Regulation, FERC B-34
- 06/12/84 - Kenneth F. Plumb, Secretary, FERC B-35
- 05/05/85 - Kenneth F. Plumb, Secretary, FERC B-37
- 03/14/86 - Kenneth F. Plumb, Secretary, FERC B-41
- 10/07/87 - Honorable Lawrence Coughlin, House of Representatives B-43

10-20-82

70-0-20-1082

BEFORE THE
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

PETITION TO INTERVENE
on behalf of Connelly Containers, Inc.

in
Pennsylvania Hydroelectric Development Corporation
Application For License #2803.

by

Connelly Containers, Inc.

Righters Ferry Road & the Schuylkill River

Bala Cynwyd, Pennsylvania 19004

PETITION TO INTERVENE
PROJECT NO. 2803
THE FEDERAL ENERGY REGULATORY COMMISSION
BY CONNELLY CONTAINERS, INC.

1. CONNELLY CONTAINERS, INC. (Petitioner) petitions the Federal Energy Regulatory Commission (FERC) to intervene in the Flat Rock Dam Project, described as FERC Project No. 2803. The Applicant for the license is the Pennsylvania Hydroelectric Development Corporation (PHDC).

2. Petitioner is a Pennsylvania corporation with its principal office located at Righters Ferry Road and the Schuylkill River, Bala Cynwyd, Pennsylvania, 19004.

3. Petitioner manufactures and sells paperboard containers. Presently the office and mill employ 366 people of whom many are residents of Philadelphia.

4. Petitioner's paper mill is located in Philadelphia on Venice Island which is bounded on the west side by the Schuylkill River and on the east side by the Manayunk Canal. The mill is about one mile below the Flat Rock Dam.

5. Presently Petitioner uses traditional forms of electrical energy. Petitioner proposes to withdraw 600 c.f.s. of water from the canal to be diverted into and under its mill where it will drive a hydraulic turbine. It is estimated that generating power by means of a hydraulic turbine at the mill will result in a 50% savings of energy costs with no harmful environmental effects.

6. In the past several years Petitioner has been negotiating with the City of Philadelphia about plans for its hydraulic turbine.

7. Petitioner is not opposed in principle to the Applicant's water power project. However, it needs to be assured that the necessary 600 c.f.s. of water in the canal will be available when its hydraulic turbine plan is approved. 600 c.f.s. is a relatively small portion of the flow of water available for the Flat Rock Dam Project.

8. In February, 1978, Petitioner received a letter from the Applicant about the Flat Rock Dam Project in its planning stage. Several years later, to wit on December 23, 1981, Applicant filed its application for a license with the FERC.

9. Petitioner was unaware that the application for a license for FERC Project No. 2803 had been filed in December, 1981.

10. In October, 1982, Petitioner retained the legal firm of Franklin/Grodinsky/Boonin, Suite 1200, 2000 Market Street, Philadelphia, Pennsylvania, 19103, to represent it in its efforts to obtain the necessary approval required to build a hydraulic turbine at its plant on the Manayunk Canal.

11. On October 8, 1982, Susan Bartow, Esquire of that office examined file No. 2803 at the FERC offices in Washington, D.C. On that date, for the first time, Petitioner learned that a Petition to Intervene should have been filed on or before May 12, 1982.

12. There are presently three outstanding Petitions to Intervene; the intervenors are the Pennsylvania Department of Environmental Resources, Philadelphia Electric Company, and the City of Philadelphia Water Department. In addition, The Container Corporation of America has filed "Comments" to the Application of PHDC.

13. To date, the FERC has not taken action on the Application of PHDC, so that the delay in filing this Petition to Intervene has had no adverse effect on the rights of the Applicant.

14. Petitioner believes that it is imperative that it be permitted to intervene. The granting of the license without its interests being considered may have extremely detrimental effects to Petitioner, its employees and its customers. In this time of a national

energy crisis, alternative methods of production of energy must be fully explored.

WHEREFORE, Petitioner asks that the Commission grant it leave to intervene in FERC Project No. 2803.

Respectfully Submitted,

CONNELLY CONTAINERS, INC.

By:

Joseph J. Donahue, President

OF COUNSEL:

Robert S. Grodinsky, Esq.
Susan Bartow, Esq.
Franklin/Grodinsky/Boonin
Suite 1200
2000 Market Street
Philadelphia, PA 19103
215-L01-1520

COMMONWEALTH OF PENNSYLVANIA :
: SS.
COUNTY OF PHILADELPHIA

JOSEPH J. DONAHUE, being duly sworn according to law, deposes
and says that he is President of Connelly Containers, Inc. and that the
facts set forth in the foregoing Petition to Intervene are true and
correct to the best of his knowledge, information and belief.

JOSEPH J. DONAHUE

SWORN TO AND SUBSCRIBED
BEFORE ME THIS 19TH DAY
OF OCTOBER, 1982.

NOTARY PUBLIC

MARIE O. NOVAK, Notary Public
LOWER MERION TWP., MONT. CO.
My Commission Expires November 19, 1984

CERTIFICATE OF SERVICE
PROJECT NO. 2803
THE FEDERAL REGULATORY COMMISSION
BY CONNELLY CONTAINERS, INC.

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list compiled by the Secretary in this proceeding in accordance with the requirements of §1.17 of the Rules of Practice and Procedure.

Dated this 20th day of October, 1982.

ROBERT S. GRODINSKY, ESQ.

Of Counsel for
Connelly Containers, Inc.

COMMONWEALTH OF PENNSYLVANIA RECEIVED MAR 26 1982
PENNSYLVANIA HISTORICAL AND MUSEUM COMMISSION
WILLIAM PENN MEMORIAL MUSEUM AND ARCHIVES BUILDING
BOX 1026
HARRISBURG, PENNSYLVANIA 17120

March 24, 1982

Elizabeth Higgs
Project Manager
Pennsylvania Hydroelectric
Development Corporation
P.O. Box 814
King of Prussia, Pennsylvania 19406

Re: Flat Rock Dam, Philadelphia
FERC Permit #2803
ER 81-131-1015

Dear Ms. Higgs:

When you, Dr. Richard Tyler and I met on March 18 our discussion focused on the visual impact of the proposed powerhouse on the upper lock/gatehouse area of the Manayunk Canal. Dr. Tyler and I agreed that the effect of the new construction on the historical environment in this area would be minimized if the powerhouse was comparable in height and compatible in exterior form and finish to the adjacent spillway wall. We also agreed that the height of the stairtower may be the most intrusive feature of the new construction and Dr. Tyler inquired about the possibility of incorporating the stairtower into the existing gatehouse. Please comment upon the feasibility of this suggestion or upon other options for rendering the stairtower less obtrusive. The Bureau for Historic Preservation looks forward to reviewing final exterior plans for the new powerhouse and to being consulted on any treatments effecting the historic material of the gatehouse and upper lock area.

A second effect discussed was that of increased water level and/or flow rate on the canal and particularly on the lower lock. After subsequent evaluation it is the Bureau for Historic Preservation's opinion that an increased water level and/or flow rate could have serious effects on the canal and lock. Our concerns include doubt over the capacity of the canal walls to retain the increased level and/or flow rate, particularly in areas where the walls have dried out, and serious concern over the present unstable condition of the lower lock. It is further our opinion that the effect of including in this project flow release into the Manayunk Canal must be thoroughly analyzed by a professional qualified in historical engineering. Acceptance of their report by the Bureau for Historic Preservation and appropriate

Elizabeth Higgs
Page 2
March 24, 1982

action to Pennsylvania Hydro would be necessary to avoid or mitigate this effect.

Alternatively, can this project be designed to exclude flow release into the canal? This would significantly reduce the potential effects of the project on historic resources.

Sincerely,

Greg Ramsey, Chief
Division of Planning & Protection
Bureau for Historic Preservation
(717) 783-6947

GR/vms

cc: Mr. William J. Marrazzo
Mr. Peter Duncan
Dr. Richard Tyler

RECEIVED OCT 14 1982

COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA HISTORICAL AND MUSEUM COMMISSION
WILLIAM PENN MEMORIAL MUSEUM AND ARCHIVED BUILDING
BOX 1026
HARRISBURG, PENNSYLVANIA 17120

October 8, 1982

Ms. Elizabeth S. Higgs
Project Manager
Pennsylvania Hydroelectric Development Corp.
P.O. Box 814
King of Prussia, Pennsylvania 19406

Re: Flat Rock Dam Hydro Project
FERC No. 2803-001
File No. ER 81-101-1015

Dear Ms. Higgs:

The Bureau for Historic Preservation has completed our review of "Detailed Plan to Avoid and/or Mitigate Any Adverse Impacts to the Property" (Manayunk Canal) which you brought to our meeting on September 29.

We agree with the approaches recommended to avoid or mitigate visual impacts, impact of altered flow in the Manayunk Canal, impacts on archeological resources and vandalism. The effect of altered flow on the Manayunk Canal cannot be determined at this time but will be determined during the detailed design phase. Mitigation or avoidance will have to be considered at that time in consultation with the State Historic Preservation Officer and the Advisory Council on Historic Preservation if adverse effects are determined. Similarly consultation for mitigation or avoidance will be necessary if significant archeological resources are discovered in the archeological survey.

It was also noted during our meeting that the National Register office will evaluate the Manayunk Canal for eligibility upon receipt of a letter of request from the Federal Energy Regulatory Commission.

Sincerely,

Greg Ramsey
Greg Ramsey, Chief
Division of Planning & Protection
Bureau for Historic Preservation
(717) 783-8947

cc: Edwin Slatter, FERC

GR:jk

11-1-82

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

* * * * *
In Re: *
APPLICATION OF PENNSYLVANIA *
HYDROELECTRIC DEVELOPMENT *
CORPORATION -- FLAT ROCK *
PROJECT *
* * * * *

OEPR-#2803

EXHIBITS

The attached Exhibits are hereby made a part of the Answer and Response of Pennsylvania Hydroelectric Development Corporation filed this 1st day of November, 1982, and are a true and correct copy of the documents constituting the Exhibits and retained in the records of Pennsylvania Hydroelectric Development Corporation.

PENNSYLVANIA HYDROELECTRIC
DEVELOPMENT CORPORATION

By:

John W. Gulliver

11-1-82

VERIFICATION

STATE OF MAINE
CUMBERLAND, SS.

November 1, 1982

Personally appeared the above-named JOHN W. GULLIVER, being first duly sworn, and deposed and stated that he is the duly authorized attorney for Pennsylvania Hydroelectric Development Corporation, that the foregoing Answer and Response and Exhibits be his free act and deed in his said capacity and the free act and deed of Pennsylvania Hydroelectric Development Corporation; that he has read the foregoing Answer and Response and Exhibits and knows the contents therein; that the same are true to the best of his knowledge and belief.

Subscribed and Sworn to:

Before me,

Notary Public

MY COMMISSION EXPIRES
JANUARY 2, 1987

CERTIFICATE OF SERVICE

STATE OF MAINE
CUMBERLAND, ss.

November 1, 1982

I, John W. Gulliver, Attorney for Pennsylvania Hydro-electric Development Corporation, do hereby certify that I made service of the Answer and Response of Pennsylvania Hydro-electric Development Corporation to the Petition to Intervene of Connelly Containers, Inc., upon all parties of record by depositing copies of the same in the United States Mail, postage prepaid, addressed as follows:

Mr. R. Timothy Weston
Associate Deputy Secretary
Office of Resources Management
Department of Environmental Resources
P.O. Box 1467
Harrisburg, PA 17120

John E. Childe, Jr., Esq.
Assistant Counsel
Department of Environmental Resources
P.O. Box 2357
Room 518 - Executive House
Harrisburg, PA 17120

Mr. William J. Marrazzo
Water Commissioner
Philadelphia Water Department
1180 Municipal Services Building
Philadelphia, PA 19107

Marguerite R. Goodman, Esq.
General Counsel
Philadelphia Water Department
1180 Municipal Services Building
Philadelphia, PA 19107

Eugene J. Bradley, Esq.
Associate General Counsel
Philadelphia Electric Company
2301 Market Street
Philadelphia, PA 19107

Peyton G. Bowman, III, Esq.
Brian J. McManus, Esq.
Reid & Priest
1111 19th Street, N.W.
Washington, D.C. 20036

Robert S. Grodinsky, Esq.
Franklin, Grodinsky & Boonin
Suite 1200
2000 Market Street
Phildelphia, PA 19103

DATED: November 1, 1982

John W. Gulliver, Attorney for
Pennsylvania Hydroelectric
Development Corporation

11-1-82

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

* * * * *
In Re: *
APPLICATION OF PENNSYLVANIA *
HYDROELECTRIC DEVELOPMENT *
CORPORATION -- FLAT ROCK *
PROJECT *
* * * * *

OEPR-#2803

ANSWER AND RESPONSE OF PENNSYLVANIA HYDROELECTRIC
DEVELOPMENT CORPORATION TO PETITION TO INTERVENE
OF CONNELLY CONTAINERS, INC.

NOW COMES Pennsylvania Hydroelectric Development Corpora-
tion ("PA Hydro") and, pursuant to Rule 214(c) of the Rules of
Practice and Procedure of the Federal Energy Regulatory Commis-
sion ("Commission"), 18 C.F.R. §385.214(c), responds to the
Petition to Intervene ("Petition") submitted by Connelly Con-
tainers, Inc., ("Connelly Containers") as follows:

I. COMMUNICATIONS

All communications concerning this matter should be ad-
dressed as follows:

Lawrence Gleeson, President
Pennsylvania Hydroelectric Development Corporation
P.O. Box 814
King of Prussia, PA 19406

John W. Gulliver, Esq.
Pierce, Atwood, Scribner, Allen, Smith & Lancaster
One Monument Square
Portland, ME 04101

II. PROCEDURAL HISTORY

1. Commencing in 1975, PA Hydro began to examine the
feasibility of restoring the Flat Rock Dam, located on the

Schuylkill River, in Philadelphia, Pennsylvania, to hydroelectric production ("the Project"). In 1977, PA Hydro applied for, and subsequently received from the Commission, a preliminary permit for the Project under the Federal Power Act. The permit granted PA Hydro a period of 36 months in which to complete feasibility studies on the Project and to file an application with the Commission for a Project license. Pursuant to public notice of PA Hydro's application for said preliminary permit, parties with an interest in the proceeding were given the opportunity to file comments, protests, or petitions to intervene. Connelly Containers filed no such comment, protest or petition to intervene with respect to PA Hydro's preliminary permit application.

2. Pursuant to the preliminary permit, PA Hydro conducted extensive engineering, environmental and economic surveys of the feasibility of rehabilitating the Flat Rock Dam for hydroelectric generation. As part of these studies, PA Hydro sought the comments of various federal, state, and local agencies, and of private citizens, including Connelly Containers. As Connelly Containers admits in paragraph 8 of its Petition to Intervene, it received in February, 1978 a letter from PA Hydro informing it of the proposed rehabilitation of the Flat Rock Dam. Connelly Containers, however, made no response this notice of PA Hydro's intent to pursue the Flat Rock Project.

3. On the basis of its feasibility studies and the comments received from various governmental agencies and other parties, PA Hydro, on or about December 22, 1981, submitted its

"Application for License" for the Project ("Application"). By its letter dated February 23, 1982, the Commission accepted the Application for filing as of the submittal date.

4. Public notice of acceptance of the Application for filing was made, both in the Federal Register and in Philadelphia area newspapers. A copy of said public notice is attached hereto as Exhibit A, and made a part hereof. Pursuant to the terms of said notice, comments, protests or petitions to intervene filed by the public were required to be submitted to the Commission on or before May 12, 1982.

5. Notwithstanding the public notice of the Application and of the May 12, 1982, date by which protests, comments, or petitions to intervene were to be filed with respect to the Application, the public notice with regard to the application for the preliminary permit, or PA Hydro's February, 1978 letter informing Connelly Containers of the Project, Connelly Containers did not file any pleadings in these proceedings until its Petition to Intervene dated October 20, 1982.

6. It is in response to this late-filed Petition that PA Hydro has filed this Answer and Response.

III. RESPONSE TO PETITION

1. As the facts clearly demonstrate, and as Connelly Containers frankly admits in Paragraph 11 of its Petition, the Petition to Intervene has not been timely filed. Indeed, the Petition to Intervene has been filed more than five months after the May 12, 1982, date established for the filing of comments, protests, or petitions to intervene.

2. Rule 214(b)(3) of the Commission's Rules of Practice and Procedure, 18 C.F.R §385.214(b)(3), requires that late-filed petitions to intervene must show "good cause" why the time limitation for such petitions should be waived. Connelly Containers has failed to show such good cause. Instead, Connelly Containers merely has stated that in October, 1982, it retained legal counsel to represent it in efforts to obtain necessary approval to build a hydraulic turbine at its plant on the Manayunk Canal in Philadelphia, Pennsylvania and in the course of such review, determined that its Petition to Intervene should have been filed on or before May 12, 1982. Connelly Containers has not presented any other evidence allegedly constituting good cause for its late-filed petition. However, the failure to heed Commission notices concerning the date by which petitions to intervene must be filed wholly fails to constitute good cause justifying an untimely petition. Connelly Containers has shown no extraordinary circumstances excusing its tardiness in filing its Petition; leave to file the Petition should be denied.

3. The granting of Connelly Containers' Petition to Intervene at this late date is likely to cause disruption of the licensing proceeding with regard to PA Hydro's Application. See, Rule 214(d)(ii), 18 C.F.R. §385.214(d)(ii). The Application was accepted for filing as of December 21, 1981, more than ten months ago. Comments have been obtained from all federal, state and local agencies reviewing the Application. In addition, a number of other Petitions to Intervene from

interested parties, including the City of Philadelphia Water Department, the Philadelphia Electric Company, and the Commonwealth of Pennsylvania Department of Environmental Resources, were submitted to and received by the Commission on a timely basis. Review of PA Hydro's Application by the Commission staff, in light of agency comments and of the comments of Intervenor, has proceeded and is nearing conclusion. Granting of Connelly Containers' late-filed Petition to Intervene at this date, with its proposal to withdraw 600 cfs of water from the Manayunk Canal, is likely to cause significant disruption of the proceedings at this late date.

4. Moreover, the granting of Connelly Containers' Petition to Intervene is likely to cause prejudice to or place additional burdens upon the existing parties to the proceeding. See, Rule 214(d)(iii), 18 C.F.R. §385.214(D)(iii). Review and analysis of Connelly Containers' proposal to withdraw and divert 600 cfs of water from the Manayunk Canal will require extensive economic, environmental and engineering analyses by both the Commission staff and by other parties to the proceeding, including PA Hydro and the Intervenor. This further review and analysis will place significant additional financial and time burdens on the existing parties to the proceeding.

5. Finally, Connelly Containers' proposal to divert 600 cfs of water from the Manayunk Canal would pose severe economic, environmental and aesthetic problems at the Project site:

A. Diversion of 600 cfs of water is likely to render PA Hydro's Flat Rock Dam Project economically unfeasible. As PA Hydro has explained in materials previously furnished to the Commission, the maximum diversion of water for purposes other than power production which allows the Project to remain economically feasible is approximately 330 cfs, the minimum flow requirement recommended by the Commonwealth of Pennsylvania Department of Environmental Resources. The additional diversion of 600 cfs proposed by Connelly Containers, when combined with other proposed diversions for fish passage facilities and minimum flow requirements in the Manayunk Canal, would bring the total diversion of water unavailable for power production at the Flat Rock Dam Project to over 1000 cfs. This large - 1000 cfs - diversion would render the Flat Rock Dam Project economically unfeasible. Nonetheless, it was the PA Hydro proposal for redevelopment of the Flat Rock Dam which first received preliminary permit approval from the Commission in 1977, and the license application for which was submitted to and accepted by the Commission as of December, 1981. Some five years after the issuance of the preliminary permit, and nearly a year after submission of the license application, Connelly Containers now has proposed an alternative use of the water resource of the Manayunk Canal, a proposal which has been filed too

late, and which would have a substantially adverse effect on the Flat Rock Project.

- B. Diversion of an additional 600 cfs of water from the Manayunk Canal would raise substantial difficulties with operation of the fish passage scheme already proposed for the Flat Rock Project. Such an additional diversionary flow could result in interference with expected fish migratory patterns and could result in increased fish mortality rates.
- C. Diversion of an additional 600 cfs of water in the Manayunk Canal is likely to result in severe damage and erosion to the Canal. As is explained in letters from the Commonwealth of Pennsylvania, Pennsylvania Historical and Museum Commission, to PA Hydro, dated March 24, 1982, and October 8, 1982, copies of which are attached hereto as Exhibits B and C respectively, the Manayunk Canal is a significant historical resource which is being considered for inclusion in the National Register of Historic Places. The Pennsylvania Historical and Museum Commission has verbally indicated to PA Hydro that a flow in the Canal in the range of 30 cfs to 50 cfs may be the maximum flow permissible consistent with preservation of archeological and historical resources and the mitigation of Canal bank erosion. The proposed diversionary flow raised in Connelly Containers' Petition to Intervene

is likely to exacerbate erosion of the Canal and destruction of this historical resource.

6. In short, Connelly Containers' Petition to Intervene must be denied, both because it is untimely filed without good cause having been shown for its late-filing, and because the Petition to Intervene on its merits proposes use of the Manayunk Canal which would have a substantially adverse effect on the economic feasibility of the Flat Rock Dam Project, and substantial adverse effects on environmental, aesthetic and historic resources.

WHEREFORE, Pennsylvania Hydroelectric Development Corporation requests that the Commission reject the late-filed Petition to Intervene of Connelly Containers, Inc., and that the Commission grant its Application for License for the Flat Rock Dam Project.

IN WITNESS WHEREOF, Pennsylvania Hydroelectric Development Corporation has hereby caused its name to be hereunto signed and its seal to be hereunto affixed by John W. Gulliver, its attorney, thereunto authorized, this 1st day of November, 1982.

WITNESS:

_____

PENNSYLVANIA HYDROELECTRIC
DEVELOPMENT CORPORATION

By: _____
John W. Gulliver

FRANKLIN · GRODINSKY · BOONIN
PROFESSIONAL CORPORATION · LAW OFFICES
SUITE 1200 · 2000 MARKET STREET
PHILADELPHIA, PA. 19103 · (215) 561-1520

February 3, 1983

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

Re: FERC Project No. 2803
Pennsylvania Hydroelectric Development Corporation

Dear Mr. Plumb:

Your file on the above project will disclose a Petition to Intervene by Connelly Containers (Connelly) filed in October, 1982 and an Answer and Response by Pennsylvania Hydroelectric Development Corporation (PA Hydro) filed on November 1, 1982. It is not the purpose of this letter to review the responsive pleadings of PA Hydro. However, a short replication may be helpful.

In its Answer, PA Hydro refers to the failure of Connelly to file its Petition for Intervention prior to May 12, 1982. This is true. Connelly admits that its Petition to Intervene was filed late.

PA Hydro contends that the granting of Connelly's Petition to Intervene "is likely to cause prejudice to or place additional burdens upon the existing parties to the proceedings." It refers in its Paragraph 4 to the proposal by Connelly to withdraw and divert 600 cfs of water from the Manayunk Canal as requiring extensive economic, environmental and engineering analysis. It further refers in Paragraph 5 to the proposal to divert 600 cfs of water as posing severe economic, environmental and aesthetic problems on the project site. Finally, it contends in its Paragraph 6 that there will be a substantial adverse effect on the economic feasibility of the Flat Rock Dam Project if Connelly is permitted to intervene.

The equitable responsibilities of the Federal Energy Regulatory Commission (FERC) require that it considers the possible adverse effects on Connelly as well as the supposed adverse effects on PA Hydro. The plant which Connelly owns and operates for the last twenty-five (25) years has been on Venice Island adjacent to the canal since the 18th century. It employs 360 persons from the Philadelphia area. Its Petition for Intervention refers specifically to the necessity of protecting these jobs, and to the fact that its inability to reduce

energy costs may have detrimental effects on its customers as well as these employees. The Petition for Intervention does not ask for a determination between the respective adverse effects of PA Hydro and Connelly; rather it gives Connelly an opportunity to present such adverse effects of the proposed Flat Rock Dam on its operation.

The Commission has before it Petitions for Intervention that have been filed by the Pennsylvania Department of Environmental Resources, Philadelphia Electric Company and the City of Philadelphia Water Department. The latter intervention petition specifically alleges a concern that the project of PA Hydro may not permit a sufficient flow of water in the Manayunk Canal for use by industry on the Canal. The only industrial concern on the Canal interested in using the water to which the City of Philadelphia Water Department refers is Connelly.

After Connelly's Petition to Intervene was filed, the Presidents of Connelly and PA Hydro attempted to negotiate a settlement of the differences between their companies so that the Flat Rock Dam Project could remain economically feasible for PA Hydro, and Connelly could also obtain the flow of water it needed for its proposed hydraulic turbine use. During the negotiations, Connelly suggested that its need for water could possibly be reduced below 600 cfs. PA Hydro promised to negotiate further, but thus far has not done so. If the Petition for Intervention is not permitted, the negotiations between PA Hydro and Connelly place Connelly in an unfair and inequitable position, in that it will not be permitted to present its views before the Commission as to the hardships it will face.

PA Hydro seeks administrative sanction for a license to utilize the community's water flow in the Schuylkill River to generate electricity for private sale at a profit. A licensing authority should be permitted, at its discretion, to invoke equitable considerations when hearings are held to determine the propriety of granting the license. "He who seeks equity must do equity." This aphorism is usually applied to procedures in Courts of Equity. However, an administrative body, in this case the FERC, grants this license, not as a matter of right or law, but with equitable discretion in order to enhance and make more efficient the use of energy inherent in the water supply in the Schuylkill River. Accordingly, the claims of PA Hydro for a license to use this water must also not be harsh and oppressive on Connelly.

Mr. Kenneth F. Plumb

February 3, 1983

Page Three

Wherefore, it is respectfully requested that Connelly's Petition to Intervene be granted. Only in this way can the application for a license by PA Hydro be fairly considered by the Commission so that all necessary parties effected by the project will have an opportunity to be heard. This will make a fair and proper decision by the Commission more certain.

Respectfully,

Robert S. Grodinsky

RSG/sam

cc: Mr. R. Timothy Weston
John E. Childs, Jr., Esq.
Mr. William J. Marrazzo
Marguerite R. Goodman, Esq.
Eugene J. Bradley, Esq.
Mr. Lawrence Gleeson
Mr. Fred E. Springer
~~John~~ John W. Gulliver, Esq.

COMMONWEALTH OF PENNSYLVANIA :
: SS
COUNTY OF PHILADELPHIA :

CERTIFICATE OF SERVICE

I, ROBERT S. GRODINSKY, Attorney for Connelly Containers do hereby
certify that I sent copies of my February 3, 1983 letter to Kenneth F.
Plumb at the Federal Energy Regulatory Commission to the following people:

Mr. R. Timothy Weston
Associate Deputy Secretary
Office of Resources Management
Department of Environmental Resources
P.O. Box 1467
Harrisburg, PA 17120

John E. Childs, Jr., Esq.
Assistant Counsel
Department of Environmental Resources
P.O. Box 2357
Room 518 - Executive House
Harrisburg, PA 17120

Mr. William J. Marrazzo
Water Commissioner
Philadelphia Water Department
1180 Municipal Services Building
Philadelphia, PA 19107

Marguerite R. Goodman, Esq.
General Counsel
Philadelphia Water Department
1180 Municipal Services Building
Philadelphia, PA 19107

Eugene J. Bradley, Esq.
Associate General Counsel
Philadelphia Electric Company
2301 Market Street
Philadelphia, PA 19107

Mr. Lawrence Gleeson, President
Pennsylvania Hydroelectric
Development Corporation
P.O. Box 814
King of Prussia, PA 19406

Mr. Fred E. Springer
Chief, Applications Branch
Division of Hydro Power Licensing
Federal Energy Regulatory
Commission
Room 208 RB
825 North Capitol Street
Washington, D.C. 20426

John W. Gulliver, Esq.
Pierce, Atwood, Scribner,
Allen, Smith and Lancaster
One Monument Square
Portland, Maine 04101

February 3, 1983

ROBERT S. GRODINSKY
Attorney For Connelly Containers

Pennsylvania Hydroelectric Development Corporation

22 February, 1984

The Honorable Ray J. O'Connor
Chairman
Federal Energy Regulatory Commission
825 North Capitol Street
Washington, D.C. 20426

RE: License Application
Flat Rock Project
FERC #2803

Subject: Resolution of concerns expressed subsequent
to the application being placed before the
Commission for action regarding licensing.

Since becoming aware of this situation in August, 1983, Pennsylvania Hydro has endeavored to identify and resolve the concerns. The good offices support provided by Congressman Larry Coughlin has facilitated what turned out to be a participatory effort. The attached letter of 26 January, 1984, from Lawrence Gleeson, Pennsylvania Hydro, to the Congressman summarizes Pennsylvania Hydro's understanding of a proposed resolution acceptable to both Pennsylvania Hydro and the majority of other participants. Copies of the letter were distributed to participants and others by the Congressman's staff for comments. Not all comments have been received by the Congressman's office.

As the comment period for this project terminated more than a year ago, it is suggested that the proposal should be regarded as informational for Commission consideration rather than as a modification to the application. Pennsylvania Hydro believes that the proposed resolution effects the project's environmental impact in a beneficial manner only and that this should not be cause for redistribution of the proposed project for general comment. Pennsylvania Hydro would be responsive to Commission suggestions or requirements with respect to this somewhat unusual proceeding.

R.J. O'Connor
FERC
2/22/84
Page Two

Pennsylvania Hydro stands ready to provide whatever is necessary to expeditiously resolve the Flat Rock application, as well as the other related applications for projects on the Schuylkill and Lehigh rivers which Pennsylvania Hydro has before the Commission.

Thank you for your assistance.

Yours truly,

Lawrence Gleeson/cag
Lawrence Gleeson
President

LG/cag

Enclosure:

1/26/84 PA Hydro to L. Coughlin

cc: Lawrence Coughlin

PA DER

PECO

City of Phila. Water Dept.

Connelly Container

Pennsylvania Hydroelectric Development Corporation

14 May, 1984

Mr. Lawrence R. Anderson
Director, Office of Electric
Power Regulation
Federal Energy Regulatory Commission
825 North Capitol Street
Washington, D.C. 20426

RE: Minimum Flow Discussion
Flat Rock Project No. 2803-PA

Several individuals and local groups concerned about the project's potential for environmental impact have recently based their flow requests upon a year round 650 cfs minimum flow recommendation made by representatives of the Pennsylvania Fish Commission in an April 16th meeting in Harrisburg which was also attended by Pennsylvania Hydro representatives.

Pennsylvania Hydro believes that the consequence of such a flow requirement, in terms of reduced energy production, could have a disastrous effect upon the proposed project's economics. Mr Weston of PA DER and Mr. J. Mahoney of Congressman Coughlin's office were notified of this situation on 3 May, 1984.

Pennsylvania Hydro's Fisheries Biologist Consultant, Mr. Gerald Taylor, has suggested that PA Hydro and the Fish Commission consider at this time alternative plans wherein flow releases are routed and varied seasonally in accordance with habitat requirements. Such a study was planned during the first two years of commercial service when the power plant and fishway were both operational. Recently surfaced concerns may dictate an earlier review of this matter.

Attached is a copy of our letter to Mr. Abele of the Fish Commission.

Yours truly,

Lawrence Gleeson
President

*Connolly & Coughlin
on attached dist. list
LG/cag*

SARNER, FRANKLIN, GRODINSKY, MARGULIES & HUNTINGTON

EDWARD SARNER
JIMMY MARGULIES
STEPHEN N. HUNTINGTON
DAVID M. LEWIS
LISAN BARTOW

ROBERT S. GRODINSKY
ROBERT L. FRANKLIN
THOMAS E. WIENER
SAMUEL D. HODGE, JR.

A PROFESSIONAL CORPORATION OF ATTORNEYS AT LAW
28TH FLOOR-2000 MARKET STREET
PHILADELPHIA, PENNSYLVANIA 19103
(215) 561-1530

*Rec'd
6-21-84
SM*

June 12, 1984

3/10/84

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

Re: FERC Project No. 2803
Pennsylvania Hydroelectric Development Corporation (Applicant)

Dear Mr. Plumb:

I am writing on behalf of Connelly Containers, Inc. (Connelly), Bala Cynwyd, Pennsylvania, an intervenor in the above-captioned matter. I had recently written to you on May 18, 1984.

Upon reviewing recent correspondence in this matter, I believe that a clarification of the position of Connelly would be helpful. Connelly's Petition for Intervention states in paragraph 7 that Connelly is not opposed in principle to the Applicant's water project. The paragraph states further that Connelly needs to be assured that 600 cfs of water will be available in the Manayunk Canal when Connelly's hydraulic turbine plan is approved.

After the Petition for Intervention was filed, discussions were held between representatives of Connelly and representatives of the Applicant, the purpose of which was to determine if the hydraulic turbine plan of Connelly and the water power project of Applicant could each be possible with the available water supply from the Schuylkill River. Subsequently, as a result of requests from other interested persons, Congressman Lawrence Coughlin has written, and referred to additional requirements for water flowing over the Flat Rock Dam on the river.

You also have recently received a letter from the City of Philadelphia referring to the necessity of water remaining in the Canal. The water requirements of the City of Philadelphia and of Connelly are complimentary, not exclusive. The 50 cfs of water needed in the Manayunk Canal would be a portion of the water needed by Connelly, and not in addition to it.

Kenneth F. Plumb, Secretary
Federal Energy Regulatory Commission

June 12, 1984

Page 2

Under the present circumstances, and until it is certain that it has a sufficient amount of water needed for its project for use in its industrial plant and industrial development along the Manayunk Canal, Connelly is opposed to the granting of a license to the Applicant.

Respectfully,

ROBERT S. GRODINSKY

RSG/mp

cc: Congressman Lawrence Coughlin
Martha Bush, Esquire
Mr. R. Timothy Weston
John E. Childs, Jr., Esquire
Eugene J. Bradley, Esquire
✓ Mr. Lawrence Gleeson
Mr. Fred E. Springer
John W. Gulliver, Esquire

SARNER, FRANKLIN, GRODINSKY, MARGULIES & HUNTINGTON

LEONARD SARNER
SIDNEY MARGULIES*
STEPHEN N. HUNTINGTON
PAUL M. LEWIS
SUSAN BARTOW

ROBERT S. GRODINSKY
ROBERT L. FRANKLIN
THOMAS E. WIENER**
SAMUEL D. HODGE, JR.

A PROFESSIONAL CORPORATION OF ATTORNEYS AT LAW
28TH FLOOR-2000 MARKET STREET
PHILADELPHIA, PENNSYLVANIA 19103

(215) 561-1520

*FLORIDA BAR ALSO

**TEXAS AND D. C. BAR ALSO

March 5, 1985

COPY

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

Re: Flat Rock Dam Project
FERC #2803 Powerhouse Location
Pennsylvania Hydroelectric Development Corporation (Applicant)

Dear Mr. Plumb:

In the above matter, the undersigned is counsel for the Respondent, Connelly Containers, Inc. (Connelly). I have reviewed copies of correspondence initiated by and sent to Lawrence Gleeson, President, Pennsylvania Hydroelectric Development Corporation (Pa. Hydro), copies of which have been sent to you. The most recent letter, dated December 26, 1984, is a request to the Commission for a modification of a previous application for a proposed powerhouse for Pa. Hydro.

Your records will disclose that the application for the license for the project was originally filed with the Commission in December of 1981. In October, 1982, Connelly filed a Petition to Intervene. The application was granted by the Commission on January 27, 1983. A Petition to Intervene by the City of Philadelphia Water Department was also filed on March 4, 1982, and granted on March 18, 1983.

At the proposed location, the Schuylkill River runs generally south towards its confluence with the Delaware River some 15 miles away. The river is bounded on the east by the City of Philadelphia, and on the west by Montgomery County, a suburban area. On the east side of the river is Venice Island, separated from the east bank by the Manayunk Canal. At one time the Canal had its water flow controlled by locks at its northern end. The locks are now in disrepair. Pa. Hydro first proposed to place its facility adjacent to these locks at the head of the Canal. Had such facility been constructed, it would have diverted most of the water in the Canal back into the river. This would have materially affected a recreational area in the Canal below the facility as well as a proposal of Connelly to use the water for an hydraulic turbine. You will note that the Petition for Intervention of Connelly asks for 600 cfs of water.

March 5, 1985

Page 2

Subsequent to the date of the filing of its Petition for Intervention, Connelly, by its consultant engineer, attempted to discuss with Pa. Hydro the sharing of the limited supply of water in the Canal for the several functions needed. These attempts were not, by any measure, successful. Thereafter, Pa. Hydro has continued efforts to obtain its license with FERC without consultations with Connelly and to the knowledge of the writer, without consultations with the City of Philadelphia, or their respective representatives.

By its letter of December 26, 1984 and enclosures Pa. Hydro now changes the location in its facility and thereby presents an entirely new application to the Commission. It now proposes a shift of the facility from the east side of the river on the upper reaches of the Canal, to the river's west side. This new plan has certain purported benefits as described in the Project Design Modification Report. However, despite the request for 600 cfs by Connelly as set forth in its Petition for Intervention, the application estimates that only 50 cfs of water will be available downstream into the Manayunk Canal. Later the report refers to 30 to 50 cfs. This flow, says the report, will be an amount "at the direction of the City of Philadelphia" and in another place it says "this release would be made and adjusted per direction of the City of Philadelphia Water Department." Nothing is said about the need for water for the Connelly project.

The use of water from the Canal by Connelly or its predecessor antedates the application of Pa. Hydro by at least a century. Long before hydroelectric power was in use, and long before railroads appeared on the banks of the Schuylkill River, the Canal was constructed and used to bring goods up the river into the Pottsville and Reading area and to bypass the rapids at the location. The predecessor to Connelly on the property used hydraulic turbines to generate power for manufacturing processes. The sluice is already in place. With the advent of cheap power, the hydraulic turbine use was abandoned. In recent years, as the cost of energy has once again risen to higher levels, the idea for the use of the turbine was again considered and proposals were made to the City of Philadelphia Water Department on several occasions over the past ten years. These proposals were made prior to the application of Pa. Hydro.

Since its application to intervene was granted, Connelly has obtained Water Obstruction and Encroachment Permit No. 51-40 from the Pennsylvania Department of Environmental Resources. This is the same governmental authority now negotiating with Pa. Hydro. In addition, the engineering consultant for Connelly has undertaken a study of the affect of the proposed water use in the Manayunk Canal. The results of this study will be utilized in negotiations now underway with Patrick R. Cairo, Planning & Engineering Water Department, City of Philadelphia. It will be necessary that the use of the water in the Canal by the City of Philadelphia and by Connelly is coordinated, to make certain that the Canal itself is not eroded by the water flow, that the City recreational facilities are preserved, that the Canal is kept clean, that the locks are repaired to insure that damage will not be caused by flooding, and

Kenneth F. Plumb, Secretary
Federal Energy Regulatory Commission

March 5, 1985

Page 3

of course so that the hydraulic turbine itself can again be used by Connelly.

By its new plan to construct a facility on the west side of the river, Pa. Hydro may preempt all of these desirable functions. Until such time as the negotiations between the City of Philadelphia, Connelly, Pa. Hydro and all other necessary government officials are concluded, it would be improper for the FERC to rule favorably for Pa. Hydro.

Copies of this letter are being sent to Pa. Hydro and to all other interested parties. Efforts will, once again, be made to conduct negotiations so that the application of Pa. Hydro can continue and this matter once and for all be brought to a final conclusion. In the meantime, it is requested that the application for a license be denied until the needs of all intervenors are considered and satisfied.

Respectfully,

ROBERT S. GRODINSKY

RSG/mp

cc: Mr. Patrick R. Cairo, General Manager
Planning and Engineering
Water Department
One Reading Center, 5th Floor
Philadelphia, PA 19107

✓ Mr. Lawrence Gleeson, President
Pennsylvania Hydroelectric Development Corporation
P.O. Box 814
King of Prussia, PA 19406

Ms. Martha W. Bush,
Deputy City Solicitor
City of Philadelphia
Law Department
15th Floor, Municipal Services Bldg.
Philadelphia, PA 19102

Eugene J. Bradley, Esquire
Philadelphia Electric Co.
2301 Market Street
Philadelphia, PA 19103

Kenneth F. Plumb, Secretary
Federal Energy Regulatory Commission

March 5, 1985

Page 4

Mr. Eugene E. Counsil, Chief
Division of Waterways and
Storm Water Management
Department of Environmental Resources
P.O. Box 2357
Harrisburg, PA 17120

Mr. Raymond J. O'Connor, Chairman
Federal Energy Regulatory Commission
825 North Capitol Street, N.E.
Washington, DC 20426

John W. Gulliver, Esquire
Pierce, Atwood, Scribner,
Allen, Smith and Lancaster
One Monument Square
Portland, Maine 04101

TOWNSHIP
OF
LOWER MERION

MONTGOMERY COUNTY

BOARD OF COMMISSIONERS

75 E Lancaster Ave
Ardmore, Pa. 19003
Telephone (215) 649-4000

CHARLES F. WARD
President

ROBERT P. VAN BROTT
Vice President

NOLAN N. ATKINSON, JR.
RICHARD B. CUFF
FRANCIS C. DOYLE
THOMAS FREED
ARAM K. JERREHAN, JR.
WALTER M. KUBIAK
FRANK LUTZ
JOSEPH M. MANKO
HESTER R. McCULLOUGH
EDITH N. PHELAN
HOWARD L. WEST, JR.
GLORIA P. WOLEK

PATRICK J. JOYCE
Manager

GILBERT P. HIGH, JR.
Solicitor

EILEEN R. TRAINER
Secretary

March 14, 1986

Kenneth A. Plumb, Secretary
Federal Energy Regulatory Commission
825 North Capitol Street, NE
Washington, D.C. 20426

**Re: Flat Rock Dam Hydroelectric Project
FERC Project No. 2803-002 Pennsylvania**

Dear Mr. Plumb,

We have reviewed the draft "License Application Amendment, Exhibit E, Environmental Report" for the above-referenced project. This letter is to express our concerns with the development as proposed.

Township-owned Land

The land between the railroad right-of-way on the west side of the river that the application mentions and the Schuylkill River is owned by Lower Merion Township. Although part of the river bank is used as a township park, the land adjacent to the dam is not yet developed. Therefore, we are obviously concerned about how the plant would affect future development of the park. The location of the almost two acres of land where vegetation would be removed is unclear (whether this is all on Township land or is also within the railroad right-of-way). We have told the applicant that some kind of agreement must be reached with the Township for access to the river both for construction and for maintenance of the plant.

Recreation Facilities

The applicant states that detailed design of recreation facilities will be drawn after the receipt of a license. He should be aware that the Township will have final approval of the plans that involve Township-owned land. I would expect that the Board of Commissioners would not approve an agreement with the applicant for provision of access for construction and maintenance until all plans for Township-owned land are also approved by them. This will include the examination of detailed plans showing exactly the impact of the plant on the Township. (Grading in the floodplain and proposed plantings would also have to be approved.)

Flow of Water Over the Dam

It is difficult for us to assess the visual impact of diverting water away from the dam to go through the plant. Although alternate forms of energy generation are desirable, we are also concerned about the esthetic consequences for the users of the park as well as residents whose homes overlook the dam.

Therefore, we request that this be part of the Commission's consideration of the project.

We appreciate the opportunity to comment.

Very truly yours,

Charles E. Ward, President
Board of Commissioners

SBH:bh

cc: Jason D. James, ESI
Arthur F. Loeben, MCPC
Lawrence Coughlin, Congressman

Department of Energy
Washington, DC 20585

October 7, 1987

Rec'd 11/3/87
CC: LG
JLL

Honorable Lawrence Coughlin
House of Representatives
Washington, D.C. 20515

Dear Mr. Coughlin:

This is in response to your letter of July 10, 1987, to the Secretary of Energy, regarding the Flat Rock hydropower project.

The Flat Rock project was selected competitively for a cooperative agreement as part of the Department's Small-Scale Hydropower Program. Since a cross-section of the hydropower industry was desired as participants in the program, the Department determined it appropriate to include a small private entrepreneur, such as the Pennsylvania Hydroelectric Development Corporation.

As you mentioned, there were delays in this project and the Department examined these delays and the reasons for them. When it was determined that most of these delays were beyond the control of the developer, the Department agreed to grant two no-cost extensions to the cooperative agreement.

Over the past two years the Department has had a number of discussions with your staff concerning the Flat Rock cooperative agreement. In January 1987 the Department's Idaho Operations Office advised your staff of the status of the agreement. Upon being informed of a pending motion to intervene before the Federal Energy Regulatory Commission (FERC), the Idaho Operations Office agreed to review the relevance of this issue with respect to the decision to grant an extension to the cooperative agreement. As part of this review, a "fact finding" meeting in Washington, D.C. of all concerned parties was under consideration, and had such a meeting occurred, the participation of your office would have been encouraged. Upon review, however, the Department concluded the concerns that you and your constituents have expressed regarding the Flat Rock project were appropriately being addressed by the FERC under its authority as the Federal licensing agency. Consequently, such a meeting was not necessary at the time, and the Department had no basis to deny granting an extension to the existing cooperative agreement.

- 2 -

I regret any inconvenience that may have occurred as a result of the delay in your being informed of the preceding actions and I have directed the program office to keep your office advised in the future concerning Departmental decisions related to the Flat Rock project. Our staff continues to be available to discuss the concerns you and your staff have raised with respect to this project.

I hope this information will be of assistance to you.

Yours truly,

A handwritten signature in dark ink, appearing to read 'Joseph F. Salgado', written over a horizontal line.

Joseph F. Salgado
Under Secretary

APPENDIX C
MAJOR FLAT ROCK DESIGN ALTERNATIVES/PROJECT
PLAN DIAGRAMS

APPENDIX C

The Major Flat Rock Design Alternatives are illustrated by a project plan diagram for each major design category; these are indicated by an * on the list following.

1. Plans for Design Alternatives

- * 1.0(a) The drawing identified as Exhibit G, sheet 1 of 2, dated 15 Dec., 1981, is a project Site Location Map.
 - 1.1 Left side of river below gatehouse, 1000 kw, 1977
 - 1.1(a) Allis-Chalmers letter to L. Gleeson, 13 June, 1977
 - * 1.1(b) Drawing identified as "Figure 4 Existing Structures-Flat Rock Dam", design is for 2 units, 500 kw each (HED Corp 1977)
 - 1.2 Left side of river above gatehouse, single unit, 3500 kw
 - 1.3 Left side of river above gatehouse, multiple units
 - * 1.3(a) Drawing number C-627-001, 9 July, 1979
Design is for 2 each 3000mm units of 3500 kw maximum output
 - 1.4 Left side of river above gatehouse w/ low flow unit 3650 kw
A separate low flow release/generating unit(s) (LFU) to be located at the Canal wall/left end of Flat Rock spillway apron. With a single 150 kw LFU, the capacity is 3650 kw.
 - * 1.4(a) The drawing identified as Exhibit G, sheet 2 of 2, dated 15 Dec., 1981, is a plan view of alternative 1.4
 - 1.5 Right side of river at dam, multiple units, 3000 kw per June, 1985 License Amendment
 - * 1.5(a) The drawing identified as Exhibit G, sheet 1 of 3, dated 6 June, 1985, is a plan view of alternative 1.5
 - 1.6 Right side of river at dam, downsized capacity 1500 kw alternative studied 1984/1985
 - 1.7 Right side of river at dam, single unit, 3250 kw
single unit alternative as licensed by FERC

PLAN

PROJECT
LOCATION

SITE LOCATION

THIS DRAWING IS PART OF THE
APPLICATION FOR LICENSE MADE
BY THE UNDERSIGNED THIS 15th DAY
OF DEC. 1981
NA HYDROELECTRIC DEVELOPT. CORP.

1.0 (a)

EXHIBIT G	SHEET ONE OF 2
PROPOSED REDEVELOPMENT OF FLAT ROCK	
HYDROELECTRIC PROJECT	
PHILADELPHIA, PENNSYLVANIA	

C-5

BOX 712 • YORK, PENNSYLVANIA 17405 / 717 792-3511

YORK PLANT
HYDRO-TURBINE DIVISION

June 13, 1977

Hydro-Electric Development Corp.
Box 35
Paoli, Pennsylvania 19301

ATTENTION: Mr. Lawrence Gleeson
President

SUBJECT: Flat Rock Dam
Our Inquiry No. 01-77-033

Dear Sir:

We mailed to you last week under separate cover two (2) copies of our preliminary general arrangement drawing P-3833-DAZ-2. The existing tunnels and their elevation has been taken from some of our old S. Morgan Smith drawings since we originally provided the intake gates and small gate operating turbine for this site. The river tailwater elevation is therefore derived from these old drawings based on a gross head of 23.5 ft. This in turn was based on our field measurements made adjacent to the wing wall spillway.

This drawing has been prepared for your use in negotiations with the Power Company and Government agencies.

The basic unit arrangement is based on our rather extensive experience with TUBE turbines and this unit in particular has essentially the same physical dimensions as the unit provided to the Imperial Irrigation District in Southern California. This is illustrated on Page 6 of our Bulletin 54B2531. At that time we made a rather extensive study to try to optimize the equipment involved and at the present time we seem to be arriving at essentially the same conclusions. It should be noted that this unit can be provided either with fixed or adjustable blades so that it would have a wide range of good efficiency as shown in Curve "B", Figure 3 on Page 3 of the above referenced bulletin or a single operating point for a given head as shown at Point "C". We recommend this latter approach for certainly a first unit at this location since the unit should be able to operate at a near full load most of the time. We believe that an induction generator with speed increaser and butterfly type inlet valve for tight shut-off will provide the simplest, most economical unit suitable for remote control. Incidentally, this particular size is the first of a series of predesigned

Mr. Lawrence Gleeson

-2-

June 13, 1977

units which we are developing at the present time. We expect to have initial pricing information available next month and would plan to put together a firm proposal for you as soon as we get these cost estimates under control. In the meantime, if absolutely necessary we certainly can put together preliminary figures.

Very truly yours,

H. A. Mayo, Jr., P.E.
Manager, Small Hydroelectric Units

HAM/sm
Enclosure

PHASE I - TAP INTO EXISTING TUNNELS,
 INSTALL 2 - 500 kw UNITS

IED CORP. - FLAT ROCK DAM PROJECT
 IED CORP - 1977

1.1(b)

SEE SH. 1
FOR
WESTERN
PROJECT
BOUNDARY

THIS DRAWING IS A PART OF THE
APPLICATION FOR A LICENSE MADE
BY THE UNDERSIGNED THIS - 15 TH
DAY OF DEC 1981.

PENNSYLVANIA HYDROELECTRIC
DEVELOPMENT CORPORATION

SIGNED

[Signature]
[Signature]

0 100

0 300 400 500 600

SCALE IN FEET

1.4 (a)

EXHIBIT G

SHEET 2 OF 2

PROPOSED REDEVELOPMENT OF
FLAT ROCK HYDROELECTRIC
PROJECT
PHILADELPHIA, PENNSYLVANIA

THIS DRAWING IS PART OF AN
AMENDMENT FOR A
LICENSE APPLICATION SUBMITTED

BY THE UNDERSIGNED

PENNSYLVANIA
HYDROELECTRIC DEVELOPMENT CORP.

ON THIS 16th DAY OF June 1985

BY [Signature]

OVER-HEAD POLE
TO SHAWMUT SUB.
STATION, PHILA.
ELEC. CO.

15 KV UNDERWATER
TRANSMISSION LINE

PROJECT BOUNDARY AND
FEE SIMPLE ALONG UPSTREAM
FACE OF OLD DAM

EXISTING OLD DAM
EXISTING NEW DAM

SEE ENLARGED
DETAIL SHT #3

175'

210'

20' PUBLIC STREET

APPROX. EXTENT
CHANNEL DREDGE

TAILRACE

TEMPORARY
EASEMENTS

PERMANENT
EASEMENT

PROJECT

SCHUYLKILL R.

DELAWARE R.

LOCATION MAP

SITE PLAN

100' 0 100'

SCALE IN FEET

EXHIBIT G

RESPECT. OFC

AMENDMENT TO APPLICATION

FOR A MINOR LICENSE

FLAT ROCK HYDROELECTRIC

PROJECT

LOWER MERION TWP. PENNA.

1.5(a)

APPENDIX D
LICENSE

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Before Commissioners: Martha O. Hesse, Chairman;
Anthony G. Sousa, 1/ Charles G. Stalon
and Charles A. Trabandt.

Pennsylvania Hydroelectric Development Corporation) Project No. 2803-001

ORDER ISSUING LICENSE
(Major Project - 5MW or Less)

(Issued August 16, 1988)

Pennsylvania Hydroelectric Development Corporation (PHDC) has filed a license application under Part I of the Federal Power Act (FPA) to construct, operate, and maintain the Flat Rock Dam Project No. 2803, to be located at the existing Flat Rock Dam on the Schuylkill River, on the border between the City of Philadelphia (Philadelphia County), and Lower Marion Township (Montgomery County), Pennsylvania. The project, which would affect the interests of interstate or foreign commerce, would consist of the existing dam and reservoir, a new intake structure and powerhouse located on the right abutment of the dam and containing a single 3.25 MW generating unit, one-foot-high flashboards on the dam, a 500-foot-long tailrace, a 600-foot-long submerged transmission cable, and appurtenant facilities.

Notice of the application has been published. The motions to intervene that have been granted 2/ and the comments and protests filed by agencies and individuals have been fully considered in determining whether to issue this license, as discussed below.

Lands and Facilities

Intervenor Pennsylvania Department of Environmental Resources (DER) and the City of Philadelphia Water Department (City) object to the issuance of a license for the project,

- 1/ Commissioner Sousa resigned effective July 31, 1988; however he was present and voted on this item at the meeting of June 29, 1988.
- 2/ The intervenors in this proceeding are the Pennsylvania Department of Environmental Resources, the City of Philadelphia Water Department, Philadelphia Electric Company, Connelly Containers, Inc., and Montgomery County, Pennsylvania.

Project No. 2803-001

-2-

asserting that property ownership issues concerning the existing dam and surrounding areas must be resolved prior to license issuance. DER, which owns the Flat Rock Dam, states that no agreement has been reached between itself and PHDC concerning the right to use the dam. DER asserts that responsibility for the maintenance of the Flat Rock Dam and other conditions regarding its use must be addressed in an agreement between PHDC and DER, and that until the details of such an agreement are completed, the Commission cannot determine whether the project is either physically compatible with the other useful public benefits provided by the dam or consistent with the best utilization of the water resources of the region.

The City states that no agreement has been reached between itself and PHDC concerning the right to occupy and use City-owned lands for the project, the compensation for use of the lands, and the rights and obligations of each of the parties with respect to inspections, operations, access to property, indemnification, and liability to each other and third parties. The City further states that, without such a lease agreement, the project would not be feasible, since the land is necessary for the development of the project.

In response to the intervenors' objections, PHDC stated that, although no agreements have been made, it has conducted numerous consultations with, and has presented lease agreement proposals to, both DER and the City.

Licensees are not required to possess all of the property rights necessary to construct, operate, and maintain their projects at the time they apply for or receive a license. Current Commission practice is to allow a licensee five years from the date of issuance of the license to acquire all the necessary property interests in the project. 3/ A licensee must have sufficient control over project works and lands to enable the Commission, through its licensee, to carry out its regulatory responsibilities with respect to the project. Consequently, as to the dam, and to the extent PHDC's project uses City-owned land, PHDC must acquire, if not fee title, then a right to use the dam and land that is sufficient for project purposes during the term of the license issued and any subsequent licenses issued

- 3/ Standard Article 5 of the license (see 54 F.P.C. 1792, 1866-67 (1975)), requires PHDC, within five years from the issuance date of the license, to acquire title in fee or the right to use in perpetuity all lands necessary or appropriate for the construction, maintenance, and operation of the project.

for the project. 4/ Lease agreements between PHDC and DER and the City would be acceptable so long as these requirements are met.

We have no reason to believe that PHDC will not be able to enter into satisfactory lease arrangements with DER and the City for use of the dam and City-owned lands. The subjects raised by the City can be negotiated as part of the arrangement between PHDC and the City. As to DER's assertion that the dam is used by DER for other public purposes, rights encompassing these other uses need not be transferred to PHDC or otherwise be subject to the terms of the license to the extent those other uses are not inconsistent with licensed project purposes. 5/

The environmental concerns of these and other intervenors are discussed in the attached Environmental Assessment (EA).

Recommendations of Federal and State Fish and Wildlife Agencies

Section 10(j) of the FPA, which was added by the Electric Consumers Protection Act of 1986 (ECPA), Pub. L. No. 99-495 (Oct. 16, 1986), 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 EA for the Flat Rock Dam Project No. 2803, which was prepared prior to ECPA and which is attached to and made part of this license, generally addresses the concerns of the federal and state fish and wildlife agencies. The EA, however, did not adopt all of the recommendations contained in the Pennsylvania Fish Commission's (PFC) letter of comment dated September 16, 1986, and in the U.S. Department of the Interior's (Interior) comment letter dated May 13, 1982.

For the protection of fishery resources in the Schuylkill River, PFC and Interior recommend various measures that would minimize the project's effects on these resources. The EA generally agreed with the agencies' assessments of project impacts and recommended mitigation, except for Interior's recommendation for a minimum flow release and PFC's recommendation regarding dissolved oxygen (DO) levels. Interior had recommended a release of 950 cubic feet per second (cfs) over the spillway to protect aquatic resources in the Schuylkill River downstream of the project. Interior's recommendation was based on an earlier project design that would have bypassed

4/ See Pennsylvania Hydroelectric Development Corporation, 40 FERC ¶ 61,282 (1987), reh'g denied, 42 FERC ¶ 61,070 (1988), and cases cited therein.

5/ Id.

approximately 700 feet of the river channel. However, subsequent to Interior's letter, PHDC revised the project design by relocating the powerhouse to the base of the dam, thereby eliminating the bypassed reach. Consequently, the EA determined that a minimum flow of only 250 cfs was necessary to protect aquatic resources.

PFC had recommended that DO levels below Flat Rock Dam be maintained at pre-operation levels, contending that any decrease in DO levels could lead to water quality problems that would adversely affect resident and anadromous fish. The EA determined that PHDC should develop a plan to monitor DO levels above and below the project dam that provides for rapid changes in project operation to maintain DO levels downstream of the project at state standard levels.

Consistent with Section 10(j)(2) of the FPA, Commission staff attempted to resolve with PFC and Interior the minimum flow and DO level issues. By letters dated February 18, 1987, the Director of the Division of Environmental Analysis (Director) advised PFC and Interior of the differences between the EA's recommendations and their recommendations regarding minimum flows and DO levels. The Director requested that PFC and Interior provide comments on any possible reconciliation of inconsistencies that existed between the EA's recommendations and the recommendations of the agencies. PFC responded by letter dated May 12, 1987; Interior responded by letter dated April 29, 1987.

Interior concurred in its April 29, 1987 letter with the EA's recommended minimum flow release of 250 cfs for aquatic resource protection purposes. Interior also commented that PHDC should be required to obtain pre-construction water quality data to design aeration facilities that would make up for any reduction in DO associated with project operation.

PFC reaffirmed in its May 12, 1987 letter its position that DO levels should be maintained at pre-project levels. According to the recommendations contained in the EA, PHDC would be required to maintain the DO levels of the river downstream of the project at state standard levels. In doing so, it would be required to maintain the DO levels immediately below the project at levels in excess of state standards to ensure that the reduction in DO associated with the water passing through the next downstream impoundment would not be less than state standard levels at the point of maximum oxygen sag. Implementing this recommendation would increase the frequency that the DO levels, at the point of maximum oxygen sag, would be maintained at state standard levels during the summer low-flow period. During extreme low-flow conditions, the DO concentration of the river below the project would need to be maintained at pre-operation levels to ensure maintenance of the state standard DO levels.

Thus, under these conditions, the recommendations of PFC and those contained in the EA are the same. Under average summer low-flow conditions, when DO levels are below saturation levels, implementing the recommendations contained in the EA would result in a reduction in the DO levels to state standard levels at the point of maximum sag. Requiring pre-operation DO levels would provide for higher DO levels at the point of maximum oxygen sag during this period. During the remainder of the year, in river systems similar to the Schuylkill, DO concentration is at or near saturation and project-induced reductions in DO would be minimal and would not adversely affect fish resources.

Upon reconsideration of the DO issue and to ensure protection of fish resources, we have determined that PHDC should maintain pre-operation DO levels in the Schuylkill River. To minimize any project-induced reductions in DO and subsequent impacts to fish resources, Article 402 requires PHDC to prepare a plan to ensure maintenance of pre-operation DO levels. The article also requires PHDC to monitor DO levels at the project to determine the pre-operation conditions and requires it to identify procedures for implementing changes in project structures or operation as necessary to maintain pre-operation DO levels.

Comprehensive Plans

Section 10(a)(2)(A) of the FPA, as added 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 prepared by appropriate federal or state agencies. The Commission's interpretation of "comprehensive plan" under Section 10(a)(2)(A) 6/ was revised on rehearing by order issued April 27, 1988. 7/ On rehearing, the Commission instructed the Director, Office of Hydropower Licensing, to request the state and federal agencies to file plans they believe meet the revised guidelines. Until the process is completed, the Commission will consider all previously-submitted plans as comprehensive plans pursuant to Section 10(a)(2)(A).

6/ Order No. 481, 52 Fed. Reg. 39,905 (October 26, 1987), III FERC Stats. & Regs. ¶ 30,773 (1987).

7/ Order No. 481-A, 43 FERC ¶ 61,120 (April 27, 1988).

The Commission reviewed nine plans that touch on various aspects of waterway management in relation to the proposed project. 8/ No conflicts were found.

Summary of Findings

An EA was issued for this project. Background information, analysis of impacts, support for related license articles, and the basis for a finding of no significant impact on the environment are contained in the EA attached to this order. A water quality certificate for this project was issued by DER on June 2, 1986. Issuance of this license is not a major federal action significantly affecting the quality of the human environment.

Both the EA and the Safety and Design Assessment (SDA), a copy of which is attached to this order, found that the project would be economically beneficial when compared to the long-term leveled cost of alternative sources of energy to any utility in the region that can be served by the project. Those estimates were based on PHDC's determination that the project would produce an average of 12,600,000 kWh annually. However, that determination was premised on the assumption that PHDC would be required to release a minimum flow of 250 cfs at all times. However, as discussed in the EA, and as required by Article 404 of the license, PHDC must increase the minimum flow to 650 cfs during daylight hours to protect visual resources. This increased minimum flow requirement will reduce average annual generation to 11,757,000 kWh. Using this generation figure, the cost of project power would be 67.1 mills/kWh. However, since this is 17 mills/kWh below our current estimate of 84.1 mills/kWh

8/ Pennsylvania Fish Commission, Strategic Fishery Management Plan for American Shad Restoration in Schuylkill and Lehigh River Basins, undated; Pennsylvania Department of Environmental Resources, Pennsylvania Scenic Rivers Inventory, 1986; Delaware Basin Fish and Wildlife Management Cooperative, A Review and Recommendations Relating to Fishways within the Delaware Basin, 1985; Delaware River Basin Commission, Water Code, Delaware River Basin, 1985; Office of Resource Management and Bureau of Water Resources Management, the State Water Plan-Subbasin 3, 1983; Delaware River Basin Commission, Administrative Manual Part II, Rules of Practice and Procedure, 1981; Delaware Basin Fish and Wildlife Management Cooperative, A Management Plan for the American Shad in the Delaware River Basin, 1980; Pennsylvania Department of Environmental Resources, Pennsylvania Recreation Plan, 1980-1985, 1980; Delaware River Basin Commission, Delaware River Basin Compact, 1961.

for the long-term (50 year) levelized cost of alternative sources of energy, the project would still provide positive net annual economic benefits. Based on the 17 mill/kWh difference between the cost of project power and the cost of alternatives, we believe that PHDC should be able to secure the financing necessary to proceed with its project. Accordingly, we conclude that the project is financially feasible.

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 attached StDA.

Pursuant to Standard Article 5 of the license for Project No. 2803, PHDC has five years from the date of issuance of the license to obtain the property interests in the dam and lands necessary for the construction, maintenance, and operation of the project. Article 204 requires PHDC, within five years of issuance of the license, to file a report detailing its acquisition of adequate property interests in the project.

Based upon our review of the agency and public comments filed in this proceeding, and an independent analysis as discussed herein, it is concluded that the Flat Rock Project No. 2803 would not conflict with any planned or authorized development and is best adapted to a comprehensive development of the Schuylkill River, taking into consideration the beneficial public uses described in Section 10(a)(1) of the FPA.

The Commission orders:

(A) This license is issued to Pennsylvania Hydroelectric Development 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 Flat Rock Dam Project. This license is subject to the terms and conditions of the FPA, which is incorporated by reference as part of this license, and subject to the regulations the Commission issues under the provisions of the FPA.

(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. 2803-</u>	<u>Showing</u>
1	8	Site Plan

(2) Project works consisting of: (1) a dam, 525 feet long and 17 feet high, constructed of concrete with an ogee spillway along the entire crest width; (2) one-foot-high flashboards; (3) a reservoir having minimal pondage; (4) an intake structure with trashracks, gates, and stoplogs located at the right of the dam; (5) a powerhouse containing one turbine-generator unit having a rated capacity of 3,250 kW; (6) a tailrace; (7) the 4-kV generator leads; (8) the 4/13.2-kV, 4-MVA transformer; (9) the 1.275-foot long, 13.2-kV transmission line; and (10) appurtenant facilities.

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

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

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

(D) This license is subject to the articles set forth in Form L-11, (October 1975), entitled "Terms and Conditions of License for Unconstructed 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 FPA, 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 4,300 horsepower.

Article 202. Pursuant to Section 10(d) of the FPA, 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.

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 203. 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 204. The licensee shall, within five years from issuance of the license, prepare and file with the Commission a report detailing its acquisition of adequate property interests in the project.

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, 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.

Article 303. 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 304. 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 401. The licensee, after consultation with the Pennsylvania Department of Environmental Resources, and before beginning any project-related land-clearing, land-disturbing, or spoil-producing activities, shall prepare and file for Commission approval a comprehensive plan to control erosion, dust, and slope stability and to minimize the quantity of sediment or other potential water pollutants resulting from project construction, spoil-disposal, and project operation and maintenance. The Commission reserves the authority to require changes to the plan. No project-related land-clearing, land disturbing, or spoil-producing activities shall begin until the licensee is notified by the Commission that the plan complies with the requirements of this article. The plan shall be based on actual-site geological, soil, slope, and groundwater conditions and on the final project design, and shall include detailed descriptions of the actual-site conditions, detailed descriptions and functional design drawings of control measures, topographic map locations of all control measures, a specific implementation schedule, specific details of monitoring and maintenance programs for the project construction period and for project operation, and a schedule for periodic review of the plan and for making necessary revisions to the plan. The plan shall also consider the scheduling of sediment producing activities in relationship to similar land-disturbing activities in the Schuylkill River Basin, in order to minimize sedimentation from multiple construction activities within the basin. The licensee shall include in the filing documentation of consultation with the above-referenced

agency before preparing the plan, copies of the agency's comments or recommendations on the completed plan after it has been prepared and provided to the agency, and specific descriptions of how all of the agency's comments and recommendations are accommodated by the plan. Before filing the plan, the licensee shall allow a reasonable period of time, in no case less than 30 days, for the agency to comment and to make recommendations. If the licensee disagrees with any of the agency's recommendations, the licensee shall provide a discussion of the reasons for disagreeing, based on actual-site geological, soil, and groundwater conditions, along with a written response from the agency on the licensee's reasons for disagreement.

Article 402. The licensee, after consultation with the Pennsylvania Department of Environmental Resources, the Pennsylvania Fish Commission, and the U.S. Fish and Wildlife Service, shall file with the Commission for approval, within six months after issuance of this license, a plan to determine the pre-operation dissolved oxygen (DO) levels in the Schuylkill River and to monitor DO levels of the river to ensure maintenance of pre-operation levels downstream of the project. The plan shall include identification of procedures for implementing changes in project structures or operations necessary to ensure maintenance of the pre-operation DO levels of the Schuylkill River downstream of the project. Agency comments on the plan shall be included in the filing. The Commission reserves the right to require modifications to the plan.

Article 403. The licensee shall operate the Flat Rock Dam Project in an instantaneous run-of-river mode for the protection of fish and wildlife resources in the Schuylkill River. 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, i.e., maintain discharge from the project so that flow in the Schuylkill River, as measured immediately downstream from the project tailrace, approximates the instantaneous sum of inflow to the 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 Pennsylvania Fish Commission.

Article 404. The licensee shall discharge over the spillway of the Flat Rock Dam during the period beginning one-half hour before sunrise and ending one-half hour after sunset a continuous minimum flow of 650 cubic feet per second (cfs) as measured immediately downstream from the project dam, or inflow to the reservoir, whichever is less, for the protection of visual resources and fish and wildlife resources in the Schuylkill River. At all other times, this flow may be reduced to not less than 250 cfs. A minimum flow of 50 cfs shall be discharged from

the project reservoir to the Manayunk Canal, for the protection of historical resources. These flows may be modified if approved by the Commission in accordance with the requirements of Article 407, and 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, the Pennsylvania Fish Commission, and the Pennsylvania Department of Environmental Resources.

Article 405. The licensee shall consult with the Pennsylvania Department of Environmental Resources, the Pennsylvania Fish Commission, and the U.S. Fish and Wildlife Service on the final design of the intake structure and associated fish protective measures, and within six months after issuance of this license, and prior to any ground-disturbing activities, shall file for Commission approval functional design drawings of the intake and fish protective structures. Agency comments on the proposed designs shall be included in the filing. The licensee shall file as-built drawings with the Commission within six months after completion of construction.

Article 406. The licensee shall consult with the Pennsylvania Department of Environmental Resources, the Pennsylvania Fish Commission, and the U.S. Fish and Wildlife Service on the design of upstream fish passage facilities for the Flat Rock Dam. The design must include provisions to accommodate flows up to 100 cubic feet per second. Within six months after issuance of this license, and prior to any ground-disturbing activities, the licensee shall file for Commission approval functional design drawings of the fish passage facilities. Agency comments on the proposed designs shall be included in the filing. The licensee shall construct the upstream fish passage facilities in accordance with the approved functional design drawings and shall file as-built drawings with the Commission within six months after completion of construction.

Article 407. The licensee, after consultation with the Pennsylvania Department of Environmental Resources and the Montgomery County Planning Commission, shall conduct a study to investigate the effectiveness of alternative flow releases, in the range of 250 to 650 cubic feet per second, in protecting visual resources at the project site. The study shall address in detail: (1) the degree to which existing visual quality and sensory values would be maintained; (2) the times of day, month, and year when the existing visual quality and other sensory values are most sensitive to disruption; (3) the effects of flashboards on any flow release over the dam; and (4) an analysis of costs and economic impacts of any alternative flow releases.

The licensee, within two years after commencement of project operation, shall file a report on its findings, and for Commission approval, any recommended changes in project flow releases to protect visual resources. Any recommended changes in flow releases must be based on information collected in a verifiable manner, using gaging station data, photographs, or videotapes. Agency comments on the study and recommendations shall be included in the filing.

Article 408. The licensee, at least 60 days before the scheduled start of land-disturbing or land-clearing activities, shall file with the Commission a management plan for constructing the powerhouse, tailrace, and associated facilities in a manner that is visually compatible with the historic integrity of the Manayunk Canal and Historic District. The Commission may require changes to the plan. No land-disturbing or land-clearing activities shall begin until the licensee is notified that the plan complies with the requirements of this article. The licensee shall prepare the plan after consultation with the State Historic Preservation Officer (SHPO). The licensee shall include with the plan documentation of consultation with the SHPO and copies of the SHPO's comments and recommendations. If the licensee does not adopt the SHPO's recommendations, the filing shall include the licensee's reasons based on project-specific information.

Article 409. The licensee, before starting any ground-disturbing or land-clearing activities within the project boundaries, other than that specifically authorized in this license, shall consult with the SHPO about the need for a cultural resources survey and salvage work. The licensee shall file with the Commission documentation of the nature and extent of consultation, including a cultural resources management plan and a schedule to conduct the necessary investigation, together with a copy of a letter from the SHPO commenting on the plan and schedule, 60 days before starting any such ground-disturbing or land-clearing activities. The licensee shall make funds available in a reasonable amount for the required work. If the licensee discovers any previously-unidentified archeological or historic sites during the course of constructing or developing project works or other facilities at the project, the licensee shall stop all construction and development activities in the vicinity of the sites and shall consult a qualified cultural resources specialist and the SHPO concerning the eligibility of the sites for listing in the National Register of Historic Places, and any measures needed to avoid the sites or to mitigate effects on the sites. If the licensee and the SHPO cannot agree on the amount of money to be spent for project specific archeological and historical purposes, the Commission reserves the right to require the licensee to conduct the necessary work at the licensee's own expense.

Article 410. Prior to commencement of commercial operation, the licensee shall construct: (1) walkways, steps, and railings to provide public access for anglers in the tailrace area; (2) a canoe take-out, put-in, and portage trail; (3) interpretive signs on the hydropower facility; and (4) safety features to protect recreationists in the project area. Within 90 days following completion of project construction, the licensee shall file with the Commission as-built drawings showing the type and location of the constructed recreational facilities. The filing shall also indicate the entity responsible for maintenance and operation of the facilities. The licensee shall construct the facilities after consultation with the Office of Resources Management and Scenic Rivers Division of the Pennsylvania Department of Environmental Resources, the Pennsylvania Fish Commission, the Philadelphia City Planning Commission, and the Montgomery County Planning Commission. The licensee shall include with the filing documentation of consultation and copies of agency comments and recommendations. If the licensee does not adopt any agency recommendations, the filing shall include the licensee's reasons, based on project-specific information.

Article 411. Within one year from the date of issuance of this license, the licensee shall file with the Commission a plan to provide for whitewater boating opportunities directly below the dam. The licensee shall prepare the plan after consultation with the Pennsylvania Department of Environmental Resources and the Philadelphia City Planning Commission. The licensee shall include with the plan documentation of consultation and copies of comments and recommendations from the above-named entities. If the licensee does not adopt any recommendations, the filing shall include the licensee's reasons, based on project-specific information.

Article 412. The licensee, in cooperation with the Pennsylvania Department of Environmental Resources (DER), shall develop a plan to install streamflow gages in the Schuylkill River to monitor the flow releases required by Article 404. The plan shall include a determination of the location and design of the gages, the method of flow data collection, and a provision for providing the flow data to the DER within 30 days from the date of a DER request for the data. The plan shall be filed with the Commission within one year after the date of issuance of this license, and shall include comments from the DER on the plan. The Commission reserves the right to require modifications to the plan.

Article 413. The licensee, after consultation with the Pennsylvania Department of Environmental Resources and the Pennsylvania Fish Commission, shall coordinate the construction activities of the Flat Rock Dam Project with the other licensed or exempted projects that are coincidentally under construction

in the Schuylkill River, in order to minimize the impacts of suspended sediment on the fishery resources of the Schuylkill River Basin. Within 90 days from the date of issuance of the license, the licensee shall file for Commission approval a construction plan that minimizes the potential coincidental impacts of sediment production from the Flat Rock Dam Project with others on the Schuylkill River. In the filing, the licensee shall document consultation with the agencies and shall explain why the licensee's plan fails to incorporate any recommendations made by the agencies.

Article 414. The licensee, at least 60 days before the scheduled start of land-clearing, land-disturbing, or spoil producing activities, shall file with the Commission a plan to avoid or minimize disturbances to the quality of the existing visual resources of the project area resulting from constructing and operating project facilities. The Commission may require changes to the plan. No land-clearing, land-disturbing, or spoil producing activities shall begin until the licensee is notified that the plan complies with the requirements of this article. The licensee shall prepare the plan after consultation with appropriate federal, state, and local resource agencies and with all federal agencies having managerial authority over any part of project lands. The licensee shall include with the plan documentation of agency consultation and copies of agency comments and recommendations. If the licensee does not adopt agency recommendations, the filing shall include the licensee's reasons, based on visual and landscape conditions at the site. The plan, at a minimum, shall include: (a) the licensee's strategy for blending the project works, including the access road, into existing landscape characteristics; revegetating, stabilizing, and landscaping new construction areas and areas immediately adjacent to the project site disturbed by previous construction or that presently impact the visual resources of the surrounding area; grading, planting grasses, repairing slopes damaged by erosion, and preventing future erosion; (b) an implementation schedule; (c) monitoring and maintenance programs for project construction and operation; and (d) provisions for periodic review and revision.

Article 415. (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 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 watercraft at a time and where said facility is intended to serve single family type dwellings; and (3) embankments, bulkheads, retaining walls, or similar structures for erosion control to protect the existing shoreline. To the extent feasible and desirable to protect and enhance the project's scenic, recreational, and other environmental values, the licensee shall require multiple use and occupancy of facilities for access to project lands or waters. The 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.

(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 marina; (6) recreational development consistent with an approved Exhibit R or approved report on recreational resources of an Exhibit E; and (7) other uses, if: (i) the amount of land conveyed for a particular use is five acres or less; (ii) all of the land conveyed is located at least 75 feet, measured horizontally, from the edge of the project reservoir at normal maximum surface elevation; and (iii) no more than 50 total acres of project lands for each project development are conveyed under this clause (d)(7) in any calendar year. At least 45 days before conveying any interest in project lands under this paragraph (d), the 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.

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

- (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.

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

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

(F) This order is final unless an application for rehearing is filed within 30 days from the date of its issuance, as provided in Section 313(a) of the FPA. The filing of an application for rehearing does not operate as a stay of the effective date of this order or of any other date specified in this order, except as specifically ordered by the Commission. The licensee's failure to file an application for rehearing shall constitute acceptance of this order.

By the Commission. Commissioner Trakandt concurred in part and dissented in part with a separate statement attached.

(S E A L)

Lois D. Cashell
Lois D. Cashell,
Acting Secretary.

ENVIRONMENTAL ASSESSMENT 1/
DIVISION OF ENVIRONMENTAL ANALYSIS, OFFICE OF HYDROPOWER LICENSING
FEDERAL ENERGY REGULATORY COMMISSION

FLAT ROCK DAM PROJECT
FERC NO. 2803-001--PENNSYLVANIA

July 28, 1986

I. APPLICATION

On December 23, 1981, Pennsylvania Hydroelectric Development Corporation (applicant) filed an application for a major license, 5 megawatts (MW) or less, for the Flat Rock Dam project (FERC No. 2803-001). On June 6, 1985, and January 3, 1986, the applicant amended its application to revise the proposed project design. The project would be located at an existing dam on the Schuylkill River on the border between the City of Philadelphia (Philadelphia County) and Lower Merion Township (Montgomery County), Pennsylvania. Flat Rock Dam is owned by the Pennsylvania Department of Environmental Resources (DER) and is located about 15 miles upstream from the mouth of the river; the Schuylkill River enters the Delaware River in the City of Philadelphia. The city-owned Fairmount Dam is located about 6 miles downstream of Flat Rock Dam, while the Plymouth Dam, also owned by the DER, is located about 5 miles upstream of Flat Rock Dam (figure 1).

II. RESOURCE DEVELOPMENT

A. Purpose

The proposed project would provide an estimated average of 12,600,000 kilowatt hours (kWh) of electrical energy per year to the Philadelphia Electric Company.

B. Need for Power

Available data show that growth in the demand for electric power and energy will continue. Given load growth and an existing generating resource base, a need for additional generating resources can be projected to exist in the future for any power system. 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

1/ Figures and attachments referenced in the text are omitted from this document due to reproduction requirements.

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 Mid-Atlantic Area Council (MAAC) region, and MAAC, in the April 1986, Regional Reliability Council Coordinated Bulk Power Supply Program, projects average annual growth rates of 1.1 percent for summer peak demand and 1.5 percent for annual energy requirements. Existing generating resources in the MAAC area as of January 1, 1986, include approximately 34,704 MW of fossil-fueled thermal generating capacity. An additional 1,688 MW of fossil-fueled thermal capacity are projected for installation in the next 10 years to meet load growth in the areas.

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

The small size of the project ensures that the project power would be integrated into the existing generating resource base without the temporary overbuilding commonly associated with bringing large power projects on-line (i.e., initiating commercial operation). Moreover, in accordance with the Federal Power Act, the schedule for the project can be made to accommodate uncertain market conditions to some extent by the licensee's delaying commencement of construction 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 MAAC. From the time the project goes on-line it will be available to displace fossil-fueled power generation in the region and thereby, to conserve nonrenewable fossil fuels and to reduce the emission of noxious byproducts caused by the combustion of fossil fuels.

C. Economic Evaluation

A proposed project is economically beneficial so long as its projected levelized cost is less than the long-term levelized cost of alternative energy to any utility in the region that can be served by the project. The staff has identified projected long-term levelized alternative energy costs in the region of up to 79.4 mills/kWh. Since the levelized cost of energy from the project is estimated to be 52.5 mills/kWh, the project is

estimated to provide a levelized economic benefit of 26.9 mills for each kilowatt hour of energy produced, or about \$339,000 annually.

Based on the 26.9 mills/kWh differential between the levelized cost of the project energy, and the long-term levelized cost of alternative energy, the staff is reasonably confident that there will be a market for the project power at prices sufficient to support the financing and operation costs of the project.

D. Comprehensive Development

The single 3,250-kilowatt (KW) unit would be able to utilize river flows between 450 cubic feet per second (cfs) and 3000 cfs. The gross head available at the site would be 18.2 feet with the installation of 1-foot-high flashboards and excavation of the tailrace. The turbine would be a horizontal pit-type unit with a rated net head of 15 feet. The flow of the Schuylkill River exceeds the sum of the hydraulic capacity of the plant and a 400-cfs minimum flow about 24 percent of the time.

The applicant estimates that the project would generate 12,600,000 kWh annually. The staff finds this estimate of annual generation reasonable. The estimate of annual generation was based on flow data from a nearby gage on the Schuylkill River, which was adjusted to reflect the drainage basin size at the site.

The applicant estimates that the proposed redesigned project would cost \$5,061,000 and require 16 months to complete construction. The project would make good use of the existing dam and site by providing a financially feasible means of generating hydroelectric energy while still being compatible with the fisheries resources, aesthetics, and other environmental attributes of the site.

Both the Soil Conservation Service and the National Park Service filed letters stating that those agencies have no comprehensive plans that this project would affect. No other specific State of Federal agency comments or recommendations were made addressing comprehensive plans, flood control, navigation, water supply, or irrigation requirements in the basin.

The Schuylkill river is located within the Delaware River basin. The Commission's Planning Status Report for the Delaware River basin discusses the existing water developments and reconnaissance level plans for possible future development within the basin. The project does not conflict with any existing or planned development or any pending applications for exemption, license, or preliminary permit.

In summary, our analysis shows that the proposed project is properly designed to develop the hydropower potential of the Schuykill River at Flat Rock Dam, and would not conflict with any existing or planned water resource developments in the basin.

III. PROPOSED PROJECT AND ALTERNATIVES

A. Proposed Project

1. Project Description

The applicant proposes to utilize the existing 525-foot-long, 17-foot-high Flat Rock Dam and install: (1) a new intake structure and 50-foot-wide by 75-foot-long powerhouse, with an installed capacity of 3,250 Kw, on the right abutment of the dam; (2) an excavated tailrace extending about 500 feet downstream from the dam; (3) 1-foot-high flashboards across the dam crest; and (4) a 675-foot-long, 13.2-kilovolt, above ground transmission line, connected to a 600-foot-long under water transmission line cable (figure 2). The applicant would reserve space in the vicinity of the powerhouse for the construction of fish passage facilities. The applicant would operate the project in a run-of-river mode, and provide a continuous release of 250 cfs over the dam for the protection of visual and aquatic resources.

2. Proposed Mitigative Measures

Mitigative measures proposed by the applicant for the construction period include: (1) using cofferdams so that construction activities would occur in the dry; (2) proper disposal of excavated materials in approved disposal sites; and (3) revegetating disturbed land areas with grasses, shrubs, and trees to provide habitat for wildlife.

Measures proposed as part of the project design and for the project operational period include: (1) making design space available and cooperating with the DER in the construction and operation of fish passage facilities; (2) passing a continuous flow of 250 cfs over the dam to protect visual and aquatic resources; (3) monitoring dissolved oxygen concentrations at the project, with provisions for implementing aeration measures if needed; (4) providing a flow of 50 cfs into the Manayunk Canal to protect the cultural resources; (5) using an underwater transmission line cable to protect visual resources; and (6) providing increased recreational access and a new canoe portage trail at the project site.

B. Alternatives to the Proposed Project

Hydroelectric projects are unique in the electric power generation field because of their rugged machinery, high reliability, low operation 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 -- maximum hydraulic head (fall) in a short run of the stream (horizontal distance); (3) accessibility; (4) availability of electric transmission system; (5) minimum water release; and (6) environmental effects.

The applicant is not an electric utility so the only alternative is not to construct the project. If the proposed project is not constructed, the power that would have been developed eventually would be provided by nonrenewable fuels. It is presumed that projects that would use nonpassive renewable resources other than hydropower, such as wind, biomass, or solar photovoltaic power generation, will be installed when they become commercially and economically feasible. Whether the proposed project is built or not, the installation of projects that would use passive renewable resources, such as solar, water or space heating will continue, and conservation efforts will 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 involve no alternatives to the existing environment in the vicinity of Flat Rock Dam, and would preclude the applicant from producing electric power at the site.

IV. CONSULTATION AND COMPLIANCE

A. Agency Consultation

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

consultation must be complete and 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 March 4, 1982.

<u>Commenting entity</u>	<u>Date of Letter</u>
Pennsylvania Fish Commission	April 16, 1982
National Marine Fisheries Service	April 23, 1982
The Philadelphia Canoe Club	April 26, 1982
U.S. Fish and Wildlife Service	May 23, 1982
<u>Intervenors</u>	<u>Date of Petition</u>
Commonwealth of Pennsylvania Department of Environmental Resources	April 27, 1982
City of Philadelphia, Water District	May 12, 1982
Philadelphia Electric Company	May 12, 1982
Connelly Containers, Inc.	October 20, 1982

The applicant's amendment to the application, which was filed on June 6, 1985, and revised the proposed project design, was not judged to be a material amendment of the application and was not noticed. The applicant, however, consulted with the appropriate agencies during the preparation of the amendment, and based many of the project revisions on agency recommendations. Agency comments on the proposed revisions were included in the amendment filings. The following entities also filed comments on the proposed amendment with the Commission.

<u>Commenting entity</u>	<u>Date of Letter</u>
Connelly Containers, Inc.	March 5, 1985
Pennsylvania Fish Commission	June 20, 1985
	January 13, 1986

The applicant has responded to the comments of the resource agencies and other entities, and to the petitions to intervene, by several letters and filings since 1982.

R. Water Quality Certification

On September 25, 1981, the DER granted \$ 401 water quality certification for the previously proposed project, as required by the Clean Water Act. On March 17, 1986, the applicant applied to the DER for water quality certification for the currently proposed project. On June 2, 1986, the DER issued a water quality certificate for the currently proposed project.

V. ENVIRONMENTAL ANALYSIS

A. Proposed Project

There would be no direct or indirect adverse environmental impacts on socioeconomic resources because: (1) project construction would require few onsite personnel; (2) turbines, generators, transformers and other major equipment probably would not be manufactured in the Philadelphia area; and (3) the applicant has proposed to release flows over the dam to protect existing visual resources, which in turn would protect the market value of nearby residences.

1. General Description of the Locale

The Flat Rock Dam is located in suburban Philadelphia in an area containing both industrial and residential development. The river banks rise steeply from the river and support a narrow strip of hardwood forest. Railroad tracks border both sides of the river, and the Schuylkill Expressway (Interstate 76) parallels the west shore. Recreational facilities found in the area include Flat Rock Park, located on the west shore upstream of Flat Rock Dam, and the towpath, which follows the east bank of the river and connects to other recreational facilities and parks in the Schuylkill River corridor. The historic Manayunk Canal is also located on the east bank immediately downstream of the Flat Rock Dam. The project area is used extensively by recreationists.

2. Geology and Soils

Affected Environment: The project site is underlain by bedrock, as indicated by exposed boulders and ledge rock immediately downstream of the dam. The area of the proposed intake structure and powerhouse has deep deposits of sediments and soil overlying the bedrock, and a shallow soil profile covers the area of the proposed tailrace location (personal communication, Cliff Romig and Michael Packard, DER, Harrisburg, Pennsylvania, July 18, 1986).

Environmental Impacts and Recommendations: Construction of the proposed project would cause increases in erosion and

sedimentation during land-clearing and ground-disturbing activities, which would include excavation, dredging, and spoil disposal.

The location of the proposed project would impact sediment that may contain polychlorinated biphenyls (PCB's), and the disturbance of sediment containing PCB's could adversely impact downstream resources (personal communication, Michael Packard, DER, Harrisburg, Pennsylvania, July 18, 1986).

The licensee, before starting any land-clearing or ground-disturbing activities, should file with the Commission a plan to control erosion and sedimentation, and an assessment of the extent and the proper disposal of any contaminated spoil and other wastes resulting from project construction.

Unavoidable Adverse Impacts: Construction activities would cause short-term increases in erosion and sedimentation.

3. Water Resources

Affected Environment: The Schuylkill River at Flat Rock Dam has a drainage area of 1,809 square miles. The average annual flow at the site is estimated to be 2,831 cfs; the maximum and minimum recorded flows for the lower Schuylkill River, measured at the downstream Fairmount Dam, are 103,000 cfs and 0.6 cfs, respectively (Pennsylvania Hydroelectric Development Corporation, 1985b, license application amendment, exhibit E). The normal runoff pattern from the basin is that of peak flows in early spring (March), lowest flows in late summer or early fall (October), and slightly higher flows during the winter months. All river flows currently pass over the Flat Rock Dam spillway, with the exception of a small volume of flow into the Manayunk Canal.

Water quality in the lower Schuylkill River historically was severely degraded by industrial development, coal mining, and urbanization. By the 1930's, the river was heavily polluted by acid discharges from coal mines, by chemical wastes, and by sewage discharges. The river also contained heavy loadings of coal dust, which was deposited in the reservoirs on the river's main stem. In the late 1940's, the State of Pennsylvania embarked on a program to remove the coal dust and to improve water quality (Hobbs and Mulfinger, 1978). With the passage of the Clean Water Act, federal funds became available in the early 1970's to aid the cleanup effort.

As a result of these efforts, water quality has improved in the river, and the DER now classifies the river in the project vicinity as suitable habitat for warmwater and anadromous fishes.

Recent Geological Survey (USGS) data provided by the applicant (Consolidated Hydro, Inc., 1986, additional information in support of license application) indicate that dissolved oxygen (DO) levels generally remain higher than 5.0 milligrams per liter (mg/l), with maximum recorded water temperature not exceeding 28° Celsius (82° Fahrenheit). Data on pH units indicate that the river is no longer affected by acid drainage from coal mines, with most readings in the range of 7.0 to 8.0; occasional readings as low as 5.4 are still reported, however. A water quality parameter that remains in the unsuitable category is the fecal coliform count. Counts have generally remained in excess of 1,000 coliforms per 100 milliliters (COLS/100ml), with some readings in recent years as high as 11,000 to 13,000 COLS/100ml. For this reason, swimming and wading is discouraged in the project area.

Environmental Impacts and Recommendations: Construction of the project would result in the excavation of about 220 feet of the right embankment of Flat Rock Dam for the placement of the proposed powerhouse, and excavation of a tailrace in the bed of the Schuylkill River for about 500 feet downstream from the powerhouse. The applicant proposes to conduct these excavations "in the dry" behind cofferdams. Cofferdam installation and removal, however, would result in some disturbance of riverbed materials and the probable generation of turbidity and sedimentation in the immediate area. Tailrace excavations could also disturb river sediments that contain toxic substances, such as PCB's and pesticides, which entered the river via the industrial discharges of the past. The applicant proposes to dispose of excavated sediments at an approved site in accordance with Corps of Engineers and DER permits.

The applicant's proposed mitigative measures would generally protect water quality during construction, and should prevent the resuspension of toxic substances in the river. As stated previously, however, the applicant should prepare a detailed erosion and sediment control plan prior to commencing construction, which would include an assessment of the extent of contaminated sediments and determine proper disposal methods.

Project operation would reduce the amount of water that spills over Flat Rock Dam; up to 3,000 cfs would be passed through the proposed powerhouse at full generation. The applicant proposes to maintain a minimum instantaneous release of 250 cfs over the spillway to protect aquatic and visual resources. Reduction of spillway flows would, however, in turn reduce the aeration effect of the dam as a smaller volume of water is exposed to the turbulence and atmospheric contact associated with spillway passage. The DO data from the lower Schuylkill River indicate that DO depletion is not a serious problem, although reduction of

the aeration effect of the dam could affect DO levels during summer low-flow periods.

In addition to passing the 250 cfs minimum flow over the spillway, the applicant proposes to continuously monitor DO levels at the project, as recommended by DER and the Pennsylvania Fish Commission (PFC), and to design the project so that aeration devices could be later installed if the monitoring program detects DO depletion downstream of the project. The applicant states that either turbine venting or tailrace aeration would be used, depending on the effectiveness and economics of each method.

Measures proposed by the applicant would likely protect water quality during project operation. The applicant should, however, consult with the agencies and develop a detailed plan for DO monitoring, and for implementation of aeration measures if needed.

Two additional issues associated with water resources that were raised by commenting agencies are the volume of flow needed in the Manayunk Canal, and the use of 1-foot-high flashboards on the dam.

The intervenor Connelly Containers, Inc. (Connelly), which has a manufacturing plant on the Manayunk Canal downstream of Flat Rock Dam, states that it is currently studying the feasibility of installing a hydroelectric project that would utilize 400 cfs of water from the Canal. Connelly further states that the Flat Rock Dam Project would conflict with its potential project, since the applicant proposes to release only 50 cfs into the Canal to preserve historic structures. Connelly recommends that the Flat Rock Dam Project not be authorized until Connelly has concluded its negotiations with the city of Philadelphia regarding the feasibility of its project.

The applicant responds that Connelly's proposal would have detrimental effects on the historic structures on the Manayunk Canal and on fish migrations through the reach, as well as reduce the economic benefits of the proposed Flat Rock Dam Project. The applicant states that it has verbal concurrence from the Pennsylvania Historical and Museum Commission that a flow of 30 to 50 cfs would be sufficient to protect historical resources, and that higher flows would cause Canal erosion and possible destruction of historical resources. The applicant further states that a release of 400 cfs from the Canal would adversely affect fish migrations by producing attraction water flows that would compete with those from the fish passage facilities at Flat Rock Dam.

Connelly's proposal to operate a project in the Manayunk Canal, using 400 cfs of water, would potentially result in adverse impacts as described by the applicant. Connelly, however, has not filed an application for a license or for a preliminary permit for its project, even though the applicant's application for license, which Connelly has been fully aware of, has been before this Commission since December, 1981. Delaying the processing of the applicant's application, as recommended by Connelly, would not appear justified, based on the potential effects of Connelly's proposal, and on the fact that Connelly has not indicated when a decision on its project would be reached. Thus, any license issued should require the licensee to release only a maximum of 50 cfs into the Canal.

The applicant's proposal to use 1-foot-high flashboards on the dam has not been accepted by the DER, the Montgomery County Planning Commission (MCP), nor by property owners in the vicinity of the project. Concern has been expressed that the flashboards could result in higher water levels during both normal and flood flows, and result in greater flood damage to surrounding properties. The applicant states that the flashboards would only maintain the reservoir at about the same level as now exists, and that the flashboards would be designed to fail at high river flows, resulting in the same flood levels as now occurs.

The proposed 1-foot-high flashboards would not likely result in greater damage to properties located on the project reservoir. The flashboards would likely enhance water levels in the reservoir during the summer low-flow periods, since the reservoir level would be maintained 1-foot above the dam crest. This would enhance boating opportunities in the reservoir. Flashboards that are designed to fail at high river flows, as proposed by the applicant, would not increase flood levels upstream of the dam.

Unavoidable Adverse Impacts: Construction activities would result in some increased sedimentation and turbidity in the Schuylkill River in the immediate project vicinity.

4. Fishery Resources

Affected Environment: The Schuylkill River in the project vicinity supports a good warmwater recreational fishery, which is concentrated in the 1-mile reach of river immediately below the Flat Rock Dam. Species occurring in the project vicinity include smallmouth bass (*Micropterus dolomieu*), largemouth bass (*M. salmoides*), crappie (*Pomoxis*, sp.), sunfish (*Lepomis*, sp.), carp (*Cyprinus carpio*), white sucker (*Catostomus commersoni*), muskellunge (*Esox masquinongy*), gizzard shad (*Dorosoma cepedianum*), channel catfish (*Ictalurus unctatus*), and several

species of minnows (*Notropis*, sp.). Coldwater species, brown trout (*Salmo trutta*) and rainbow trout (*S. gairdneri*), have also been reported in the vicinity of the dam.

Anadromous species may also occur seasonally below Flat Rock Dam. A fish ladder has been installed on the downstream Fairmount Dam, and the PFC has embarked on a program to restore American shad (*Alosa sapidissima*) to the Schuylkill River (Hesser, 1984). Anadromous species that have passed the Fairmount Dam fish ladder, and reached the base of Flat Rock Dam, include American shad, striped bass (*Morone saxatilis*), blueback herring (*A. aestivalis*), and alewife (*A. pseudoharengus*). The catadromous American eel (*Anguilla rostrata*) has also passed through the ladder (table 1). The Flat Rock Dam is not equipped with fish passage facilities, and blocks further upstream migration of fishes.

Table 1. Numbers of anadromous fishes and American eel observed at the Fairmount Dam fishway, Schuylkill River, Philadelphia, Pennsylvania, 1979 through 1984. 2/

Species	Year 3/					
	1979	1980	1981	1982	1983	1984
American shad	2	7	22	11	8	0
Herring 4/	19	33	305	159	28	8
Striped bass	0	1	1	1	0	4
American eel 5/	-	-	-	-	-	-

2/ Source: Personal communication, Leroy Young, Pennsylvania Fish Commission, Bellefonte, Pa., July 24, 1986.

3/ Hours per day and dates for counting varied from year to year. No counts were made in 1985 and 1986.

4/ Includes both blueback herring and alewife.

5/ Observed every year, but not counted.

Environmental Impacts and Recommendations: Project construction would disturb fish habitat below Flat Rock Dam; the disturbed area would extend downstream about 500 feet, and about halfway across the river channel. Cofferdams and excavation of the tailrace would prevent fish from using this area until after completion of construction. Short-term increases in sedimentation and turbidity would make other areas not directly occupied by construction activities less suitable as fish habitat. Fishes would likely avoid use of much of the area below the dam during the construction period. Implementation of the applicant's and staff's proposed mitigative measures for construction, however, would adequately protect fishery resources during this period.

Project operation would reduce the volume of spill over the dam, and reduce flow over the aquatic habitat immediately downstream of the dam. Under average flow conditions, most of the river flow would be discharged through the powerhouse and tailrace, while habitat immediately below the dam would receive only the minimum spillway flow of 250 cfs. The exact area that would be affected is difficult to determine since the pattern of flow discharging from the tailrace has not been determined. The back water from the tailrace discharge would likely help maintain a portion of the habitat.

Commenting agencies do not express concern about the reduction of flows over the spillway, and indicate that 250 cfs would be adequate to protect aquatic habitat immediately below the dam. The licensee should, therefore, maintain a continuous minimum flow of 250 cfs over Flat Rock Dam, except for the periods when additional flows would be required for protection of visual resources, as described later in this report. The licensee should also operate the powerhouse in an instantaneous run-of river mode, as proposed, to protect aquatic habitat downstream of the tailrace. The licensee should install stream gages in the vicinity of the project to ensure that minimum flows required by any license issued are being maintained.

Operation of the proposed powerhouse would expose downstream migrating anadromous fishes and resident fishes to entrainment and turbine mortality. American shad fry have been stocked and will continue to be stocked in the Schuylkill River Basin upstream of the proposed project, and will migrate downstream through the project area in the fall. If adult shad or other anadromous species are passed above Flat Rock Dam through a fish passage facility, these adults and any juvenile fish spawned above the dam would also migrate downstream through the project. Although some fish would use the spillway for passage, with minimal mortality, many fish would follow the larger volume of flow through the powerhouse. The mortality rate of fish passing through the turbine is difficult to predict; studies have shown that mortality rates may range from as low as 2 percent for salmon smolts passing through a horizontal

Kaplan unit (Knight and Kuzmeskus, 1982), to 83 percent for juvenile shad and herring passage through a vertical Kaplan unit (Kynard, et al., 1982).

The U.S. Fish and Wildlife Service (FWS) and the PFC recommend that fish protection be provided at the project. The applicant states that fish protective measures would be installed, but recommends that such installation be delayed until the final design stage of the project. This would allow the applicant to consider research in progress elsewhere on fish protection, and to reflect the state-of-the-art in the final project design. The applicant indicated in a recent phone conversation with staff that only a "standard" trashrack would be initially installed (personal communication, Jason James, Consolidated Hydro, Inc., July 17, 1986).

The applicant has committed to providing fish protection at the project, although has not yet proposed specific designs for facilities. The licensee should consult with the FWS, PFC, and DER on the design of fish screens or other measures at the project intake, and file functional design drawings for Commission approval prior to commencement of project construction.

The FWS and PFC also recommend that fish passage facilities for upstream migrating fishes be installed at the project, and that up to 100 cfs of water be made available for fishway operation. The DER, as owner of the Flat Rock Dam, had previously agreed to construct fish passage facilities at the dam, although has not done so because of the pending application for license. Any facility constructed by DER must be designed to be compatible with the proposed hydroelectric project, to ensure success in passing fish. The DER now recommends that the applicant construct the fish passage facility in conjunction with project construction; DER would reflect the applicant's expenditure for fish facilities in the lease payments that would be levied by DER for use of the dam.

The applicant agrees to the recommendations of DER, and would coordinate the design, construction, and operation of the fishway with the DER. The applicant also agrees to provide 100 cfs for fishway operation. This arrangement, in which the licensee would construct the fishway at the same time as the powerhouse, and receive credits on the lease payments to DER, would adequately provide for fish passage at the project. Thus, the licensee should consult with the DER, FWS, and PFC on the design of upstream migrant fish passage facilities, and file functional design drawings for Commission approval prior to commencement of project construction.

Unavoidable Adverse Impacts: Project construction would temporarily disturb and eliminate aquatic habitat immediately downstream of Flat Rock Dam. The proposed tailrace would permanently alter aquatic

habitat; a portion of the existing relatively shallow riffle habitat would be transformed to a deeper-water channel.

5. Terrestrial Resources

Affected Environment: The proposed project is located within an area of the City of Philadelphia. The botanical and wildlife resources of this area are limited. Vegetation is restricted to a narrow corridor along the river. The typical vegetation in this area consists of the tree-of-heaven (*Ailanthus altissima*), box elder (*Acer negundo*), silver maple (*Acer saccharinum*), and various shrubs. A variety of grasses and herbs, such as butter cup (*Ranunculus sp.*), stinging nettle (*Urtica dioica*), jewelweed (*Impatiens sp.*), and bedstraw (*Galium sp.*); are present near the dam, and within the project area.

Wildlife that may be found in the project vicinity include: grey squirrel (*Sciurus carolinensis*), raccoon (*Procyon lotor*), and opossum (*Didelphis marsupialis*). Avian species that live in or visit the project area include: Canada geese (*Branta canadensis*), mallards (*Anas platyrhynchos*), gulls (*Larus sp.*), and a variety of passerine species.

Environmental Issues and Recommendations: Approximately 0.75 acres of vegetation would be removed during construction of project facilities. The applicant proposes to mitigate this impact by planting in the cleared area grasses, shrubs and trees. This revegetation would provide cover and food for wildlife. The applicant should implement this mitigative plan.

Unavoidable Adverse Impacts: Project construction would temporarily disturb a small area of terrestrial habitat, and temporarily displace wildlife from the area.

6. Threatened and Endangered Species

Affected Environment: No federally listed threatened or endangered birds or mammals are known to reside in the immediate project area. The bald eagle (*Haliaeetus leucocephalus*) and peregrine falcon (*Falco peregrinus*) may occur as transients, although the presence of these species in the project area has not been verified.

The endangered shortnose sturgeon (*Acipenser brevirostrum*) has been reported in the lower Delaware River, but has not been reported in the Schuylkill River (Genoways and Brenner, 1985). The PFC has surveyed the fish populations in the lower river in recent years and has not detected the presence of the shortnose sturgeon (Pennsylvania Hydroelectric Development Corporation, 1985b, license application amendment, exhibit E).

Environmental Impacts and Recommendations: Construction and operation of the proposed project would not adversely affect any endangered species that may occasionally occur in the area. Any transient bald eagles or peregrine falcons may avoid the area during construction but this would be only a minor, short-term impact. Commenting agencies did not raise any concerns regarding the project's effects on federally listed threatened or endangered species.

Unavoidable Adverse Impacts: Transient bald eagles or peregrine falcons would avoid the project area during the construction period.

7. Visual Resources

Affected Environment: The proposed project area has a developed man-made landscape character consisting of urban, industrial, and transportation development interspersed with trees, undeveloped space, and a natural appearing river and shoreline. The existing dam, along with the whitewater below the dam, are a local attraction to residents, and recreational users. The visual quality along the river is generally picturesque with many areas being preserved as parks and recreation trails by federal, state and local agencies. The proposed project site, although generally pleasant to view, is blighted by the dilapidated buildings and discarded debris of the Connelly Container Corporation. Connelly's yards are in clear view of recreationists using a tow path access trail on the east side of the river, and is evident in views from the homes on the hills to the west of the dam. People using the tow path also are exposed to side cast debris of bricks, concrete chunks, construction lumber, etc., that detracts from the picturesque atmosphere. Homes located on the west side of the river have a good view of the dam, the container factory, the urbanized area to the east and other industrial buildings. Sound from the river would at least blend with the noise from the highway at the base of the hill. This segment of the river has been given a "1A" priority classification under the state's scenic river system.

Environmental Impacts and Recommendations: Reduction of flows over the spillway would adversely affect the visual quality of the area, since the picturesque appearance of a turbulent flow at the base of the dam would be reduced. Based in part on the PFC recommendation of 250 cfs for protection of aquatic habitat, the applicant proposes to release a continuous flow of 250 cfs over the dam, which would provide 3.5 inches of water over the dam crest, to maintain both visual quality and aquatic habitat. The MCPC recommends that a 650-cfs minimum flow be passed over the dam during daylight hours to protect visual quality. The MCPC states that the 650 cfs is a compromise flow based on the existing natural flow, and on what the local community could accept as a minor, adverse impact (personal communication, Arthur Loeben, MCPC, Norristown, Pennsylvania, July

18, 1986). The MCPC also expresses the concern that installation of flashboards could adversely affect the aesthetics of the dam.

A site visit by staff on April 15, 1987, indicated: (1) the importance of the whitewater below the dam to the visual and aesthetic quality of the site, rather than the smooth flow of water over the ogee spillway; and (2) the high use of the tow path by recreationists.

A 650-cfs release from the dam would provide about 47 percent of the average flow in the river for October, the lowest flow month. A 250-cfs release would provide about 18 percent of the average monthly flow for October. The installation of flashboards would affect the visual character of the dam, although flashboards could enhance aesthetics under certain flow conditions.

Flows should be provided over the dam to maintain the whitewater at the base of the dam, to preserve the visual quality of the project area. The 650-cfs release over the dam would adequately maintain the whitewater at the base of the dam during daylight hours. The licensee, however, should study alternative flows between 250 cfs and 650 cfs, to determine if a lesser flow would adequately maintain the visual quality at the dam. The study should examine various flows and the degree of sensitivity that the people who use the area have for the visual quality, and the time of day, month, and year when the existing visual quality and other sensory values are most sensitive to disruption, and should consider the effects of flashboards on any alternative flows.

The Township of Lower Merion also expresses concern about whether the access road corridor could be landscaped and revegetated to blend with the surrounding area. To assure that project facilities, including the access road, blend with the surrounding area to the maximum extent possible, the licensee should provide a plan for the design of the project facilities, including the alignment, location, colors, building materials, and landscaping.

Unavoidable Adverse Impacts: Construction activities, including the presence of men and equipment, would have a short-term effect on the landscape character of the project area. The presence of additional man-made structures and reduced flows over the spillway would result in a minor reduction in visual quality for the life of the project.

8. Cultural Resources

Affected Environment: The Manayunk Canal and Historic District, which includes the Original Flat Rock Dam, are eligible for listing on the National Register of Historic Places, and are in the immediate vicinity of the proposed project (letter from Brenda Barrett, Director, Bureau for Historic Preservation, Harrisburg,

Pennsylvania, June 28, 1982). Originally built in the early nineteenth century, the Canal is about 11,180 feet long and, at its widest point, measures about 100 feet; the width of the remainder of the Canal varies. The original Flat Rock Dam was built just north of the canal in 1818 as part of the "slackwater" system. It was disturbed during the construction of the new dam in 1976-77. The old dam's remains are now underwater.

The Canal, part of a larger series of canals and slack pools covering about 108 miles called the Schuylkill Navigation Company, has played an important role in the Town of Manayunk becoming one of America's first industrialized communities. When completed in 1823, the Canal was the artery used to transport raw materials, such as lumber, agricultural products, and most importantly anthracite coal. Many new mills were built along its banks. The remains of the mill structures along federal-style rowhouses and cobblestone streets comprise the remainder of the historic district.

No archeological sites have been identified in the area as being either listed on or eligible for listing on the National Register (letter from Greg Ramsey, Chief, Division of Planning and Protection, Bureau for Historic Preservation, Harrisburg, Pennsylvania, October 8, 1982).

Environmental Impacts and Recommendations: Constructing and operating the proposed project at the western abutment of the modern Flat Rock Dam would visually affect the characteristics of the Manayunk Canal and Historic District that contribute to these properties' meeting the National Register criteria of significance. The effect, however, would not be adverse (letter from Dan G. Deibler, Chief, Division of Planning and Protection, Bureau for Historic Preservation, Harrisburg, Pennsylvania, June 24, 1986).

If a license is issued for the project, an adverse effect could result if the new powerhouse, tailrace, and associated facilities are constructed in a manner that would be visually incompatible with the existing historic structures. Therefore, the licensee should prepare a plan to construct the new facilities in a manner that is compatible with the Manayunk Canal and Historic District.

The licensee should file with the Commission the plan, documentation of having consulted with the SHPO in preparing the plan, and copies of the SHPO's comments and recommendations. If the licensee does not adopt the SHPO's recommendations, the filing should include the licensee's reasons.

Ground disturbing and land-clearing activities could adversely affect eligible archeological and historic sites not previously identified in the project area. If the applicant encounters such sites during the development of project works or related facilities,

the applicant should stop ground-disturbing and land-clearing activities in the vicinity of the sites, and should consult the SHPO concerning the eligibility of the sites, and any measures needed to avoid the sites or to mitigate effects on the sites. Before starting any ground-disturbing or land-clearing activities within the project boundaries, other than that specifically authorized in this license, the applicant should consult with the SHPO about the need to conduct an archeological or historical survey and the need for avoidance or mitigative measures. In these instances, 60 days before any such ground-disturbing or land-clearing activities, the applicant should file a plan and a schedule for conducting the appropriate studies along with a copy of the SHPO's written comments concerning the plan and the schedule.

Unavoidable Adverse Impacts:None.

9. Recreation and Other Land Uses

Affected Environment: On-shore recreational uses in the project area include bicycling, hiking, horseback riding, jogging, and sightseeing. Fishing and boating are popular above and below Flat Rock Dam; the river immediately downstream of the dam provides some whitewater boating. Swimming and wading are prohibited.

Flat Rock Park, upstream of the dam on the west bank of the Schuylkill River, provides boating and fishing access. Facilities include parking and picnic areas, a boat launch, and restrooms. Fishing access is also available on the west bank just below the dams. Canoeists running the river use an informal take-out, put-in, and canoe portage to bypass the dam. When the dam was reconstructed in 1977, two low-flow notches were placed on the dam specifically to provide whitewater canoeing opportunities. Boulders were placed downstream of these notches to increase whitewater diversity. The towpath along the east bank of the river is used for on-shore activities and as a link between other recreational areas such as Fairmount Park further down stream and Valley Forge National Park further upstream (figure 3).

A 10.4 mile segment of the Schuylkill River, which includes the project area, has been designated as modified recreational under Pennsylvania's Scenic River System. The designation was based on the use of the stretch of the river for whitewater boating and fishing.

Other land uses in the vicinity of the project include industrial, commercial, and residential development.

Environmental Impacts and Recommendations: Construction of the proposed project offers the opportunity for enhancement of public access facilities in the project area. The applicant proposes to

provide walkways, steps, and railings at the powerhouse to increase angling opportunities in the tailrace area. The applicant also proposes to construct a new canoe put-in, take-out, and portage trail to improve boating access in this stretch of the river. The FWS, the DER, PFC, and the Philadelphia City Planning Commission (PCPC) find the proposed access facilities adequate. The PCPC suggests that the applicant also provide interpretive signs at the proposed hydropower facility and safety measures to protect boaters in the project area. The applicant agrees.

If a license is issued for the project, the licensee, after consultation with DER Office of Resources Management and Scenic River Division, PFC, PCPC, and MCPC, should construct the proposed public access facilities and interpretive signs and provide safety measures to protect recreationists in the area. After construction of the facilities, the licensee should file with the Commission drawings showing the type and location of the facilities and the entity responsible for maintenance and operation of the facilities.

The diversion of water through the powerhouse and sealing of the low flow notches could adversely affect whitewater boating directly downstream of the dam. The PCPC is concerned that the waters at the toe of the dam that are used as an informal whitewater course may be lost by the diversion of water for project operation. The DER indicates that the concentration of flow releases from the powerhouse along the right bank may mitigate the loss of the concentrated flows below the notches. They also state that it may be necessary to place boulders downstream of the tailrace and a new put in area to maintain whitewater diversity. The applicant states that the proposed project would only relocate the area of use by whitewater enthusiasts. The applicant agrees to consult with DER to address options for protecting whitewater opportunities directly below the dam. If a license is issued for the project, the licensee should consult with DER and PCPC, and prepare a plan to provide whitewater boating opportunities directly below the dam.

During construction, noise from machinery and other construction activities would temporarily disturb recreationists in the project area.

Unavoidable Adverse Impacts: Construction activities would produce noise, dust, exhaust emissions, and vehicular traffic that would temporarily disturb recreationists in the project area.

B. Cumulative Environmental Impact Analysis

1. Schuylkill River Basin

The Schuylkill River Basin is located in southeastern Pennsylvania (figure 1). The basin is about 93 miles long, averages about 21

miles in width, and encompasses a drainage area of about 1,916 square miles (Corps of Engineers, 1980). The Schuylkill River originates in Schuylkill County in the Appalachian Mountains and flows in a southeasterly direction to a confluence with the Delaware River at Philadelphia, Pennsylvania. Principal tributaries of the Schuylkill River are Perkiomen Creek, French Creek, Manatawny Creek, Tulpehocken Creek, Maiden Creek, and the Little Schuylkill River (figure 1).

The lower 8.6 miles of the Schuylkill River, which runs through the City of Philadelphia, Pennsylvania, is used for commercial navigation. The river and its tributaries receive municipal, industrial, and domestic wastewaters; provide water for domestic consumption, industrial cooling purposes, and recreation; and create habitat for fish and wildlife resources. Federal and state agencies have constructed flood control, navigation, and water supply projects in the basin (Corps of Engineers, 1980); 11 dams are on or near the mainstem of the Schuylkill River (figure 1).

The state has designated portions of the Schuylkill River, including a 93-mile-long-reach between Port Clinton, Pennsylvania, and Fairmount Dam (figure 1), as part of the state scenic rivers system (Pennsylvania Bureau of Environmental Planning, 1981). The proposed Flat Rock Project would be located within a scenic river segment of the Schuylkill River that allows commercial, industrial, and recreational usage of the river.

2. Proposed and Existing Hydroelectric Development

As of July 10, 1986, there were no licensed or exempted hydro electric projects operating in the Schuylkill River Basin. In addition to the proposed project, there is one pending license application, two issued exemptions, and one issued license in the Schuylkill River Basin (figure 1). About half of the projects are in the upper basin and half in the lower basin. All the projects involve converting existing dams to hydropower production. The proposed Flat Rock Dam project would be located between two dams on the mainstem Schuylkill River. The exempted Fairmount Dam Project (FERC No. 3227) is about 6 miles downstream from Flat Rock Dam; the Plymouth Dam, for which a preliminary permit has been issued, is about 5 miles upstream (figure 1).

3. Target Resources

The staff has identified water quality (DO and sedimentation), river-oriented recreation, and fishery resources, both resident and migratory species, as target resources in the Schuylkill River Basin that could be adversely affected by two or more proposed hydropower projects. The staff selected the target resources by reviewing applications for proposed and existing hydropower projects, and

reviewing comments from federal and state natural resource agencies and the public.

Industrial and agricultural developments have created water quality problems in the Schuylkill River and in the basin over the years. An abundance of coal mines in the watershed has lead to acid mine pollution that affects over 170 miles of streams in the basin; municipal and industrial wastes affect another 46 miles (Corps of Engineers, 1980). The upper reaches of the Schuylkill River contain high concentrations of iron, zinc, sulfates, and copper. These metals interact with the coal fines deposited on the stream bottom and with other chemicals deposited in the river from agricultural and municipal discharges to reduce DO levels; ultimately there is a reduction in aquatic resources and in habitat that further limits recreational use of the river. In the lower reaches of the Schuylkill River, where commercial navigation is important, deposits of heavy metals and hydrocarbons in the sediments also cause water quality problems similar to some problems in the upper reaches of the river.

Since the mid-1970's, continuing efforts to improve the water quality of the basin through desilting projects, river dredging, building new wastewater treatment facilities, and restricting waste discharges have produced a marked improvement in the over all water quality of the basin (Hesser, 1985). Although there are still some water quality problems near urban centers, especially under low streamflow regimes and under warm water temperatures, water quality has improved to the extent that restoration efforts are underway for American shad, and increased fishing and boating occurs along many segments of the Schuylkill River (Corps of Engineers, 1980; Hesser, 1985).

The installation of low-head hydropower projects throughout the mainstem Schuylkill River has the potential to cause cumulative adverse impacts to the water quality of the Schuylkill River in two ways. During certain periods of the year, particularly during late summer low flows, the DO level in portions of the Schuylkill River is naturally reduced, and any diversion of water through turbines instead of over spillways could cause additional reductions in DO levels and reduce fisheries habitat. In addition, the construction activities associated with fitting some existing dams with hydropower facilities could increase the turbidity and sedimentation in the stream. The distance between some dams is short (figure 1). Simultaneous construction activities, in conjunction with summer low flows, could reduce DO levels and cause cumulative adverse impacts on fishery resources.

Federal, state, and local agencies provide recreational facilities throughout the basin (Corps of Engineers, 1980). Numerous state parks offer boating, fishing, swimming, and camping opportunities.

The basin is readily accessible to outdoor enthusiasts from the nearby metropolitan area of Philadelphia. There is extensive use of existing recreational facilities and an increasing demand for additional facilities (Corps of Engineers, 1980). The improved water quality increases angling opportunities for resident species and for migratory species such as American shad and striped bass. Canoeists, kayakers, and fishermen currently use the Schuylkill River in the vicinity of the proposed project.

The degradation of water quality through increased siltation, or through reductions in DO as a result of multiple hydropower development could have cumulative adverse effects on recreational activities in the Schuylkill River Basin. Increased turbine mortality could reduce fish opulations, and fishermen would have to seek recreational activities elsewhere. Similarly, changes in existing flow patterns and releases at existing dams could reduce the visual quality enjoyed by canoeists along the Schuylkill River, and could eliminate the chutes and whitewater areas enjoyed by kayakers.

American shad, hickory shad (Alosa mediocris), alewife, blueback herring, and American eel historically ascended the Schuylkill River from the Delaware River; American shad reportedly migrated 120 miles upriver to Pottsville Dam (Hesser, 1985). In the 19th and 20th centuries, construction of dams in the mainstem of the Schuylkill River prevented access to most of the river and eventually eliminated several diadromous species from the basin, including the anadromous striped bass and American shad and catadromous American eel (Corps of Engineers, 1980; Hesser, 1985). In the mid-1970's, the PFC found that with improving water quality, anadromous species could be expected to reach the New Kersville Dam, nearly 100 miles upriver from the river mouth (Hesser, 1985).

A fishway has been in operation at Fairmount Dam since 1979 and various diadromous species, including striped bass, have been reported at the base of Flat Rock Dam (Hesser, 1985). The PFC began to restore American shad to the Schuylkill River in 1984, and has planted slightly over a quarter of a million fry each year since then. The capture of juvenile fish downstream from the planting sites verifies the shad's survival (personal communication, Robert B. Hesser, Fishery Resources Biologist, PFC, Bellefonte, Pennsylvania, July 11, 1986).

PFC's objective is to achieve an annual spawning population of 300,000 to 850,000 American shad in the Schuylkill River. These numbers of shad would provide 60,000 to 170,000 sport fishing trips, with a recreational value of \$3 million annually (Hesser, 1984; 1985).

The success of the American shad restoration effort on the Schuylkill River ultimately will depend on the installation of fish passage facilities at existing dams on the mainstem river.

The installation of low-head hydropower facilities on existing dams in the Schuylkill River could cause cumulative adverse impacts to resident and migratory fishery resources by reducing water quality, reducing habitat and access to habitat, reducing fish populations through turbine mortality, and subjecting anadromous fish species to difficulties in passage because of inadequate placement of attraction flows or other design and operational problems associated with fish passage facilities.

4. Environmental Impacts to Target Resources

As a result of coordination with the PFC and FWS, the applicant has made major changes in the project proposal, including a proposed relocation of the hydroelectric facility from the east side of the river to the west side of the river to accommodate the agencies' concerns about adverse impacts to water quality and to fishery resources. Although the project would be run-of-river, the applicant would release minimum flows over the dam to prevent the reduction of DO levels that otherwise could be caused by passing water through the turbines for power generation. Under the applicant's proposal, water quality at the site would remain similar to existing water quality; project operation would not cause cumulative adverse impacts to DO in combination with other projects in the basin, particularly those immediately upstream and downstream from the site.

The applicant's proposed construction activities would have minor, short-term, site-specific effects on sedimentation and turbidity; these could become cumulative problems if the applicant does not coordinate project construction with the operators of other hydropower projects in the basin. Any license for the proposed project should contain conditions that would ensure that construction activities would not occur simultaneously, and in turn cause cumulative adverse impacts to the water quality in the Schuylkill River Basin.

The water releases over the dam recommended by staff would maintain the visual quality of the site, would provide flows for the downstream passage of migratory fish, and would help to maintain DO levels. The applicant's proposed flow releases from the power house would make possible continued recreational boating activities in the river. The applicant would provide trails, walkways, and public access to the river; these amenities would improve recreational opportunities at the site without any cumulative adverse effects.

The applicant also proposes: to provide fish passage facilities, to support anadromous fish restoration efforts underway for the Schuylkill River Basin; to aid the downstream passage of anadromous species by releasing flows over the dam; and to maintain resident and anadromous fish habitat by maintaining DO levels at the site. The installation of a fishway would yield a benefit to the recreational fishery that would offset fish losses caused by power generation. To minimize fish losses caused by turbine mortality, however, any license for the proposed project should require the installation of protective devices to reduce the cumulative adverse impacts caused by turbine mortality at this site and at other dam sites on the Schuylkill River.

The staff concludes that construction and operation of the proposed Flat Rock Dam Project would have no significant cumulative adverse impacts to the target resources identified for the Schuylkill River Basin, provided that the applicant's proposed mitigative measures are implemented and provided that conditions are included in any license to reduce turbine mortality and to moderate the effects of simultaneous construction activities.

C. Alternative of No Action

Under the no-action alternative, there would be no construction of project facilities or changes to the existing physical, biological, or cultural components of the area. Electrical power that would be generated by the proposed project would have to be generated from other available sources or offset by conservation measures.

Other beneficial aspects of the project development also would not occur under the no-action alternative. This would include the construction of fish passage facilities at the Flat Rock Dam, and the providing of additional recreational opportunities in the area.

D. Recommended Alternative

The proposed project is the preferred alternative because the generation of electricity from a renewable resource would reduce the use of fossil-fueled plants, and because the applicant would adequately mitigate the environmental effects of building and operating the project. Development of the proposed project would also result in the enhancement of fishing and other recreational opportunities in the area.

VI. FINDING OF NO SIGNIFICANT IMPACT

Construction of the proposed project would result in the short term disturbance of aquatic habitat, terrestrial habitat, and the recreational use in the immediate vicinity of Flat Rock Dam. Project operation would result in the minor, long-term degradation

of aquatic habitat and visual quality in the vicinity of the dam, although the applicant's and staff's recommended mitigation would adequately protect and enhance other important environmental resources in the area.

On the basis of this 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

- Consolidated Hydro, Inc., 1986. Additional information in support of an application for license for the proposed Flat Rock Dam Project, FERC 2803-001, Pennsylvania. June 18, 1986.
- Corps of Engineers. 1980. Feasibility report, Schuylkill River review study, Pennsylvania: stage 2, main report. Department of the Army, Philadelphia District Corps of Engineers, Philadelphia, Pennsylvania. March 1980.
- Genoways, H.H. and F. J. Brenner. 1985. Species of special concern in Pennsylvania. Special Publication of Carnegie Museum of Natural History, No. 11, Pittsburgh, Pennsylvania.
- Hesser, R. B. 1984. Strategic fishery management plan for American shad restoration in the Schuylkill and Lehigh River Basins. Pennsylvania Fish Commission, Bellefonte, Pennsylvania.
- American shad restoration--Pennsylvania's challenge. Pennsylvania angler. March 1985.
- Hobbs, W. F. and R. M. Mulfinger. 1978. Fairmount Dam fishway, Schuylkill River, Philadelphia. Paper presented to the Northeast Fish and Wildlife Conference, White Sulphur Springs, West Virginia. February 28, 1978.
- Knight, A. E. and D. M. Kuzmeskus. 1982. Potential effects of bulb turbines on Atlantic salmon smolts. In: W. E. Knapp, B. Kynard, S. P. Gloss (eds.). Potential effects of Kaplan, Ossberger, and bulb turbines on anadromous fishes of the northeast United States. FWS/OBS-82/62. U.S. Fish and Wildlife Service, Newton Corner, Massachusetts. September 1982.
- Kynard, B., R. Taylor, L. Bell, and D. Stier. 1982. Potential effects of Kaplan turbines on Atlantic salmon smolts, American shad, and blueback herring. In: W. E. Knapp, B. Kynard, S. P. Gloss (eds.). Potential effects of Kaplan, Ossberger, and bulb turbines on anadromous fishes of the northeast United States. FWS/OBS-82/62. U. S. Fish and Wildlife Service, Newton Corner, Massachusetts. September 1982.
- Pennsylvania Bureau of Environmental Planning. 1981. Pennsylvania's recreation plan, 1980-1985. Pennsylvania Department of Environmental Resources, Harrisburg, Pennsylvania. 160 pp.
- Pennsylvania Hydroelectric Development Corporation. 1985a. Amendment to Flat Rock Dam Project license application, FERC No. 2803, Pennsylvania. June 1985.

SAFETY AND DESIGN ASSESSMENT
FLAT ROCK DAM PROJECT
FERC NO. 2803-001 - PENNSYLVANIA

License application amendment, Exhibit E - environmental report, Flat Rock Dam Hydroelectric Project, FERC Project No. 2803-001, Pennsylvania. December 1985.

VIII. LIST OF PREPARERS

Peter S. Foote--Coordinator, Fisheries and Water Resources (Fishery Biologist; M.S., Fisheries Biology).

Brad Bortner--Terrestrial Resources (Ecologist; M.S., Wildlife Biology).

Angelo Colianni--Geology and Soils (Soil Conservationist; B.S., Agriculture, Range Management, Soil Science).

Lee Emery--Cumulative Impacts (Fishery Biologist; M.S., Zoology).

James T. Griffin--Cultural Resources (Archeologist; B.A., Anthropology; Master of Public Administration).

Ann Miles--Recreation and Land Use (Environmental Protection Specialist; M.A., Recreation Resource Management).

John Murphy--Purpose, Economic Feasibility, and Comprehensive Development (Civil Engineer; B.C.E.).

David C. Starkie--Visual Resources (Landscape Architect; B.L.A., Landscape Architecture).

Martin Thorpe--Need For Power and Alternatives to the Proposed Project (Electrical Engineer; B.S.E.E.).

DAM SAFETY

The Commission's New York Regional Office classified the existing concrete gravity Flat Rock dam a low hazard structure on April 12, 1982. The dam impounds approximately 790 acre-feet of water with a surface area of 243 acres at elevation 38.2 feet. Failure of the dam would not endanger downstream life or property due to the low height of the dam and the wide river channel downstream of the dam. The Corps of Engineers (Corps) estimated that the water surface level below the dam would be at elevation 51 feet during the 100 year flood event. At this elevation, the dam would be completely submerged and the proposed powerhouse would be partially submerged. The applicant has proposed to flood proof the powerhouse to protect it against flows up to and including the estimated 100 year flood.

Flat Rock dam was constructed in 1977 to replace a rock-filled timber crib structure. The Commission's pre-license inspection of the site and existing structures on March 24, 1982, determined that the dam and abutments were sound and showed no evidence of deterioration. Surface spalling was noted along the canal wall but was determined to be insignificant.

PROJECT DESIGN

On June 6, 1985, the applicant redesigned the project to mitigate adverse impacts on aesthetic and environmental resources that would have resulted from the original design. The redesigned project consists of an intake structure located immediately upstream of the dam, a concrete conduit, a powerhouse immediately downstream of the dam, and an excavated tailrace. The powerhouse would be partially buried.

EXHIBITS

The following portions of Exhibit A filed on November 27, 1985, and Exhibit F drawings filed June 6, 1985, conform to the Commission's rules and regulations and are included in the license.

<u>Exhibit A</u> Description of the turbine and the generator.		
<u>Exhibit F</u> <u>No.</u>	<u>FERC No.</u> <u>2803-</u>	<u>Description</u>
1	6	Project Plan
2	7	Powerhouse Section 2

FEDERAL ENERGY REGULATORY 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

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, of the Commission, in the region wherein the project is located, or of such other officer or agent as the Commission may designate, who shall be the authorized representative of the Commission for such purposes. The Licensee shall cooperate fully with said representative and shall furnish him a detailed program of inspection by the Licensee that will provide for an adequate and qualified inspection force for construction of the project and for any subsequent alterations to the project. Construction of the project works or any feature or alteration thereof shall not be initiated until the program of inspection for the project works or any such feature thereof has been approved by said representative. The Licensee shall also furnish to said representative such further information as he may require concerning the construction, operation, and maintenance of the project, and of any alteration thereof, and shall notify him of the date upon which work will begin, as far in advance thereof as said representative may reasonably specify, and shall notify him promptly in writing of any suspension of work for a period of more than one week, and of its resumption and completion. The Licensee shall allow said representative and other officers or employees of the United States, showing proper credentials, free and unrestricted access to, through, and

across the project lands and project works in the performance of their official duties. The Licensee shall comply with such rules and regulations of general or special applicability as the Commission may prescribe from time to time for the protection of life, health, or property.

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

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

the purpose of transferring the project to the United States or to a new licensee, to acquire any different title to, or right of occupancy and use in, any of such project property than was necessary to acquire for its own purposes as the Licensee.

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

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

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

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

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

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

Article 13. On the application of any person, association, corporation, Federal agency, State or municipality, the Licensee shall permit such reasonable use of its reservoir or other project properties, including works, lands and water rights, or parts thereof, as may be ordered by the Commission, after notice and opportunity for hearing, in the interests of comprehensive development of the waterway or waterways involved and the conservation and utilization of the water resources of the region for water supply or for the purposes of steam-electric, irrigation, industrial, municipal or similar uses. The Licensee shall receive reasonable compensation for use of its reservoir or other project properties or parts thereof for such purposes, to include at least full reimbursement for any damages or expenses which the joint use causes the licensee to incur. Any such compensation shall be fixed by the Commission either by approval of an agreement between the Licensee and the party or parties benefiting or after notice and opportunity for hearing. Applications shall contain information in sufficient detail to afford a full understanding of the proposed use, including satisfactory evidence that the applicant possesses necessary water rights pursuant to applicable State law, or a showing of cause why such evidence cannot concurrently be submitted, and a statement as to the relationship of the proposed use to any State or municipal plans or orders which may have been adopted with respect to the use of such waters.

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

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

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

(Issued August 16, 1988)

Statement of Commissioner Charles A. Trabandt Concurring in Part and Dissenting in Part

I concur with the majority's resolution of all the issues in this proceeding except one: flow releases for visual resources.

The majority has determined that a flow release of 650 cfs is required at this time in order to adequately protect the visual resources at the project site. The order acknowledges that only 250 cfs is necessary to protect the aquatic life in the Schuylkill River, and that figure was acceptable to all state and local agencies except the county planning commission. The order further states that the increased minimum flow requirement for visual resources will reduce average annual generation by approximately 843,000 kWh (slip op. at 6). The only justification for the 650 cfs figure is the perceived need to maintain whitewater splashing at the base of the dam, rather than a smooth flow. Among the range of flows above 250 cfs, the 650 cfs figure appears to be relatively arbitrary.

At the Commission meeting during which this matter was discussed, Staff conceded that the reduction in average annual generation made this project only marginally economic. Moreover, Staff's assessment that the project is only marginally economic does not include the potential additional cost of acquiring title to the project site which is now in the hands of the Commonwealth of Pennsylvania. Consequently, the Commission has chosen to require 650 cfs to keep the whitewater splashing, even though the economic viability will be threatened directly as a result.

Assuming, as the order does, that the power from the proposed project is needed, I am compelled to ask why the Commission must set a flow release 400 cfs higher than is needed to protect aquatic life in the Schuylkill River when to do so puts the viability of the needed project at high risk. In my view, the majority has elevated the speculative impact on visual resources above the project's viability and that is wrong on several counts.

Balancing all the competing interests attached to a hydropower project does not require complete resolution of all

issues at the time a license is issued. Issues that involve the potential for irreparable harm to a resource, such as a fishery, are issues that must be fully addressed before any final action on a license is taken by the Commission. (See, Confederated Tribes and Bands of the Yakima Indian Nation v. FERC, 746 F.2d 466 (9th Cir. 1984).) However, where the issue is how much additional water should be released over a spillway at an existing dam in order to preserve a visual resource, as in the instant case, the Commission is not burdened with a decision that has the potential to cause immediate irreparable harm. Consequently, in the instant case, the Commission has the time after issuance of the license to explore the water release options that will permit the needed project to go forward while at the same time providing reasonable protection to the visual resource.1/

Article 404 requires the licensee to discharge a continuous minimum flow of 650 cfs during the period beginning one-half hour before sunrise and ending one-half hour after sunset. Article 407 requires the licensee to conduct a study to investigate the effectiveness of alternatives in the range of 250 cfs to 650 cfs to protect visual resources and submit a report to the Commission within two years, including comments by state and local agencies, which can recommend modifications to the minimum flow. Unfortunately, these articles get the issue just backwards, because the higher 650 cfs in Article 404 could kill the project by rendering it uneconomic. The far better approach would be to require 250 cfs initially, as agreed by all agencies as sufficient to protect fishery resources, and then conduct the study to determine what amount of additional minimum flow, if any, was objectively justified on the basis of a balanced consideration of the visual resource impact. Mandating the higher, arbitrarily-set 650 figure and then conducting the study is directly contrary to reasoned decisionmaking and Congressional intent in the Electric Consumers Protection Act of 1986.

The Federal Power Act as amended by the Electric Consumers Protection Act of 1986, requires only "equal consideration" of power and non-power issues; not necessarily equal treatment. The

1/ Furthermore, nowhere in the record of this proceeding is there any evidence suggesting that the visual resource is "unique" or of sufficient public interest so as to preserve it in its current state at the expense of the power produced at this project. See, Northern Lights, Inc., Opinion No. 276, 39 FERC ¶ 61,352 (1987).

Project No. 2803-001

- 3 -

majority in the instant proceeding has incorrectly elected to give preferential treatment to the visual resource at the project site, and this I fear will be at expense of the needed project. Therefore, I dissent as to that decision.

Charles A. Trabandt
Commissioner

APPENDIX E
ENERGY AND PROJECT ECONOMICS

CUNNINGHAM CORPORATION

21 Benedict Place
Greenwich, Connecticut 06830
(203) 625-0503

EXHIBIT A

*Ch. Larry Bates
file that under
for economic
and other items. Ph.*

8702-001
WP8701
049

August 27, 1987

The Honorable Kenneth A. Plumb
Secretary
Federal Energy Regulatory Commission
825 North Capital Street, N.E.
Washington, D.C. 20426

Subject: Flat Rock Dam Hydroelectric Project
FERC Project No. 2803 - PA

Dear Secretary Plumb:

On behalf of the Applicant, Pennsylvania Hydroelectric Development Corporation, enclosed for filing in the above referenced proceeding is an original and 14 copies of a special report on energy and project economics which was verbally requested by FERC staff.

Respectfully submitted,

Carol H. Cunningham, P.E.

Enclosures

CHC:tb

cc: Steven Rossi, FERC (with enclosure)
Jason James, CHI (with enclosure)

FLAT ROCK DAM HYDROELECTRIC PROJECT
FERC Project No. 2803 - Pennsylvania

SPECIAL REPORT ON ENERGY AND PROJECT ECONOMICS

INTRODUCTION

At the request of Pennsylvania Hydro Development Corporation, this special report was prepared to respond to a request by FERC staff for additional information. Specifically, FERC requested the Applicant to determine the impact additional special releases over the dam would have on the energy and economics of the Flat Rock Dam Hydroelectric Project.

In the License Application currently pending before FERC, the Applicant has proposed to release 350 cfs, as follows:

- 50 cfs flow through the canal;
- 50 cfs for fish attraction water; and
- 250 cfs to be spilled over the crest of the dam.

All of these releases are made prior to diverting water for power generation, and thus have a significant impact on the annual energy generation. These releases were accounted for in the previous energy studies performed.

As requested by FERC staff, the impact of releasing a total of 650 cfs over the dam during the day and 250 cfs at night is the subject of this report.

ANNUAL ENERGY GENERATION

The net average annual energy generation of the Project, based on the special releases identified in the License Application, is computed to be 12,630,000 kWh. This annual energy was derived using the flow duration curve contained in the Application and the project description contained in the supplemental filing dated November 26, 1987. Attachment 1 shows the details of the original energy estimate.

For the purposes of assessing the impact of releasing a total of 650 cfs over the dam during the daytime, it was assumed that, on the average, this would be equivalent to 12 hours a day (or 84 hours a week.) On this basis, the decrease in generation due to the additional 400 cfs release during the daylight hours is estimated to be 1,055,000 kWh, making the adjusted total net annual energy generation 11,757,000 kWh. The details of this computation are also shown in Attachment 1.

POWER SALES

At the present time, the Applicant proposes to sell the energy generated by the Project to Philadelphia Electric Company (PEC). Currently, PEC is not making capacity payments, as it contends it has adequate generating capacity. PEC has provided the Applicant with the following estimates of future avoided cost rates:

1990:	4.42 cents/kWh
1991:	4.78
1992:	5.34
1993:	6.22
1994:	6.97

On the basis of PEC's current weighted averages, on-peak energy is valued at 1.310 times the weighted average, while off peak energy is 0.853. PEC defines on-peak hours as 8 a.m. to 8 p.m. Monday through Thursdays and 8 a.m. to 4 p.m. on Friday.

Avoided energy costs for the years 1995 through 2000 were based on data contained in the report Regional Projections of End Use Energy Consumption and Prices Through 2000, April 1987, prepared by the Energy Information Administration, Office of Energy Markets and End Use, U.S. Department of Energy. The escalation rates for the Base Case Fossil Fuel Average in Region 3 - Mid-Atlantic were used in the analysis.

ECONOMIC EVALUATION

Attachment 2 contains a economic evaluation of the Project using both the base case energy (Case 1) and the reduced energy resulting from the additional releases over the dam (Case 2.) To the extent possible, these analyses were performed in accordance with FERC's criteria and methodology:

- O&M costs were escalated at 6 percent for the first 10 years of operation of the Project and held constant thereafter;
- Avoided costs were escalated as indicated above through the year 2000. After the year 2000 the avoided cost rate was held constant;
- The capital cost of the Project was amortized over 50 years at 11 percent; and
- The avoided costs and cost of power were levelized at 11 percent for both a 30 year and 50 year period.

The results of the economic analyses were as follows:

<u>Case</u>	<u>Levelized Over 30 Years</u>			<u>Levelized Over 50 Years</u>		
	<u>Benefits</u>	<u>Costs</u>	<u>BCR</u>	<u>Benefits</u>	<u>Costs</u>	<u>BCR</u>
1	7.26	6.54	1.11	7.37	6.56	1.12
2	7.21	7.14	1.01	7.32	7.15	1.02

As demonstrated by the above analyses, the benefit cost ratio in Case 1 is between 1.11 and 1.12, which is on the low end for the industry. For Case 2, which includes the additional releases over the dam, the benefit cost ratios drops to near one, clearly making it a marginal project.

FINANCIAL ANALYSIS :

Attachment 3 contains the financial analyses of the Project from the perspective of the Applicant. The differences between the economic and financial analyses are as follows:

- A project life of 30 years is used in the Financial Analysis.
- The Applicant uses inflation rates of 5 percent per year on the annual operating costs. These costs are escalated over the financial life of the project.
- Projects are evaluated on the basis of their Internal Rate of Return over a 30 year period.

The base case Internal Rate of Return (IRR) of 11.7 percent is marginal for the Applicant. However, this return can be improved if the project costs can be reduced or if the power can be sold to a utility that will pay a capacity credit. In Case 2, the IRR is only 10.1 percent, indicating that the additional releases over the dam are having a significant impact on the IRR.

ATTACHMENT 1

LOTUS2

FLAT ROCK DAM ECONOMIC EVALUATION

CASE NUMBER: 1

VALUE OF POWER: Philadelphia Electric Company Rates

INSTREAM RELEASES: 50 cfs for canal, 50 cfs for fish attraction water, and 250 cfs over the dam during both daylight hours and night hours.

ANNUAL ENERGY GENERATION: 12,630,000
PERCENT ON PEAK: 33.30%TOTAL PROJECT COST (1987 \$) \$5,061,000
ESCALATION (NIPA GNP PRICE DEF.) \$394,758ANNUAL O&M (1990 \$) \$225,000
ANNUAL O&M ESCALATION: 6.00%

TOTAL PROJECT COST: \$5,455,758

50 YR AMORTIZATION @ 11%: \$603,403

LEVELIZED AVOIDED COST								LEVELIZED COST OF POWER			
YEAR	YEAR OF OPER.	PRESENT VALUE FACTOR (11%)	AVOIDED COST ESC. RATE	ON PEAK AVOIDED ENERGY COST	OFF PEAK AVOIDED ENERGY COST	WEIGHTED TOTAL	PRESENT VALUE (C/KWH)	ANNUAL O&M	CAPITAL AMORT.	ANNUAL COST OF PRODUCTION (CENTS/KWH)	PRESENT VALUE (C/KWH)
1987											
1988											
1989											
1990	1	1.0000		5.790	3.770	4.443	4.00	\$225,000	\$603,403	6.56	5.91
1991	2	0.9009		5.086	4.077	4.413	3.58	\$238,500	\$603,403	6.67	5.61
1992	3	0.8116		5.682	4.555	4.930	3.60	\$252,810	\$603,403	6.78	4.96
1993	4	0.7312		6.618	5.306	5.743	3.78	\$267,979	\$603,403	6.90	4.54
1994	5	0.6587		7.416	5.945	6.435	3.82	\$284,057	\$603,403	7.03	4.17
1995	6	0.5935	12.91%	8.373	6.712	7.266	3.88	\$301,101	\$603,403	7.16	3.83
1996	7	0.5346	12.68%	9.435	7.564	8.187	3.94	\$319,167	\$603,403	7.30	3.52
1997	8	0.4817	12.22%	10.588	8.488	9.187	3.99	\$338,317	\$603,403	7.46	3.24
1998	9	0.4339	2.49%	10.852	8.699	9.416	3.68	\$358,616	\$603,403	7.62	2.98
1999	10	0.3909	9.84%	11.920	9.555	10.343	3.64	\$380,133	\$603,403	7.79	2.74
2000	11	0.3522	10.84%	13.212	10.591	11.464	3.64	\$380,133	\$603,403	7.79	2.47
2001	12	0.3173		13.212	10.591	11.464	3.28	\$380,133	\$603,403	7.79	2.23
2002	13	0.2858		13.212	10.591	11.464	2.95	\$380,133	\$603,403	7.79	2.01
2003	14	0.2575		13.212	10.591	11.464	2.66	\$380,133	\$603,403	7.79	1.81
2004	15	0.2320		13.212	10.591	11.464	2.40	\$380,133	\$603,403	7.79	1.63
2005	16	0.2090		13.212	10.591	11.464	2.16	\$380,133	\$603,403	7.79	1.47
2006	17	0.1883		13.212	10.591	11.464	1.94	\$380,133	\$603,403	7.79	1.32
2007	18	0.1696		13.212	10.591	11.464	1.75	\$380,133	\$603,403	7.79	1.19
2008	19	0.1528		13.212	10.591	11.464	1.58	\$380,133	\$603,403	7.79	1.07
2009	20	0.1377		13.212	10.591	11.464	1.42	\$380,133	\$603,403	7.79	0.97
2010	21	0.1240		13.212	10.591	11.464	1.28	\$380,133	\$603,403	7.79	0.87
2011	22	0.1117		13.212	10.591	11.464	1.15	\$380,133	\$603,403	7.79	0.78
2012	23	0.1007		13.212	10.591	11.464	1.04	\$380,133	\$603,403	7.79	0.71
2013	24	0.0907		13.212	10.591	11.464	0.94	\$380,133	\$603,403	7.79	0.64
2014	25	0.0817		13.212	10.591	11.464	0.84	\$380,133	\$603,403	7.79	0.57
2015	26	0.0736		13.212	10.591	11.464	0.76	\$380,133	\$603,403	7.79	0.52

FLAT ROCK DAM ECONOMIC EVALUATION

CASE NUMBER: 1

VALUE OF POWER: Philadelphia Electric Company Rates

STREAM RELEASES: 50 cfs for canal, 50 cfs for fish attraction water, and 250 cfs over the dam during both daylight hours and night hours.

ANNUAL ENERGY GENERATION: 12,630,000
PERCENT ON PEAK: 33.30%

TOTAL PROJECT COST (1987 \$) \$5,061,000
ESCALATION (NIPA GNP PRICE DEF.) \$394,758

ANNUAL O&M (1990 \$) \$225,000
ANNUAL O&M ESCALATION: 6.00%

TOTAL PROJECT COST: \$5,455,758

50 YR AMORTIZATION @ 11%: \$603,403

LEVELIZED AVOIDED COST							LEVELIZED COST OF POWER				
YEAR	YEAR OF OPER.	PRESENT VALUE FACTOR (11%)	AVOIDED COST ESC. RATE	ON PEAK AVOIDED ENERGY COST	OFF PEAK AVOIDED ENERGY COST	PRESENT WEIGHTED TOTAL (C/KWH)	PRESENT VALUE (C/KWH)	ANNUAL O&M	CAPITAL AMORT.	ANNUAL COST OF PRODUCTION (CENTS/KWH)	PRESENT VALUE (C/KWH)
1987											
2016	27	0.0663		13.212	10.591	11.464	0.68	\$380,133	\$603,403	7.79	0.47
2017	28	0.0597		13.212	10.591	11.464	0.62	\$380,133	\$603,403	7.79	0.42
2018	29	0.0538		13.212	10.591	11.464	0.56	\$380,133	\$603,403	7.79	0.38
2019	30	0.0485		13.212	10.591	11.464	0.50	\$380,133	\$603,403	7.79	0.34
2020	31	0.0437		13.212	10.591	11.464	0.45	\$380,133	\$603,403	7.79	0.31
2021	32	0.0394		13.212	10.591	11.464	0.41	\$380,133	\$603,403	7.79	0.28
2022	33	0.0355		13.212	10.591	11.464	0.37	\$380,133	\$603,403	7.79	0.25
2023	34	0.0319		13.212	10.591	11.464	0.33	\$380,133	\$603,403	7.79	0.22
2024	35	0.0288		13.212	10.591	11.464	0.30	\$380,133	\$603,403	7.79	0.20
2025	36	0.0259		13.212	10.591	11.464	0.27	\$380,133	\$603,403	7.79	0.18
2026	37	0.0234		13.212	10.591	11.464	0.24	\$380,133	\$603,403	7.79	0.16
2027	38	0.0210		13.212	10.591	11.464	0.22	\$380,133	\$603,403	7.79	0.15
2028	39	0.0190		13.212	10.591	11.464	0.20	\$380,133	\$603,403	7.79	0.13
2029	40	0.0171		13.212	10.591	11.464	0.18	\$380,133	\$603,403	7.79	0.12
2030	41	0.0154		13.212	10.591	11.464	0.16	\$380,133	\$603,403	7.79	0.11
2031	42	0.0139		13.212	10.591	11.464	0.14	\$380,133	\$603,403	7.79	0.10
2032	43	0.0125		13.212	10.591	11.464	0.13	\$380,133	\$603,403	7.79	0.09
2033	44	0.0112		13.212	10.591	11.464	0.12	\$380,133	\$603,403	7.79	0.08
2034	45	0.0101		13.212	10.591	11.464	0.10	\$380,133	\$603,403	7.79	0.07
2035	46	0.0091		13.212	10.591	11.464	0.09	\$380,133	\$603,403	7.79	0.06
2036	47	0.0082		13.212	10.591	11.464	0.08	\$380,133	\$603,403	7.79	0.06
2037	48	0.0074		13.212	10.591	11.464	0.08	\$380,133	\$603,403	7.79	0.05
2038	49	0.0067		13.212	10.591	11.464	0.07	\$380,133	\$603,403	7.79	0.05
2039	50	0.0060		13.212	10.591	11.464	0.00	\$380,133	\$603,403	7.79	0.00
30 YEAR LEVELIZED RATE:							7.26				6.54
50 YEAR LEVELIZED RATE:							7.37				6.56

FLAT ROCK DAM ECONOMIC EVALUATION

CASE NUMBER: 2

VALUE OF POWER: Philadelphia Electric Company Rates

INSTREAM RELEASES: 50 cfs for canal, 50 cfs for fish attraction water, and 650 cfs over the dam during the daylight hours and 250 cfs during the night.

ANNUAL ENERGY GENERATION: 11,575,000
PERCENT ON PEAK: 30.30%

TOTAL PROJECT COST (1987 \$) \$5,061,000
ESCALATION (NIPA GNP PRICE DEF.) \$394,758

ANNUAL O&M (1990 \$) \$225,000
ANNUAL O&M ESCALATION: 6.00%

TOTAL PROJECT COST: \$5,455,758
50 YR AMORTIZATION @ 11%: \$603,403

LEVELIZED AVOIDED COST							LEVELIZED COST OF POWER				
YEAR	YEAR OF OPER.	PRESENT VALUE FACTOR (11%)	AVOIDED COST ESC. RATE	ON PEAK AVOIDED ENERGY COST	OFF PEAK AVOIDED ENERGY COST	WEIGHTED TOTAL	PRESENT VALUE (C/KWH)	ANNUAL O&M	CAPITAL AMORT.	ANNUAL COST OF PRODUCTION (CENTS/KWH)	PRESENT VALUE (C/KWH)
1987											
1988											
1989											
1990	1	1.0000		5.790	3.770	4.382	3.95	\$225,000	\$603,403	7.16	6.45
1991	2	0.9009		5.086	4.077	4.383	3.56	\$238,500	\$603,403	7.27	5.90
1992	3	0.8116		5.682	4.555	4.896	3.58	\$252,810	\$603,403	7.40	5.41
1993	4	0.7312		6.618	5.306	5.704	3.76	\$267,979	\$603,403	7.53	4.96
1994	5	0.6587		7.416	5.945	6.391	3.79	\$284,057	\$603,403	7.67	4.55
1995	6	0.5935	12.91%	8.373	6.712	7.216	3.86	\$301,101	\$603,403	7.81	4.18
1996	7	0.5346	12.68%	9.435	7.564	8.131	3.92	\$319,167	\$603,403	7.97	3.84
1997	8	0.4817	12.22%	10.588	8.488	9.124	3.96	\$338,317	\$603,403	8.14	3.53
1998	9	0.4339	2.49%	10.852	8.699	9.351	3.66	\$358,616	\$603,403	8.31	3.25
1999	10	0.3909	9.84%	11.920	9.555	10.272	3.62	\$380,133	\$603,403	8.50	2.99
2000	11	0.3522	10.84%	13.212	10.591	11.385	3.61	\$380,133	\$603,403	8.50	2.70
2001	12	0.3173		13.212	10.591	11.385	3.25	\$380,133	\$603,403	8.50	2.43
2002	13	0.2858		13.212	10.591	11.385	2.93	\$380,133	\$603,403	8.50	2.19
2003	14	0.2575		13.212	10.591	11.385	2.64	\$380,133	\$603,403	8.50	1.97
2004	15	0.2320		13.212	10.591	11.385	2.38	\$380,133	\$603,403	8.50	1.78
2005	16	0.2090		13.212	10.591	11.385	2.14	\$380,133	\$603,403	8.50	1.60
2006	17	0.1883		13.212	10.591	11.385	1.93	\$380,133	\$603,403	8.50	1.44
2007	18	0.1696		13.212	10.591	11.385	1.74	\$380,133	\$603,403	8.50	1.30
2008	19	0.1528		13.212	10.591	11.385	1.57	\$380,133	\$603,403	8.50	1.17
2009	20	0.1377		13.212	10.591	11.385	1.41	\$380,133	\$603,403	8.50	1.05
2010	21	0.1240		13.212	10.591	11.385	1.27	\$380,133	\$603,403	8.50	0.95
2011	22	0.1117		13.212	10.591	11.385	1.15	\$380,133	\$603,403	8.50	0.86
2012	23	0.1007		13.212	10.591	11.385	1.03	\$380,133	\$603,403	8.50	0.77
2013	24	0.0907		13.212	10.591	11.385	0.93	\$380,133	\$603,403	8.50	0.69
2014	25	0.0817		13.212	10.591	11.385	0.84	\$380,133	\$603,403	8.50	0.63
2015	26	0.0736		13.212	10.591	11.385	0.75	\$380,133	\$603,403	8.50	0.56

FLAT ROCK DAM ECONOMIC EVALUATION

CASE NUMBER: 2

VALUE OF POWER: Philadelphia Electric Company Rates

INSTREAM RELEASES: 50 cfs for canal, 50 cfs for fish attraction water, and 650 cfs over the dam during the daylight hours and 250 cfs during the night.

ANNUAL ENERGY GENERATION: 11,575,000
PERCENT ON PEAK: 30.30%

TOTAL PROJECT COST (1987 \$) \$5,061,000
ESCALATION (NIPA GNP PRICE DEF.) \$394,758

ANNUAL O&M (1990 \$) \$225,000
ANNUAL O&M ESCALATION: 6.00%

TOTAL PROJECT COST: \$5,455,758

50 YR AMORTIZATION @ 11%: \$603,403

LEVELIZED AVOIDED COST							LEVELIZED COST OF POWER				
YEAR	YEAR OF OPER.	PRESENT VALUE FACTOR (11%)	AVOIDED COST ESC. RATE	ON PEAK AVOIDED ENERGY COST	OFF PEAK AVOIDED ENERGY COST	WEIGHTED TOTAL	PRESENT VALUE (C/KWH)	ANNUAL O&M	CAPITAL AMORT.	ANNUAL COST OF PRODUCTION (CENTS/KWH)	PRESENT VALUE (C/KWH)
1987											
2016	27	0.0663		13.212	10.591	11.385	0.68	\$380,133	\$603,403	8.50	0.51
2017	28	0.0597		13.212	10.591	11.385	0.61	\$380,133	\$603,403	8.50	0.46
2018	29	0.0538		13.212	10.591	11.385	0.55	\$380,133	\$603,403	8.50	0.41
2019	30	0.0485		13.212	10.591	11.385	0.50	\$380,133	\$603,403	8.50	0.37
2020	31	0.0437		13.212	10.591	11.385	0.45	\$380,133	\$603,403	8.50	0.33
2021	32	0.0394		13.212	10.591	11.385	0.40	\$380,133	\$603,403	8.50	0.30
2022	33	0.0355		13.212	10.591	11.385	0.36	\$380,133	\$603,403	8.50	0.27
2023	34	0.0319		13.212	10.591	11.385	0.33	\$380,133	\$603,403	8.50	0.24
2024	35	0.0288		13.212	10.591	11.385	0.30	\$380,133	\$603,403	8.50	0.22
2025	36	0.0259		13.212	10.591	11.385	0.27	\$380,133	\$603,403	8.50	0.20
2026	37	0.0234		13.212	10.591	11.385	0.24	\$380,133	\$603,403	8.50	0.18
2027	38	0.0210		13.212	10.591	11.385	0.22	\$380,133	\$603,403	8.50	0.16
2028	39	0.0190		13.212	10.591	11.385	0.19	\$380,133	\$603,403	8.50	0.15
2029	40	0.0171		13.212	10.591	11.385	0.18	\$380,133	\$603,403	8.50	0.13
2030	41	0.0154		13.212	10.591	11.385	0.16	\$380,133	\$603,403	8.50	0.12
2031	42	0.0139		13.212	10.591	11.385	0.14	\$380,133	\$603,403	8.50	0.11
2032	43	0.0125		13.212	10.591	11.385	0.13	\$380,133	\$603,403	8.50	0.10
2033	44	0.0112		13.212	10.591	11.385	0.12	\$380,133	\$603,403	8.50	0.09
2034	45	0.0101		13.212	10.591	11.385	0.10	\$380,133	\$603,403	8.50	0.08
2035	46	0.0091		13.212	10.591	11.385	0.09	\$380,133	\$603,403	8.50	0.07
2036	47	0.0082		13.212	10.591	11.385	0.08	\$380,133	\$603,403	8.50	0.06
2037	48	0.0074		13.212	10.591	11.385	0.08	\$380,133	\$603,403	8.50	0.06
2038	49	0.0067		13.212	10.591	11.385	0.07	\$380,133	\$603,403	8.50	0.05
2039	50	0.0060		13.212	10.591	11.385	0.00	\$380,133	\$603,403	8.50	0.00
30 YEAR LEVELIZED RATE:							7.21				7.14
50 YEAR LEVELIZED RATE:							7.32				7.15

FLAT ROCK DAM HYDROELECTRIC PROJECT

COST BREAKDOWN

FERC ACCOUNT	ITEM	AMOUNT (1987 \$)
330	Land and Land Rights	\$0
331	Structures & Improvements	\$1,042,500
332	Reservoirs, Dams & Waterways (Inc. in 331)	\$2,400,000
333	Waterwheels, Turbines & Generators (Inc. in 333)	\$200,000
334	Accessory Electric Equipment	\$25,000
335	Misc. Power Plant Equipment	
336	Roads and Railroads	
	Subtotal:	\$3,667,500
	Conting. & Omitted Items (20%):	\$733,500
	Engin., Legal, & Admin. (15%):	\$660,000
	Subtotal:	\$5,061,000
	Escalation:	\$394,758
	TOTAL PROJECT COST:	\$5,455,758

1988 OPERATING COSTS

Operation and Maintenance	\$150,000
Lease Payments	
Property Taxes	\$25,000
Insurance	\$50,000
TOTAL ANNUAL OPERATING EXPENSES	\$225,000

PROJECTED VALUE OF POWER

Year	On Peak (Cents/kWh)	Off-Peak (Cents/kWh)
1990	5.790	3.770
1991	5.086	4.077
1992	5.682	4.555
1993	6.618	5.306
1994	7.416	5.945
1995	8.376	6.713
1996	9.436	7.564
1997	10.508	8.488
1998	10.852	8.700
1999	11.920	9.556
2000	13.212	10.592
2001	13.212	10.592
2002	13.212	10.592
2003	13.212	10.592
2004	13.212	10.592
2005	13.212	10.592
2006	13.212	10.592
2007	13.212	10.592
2008	13.212	10.592
2009	13.212	10.592
2010	13.212	10.592
2011	13.212	10.592
2012	13.212	10.592
2013	13.212	10.592
2014	13.212	10.592
2015	13.212	10.592
2016	13.212	10.592
2017	13.212	10.592
2018	13.212	10.592
2019	13.212	10.592

FLAT ROCK DAM HYDROELECTRIC PROJECT

CASE 1:

F-15

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
REVENUES															
Base Case:	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033
Special Releases:	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Revenues:	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033
EXPENSES															
OMA	\$311,839	\$327,431	\$343,803	\$360,993	\$379,043	\$397,995	\$417,894	\$438,789	\$460,729	\$483,765	\$507,953	\$533,351	\$560,018	\$588,019	\$617,420
Lease/Royalty Payment	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Property Taxes:	\$51,973	\$54,572	\$57,300	\$60,165	\$63,174	\$66,332	\$69,649	\$73,132	\$76,788	\$80,627	\$84,659	\$88,892	\$93,336	\$98,003	\$102,903
Insurance:	\$103,946	\$109,144	\$116,601	\$120,331	\$126,348	\$132,665	\$139,298	\$146,263	\$153,576	\$161,255	\$169,318	\$177,784	\$186,673	\$196,006	\$205,807
Special Studies:															
Total Operating Exp:	\$467,759	\$491,147	\$515,704	\$541,489	\$568,564	\$596,992	\$626,842	\$658,184	\$691,093	\$725,647	\$761,930	\$800,026	\$840,028	\$882,029	\$926,131
NET INCOME:	\$980,274	\$956,887	\$932,329	\$906,544	\$879,469	\$851,041	\$821,192	\$789,850	\$756,940	\$722,386	\$686,103	\$648,007	\$608,006	\$566,004	\$521,903
30 YEAR IRR:															

FLAT ROCK DAM HYDROELECTRIC PROJECT

FINANCIAL ANALYSIS

CASE 2: WITH SPECIAL RELEASES OVER THE DAM

NET INCOME:

NET GENERATION:			
On-Peak Generation	Off-Peak Generation	Total Generation	
4,210,000	8,420,000	12,630,000	
(706,850)	(346,150)	(1,053,000)	
3,503,150	8,073,850	11,577,000	

INFLATION RATES

OSH	5.00%
Insurance	5.00%
Property Taxes	5.00%
Special Studies	5.00%

F-16

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
REVENUES															
Base Case:	\$561,223	\$557,429	\$622,735	\$725,358	\$812,820	\$917,776	\$1,034,160	\$1,160,456	\$1,189,377	\$1,306,460	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033
Special Releases:	(\$54,054)	(\$50,145)	(\$56,020)	(\$65,252)	(\$73,120)	(\$82,561)	(\$95,031)	(\$104,392)	(\$106,994)	(\$117,526)	(\$130,262)	(\$130,262)	(\$130,262)	(\$130,262)	(\$130,262)
Total Revenues:	\$507,169	\$507,284	\$566,715	\$660,106	\$739,701	\$835,215	\$941,129	\$1,056,064	\$1,082,383	\$1,188,934	\$1,317,771	\$1,317,771	\$1,317,771	\$1,317,771	\$1,317,771
EXPENSES															
OSH	\$150,000	\$157,500	\$165,375	\$173,644	\$182,326	\$191,442	\$201,014	\$211,065	\$221,618	\$232,699	\$244,334	\$256,551	\$269,378	\$282,847	\$296,990
Lease/Royalty Payment	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Property Taxes:	\$25,000	\$26,250	\$27,563	\$28,941	\$30,388	\$31,907	\$33,502	\$35,178	\$36,936	\$38,783	\$40,722	\$42,758	\$44,896	\$47,141	\$49,498
Insurance:	\$50,000	\$52,500	\$55,125	\$57,881	\$60,775	\$63,814	\$67,005	\$70,355	\$73,873	\$77,566	\$81,445	\$85,517	\$89,793	\$94,282	\$98,997
Special Studies:															
Total Operating Exp:	\$225,000	\$236,250	\$248,063	\$260,466	\$273,489	\$287,163	\$301,522	\$316,598	\$332,427	\$349,049	\$366,501	\$384,826	\$404,068	\$424,271	\$445,485
NET INCOME:	\$282,169	\$271,034	\$318,652	\$399,641	\$466,212	\$548,051	\$639,607	\$739,466	\$749,956	\$839,885	\$951,270	\$932,945	\$913,704	\$893,500	\$872,287
30 YEAR IRR:	10.12%														

AT ROCK DAM HYDROELECTRIC PROJECT

CASE 2:

E-17

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
REVENUES															
Base Case:	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033	\$1,448,033
Special Releases:	(\$130,262)	(\$130,262)	(\$130,262)	(\$130,262)	(\$130,262)	(\$130,262)	(\$130,262)	(\$130,262)	(\$130,262)	(\$130,262)	(\$130,262)	(\$130,262)	(\$130,262)	(\$130,262)	(\$130,262)
Total Revenues:	\$1,317,771	\$1,317,771	\$1,317,771	\$1,317,771	\$1,317,771	\$1,317,771	\$1,317,771	\$1,317,771	\$1,317,771	\$1,317,771	\$1,317,771	\$1,317,771	\$1,317,771	\$1,317,771	\$1,317,771
EXPENSES															
OGM	\$311,839	\$327,431	\$343,803	\$360,993	\$379,043	\$397,995	\$417,894	\$438,789	\$460,729	\$483,765	\$507,953	\$533,351	\$560,018	\$588,019	\$617,420
Lease/Royalty Payment	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Property Taxes:	\$51,973	\$54,572	\$57,300	\$60,165	\$63,174	\$66,332	\$69,649	\$73,132	\$76,788	\$80,627	\$84,659	\$88,892	\$93,336	\$98,003	\$102,903
Insurance:	\$103,946	\$109,144	\$114,601	\$120,331	\$126,348	\$132,665	\$139,298	\$146,263	\$153,576	\$161,255	\$169,318	\$177,784	\$186,673	\$196,006	\$205,807
Special Studies:															
Total Operating Exp:	\$467,759	\$491,167	\$515,704	\$541,489	\$568,564	\$596,992	\$626,842	\$658,184	\$691,093	\$725,647	\$761,930	\$800,026	\$840,028	\$882,029	\$926,131
NET INCOME:	\$850,013	\$826,625	\$802,067	\$776,282	\$749,208	\$720,779	\$690,930	\$659,588	\$626,679	\$592,124	\$555,842	\$517,745	\$477,744	\$435,742	\$391,641
30 YEAR IRR:															

CERTIFICATE OF SERVICE

I, Thomas R. Doyle, Attorney for Pennsylvania Hydro Development Corporation, hereby certify that I have this day served the foregoing document upon the persons designated on the official service list compiled by the Secretary in this proceeding. The following parties have been served:

1. Joseph J. Donahue
President
Connelly Container, Inc.
Richters Ferry Road & Schuylkill River
Box 426
Bala Cynwyd, PA 19004
2. Byron H. Matthews
General Manager
Container Corporation of America
5000 Flat Rock Road
Philadelphia, PA 19127
3. R. Thomas Weston
Dept. of Environmental Resources
Bureau of State Parks
P.O. Box 1467
Harrisburg, PA 17120
4. Alfred R. Marcks
Regulatory Administrator
Dept. of Housing and Urban Development
Curtis Building
Sixth and Walnut Streets
Philadelphia, PA 19106
5. Mr. Lawrence Gleeson
President
Pennsylvania Hydroelectric Corporation
213 Continental Offices
Post Office Box 814
King of Prussia, PA 19406
6. Eugene J. Bradley
General Counsel
Philadelphia Electric Company
2301 Market Street
Post Office Box 8699
Philadelphia, PA 19101
7. William J. Marrazzo
Water Commission
Philadelphia Water Department
1180 Municipal Services Building
Philadelphia, PA 19107

8. Robert S. Grodinsky, Esq.
Franklin, Grodinsky & Boonin
Suite 1200
2000 Market Street
Philadelphia, PA 19103
9. John C. Mason, Esq.
Morgan, Lewis & Bockius
1800 M. Street, N.W.
Washington, D.C. 20036
10. John E. Childe, Jr., Esq.
Pennsylvania Department of Environmental Resources
Evangelical Press Building
Box 1467
Third & Reilly Streets
Harrisburg, PA 17120
11. Richard S. Watt, Esq.
354 West Lancaster Avenue
Haverford, PA 19041
12. Arthur A. Moorshead, Esq.
301 West Lancaster Avenue
Devon, PA 19333
13. Peyton G. Bowman, III
Reid & Priest
1111 19th Street, N.W.
Washington, D.C. 20036
14. Marguerite R. Goodman
General Counsel
Philadelphia Water Department
1180 Municipal Services Building
Philadelphia, PA 19107

Dated at Portland, Maine this 17th day of October, 1988.

Thomas R. Doyle, Esquire

Pierce, Atwood, Scribner,
Allen, Smith & Lancaster
One Monument Square
Portland, Maine 04101

END

**DATE
FILMED
03/2/92**