State of Vermont

AGENCY OF ENVIRONMENTAL CONSERVATION

Department of Fish and Wildlife
Department of Forests, Parks and Recreation
Department of Water Resources & Environmental Engineering
Natural Resources Conservation Council
State Geologist

Montpelier, Vermont 05602
Department of Water Resources
and
Environmental Engineering

WATER QUALITY DIVISION
January 18, 1985

Worcester Hydro Company
c/o John H. Stuart
P.O. Box 367
Essex Center, VT 05451

Re: Ladds Mill Hydroelectric Project
Water Quality Certification

Dear Mr. Stuart;

The enclosed Water Quality Certification for the Ladds Mill Hydroelectric Project is being issued at your request pursuant to the provisions in P.L. 92-500, Section 401. Please examine the conditions in the Certificate carefully and contact us if you have any questions.

Sincerely,

Jeffrey R. Cueto, P.E.
Hydrologist

JRC/rh

cc: Stephen B. Sease, Director,
Environmental Conservation Planning
Angelo Incerpi, Director, Fisheries Management
Len Gerardi, Assistant Director, Fisheries
Phil Wightman, District Fisheries Biologist
Federal Energy Regulatory Commission
Public Service Department
Public Service Board
Gordon Beckett, U.S.Fish & Wildlife Service

WATER QUALITY CERTIFICATION
(P.L. 92-500)

In the matter of: Worcester Hydro Company
c/o John H. Stuart
P.O. Box 367
Essex Center, VT 05451
Application for Ladds Mill
Hydroelectric Project

In completion of its review of an April, 1984 request for a Water Quality Certification, the Water Quality Division of the Vermont Department of Water Resources and Environmental Engineering (the Department) has examined the revised Federal Energy Regulatory Commission exemption application filed by Worcester Hydro Company by letter dated November 12, 1984. The Department has made the following findings:

1. The applicant proposes to construct a hydroelectric facility at the existing dam site (known as Ladds Mill) on the North Branch of the Winooski River in Worcester Village. Water power at the site was formerly used by a lumber mill, which was destroyed by fire in 1957. An output of 171 kw is to be developed, and the power produced sold to a Vermont utility.

2. The dam is a concrete, gravity-type structure, 80 feet long and 21 feet high. One foot (1.0 foot) of flashboards are to be installed across the crest, designed to fail when overtopped by two feet of water. The control house will be constructed adjacent to the existing forebay on the left (east) end of the dam. A seventy-foot long training wall separates the tailrace from the river. The configuration of the lower forty feet of the wall will be changed to improve tailrace hydraulics.

3. The impoundment formed by the dam is about 3,000 feet long, varies in width from 30 to 400 feet, and has a surface area of 7.7 acres. Installation of flashboards will increase the surface area to approximately 8.5 acres. The present volume is 56.9 acre-feet. This will increase to 67.6 acre-feet. The applicant states in Section 8 of the Exemption Application Exhibit A that there will be a "net available impoundment for power production [of] about 17.2 acre-feet". Mr. Stuart has stated, however, that the available storage would not be used except in the case of an emergency generation period beyond the operator's control.

4. Two new 85.5 kw turbine/generator units are to be installed. The proposed units are Leroy-Somers Hydrolec tube turbines. One has variable pitch runners, and the other has fixed runners. The expected production is 735,000 kw-hrs. at a net head of 17 feet.

5. Operation is characterized as "run-of-the-river" by the applicant. The turbines will be automatically "regulated by stream flow controls that are sensor activated" (August 1, 1984 letter from J.H. Stuart Associates to Department). The combined hydraulic capacity of the units is 25 cfs to 160 cfs.

6. The drainage area at the site is 42 square miles, about 55% of the total watershed of the North Branch. The U.S. Geological Survey has operated a surface water gaging station (#03285500) at Wrightsville since October, 1933. The watershed area at the gage is 69.2 square miles. Flow estimates for Ladds

Mill have been made using a simple drainage area proration (60.7%) of the gage data. The mean annual flow is 81 cfs (26.3 inches/year), and the 7Q10 value is 2.1 cfs.

7. The fishery in the project area consists primarily of brook, rainbow and brown trout. Future plans by the Vermont Department of Fish and Wildlife are to restore landlocked salmon and steelhead trout to the Winooski River and its tributaries, including the North Branch. This will be achieved through a trap-and-truck operation.

In order to protect the fishery and other aquatic organisms in the North Branch, the applicant proposes:

a. To create a stable impoundment elevation;

b. To operate in a strict run-of-the-river manner;

c. To discharge a minimum flow of 10 cfs through a gate on the west side of the forebay in order to maintain the extensive pool between the dam and tailrace; and

d. To maintain 22 cfs downstream of the tailrace in those rare instances where the impoundment is to be restored following a maintenance operation or an emergency drawdown period.

8. The Department finds that 10 cfs will be sufficient to maintain the pool at the base of the dam in a fresh condition and that 22 cfs (the estimated Summer Aquatic Base Flow derived from the U.S. Fish and Wildlife Flow Recommendation Policy for the New England Area will be adequate

for indigenous aquatic organisms below the tailrace while water is being put in storage following a maintenance operation or an emergency drawdown period.

9. The Department has classified the North Branch as Class B in the project area. Class B waters are waters suitable for bathing and recreation; irrigation and agricultural uses; good fish habitat; good aesthetic value; and acceptable for public water supply with filtration and disinfection. No point sanitary waste effluent discharges are known to exist on the North Branch. The stream is Water Management Type I or II, setting the minimum dissolved oxygen standard at 6 mg/l, or 7 mg/l in spawning areas. The Department has no recent water quality data for the North Branch in this area. Historical data indicates that the stream has excellent water quality characteristics. The Department concludes that the project will not significantly degrade water quality if the proposed minimum flows are maintained. During critical low flow periods, the project will be unable to operate due to the fact that the minimum operating capacity of one turbine is 25 cfs and 10 cfs must be released at the dam.

CONDITIONS

The Department certifies that this project will meet Vermont Water Quality Standards with the imposition of the following conditions:

A. The project shall be operated as a run-of-the-river facility with instantaneous flows below the tailrace maintained equivalent to instantaneous inflows. The impoundment level shall not be cycled.

Following a drawdown of the impoundment necessitated by a maintenance procedure or an emergency generation period outside the control of the operator, the project shall release an instantaneous flow of 22 cfs during the refilling of the impoundment.

When the project is not operating, all flows shall be passed at the dam.

B. A continuous instantaneous flow of 10 cfs or instantaneous inflow, if less, shall be released at the dam at all times. The applicant shall furnish the Department with a plan and hydraulic calculations for the device to be used to maintain this minimum flow.

C. The impoundment shall not be drawn down below the dam crest for maintenance purposes without prior written approval by the Department.

D. The applicant shall not discharge petro chemicals, wet concrete, or debris to State waters during construction or

operation of the facility. Any debris removed from the trashracks shall be disposed of properly.

E. During the final engineering phase or earlier, the applicant shall file a comprehensive erosion and sediment control plan with the Department for review and approval. The plan shall specify temporary and permanent erosion control measures to be utilized during and following construction and shall detail the techniques to be used to pass flows during construction.

F. Any significant changes to the project must be submitted to the Department for review and approval.

G. No construction may commence until the Department has issued written approval for Conditions B and E. Operational changes made after project completion are subject to Condition F and must be approved prior to effecting the change.

H. Any future desilting of the impoundment shall be done in accordance with the Agency of Environmental Conservation Desilting Policy, a copy of which is attached. The Agency shall be notified prior to any desilting activity.

I. The applicant shall provide the Department of Water Resources and Environmental Engineering with an as-built set of plans for the record.

John R. Ponsetto

John R. Ponsetto, Commissioner
Department of Water Resources
and Environmental Engineering

Dated at Montpelier, Vermont
this 25 day of January, 1985.