



# State of Vermont

## AGENCY OF ENVIRONMENTAL CONSERVATION

Montpelier, Vermont 05602  
Department of Water Resources  
and  
Environmental Engineering

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

### WATER QUALITY DIVISION

January 6, 1986

Mr. John H. Stuart  
P.O. Box 367  
Essex Center, Vermont 05451

Re: Ladds Mill Hydroelectric  
Project - Water Quality  
Certification Amendment.

Dear Mr. Stuart;

Please find, enclosed, the Water Quality Certification Amendment issued by the Department for the Ladds Mill Hydroelectric Project pursuant to the provisions in P.L. 92-500, Section 401. Please read it over carefully and contact the Department if you have any questions.

Sincerely yours,

Alison M. DesMueles  
Environmental Technician

AMD/djc

cc: Stephen B. Sease  
Angelo Incerpi  
Phil Wightman  
Public Service Department  
Public Service Board  
Gordon Beckett, U.S. Fish and Wildlife Service, NH  
Elizabeth Higgins, EPA  
FERC  
Martin Inwald, FERC (NY)

WATER QUALITY CERTIFICATION AMENDMENT  
(P.L. 92-500, Section 401)

In the matter of : Worcester Hydro Company  
c/o Mr. John H. Stuart  
P.O. Box 367  
Essex Center, Vermont 05451  
Application to Amend Ladds Mill  
Hydroelectric Project Water Quality  
Certification.

The Water Quality Division of the Vermont Department of Water Resources and Environmental Engineering (the Department) has reviewed the information provided by Mr. John H. Stuart (the applicant) dated November 15, December 10, December 12 and December 17, 1985. The Department also made a site inspection on December 11, 1985. The Department has made the following findings:

1. The Department issued a Water Quality Certification to the applicant for the project dated January 25, 1985.
2. The applicant has since modified the project as follows:
  - a. The two tubular turbines have been replaced with a single Ossberger 800 mm crossflow unit which will require the construction of a powerhouse. The unit is rated at 148 kw and has a hydraulic capacity of 22 to 141 cfs. The powerhouse will be constructed as an extension of the existing forebay structure and will incorporate a portion of the existing tailrace wall.

b. The project's tailrace has been relocated to discharge at a point about 20 feet downstream of the dam. The applicant states that the point of discharge from this tailrace will be directed into the pool at the base of the dam, preserving the water quality of that pool and keeping it fresh. The majority of the existing tailrace wall will remain intact with only a 20 foot long section being removed to accommodate this new tailrace configuration. The tailrace will extend only as far as the existing tailrace wall. No construction will take place in the stream.

2. Crossflow turbines characteristically have high mortality rates for fish passing through the units. The intake must be properly screened to protect fish moving downstream. The applicant has presented information on proposed trashrack design to the Vermont Department of Fish and Wildlife (Fish and Wildlife) for review and approval. The applicant states that with a forebay opening of 116 square feet and a maximum flow through the turbine of 141 cfs, the resultant approach velocity will be 1.2 fps. Additionally, there will be a 15/16 inch opening between the vertical members of the trashrack. Fish and Wildlife finds these trashrack features to be acceptable.

Fish and Wildlife requires one change in trashrack design (as submitted to Fish and Wildlife in plans dated November



1985). The rack must be placed upstream in the headrace as close as possible to the headrace entrance. Fish and Wildlife has discussed this design change with the applicant.

3. The minimum flow requirement at the dam of 10 cfs, or instantaneous inflow to the impoundment if less, was proposed by the applicant and approved by the Department under the original project design to maintain the water quality of the extensive pool which would have existed between the tailrace discharge and the dam. This spillage flow requirement was also found by the Agency of Environmental Conservation to be sufficient to protect the aesthetic quality of the project area.

Under the revised project, the tailrace discharge is directly into the pool below the dam. The location of this discharge in combination with the spillage over the dam will be sufficient to maintain the water quality of the pool.

4. The applicant has provided the Department with his proposed method for maintaining the 10 cfs flow requirement at the dam. Two two-inch high by 3.36 foot long weirs will be notched into the top of the project's flashboards. Main-

taining the impoundment's water level at the top of the flashboards (which would result in a two inch head on these weirs) would provide a flow of 5 cfs at each weir.

The applicant has not provided the Department with specific information on the level sensor to be used to maintain the impoundment level at the top of the flashboards. The Department finds that this information is necessary before final approval can be issued on the applicant's minimum flow passage techniques.

5. The applicant commenced construction at the project on November 25, 1985 and continued through December 12 without having been issued approvals under Conditions B, E, F, and G of the January 25, 1985 certification. Repairs to the dam have been made, flashboards have been installed, excavation of the powerhouse and tailrace has commenced, and an existing road to the project area has been upgraded. Blasted rock has been disposed of in the old tailrace area which is separated from the stream by a training wall. Some of this rock has been disposed of downstream of this old tailrace area and has partially restricted the flow of a small stream. On December 11 the Department inspected the site and observed a pump which was set up to dewater the powerhouse excavation area. The pump was discharging turbid water directly into the river. The Department collected

water quality samples on the afternoon of December 11 at the project site. The pump discharge had a turbidity measurement of 580 NTUs. Turbidity measurements upstream and downstream of the discharge were 1 and 3 NTUs respectively.

6. The applicant has provided the Department with an erosion control plan which covers existing and proposed erosion control measures to be used at the project site. The Department finds this plan to be acceptable and hereby approves this plan with the exception of the disposed rock debris downstream of the old tailrace area. The Department will inspect the site in the spring of 1986 or earlier and determine whether this material should be removed and disposed of in a more-suitable location. At the same time the Department will order additional erosion control measures at the site if found to be necessary. The Department maintains continuing jurisdiction over erosion control measures at the project site.



CONDITIONS

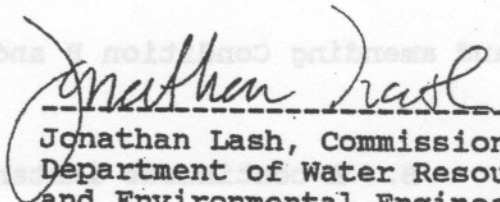
Based on its review and findings, the Department amends the Ladds Mill Water Quality Certification by adding Condition J:

J. The project shall not be operated without approved trashracks in place. Prior to commencement of project operation, the applicant shall obtain written approval of the trashrack design from the Vermont Department of Fish and Wildlife. The applicant shall file a copy of this written approval with the Department.

and amending Condition B and G to read:

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. Information on the proposed level sensor must be submitted to the Department for review and approval.

G. No construction may commence until the Department has issued written approval for Condition E. Project operation shall not commence until the Department has issued written approval for Condition B and the applicant has submitted to the Department a copy of the written approval from the Vermont Department of Fish and Wildlife under Condition J. Operational changes made after project completion are subject to Condition F and must be approved prior to effecting the change.

  
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Jonathan Lash, Commissioner  
Department of Water Resources  
and Environmental Engineering

Dated at Montpelier, Vermont this  
8 day of January, 1986.

AMD/rh