

WATER QUALITY CERTIFICATION

(P.L. 92-500, Section 401)

In the matter of: Hydro Energies Corporation  
John L. Davidson, President  
P.O. Box 500  
Quechee, VT 05059  
Application for Deweys Mills Dam Hydroelectric Project

In making the following findings, the Water Quality Division of the Vermont Department of Water Resources and Environmental Engineering has reviewed the FERC license application dated June 19, 1981 and a water quality report by Natural Resource Consulting Services transmitted to the Department by letter dated February 17, 1982:

1. Hydro Energies Corporation (the applicant) proposes to develop the former site of the A.G. Dewey Textile Mill located downstream of Quechee Village in the Town of Hartford on the Ottauquechee River. The site is in the flowage of the North Hartland flood control reservoir and is, therefore, under the ownership of the U.S. Corps of Engineers. The existing dam is at a sharp right bend in the river at the beginning of Quechee Gorge. The Deweys Mills Dam is a concrete and stone masonry gravity structure, 490 feet long with a 250 foot long ogee spillway on the right end. The spillway crest elevation is 523.23' NGVD. Three feet of flashboards are to be installed to raise the pool elevation to 526.2' NGVD. Available head shall be increased approximately six feet through tailrace excavation about 200 feet in length and 9'-14' in depth. This excavation is in rock.

2. The facility is to be operated in a strict run-of-the-river manner using two new turbine/generator units:

Primary Unit - single vertical propeller unit with a variable runner.  
520 cfs hydraulic capacity. 1500 kw (43 feet of head).

Secondary Unit - Two bulb units in series within a 42 inch vertical penstock. 110 cfs hydraulic capacity. 340 kw  
(45 feet of head).

The primary unit would operate in the range of 200 cfs to 500 cfs, with

the secondary unit taking over on the low end. The secondary unit would also pick up excess flows above the high end of the primary unit. Switching would be automatic in order to maintain a constant pool elevation.

3. The applicant has estimated an increase in impoundment surface area of four acres. The present surface area is about 35 acres, and the gross volume is 150 acre-feet. The facility will not be operated out of storage. The applicant has stated that two and three feet of flashboards have been installed across the spillway during different periods in the past. The maximum depth of the pond is 9 feet at the dam.

4. East of the impoundment, a wildlife management reserve was created through the construction of a dike by Quechee Lakes Corporation in 1971. The area is managed by the Vermont Department of Fish and Game. Water levels in the area can be adjusted using a stop log structure in the dike. The flexibility of that management option would be reduced if the proposed project held the power pool constant. Presently the water level in the management area can be drawdown to 523.7 NGVD. Cooperation of the plant operator in reducing the power pool elevation in order to allow reserve area water level management practices to be carried out is desirable and will be required as a condition of this certification. In terms of fishery management, the practices are undertaken to eliminate competing fish species through chemical treatment and to reduce the amount of aquatic vegetation. The Department of Fish and Game is attempting to establish a largemouth bass fishery. It is expected that the necessity of drawing down the power pool in order to facilitate reserve water level management will be very infrequent and of short duration.

The applicant has stated that the flashboards will be designed to fail under two (2.0) feet of surcharge. That should help preclude the possibility of the river flooding the reserve during high water. The reserve water level in March, 1982 was 528.2' NGVD.

5. Flows on the Ottauquechee River are gaged by the U.S. Geological Survey at North Hartland downstream of the flood control reservoir. The gaging station (#115150) has been in operation since October, 1930. For the full period of record, flows have been regulated by the flood control reservoir and/or upstream power plants. Flow statistics for natural flow conditions are, therefore, not available. The drainage area at the gaging station and at the proposed project are 221 square miles and 207 square miles, respectively. Following are several hydrologic values for the site, based on a direct drainage area proration using the gage:

<u>Parameter</u>	<u>Value (cfs)</u>
Mean Flow	374
95% exceedance	39
50% exceedance (median)	187
10% exceedance	870
7Q10	22

6. Operation of the facility in a strict run-of-the-river manner should insure that the project will not affect the present flow regime in Quechee Gorge, which is known for supporting a good population of salmonids, including trophy-size brown trout.

During periods of equipment repair or flashboard replacement, some manipulation of pool levels may be necessary. The applicant has agreed to pass flows in accordance with the U.S. Fish and Wildlife Service Flow Recommendation Policy for the New England Area during such periods.

7. The Ottauquechee River is classified as Class B from the Deweys Mills Dam downstream and as Class C upstream to the Quechee Water Pollution Control Facility outfall. The river is considered Water Management Type II in this section. The dissolved oxygen standard would be 6 mg/l, as provided in Rule 6 of the Vermont Water Quality Standards.

8. The Ottauquechee River system contains good populations of brook, brown, and rainbow trout. Rainbow trout comprise the highest percentage of the population. The principal stocking effort by the Vermont Department of Fish and Game is for brook trout and brown trout. Generally, rainbow trout

have maintained their population levels through natural reproduction. Both the riffle section below Emery Mills dam and Quechee Gorge provide excellent habitat conditions for salmonids.

9. It has been estimated that about 0.7 acre of riffle area will be inundated upstream of the existing impoundment through the installation of flashboards. As the river width is about 150 feet, this would indicate that about 200 feet of riffles will be flooded. The applicant indicates that about 2600 feet of riffles exist between Emery Mills dam and the site. It is not likely that the loss of this 200 feet of riffles would unduly impact on river reaeration or on available rainbow trout habitat.

10. Algal populations in both the Emery Mills and Deweys Mills impoundments significantly affect dissolved oxygen (D.O.) levels through the respiration process. This phenomenon is noted due to the supersaturated impoundment D.O. levels indicated in Table 1 of the applicant's water quality report. Photosynthetic oxygen production may be assumed to be responsible for those high D.O. values. No 24 hour sampling data was provided to indicate minimum diel D.O. levels.

In order to mitigate the loss of reaeration presently available through spillage of all flows over the dam, the applicant will spill a minimum of 7Q10 over the dam at all times when available from inflow. The applicant has also expressed an interest in turbine venting. It is unclear if the bulb turbines could be vented, however.

11. As the river may naturally have substandard D.O. levels in the Deweys Mills impoundment at flows greater than 7Q10 and as the river downstream of the dam during such conditions probably meets standards after reaeration over the dam, the Department shall require D.O. monitoring after completion of the project. If the monitoring reveals a D.O. problem, the Department may require additional measures to bring the project into compliance with Vermont Water Quality Standards.

12. The applicant's water quality report states that about 1500 cubic yards of sediment is to be dredged immediately upstream of the dam. This activity has not been reviewed as a part of this Water Quality Certificate and is subject to the Agency of Environmental Conservation's Desilting Policy, a copy of which is attached.

CONDITIONS

The Department of Water Resources and Environmental Engineering certifies that this project will meet Vermont Water Quality Standards with the following conditions:

A. Except as provided in Condition B, the hydroelectric facility shall be operated to maintain instantaneous flows downstream of the tailrace equivalent to the instantaneous inflow into the impoundment. At all times, except when the pool has been drawn down for maintenance purposes, a minimum stream flow of 7Q10 (22 CFS), or inflows, if less, shall be passed over the dam, on an instantaneous basis. During periods of non-generation, all flows will be passed over the dam. The applicant shall provide the Department of Water Resources and Environmental Engineering with a description and plans detailing how releases will be made at the dam for review and approval before construction may commence.

B. Under conditions when the impoundment level is to be increased as a result of a maintenance operation or the installation of flashboards, the applicant shall maintain a flow below the project greater than or equal to the following values:

May 16-October 15	104 cfs
October 16-March 31	207 cfs
April 1-May 15	828 cfs

C. The applicant will provide the Department of Water Resources and Environmental Engineering with design details for the venting of turbines as discussed in the applicant's water quality report.

D. In the first year of operation, weekly during the months of July and August, the applicant shall sample water quality at three locations:

1. Directly upstream of the head of the impoundment.
2. The impoundment at the dam.
3. The river downstream directly opposite the right end of the spillway.

Testing shall be done by a qualified laboratory, and the results shall include the date, time, both air and water temperature, D.O. level, estimated

stream flow and spillage flow and whether or not the project is operating. Samples should be collected in the early morning to reflect the algal influence on D.O. levels. Each sample run shall include a duplicate. Results of the testing shall be reported to the Department of Water Resources and Environmental Engineering on or before September 15 of the sampling year. The Department of Water Resources and Environmental Engineering may require further testing if necessary in assessing the project's impact on downstream water quality and may order mitigative measures if a problem is revealed.

E. During the final engineering phase or earlier, the applicant shall file a comprehensive erosion and sediment control plan with the Department of Water Resources and Environmental Engineering for review and approval. The plan shall cover temporary and permanent measures to limit adverse impacts on water quality from turbidity and sedimentation with regard to construction activities. It is recommended that the applicant consult with the Department for input during the development of the plan.

F. The applicant shall cooperate with the Vermont Department of Fish and Game in drawing down the impoundment when requested in order to facilitate management efforts in the wildlife reserve.

G. The applicant shall insure that every reasonable precaution is taken during construction to prevent the discharge of petro chemicals, wet concrete and debris to state waters.

H. Any debris removed from the project area during construction and later operation shall be disposed of properly. No floatables or hazardous materials shall be stored within the flood pool of North Hartland Reservoir.

I. Any significant changes to the project including the operational scheme must be submitted to the Department of Water Resources and Environmental Engineering for review and approval.

J. Upon completion of the project, the applicant shall provide the Department of Water Resources and Environmental Engineering with an as-built

set of plans for the record.

K. No construction may commence until the Department of Water Resources and Environmental Engineering has issued written approval under Conditions C, E, and I. Operational changes made after project completion are subject to Condition I and must be approved prior to effecting the change.



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

Dated at Montpelier, Vermont this  
12 day of July, 1982.

JRC/rh  
Encl.