

WATER QUALITY CERTIFICATION

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

In the matter of: Washington Electric Cooperative, Inc.
P.O. Box 8
East Montpelier, VT 05651
Application for North Branch #3
Hydroelectric Project

The Water Quality Division of the Vermont Department of Water Resources and Environmental Engineering (The Department) originally issued this certification to the Montpelier Hydroelectric Company on May 6, 1982. Pursuant to a request by Montpelier Hydroelectric Company dated February 14, 1983, this certificate is being transferred to the Washington Electric Cooperative, Inc., which is now considered to be the applicant. The Department has made the following findings:

1. The applicant intends to develop for hydroelectric power generation an existing flood control dam located at Wrightsville on the North Branch of the Winooski River in the City of Montpelier. As proposed, a six foot diameter penstock would extend from the existing power conduit in the flood control dam to a point approximately 375 feet downstream on the right bank of the stream at the former Daniels Mill dam. At that point, a powerhouse would be constructed where the mill was located. The headworks in the flood control reservoir would be modified such that the pool elevation would be increased from the present normal pool elevation of 620' NGVD to the proposed operating level, which would vary between 633' NGVD and 635' NGVD. The power

conduit is separate from the existing discharge conduit in the dam.

In increasing the normal pool elevation of the reservoir, the following physical changes to the reservoir will result:

	<u>Pool Elevation</u>	
	<u>620' NGVD</u>	<u>635' NGVD</u>
Surface area	90 acres	190 acres
Length	1.3 miles	2.1 miles
Maximum depth	15 feet	30 feet
Average depth	8 feet	15 feet
Gross storage	700 acre feet	2800 acre feet

Loss of about 7 acres of wetland area would be offset by the flooding of 35 acres of potential wetlands. The reservoir shoreline would increase about 1.3 miles. About 1200 feet of Martins Brook (Shady Rill) east of Vermont Route 12 would be flooded.

3. The drainage area at the site is 68 square miles. A USGS gaging station is located downstream of the site and has a drainage area of 69 square miles. Based on the gaging station records through water year 1979, the 7Q10 value is 3.4 cfs. The median August flow for the site is 25 cfs (0.37 csm).

4. a) The outlet of Wrightsville Reservoir is presently uncontrolled. The applicant proposes to install two horizontal Francis-type turbines. The smaller turbine would have a capacity of 100 kw running on minimum stream flows. A flow of 25 cfs is available about 77% of the time during an average year. The larger turbine would have a capacity of 900 kw and operate during periods of higher flow

and peak periods. The maximum hydraulic capacity of the plant at 62 feet of head (635' NGVD) is 200 cfs. The plant, however, will be operated at greater heads. The applicant shall limit plant output to 1000 kw by reducing the flow through the turbines as the pool rises above 635' NGVD. Stream channel erosion and flooding would be a concern if the combined flows from the discharge conduit and the powerhouse produce excessive flow velocities and stages downstream.

b) The plant will be operated out of storage between 633' NGVD and 635' NGVD. Daily fluctuation is not expected to exceed eight (8) inches.

5. The increase in the normal pool elevation at Wrightsville Reservoir should result in an enhancement of fisheries and recreational use. There will be an improved potential for warmwater sport fishery management, including the introduction of largemouth bass. Littoral zone vegetation and fish spawning in shallow areas could be adversely affected by water level fluctuations resulting from this project.

Largemouth bass spawn in the spring, building nests in shallow water. A literature review by the District Fisheries Biologist indicates that bass tend to spawn below fluctuation zones but that year class strength is best with stable or rising water levels during the spawning and larval development period.

Aquatic vegetation within the zone of fluctuation may die unless flooded with adequate frequency. The District Fisheries Biologist has recommended flooding the fluctuation zone at least three times per week. Porous, granular soils would necessitate a greater frequency.

6. Brown trout, a coldwater species, are known to reside in the affected sections of Martins Brook and the North Branch. The Vermont Department of Fish and Game accepts this loss of trout habitat in favor of the improved opportunities for warmwater species.

7. Maintenance of a flow of at least 7Q10 in the section of stream between the two dams should maintain the mill pond water quality. The applicant will repair the mill dam, which has an extensive number of leaks. Such repairs would result in both minimum stream flows and excess flows spilling over the mill dam rather than passing as leakage.

This section of stream is inaccessible to fish migration from downstream. A base flow of 25 cfs below the powerhouse should be sufficient to prevent adverse impacts on aquatic life downstream.

8. a) The North Branch upstream of the Gassarow Bridge (Gould Hill) in Montpelier is Class B water and is Class C downstream, as ordered by the Vermont Water Resources Board. The stream may be typed as Water Management Type I or II downstream of the dam, setting the minimum dissolved oxygen (D.O.) standard at 6 mg/l. A

standard of 7 mg/l may apply to spawning areas for salmonids.

b) Two sets of water quality samples were taken by the Department of Water Resources and Environmental Engineering in August, 1978 and July, 1979 on the North Branch about 0.1 mile upstream of the confluence with the Winooski River. Flows during the sampling periods were at about twice 7Q10 in 1978 and four times 7Q10 in 1979. Temperatures ranged from 19.0°C to 23.0°C and 21.0°C to 26.5°C, respectively. Diurnal fluctuation in D.O. levels were noted. The lowest recorded D.O. measurements were 6.4 mg/l (70% saturation) in 1978 and 6.0 mg/l (67% saturation) in 1979 for the sampling periods. It thus appears that sections of the North Branch may be substandard in terms of D.O. levels under certain conditions.

The proposed intake has been designed as a bottom withdrawal (612' NGVD). Although it is the conclusion of the Department of Water Resources and Environmental Engineering that D.O. levels downstream of the powerhouse will not be lowered as a result of this project, the results of the analyses that led to that conclusion should be confirmed by the collection of field data after construction of the project.

A set of falls upstream at Putnamville provides good reaeration opportunities for the stream during critical periods. The applicant has stated that the head of the new impoundment will be some distance downstream of the falls.

The Department of Water Resources and Environmental Engineering may require the applicant to reduce the pool elevation if it is found that the new impoundment floods any portion of the falls with resultant losses of dissolved oxygen.

CONDITIONS

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

A. The hydroelectric facilities shall be operated to maintain the stream flow downstream of the tailrace of the powerhouse at 25 cfs or greater, unless inflows to Wrightsville Reservoir fall below 25 cfs, in which case the instantaneous discharge below the powerhouse tailrace shall at least equal the instantaneous inflow to the reservoir. At the existing outlet to Wrightsville Reservoir, the applicant shall provide a minimum discharge of at least 7010 (3.4 cfs). The maximum generation flow is not to exceed 200 cfs.

B. The applicant shall file a detailed description of its operation with the Department of Water Resources and Environmental Engineering for review and approval. The description shall discuss the magnitude, frequency and duration of pool fluctuations.

C. Woody vegetation below elevation 636.0' NGVD within the impoundment area shall be removed to the satisfaction of the Department of Water Resources and Environmental Engineering prior to raising the permanent pool.

D. The Department of Water Resources and Environmental Engineering may require the applicant to modify the power pool fluctuation scheme if it is found to be necessary

in order to provide suitable habitat conditions for spawning and incubation of fish species under the Vermont Fish and Game Department management program for the reservoir.

E. In the first year of operation, weekly during the months of July and August, the applicant shall sample water quality directly downstream of the tailrace. Testing shall be done by a qualified laboratory, and the results shall be reported to the Department of Water Resources and Environmental Engineering on or before September 15 of the same year. The report shall include the date, time, both water and air temperatures, D.O. level, estimated stream flow, the elevation of the impoundment and whether or not all the water is being drawn off the bottom. Each sampling run shall include a duplicate. 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.

F. 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 and project design. It is recommended that the applicant consult with the Department for input during the development of the plan.

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 at the headworks both during project construction and later operation shall be disposed of properly.

I. The maximum drawdown shall not exceed 2.0 feet from a reservoir stage of 635.0 NGVD without the prior approval of the Department of Water Resources and Environmental Engineering. Fluctuation shall not exceed 8 inches daily.

J. 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.

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

L. All references to regulation of the reservoir level, stream flows and turbine discharges in Conditions A-K are for the purposes of protecting water quality in the reservoir and in the North Branch below the dam.

The primary purpose of Wrightsville Dam continues to be flood control and the applicant may be required by the State or Federal Government to temporarily and from time to time modify the above through the inlet and outlet works, including the turbines, if required for flood control (including ice jam control) purposes or dam safety.



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

Dated at Montpelier, Vermont
this ~~12th~~ 30th day of
MARCH, 1983.

JRC/rh