

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

In the matter of: Winooski Hydroelectric Company
26 State Street
Montpelier, Vermont 05602
Application for Winooski #8 Hydroelectric Project

The Water Quality Division of the Vermont Department of Water Resources and Environmental Engineering (the Department) has examined the Water Quality Certification application and the FERC license application Exhibit E filed by Winooski Hydroelectric Company (the applicant) and makes the following findings:

1. The applicant proposes to develop the site of an existing dam located on the Winooski River in the Town of East Montpelier and presently under the ownership of the Green Mountain Power Corporation. The Winooski #8 project would include the construction of a 200 foot penstock and a new powerhouse approximately 750 square feet in area. The powerhouse would be located on the right (north) bank. The site is about 1.4 miles upstream of the confluence of the Stevens Branch and the Winooski River.

2. The dam, a gravity, reinforced concrete structure was constructed by the Corry-Deavitt-Frost Electric Company in 1908-1909. From 1927 to 1970, the hydroelectric facility was operated by Green Mountain Power Corporation, utilizing a powerhouse located approximately 2900 feet downstream. The dam has a length of 227 feet, 152 feet of which constitutes the spillway crest. It is 20 feet high. The forebay is on the right end of the dam, and some desilting in that area will be necessary in order to improve entrance conditions.

3. The crest elevation is 610.2' NGVD. The pond surface area at that elevation is about 4 acres, and the backwater extends about 1500 feet upstream. Flashboards 3.3 feet in height are to be installed across the crest, raising the pool to 613.5' NGVD. That will result in an increase in surface area of about 3 acres and an extension of the backwater about 700 feet. The gross storage with the flashboards in place would be 34-acre feet.

4. The applicant proposes to install a single Kaplan-type turbine unit. The installed capacity would be 550 kw with 24.0 feet of gross head (tailrace elevation of 585.5' NGVD). The project would be operated in a strict run-of-the-river manner. This is interpreted to mean that instantaneous flows below the tailrace will be maintained equivalent to instantaneous inflows to the project, and that no operation from storage will occur. The maximum hydraulic capacity of the powerhouse would be 350 cfs, and the minimum necessary for generation would be 55 cfs.

5. The closest surface water gaging station (#42870) is operated by the U.S. Geological Survey on the Winooski River in Montpelier. The gage has been in continuous operation since August, 1928. Between the site (drainage area 200 square miles) and the gage (drainage area 397 square miles), two major tributaries - the Stevens Branch and the North or Worcester Branch - contribute flow. Flows are regulated by flood control reservoirs on both those tributaries. Above the site, flows are regulated by Molly Falls Reservoir and Peacham Pond, which are used for flow augmentation by Green Mountain Power Corporation, the operator of several hydroelectric facilities in the Winooski Basin.

Based on a direct proration by drainage area using the Montpelier gage, following are several hydrologic values for the site:

<u>Parameter</u>	<u>Value (cfs)</u>
Mean flow	295
95% exceedance	47
50% exceedance (median)	161
10% exceedance	760
7Q10	30

6. The applicant has estimated the 7Q10 flow value to be 20 cfs at the site using a logarithmic regression of 7Q10 versus drainage area for USGS gaging stations near Essex Junction, Moretown, Northfield, Northfield Falls, Montpelier and Middlesex.

7. The Vermont Water Resources Board has designated the Winooski River from Plainfield downstream as Class C waters. Class C waters are considered suitable for recreational boating; irrigation of crops not used for consumption without cooking; habitat for wildlife and for common food and game fishes indigenous to the region; and such industrial uses as are consistent with other Class uses. The Water Management Type is I or II, and the associated dissolved oxygen (D.O.) standard would be 6 mg/l. A D.O. level of 7 mg/l may be required at and near spawning areas.

8. The applicant took two sets of D.O. samples on August 19 and August 30, 1982 when river flow was estimated at 85 cfs, or roughly three times 7Q10. All samples were at or near saturation. Photosynthetic oxygen production may be responsible for the higher D.O. measurements.

The Department has sampled the river at the U.S. Route 2 bridge about 0.4 mile upstream of the Stevens Branch confluence. All samples exhibited high D.O. values, all above minimum standards. An excellent set of riffles exists between the site and the sampling location.

9. In order to insure that the section of river between the dam and the tailrace will continue to meet standards when the project is operating, a minimum flow of 7Q10 must be spilled at the dam.

10. A sizeable relatively deep plunge pool is located at the base of the dam. The pool is considered to be an important refuge and habitat area for salmonids. It is a very popular fishing spot. Passage of 7Q10 over the dam will preserve the quality of the pool; however, it may be necessary to construct a low flow channel along the right bank to connect the tailrace and the pool. The channel would maintain the capability of upstream migrants to negotiate the bypassed section of stream with adequate depth of water.

A detailed topographic survey of the bypassed section of river shows that neither the pool depth nor area will be significantly reduced by the passage of lower-than-natural flows.

CONDITIONS

The Department certifies that the Winooski #8 hydroelectric project will meet Vermont Water Quality Standards with the following conditions:

A. The hydroelectric facility will be operated in a strict run-of-the-river manner, with instantaneous flows below the tailrace maintained equivalent to instantaneous inflows. The one exception to this is when storage is being replaced following a maintenance operation such as the reinstallation of flashboards. In such cases, a flow of 100 cfs, or greater shall be maintained below the tailrace.

B. A flow of 25 cfs, or greater shall be passed at the dam at all times when available from instantaneous inflow to the impoundment. When the project is not operating, all inflows shall be released at the dam, except during the aforementioned maintenance operations. The applicant shall provide the Department with a description and plans detailing how releases will be made at the dam for review and approval before construction may commence.

C. Following project completion, the Department may order the construction of a low flow channel in the bypassed section of river if it is found that fish migration has been impeded by the change in flow regime.

D. During the final engineering phase or earlier, the applicant shall file a comprehensive erosion and sediment control plan with the Department. 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.

E. 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.

F. Any debris removed from the project area during construction and later operation shall be disposed of properly.

G. Any significant changes to the project including the operational scheme must be submitted to the Department.

H. Upon completion of the project, the applicant shall provide the Department with an as-built set of plans for the record.

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

For 

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

Dated at Montpelier, Vermont this
29th day of Dec., 1982.

JRC/rh