

WATER QUALITY CERTIFICATION

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

In the matter of: Public Service Company of New Hampshire
P.O. Box 330
Manchester, NH 03105
Application for Canaan Hydroelectric
Project

The Water Quality Division of the Vermont Department of Water Resources and Environmental Engineering (the Department) has reviewed the Water Quality Certification application filed by letter dated September 12, 1983 with a copy of the Federal Energy Regulation Commission minor license application. With respect to this application by the Public Service Company of New Hampshire (the applicant), the Department finds:

1. The applicant is seeking to license an existing, operating hydroelectric facility located in Canaan, Vermont and Stewartstown, New Hampshire. The facility was originally constructed in 1927 by the W.F. Allen Company. The dam, which was reconstructed in 1943, is 1/4 mile upstream of West Stewartstown. The concrete gravity dam incorporates 3.5 feet of flashboards and is 275 feet long and 14.5 feet high. The spillway crest elevation is 1051.5' NGVD.

2. No new construction is proposed.

3. The existing vertical turbine/generator unit has a rated capacity of 1100 kw. The plant is described as essentially run-of-the-river by the applicant. It is automatically operated as a base-load unit. The available average head is 35 feet. The plant has an estimated hydraulic capacity of 466 cfs.

A float or pond level control mechanism at the dam automatically regulates the operation. When flows are less than 466 cfs, wicket gates in the turbine are adjusted to operate the facility within the turbine hydraulic range (minimum capacity of 55 cfs at 0.125 gate) and a pool level from 1054.0' NGVD and 1054.8' NGVD (0.2 feet below the top of the flashboards).

4. The 9'6" wood stave penstock, which is approximately 1400 feet long, and the powerhouse are located in Canaan. The inlet invert of the penstock is at 1040.0' NGVD.

5. The reservoir has a surface area of 20 acres and a gross storage capacity of about 200 acre-feet. It extends to about 4000 feet upstream of the dam.

6. The watershed area is 381 square miles. Based on the U.S. Geological Survey surface water gaging station (#1129200), which has a drainage area of 254 square miles and is located below Indian Stream near Pittsburg, New Hampshire, the following hydrologic parameters have been estimated:

<u>Parameter</u>	<u>Value</u>
Mean	855 cfs
7Q10	51 cfs
95% Exceedance	96 cfs
Median (50% Exceedance)	795 cfs

7. About 1600 feet of the stream channel is bypassed by the penstock and tailrace. Flows in this section are frequently reduced to 5-10 cfs, which is the leakage around the gates and through the flashboards. The applicant has characterized the substrate in this section as "irregular and composed of ledge, cobble and boulders", and the primary habitat types as "pools

and cobble strewn riffles ..." (page E-8 of the FERC license application). The Vermont District Fisheries Biologist indicates that the Connecticut River in this area affords a good and diverse salmonid fishery, including rainbow, brown and brook trout. The U.S. Fish and Wildlife Service and Vermont Department of Fish and Wildlife recommend passing a minimum aquatic base flow of 50 cfs (0.13 cfs/square mile) at the dam into the bypassed section, while continuing to operate the facility in a strict run-of-the-river manner.

The flow recommendation would also reduce fluctuations in flow and stream stages as now occurs. The applicant states that large regular releases from Murphy Dam exceed the turbine capacity at Canaan resulting in spillage at Canaan Dam and scouring flows in the bypassed reach. Higher minimum flows should reduce stranding and reduce the impact of fluctuating flows on aquatic life. Further, research by this Department has shown that, generally, stream values for aquatic life are extremely degraded by regulated minimum flows in the range experienced at this site (0.03 cfs/square mile).

8. This project will have little impact on the river reach above the dam. The pool upstream is fairly stable in terms of stage under this operational scheme, and it has been existing for many years.

9. The flatter reach of the Connecticut River below the project contains primarily a warmwater fishery, with the predominant species being chain pickerel, yellow perch,

smallmouth bass, largemouth bass and rock bass. The State of New Hampshire also stocks salmonids to enhance the sport fishery. The river downstream of Canaan is primarily impacted by flow regulation imposed upstream of this facility, which, as proposed, will continue to operate in a run-of-the-river manner.

Although this project is characterized as "run-of-the-river", a pool fluctuation of 0.8 feet on the flashboards results in some regulation of downstream flows due to the Canaan facility. Presently when inflows exceed roughly 70 cfs, the project is capable of operating in a strict run-of-the-river manner. With the imposition of a 50 cfs minimum flow in the bypassed reach, the facility will be unable to operate until the inflow exceeds 105 cfs, assuming the pool is not cycled. Based on the applicant's flow duration curve (page A-6 of the FERC license application), the inflow exceeds 105 cfs about 95% of the time.

By letter dated February 16, 1983, the U.S. Fish and Wildlife Service recommended a minimum aquatic base flow of 190 cfs (0.5 cfs/square mile) below the project, based on their Flow Recommendation Policy for the New England Area. The applicant disputes this value and proposes 136 cfs (0.36 cfs/square mile). This value is based on the applicant's recalculation of the unitized August median flow used in the policy. The Department agrees that this is a more correct estimate of the August median flow.

10. The Connecticut River is classified as Class B waters from the border to Canaan, a distance of about 4.6 miles.

From Canaan downstream one mile to Leach Creek, it is Class C for the assimilation of wastewater discharged at Canaan. Class B waters are suitable for bathing and recreation; irrigation and agricultural uses; good fish habitat; and good aesthetic value; and are acceptable for public water supply with filtration and disinfection. Class C waters are 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.

From the border to the Nulhegan River, the Connecticut River is Water Management Type I, for management as a salmonid fishery. The minimum dissolved oxygen standard is 7 mg/l at and near spawning areas and 6 mg/l in non-spawning areas.

There are no known dissolved oxygen deficiencies in this section of the Upper Connecticut River. Sampling done in 1969 indicated relatively high dissolved oxygen levels. At that time, the Canaan wastewater treatment plant was not operational.

CONDITIONS

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

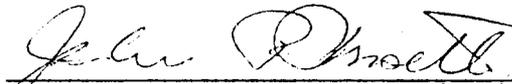
A. A continuous instantaneous flow of 136 cfs or instantaneous project inflow, if less, shall be maintained in the river at the tailrace. A minimum instantaneous flow of 50 cfs or instantaneous project inflow, if less, shall be released at the dam and into the penstock-bypassed reach. The project shall continue to be operated as a run-of-the-river facility. The applicant shall provide the Department with a description and plans detailing how the aforementioned minimum flows shall be maintained. This shall be subject to the Department's review and approval and shall be filed before July 1, 1984.

At its discretion, the applicant may, at any time, seek to amend the minimum flow requirement set forth herein, based on the results of an instream flow study coordinated with the U.S. Fish and Wildlife Service, the New Hampshire Department of Fish and Game and the Vermont Agency of Environmental Conservation. If the applicant stipulates to the Department in writing by July 1, 1984 that it will undertake such a study, the above minimum flow required in the bypassed section is waived until such time as the study is completed or January 1, 1985, whichever comes first.

B. Any debris removed from the project dam and trashracks shall be disposed of properly.

C. Any significant changes to the operational scheme shall be submitted to the Department for prior approval.

D. Any desilting operation shall be carried out in accordance with the Agency of Environmental Conservation Desilting Policy, a copy of which is attached.


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

Dated at Montpelier, Vermont
this 10th day of MAY, 1984.

AMD/rh
Attachment