

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

In the matter of: Essex Hydro Associates
89 State Street
Boston, MA 02109
Application for Wells River
Hydroelectric Project

The Water Quality Division of the Vermont Department of Water Resources and Environmental Engineering (the Department) has reviewed a Water Quality Certification application dated February 8, 1984 and filed by Essex Hydro Associates (the applicant). The Department has reviewed the applicant's exemption application to FERC and supplementary information and has made the following findings.

1. The applicant proposes to develop a hydroelectric facility on the Wells River in the Town of Newbury. The project will use an existing concrete gravity dam approximately 150 feet long. This dam is located at the top of a steep cascade about 40 feet in height. The spillway crest is at an elevation of 654.5' NGVD. The dam creates an impoundment with a surface area of about two (2) acres; storage capacity is negligible. Existing headworks would be used. One (1) foot of flashboards would be installed to elevation 655.5' NGVD. These flashboards would be designed to fail during flood conditions. Project development involves construction of a powerhouse, access road, 350 foot tailrace, and installation of a 500 foot penstock and connecting transmission line.

2. The powerhouse would contain three (3) turbines with an installed capacity of 970 kw. These turbines would operate

under a rated net head of 75 feet and a hydraulic capacity of 25.0 cfs to 182.5 cfs.

3. The powerhouse would be located about 600 feet downstream of the dam on the north streambank. The tailrace would be constructed in the stream channel along the northern side of a small island. This island is about 400 feet long extending east to west. The bypassed stream section, totalling over 1000 feet, would include the area from the dam to the end of the tailrace. The section from the dam to the powerhouse is composed of a large cascade and some pools. The remaining bypassed section, which is the stream channel on the southern side of the island, is primarily riffles.

The applicant states that the majority of stream flow naturally goes along the southern side of the island.

4. The applicant proposes to operate the facility in a run-of-the-river mode. A minimum flow of 5.0 cfs would be released through the bypassed section at all times. The pool level would be maintained at a maximum of $1\frac{1}{2}$ inches below the top of the flashboards during generation. Following turbine shutdown there would be a brief lag time prior to flows beginning to spill over the dam. With inflow to the impoundment of 30.0 cfs (low end of small turbine plus the 5.0 cfs minimum flow) and a $1\frac{1}{2}$ inch drawdown from the top of the flashboards, this lag time would be approximately 7 minutes.

5. The drainage area of Wells River at the project site is 94 square miles. A U.S.G.S. gaging station (#01139000) has been in operation on the Wells River in the Town of Newbury since

August, 1940. Records for this gaging station have been prorated based on drainage areas to estimate the following hydrologic values for the project site:

<u>Parameter</u>	<u>Value (cfs)</u>
Mean flow	133 (19.32 inches)
7Q10	13
95% Exceedance	21
50% Exceedance (Median)	72
10% Exceedance	315

6. The Wells River at the project site is rated Class B by the State of Vermont Water Resources Board. Class B waters are suitable for swimming, recreation, irrigation and agricultural uses; good fish habitat, good aesthetic values, and are acceptable for public water supply with filtration and disinfection.

The Wells River is designated Water Management Type I or II for the protection and management of aquatic life. Dissolved oxygen content of these waters shall not be less than 6 mg/l, and 7 mg/l or greater may be required at and near spawning areas.

Water quality data available from the project site since 1950 and collected at a point immediately upstream of the dam indicates dissolved oxygen concentrations are generally at or near saturation throughout the year. A minimum flow of 5.0 cfs in the bypassed section should be sufficient to maintain water quality standards in the bypass. Any loss of reaeration

potential at the falls would be made up by the steep stream gradient immediately downstream of the project.

7. The Wells River supports a good salmonid fishery including brook trout and brown trout.

8. The Department considers the applicant's proposed minimum flow of 5.0 cfs through the stream bypassed section from the dam to the powerhouse to be adequate to maintain the pools in this reach in a fresh condition. The applicant has agreed to take survey cross sections and stream profiles of this area in order to hydraulically design measures to preserve fish passage capability to and between the pools. The Department finds that this work may reveal that a minimum flow greater than 5.0 cfs will be necessary for fish passage.

The applicant has also agreed to review the condition of measures taken for fish passage to insure that these measures have not been altered significantly by natural conditions. This review would be conducted on an annual basis.

9. The applicant proposes to provide for enhancement of the fish habitat in the tailrace channel. The applicant would work with the Vermont Department of Fish and Game in this effort.

10. Project construction has commenced, and the project is supposed to be operational about mid May, 1984. On December 21, 1983, the Department issued a desilting order in accordance with 10 V.S.A., Section 1272 to cover the erosion and sediment control aspects of these activities. Project construction to

date has consisted of upgrading an existing road for use as an access road for the work area; grubbing the powerhouse and penstock areas; cofferdamming the north channel at the upper and lower ends of the island; drilling, blasting and excavating for the powerhouse foundation; beginning concrete work for the powerhouse; and removing about 20 cubic yards of silt from in front of the headgate at the dam.

On January 12, 1984, the Department approved the use of the cofferdammed area as a temporary siltation basin for water accumulated in the powerhouse excavation area.

By letter dated February 8, 1984, the Department approved the use of a disposal area for excavated and dredged materials. This area is located immediately east of the access road and approximately 240 feet from the north streambank.

11. The applicant has provided the Department with engineering plans for the proposed tailrace configurations and a description of how tailrace construction is to be conducted. The cofferdams on the upper and lower ends of the island would remain in place during construction. All excavated materials will be disposed of in the approved spoil area. A collection sump would be excavated on the upstream side of the lower cofferdam. This area would be a minimum of four (4) feet deep and would serve as a collection and settling pond for water pumped from the excavation area. Following settling, water would be pumped from this sump to a point downstream of the cofferdam but just upstream of the silt fence. Water would be pumped from the surface only.

Conditions

Based on its review, the Department certifies that the proposed facility will not violate Vermont Water Quality Standards provided the following conditions are met:

A. A minimum instantaneous stream flow of 5.0 cfs shall be maintained in the bypassed section from the dam to the tailrace at all times. Before the start of project operation, the applicant shall provide the Department with a description, hydraulic design calculations, and plans for the measure to be used to pass this minimum flow.

The Department shall require a higher minimum flow in the bypassed reach if required under Condition D.

B. The facility shall be operated in a strict run-of-the-river mode where instantaneous outflow below the project tailrace equals instantaneous inflow to the impoundment at all times. When the facility is not operating, all flows shall be spilled at the dam.

C. When the flashboards are in place, the impoundment shall not be drawn down more than 1½ inches from the top of the flashboards without prior written approval by the Department. These flashboards shall be designed to fail during periods of high water. When the flashboards are out, the project shall be operated such that the drawdown does not exceed 1 1/2 inches below the dam crest. Drawdowns in excess of the 1 1/2 inches below the crest are subject to prior written approval by the Department.

During any lag time which may occur following turbine shutdown, a minimum flow of 13 cfs (7Q10) shall be maintained below the project until spillage over the dam occurs. Before the start of project operation, the applicant shall furnish a description, hydraulic design calculations and plans for the method to be used to pass this minimum flow.

D. The applicant shall submit to the Department for review and written approval prior to the start of operation, a study outline and schedule for the design of measures to preserve fish migration in the bypassed section. The applicant shall release an instantaneous flow of 47 cfs (0.5 cfs/square mile) or instantaneous inflow, if less, at the dam until said measures have been approved and completed.

E. The applicant shall submit a plan to the Department of Fish and Game for that Department's review and written approval prior to the start of project operation, to provide for enhancement of fish habitat in the tailrace.

F. Debris associated with project construction and operation shall be disposed of properly. Excavated and dredged material shall be disposed of in the approved spoil area. An isolation distance of 240 feet shall be maintained from the north streambank. This area shall be graded, seeded and mulched following completion of project construction.

G. The applicant shall construct the tailrace according to the plans dated August, 1981 and received by the Department on February 16, 1984. Water pumped from the siltation basin on the upstream side of the downstream cofferdam shall meet a discharge

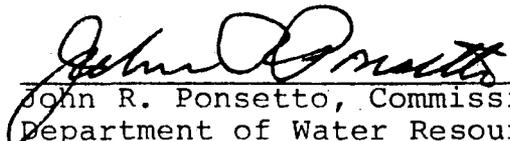
turbidity limit of 10 NTU. The cofferdams at the upper and lower ends of the island shall be removed after tailrace construction is completed, on or before April 1, 1984.

H. All disturbed sites shall be graded, seeded and mulched. The non-bedrock tailrace excavation above tailwater elevation shall be covered with three (3) inches of topsoil, limed and fertilized, and seeded with a conservation mix and mulched. The mulch shall be securely anchored. This work shall be completed as soon as possible following completion of tailrace construction. The Department shall maintain continuing jurisdiction over erosion control practices at the project site.

I. Any desilting of the dam impoundment shall be done in accordance with the Agency of Environmental Conservation's Desilting Policy, a copy of which is attached. The Department shall be contacted prior to any desilting activity.

J. Any significant changes to the project shall be submitted to the Department for prior review and approval.

K. The applicant shall provide the Department with an as-built set of plans for the record.


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

Date at Montpelier, Vermont
this 29 day of FEB, 1984