7-21-86

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

In the matter of: Bethel Mills, Inc.
P.O. Box 61
One North Main Street
Bethel, Vermont 05032
Application for Rehabilitation and Modification of the Existing Bethel Mills 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 December 10, 1985 and filed by Brown, Olson and Wilson on behalf of Bethel Mills, Inc. (the applicant). This application has been supplemented by a copy of the Federal Energy Regulatory Commission (FERC) License exemption application dated December 30, 1985. Additional information on proposed minimum flows, fish passage agreements and project operation was provided by letter dated March 11, 1986 at which point the Department considered the application to be complete. The Department has made the following findings:

1. The applicant proposes to rehabilitate and modify the existing Bethel Mills Hydroelectric project located in the Town of Bethel on the Third Branch of the White River. The dam is 0.5 miles above the confluence of the Third Branch and the main stem of the White River.

2. Existing project features include an ogee spillway concrete gravity dam about 150 feet long and 15 feet high constructed on ledge. The dam has a crest elevation of 552'

NGVD and is fitted with 2 1/2 foot flashboards which together create an impoundment with a surface area of ten acres extending upstream 0.57 mile. The flashboards are in place during the fall and summer months and are used to increase head rather than for storage.

A 75 foot long woodstave penstock diverts flows to a powerhouse which contains two turbines. The larger turbine is a 200 kw 38" Rodney Hunt unit with a maximum capacity of 100 cfs. The smaller turbine is a 110 kw 22" S. Morgan Smith unit with a 60 cfs capacity. Only the larger of the two units has been in operation for the past four years.

The project's tailrace is separated from the streambed by a concrete buttressed wall and discharges into the stream at a point 200 feet downstream of the dam.

3. Project construction consists of improving and repairing the power generation equipment, intake gates, draft tubes and tailrace. No alterations will be made to the dam or streambed. Rock debris will be removed from the tailrace.

The existing turbines will be replaced with two rehabilitated units to provide for approximately 525 kw of installed capacity at a design head of 22 feet. The larger turbine would be an S. Morgan Smith Kaplan unit with a 350 kw capacity and a maximum hydraulic capacity of 230 cfs. The smaller turbine would be an S. Morgan Smith Francis unit with a capacity of 175 kw and an operating range of 25 to 100 cfs.

In addition, the deteriorated condition of the existing penstock may require that the applicant replace the penstock as part of routine maintenance of the existing project as well as for safety considerations. A plan for replacing this penstock will be submitted to the Department for review and approval prior to conducting the work. For the purpose of this certifiction, the Department considers penstock replacement to be routine project maintenance as opposed to construction.

4. The applicant describes the project's present operating mode as run-of-the-river. The project is controlled manually. It is inspected three times a day by the project owner whose office is located just upstream of the dam overlooking the impoundment. The applicant proposes to continue to operate and control the project in the same manner. The applicant has stated that he should be in a position to install automatic flow regulation and pond level sensor devices within five years from the completion of construction. The Department prefers automatic control rather than manual control as project operation can be better regulated.

5. The U.S. Geological Survey (U.S.G.S.) operated a surface water gaging station (#01142000) on the White River in Bethel from 1932 to 1955. Flow values for the project (drainage area 136 square miles) may be estimated based on the gage (drainage area 241 square miles) using a direct proration by drainage area:

Parameter	Value
Mean runoff	279 cfs (27.84 in/yr)
7Q10	19 cfs*
95% Exceedance	33 cfs
50% Exceedance	147 cfs
10% Exceedance	632 cfs

*Flow determined by averaging the cfs/mi^2 value for 7Q10 at gage #01142000 and the U.S.G.S. surface water gaging station (#01144000) on the White River in West Hartford.

6. The Third Branch of the White River from the project downstream to the location of the proposed Bethel Wastewater Treatment Facility outfall on the main stem is designated Class B by the State of Vermont Water Resources Board. Class B waters are of a quality which consistently exhibit good aesthetic value and provide high quality habitat for aquatic biota, fish and wildlife; and are compatible with public water supply with filtration and disinfection; irrigation and other agricultural uses; swimming and recreation.

The Third Branch of the White River is coldwater fish habitat. Dissolved oxygen (D.O.) content of coldwater fish habitat shall not be less than 7 mg/l or 75 percent saturation at all times, nor less than 95 percent saturation during late egg maturation and larval development of salmonids in areas which the Secretary determines are salmonid spawning or nursery areas important to the establishment or maintenance of the fishery resource. The

D.O. content shall not be less than 6 mg/l or 70 percent saturation at all times in all other waters designated as a coldwater fish habitat.

7. The applicant proposes to maintain a minimum flow of 19 cfs at the dam or inflow, if less. This flow would be passed over the dam and through the project's bypass. The applicant describes the bypass as 130 feet of precipitous rock falls with some rock bottom pools in a 10-20 foot area upstream of the tailrace discharge. The Department finds that this flow proposal should be adequate for the preservation of water quality and aquatic habitat in the bypass.

With a strict run-of-the-river operation, there would be no project impact on downstream habitat conditions. Because they would not be operating during inflows less than 44 cfs (7Q10 plus the 25 cfs minimum plant capacity) and spilling 7Q10 at all other times, the chemical water quality, especially dissolved oxygen levels, would be within standards.

The applicant has requested the opportunity to reduce this minimum flow requirement at some time in the future based on specific flow studies conducted by the applicant and with the approval of the Agency of Environmental Conservation and the U.S. Fish and Wildlife Service.

8. The Third Branch of the White River, both above and below the project, supports a native population of brook trout and rainbow trout. In addition, the Connecticut River

Atlantic Salmon Commission has identified the White River as a key element in the Connecticut River Atlantic Salmon Restoration Plan. Facilities to provide passage for upstream migrating salmon and to prevent entrainment and turbine mortality of out-migrating salmon juveniles and kelts as well as other salmonids and provide downstream passage capability will be required. The applicant has agreed to install these facilities.

Conditions

The Department certifies that the project will meet Vermont Water Quality Standards provided the following conditions are met:

A. When available from inflow, a minimum instantaneous flow of 19 cfs shall be maintained over the dam and in the penstock bypassed section of stream at all times.

Before the start of construction, 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.

B. The facility shall be operated in a strict run-of-the-river mode where instantaneous flows below the tailrace shall equal instantaneous inflow to the impoundment at all times. The impoundment shall be maintained at the top of the flashboards when in place or at the dam crest when the boards are removed. The impoundment may not be drawn down below the dam crest without prior approval by the Department. When the facility is not operating, all flows shall be spilled at the dam.

C. During periods of flashboard installation, a minimum flow of 68 cfs, or instantaneous inflow to the impoundment, if less, shall be maintained below the project until Condition B can be met. Measures shall be taken during this period to meet Condition A.

D. The applicant shall install automatic flow regulation and pond level sensor devices within five years

of the completion of project construction. The applicant shall provide the Department with the design details and manufacturer's specifications of these automatic control devices for the Department's review and approval prior to their installation.

E. The applicant shall file for review and written approval, prior to the start of construction, a comprehensive erosion control and water management plan to cover construction activities. This plan shall address the maintenance of stream flow during construction and measures taken to prevent the discharge of sediment, wet concrete, and debris into State Waters to limit adverse impacts on water quality, aquatic habitat and biota. It may be beneficial to consult with the Department during the development of this plan.

F. The applicant shall submit a plan for downstream fish passage to the Department of Fish and Wildlife (Fish and Wildlife) for review and written approval prior to project construction. This plan shall include provisions to:

1) minimize passage of fish into the generating unit(s) if injury or mortality can result;
2) minimize impingement of fish on devices or structures used to accomplish 1); and
3) convey fish safely and effectively downstream of the facility.

The redeveloped project shall not be operated without the approved passage plan in place. The applicant shall

file a copy of the approval letter and any appropriate plans with the Department within two weeks of Fish and Wildlife's action.

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. Debris associated with project construction and operation, including trashrack debris, shall be disposed of properly.

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, including project operation, must be submitted to the Department for prior review and written approval.

K. The applicant shall provide the Department with an as-built set of plans and a copy of the turbine rating curves for the record within one year of the completion of construction.

L. No construction may commence until after the Department has issued written approval under Conditions A, E and J and until Fish and Wildlife has issued written approval under Condition F. Operational changes made after project completion are subject to Condition J and must be approved prior to effecting the change.

M. The applicant shall notify the Department when project construction has been completed. This shall be done in writing within two weeks of completion.

N. If project construction has not commenced within five years of the date of issuance of this certification, the Department shall consider the certification expired.

Dated at Montpelier, Vermont this 21st day of July, 1986.

for Jonathan Lash, Commissioner
Department of Water Resources
and Environmental Engineering

vjb