

Water Quality Certification
(33 U.S.C. §1341)

In the matter of: Central Vermont Public Service Corporation
 77 Grove Street
 Rutland, VT 05701

APPLICATION FOR CARVER FALLS HYDROELECTRIC PROJECT

The Vermont Department of Environmental Conservation (the Department) has reviewed a water quality certification application dated December 7, 2007 and filed by the Central Vermont Public Service Corporation (CVPS, the applicant) for the Carver Falls Hydroelectric Project. The supporting documentation for the application includes the applicant's Federal Energy Regulatory Commission (FERC) license application filed with FERC under a cover letter dated April 22, 1994; the April 21, 1995, New York State water quality certification; the March 4, 1996, FERC Additional Information Request (AIR) response; a settlement agreement between the applicant, New York Rivers United and the New York State Department of Environmental Conservation, dated December 5, 1996 (NYS settlement agreement); the FERC Environmental Assessment (EA) dated March 13, 1997; and a submittal addressing flashboard design filed by e-mail on September 12, 2008.

The current application is subject to review under the Vermont Water Quality Standards adopted by the Water Resources Board on January 25, 2006 (Standards). Standards became effective on February 9, 2006 (Standards, Section 1-01. Applicability and Definitions).

The Department held a public hearing on November 24, 2008 under the rules governing certification and received testimony during the hearing and, as written filings, until November 25, 2008.

The Department, based on the application and record before it, makes the following findings and conclusions.

Findings

Background and General Setting

1. The Carver Falls Hydroelectric Project is located at river mile 3.8 on the Poultney River. In this area, the Poultney River flows east to west, forming the border between New York (to the south) and Vermont (to the north). The interstate boundary is located in the middle of the river channel. The project is located in the towns of West Haven, Vermont and Hampton, New York.
2. The Poultney River drains portions of Rutland County, Vermont and Washington County, New York. The watershed is located at the northern tip of the Taconic Mountain Range where it meets the upper Champlain Valley. Land cover primarily consists of deciduous forest and agricultural land, with several towns and small villages interspersed. Major tributaries include the Castleton River, which rises in the eastern part of the watershed and enters the Poultney River above the project, and the Hubbardton River, which drains the northwestern portion of the

basin and enters the Poultney River downriver from the project. The Poultney River is the southernmost of 32 major Lake Champlain tributaries.

3. Of the Poultney River's 286 square mile watershed, the project utilizes runoff from an area of 186 square miles.
4. The project is currently unlicensed. On September 29, 1988, the Federal Energy Regulatory Commission issued a finding of jurisdiction under the Federal Power Act for the Carver Falls Hydroelectric Project and ordered the applicant to file a license application within 18 months. The applicant appealed the federal decision, which was upheld on subsequent review. The applicant filed its application for an initial license on May 6, 1994. On April 21, 1995, the State of New York issued a water quality certification for the project.

Project and Civil Works

5. Carver Falls was originally developed for hydroelectric power in 1894. The project has experienced numerous physical changes since it was constructed, including an added dam section following the flood of November 1927. The project was developed by the Carver Falls Power Company and acquired by the applicant in 1929.
6. The dam has a total length of 514 feet. It consists of a stone masonry structure with a concrete cap on the north (river right) end. The north spillway is 110 feet long with a fixed crest elevation of 227.8 feet msl. The spillway is topped with 6.0-foot plywood flashboards. The applicant has proposed, in a September 12, 2008 submittal, changing the flashboard design to consist of a 4.0-foot high lower section made of steel topped with a 2.0-foot wooden section constructed with untreated lumber. The southern section of the dam (river left) is a concrete structure consisting of a 215-foot spillway with a fixed crest elevation of 231.8 feet msl, a 10-foot stoplog section, a 6-foot wide by 9-foot high Broome gate, and an intake structure. The south spillway is topped with 1.5-foot hinged steel flashboards.
7. At a normal elevation of 233.3 feet msl, the impoundment extends 2,400 feet upriver. The surface area is approximately 10 acres. The impoundment has a gross storage capacity of 23 acre-feet and a usable storage capacity of 18 acre-feet.
8. The project headworks are located at the left end of the dam. They consist of trashracks with 1.75-inch clear spacing and an electrically-operated 7-foot square Chapman valve. There is a 7.0-foot diameter steel penstock, 300 feet long, that bifurcates into two 150-foot long steel penstocks, 3.0 feet and 4.0 feet in diameter between the dam and the powerhouse.
9. The stone and mortar powerhouse houses two horizontal turbines with a net design head of 115 feet. One turbine, manufactured by S. Morgan Smith, is rated at 1,700 horsepower and has a maximum hydraulic capacity of 162 cfs. The second turbine, manufactured by American Hydro, is rated at 1,250 horsepower at its hydraulic capacity of 92 cfs. The turbines drive 1,050 kW Westinghouse and 800 kW Allis-Chalmers generators, respectively. The normal tailwater elevation is 114.5 feet msl, which is about 19 feet above the normal water level of Lake Champlain.

10. The plant, with its total installed capacity of 1,850 kW, produces an average annual output of 7,351,200 kWh, based on 20 years of data ending in 2007. (Letter from Harriet King, Esq., representing CVPS, to Jeffrey Cueto, Department, November 21, 2008)

River Hydrology and Streamflow Regulation

11. Carver Falls is the only operating commercial-scale hydroelectric project in the Poultney River watershed.
12. There are several dams in the watershed that control the outlets of lakes, including Lake Bomoseen, Sunset Lake, Glen Lake, and Lake Hortonia. Except for Lake Bomoseen Dam, outflow from these dams is not normally manipulated. The applicant formerly owned the dam at Lake Bomoseen and operated it to enhance power production at Carver Falls.
13. The Carver Falls Project operates in a run-of-river mode when inflow is at least equal to the station's minimum hydraulic capacity of 30 cfs. When inflow is less than station capacity, impoundment storage is used to provide peaking power on a daily cycle. Impoundment drawdowns average two feet, but have been as great as nine feet during extreme low flow periods. Leakage at the dam discharges approximately 9.5 cfs into the bypass when the impoundment is at its normal elevation. (EA, p. 5)
14. Since 1928, the U.S. Geological Survey has operated a surface water gaging station (No. 04280000) on the Poultney River 0.4 mile below the Carver Falls Project. The drainage area measured by the gage is 187 square miles, essentially equal to the drainage area of 186 square miles at the Carver Falls dam. The following hydrologic statistics are available based on gage data through water year 2004:

Mean annual flow	259 cfs
Annual runoff	18.84 inches
10 percent exceedance	616 cfs
50 percent exceedance	139 cfs
90 percent exceedance	28 cfs
7Q10	8.2 cfs

Applicant Proposal for Relicensing

15. The applicant proposes to operate the Carver Falls Project in strict run-of-river mode.¹
16. The applicant proposes a continuous release of 18.5 cfs, or inflow, at the dam. This flow would consist of approximately equal parts of leakage and spillage.

¹A true run-of-river project is one which does not operate out of storage and, therefore, does not artificially regulate streamflows below the project's tailrace. Outflow from the project is equal to inflow to the project's impoundment on an instantaneous basis. The flow regime below the project is essentially the river's natural regime, except in special circumstances, such as following the reinstallation of flashboards and project shutdowns. Under those circumstances, a change in storage contents is necessary, and outflow is reduced below inflow for a period.

17. All flows would be released at the dam when inflow is less than 48 cfs, the minimum hydraulic capacity of the station (30 cfs) plus the 18.5 cfs release at the dam.
18. The 6-foot-high flashboards are removed for replacement at approximately 5-year intervals. These flashboards also occasionally fail under high-flow surcharges of about two feet. As discussed above, the flashboards have been redesigned to incorporate a steel lower section; the change in design is intended to reduce the frequency of replacement. Project operation would deviate from true run-of-river mode when the flashboards are being replaced.
19. The hinged, steel flashboards on the southern spillway typically are upright from early May into the fall. They are laid down during the winter and raised following spring runoff.
20. The applicant has proposed the following procedure for operation during flashboard replacement or maintenance. Bypass flows would be maintained by opening the Broome gate and one or both turbines would be used to draw the impoundment to slightly below the dam crest. Once the flashboards have been replaced, turbine discharge will be adjusted to maintain 90 percent of inflow below the tailrace, converting 10 percent to storage until the impoundment is refilled. Once water again spills over the flashboards, the Broome gate will be closed.

Standards Designation

21. The applicable 2006 Vermont Water Quality Standards (Standards) were promulgated by the Vermont Water Resources Board pursuant to 10 V.S.A., Chapter 47, Water Pollution Control. Section 1252 of the chapter provides for the classification of State waters as either Class A or Class B and authorizes the adoption of standards of water quality to achieve the purpose of classification.
22. The Poultney River has been designated by the Vermont Water Resources Board as Class B waters.
23. Class B waters are managed to achieve and maintain a high level of quality compatible with certain beneficial values and uses. Values are high quality habitat for aquatic biota, fish and wildlife and a water quality that consistently exhibits good aesthetic value; uses are public water supply with filtration and disinfection, irrigation and other agricultural uses, swimming, and recreation. (Standards, Section 3-04(A) *Class B Waters: Management Objectives*)
24. The waters of the Poultney River from its headwaters to Carver Falls are designated coldwater fish habitat for the protection and management of fisheries. From Carver Falls to the river's confluence with Lake Champlain, the river is designated warmwater fish habitat for the protection and management of fisheries. (Standards, Section 3-05. *Fish Habitat Designation*)
25. In Class B waters, the dissolved oxygen standard for coldwater fish habitat streams is not less than 7 mg/l and 75 percent saturation at all times, nor less than 95 percent saturation during late egg maturation and larval development of salmonids in areas that the Secretary determines are salmonid spawning or nursery areas important to the establishment or maintenance of the fishery resource. At all times in all other waters designated as a coldwater fish habitat, the standard is not less than 6 mg/l and 70 percent saturation. In Class B waters designated as

warmwater fish habitat, the standard is not less than 5 mg/l and 60 percent saturation.
(Standards, Section 3-04(B)(2) *Water Quality Criteria for Class B waters: Dissolved Oxygen*)

26. The temperature standard for coldwater fish habitat limits increases to 1.0°F from ambient conditions, or background. For warmwater fish habitat, the temperature standard limits increases from 1.0-5.0°F, depending on ambient temperature. (Standards, Section 3-01(B)(1) *General Criteria: Temperature*)
27. The turbidity standard is 10 NTU for coldwater fish habitat and 25 NTU for warmwater fish habitat. (Standards, Section 3-04(B)(1) *Water Quality Criteria for Class B waters: Turbidity*)
(The Department notes that this section was amended on January 1, 2008)
28. Under the Class B criterion for aquatic biota, wildlife and aquatic habitat, the Standards require “[n]o change from the reference condition that would prevent the full support of aquatic biota, wildlife, or aquatic habitat uses. Biological integrity is maintained and all expected functional groups are present in a high quality habitat. All life-cycle functions, including overwintering and reproductive requirements are maintained and protected.” As the Poultney River has not been assigned a water management type, the criterion is “no change from reference conditions that would have an undue adverse effect on the composition of the aquatic biota, the physical or chemical nature of the substrate or the species composition or propagation of fishes.”
(Standards, Section 3-04(B)(4) *Water Quality Criteria for Class B waters: Aquatic Biota, Wildlife and Aquatic Habitat*)
29. The Hydrology Policy requires that “[t]he proper management of water resources now and for the future requires careful consideration of the interruption of the natural flow regime and the fluctuation of water levels resulting from the construction of new, and the operation of existing, dams, diversions, and other control structures.” (Standards, Section 1-02(E)(1) *General Policy: Hydrology Policy*) For Class B waters, “[a]ny change from the natural flow regime shall provide for maintenance of flow characteristics that ensure the full support of uses and comply with the applicable water quality criteria.” (Standards, Section 3-01(C)(1) *Hydrology Criteria: Streamflow Protection*)
30. The Anti-Degradation Policy provides for protection of existing uses and high quality waters. (Standards, Section 1-03. *Anti-Degradation Policy*) Based on the analysis and conclusion set forth below, the Department finds that there will be no new or increased activity that will significantly affect water quality, but rather the proposed operations will improve water quality in the project area. Therefore, no additional analysis pursuant to Section 1-03 is warranted.

Present status

31. On September 24, 2008, the USEPA approved a list of waters considered to be impaired based on water quality monitoring efforts. The list was submitted by the Department under Section 303(d) of the Federal Clean Water Act. On prior lists issued through 2006, the Poultney River from Carver Falls downstream to its mouth was listed as impaired for fish consumption due to elevated levels of mercury in the tissue of walleye. This reach of the Poultney River downstream of Carver Falls is no longer listed due to approval by EPA (on December 20, 2007) of a regional TMDL for mercury.

32. The Department issued a six-part list, *List of Priority Surface Waters Outside the Scope of the Clean Water Act Section 303(d)* in 2008. Part F lists those surface waters where water quality or habitat is being impacted by flow regulation. The reach from Carver Falls to the mouth of the river is listed due to artificial flow regulation by the project.
33. On April 21, 1995, the New York State Department of Environmental Conservation issued a water quality certification as part of this licensing proceeding. The decision was appealed by the Vermont Natural Resources Council and New York Rivers United, both of which withdrew the appeals under the terms of a settlement agreement (NYS settlement agreement), which was reached on December 5, 1996. The NYS settlement agreement included: 1) a bypass conservation flow of 50 cfs to support spring walleye spawning (April 1 through May 15); 2) improved parking and site access; 3) certain special aesthetic flow releases into the bypass; and 4) creation of the Carver Falls Advisory Council. By letter dated December 13, 1996, the New York State Department of Environmental Conservation modified its certification in accordance with the NYS settlement agreement.

Outstanding Resource Water Designation

34. On June 28, 1991, the Water Resources Board designated the lower Poultney River an Outstanding Resource Water (ORW) because of its exceptional natural, cultural and scenic values. (Vermont Water Resources Board; Finding of Fact, Conclusions of Law and Order; Poultney River Outstanding Resource Water, Docket No. 90-01, June 28, 1991) The designation affects approximately 22 miles of the Poultney River mainstem from the Poultney-Fair Haven town line to Lake Champlain. This reach includes the project.
35. In cases where ORWs have been so designated because of their water quality values, "their existing water quality shall, at a minimum, be protected and maintained." (Standards, Section 1-03(D) *Protection of Outstanding Resource Waters*)

Water Chemistry

36. Wastewater treatment plants at Castleton, Poultney and Fair Haven discharge into the Poultney and Castleton rivers, providing an organic loading of pollutants that reduces dissolved oxygen levels during the decay process. The watershed also contributes substantial organic and nutrient loadings from natural and other cultural (land use) sources.
37. The applicant measured dissolved oxygen concentrations in 1992 at four locations: head of the impoundment, bypass, tailrace, and downstream. The results from the station at the head of the impoundment showed that the dissolved oxygen standard for coldwater fish habitat was not met on one occasion, and met on three others. The dissolved oxygen concentrations of a majority of the samples ranged from 6.8-7.2 mg/l, while two samples had a concentration of 8.0 mg/l. (*1992 Pre-dawn Dissolved Oxygen Sampling - Carver Falls Hydroelectric Generation Facility, License Application, Appendix G*).

Aquatic Biota and Habitat

38. Class B waters are managed to provide high quality habitat for aquatic biota (Standards, Section 3-04(A) *Class B Waters: Management Objectives*). Aquatic biota are defined as "organisms that spend all or part of their life cycle in or on the water." (Standards, Section 1-01(B) *Definitions*) Included, for example, are fish, aquatic insects, amphibians and some reptiles, such as turtles.
39. The Poultney River supports a diverse fish population that includes both coldwater and warmwater species. Walleye, brown trout, rainbow smelt, eastern sand darter (threatened in Vermont and New York), channel darter (endangered in Vermont), log perch, blackchin shiner, bridal shiner, and silver redhorse are some of the fish found below the Carvers Falls Project. The latter three species, while not listed as threatened or endangered, are considered rare in Vermont.
40. The reach of the Poultney River from the plunge pool at Carver Falls downstream for approximately 1,600 feet provides the prime walleye spawning habitat in the Poultney River. It is characterized primarily by a rocky substrate, unlike the majority of the remainder of the lower river, which has substrate consisting of sand and silt. Its use has been documented by Agency of Natural Resources (ANR or Agency) biologists. The primary value of the plunge pool is resting habitat for walleye.
41. There is a very diverse mussel community below Carver Falls consisting of eleven identified species, including several which are threatened or endangered in Vermont.

Flow Needs for Protection of Aquatic Habitat

42. Flows discharged below the project will essentially be unregulated, except during impoundment refilling following flashboard reinstallation.
43. A natural flow regime below the project tailrace will provide spawning and incubation habitat for walleye and rainbow smelt in the spring, and habitat for other fish and macroinvertebrates.
44. With adequate flows, the bypass reach can provide habitat for walleye spawning and incubation, brown trout, and other fishes and macroinvertebrates.
45. ANR staff participated in a flow demonstration at the project bypass in 1993. The purpose of the demonstration was to assess the amount of bypass flow needed to provide quality fish habitat in the lower plunge pool and the riffle between the pool and the tailrace and to maintain a zone of passage allowing fish to move up into the lower plunge pool from downstream of the project. Flows of 11.4 cfs, 18.5 cfs, and 26.3 cfs were observed.
46. At 26.3 cfs, there was good water circulation in the lower plunge pool. At this flow, the riffles below the plunge pool appeared to provide good habitat and to be passable for upstream and downstream movement of fish. At 18.5 cfs, the pool level had dropped from the higher flow and less water circulation was visible, and the riffle areas below the pool were very shallow, but appeared to be passable to fish. At 11.4 cfs the pool appeared stagnant and the riffle areas were very shallow with much less wetted area available as habitat or for fish movement. Hydraulic controls in the riffle area produced drops that may inhibit upstream fish movement.

Impoundment

47. Fisheries habitat that was formerly riverine has been impounded by the dam. The limited depth of the impoundment and its small volume relative to the size of the contributing drainage assure that thermal stratification does not occur. The impoundment provides habitat for warmwater species.

Fish Passage and Movement

48. Historically, migratory fish from Lake Champlain ascended many of its tributaries to access spawning waters. To meet the goals of the bi-state plan for the development of the Lake's salmonid fishery (*A Strategic Plan for Development of Salmonid Fisheries in Lake Champlain*, NYS Department of Environmental Conservation, October 4, 1977), upstream and downstream passage provisions are being sought at dams on certain Lake Champlain tributaries. In Vermont, the Winooski River is included in this effort; however, this initiative has not been extended to the Poultney River as the other tributaries present a better opportunity for coldwater fish spawning.

Wildlife and Wetlands

49. Several Class Three wetlands are located adjacent to the project impoundment. The total wetland area is approximately 4.4 acres.
50. An area of fringe emergent wetland, totaling approximately 1.1 acres in area, is located below steep banks on the north shore adjacent to a small tributary. This area is dominated by joe-pye weed, purple loosestrife, arrow arum, sedges, and rushes.
51. Silt deposits on the south bank, just upstream of the dam, have been colonized by cattails, reed canary grass, purple loosestrife, soft rush, and arrowhead to create a 0.9 acre wetland. Along the gradually sloping shoreline in this area is a 0.3 acre wetland dominated by shrub species including, black willow, green ash, dogwood, and speckled alder.
52. Three islands in the impoundment are dominated by emergent and woody wetland species. The total area of the island wetlands is approximately 2.1 acres.

Rare and Endangered Species and Outstanding Natural Communities

53. The Vermont Endangered Species Law (10 V.S.A. §§5401 to 5403) governs activities related to the protection of endangered and threatened species.
54. The bald eagle (*Haliaeetus leucocephalus*) is known to utilize habitat in the Poultney River corridor. This species is listed as federally threatened and state endangered.
55. Seven species of mussels that are listed as state threatened or endangered have been found in the Poultney River downstream of Carver Falls. The endangered species are: cylindrical papershell (*Anodontoidea ferussacianus*), pocketbook (*Lampsilis ovata*), fluted-shell (*Lasmigona costata*),

fragile papershell (*Leptodea fragilis*), black sandshell (*Ligumia recta*), and pink heelsplitter (*Potamilus alatus*). The giant floater (*Pyganodon grandis*) is listed as threatened.

56. Two state-listed fish species have been found in the Poultney River below the project. They are the threatened eastern sand darter (*Ammocrypta pellucida*) and endangered channel darter (*Percina copelandi*).

Shoreline Erosion

57. Soils in the Carver Falls area include Vergennes clay and Windsor loamy sand-Oakville loamy sand (USDA soils classification). These soils are deep and moderately well-drained to excessively drained.
58. The impoundment shoreline is entirely vegetated. The cover consists of mixed forest (85 percent), cattail marshes (10 percent), and perennial grasses (5 percent).
59. The applicant conducted a shoreline erosion survey of the impoundment. There were several locations where evidence of bank undercutting or ice scouring was found. Four areas were identified as having a higher erosion potential. Two areas totaling approximately 500 feet are located on the left bank adjacent to the dam. The two remaining areas, 200 and 350 feet long, are located along the right bank.

Recreational Use

60. Recreational use of the Poultney River in the vicinity of Carver Falls consists largely of fishing, canoeing, wildlife observation, and scenic appreciation. Existing recreational features and facilities at the project site are located on the New York side of the river. They include a small parking area adjacent to the dam; an unmarked trail leading from the meadow area to two lookout points (the penstock overlook and the promontory); a steep unmarked foot trail leading to the river downstream of the powerhouse; and an abandoned forest road that is currently used as a portage from the impoundment but does not provide vehicle access to drop-off boats.
61. Improvements to the recreation facilities proposed by the applicant include parking area improvements, establishment of a canoe portage trail to the impoundment upstream of the dam, an improved penstock lookout platform, interpretive signage at the powerhouse, a canoe drop-off road and downstream river access, picnic tables, and directional signage. The applicant also proposes to provide sign-in sheets for visitors to monitor recreational use.
62. The promontory is a ledge outcrop below the penstock that provides the most easily accessible view of the lower falls and the best out-of-channel view of the upper falls. Historically, it appears that the promontory was modified to provide viewing and now is maintained by users to some degree for that same purpose. The applicant proposes to continue its past practice of allowing, but not encouraging, continued access to this location.

Aesthetics

63. *The Waterfalls, Cascades and Gorges of Vermont* report (1985) describes Carver Falls as the largest falls in both height and width in Vermont. Carver Falls may be the only horseshoe-shaped falls in Vermont. Specifically, the report states:

The site itself – an abrupt ravine with sharp crests incised below the level of the surrounding country – is the sort of feature that develops in areas with fairly soft bedrock and hence, is not typical of Vermont... The natural part of the site consists of a double falls: looking down from the dam, there is a horseshoe-shaped falls (the only one in Vermont?) about 250-300 feet across by 50 feet high. This concentrates the water into a steep chute about 100 feet long, where it then goes over a second falls about 100 feet wide by 60 feet high. At the bottom there is a pool about 50 feet across, after which the river makes a sharp turn, goes through a rocky gorge about 30 feet wide at the bottom with walls from 20-80 feet high, and then into a wider portion of the channel. The gorge is what is called a “shut-in” in the midwest: a narrow rock-walled gorge abruptly incised into generally flatter land.

64. The falls are of limestone bedrock and consist of four distinguishable sections: the spillway, the cascades below the spillway and above two abandoned penstocks, the two falls (upper falls) that discharge into an intermediate pool, and the lower falls, which discharges into the large plunge pool noted above as walleye resting habitat. There are at least four areas from which various sections of the falls can be viewed: the penstock overlook (the platform on the existing penstock below the intake), the promontory, the falls proper, and from river left at the plunge pool outlet. The access to the pool outlet site requires passage through the powerhouse or access by boat from downstream. Viewing points are also available from the Vermont side by hiking in across private land or walking across the falls from the New York side.
65. The lower falls contains solution cavities through which the water flows and reemerges in the large plunge pool at the base of the falls. Under low flow conditions, no water spills over the lower falls, even with the hydroelectric station off line.
66. The abandoned steel penstock sections span the falls just below the upper cascade section. These penstocks partially block views of the cascades above the upper plunge pool. Under the terms of the NYS settlement agreement, the penstock sections and associated concrete cradles will be removed; the old stone cradles will remain.
67. A one-day flow demonstration was conducted by the applicant on December 4, 1995. Flows spilling 1 inch, 2 inches, and 3 inches were targeted for documentation, along with an identification of the threshold flow that provides the first spillage over the lower falls. Corresponding flows were metered at a transect below the lower plunge pool. The demonstration flows were documented with still photographs and videotape.
68. The demonstration study was documented in the report, *Visual Aesthetic Review of Three Flows from the Carver Falls Hydroelectric Project*, prepared by landscape architect Elizabeth Courtney. The report describes the condition of the falls at three locations under controlled flow releases of 1 inch, 2 inches and 3 1/4 inches (metered at 21 cfs, 45 cfs, and 81 cfs, respectively,

including dam leakage) over the left spillway. After viewing the 3 1/4 inch spill, the applicant reduced spillage to 2 1/2 inches² to identify the threshold flow for spillage over the lower falls.

State Comprehensive River Plans

69. The Agency, pursuant to 10 V.S.A. Chapter 49, is mandated to create plans and policies under which Vermont's water resources are managed and uses of these resources are defined. The Agency must, under Chapter 49 and general principles of administrative law, act consistently with these plans and policies whenever possible.

Hydropower in Vermont, An Assessment of Environmental Problems and Opportunities (May 1988)

70. The Department publication *Hydropower in Vermont, An Assessment of Environmental Problems and Opportunities* is a state comprehensive river plan. The hydropower study, which was initiated in 1982, indicated that hydroelectric development has a tremendous impact on Vermont streams. Artificial regulation of natural stream flows and the lack of adequate minimum flows at the sites were found to have reduced to a large extent the success of the state's initiatives to restore the beneficial values and uses for which the affected waters are managed.
71. With respect to the Carver Falls Project, the plan included recommendations that minimum flows should be required, the old penstock should be removed, and silt releases should be avoided. The plan also recommended studies of the project's impact on water quality, bypass fish habitat, and potential recreational development. These issues have been considered in the Department's current review.

Vermont Agency of Natural Resources Management Plan for the Lower Poultney River – A Vermont Outstanding Resource Water (August 1992)

72. The Agency of Natural Resources, with extensive public involvement, completed a comprehensive river plan for the Lower Poultney River. The plan, entitled *Vermont Agency of Natural Resources Management Plan for the Lower Poultney River – A Vermont Outstanding Resource Water* defines the following management goal:

For that portion of the Lower Poultney River within Vermont borders, the State will seek to manage certain activities affecting the water quality, flows, course, current, and cross section of the Lower Poultney River to preserve and enhance the exceptional natural, cultural, scenic, and recreational values of the river and river corridor..."

73. This plan formed part of the basis for the Water Resources Board's designation of the Lower Poultney River (from the Poultney-Fair Haven town line to Lake Champlain) in 1991 an Outstanding Resource Water for its exceptional natural, cultural and scenic values.

²The applicant estimated the total flow with 2 1/2 inches of spillage at 57 cfs (45 cfs spilled). Unlike the other flows, this flow was only estimated using the weir equation. A small amount of flow, estimated at 3 cfs, cascaded over the lower falls during the 57 cfs flow.

74. Although the Department had recommended including recreation value in its designation, the Board elected not to include it. It concluded that it had not received sufficient evidence, although it did note that there is “exceptional canoeing for those seeking privacy and wildlife observation and [that] the river is important for its diversity of game fish, especially below Carver Falls...”

1993 Vermont Recreation Plan

75. The 1993 Vermont Recreation Plan (Department of Forests, Parks and Recreation), through extensive public involvement, identified water resources and access as top priority issues. The planning process disclosed that recreational use of surface waters is increasing, resulting in greater concern about water quality, public access to Vermont’s waters, and shoreland development.

76. The plan’s Water Resources and Access Policy is:

It is the policy of the State of Vermont to protect the quality of the rivers, streams, lakes, and ponds with scenic, recreational, cultural and natural values and to increase efforts and programs that strive to balance competing uses. It is also the policy of the State of Vermont to provide improved public access through the acquisition and development of sites that meet the needs for a variety of water-based recreational opportunities.

77. The applicant proposes to provide continued access to the river in the project area. This access and improved aesthetic and bypass flows would be compatible with this policy and balance the competing uses of recreation and hydropower. Failure to provide access would exacerbate a critical state recreational problem.

78. Another priority issue identified in the Recreation Plan is the loss or mismanagement of scenic resources. The plan notes “[t]he protection of the scenic and visual resources in Vermont is paramount if Vermont is to maintain its renowned charm and character.”

79. The Scenic Resources Protection and Enhancement Policy in the Recreation Plan is:

It is the policy of the State of Vermont to initiate and support programs that identify, enhance, plan for, and protect the scenic character and rural traditions of Vermont.

Analysis

Water Chemistry

80. Available water quality sampling by the applicant indicates that the dissolved oxygen standard for coldwater fish habitat may not be met upstream of the impoundment. The applicant proposes to spill 9.0 cfs, or inflow, at the dam, which will provide some reaeration. Further, when flows recede to 48.5 cfs, the minimum plant capacity of 30 cfs plus the 18.5 cfs (spill and leakage) in the bypass, the project would suspend operation in order to maintain the run-of-river conditions, and all inflows would be released at the dam. Consequently, under summer low flow conditions, all flows would be released at the dam, and water quality would benefit from reaeration through

the bypassed reach. Additional enhancement of downstream dissolved oxygen levels would occur with the maintenance of bypass flows necessary to support habitat and aesthetics. Finally, the Poultney River downstream of Carver Falls is managed for warmwater fish habitat, which has a lower dissolved oxygen standard than the upstream, coldwater-habitat reach.

Flow and Water Level Management

Habitat Protection – Downstream

81. Run-of-river operation will provide aquatic habitat and wetland protection below the project.
82. During periods when the impoundment is refilled following flashboard replacement, adequate flows must be provided to protect downstream habitat.

Habitat Protection – Bypass

83. Adequate bypass flows must be provided to address year-round habitat needs and enable fish movement between the plunge pool and the reach below the project. The observation flow of 26.3 cfs provides higher quality habitat and a better passage zone for fish moving between the plunge pool and the below-project reach than the flow of 18.5 cfs. The 18.5 cfs flow provides minimally acceptable conditions in the bypass for fish habitat and movement, but is deemed adequate given the limited length of the bypass and the restoration of habitat under the proposed run-of-river operation. As discussed below, however, special spring flows will be necessary to support walleye propagation.
84. The reach from the lower plunge pool to below the tailrace can provide excellent habitat for walleye spawning and incubation, provided there are adequate flows during the spawning season (April 1 to May 15). Adult fish may use the lower plunge pool for resting, so there must be sufficient water depth to allow them to move through this reach. A water depth of 18 inches in the bypass allows adult fish to move over the hydraulic controls and reach the plunge pool. This water depth also provides some, but not optimal, spawning and incubation habitat. Given the limited length of the bypass and the improved habitat conditions below the project provided by run-of-river operations, a bypass water depth of 18 inches will provide adequate habitat conditions during the walleye spawning season. Based on data collected during the aesthetic flow study conducted in December 1995, a flow of 50 cfs will provide this depth. This flow will be provided under the terms of the NYS settlement agreement.

Habitat Protection – Impoundment

85. The wetlands adjacent to the impoundment are significant for shoreline stabilization and wildlife habitat. In addition, the shoreline wetlands contribute to maintaining the surface water quality of the Poultney River in the impoundment. The project is proposed to be operated in run-of-river mode, so frequent impoundment fluctuations will be avoided. Some water level fluctuations will occur during periods of failure and replacement of the 6-foot flashboards and when the hinged 1.5-foot flashboards are lowered. Infrequent changes in impoundment elevation caused by dropping or raising the 1.5-foot-high flashboards or replacing the 2.0-foot wooden section of the 6-foot flashboards does not significantly compromise wetland habitat or

exacerbate shoreline erosion. Large-scale drawdowns caused by damage to the 6-foot flashboards or replacement of the lower steel section of the 6-foot flashboards will cause substantial loss of impoundment habitat and the potential for a sediment release downstream; however, the applicant indicates that the modified design will reduce the frequency of these drawdowns to intervals of 5 years or longer.

Aesthetics

86. Aesthetics is an important consideration at Carver Falls due to the statewide significance of the site, its unique character, and the ready accessibility to the public.
87. The dam is highly visible from downstream vantage points. This area is accessible to the public, which uses the river for swimming, fishing, and general enjoyment of the water. A veil of water flowing over the dam is important for aesthetic purposes, as well as providing certain water quality benefits. To the extent feasible given the leakage conditions at the dam, at least 1.0 inch of spillage (about 15 cfs) should be maintained over the south spillway to provide the veil of water, and the remainder or bypass flows can be discharged via a gate release. Sufficient water should be released into the bypass to provide a veil of water over the New York spillway, cascade attractively over the double upper falls, and visibly spill over the lower falls.
88. At bypass flows below about 55 cfs, no water flows over the lower falls. Of those flows that were observed during the aesthetics flow demonstration, 81 cfs is the minimum flow that would provide visible spill over the lower falls.
89. The NYS settlement agreement addressed aesthetic flow releases. The agreement calls for the applicant to provide a flow over the south spillway of 2.5 inches (or inflow, if less) on Memorial Day, Independence Day, Labor Day, Columbus Day and every Sunday during the months of July and August, commencing at 9:00 a.m. and continuing through the daylight hours.

Conclusions

90. Run-of-river operation will be necessary to protect impoundment and downstream habitat. A limited deviation from run-of-river may occur when the impoundment is being refilled following flashboard replacement or a maintenance drawdown. To address this issue, this certification is being conditioned to require that 90 percent of inflow be released downstream during refill periods.
91. Adequate bypass flows will be needed to provide high quality aquatic habitat in that reach. Based on the current record, this objective can be met by providing, from May 16 to March 31, a minimum bypass flow of 18.5 cfs and, from April 1 to May 15, a minimum bypass flow of 50 cfs (the latter to support walleye spawning and incubation and access to the plunge pool at the base of the falls).
92. Another flow management objective is support of aesthetics by providing a veil of water over the south spillway and flows over the upper and lower falls during periods when public use of the falls area is likely to be higher. The NYS settlement agreement addresses aesthetics flows.

93. Implementing the proposed redesign of the existing 6-foot plywood flashboards will be necessary to limit potential standards violations caused by flashboard failure or maintenance and replacement activities.
94. Precise control of the impoundment elevation will be necessary to consistently provide the required flows over the spillway.
95. By condition of this certification, the applicant shall be required to maintain run-of-river operation and provide bypass flows as described above by spilling water over the south spillway.

Fish Passage

96. In accordance with *A Strategic Plan for Development of Salmonid Fisheries in Lake Champlain* (NYS Department of Environmental Conservation, October 4, 1977), neither upstream nor downstream fishways are considered necessary at Carver Falls.

Recreation

97. Vermont Water Quality Standards require the protection of existing water uses, including the use of water for recreation. Standards also requires the management of the waters of the State to protect, maintain, and improve water quality. (Standards, Section 1-03. *Anti-Degradation Policy*)
98. Uses for which Class B waters are managed include water that exhibits good aesthetic value and swimming and recreation. (Standards, Section 3-04(A) *Class B Waters: Management Objectives*)
99. The applicant will provide continued public access to the project area and has proposed several recreational improvements. The proposed improvements will enhance the existing uses of fishing, canoeing, wildlife observation and scenic appreciation.
100. Allowing continued access to the promontory will enable visitors to continue to be able to view both the upper and lower falls, a long-standing public use at the site. Improvements to the access to the promontory should be limited to those necessary to avoid erosion or other resource impacts and address public safety.
101. By condition of this certification, the applicant shall be required to provide continued public access to the area and to develop a recreation plan, subject to review and approval by the Department.
102. The NYS settlement agreement establishes the Carver Falls Advisory Council "[i]n order to keep abreast of changing conditions that may affect the Carver Falls site..." The Council will be comprised of the New York State Department of Environmental Conservation, the applicant, the Vermont Natural Resources Council, and New York Rivers United.

Erosion

103. Erosion, if severe, can impair recreational use and cause turbidity and the discharge of suspended solids, potentially violating the standards for those parameters. (Standards, Section 3-03(B)(1) *Turbidity* and Section 3-01(B)(5) *Settleable solids, floating solids, oil, grease, scum, or total suspended solids*) Several eroding areas along the impoundment were identified during the applicant's shoreline erosion survey. However, run-of-river operation should mitigate any contribution of project operation to this problem.
104. Recreational use of project lands may cause some localized erosion. Proper recreation planning limits the risk of significant erosion, but the Department will maintain continuing jurisdiction over this issue and require modifications where found necessary to abate erosion.

Debris

105. The applicant does not provide information on the handling and disposal of trashrack debris and other project related debris. The depositing or emission of debris and other solids to state waters violates the state solid waste laws and Standards, Section 3-01(B)(5) *Settleable solids, floating solids, oil, grease, scum, or total suspended solids*. Debris may also impair aesthetics and boating. A debris disposal plan is being required as a condition of this certification.

Decision and Certification

Based on its review of the applicant’s proposal and the above findings, the Department concludes that there is reasonable assurance that operation and maintenance of the Carver Falls Hydroelectric Project as proposed by the applicant and in accordance with the following conditions will not cause a violation of Vermont Water Quality Standards and will be in compliance with sections 301, 302, 303, 306, and 307 of the Federal Clean Water Act, 33 U.S.C. §1251 et seq., as amended, and other appropriate requirements of state law:

- A. **Compliance with Conditions.** The applicant shall operate and maintain this project consistent with the findings and conditions of this certification, where those findings and conditions relate to protection of water quality and support of designated and existing uses under Vermont Water Quality Standards and other appropriate requirements of state law.
- B. **Flow Management.** Except as allowed in Condition C below, the facility shall be operated in a true run-of-the-river mode where instantaneous flows below the tailrace shall equal instantaneous inflow to the impoundment at all times. When the facility is not operating, all flows shall be spilled at the dam. Bypass flows shall be maintained in accordance with the following table.

Period	Bypass Flow Release (cfs)
May 16 – March 31	18.5
April 1 – May 15	50
<p>The bypass flow release is the value listed above or instantaneous inflow, if less.</p> <p>Bypass conservation flows, except for uncontrolled leakage, shall be released as full crest spillage over the south spillway section. Except during the aesthetic flow release periods noted below, any portion of the flow that would exceed 1.0 inch of spillage may be routed through a gate. The full crest spillage requirement does not apply during the period November through March.</p> <p>Aesthetics flow releases consisting of no less than 2.5 inches of spillage (or inflow, if less) over the south spillway shall be provided on Memorial Day, Independence Day, Labor Day, Columbus Day and every Sunday during the months of July and August. The flow release shall commence at 9:00 a.m. and continue through the daylight hours.</p>	

- C. **Flow Management during Impoundment Refill.** During refilling of the project impoundment after flashboard replacement, an approved dam maintenance operation or an emergency drawdown, the applicant shall release at least 90 percent of instantaneous inflow below the

project. While the impoundment is being refilled, bypass flow requirements shall be met at all times.

- D. **Flow Management Plan.** The applicant shall develop and file with the Department a flow management plan detailing how the project will be operated to comply with the conservation flow and impoundment fluctuation limitations described above. The plan shall include information on how the project will be managed to control lag times and avoid related non-compliance with the conservation flow requirements. The plan shall be subject to Department review and approval. The Department reserves the right of review and approval of any material changes made to the plan.
- E. **Monitoring Plan for Impoundment and Flow Management.** The applicant shall develop a plan for continuous monitoring and reporting of flow releases at the project (spillage and turbine discharge), impoundment levels, flashboard status and inflows. The plan shall include procedures for reporting deviations from prescribed operating conditions to the Department, explaining the reasons for those deviations and indicating measures to be taken to avoid recurrences. The applicant shall maintain continuous records of flows and impoundment levels and provide such records on a regular basis as per specifications of the Department. The plan shall include a provision for the inclusion of contemporaneous records from the U.S. Geological Survey gage (Poultney River below Fair Haven, Vermont, Gage No. 04280000) located below the project powerhouse. The applicant shall fund the gage in order to facilitate compliance monitoring and to furnish data for quality control purposes. The plan shall be developed in consultation with the Department and the U.S. Fish and Wildlife Service. The plan shall be subject to Department review and approval. The Department reserves the right of review and approval of any material changes made to the plan.
- F. **Turbine Rating Curves.** The applicant shall provide the Department with a copy of the turbine rating curves, accurately depicting the flow/production relationship, for the record within one year of the issuance of the license.
- G. **Flashboards.** The applicant shall replace the 6-foot plywood flashboards on the north spillway with a new system consisting of a lower 4.0-foot steel section and an upper 2.0-foot section of untreated lumber, or an alternate design approved by the Department and meeting the objective of reducing the incidence of large scale impoundment drawdowns. The final design and implementation schedule shall be filed with the Department within 60 days of the issuance of the license, and shall be subject to Department review and approval. The modified system shall be in place within two years of license issuance.
- H. **Debris Disposal Plan.** The applicant shall develop a plan for proper disposal of debris associated with project operation, including trashrack debris. The plan shall be developed in consultation with the Department and shall be subject to Department review and approval. The Department reserves the right of review and approval of any material changes made to the plan at any time.
- I. **Maintenance and Repair Work.** Any proposals for project maintenance or repair work, including drawdowns below the fixed dam crest to facilitate repair/maintenance work, shall be filed with the Department for prior review and approval, if said work may have a material

adverse effect on water quality or cause less-than-full support of an existing use or a beneficial value or use of State waters.

- J. **Public Access.** The applicant shall allow public access to the project lands for utilization of public resources, subject to reasonable safety and liability limitations. Such access shall be prominently and permanently posted so that its availability is made known to the public. Any proposed limitations of access to State waters to be imposed by the applicant shall first be subject to written approval by the Department. In cases where an immediate threat to public safety exists, access may be restricted without prior approval; the applicant shall so notify the Department and shall file a request for approval, if the restriction is to be permanent or long term, within 14 days of the restriction of access.
- K. **Abandoned Penstocks.** The applicant shall remove the concrete cradles and the section of abandoned steel penstocks between the last stone cradle and the river embankment following full consultation with the Vermont Division for Historic Preservation and within two years of the issuance of the license.
- L. **Recreational Facilities.** Recreational facilities shall be constructed and maintained consistent with a recreation plan approved by the Department. The plan shall include a provision to allow but not encourage access to the promontory. The plan shall be filed with the Department within one year of license issuance and shall include an implementation schedule. Where appropriate, the recreation plan shall include details on erosion control. The plan shall be updated at intervals not exceeding ten years or a written statement provided that indicates the basis for there being no need to upgrade the facilities or otherwise modify the plan. Modifications to the recreation plan shall also be subject to Department approval over the term of the license.
- M. **Restoration Fund.** The applicant shall contribute \$250,000 to a fund (Fund) to be known as the Lake Champlain and Tributaries Restoration Fund, which shall be created by the State of Vermont and administered by an independent non-profit community foundation (the Fund Trustee) chosen by the applicant and the Vermont Agency of Natural Resources. The Fund, which shall include the contribution and associated earnings as well as outside monies contributed by others and associated earnings, is to only be used for eligible projects, the purpose of which are to:
- a) Protect, restore and enhance the ecosystem integrity and ecological connectivity of the community of aquatic life in the Lake Champlain ecosystem and its tributaries.
 - b) Protect, restore and enhance lake sturgeon and their habitats in the Lake Champlain basin and its tributaries.
 - c) Restore a self-sustaining land-locked Atlantic salmon population in Lake Champlain through habitat restoration and fish monitoring programs.
 - d) Protect the riparian zones along Lake Champlain tributaries for the benefit of the ecological and recreational resources, through the purchase of land or easements.

The Fund shall not be used for projects located outside of the Lake Champlain basin, or on New York tributaries of Lake Champlain. The applicant shall make a nonrefundable contribution in the amount of \$250,000 within 30 days of the completion of the following two events: (a) issuance of this certification or if this certification is the subject of an appeal, upon the completion of the appeal process provided that the certification contains conditions that are materially similar to this original certification and (b) issuance of a FERC license that contains conditions of this certification, or a certification issued on appeal with materially similar conditions, or if the FERC license is the subject of an appeal, upon the completion of the appeal process provided that the FERC license contains conditions that are materially similar to the final certification.

The Fund Trustee shall make investment decisions, and shall disburse monies from the Fund from time to time, in whole or in part, based upon recommendations made by representatives of the CVPS, the ANR, the U.S. Fish and Wildlife Service, the Vermont Natural Resources Council and Trout Unlimited who shall serve as the Fund Advisors. The Fund Advisors shall make decisions based upon vote of a majority of the Fund Advisors (not simply a quorum thereof). Any party may permanently withdraw as a Fund Advisor upon written notice to the other Fund Advisors. The Fund Advisors may solicit proposals from nonprofit organizations, educational institutions, units of government, and officially appointed commissions, boards or other entities within the state of Vermont for projects which address any of the above purposes. The Fund Advisors may target a specified portion of the funds to specific protection, mitigation, or enhancement objectives or to specific areas which are encompassed within the purposes and geographic scope defined above.

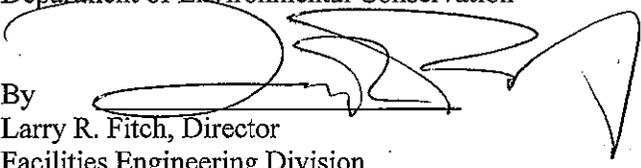
The Fund Trustee shall only disburse monies from the Fund when matching funds are contributed to a project by Parties or entities other than CVPS, at a ratio of no less than \$1 of outside monies for every \$2 drawn from CVPS's contribution and Fund earnings thereon.

- N. **Erosion Control.** Upon a written request by the Department, the applicant shall design and implement erosion control measures as necessary to address erosion occurring as a result of use of the project lands for recreation. Any work that exceeds minor maintenance shall be subject to prior approval by the Department and FERC.
- O. **Compliance Inspection by Department.** The applicant shall allow the Department to inspect the project area at any time to monitor compliance with certification conditions.
- P. **Posting of Certification.** A copy of this certification shall be prominently posted within the project powerhouse.
- Q. **Approval of Project Changes.** Any change to the project that would have a significant or material effect on the findings, conclusions or conditions of this certification, including project operation, must be submitted to the Department for prior review and written approval where appropriate and authorized by law and only as related to the change proposed.
- R. **Reopening of License.** The Department may request, at any time, that FERC reopen the license to consider modifications to the license as necessary to assure compliance with Vermont Water Quality Standards.

- S. **Continuing Jurisdiction.** The Department reserves the right to add and alter the terms and conditions of this certification, when authorized by law and as appropriate to carry out its responsibilities with respect to water quality during the life of the project.

Dated at Waterbury, Vermont this
5TH day of December, 2008

Laura Q. Pelosi, Commissioner
Department of Environmental Conservation

By 
Larry R. Fitch, Director
Facilities Engineering Division

c: Distribution List

LRF/BTF

