

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

In the matter of: Jonathan and Jayne Chase
 361 Goodall Rd.
 Derby Line, Vermont 05830

APPLICATION FOR TROY HYDROELECTRIC PROJECT

The Vermont Department of Environmental Conservation (the Department) has reviewed a water quality certification application dated August 11, 2010 and filed by Jonathan and Jayne Chase (Applicant) for the Troy Hydroelectric Project. The application was determined to be technically complete following the filing of the Applicant's response of December 15, 2010 to FERC's Additional Information Request of October 15, 2010. Supporting documentation for the application includes the Applicant's Federal Energy Regulatory Commission (FERC) Initial Consultation Document, filed by letter dated January 22, 2010, and application for exemption from licensing filed with FERC on July 23, 2010.

In accordance with 10 V.S.A. § 1004, the current application is subject to review under the Vermont Water Quality Standards (Standards) adopted by the Water Resources Panel effective January 1, 2008 (Standards, Section 1-01. Applicability and Definitions).

The Department held a public hearing on July 25, 2011 under the Department's rules governing certification (§13.11 of the Vermont Water Pollution Control Permit Regulations, dated February 26, 1974). No testimony was received at the hearing. The Department received written filings through July 29, 2011.

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

Findings

Background and General Setting

1. The Troy Hydroelectric Project is located at Bakers Falls on the Missisquoi River in the Town of Troy at position 44° 55.02' N, 72° 23.82 W (NAD 83).
2. The dam was constructed in 1925. Prior to 1998, the dam and adjacent lands were utilized by the former Bakers Falls Hydroelectric Project, which was owned and operated by the Citizens Utilities Company. These facilities were taken out of service in 1998 after a major flooding event damaged the generator.
3. The Missisquoi watershed drains about 855 square miles, of which 619 square miles are in northern Vermont, with the remainder in Canada. From its headwaters in Lowell, the river flows northward into Canada before returning to the United States at East Richford and then flowing west through Franklin County to Highgate, where it empties into Lake Champlain. The mainstem is approximately 88 miles long. The principal tributaries in Vermont are the Trout River, the Tyler Branch, Black Creek and Hungerford Brook.
4. The project utilizes runoff from an area of 101 square miles, or about 12 percent of the river's 855 square mile watershed.

5. The upper impoundment and low lying areas beneath the falls are relatively level dominated by recent deposits of alluvium on floodplains, as well as older outwash, lacustrine and marine deposits of sand and gravel, and clay and silt. The reservoir banks are stable with no significant signs of slumping or mass wasting. The well-vegetated streambanks are steeply cut with periodic exposed slopes of silts, fine to coarse sand, and gravel deposits. The dam is situated at the top of a cascade that is steeply cut through exposed bedrock, which extends roughly to the limits of the tailrace. Slopes through the cascade range from 3-90 percent.

Project and Civil Works

6. The Bakers Falls Dam is a concrete gravity structure, 180 feet in length, including a spillway that is 134 feet long. The dam crest elevation is 739.4 feet (msl). An island immediately downstream of the dam separates the spillway and bypass into two sections.
7. Citizens Utilities previously operated the project with 18-inch flashboards, but flashboards are not included in the current proposal.
8. The impoundment extends approximately 2,100 feet upstream and has a surface area of approximately 6.9 acres. The normal storage capacity of the impoundment is 50 acre-feet at elevation 739.4 ft msl.
9. A 3.33-foot by 4-foot wastegate is located beneath the spillway section of the dam, approximately 6 feet 10 inches east of the intake area. The invert of the gate is located 9 feet below the spillway crest. The intake structure contains two 3.33-foot by 4-foot headgates that open to a forebay area. A 2-foot by 2-foot wastegate is located in the forebay.
10. A 6.5-foot-diameter steel penstock extends from the forebay 250 feet downstream to the powerhouse. The gross head, as measured from the crest of the spillway, is 55.7 feet. The project bypass spans 250 feet of the river.
11. The existing powerhouse is a concrete block building, and contains an inoperable, twin runner horizontal Francis turbine rated at 815 hp. The turbine is connected to a 600 kW generator. The hydraulic capacity of the generating unit is 200 cfs. The existing 600 kW/750 kVA generator was connected via 90 foot-long conductors to pole-mounted transformers that connected to the existing Vermont Electric Cooperative transmission line. These facilities were disconnected after the project was taken out of service.
12. The existing powerhouse may require modification since it has essentially been abandoned for over 10 years. If modifications or the construction of a new powerhouse are required, the new powerhouse of approximately the same dimensions will be located adjacent to the existing powerhouse, which will be removed. Additional anticipated upgrades would include installation of a new trash rack with 1-inch clear bar spacing, replacement of the existing turbine, and installation of new switchgear and an electronic control system for remote operation.
13. The total intake area at the trashrack at the normal pool elevation, not including the surface area of the bars themselves, will be 120 square feet or more. The trashrack will be located at the bank on river-left directly adjacent to the spillway. The trashrack will be at an angle to the river flow and will be no deeper than 729.4 feet elevation (msl), 10 feet below the dam crest. Water will be drawn into the intake from a depth of no more than 10 feet. Intake velocity will be 2.0 fps or less.

14. Approximately 450 cubic yards of sediment will be excavated from the forebay and intake and approximately 1,125 cubic yards from the impoundment.
15. The proposed maximum hydraulic capacity for the hydroelectric equipment will be 239 cfs, and minimum capacity will be 25 cfs. The turbine output would be 920 kW, and the generator output would be 850 kW.
16. The bypass flow of 44 cfs will be automatically controlled by a pond level sensor located in the headpond which will control the turbine guide vane position. If the pond level sensor cannot maintain a consistent water level across the entire spillway, the Applicant has proposed some notching of the spillway.
17. The current proportioning of the bypass conservation flow, based on relative spillway lengths of uniform height, is approximately 40 percent over the west (left) crest and 60 percent over the east (right) crest. This flow distribution will be maintained.

River Hydrology and Streamflow Regulation

18. There are four FERC-jurisdictional hydroelectric projects in the Missisquoi basin, all of which are downstream of the proposed Troy Hydroelectric project. In addition, there are two small unlicensed projects located upriver. Between November and March, Jay Peak Ski Resort withdraws approximately 120 million gallons of water from the Jay Branch for snowmaking.
19. Since October 1931, the U.S. Geological Survey has operated a surface water gaging station (No. 04293000) on the Missisquoi River in North Troy. The gage is approximately 5.5 miles downstream of the project location where the drainage area is 131 square miles. The following hydrologic statistics for the project site are based on gage data for water years 1931-2010:

Mean annual flow	216 cfs
Annual runoff	29.02 inches
10 percent exceedance	500 cfs
50 percent exceedance	101 cfs
90 percent exceedance	36 cfs
August median flow	44 cfs (period of record 1931 through 2006)
7Q10	16 cfs (period of record 1932 through 2004)
20. The former Bakers Falls Hydroelectric Project operated as a daily peaking facility in which the impoundment was drawn down up to three feet below the dam crest. Streamflow regulation at the site ceased when the project was damaged in 1998.

Applicant Proposal for Licensing

21. The project will operate in a strict run-of-river mode.¹
22. A continuous release of 44 cfs, or inflow if less, will be spilled at the dam.
23. Flashboards will not be utilized in this project.

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.

24. All flows will be released at the dam when inflow is less than 69 cfs, the minimum capacity of the turbine (25 cfs) plus the 44 cfs bypass flow release.
25. Ninety percent of instantaneous inflow will be released downstream during impoundment refills following maintenance drawdowns.

Standards Designation

26. The Vermont Water Quality Standards (Standards) are promulgated by the Vermont Water Resources Panel pursuant to 10 V.S.A., Chapter 47, Water Pollution Control. 10 V.S.A. § 1252 provides for the classification of State waters as either Class A or Class B and authorizes the Panel to adopt standards of water quality to achieve the purpose of classification.
27. The Missisquoi River has been designated by the Vermont Water Resources Panel as Class B waters.
28. The Anti-Degradation Policy in the Standards requires that “[a]ll waters shall be managed in accordance with [Standards] to protect, maintain, and improve water quality.” (Standards, Section 1-03A)
29. Class B waters are managed to achieve and maintain a high level of quality that supports the following designated uses: aquatic biota, wildlife and aquatic habitat; aesthetics; public water supply; irrigation of crops and other agricultural uses; swimming and other primary contact recreation; boating, fishing and other recreational uses. (Standards, Section 3-04A)
30. The waters of the Missisquoi River in the vicinity of the project are designated coldwater fish habitat for the protection and management of fisheries. (Standards, Section 3-05)
31. In Class B waters, the dissolved oxygen (D.O.) standard for coldwater fish habitat streams is not less than 7mg/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. (Standards, Section 3-04B.2)
32. The temperature standard for coldwater fish habitat limits increases to 1.0° F from ambient conditions. (Standards, Section 3-01B.1b)
33. The turbidity standard is 10 NTU as an annual average under dry weather base-flow conditions for coldwater fish habitat. (Standards, Section 3-04B.1a)
34. 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.” (Standards, Section 3-04B.4)
35. The Hydrology Policy in the Standards 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 1-02E.1)

36. The Hydrology criteria require that, for Class B waters that have not been classified as WMT 1, streamflows be protected in such a manner that the change from the natural flow regime “provide for maintenance of flow characteristics that ensure the full support of uses and comply with the applicable water quality criteria.” There is a preference for study-based, site-specific streamflow protection standards; however, use of general hydrologic standards is also accepted. (Standards, Section 3-01C)
37. In 10 V.S.A. §1250, the Vermont Legislature enumerated the State water quality policy. The State’s policy is to upgrade the quality of its waters and reduce existing risks to water quality over the long term and to protect and enhance the quality, character and usefulness of its surface waters. Further, it is the State’s policy to allow beneficial and environmentally sound development.
38. On September 24, 2008, the USEPA approved a list, prepared by the Department under Section 303(d) of the Federal Clean Water Act, indicating waters considered to be impaired based on water quality monitoring efforts. No waters affected by the project are listed.
39. 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 altered by flow regulation. The Missisquoi River for four miles below the Bakers Falls Dam is listed because of the former hydroelectric project.

Water Chemistry

40. The Missisquoi River has been classified as Class B waters by the Vermont Water Resources Panel. Class B waters are of a quality which consistently exhibits good aesthetic value and provide high quality habitat for aquatic biota, fish and wildlife. Uses are public water supply with filtration and disinfection; irrigation and other agricultural uses; swimming; recreation and hydropower. The Missisquoi River downstream of Bakers Falls Dam meets Class B standards as determined by the Vermont Agency of Natural Resources.
41. While no specific water quality issues were noted for the mainstem of the Missisquoi River, Coburn Brook was identified as being impaired from nutrient loading resulting from the discharge of nitric acid at the former Kraft Agri-Mark plant in Troy, Vermont. The plant has since ceased operations.
42. There are at least 12 permitted direct wastewater and stormwater discharges to the upper Missisquoi River watershed. There is also one permitted large farm operation in the upper Missisquoi River watershed.
43. The Applicant conducted dissolved oxygen sampling during the summer of 2010. Measurements were taken at five locations in the impoundment, bypass and tailrace during low flow periods. All results indicated D.O. concentrations in excess of the 6 mg/L standard, but percent saturation was not reported.

44. Data collected at the USGS gaging station near North Troy (No. 04293000) show that the average water temperature for the period of record (January 5, 1950 to September 24, 1999) was 8.84 °C (47.91°F). Other water quality parameters were recorded on the site for only one day (November 10, 1978) and were all reported to be within Vermont state water quality standards. Dissolved oxygen was reported at 10.20 mg/L, with 84 percent saturation and pH was reported as 7.4.
45. Any temperature impacts caused by the impoundment already exist due to the presence of the dam and development and operation of the project will not change the existing condition.

Aquatic Biota and Habitat

46. Class B waters are managed to provide high quality habitat for aquatic biota (Standards, Section 3-03(A)). 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)) Included, for example, are fish, aquatic insects, amphibians and some reptiles, such as turtles.
47. Brook and brown trout are found upstream of the project and other cold water species of minnows and suckers are expected to also be present. The river downstream of the project has not been surveyed but is presumed support similar fish species. Yellow perch, minnows, brown bullheads and brown trout are found in the impoundment. Anglers use the area regularly, both upstream and downstream.
48. The project bypass consists of multiple channels and diverse conditions. The left channel is about 250 feet long from dam to powerhouse. However, the right channel is roughly twice this length. It includes an elbow bend and then does not rejoin the powerhouse discharge until about 200 feet further downstream due to a mid-channel island. This bypass is quite different from the predominant habitat found above and below the project area. It is relatively steep and rocky whereas surrounding areas are low gradient with finer substrate. The habitat found in the bypass is in short supply elsewhere in the river and therefore important. It includes pools formed in ledge and riffle/run habitats in the downstream parts of the bypass channels.
49. The bypass consists of two channels of roughly equal width, plus a smaller middle channel that receives a portion of the spillage from below the control of the second pool in the left channel. This middle channel is about 8-10 feet wide and runs diagonally downstream to connect with a riffle stretch in the right channel. The middle channel does contain a few small areas of gravel but not in significant enough quantity to warrant addressing flow needs for spawning and incubation. However, this channel provides a unique habitat type and has value to conserve for use by other life stages of fish.
50. Fish and Wildlife Department staff visited the site and inspected the bypass on August 20, 2009. The average daily flow at the Troy USGS gage on this day was 68 cfs (0.52 csm) or 52 cfs prorated to the project site. No discharge measurements were taken to determine the quantity of flow entering each channel. However, the observed division of flow between the channels appeared to provide roughly equivalent habitat conditions in each channel and was assessed as acceptable.

Fish Passage and Movement

51. Conditions in the impoundment conditions do not favor salmonids, so that it is unlikely that significant numbers of fish will seek to move downstream past the dam.

Wildlife and Wetlands

52. The Applicant conducted a wetland survey of the project area. A narrow fringe of palustrine broad-leaved, deciduous silver maple trees and alder shrubs dominated the narrow fringe wetlands that border the river.
53. In general, the wetland fringe along the Missisquoi River exhibits classic wooded swamp vegetation strata with silver maple (*Acer saccharinum*) dominating the forest overstory, and with other species such as yellow birch (*Betula alleghaniensis*), ash (*Fraxinus* sp.), and American elm (*Ulmus americana*), also present in lesser quantities. The shrub stratum and herb layer in this wetland is dominated by speckled alder (*Alnus incana*), black willow (*Salix nigra*), gray birch (*Betula populifolia*), witch hazel (*Hamamelis virginiana*), winterberry (*Ilex verticillata*), and cinnamon fern (*Osmunda cinnamomea*). This is not representative of an exhaustive list, but rather a sampling of the vegetation commonly observed within the wetland.
54. The wetlands above the dam are generally characteristic of palustrine emergent and palustrine scrub-shrub type commonly found along floodplain areas. Topography in this area is moderate with shallow sandy slopes. Low lying areas adjacent to the water's edge are dominated by herbaceous wetland species. In the areas with steeper slopes, a transition occurs from emergent wetlands to scrub-shrub wetlands where grasses and woody shrubs dominate. The substrate at the head of the impoundment can be characterized as inundated or saturated, unconsolidated soft fine sediments of deep to moderate depths which are often associated with emergent wetlands.
55. A terrestrial resource assessment conducted by the Applicant showed that the project area provides good, if limited, wildlife habitat. The project area is largely undeveloped and consists of a patchwork of hardwood forests, scrub-shrub areas, open fields, and agricultural land. Slopes are steep, creating a valley in which the impoundment flows through. Typical upland riparian forest vegetation include balsam, hemlock, white pine, red spruce, yellow birch, paper birch, black cherry, and trembling aspen. Riparian vegetation within the narrow floodplain located at the toe of the slope a few feet above mean water surface elevation was characterized by eastern cottonwood, silver maple, speckled alder, black spruce, green ash, black ash, box elder, and black willow. Wildlife observations made during the assessment included: great blue heron, various small birds, minnows, frogs, an unidentified snake, beaver, rodents, and moose. During this field assessment observations were also made that indicate wildlife usage in the project area such as game trails in the dense understory as well as beaver activity.

Rare and Endangered Species and Outstanding Natural Resources

56. There are no known federally or state listed endangered or threatened aquatic habitats, resources or species; federally or state listed endangered or threatened wildlife habitats, resource or species; or essential fish habitat within the project area.
57. Two known rare plants: dwarf bilberry (*Vaccinium caespitosum*), which is considered rare in Vermont, and Tradescant's aster (*Symphotrichum tradescantii*), which is rare to very rare in Vermont were found in the vicinity of the base of the falls. Dwarf bilberry is found along streams and relies on high scouring flows to maintain its habitat. Tradescant's aster is found rooted into fissures and cracks of rocky streambanks at or below ordinary high water. This habitat is inhospitable to many invasive exotics. Maintenance of the high flow regime is important to conservation of these two species.

Shoreline Erosion

58. The reservoir banks are stable with no significant signs of slumping or mass wasting. The well-vegetated streambanks are steeply cut with periodic exposed slopes of silts, fine to coarse sand, and gravel deposits. The dam is situated at the top of a cascade that is steeply cut through exposed bedrock, which extends roughly to the limits of the tailrace. Because the project would be operated as run of river it would not cause any water level fluctuation that could cause erosion in the impoundment or the tailrace.

Recreational Use

59. Recreation activities occurring in the project vicinity include angling, swimming, sightseeing, and snowmobiling. Several waterfalls and swimming holes are in the project vicinity, including Big Falls, Bakers Falls, Four-Corners Swimming Hole, and the Jay Branch Gorge. In the immediate Project Area, a gated public road that provides access to the powerhouse is designated as a local snowmobile trail.
60. The Missisquoi River is currently being studied to determine if it is eligible for designation as a National Wild and Scenic River. The area within the project boundary would not be included in the proposed Wild and Scenic River segment, but the upstream and downstream reaches would be.
61. There are no formal recreational facilities at the project.
62. There is no established portage route at the project, but boaters may take out above the dam, carry down the gated town road and powerhouse access road, and put in near the powerhouse.
63. The Applicant monitored recreational use during the spring and summer of 2009. There was fairly limited use, about equally divided between angling and informal social gatherings. Discarded trash provided additional evidence that angling takes place in the project area.
64. The upper end of the falls is inaccessible due to the dam and the steep topography. The right (north) side of the river is not included in the project boundary in this vicinity.

Aesthetics

65. The Applicant conducted an aesthetics flow evaluation in 2009. The evaluation consisted of photographing both channels of the dam and cascade at two different flows, estimated from gage data to be 30 cfs and 50 cfs.
66. Of the two bypass channels, the east (river-right) channel is more accessible and visible to the public than the west channel.

State Comprehensive River Plans

67. 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.

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

68. 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 conservation 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.

69. The 1982 hydropower study report indicated that the impact of the project as it was operated at that time had significant impacts on water quality and fisheries. Data indicated violations of Vermont Water Quality Standards for D.O. Aquatic habitat impacts resulted from the presence of the impoundment, the lack of bypass conservation flows and downstream flow regulation. The report also noted that siltation in the impoundment is a problem. The report identified a need for additional study of water quality (temperature and D.O.), fisheries and recreation needs. Following completion of the studies, the report recommended that a conservation flow be established at the project.

1993 Vermont Recreation Plan

70. 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.

71. 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.

72. 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."

73. 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

74. Available data indicate that waters in the vicinity of the project meet water quality standards for D.O. and temperature.
75. Upstream of the project, the Missisquoi is a fairly productive, low gradient river. Currently, natural reaeration occurs at the dam and the falls, so it is likely that any D.O. deficits are fully mitigated. Pre-development monitoring suggests that D.O. deficits do not exist in the impoundment. However, further monitoring will be necessary to ensure that standards continue

to be met under hot, dry conditions, when D.O. concentrations are likely to be at their lowest point, and a majority of the downstream flow is being diverted through the turbine and not re-aerated. By condition of this Certification, such monitoring shall be required in accordance with a monitoring plan approved by the Department. If the monitoring results indicate that mitigation is necessary, the Applicant will be required to design and implement appropriate mitigation measures.

Flow and Water Level Management

76. Run-of-river operations would support aquatic habitat and aesthetics below the project tailrace.
77. Adequate bypass flows are necessary to address year-round habitat needs and enable fish movement through the bypass reach. The *Agency Procedure for Determining Acceptable Minimum Stream Flows* (July 14, 1993) describes how conservation flows are determined. The August median flow (or ABF) based on the USGS gage near North Troy is 0.44 cfs/mi² (of drainage area). The drainage area at the project is 101 square miles which equates to an ABF flow of 44 cfs. The aquatic base flow of 44 cfs will provide high quality aquatic habitat in this reach.
78. The Applicant may consider alternate methods for discharging the bypass conservation flow other than full crest spillage. However, any alternative shall be subject to Department review and approval prior to implementation. The impact on aesthetics and D.O. will be considered during the Department's review.
79. Physical channel conditions are expected to be maintained since high flow conditions will continue to occur periodically and will not be significantly affected by the project.
80. Run-of-river operation will result in an impoundment water level that is maintained within a narrow range during normal operations, supporting aquatic habitat in the impoundment.
81. The project impoundment extends about 2,100 feet upriver and contains considerable sediment. It may experience elevated temperatures since it is slow flowing and shallow and there is minimal shade.
82. During impoundment refilling following maintenance activities, releasing 90 percent of instantaneous inflow will protect downstream habitat.
83. By conditions of this Certification, the Applicant shall be required to maintain run-of-river operation and provide bypass flows as described above through full-length crest spillage. Further, the Applicant shall be required to develop a flow and water level management plan that details the civil works, equipment and operating protocols that will be used to meet these requirements.

Fish Passage, Impingement and Entrainment

84. The Vermont Fish and Wildlife Department has determined that downstream fish passage facilities are not warranted at this project, due to unfavorable conditions for salmonids in the impoundment.
85. The proposed trashrack design will minimize impingement and entrainment of resident fish. Implementation of the proposed design prior to project operation will be required by condition of this Certification.

Rare and Endangered Species and Outstanding Natural Resources

86. Two rare plant species, dwarf bilberry and Tradescant's aster, are found near the base of the falls. To protect these species, construction in this area should be avoided. By condition of this Certification, prior approval of any bypass construction activities will be required. Prior to granting its approval, the Department may require a study and plan to avoid any impact to the populations of these plants.
87. RecreationThe Applicant has not proposed specific recreation-related improvements. An important objective at the project will be to provide access to public waters by supporting public use of project lands, subject to site constraints and reasonable safety-related restrictions. The possible designation of the upper Missisquoi as a Wild and Scenic River increases the importance of providing the public with access and a portage route to pass through the site. Appropriate improvements to enhance public use of the project could include signage, parking, designated river access points and a portage route around the dam and falls. A recreation plan addressing the details of recreational use of the project will be required as a condition of this Certification.

Erosion

88. 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.
89. Dredging of the forebay area may lead to erosion and contribution of sediment to the water column. Sedimentation in the vicinity of the headworks has historically been problematic at this site, which could result in the need to conduct frequent dredging operations. It may be necessary to modify the intake to reduce the impact of sedimentation on project operations. Proposals for dredging during development and operation of the project will be subject to prior review and approval by the Department.

Debris Disposal

90. 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 is regulated by state solid waste laws and Standards, Section 3-01(B)(7). Debris may also impair aesthetics and boating. A debris disposal plan shall be required as a condition of this Certification.

Aesthetics

91. Spillage of 44 cfs across the full length of the spillway will be adequate to support aesthetics at the dam and in the bypass.
92. Run-of-river operation will support aesthetics downstream.
93. Precise control of the impoundment elevation will be necessary to consistently provide the required flows over the spillway. Details on the equipment necessary to fulfill this requirement, and its operation, will be addressed in the flow management plan.
94. If it is necessary to notch the dam to maintain a consistent flow over the crest, this would constitute a project change subject to prior review and approval by the Department.

Anti-Degradation

95. Pursuant to §1-03, Anti-Degradation Policy (Policy), of Vermont's Water Quality Standards and the Department's Interim Anti-Degradation Implementation Procedure dated October 12, 2010 (Procedure), the Department must apply the Policy and Procedure during the review of applications for any permit for a new discharge if during the application review process compliance with the Standards is evaluated pursuant to applicable state or federal law. This includes water quality certifications required by Section 401 of the Clean Water Act for a federal license or permit.
96. Discharges subject to water quality certifications issued by the Department for flow modifying activities are reviewed under Section VIII of the Procedure. Class B waters are affected by this project and are high quality waters subject to anti-degradation review. Pursuant to the Policy, a limited reduction in water quality may only be allowed if the socioeconomic justification test set forth in the Policy is met. The Agency has reviewed the proposed project for compliance with the Anti-Degradation Policy in Section 1-03 of the Vermont Water Quality Standards and the Agency's Interim Anti-Degradation Implementation Procedure. While recognizing that there is an existing dam and impoundment that have changed the natural condition of the river at the project location, the Secretary finds that development and operation of the project will not result in any change in existing physical and water quality conditions that would result in habitat changes outside of the range of natural variability and therefore no reduction in the overall biological integrity. Development of the project will result in a flow reduction in the bypass. However, aquatic habitat and aesthetics will be fully supported by provision of 44 cfs (or inflow) into the bypass. Run-of-river operation will ensure that no changes in water quality occur downstream. Although there is some possibility that over time the installation and operation of the project might degrade downstream D.O., available data indicate that this is currently not a problem. The Applicant will be required to perform monitoring to determine if downstream D.O. is being degraded due to project operation. If that is the case, the Applicant will be required to propose and implement mitigative measures to eliminate any degradation and prevent future degradation. Failure to remediate or prevent any degradation due to D.O. may result in a reopening of this certification. Accordingly, the Secretary finds that the project meets the requirements of the Anti-Degradation Policy and Interim Anti-Degradation Procedure relating to the protection and maintenance of high quality waters.
97. In conducting anti-degradation review, the Secretary must also determine whether there will be an elimination of any existing uses and whether any Outstanding Resource Waters will be impacted by the project. There are no Outstanding Resource Waters impacted by this project. Recreational uses of the Missisquoi River, includes fishing, swimming, and boating. While recognizing that there is an existing dam and impoundment that have changed the natural condition of the River at the project location, the Secretary has determined that based on the required controls for this project these existing recreational uses, and the water quality necessary to support these uses, will be maintained and protected. In addition, waters potentially affected by the project have existing uses of aquatic biota and wildlife that utilize or are present in the waters and habitat that supports existing aquatic biota, wildlife and plant life. While recognizing that there is an existing dam and impoundment that have changed the natural condition of the River at the project location, the Secretary has determined that based on the required controls for this project the existing uses of aquatic biota and wildlife, and the level of water quality necessary to protect these existing uses, will be maintained and protected.

Decision and Certification

The Department has examined the project application and bases its decision in this Certification upon an evaluation of the information contained therein that is relevant to the Department's responsibilities under Section 401 of the federal Clean Water Act and has examined other pertinent information deemed relevant by the Department, sufficient to permit the Department to certify that there is reasonable assurance that operation and maintenance of the Troy Hydropower 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 provide notice to the Department of any proposed change to the project that would have a significant or material effect on the findings, conclusions or conditions of this Certification, including any changes to operation of the project. The Applicant shall not make any such change without approval of the Department.
- 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. In the river reach bypassed by the penstock, a flow of 44 cfs, or instantaneous inflow if less, shall be maintained at all times except during drawdowns conducted in accordance with Condition C below. The current apportionment of flows between the two bypass channels shall be maintained.
- C. **Impoundment Water Level Management.** The bypass conservation flow shall be provided as full crest spillage unless an alternate method is approved by the Department prior to its implementation. The impoundment shall not be drawn below the fixed dam crest unless special approval is granted by the Department under Condition O below, or for a safety-related emergency. In the latter case, the Department shall be notified within 24 hours.
- D. **Flow Management During Impoundment Refill.** During refilling of the project impoundment after an approved dam maintenance operation or an emergency drawdown, at least 90 percent of instantaneous inflow shall be released below the project.
- E. **Flow and Water Level Management Plan.** The Applicant shall develop and file with the Department a flow and water level management plan detailing how the project will be operated to achieve compliance with the flow and water level management 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.
- F. **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 and inflows. The plan shall include procedures for reporting deviations from prescribed operating requirements 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 upon request by the Department. 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.

- G. **Dissolved Oxygen.** The Applicant shall conduct a study to determine if project operation is degrading downstream D.O. concentrations. The study plan shall be developed in consultation with the Department and shall be subject to Department review and approval. Project operation shall not commence prior to approval of the plan by the Department. If the study documents that D.O concentrations are being degraded, the Applicant shall propose, subject to Department review and approval, changes in project design or operation to mitigate the impact. The Applicant shall implement any project design and operation changes approved by the Department within the timeframes specified by the Department. Failure to implement any required changes may result in a reopening of this Certification.
- H. **Trashracks.** Prior to initial operation of the project, trashracks shall be installed on the intake that meet the following criteria: (1) an approach velocity of less than 2.0 fps, as measured six inches in front of the racks; (2) clear spacing of one inch or less; and (3) extend full depth. The racks shall be kept free of debris and maintained to design specifications. Design for any trashrack replacement is subject to prior review and written approval by the Department, after consultation with the Vermont Department of Fish and Wildlife and the U.S. Fish and Wildlife Service.
- I. **Rare and Endangered Species.** Construction in the bypass shall not take place without prior written approval of the Department.
- J. **Turbine Rating Curves.** The Applicant shall provide the Department with a copy of the turbine rating curve, accurately depicting the flow/production relationship, for the record within one year of the effective date of the exemption.
- K. **Forebay and Impoundment Dredging.** The applicant shall develop a detailed plan describing the methods to be used to remove sediment from the forebay and impoundment. The plan shall be developed in consultation with the Department and shall be subject to Department approval prior to commencement of dredging operations. Intake modifications to reduce the frequency of forebay dredging once the project is operating should be addressed in the plan. The plan should specify use of native plant materials and seed to stabilize disturbed areas. The use of riprap should be minimized and soft engineering approaches emphasized. The Department approved sediment removal plan and all amendments thereto as approved by the Department shall be incorporated by reference as conditions of this Certification.
- L. **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 should 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.

- M. **Recreational Facilities.** Recreational facilities shall be constructed and maintained consistent with a recreation plan approved by the Department. The plan shall include a provision for a portage route around the project. The plan shall be filed with the Department within one year of exemption 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 exemption. The Department approved recreation plan and all amendments thereto as approved by the Department shall be incorporated by reference as conditions of this Certification.
- N. **Debris Disposal.** 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 a draft shall be submitted to the Department for review at least 60 days prior to commencement of project operation. The final plan shall be subject to Department approval. The Department reserves the right of review and approval of any material changes made to the plan at any time.
- O. **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 a designated use of State waters.
- P. **Commencement of Operation.** The Applicant shall notify the Department within two weeks of project completion and commencement of operation.
- Q. **Record Drawings.** The Applicant shall provide the Department with a set of as-built plans for the record within one year of the completion of construction.
- R. **Compliance Inspection by Department.** The Applicant shall allow the Department to inspect the project area at any time to monitor compliance with Certification conditions.
- S. **Posting of Certification.** A copy of this Certification shall be prominently posted within the gate control structure.
- T. **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.
- U. **Reopening of Exemption.** The Department may request, at any time, that FERC reopen the exemption to consider modifications to the exemption as necessary to assure compliance with the Standards.

- V. **Continuing Jurisdiction.** The Department reserves the right to alter or amend this Certification over the life of the project when such action is necessary to assure compliance with the Standards and to respond to any changes in classification or management objectives for the affected waters.

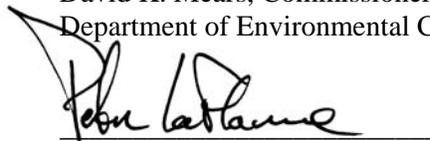
Appeals

Pursuant to 10 V.S.A. Chapter 220, any appeal of this decision must be filed with the clerk of the Environmental Court within 30 days of the date of the decision. The Notice of Appeal must specify the parties taking the appeal and the statutory provision under which each party claims party status; must designate the act or decision appealed from; must name the Environmental Court; and must be signed by the appellant or their attorney. In addition, the appeal must give the address or location and description of the property, project or facility with which the appeal is concerned and the name of the applicant or any permit involved in the appeal. The appellant must also serve a copy of the Notice of Appeal in accordance with Rule 5(b)(4)(B) of the Vermont Rules for Environmental Court Proceedings. For further information, see the Vermont Rules for Environmental Court Proceedings, available on line at www.vermontjudiciary.org. The address for the Environmental Court is 2418 Airport Road, Suite 1, Barre, VT 05641 (Tel. 802.828.1660).

Dated at Waterbury, Vermont this
12th day of August 2011

David K. Mears, Commissioner
Department of Environmental Conservation

By



Peter LaFlamme, Director
Water Quality Division