

Low Impact Hydropower Institute
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LOW IMPACT HYDROPOWER QUESTIONNAIRE



Woronoco's Middle Dam Eel Passage Facility May Be Longest Ladder in New England

Summary Status of Woronoco Hydro Project

Woronoco Hydro LLC's, Woronoco Station is located at river mile 18.5 on the Westfield River in, Russell, Massachusetts. The Woronoco Project is licensed by the Federal Energy Regulatory Commission as Project Number 2631. The Westfield River originates in North-Western Massachusetts and flows 78.1 miles to its confluence with the Connecticut River in West Springfield.

Swift River Hydro Operations operates the Woronoco Facility as a run-of-river plant. Inflows to the impoundment are instantaneously equal to the outflow from the power plant plus the environmental flows. The impoundment is kept at elevation 229.0' with a computer controlled actuator on the turbine-generating units. The station has a current hydraulic capacity of 710 cfs and a capacity of 2,700 kW from 3 units with a net head of 50' and an average annual output of 8,294 MWh per year during the 9 years since the hydroelectric plant was returned to service.

The prior project owner, International Paper Company (IPC) filed for a FERC license renewal in 1999 and the new license was issued on April 30, 2002. The license allowed for rehabilitation of 2 broken low flow turbine generating units installed in the station that had not generated since the early 1980's. It also ordered that improved fish passage facilities be installed: 3 eel ladders for juvenile Atlantic eels migrating upstream and enhanced downstream passage facilities for Atlantic Salmon smolt, adult eel and post-spawn Salmon kelt migrating past the project. In 2009, the upstream American Eel passage facilities passed nearly 1,278 juvenile eels with 93 to 100% effectiveness utilizing Resource Agency recommendations. A trap and truck facility located at the dam just downstream of Woronoco takes adult salmon upstream past the project. The Woronoco downstream fish passage facilities have undergone design changes and 2 effectiveness tests using smolt with radio telemetry. In March 2010 Woronoco will install ¾" bar opening trash racks to prevent fish entrainment before the 2010 smolt passage season begins. An experimental angled lead system will be dismantled because it caused turbulence that obscured the fish passage entrance. In July 2010, the project will shutdown to install an automatic rake to clean these narrow opening racks and to build a fish passage entrance in the racks that is designed to help migrants quickly find the entrance to passage route past the dam. In its **2009 Revised Comprehensive Fish Passage Plan (Appendix K)**, Woronoco asked to delay further effectiveness testing until all of the proposed changes to the passage system are installed in July 2010. Woronoco has invested over \$400,000 to build and test fish passage facilities and is applying for over \$1 million of new capital to install the most effective passage facilities possible for protection of Westfield River environmental resources.

Woronoco Hydro regularly consults with USFWS, MDEP, MDFW and TU about design changes to comply with its FERC license. A **letter from Caleb Slater** of MDFW is included in **Appendix A** along with a list other consultations.

E. LOW IMPACT HYDROPOWER QUESTIONNAIRE

Background Information	Applicant Answers																					
1) Name of the Facility.	Woronoco Hydroelectric Station FERC L.P. # 2631																					
2) Applicant's name, contact information and relationship to the Facility. If the Applicant is not the Facility owner/operator, also provide the name and contact information for the Facility owner and operator.	<p>Name of Owner and LIHI Applicant:</p> <p>Woronoco Hydro LLC Attn: Peter Clark, Manager P.O. Box 149 A Hamilton, Massachusetts 01936 (Phone)- (978) 468-3999 (Fax) - (978) 468-1210 pclark@swiftriverhydro.com</p> <p>Name of Woronoco Station Operator:</p> <p>Swift River Hydro Operations Company Inc. Attn: Davis Hobbs, General Manager Wayne Bailey, Operations Manager Wayne Roberts, Station Operator 176 Cottage Avenue Wilbraham, MA 01095 (Phone)- (413) 599-1211 (Fax)- (413) 599-1291 wdhobbs@swiftriverhydro.com</p> <p>Woronoco Hydro LLC is the owner of the Woronoco Hydroelectric Project and the applicant for the Woronoco Hydroelectric LIHI application. Swift River Hydro Operations Company is the O&M Contract Operations Company that manages and operates the Woronoco Station.</p>																					
3) Location of Facility by river and state.	The Facility is located in Russell, Massachusetts on the Westfield River. The power station is located on the Westfield River approximately 18.5 miles upstream for the confluence of the Westfield River with the Connecticut River.																					
4) Installed capacity.	<p>Existing Facility</p> <table border="0"> <thead> <tr> <th></th> <th>Turbine Type</th> <th>Peak Output (kW) per manufacturers specifications:</th> </tr> </thead> <tbody> <tr> <td>T1:</td> <td>Horizontal Francis</td> <td>490 kW</td> </tr> <tr> <td>T2:</td> <td>Horizontal Francis</td> <td>490 kW</td> </tr> <tr> <td>T3:</td> <td>Horizontal Francis</td> <td>1700 kW</td> </tr> <tr> <td colspan="2">Station Total:</td> <td>2680 kW</td> </tr> </tbody> </table> <p>Facility Upon Project Completion</p> <table border="0"> <thead> <tr> <th></th> <th>Turbine Type</th> <th>Peak Output (kW) per manufacturers specifications:</th> </tr> </thead> <tbody> <tr> <td colspan="3">No new capacity will be installed, but output might be increased in the future by reducing head losses throughout the hydraulic system and by lowering the tailwater by removing from the tailwater pool and perhaps by restoring flashboards with a crest gate on the dam. The impact and economics of these options are being studied by Woronoco by applying for an environmental impact study grant at the MTC. Also, we plan to reduce head losses by installing a automated Cross Machine trash rake.</td> </tr> </tbody> </table>		Turbine Type	Peak Output (kW) per manufacturers specifications:	T1:	Horizontal Francis	490 kW	T2:	Horizontal Francis	490 kW	T3:	Horizontal Francis	1700 kW	Station Total:		2680 kW		Turbine Type	Peak Output (kW) per manufacturers specifications:	No new capacity will be installed, but output might be increased in the future by reducing head losses throughout the hydraulic system and by lowering the tailwater by removing from the tailwater pool and perhaps by restoring flashboards with a crest gate on the dam. The impact and economics of these options are being studied by Woronoco by applying for an environmental impact study grant at the MTC. Also, we plan to reduce head losses by installing a automated Cross Machine trash rake.		
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<p>5) Average annual generation.</p>	<p>ject generation over the last nine years is as follows:</p> <table border="1" data-bbox="432 210 1219 874"> <thead> <tr> <th></th> <th colspan="3">Average kWh/month</th> </tr> <tr> <th></th> <th>2001-2009 Historic Monthly Average</th> <th>Projected, w Effici. Increase</th> <th>Projected, w Head Increase</th> </tr> </thead> <tbody> <tr><td>Jan</td><td>791,499</td><td>992,927</td><td>1,087,354</td></tr> <tr><td>Feb</td><td>677,493</td><td>898,133</td><td>984,289</td></tr> <tr><td>Mar</td><td>877,883</td><td>1,367,192</td><td>1,506,140</td></tr> <tr><td>Apr</td><td>995,911</td><td>1,502,928</td><td>1,629,853</td></tr> <tr><td>May</td><td>1,023,241</td><td>1,267,224</td><td>1,389,691</td></tr> <tr><td>Jun</td><td>814,644</td><td>750,198</td><td>820,271</td></tr> <tr><td>Jul</td><td>402,464</td><td>459,892</td><td>501,655</td></tr> <tr><td>Aug</td><td>365,450</td><td>687,012</td><td>423,702</td></tr> <tr><td>Sep</td><td>349,148</td><td>363,671</td><td>398,963</td></tr> <tr><td>Oct</td><td>528,572</td><td>520,730</td><td>569,928</td></tr> <tr><td>Nov</td><td>617,413</td><td>839,445</td><td>921,169</td></tr> <tr><td>Dec</td><td>781,911</td><td>1,001,010</td><td>1,096,661</td></tr> <tr><td>kWh/year</td><td>8,225,630</td><td>10,350,361</td><td>11,359,676</td></tr> <tr><td>Incremental kWh/year</td><td></td><td>2,124,731</td><td>1,009,315</td></tr> </tbody> </table>		Average kWh/month				2001-2009 Historic Monthly Average	Projected, w Effici. Increase	Projected, w Head Increase	Jan	791,499	992,927	1,087,354	Feb	677,493	898,133	984,289	Mar	877,883	1,367,192	1,506,140	Apr	995,911	1,502,928	1,629,853	May	1,023,241	1,267,224	1,389,691	Jun	814,644	750,198	820,271	Jul	402,464	459,892	501,655	Aug	365,450	687,012	423,702	Sep	349,148	363,671	398,963	Oct	528,572	520,730	569,928	Nov	617,413	839,445	921,169	Dec	781,911	1,001,010	1,096,661	kWh/year	8,225,630	10,350,361	11,359,676	Incremental kWh/year		2,124,731	1,009,315
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<p>6) Regulatory status.</p>	<p>The project is currently regulated by the FERC as H.P. # 2631. The project was relicensed in 2002 and has a FERC license that expires in 2042. A revised Comprehensive Fish Passage Plan was sent to Resource Agencies for comment on 12/15/2009, (see Appendix K). All Permits are in good standing, (see Appendix L).</p>																																																																
<p>7) Reservoir volume and surface area measured at the high water mark in an average water year.</p>	<p>The project impoundment has a surface area of approximately 43 acres. The reservoir has a maximum depth of approximately eight feet and an average depth of approximately four feet. Therefore the reservoir has a volume of approximately 172 acre-feet.</p>																																																																
<p>8) Area occupied by non-reservoir facilities (e.g., dam, penstocks, powerhouse).</p>	<p>The non-reservoir facilities for the project include 2 dams, intake works, 11 ft. diameter 550' long penstock, powerhouse, a transformer/switchyard building and a tailrace. These facilities occupy approximately 20,576 square feet.</p>																																																																
<p>9) Number of acres inundated by the Facility.</p>	<p>Approximately 43 acres of land area are located under the project impoundment. The 5 acres tailrace pond is a natural river pool rimmed by ledge outcropping with 1-2 foot deep island at outlet formed when dam broke.</p>																																																																
<p>10) Number of acres contained in a 200-foot zone extending around entire impoundment.</p>	<p>A buffer area extending 200 feet outwards from the project impoundment would have an area of 88.7 acres.</p>																																																																
<p>11) Please attach a list of contacts in the relevant Resource Agencies and in non-governmental organizations that have been involved in Recommending conditions for your Facility.</p>	<p>A list of key Resource Agencies and NGOs involved in the relicensing proceedings and consultation regarding compliance with the conditions of the FERC license and local environment conservation and recreational uses of the project area is in Appendix A.</p>																																																																
<p>12) Please attach a description of the Facility, its mode of operation (i.e., peaking/run of river) and a map of the facility.</p>	<p>Please see the Introduction at the beginning of this document for a description of the facility and its mode of operation. Please see Appendix B for site drawings and maps.</p>																																																																
<p>Questions for "New" Facilities Only: If the Facility you are applying for</p>	<p>Yes- The facility capacity was increased after FERC re-issued the project license on April 30, 2002 (Appendix H). The previous FERC license for the project expired on 9/1/2001 and FERC issued its Environment Assessment in 12/2001 (Appendix G). A re-application for licensing was applied for and</p>																																																																

<p>is "new" i.e., an existing dam that added or increased power generation capacity after August of 1998 please answer the following questions to determine eligibility for the program</p>	<p>granted including restoration of two low flow turbine/generators installed in the powerhouse, each with 400 kW capacity, that were replaced to 490 kW each. This increased generation capacity was obtained from rehabilitating two existing turbine-generating units that had been in operation since the early 1980's and did not involve any new civil structures. License amendment is necessary to increase in net capacity by approximately 380 kW by cleaning silt from the tailrace, reducing losses at the intake. An impact study of restoring flashboards on the Woronoco dam is proposed, but no decision has been made to apply for a FERC amendment in the future.</p>
<p>13) When was the dam associated with the Facility completed?</p>	<p>The Woronoco project dam is composed of two sections, the 351' long South Dam replaced a timber crib dam built in 1872 with a concrete dam in 1950. A 307' North Dam was constructed after the 1938 hurricane flood swept away the area that now forms the bypass reach below the North Dam. Both dams have concrete ogee shaped spillways built on ledge outcroppings. Both have deep discharge gates that are used to drain the impoundment and discharge the minimum habitat maintenance flow from the dams (22 cfs at the North dam, 15 cfs at the South dam and 20 cfs at the Forebay fish passage facility).</p>
<p>14) When did the added or increased generation first generate electricity? If the added or increased generation is not yet operational, please answer question 18 as well.</p>	<p>The rehabilitation the two existing generation units was completed when T-2 began generation in July 2005 and T-1 began generation in April 2008. Each generator passed capacity tests above 490 kW and has been rated at the capacity for generation of CT Class I RECs and to generate RI New RECs.</p>
<p>15) Did the added or increased power generation capacity require or include any new dam or other diversion structure?</p>	<p>No, neither increase in project capacity required or included a new dam or diversion structure. The original capacity increase was from the rehabilitation of existing units on site. Another proposed capacity increase is lowering the tail pool and repairing draft tubes; modification to the trash racks with a new rake at the intake will reduce debris accumulation and relocation of the fish passage at the intake works will improve fish passage and reduce head losses.</p>
<p>16) Did the added or increased capacity include or require a change in water flow through the facility that worsened conditions for fish, wildlife, or water quality (for example, did operations change from run-of-river to peaking)?</p>	<p>No: the plant operates in pond level control as a run-of-river plant. However, the restored capacity from the two rehabilitated units did restore the design flow to the licensed 710 cfs peak flow of the facility but it did not change any environmental characteristics of the project. The capacity change was approved by the appropriate Resource Agencies during the FERC re-licensing process. The current modifications to restore the project capacity to 2780 kW have no influence on the amount of water flows that the project's licensed water rights because the capacity increases are due to efficiency increases. The output increase will fund the fish passage facility improvements.</p>
<p>17) (a) Was the existing dam recommended for removal or decommissioning by Resource Agencies, or recommended for removal or decommissioning by a broad representation of interested persons and organizations in the local and/or regional community prior to the added or increased capacity? (b) If you answered "yes" to question 17(a), the Facility is not eligible for certification, unless you can show that the added or increased capacity resulted in specific measures to improve fish, wildlife, or water quality protection at the existing dam. If</p>	<p>No, Woronoco Dam has never before been recommended for removal. A detailed search of Woronoco's FERC docket has revealed no recommendation for dam removal. The reissued FERC license reduced the gross head by 2.5 ft because the former owner, IPC, did not include the 30" of flashboards in its license renewal application because it shut down its paper mill and planned to sell the hydro plant. As new owners we asked FERC to include flashboards in its Environmental Assessment (EA) but FERC responded by letter that it was too advanced in its study to include the flashboards and a crest gate at that time, so the study recommends applying for an amendment once the low flow units have been rehabilitated and the fish passage facilities have been improved and passed their effectiveness testing.</p>

such measures were a result, please explain.	
18) (a) If the increased or added generation is not yet operational, has the increased or added generation received regulatory authorization (e.g., approval by the Federal Energy Regulatory Commission)? If not, the facility is not eligible for consideration; and (b) Are there any pending appeals or litigation regarding that authorization? If so, the facility is not eligible for consideration.	No, the increase in generation from the 2700 kW of the FERC license would require an amended license, which is not proposed at this time. The focus of Woronoco's investment has been to increase efficiency and fish passage effectiveness. Woronoco will apply to MTC for a grant to study the impacts of restoring flashboards with an Obermeyer crest gate on the dam but, support from the Resource Agencies is not strong as a matter of policy at this time. Thus, amending the license is not scheduled as part of Woronoco's LIHI application process. You will find reference to the study in the project's revised Comprehensive Fish Passage Plan now in agency review because there are several benefits such as reduced velocities in front of the racks and a safe passage route over a lowered section of the crest gates for smolt during the majority of their passage season while the Westfield River still is flowing above the 767 cfs combined flow of the turbines' full gate 710 cfs flow plus the regulator's required 57 cfs bypass discharge rate for habitat protection.

A. Flows	Pass	Fail	Applicant Answer
1) Is the Facility in Compliance with Resource Agency Recommendations issued after December 31, 1986 regarding flow conditions for fish and wildlife protection, mitigation and enhancement (including instream flows, ramping and peaking rate conditions, and seasonal and episodic instream flow variations) for both the reach below the tailrace and all bypass reaches?	YES = Pass, Go to B N/A = Go to A2	NO = Fail	Yes, Woronoco is in compliance with the Resource Agency recommendations made during the FERC relicensing process. Please see the attached yearly certification of Woronoco's minimum flow releases before FERC in Appendix C . Woronoco has a Resource Agency and FERC approved Minimum Flow Discharge and Management Plan (see Appendix C) and operates in compliance with that the Discharge Monitoring Plan .
2) If there is no flow condition recommended by any Resource Agency for the Facility, or if the recommendation was issued prior to January 1, 1987, is the Facility in Compliance with a flow release schedule, both below the tailrace and in all bypass reaches, that at a minimum meets Aquatic Base Flow standards or "good" habitat flow standards calculated using the Montana-Tennant method?	YES = Pass, go to B NO = Go to A3		N/A
3) If the Facility is unable to meet the flow	YES =Pass,	NO =Fail	N/A

standards in A.2., has the Applicant demonstrated, and obtained a letter from the relevant Resource Agency confirming that demonstration, that the flow conditions at the Facility are appropriately protective of fish, wildlife, and water quality?	go to B		
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B. Water Quality	Pass	Fail	Applicant Answer
1) Is the Facility either: a) In Compliance with all conditions issued pursuant to a Clean Water Act Section 401 water quality certification issued for the Facility after December 31, 1986? Or b) In Compliance with the quantitative water quality standards established by the state that support designated uses pursuant to the federal Clean Water Act in the Facility area and in the downstream reach?	YES = Go to B2		Yes- the facility is in compliance with the Woronoco Water Quality Certificate issued after December 31, 1986. Please see the attached Water Quality Certificate in Appendix D and annual compliance statements from Woronoco LLC to the FERC in Appendix C .
2) Is the Facility area or the downstream reach currently identified by the state as not meeting water quality standards (including narrative and numeric criteria and designated uses) pursuant to Section 303(d) of the Clean Water Act?	YES = Go to B3 NO = Pass		No, the area downstream of the project is classified by the State of Massachusetts as a Class B water body which means it meets the appropriate water quality standards. The Strathmore Paper Mill was shutdown in 1997 and its water treatment plant (not part of the Woronoco Hydro project) is no longer discharging into the Westfield River. Please see the attached Water Quality Assessment of the Westfield River Basin in Appendix E .
3) If the answer to question B.2 is yes, has there been a determination that the Facility is not a cause of that violation?	YES = Pass	NO = Fail	N/A

C. Fish Passage and Protection	Pass	Fail	Applicant Answer
1) Is the Facility in Compliance with Mandatory Fish Passage Prescriptions for	YES = Go to C5 N/A = Go	NO = Fail	Yes, the facility is currently in compliance with the Fish passage recommendations made by the appropriate Resource Agencies during the FERC relicensing process. The upstream juvenile American eel passageways have been installed and are

<p>upstream and downstream passage of anadromous and catadromous fish issued by Resource Agencies after December 31, 1986?</p>	<p>to C2</p>		<p>operational (see draft 2009 Report in Appendix M presently being reviewed by the Resource Agencies: MDEP, MDFW, USFWS and TU). Upstream Atlantic salmon passage is managed by the MDFW at its trap and truck facility 3 miles downstream of the project. Woronoco's downstream fish passage facility has operated since 1998, but FERC ordered Woronoco to develop a Comprehensive Fish Passage Plan, the most recent is attached as Appendix K that address two FERC orders made for fish passage on July 21, 2009 and for eel passage on July 23, 2009. Woronoco is in compliance with various design changes have been tested for effectiveness as downstream smolt passage facilities to bypass the dam and is making a third generation of changes to find the best design components. Woronoco will convert its existing 1 ¼" racks to ¾" bar spacing in March 2010 before the next smolt passage season. Velocity testing will take place in early April and construction of a new entrance to the passage system is proposed for July, while the forebay is dewatered to install the new trash rake designed to keep the ¾" racks clear of trash and frazil ice. FERC and the Resource Agencies granted the project an extension of time to consult on the new Plan an to obtain agency approval for the rack change (now approved) and the fish passage entrance change (now in consultation). Please see the order granting an extension of time for completion of the downstream salmon passage facilities in Appendix F</p>
<p>2) Are there historic records of anadromous and/or catadromous fish movement through the Facility area, but anadromous and/or catadromous fish do not presently move through the Facility area (e.g., because passage is blocked at a downstream dam or the fish run is extinct)? a) If the fish are extinct or extirpated from the Facility area or downstream reach, has the Applicant demonstrated that the extinction or expiration was not due in whole or part to the Facility? b) If a Resource Agency Recommended adoption of upstream and/or downstream fish passage measures at a specific future date, or when a triggering event occurs (such as completion of passage</p>	<p>YES = Go to C2a NO = Go to C3 YES = Go to C2b N/A = Go to C2b YES = Go to C5 N/A = Go to C3</p>	<p>NO = Fail NO = Fail</p>	<p>N/A There are plans for fish passage past the Woronoco dam under the regulation of FERC, USFWS, MDFW, MDEP and with consultation with Trout Unlimited and the Westfield River Watershed Association and local fishing groups.</p>

<p>through a downstream obstruction or the completion of a specified process), has the Facility owner/operator made a legally enforceable commitment to provide such passage?</p>			
<p>3) If, since December 31, 1986: a) Resource Agencies have had the opportunity to issue, and considered issuing, a Mandatory Fish Passage Prescription for upstream and/or downstream passage of anadromous or catadromous fish (including delayed installation as described in C2a above), and b) The Resource Agencies declined to issue a Mandatory Fish Passage Prescription, c) Was a reason for the Resource Agencies' declining to issue a Mandatory Fish Passage Prescription one of the following: (1) the technological infeasibility of passage, (2) the absence of habitat upstream of the Facility due at least in part to inundation by the Facility impoundment, or (3) the anadromous or catadromous fish are no longer present in the Facility area and/or downstream reach due in whole or part to the presence of the Facility?</p>	<p>NO = Go to C5 N/A = Go to C4</p>	<p>YES = Fail</p>	<p>N/A</p>
<p>4) If C3 was not applicable: a) Are upstream and downstream fish passage survival rates for anadromous and catadromous fish at the dam each documented at greater than 95% over</p>	<p>YES = Go to C5</p>	<p>NO = Fail</p>	<p>N/A</p>

<p>80% of the run using a generally accepted monitoring methodology? Or b) If the Facility is unable to meet the fish passage standards in 4.a., has the Applicant demonstrated, and obtained a letter from the US Fish and Wildlife Service or National Marine Fisheries Service confirming that demonstration, that the upstream and downstream fish passage measures (if any) at the Facility are appropriately protective of the fishery resource?</p>			
<p>5) Is the Facility in Compliance with Mandatory Fish Passage Prescriptions for upstream and/or downstream passage of Riverine fish?</p>	<p>YES = Go to C6 N/A = Go to C6</p>	<p>NO = Fail</p>	<p>N/A- No riverine fish passage has been recommended.</p>
<p>6) Is the Facility in Compliance with Resource Agency Recommendations for Riverine, anadromous and catadromous fish entrainment protection, such as tailrace barriers?</p>	<p>YES = Pass, go to D N/A = Pass, go to D</p>	<p>NO = Fail</p>	<p>Yes, the facility is in the process of compiling with Resource Agency recommendations for anadromous and catadromous fish entrainment protection and will install ¾" bar spaced racks in March 2010 to prevent entrainment of smolt, adult eels and post spawn kelt returning to the Atlantic. Woronoco has sent a proposal to the Resource Agencies, consultants, and FERC to design and test an improved entrance for the passage system to speed passage instead of the angled lead designs tested in 2005 and 2008. The trap and truck upstream Salmon passage facility is located downstream of Woronoco and Woronoco's juvenile American eel passage ladders are in full compliance with the current Resource Agencies recommendations. Please see FERC order granting an extension of time for completion of the downstream smolt passage facilities in Appendix F and the 2009 Juvenile American Eel Testing Report in Appendix M. Also see a recent letter in Appendix A written for the LIHI application by MDFW acknowledging consultation and conditional qualification of Woronoco for low impact hydro certification if Woronoco complies with conditions of its FERC license and passes Effectiveness tests for all passage facilities.</p>

D. Watershed Protection	Pass	Fail	Applicant Answer
<p>1) Is there a buffer zone dedicated for conservation purposes (to protect fish and wildlife habitat, water quality, aesthetics and/or low-impact recreation)</p>	<p>YES = Pass, go to E and receive 3 extra</p>	<p>NO = go to D2</p>	<p>No, there is no buffer zone around the impoundment. However, there are no residences within 200' of the impoundment, but there is a public road, bridge and RR track in active use within 200' of the river, as well as a FERC approved public Recreation Plan (Appendix J) and the Town of Russell has a park and recreation area that uses the impoundment for fishing, boating and swimming.</p>

extending 200 feet from the high water mark in an average water year around 50 - 100% of the impoundment, and for all of the undeveloped shoreline?	years of certification		All of the activities around the shore of the impoundment are low impact and managed by the town or by the project. See FERC inspection report in Appendix N)
2) Has the facility owner/operator established an approved watershed enhancement fund that: 1) could achieve within the project's watershed the ecological and recreational equivalent of land protection in D.1., and 2) has the agreement of appropriate stakeholders and state and federal resource agencies?	YES = Pass, go to E and receive 3 extra years of certification	NO = go to D3	No, the owner has not established an approved watershed enhancement fund. It is a member of the Westfield River Watershed Association and participates in its meetings as a contributing resource. Woronoco has some river bank land that could be transferred to an appropriate non-profit organization, but an option has not presented itself to date.
3) Has the facility owner/operator established through a settlement agreement with appropriate stakeholders and that has state and federal Resource Agencies agreement on appropriate shoreland buffer or equivalent watershed land protection plan for conservation purposes (to protect fish and wildlife habitat, water quality, aesthetics and/or low impact recreation).	YES = Pass, go to E	NO = go to D4	No, Woronoco LLC has not established a settlement agreement with appropriate stakeholders and it has no state or federal Resource Agency agreement for a shoreland buffer zone or equivalent watershed land protection plan for conservation purposes. Woronoco has a Recreation Plan that has been approved by local, state and federal agencies, NGOs and interest groups. It allows access to the river bank, impoundment and tail water pool at designated access points that keep the public safe from the dangers of an operating hydro station by fencing and warning signs, boat buoys, etc.
4) Is the facility in compliance with both state and federal Resource Agencies recommendations in a license approved shoreland management plan regarding protection, mitigation or enhancement of shorelands surrounding the project.	YES = Pass, go to E	No = Fail	Yes- We are in compliance with the issued FERC License regarding a Public Recreation Plan (Appendix J) . No plan was ever recommended by the Resource Agencies during the relicensing process. Please see Appendix G for a copy of the FERC Environmental Assessment and Appendix H for the FERC License with its compliance orders.

E. Threatened and Endangered Species Protection	Pass	Fail	Applicant Answer
1) Are threatened or endangered species listed under state or federal Endangered Species Acts present in the Facility area and/or downstream reach?	YES = Go to E2 NO = Pass, go to		Yes, there is a Massachusetts State Listed Species present at the project. Both the USFWS and MNHESP were consulted during the FERC relicensing and Kleinschmidt made a study. USFWS found no evidence of federally listed species, however the MNHESP found evidence of the Squawfoot freshwater mussel, a state listed species. Please see Appendix G for the MNHESP and USFWS

	F		correspondence.
2) If a recovery plan has been adopted for the threatened or endangered species pursuant to Section 4(f) of the Endangered Species Act or similar state provision, is the Facility in Compliance with all recommendations in the plan relevant to the Facility?	YES = Go to E3 N/A = Go to E3	NO = Fail	Yes, we are in compliance with all provisions of the "Standard Operating Procedures for Relocation of Freshwater Mussels in the Project Impoundment," a plan approved by FERC and the Resource Agencies. The impoundment cannot be drained unless the "Mussel Relocation Plan" is implemented. Please see a copy of the attached plan in Appendix I. Woronoco is in compliance and has not drawn down the impoundment since installing a stop log gate to mitigate the need for annual draw downs of the head pond as IPC did to make equipment repairs. Woronoco installed an automatic roller gate at the entrance to the penstock so the draining the impoundment for turbine maintenance is not required.
3) If the Facility has received authority to incidentally take a listed species through: (i) Having a relevant agency complete consultation pursuant to ESA Section 7 resulting in a biological opinion, a habitat recovery plan, and/or (if needed) an incidental Take statement; (ii) Obtaining an incidental Take permit pursuant to ESA Section 10; or (iii) For species listed by a state and not by the federal government, obtaining authority pursuant to similar state procedures; is the Facility in Compliance with conditions pursuant to that authority?	YES = Go to E4 N/A = Go to E5	NO = Fail	Yes, Woronoco consulted with the appropriate Resource Agencies, MNHESP and MDFW during the licensing process and since when it need to build the stop-log gate. They stated that no habitat destruction would occur by operating the station in its current configuration and the only way that the fresh water mussels would be harmed is from impoundment "drawdowns" for repairs and maintenance. Woronoco is concerned about the environment, therefore it first constructed a "stoplog" gate structure that allows work in the intake area without the need to draw down the head pond. Only repair of one of the deep discharge gates or a below water area on the upstream side of the dam would require lowering the impoundment. At such time Woronoco would obtain the necessary permits and implement its Mussel Relocation Plan to avoid harm to any mussels found in the impoundment. Please see the Resource Agencies correspondence in Appendix G and the Mussel Relocation Plan in Appendix I.
4) If a biological opinion applicable to the Facility for the threatened or endangered species has been issued, can the Applicant demonstrate that: a) The biological opinion was accompanied by a FERC license or exemption or a habitat conservation plan? Or b) The biological opinion was issued pursuant to or consistent with a recovery plan for the endangered or threatened species? Or c) There is no recovery plan for the threatened or endangered species under active development by the	YES = Pass, go to F	NO = Fail	Yes, the Resource Agencies approved Woronoco's Freshwater Mussel Relocation Plan to protect the endangered specie when there is a need to drain the impoundment. There is no active "recovery plan" for the "threatened or the endangered species at the Woronoco Project, other than the freshwater mussels relocation plan in the Woronoco impoundment or bypass reach because the operation of the project does not threaten this state listed specie.

relevant Resource Agency? Or d) The recovery plan under active development will have no material effect on the Facility's operations?			
5) If E.2. and E.3. are not applicable, has the Applicant demonstrated that the Facility and Facility operations do not negatively affect listed species?	YES = Pass, go to F	NO = Fail	Yes, generation at the Woronoco Facility does not directly affect the listed Mussels. The Mussel Recovery Plan was developed, tested, and implemented to eliminate any hazard for freshwater mussels. Please see the Resource Agencies correspondence in Appendix G and the Mussel Recover Plan in Appendix I.
F. Cultural Resource Protection	Pass	Fail	Applicant Answer
1) If FERC-regulated, is the Facility in Compliance with all requirements regarding Cultural Resource protection, mitigation or enhancement included in the FERC license or exemption?	YES = Pass, go to G N/A = Go to F2	NO = Fail	Yes, the facility is in compliance with all requirements regarding Cultural Resource protection, mitigation and enhancement included in the FERC license. No significant cultural resources were identified by the Massachusetts Department of Historic Preservation in correspondence during project relicensing. Please see Appendices G and H.
2) If not FERC-regulated, does the Facility owner/operator have in place a plan for the protection, mitigation or enhancement of impacts to Cultural Resources approved by the relevant state or federal agency or Native American Tribe, or a letter from a senior officer of the relevant agency or Tribe that no plan is needed because Cultural Resources are not negatively affected by the Facility?	YES = Pass, go to G	NO = Fail	N/A

G. Recreation	Pass	Fail	Applicant Answer
1) If FERC-regulated, is the Facility in Compliance with the recreational access, accommodation (including recreational flow releases) and facilities conditions in its FERC license or exemption?	YES = Go to G3 N/A = Go to G2	NO = Fail	Yes, the facility encourages public access to its recreational facilities in the project impoundment, bypass reach and tailrace. Please see the FERC approved Recreational Plan in Appendix J and the FERC inspection of the project recreational resources on June 2009 found in Appendix N with letters confirming repair of signs following the FERC site visit.
2) If not FERC-regulated,	YES =	NO	N/A

does the Facility provide recreational access, accommodation (including recreational flow releases) and facilities, as Recommended by Resource Agencies or other agencies responsible for recreation?	Go to G3	= Fail	
3) Does the Facility allow access to the reservoir and downstream reaches without fees or charges?	YES = Pass, go to H	NO = Fail	Yes, Woronoco Hydro LLC permits free public access to the shoreline of the Woronoco Project across Woronoco's lands where project facilities, hazardous areas and easements do not preclude access.
H. Facilities Recommended for Removal	Pass	Fail	Applicant Answer
1) Is there a Resource Agency Recommendation for removal of the dam associated with the Facility?	NO = Pass, Facility is Low Impact	YES = Fail	No Resource Agency has ever recommended that Woronoco Dam be considered for removal.