| RIPUC Use Only | |
|---|---|
| Date Application Received: | __ __/__ __/__ __ |
| Date Review Completed: | __ __/__ __/__ __ |
| Date Commission Action: | __ __/__ __/__ __ |
| Date Commission Approved: | __ __/__ __/__ __ |

| GIS Certification #: |
|---|
| _____ |

# RENEWABLE ENERGY RESOURCES ELIGIBILITY FORM

## The Standard Application Form
## Required of all Applicants for Certification of Eligibility of Renewable Energy Resource
## (Version 4 – November 7, 2006)

## STATE OF RHODE ISLAND PUBLIC UTILITIES COMMISSION
## Pursuant to the Renewable Energy Act
## Section 39-26-1 et. seq. of the General Laws of Rhode Island

**NOTICE:**

**When completing this Renewable Energy Resources Eligibility Form and any applicable Appendices, please refer to the State of Rhode Island and Providence Plantations Public Utilities Commission Rules and Regulations Governing the Implementation of a Renewable Energy Standard (RES Regulations, Effective Date: January 1, 2006), and the associated RES Certification Filing Methodology Guide. All applicable regulations, procedures and guidelines are available on the Commission's web site: www.ripuc.org/utilityinfo/res.html. Also, all filings must be in conformance with the Commission's Rules of Practice and Procedure, in particular, Rule 1.5, or its successor regulation, entitled "Formal Requirements as to Filings."**

- **Please complete the Renewable Energy Resources Eligibility Form and Appendices using a typewriter or black ink.**

- **Please submit one original and three copies of the completed Application Form, applicable Appendices and all supporting documentation to the Commission at the following address:**

**Rhode Island Public Utilities Commission**
**89 Jefferson Blvd**
**Warwick, RI 02888**
**Attn: Renewable Energy Resources Eligibility**

**In addition to the paper copies, electronic/email submittals are required under Commission regulations. Such electronic submittals should be sent to: Luly E. Massaro, Commission Clerk at lmassaro@puc.state.ri.us**

- **In addition to filing with the Commission, Applicants are required to send, electronically or electronically and in paper format, a copy of the completed Application including all attachments and supporting documentation, to the Division of Public Utilities and Carriers and to all interested parties. A list of interested parties can be obtained from the Commission's website at www.ripuc.org/utilityinfo/res.html.**

- **Keep a copy of the completed Application for your records.**

- **The Commission will notify the Authorized Representative if the Application is incomplete.**

- **Pursuant to Section 6.0 of the RES Regulations, the Commission shall provide a thirty (30) day period for public comment following posting of any administratively complete Application.**

- **Please note that all information submitted on or attached to the Application is considered to be a public record unless the Commission agrees to deem some portion of the application confidential after consideration under section 1.2(g) of the Commission's Rules of Practice and Procedure.**

- **In accordance with Section 6.2 of the RES Regulations, the Commission will provide prospective reviews for Applicants seeking a preliminary determination as to whether a facility would be eligible prior to the formal certification process described in Section 6.1 of the RES Regulations. Please note that space is provided on the Form for applicant to designate the type of review being requested.**

- **Questions related to this Renewable Energy Resources Eligibility Form should be submitted in writing, preferably via email and directed to: Luly E. Massaro, Commission Clerk at lmassaro@puc.state.ri.us**

**SECTION I: Identification Information**

1.1 Name of Generation Unit (sufficient for full and unique identification):
PAWTUCKET HYDROPOWER

1.2 Type of Certification being requested (check one):
☒ Standard Certification ? Prospective Certification (Declaratory Judgment)

1.3 This Application includes: (Check all that apply)[1]

- ☐ APPENDIX A: Authorized Representative Certification for Individual Owner or Operator
- ☒ APPENDIX B: Authorized Representative Certification for Non-Corporate Entities Other Than Individuals
- ☒ APPENDIX C: Existing Renewable Energy Resources
- ☐ APPENDIX D: Special Provisions for Aggregators of Customer-sited or Off-grid Generation Facilities
- ☐ APPENDIX E: Special Provisions for a Generation Unit Located in a Control Area Adjacent to NEPOOL
- ☐ APPENDIX F: Fuel Source Plan for Eligible Biomass Fuels

1.4 Primary Contact Person name and title: CHARLES ROSENFIELD
SECRETARY - TREASURER OF SOLE MEMBER

1.5 Primary Contact Person address and contact information:
Address: 87 SENEXET ROAD
WOODSTOCK, CT 06281

Phone: (860) 928-7100 Fax: (860) 928-7100
Email: putnamhydro@charter.net

1.6 Backup Contact Person name and title: PRIMARY CONTACT ONLY

1.7 Backup Contact Person address and contact information:
Address: _____

Phone: _____ Fax: _____
Email: _____

[1] Please note that all Applicants are required to complete the Renewable Energy Resources Eligibility Standard Application Form and all of the Appendices that apply to the Generation Unit or Owner or Operator that is the subject of this Form. Please omit Appendices that do not apply.

1.8 Name and Title of Authorized Representative (*i.e.*, the individual responsible for certifying the accuracy of all information contained in this form and associated appendices, and whose signature will appear on the application):

CHARLES ROSENFIELD
SECRETARY-TREASURER OF SOLE MEMBER

Appendix A or B (as appropriate) completed and attached? (? Yes) ? No ? N/A

1.9 Authorized Representative address and contact information:

Address: 87 SENEXET ROAD
WOODSTOCK CT 06281

Phone: (860) 928-7100 Fax: (860) 928-7100
Email: putnamhydro@charter.net

1.10 Owner name and title: PAWTUCKET HYDROPOWER LLC

1.11 Owner address and contact information:

Address: 87 SENEXET ROAD
WOODSTOCK, CT 06281

Phone: (860) 928-7100 Fax: (860) 928-7100
Email: putnamhydro@charter.net

1.12 Owner business organization type (check one):

- ☐ Individual
- ☐ Partnership
- ☐ Corporation
- ☒ Other: LLC

1.13 Operator name and title: PAWTUCKET HYDROPOWER

1.14 Operator address and contact information:

Address: 87 SENEXET ROAD
WOODSTOCK CT 06281

Phone: (860) 928-7100 Fax: (860) 928-7100
Email: putnamhydro@charter.net

1.15 Operator business organization type (check one):

- ☐ Individual
- ☐ Partnership
- ☐ Corporation
- ☒ Other: LLC

**SECTION II: Generation Unit Information, Fuels, Energy Resources and Technologies**

2.1 ISO-NE Generation Unit Asset Identification Number or NEPOOL GIS Identification Number (either or both as applicable): 789

2.2 Generation Unit Nameplate Capacity: 1.6 MW

2.3 Maximum Demonstrated Capacity: 1.35 MW

2.4 Please indicate which of the following Eligible Renewable Energy Resources are used by the Generation Unit: (Check ALL that apply) – *per RES Regulations Section 5.0*

- ☐ Direct solar radiation
- ☐ The wind
- ☐ Movement of or the latent heat of the ocean
- ☐ The heat of the earth
- ☒ Small hydro facilities
- ☐ Biomass facilities using Eligible Biomass Fuels and maintaining compliance with all aspects of current air permits; Eligible Biomass Fuels may be co-fired with fossil fuels, provided that only the renewable energy fraction of production from multi-fuel facilities shall be considered eligible.
- ☐ Biomass facilities using unlisted biomass fuel
- ☐ Biomass facilities, multi-fueled or using fossil fuel co-firing
- ☐ Fuel cells using a renewable resource referenced in this section

2.5 If the box checked in Section 2.4 above is "Small hydro facilities", please certify that the facility's aggregate capacity does not exceed 30 MW. – *per RES Regulations Section 3.31*

☑ ← check this box to certify that the above statement is true

? N/A or other (please explain) _____

_____

2.6 If the box checked in Section 2.4 above is "Small hydro facilities", please certify that the facility does not involve any new impoundment or diversion of water with an average salinity of twenty (20) parts per thousand or less. – *per RES Regulations Section 3.31*

☑ ← check this box to certify that the above statement is true

? N/A or other (please explain) _____

_____

2.7 If you checked one of the Biomass facilities boxes in Section 2.1 above, please respond to the following:

A. Please specify the fuel or fuels used or to be used in the Unit: _____

_____

B. Please complete and attach Appendix F, Eligible Biomass Fuel Source Plan.

Appendix F completed and attached? ? Yes ? No ? N/A

2.8 Has the Generation Unit been certified as a Renewable Energy Resource for eligibility in another state's renewable portfolio standard?

☒ Yes ? No If yes, please attach a copy of that state's certifying order.

Copy of State's certifying order attached? ✓ Yes ? No ? N/A

**SECTION III: Commercial Operation Date**

Please provide documentation to support all claims and responses to the following questions:

3.1 Date Generation Unit first entered Commercial Operation: 03/01/85 at the site.

3.2 Is there an Existing Renewable Energy Resource located at the site of Generation Unit?

☒ Yes
☐ No

3.3 If the date entered in response to question 3.1 is earlier than December 31, 1997 or if you checked "Yes" in response to question 3.2 above, please complete Appendix C.

Appendix C completed and attached? ✓ Yes ? No ? N/A

3.4 Was all or any part of the Generation Unit used on or before December 31, 1997 to generate electricity at any other site?

☒ Yes
☐ No

3.5 If you checked "Yes" to question 3.4 above, please specify the power production equipment used and the address where such power production equipment produced electricity (attach more detail if the space provided is not sufficient):

VOEST-ALPINE TURBINES SANTASALO GEARBOXES, GE GENERATORS AND CONTROLS AT 34 ROOSEVELT AVE, PAWTUCKET RI

**SECTION IV: Metering**

4.1 Please indicate how the Generation Unit's electrical energy output is verified (check all that apply):

☒ ISO-NE Market Settlement System
☐ Self-reported to the NEPOOL GIS Administrator
☐ Other (please specify below and see Appendix D: Eligibility for Aggregations):

Appendix D completed and attached? ? Yes ? No ✓ N/A

**SECTION V: Location**

5.1 Please check one of the following that apply to the Generation Unit:

- [x] Grid Connected Generation
- [ ] Off-Grid Generation (not connected to a utility transmission or distribution system)
- [ ] Customer Sited Generation (interconnected on the end-use customer side of the retail electricity meter in such a manner that it displaces all or part of the metered consumption of the end-use customer)

5.2 Generation Unit address: 34 ROOSEVELT AVE
PAWTUCKET, RI

5.3 Please provide the Generation Unit's geographic location information:

A. Universal Transverse Mercator Coordinates: UTM 19 302178E 4688588N

B. Longitude/Latitude: 41.876N/71.384W

5.4 The Generation Unit located: (please check the appropriate box)

- [x] In the NEPOOL control area
- [ ] In a control area adjacent to the NEPOOL control area
- [ ] In a control area other than NEPOOL which is not adjacent to the NEPOOL control area ← *If you checked this box, then the generator does not qualify for the RI RES – therefore, please do not complete/submit this form.*

5.5 If you checked "In a control area adjacent to the NEPOOL control area" in Section 5.4 above, please complete Appendix E.

Appendix E completed and attached? ? Yes ? No ✓ N/A

**SECTION VI: Certification**

6.1 Please attach documentation, using one of the applicable forms below, demonstrating the authority of the Authorized Representative indicated in Section 1.8 to certify and submit this Application.

**Corporations**

If the Owner or Operator is a corporation, the Authorized Representative shall provide **either**:

(a) Evidence of a board of directors vote granting authority to the Authorized Representative to execute the Renewable Energy Resources Eligibility Form, **or**

(b) A certification from the Corporate Clerk or Secretary of the Corporation that the Authorized Representative is authorized to execute the Renewable Energy Resources Eligibility Form or is otherwise authorized to legally bind the corporation in like matters.

Evidence of Board Vote provided? ? Yes ? No ☑ N/A

Corporate Certification provided? ? Yes ? No ☑ N/A

**Individuals**

If the Owner or Operator is an individual, that individual shall complete and attach APPENDIX A, or a similar form of certification from the Owner or Operator, duly notarized, that certifies that the Authorized Representative has authority to execute the Renewable Energy Resources Eligibility Form.

Appendix A completed and attached? ? Yes ? No ☑ N/A

**Non-Corporate Entities**

(Proprietorships, Partnerships, Cooperatives, etc.) If the Owner or Operator is not an individual or a corporation, it shall complete and attach APPENDIX B or execute a resolution indicating that the Authorized Representative named in Section 1.8 has authority to execute the Renewable Energy Resources Eligibility Form or to otherwise legally bind the non-corporate entity in like matters.

Appendix B completed and attached? ☑ Yes ? No ? N/A

6.2 Authorized Representative Certification and Signature:

I hereby certify, under pains and penalties of perjury, that I have personally examined and am familiar with the information submitted herein and based upon my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties, both civil and criminal, for submitting false information, including possible fines and punishment. My signature below certifies all information submitted on this Renewable Energy Resources Eligibility Form. The Renewable Energy Resources Eligibility Form includes the Standard Application Form and all required Appendices and attachments. I acknowledge that the Generation Unit is obligated to and will notify the Commission promptly in the event of a change in a generator's eligibility status (including, without limitation, the status of the air permits) and that when and if, in the Commission's opinion, after due consideration, there is a material change in the characteristics of a Generation Unit or its fuel stream that could alter its eligibility, such Generation Unit must be re-certified in accordance with Section 9.0 of the RES Regulations. I further acknowledge that the Generation Unit is obligated to and will file such quarterly or other reports as required by the Regulations and the Commission in its certification order. I understand that the Generation Unit will be immediately de-certified if it fails to file such reports.

Signature of Authorized Representative:

SIGNATURE:  DATE: 1/5/07

SECRETARY - TREASURER OF SOLE MEMBER
(Title)

GIS Certification #:
_____

# APPENDIX B
## (Required When Owner or Operator is a Non-Corporate Entity Other Than An Individual)

## STATE OF RHODE ISLAND
## PUBLIC UTILITIES COMMISION

## RENEWABLE ENERGY RESOURCES ELIGIBILITY FORM
**Pursuant to the Renewable Energy Act**
**Section 39-26-1 et. seq. of the General Laws of Rhode Island**

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**RESOLUTION OF AUTHORIZATION**

**Resolved**: that CHARLES ROSENFIELD, named in Section 1.8 of the Renewable Energy Resources Eligibility Form as Authorized Representative, is authorized to execute the Application on the behalf of PAWTUCKET HYDROPOWER LLC the Owner or Operator of the Generation Unit named in section 1.1 of the Application.

SIGNATURE: _____ DATE: 1/5/07

State: CT

County: WINDHAM

(TO BE COMPLETED BY NOTARY) I, Sean M. Morrissey as a notary public, certify that I witnessed the signature of the above named Charles Rosenfield and that said person stated that he/she is authorized to execute this resolution, and the individual verified his/her identity to me, on this date: January 5th 2007.

SIGNATURE: _____ DATE: 1/5/2007

My commission expires on: August 31 2010 NOTARY SEAL:

OFFICIAL SEAL
Notary Public, Connecticut
County of Windham
SEAN M. MORRISSEY
My Commission Expires Aug. 31, 2010

| GIS Certification #: |
| --- |
| ———— |

# APPENDIX C
## (Required of all Applicants with Generation Units at the Site of Existing Renewable Energy Resources)

## STATE OF RHODE ISLAND
## PUBLIC UTILITIES COMMISION

## RENEWABLE ENERGY RESOURCES ELIGIBILITY FORM
**Pursuant to the Renewable Energy Act**
**Section 39-26-1 et. seq. of the General Laws of Rhode Island**

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If the Generation Unit: (1) first entered into commercial operation before December 31, 1997; or (2) is located at the exact site of an Existing Renewable Energy Resource, please complete the following and attach documentation, as necessary to support all responses:

C.1 Is the Generating Unit seeking certification, either in whole or in part, as a New Renewable Energy Resource? ✓ Yes ? No

C.2 If you answered "Yes" to question C.1, please complete the remainder of Appendix C. If you answered "No" and are seeking certification entirely as an Existing Renewable Energy Resource, you do NOT need to complete the remainder of Appendix C.

C.3 If an Existing Renewable Energy Resource is/was located at the site, has such Existing Renewable Energy Resource been retired and replaced with the new Generation Unit at the same site? ? Yes ✓ No

C.4 Is the Generation Unit a Repowered Generation Unit (as defined in Section 3.28 of the RES Regulations) which uses Eligible Renewable Energy Resources and which first entered commercial operation after December 31, 1997 at the site of an existing Generation Unit? ? Yes ✓ No

C.5 If you checked "Yes" to question C.4 above, please provide documentation to support that the entire output of the Repowered Generation Unit first entered commercial operation after December 31, 1997.

C.6 Is the Generation Unit a multi-fuel facility in which an Eligible Biomass Fuel is first co-fired with fossil fuels after December 31, 1997? ? Yes ✓ No

C.7 If you checked "Yes" to question C.6 above, please provide documentation to support that the renewable energy fraction of the energy output first occurred after December 31, 1997.

C.8 Is the Generation Unit an Existing Renewable Energy Resource other than an Intermittent Resource (as defined in Section 3.9 and 3.14 of the RES Regulations)? ? Yes (✓) No

C.9 If you checked "Yes" to question C.8 above, please attach evidence of completed capital investments after December 31, 1997 attributable to efficiency improvements or additions of capacity that are sufficient to, were intended to, and can be demonstrated to increase annual electricity output in excess of ten percent (10%). As specified in Section 3.22.v of the RES Regulations, the determination of incremental production shall not be based on any operational changes at such facility **not directly** associated with the efficiency improvements or additions of capacity.

C.10 Is the Generating Unit an Existing Renewable Energy Resource that is an Intermittent Resource? (✓) Yes ? No

C.11 If you checked "Yes" to question C.10 above, please attach evidence of completed capital investments after December 31, 1997 attributable to efficiency improvements or additions of capacity that are sufficient to, were intended to, and have demonstrated on a normalized basis to increase annual electricity output in excess of ten percent (10%). The determination of incremental production shall not be based on any operational changes at such facility **not directly** associated with the efficiency improvements or additions of capacity. In no event shall any production that would have existed during the Historical Generation Baseline period in the absence of the efficiency improvements or additions to capacity be considered incremental production. Please refer to Section 3.22.vi of the RES Regulations for further guidance. SEE ATTACHED PAGE

C.12 If you checked "Yes" to C.10, provide the single proposed percentage of production to be deemed incremental, attributable to the efficiency improvements or additions of capacity placed in service after December 31, 1997. Please provide backup information sufficient for the Commission to make a determination of this incremental production percentage.
SEE ATTACHED PAGE

C.13 If you checked "no" to both C.3 and C.4 above, please complete the following:

a. Was the Existing Renewable Energy Resource located at the exact site at any time during calendar years 1995 through 1997? (✓) Yes ? No

b. If you checked "yes" in Subsection (a) above, please provide the Generation Unit Asset Identification Number and the average annual electrical production (MWhs) for the three calendar years 1995 through 1997, or for the first 36 months after the Commercial Operation Date if that date is after December 31, 1994, for each such Generation Unit. SEE ATTACHED PAGE

c. Please attach a copy of the derivation of the average provided in (b) above, along with documentation support (such as ISO reports) for the information provided in Subsection (b) above. Data must be consistent with quantities used for ISO Market Settlement System.

**Pawtucket Hydropower**
**RIPUC Renewable Energy Resources Eligibility Form**
**Appendix C**

**C.11**
Pawtucket Hydropower purchased the Pawtucket project in June 1999 and began efficiency upgrades. These included:

- Removal and complete refurbishment of the Unit 2 turbine to allow full Kaplan (adjustable pitch blade) operation. After repeated mechanical failure the previous owner had converted it to a fixed propeller turbine with non-adjustable blades in 1991. The turbine and shaft were removed in 1999, sent to Pennsylvania for internal redesign and complete overhaul, and reinstalled properly aligned with the rest of the system in 2000.
- Refurbishment of the control system with a newly developed, and improved, cam curve for gate/blade relationship. This increased efficiency when at less than full wicket gate opening.
- Dam repairs improving net head.
- Reduction of station service electric load
- Underwater removal of intake restrictions improving net head in 2001

The cost of this work in the eighteen month period July 1999-December 2000 was $232,000 plus management time not directly charged.

$12,619 was spent on intake restriction removal in 2001

In addition to these expenditures significant investment and repairs were made to other parts of the plant.

**C.12**
The incremental performance attributable to efficiency improvements is 65%. See attached letter and supporting information by Fred Szufnarowski, P.E.

**C.13 b**
The ISO-NE Asset Identification Number for Pawtucket Hydropower is #789.
Average annual MWH production for the years 1995-1997 is as follows:
1995 2,813 MWH
1996 3,887 MWH
1997 1,948 MWH 1995-1997 Average: 2,883 MWH

The ISO has advised us that they do not have records for this plant from 1995-1997. This is the generation data supplied by Eastern Utilities Associates (the previous owner/operator) and Reed Consulting Group when the plant was marketed to be sold.

**C.13 c**
The monthly generation data supplied by Eastern Utilities and Reed Consulting is attached.

Pawtucket Hydropower
Appendix C.13 c
Generation in MWH 1995-1997
Data supplied by Eastern Utilities Associates and Reed Consulting Group

| | Total | January | February | March | April | May | June | July | August | September | October | November | December |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1995 | 2,813 | 572 | 389 | 647 | 364 | 256 | 48 | -4 | 0 | 6 | 57 | 250 | 228 |
| 1996 | 3,887 | 220 | 476 | 579 | 521 | 554 | 254 | 202 | 160 | 150 | 217 | 183 | 371 |
| 1997 | 1,948 | 386 | 371 | 327 | 456 | 289 | 50 | -3 | -3 | -4 | -6 | 46 | 39 |
| Average | 2,883 | | | | | | | | | | | | |

THE ESSEX PARTNERSHIP
65 Main Street, Suite 22
Ivoryton, CT 06442
(860) 237 – 8118

January 3, 2007

Mr. Charles Rosenfield
President
Pawtucket Hydro
87 Senexet Road
Woodstock, CT 06281

Dear Mr. Rosenfield,

Re: Pawtucket Hydroelectric Project

This letter report summarizes the findings of our analyses concerning the efficiency improvements that were implemented at the project in 1999-2001. In accordance with Section 3 of the RES Regulations we developed projections of long-term average energy production for the project, both for the period prior to the efficiency improvements (Baseline) and for the project Post-Upgrade. Based on our analyses of the available data, the efficiency improvements are expected to increase long-term average annual generation by approximately 65% over the Baseline Period. The methodology and details of our study are presented below.

**Background** The Project is located at the mouth of the Blackstone River in Pawtucket RI. In 1984 the project was repowered by installing two identical 'inclined tube' Kaplan (i.e., double regulated) units. Each unit is rated at 820 kW, 200 RPM and 16.5-ft. of head. Due to site flow characteristics, Unit 2 historically has been more efficient, producing approximately 10% more power. Both units experienced problems with their blade operating systems and cams that controlled the Kaplan blade angle, and Unit 2 was converted to fixed blade in 1991.

**Efficiency Improvements** After acquiring the project from the Eastern Utilities Associates/Blackstone Valley Electric in 1999, Pawtucket Hydropower implemented a series of efficiency improvements, including:

1. restoring the crest of the dam to increase the headpond;
2. improving the intake geometry to reduce headloss;
3. installing/replacing equipment to reduce station service load;
4. rehabilitating the blade angle operating system;
5. installing new cams on both units; and
6. converting Unit 2 back to a full Kaplan.

Measures 1-3 are improvements that increase the overall plant efficiency, under all operating conditions. Measures 4-6 will significantly increase turbine efficiency at part load conditions and therefore tend to have their greatest impact during moderate and low flow conditions.

**Analyses** In accordance with Section 3 of the RES Regulations, projections of long-term average annual generation were developed using plant performance data for both the Baseline Period (1995-1997) and Post-Upgrade (2002-2006). For each period relationships were developed between monthly generation and river flow. Generation was capped at river flows of 1,200 cfs, which equates to the station's hydraulic capacity at mean tailwater. The monthly flows were then correlated to long-term average monthly flows to develop projections of long-term average generation for Baseline and Post-Upgrade conditions.

Flow data were obtained from the USGS gauge, no. 0111250. The gauge data were adjusted by the ratio of drainage areas (project drainage area/gauge drainage area) to develop flows at the project. Generation data for the Baseline Period were provided by Pawtucket Hydropower from records they received from the prior owner. Generation data Post-Upgrade were provided by Pawtucket Hydropower from their own operating records. Flow and generation data for both the Baseline and Post-Upgrade Periods are presented in Table 1.

**Results** Average annual river flow for the Baseline Period was approximately 763 cfs, which is noticeably drier than the long-term period of record, 928 cfs. Average annual generation for the baseline Period was 2,883 MWH. Correlating the Baseline river flows to the long-term period of record increases the average annual generation to 3,204 MWH.

Annual river flows for the Post-Upgrade Period (2002-2006) were even drier, averaging 738 cfs. Due to the efficiency improvements, however, the average annual generation after the upgrade increased to 4,531 MWH. Correlating Post-Upgrade river flows to the long-term period of record indicates that annual generation is expected to average 5,285 MWH, which is approximately a 65% increase over the Baseline Period. Monthly flows, generation and percentage increases in generation for Baseline and Post-Upgrade are presented in Table 2.

A side by side comparison of Baseline and Post-Upgrade long-term monthly generation is depicted in Figure 1. As is typical for run-of-river projects, generation peaks during the wet months and then steadily decreases during the drier months of summer and early autumn. More significantly, the plot shows a consistent pattern of higher generation for the Post Upgrade conditions. The percentage increase in generation is greatest during the drier months – when the advantages of the rehabilitated blade angle operating system, cam replacement and Unit 2 Kaplan conversion are most pronounced.

Please feel free to contact me if you have any questions.

Sincerely,

Fred Szufnarowski

Fred Szufnarowski, P.E
The Essex Partnership

Enc.

*Figure 1*

**Pawtucket Hydro**

*The Essex Partnership, LLC*

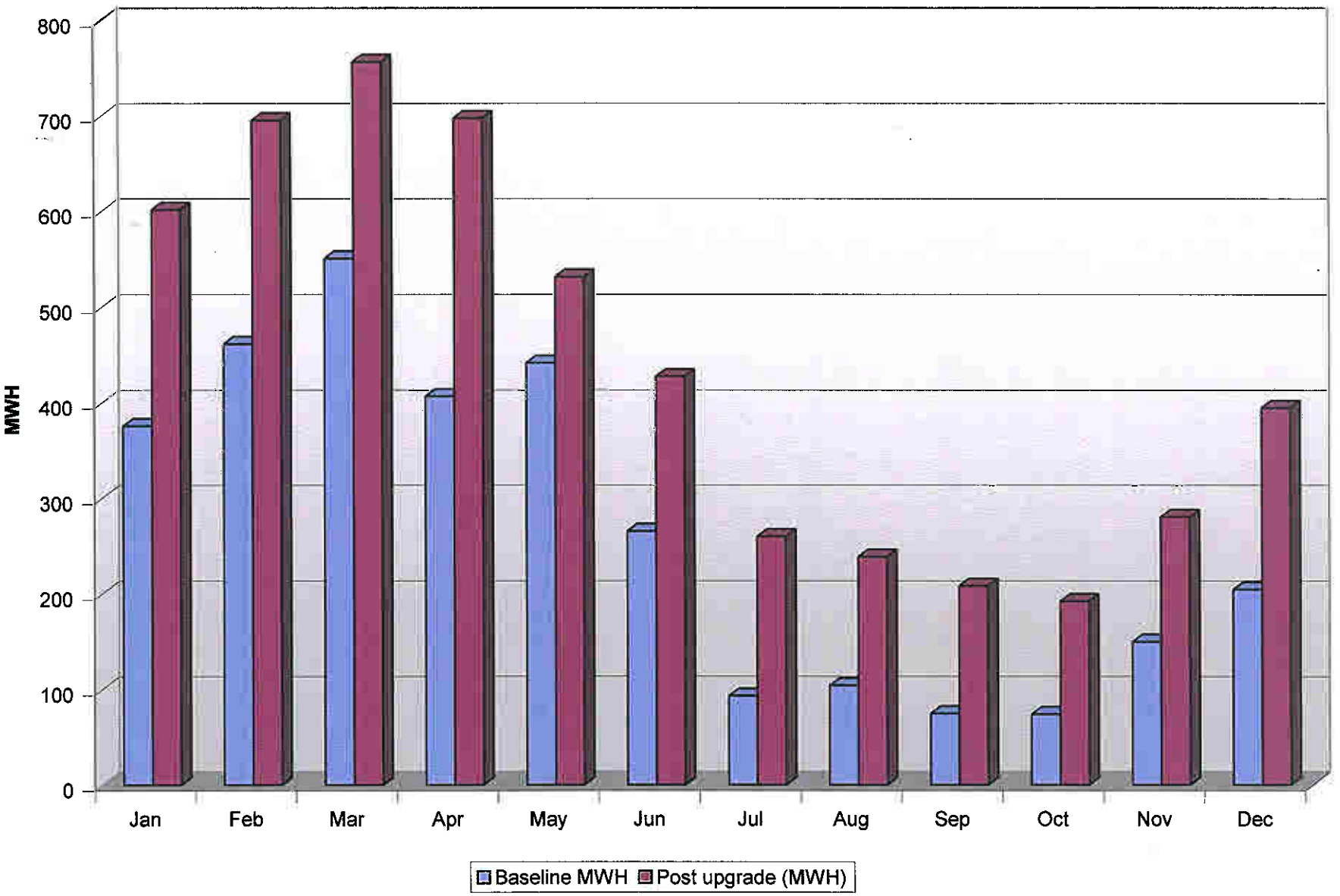

*Table 1*

***Pautucket Hydro***
***Annual Data***

***The Essex Partnership, LLC***
***January 3, 2007***

**Baseline Period**

| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1995 | **MWH** | 572 | 389 | 647 | 364 | 256 | 48 | (4) | 0 | 6 | 57 | 250 | 228 |
| | **Flow (cfs)** | 1,425 | 828 | 1,126 | 644 | 514 | 241 | 144 | 127 | 106 | 507 | 1,091 | 535 |
| 1996 | **MWH** | 220 | 476 | 579 | 521 | 554 | 254 | 202 | 160 | 150 | 217 | 183 | 371 |
| | **Flow** | 1,706 | 1,723 | 1,385 | 1,792 | 1,221 | 456 | 561 | 294 | 568 | 1,354 | 954 | 2,371 |
| 1997 | **MWH** | 386 | 371 | 327 | 456 | 289 | 50 | (3) | (3) | (4) | (6) | 46 | 39 |
| | **Flow** | 1,319 | 1,156 | 1,058 | 2,111 | 932 | 295 | 126 | 124 | 104 | 123 | 431 | 346 |

**Post Upgrade**

| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2001 | **MWH** | 342 | 435 | 564 | 672 | 273 | 320 | 266 | 125 | 45 | 11 | 0 | 91 |
| | **Flow** | 416 | 648 | 2,323 | 1,920 | 443 | 1,015 | 404 | 239 | 150 | 149 | 157 | 222 |
| 2002 | **MWH** | 206 | 257 | 424 | 444 | 389 | 346 | 71 | 28 | 0 | 130 | 249 | 379 |
| | **Flow** | 270 | 345 | 622 | 675 | 1,117 | 699 | 153 | 102 | 131 | 277 | 627 | 1,148 |
| 2003 | **MWH** | 481 | 416 | 667 | 764 | 525 | 648 | 307 | 296 | 232 | 218 | 318 | 380 |
| | **Flow** | 892 | 772 | 1,876 | 1,740 | 924 | 1,634 | 420 | 437 | 311 | 549 | 733 | 1,453 |
| 2004 | **MWH** | 332 | 366 | 513 | 682 | 605 | 275 | 195 | 207 | 245 | 353 | 272 | 601 |
| | **Flow** | 816 | 529 | 724 | 2,364 | 1,036 | 377 | 261 | 267 | 473 | 578 | 615 | 1,434 |
| 2005 | **MWH** | 567 | 635 | 697 | 526 | 639 | 307 | 176 | 48 | 75 | 288 | 309 | 436 |
| | **Flow** | 1,699 | 1,369 | 1,380 | 2,067 | 1,235 | 435 | 390 | 152 | 155 | 2,651 | 1,472 | 1,386 |
| 2006 | **MWH** | 708 | 692 | 421 | 337 | 579 | 658 | 383 | 212 | 158 | 231 | 426 | 595 |
| | **Flow** | 1,874 | 1,749 | 570 | 461 | 1,415 | 2,458 | 507 | 242 | 238 | * | * | * |

Notes: * USGS data not available

*Table 2*

***Pautucket Hydro***
***Generation Analysis***

***The Essex Partenrship, LLC***
***January 3, 1997***

**Long Term Period of Record, 1929-2005**

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average Flow (cfs) | 1,148 | 1,189 | 1,788 | 1,727 | 1,064 | 748 | 398 | 362 | 384 | 506 | 776 | 1,043 | 928 |

**Baseline Period, 1995-1997**

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average Flow (cfs) | 1,200 | 1,061 | 1,128 | 1,318 | 882 | 331 | 277 | 182 | 259 | 610 | 825 | 1,084 | 763 |
| Avg. MWH | 393 | 412 | 518 | 447 | 366 | 117 | 65 | 52 | 51 | 89 | 160 | 213 | 2,883 |
| MWH/cfs | 0.327 | 0.388 | 0.459 | 0.339 | 0.415 | 0.355 | 0.235 | 0.288 | 0.195 | 0.146 | 0.193 | 0.196 | 0.295 |
| MWH, Long-Term Avg. | 376 | 462 | 551 | 407 | 442 | 266 | 93 | 104 | 75 | 74 | 150 | 205 | 3,204 |

**Post-Upgrade, 2002-2006**

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average Flow (cfs) | 876 | 809 | 863 | 947 | 1,095 | 782 | 346 | 240 | 262 | 651 | 794 | 1,187 | 738 |
| Avg. MWH | 459 | 473 | 544 | 551 | 547 | 447 | 226 | 158 | 142 | 247 | 287 | 449 | 4,531 |
| MWH/cfs | 0.524 | 0.585 | 0.631 | 0.581 | 0.500 | 0.571 | 0.654 | 0.659 | 0.543 | 0.380 | 0.362 | 0.378 | 0.531 |
| MWH, Long-Term Avg. | 602 | 695 | 757 | 698 | 532 | 428 | 260 | 239 | 208 | 192 | 280 | 395 | 5,285 |
| Increase (%) | 160% | 151% | 137% | 171% | 120% | 161% | 279% | 229% | 278% | 259% | 187% | 193% | 165% |

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RESUME

# Fred J. Szufnarowski, P.E.

Managing Partner
Principal Engineer

**Education:** B.S. Mathematics, Worcester Polytechnic Institute
B.S. Civil Engineering, University of Massachusetts

**Experience:** 35 years of industry experience working with Independent Power Producers, utilities, and financial institutions on bio-mass, diesel, gas turbine, hydroelectric, solid fuel and wind generating projects.

- The Essex Partnership, L.L.C. - Partner and Principal Engineer. The Essex Partnership provides strategic energy and environmental consulting services to decision-makers and project owners. At the Partnership Mr. Szufnarowski performed the buyer's due diligence for the acquisition of a 14-project hydro portfolio; managed the maintenance overhaul of a pumped storage project; performed the upgrade studies for a large conventional hydro project in the Southeast and assisted owners with the development of hydroelectric projects in Connecticut, New York and Rhode Island

- Kleinschmidt Associates - Owner and Vice President. Head of the Management Consulting Department which provided acquisition and asset management services to project owners, buyers and financial institutions. Directed and managed large-scale energy projects throughout the country including: acquisitions of generating projects; lenders' due diligence evaluations; planning and optimization studies; upgrades; overhauls of generating projects; hydroelectric licensings and post licensing compliance. Conducted training workshops on restructuring of the power industry and ancillary services in deregulated markets.

- Charter Oak Energy – Director of Engineering. Responsible for technical development and Asset Management of an international Independent Power Producer. Led acquisition efforts for coal, gas turbine and hydroelectric projects. Headed the technical development of biomass, gas turbine and wind projects. Representative projects include two biomass projects in India, a combustion turbine project in Colombia, 210 MW coal plant in India, a gas turbine project in Argentina, eight hydroelectric projects in Argentina in Argentina totaling 1,100 MW and a 50 MW wind farm in Costa Rica.

- Northeast Utilities – Principal Engineer, Fossil-Hydro Generation. Directed and managed the construction of new generation projects, repowering and upgrading existing projects, and conducted optimization and planning studies. Led the due diligence effort of generation assets for NU's successful acquisition of Public Service Company NH.

# STATE OF CONNECTICUT

**DEPARTMENT OF PUBLIC UTILITY CONTROL**
**TEN FRANKLIN SQUARE**
**NEW BRITAIN, CT 06051**

**DOCKET NO. 03-12-16 APPLICATION OF PAWTUCKET HYDROPOWER LLC FOR QUALIFICATION OF PAWTUCKET HYDRO AS A CLASS II RENEWABLE ENERGY SOURCE**

September 22, 2005

By the following Commissioners:

Anne C. George
Jack R. Goldberg
John W. Betkoski, III

## DECISION

## I. INTRODUCTION

### A. SUMMARY

In this Decision, the Department of Public Utility Control determines that the Pawtucket Hydro generating facility qualifies as a Class II renewable energy source as a run-of-river hydroelectric facility and assigns it Connecticut Renewable Portfolio Standard (RPS) Registration Number CT00002-03.

### B. BACKGROUND OF THE PROCEEDING

By application dated December 8, 2003, Pawtucket Hydropower LLC. (Pawtucket) requested that the Department of Public Utility Control (Department) determine that the Pawtucket Hydro generation facility qualifies as a Class II renewable energy source.

Pawtucket Hydro is a hydroelectric facility located in Pawtucket, Rhode Island and is owned by Pawtucket. Pawtucket Hydro began commercial operation on July 1, 1984 and has a nameplate capacity of 1.25 MW.

### C. CONDUCT OF THE PROCEEDING

There is no statutory requirement for a hearing, no person requested a hearing, and none was held.

### D. PARTICIPANTS IN THE PROCEEDING

The Department recognized Pawtucket Hydropower LLC, 87 Senexet Road, Woodstock, Connecticut 06281, and the Office of Consumer Counsel, Ten Franklin Square, New Britain, Connecticut 06051, as participants in this proceeding.

## II. DEPARTMENT ANALYSIS

Pursuant to Connecticut General Statutes (C.G.S.) §16-1(a)(27), as amended by Public Act 03-135, An Act Concerning Revisions to the Electric Restructuring Legislation, "Class II renewable energy source" includes energy derived from a run-of-the-river hydropower facility provided such facility has a generating capacity of not more than five megawatts, does not cause an appreciable change in the river flow, and began operation prior to July 1, 2003.

In interpreting C.G.S. §16-1(a)(27), the Department determined that:

(1) "Facility" refers to an entire hydroelectric plant at a single site rather than a turbine generating unit within a hydroelectric plant;

(2) The "generating capacity of not more than five megawatts" refers to a hydroelectric facility's nameplate capacity, not its actual or average generation output;

(3) In order to qualify as "run-of-the-river," a hydroelectric facility must show a current FERC license or exemption that requires the facility to operate in run-of-river mode. In addition, a facility can qualify as a Class I or Class II renewable energy facility only to the extent that its FERC license or exemption requires run-of-river operation. Hydroelectric facilities that are not regulated by FERC will be required to show a FERC order or a court decision stating that FERC has no jurisdiction, or has declined to exercise jurisdiction, over such facility. In such cases, the hydroelectric facility must show that its operation allows the river inflow to equal outflow instantaneously and therefore, does not cause an appreciable change in the river flow; and

(4) "Began operations" means (A) the date an existing facility with existing generation began commercial operation as shown in documentation from FERC; (B) the new date given to an abandoned or destroyed facility that comes back into operation as shown in its documentation from FERC or as determined by the Department; (C) the date upon which a facility changes operation from store and release to run-of-river as shown in documentation from FERC; or (D) the new date that incremental generation is in operation at an existing facility as shown in its documentation from FERC.

See Docket No. 04-02-07, DPUC Declaratory Ruling Concerning "Run-of-the-River Hydropower" as That Term is Used in the Definitions of Class I and Class II Renewable Energy Source in C.G.S. §16-1(a)(26) &(27).

As provided in the Application, Pawtucket Hydro is located in Pawtucket, Rhode Island, is owned by Pawtucket, has a nameplate capacity of 1.25 MW and began commercial operation on July 1, 1984. Application, pp. 1-2. In the application for an exemption from FERC licensing, the Pawtucket Hydro generating facility is described as operating in run-of-river mode. FERC Notice of Application for Exemption of Small Hydroelectric Power Project from Licensing, Project No. 3689-000, dated March 23, 1981. Additionally, Pawtucket states that the small storage volume of the pond prohibits operation in anything other than run-of-river mode, and, at full load with pond level near the top, the pond would only provide 30-40 seconds of water consumption to the turbine/generator. Response to Interrogatory EL-4.

The FERC, in its Order Granting Exemption from Licensing of a Small Hydroelectric Project of 5 Megawatts or Less issued July 21, 1981, granted an exemption to the Pawtucket Hydro facility. FERC issued the exemption based on the information described in the Exemption Application. Further, Pawtucket affirms that the current technical characteristics of the facility are identical to those described to FERC in its application. Response to Interrogatory EL-2. For purposes of C.G.S. § 16-1(27), the Department determines that the Pawtucket Hydro Exemption and Application, taken together with representations from Pawtucket that the facility presently operates as described in those documents, sufficiently establish that the facility is required to operate in run-of-river mode.

Based on the foregoing, the Department determines that the Pawtucket Hydro generating facility qualifies as a Class II renewable energy facility.

## III. FINDINGS OF FACT

1. Pawtucket Hydro is located in Pawtucket, Rhode Island.

2. Pawtucket Hydro is owned by Pawtucket.

3. The facility has a nameplate capacity of 1.25 MW.

4. Pawtucket Hydro began commercial operation on July 1, 1984.

5. In the application for exemption, Pawtucket Hydro is described as operating in a run-of–river mode.

6. The FERC granted an exemption to Pawtucket Hydro.

## IV. CONCLUSION

Based on the evidence submitted, the Department finds that the Pawtucket Hydro generating facility qualifies as a Class II renewable generation source pursuant to Conn. Gen. Stat. § 16-1(a)(27).

The Department assigns each renewable generation source a unique Connecticut RPS registration number. Pawtucket Hydro's Connecticut RPS registration number is CT00002-03.

The Department's determination in this docket is based on the information submitted by Pawtucket. The Department may reverse its ruling or revoke the Applicant's registration if any material information provided by Applicant proves to be false or misleading. The Department reminds Pawtucket that it is obligated to notify the Department within 10 days of any changes to any of the information it has provided to the Department.

**DOCKET NO. 03-12-16 APPLICATION OF PAWTUCKET HYDROPOWER LLC FOR QUALIFICATION OF PAWTUCKET HYDRO AS A CLASS II RENEWABLE ENERGY SOURCE**

This Decision is adopted by the following Commissioners:

Anne C. George

Jack R. Goldberg

John W. Betkoski, III

CERTIFICATE OF SERVICE

The foregoing is a true and correct copy of the Decision issued by the Department of Public Utility Control, State of Connecticut, and was forwarded by Certified Mail to all parties of record in this proceeding on the date indicated.

Louise E. Rickard
Acting Executive Secretary
Department of Public Utility Control

Sept. 22, 2005
Date