

**GREENVILLE DAM PROJECT**

**LIHI APPLICATION**

**ATTACHMENT C**

**FISH PASSAGE**

## Al Nash

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**From:** Gephard, Steve [Steve.Gephard@ct.gov]  
**Sent:** Friday, December 21, 2012 3:01 PM  
**To:** 'Al Nash'  
**Cc:** Mark Greene  
**Subject:** RE: Counter information and LIHI letter

I'm sorry to tell you that I just can't get to this until January. Too many last minute things and I'm am off next week. I will try to get to it promptly after the new year.

I will reassure Mark that I have decided to write the letter of support for LIHI. In most cases, I send that directly to LIHI. Should I do that (and copy you) or should I send it to one of you?

Merry Christmas.

Steve

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**From:** Al Nash [<mailto:al.nash@renewablepowerconsulting.com>]  
**Sent:** Wednesday, December 19, 2012 11:42 AM  
**To:** Gephard, Steve  
**Subject:** Counter information and LIHI letter

Good morning Steve - when you get a chance would you please send me the Denil counter information we discussed and the LIHI letter for Norwich's Occum and Greenville stations?

Alfred Nash, P.E.  
Renewable Power Consulting, PA  
43 Spaulding Road  
P.O. Box 195  
Palmyra, ME 04965  
(207) 992-3926  
email: [AL.Nash@renewablepowerconsulting.com](mailto:AL.Nash@renewablepowerconsulting.com)

UNITED STATES OF AMERICA 69 ferc ¶ 62, 043  
FEDERAL ENERGY REGULATORY COMMISSION

City of Norwich

Project No. 2441-013, -014,  
-015  
Connecticut

ORDER APPROVING AND MODIFYING FISH PASSAGE  
DESIGN DRAWINGS AND APPROVING  
EROSION AND SEDIMENT CONTROL PLAN  
(ISSUED OCTOBER 19, 1994)

On July 20, 1994, the City of Norwich, licensee for the Greenville and Tenth Street Project, filed design drawings for upstream and downstream fish passage under license articles 405 and 406, and an erosion and sediment control plan under license article 401.

The Greenville and Tenth Street Project, located on the Shetucket River, Connecticut, was licensed in a Commission order issued March 31, 1993. The construction of fish passage facilities at the dam was required in the license in order to provide passage for American shad and river herring.

Background

License article 405 sets target dates for the construction of upstream fish lift facilities,<sup>1</sup> and license article 406 sets target dates for the construction of downstream fish passage facilities. Both articles require filing, for Commission approval, of detailed design drawings at least 90 days before the start of any land-clearing or land-disturbing activities.

Articles 405 and 406 require that the filings regarding fish passage be prepared after consultation with the Connecticut Department of Environmental Protection (CDEP) and the U.S. Fish and Wildlife Service (FWS). Documentation of consultation with the agencies is to be included with the filed drawings, along with copies of comments and recommendations, and specific descriptions of how the agencies' comments are accommodated. If a recommendation is not adopted, reasons are to be given based on project-specific information. Articles 405 and 406 state that the Commission reserves the right to require changes to the proposed facilities and schedules.

<sup>1</sup> A Commission order issued April 12, 1994 removed the requirement for a Denil fish ladder originally required by article 405.

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License article 401 requires the licensee to file, at least 90 days before the start of any land-clearing or land-disturbing activities at the project site, an erosion and sediment control plan for the installation of fish passage facilities. The article requires the licensee to file the plan at the same time as the plan required by article 405 are filed.

#### Licensee's Upstream and Downstream Fish Passage Designs

The licensee's filing of July 20, 1994 contained contract documents and design drawings for the upstream and downstream fish passage facilities. Generally, upstream passage will be accomplished via a fish lift hopper with adjustable attractor flow. The hopper, once loaded, will be drawn upwards by an overhead cable to an overhead monorail track. The monorail will transport the hopper horizontally to a walkway where the fish will be netted and placed in trucks for return to the river upstream. Downstream passage will be accomplished via an angled trashrack across the entrance to the power canal. The trashrack will lead to a 36-inch diameter, 70-foot-long downstream migrant pipe, which will carry fish to a plunge pool below the dam.

The CDEP and the FWS, in letters dated July 11, 1994 and August 15, 1994, respectively, listed a number of concerns with the fish passage plans. The licensee's consultant responded to the agencies' comments in letters dated August 12, 1994 and August 15, 1994. In those letters, the licensee agreed to correct the majority of the problems perceived by the two agencies. A letter from the CDEP, dated September 12, 1994, stated that all of the that agency's major concerns were met.

A meeting of the licensee, the licensee's consultant, the CDEP, and the FWS was held September 16, 1994 to resolve any outstanding fishway issues. The minutes from the meeting were filed with the Commission on September 22, 1994. A letter from the FWS dated October 3, 1994 indicated concurrence with the fishway plans, as noted in the modifications in the meeting minutes.

However, the FWS letter stated that one issue had not been completely resolved. FWS stated its concurrence with the design of the facilities if the plans are modified to include a suitable V-trap gate associated with the operation of the fish lift hopper car. The FWS stated that the V-trap gate design was needed in order to ensure that the gate is close before the hopper car was raised to transport the fish.

#### Licensee's Erosion and Sediment Control Plan

The licensee's filing of July 20, 1994 indicated that erosion and sedimentation during construction will be controlled through the dewatering of the power canal, diversion of gate

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leakage, installation of a sheet steel cofferdam upstream of the construction, and installation of a portable cofferdam downstream. Any remaining leakage to the work area will be pumped to a sedimentation basin approximately 350 feet downstream. Prior to the excavation of the downstream plunge pool, a turbidity curtain will be installed. Following the work, the curtain will remain in place until turbidity within the plunge pool area is similar to the ambient condition. Excavated materials will be removed to a spoils area on city property surrounded by a silt fence. Non-earthen spoils will be removed.

A letter from the CDEP, dated August 23, 1994, stated that the plan was suitable for the project, and that the agency had no disagreements. A letter from the FWS, dated September 8, 1994, stated that the plan appeared to be adequate for minimizing detrimental effects to the environment.

#### Discussion and Conclusions

Upstream movement of anadromous fish is currently prevented by the Greenville Dam. The CDEP restoration plan for anadromous species (i.e., American shad and river herring) is based on installing upstream fish passage facilities at Greenville Dam first. Appropriately designed upstream and downstream fish passage are needed to ensure the efficient and safe passage of these species. The licensee's designs for these facilities at Greenville Dam are the result of careful planning and extensive consultation with CDEP and FWS.

The only remaining concern, however, as identified in FWS's October 3, 1994 letter is the design of a V-trap gate associated with the operation of the fish lift hopper. This gate would close prior to hopper movement to prevent fish from escaping during the closing period. The licensee, in its minutes of the September 16 meeting, indicated it would evaluate the use of a V-trap gate to prevent the escapement of fish. Without the construction and operation of this gate, the hopper may operate inefficiently, with the necessity of repeated operation of the hopper with small numbers of collected fish. Therefore, the licensee should be required to design the fish lift hopper with the V-trap gate. The licensee should file this design with the Commission, for Commission approval, within 45 days of the date of issuance of this order. The filing should include the comments of the CDEP and FWS. With this modification included, the licensee's proposed design for upstream and downstream fish passage facilities, to include the agreements with CDEP and FWS described in the meeting minutes filed with the Commission on September 22, 1994, should therefore be approved.

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In addition, the implementation of the licensee's proposed  
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measures in its erosion and sediment control plan will adequately minimize soil erosion and stream sedimentation during construction of the fish passage facilities. The licensee's erosion and sediment control plan should also be approved.

The Director orders:

(A) The design drawings for upstream and downstream fish passage filed on July 20, 1994, to include the agreements with the Connecticut Department of Environmental Protection (CDEP) and the U.S. Fish and Wildlife Service (FWS) described in the meeting minutes filed with the Commission on September 22, 1994, and as modified by paragraph (B) fulfill the requirements of license articles 405 and 406, and C, and are approved.

(B) The licensee shall file for Commission approval, within 45 days of the date of this order, a design for a V-trap gate associated with the operation of the fish lift hopper. The licensee shall prepare the design for this gate after consultation with the CDEP and FWS. The filing shall include comments from the CDEP and FWS on the V-trap gate design.

(C) The Commission reserves the right to require the licensee to make changes to the fish passage facilities' structures and operations in order to ensure the efficient passage of fish through the facilities.

(D) The licensee's erosion and sediment control plan, filed on July 20, 1994, under article 401, is approved.

(E) This order constitutes final agency action. Requests for rehearing by the Commission may be filed within 30 days from the date of issuance of this order, pursuant to 18 CFR § 385.713.

J. Mark Robinson  
Director, Division of Project  
Compliance and Administration

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92 FERC ¶ 62,205

UNITED STATES OF AMERICA  
FEDERAL ENERGY REGULATORY COMMISSION

City of Norwich

Project No. 2441-033

ORDER APPROVING REPORT AND RECOMMENDATIONS FOR  
CONTINUED FISH PASSAGE OPERATION

(Issued September 8, 2000)

City of Norwich (licensee), filed on March 15, 1999, and supplemented on January 31, 2000, the results on monitoring the effectiveness of the upstream and downstream fish passage facilities installed at the Greenville Project. These studies were required by ordering paragraph (A) of the Order Modifying and Approving Fish Passage Assessment Plans, issued on May 7, 1996.<sup>1</sup> The project is located on the Shetucket River in the City of Norwich, New London County, Connecticut.

The May 7, 1996 order required the licensee to file a report on fish passage effectiveness to include a quantitative and qualitative description of the effectiveness of the upstream and downstream fish passage facilities; a description of any problems identified during the evaluation regarding the facilities; and any necessary modifications to the facilities to improve passage.

Upstream and downstream fish passage facilities were required in the order issuing license.<sup>2</sup> In general, upstream passage is accomplished via a fish lift while downstream passage is provided through a 36-inch diameter pipe. Fish are directed towards the bypass pipe via an angled trashrack across the entrance to the power canal, downstream of the gatehouse.

LICENSEE'S REPORT

In general, the fishlift was operated manually from 1996-1998. Significant maintenance was required in 1996-1997 because of leaf litter, but in 1998, a boom was installed upstream of the gate house that successfully deflected leaves from the fishway.

For this evaluation, counts of fish using the fishway were conducted from 1996 to 1998. In 1996, more than 900 American shad and 150 alewives and blueback herring passed via the lift. In 1997, these numbers were 2,800 American shad and 950 alewives

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<sup>1</sup>75 FERC ¶ 62,089 (1996).

<sup>2</sup>62 FERC ¶ 62,225 (1993). See also 69 FERC ¶ 62,043 (1994), 70 FERC ¶ 62,181 (1995), and 73 FERC ¶ 62,028 (1995).

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and blueback herring combined. In 1998, over 5,500 American shad and 460 blueback herring and alewives passed. Given the numbers of fish that passed via the lift, the licensee concluded the 100 cfs attraction flow<sup>3</sup> is adequate to attract fish to the fishway. A mark-recapture study conducted in 1997 with American shad found that over 55 percent of the marked adults used the fishway and actual use is likely higher since studies have found that a number of American shad discontinue upstream migration after being handled.

The licensee made observations at the Tenth Street powerhouse to determine if migrating fish were attracted to the powerhouse's discharge. Although some fish were observed in the tailrace, these numbers were not large, therefore the licensee concluded this powerhouse discharge does not detract from passage via the lift.

In 1998, the licensee also evaluated the adequacy of the minimum flow (250 cfs) in allowing passage of adult clupeids through the bypassed reach. Based on water depth data collected along three transects established in the shallowest portions of the bypassed reach, the licensee determined that 250 cfs is adequate to allow migrating fish passage through this section of river. The licensee's determination is based on expected body thickness of American shad (based on a relationship of body thickness to total fish length). Given the water depths identified, the licensee believes that American shad and the smaller alewives and blueback herring, should not have a problem in passing through the bypassed reach at the required minimum flow.

Regarding downstream passage, no fish were observed during the first year of study (1996) when the entrance was not illuminated. However in 1997 with the entrance illuminated, more than 1000 juvenile clupeids were observed using the facility. Juveniles were first observed both upstream and downstream of the bar racks in September 1997, but this was likely prior to the start of downstream migration. During this time, water temperatures were generally above 20°C. Peak downstream movement of fish began in October 1997 when schools of 5-95 fish approached the illuminated entrance to the fishway. Most fish movement occurred between 5 and 10 p.m. Use of the bypass occurred both during periods of generation and non-generation. Although attempts were made to evaluate the condition of fish using the downstream bypass, only two fish were collected. One exhibited minor scale loss while the other died shortly after capture due to rough contact with the dip net. In 1998, the licensee attempted to document passage of

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<sup>3</sup>The 250 cfs release required by article 403 of the license is partitioned between spill over the flashboards (100 cfs), releases through the upstream fishlift (100 cfs), and the downstream facility (50 cfs). See 72 FERC ¶ 62,241 (1995).



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juveniles under several attraction lighting schemes, but damage to the video equipment delayed this effort and evaluations were postponed until 1999.

Regarding post-spawned adult downstream passage, the licensee observed spent American shad near the fishway in June 1996, but no fish were observed using the facility. The fishway was being operated with an attraction flow of 50 cfs. In early June 1997, the licensee again observed spent adults near the fishway swimming back and forth in front of the bar rack. On June 10, the attraction flow was increased to 60 cfs to determine whether increased flow would facilitate adult passage. Based on observations of fish before and after the increase in flow, it was determined that an attraction flow of 60 cfs facilitated spent adult passage. In addition, the licensee found that lighting may increase the number of spent adults that pass via the fishway.

As discussed above, the licensee evaluated alternative lighting regimes for the downstream fish passage facility in 1999. When adequate numbers of juvenile clupeids were in the area, the licensee installed an underwater camera to document juvenile passage under alternative attraction lighting schemes: (1) continuous attraction lights directed downward in front of the entrance and in the collection chamber; (2) a continuous attraction light directed down in the collection chamber only; (3) a pulsed attraction light (50 minutes on-10 minutes off) directed downward in front of the entrance and a continuous attraction light directed downward in the collection chamber; and (4) no attraction lights. It was found that most fish used the bypass when an attraction light was pulsed in front of the entrance and a continuous attraction light was directed in the collection chamber.

In terms of future operation of the fishlift, the licensee recommends to operate the fishlift weekdays at 8:00 and 10:00 a.m., and 12:00, 2:30, 4:30, 6:30, and 8:30 p.m. between March 16 and June 30. On weekends during the same time period, the timing and frequency of lifts will be adjusted depending on fish presence. When fish presence is light, the fishlift will be operated at 7:30 a.m. and 3:30, 5:30, and 7:30 p.m. When fish presence is heavy, the lift will operate at these same times, in addition to 11:30 a.m. and 1:30 p.m. During the fall migration season (October 1-November 15), the lift will be operated at 7:30 a.m., and 12:00 and 4:00 p.m. (weekdays) and 7:30 a.m. and 3:30 p.m. (weekends). The licensee recommends that operation of the lift may be modified as needed upon mutual agreement between the licensee and Connecticut Department of Environmental Protection (CDEP). In the future, the licensee states the number and species of fish using the lift may be documented by the CDEP.

Regarding future operation of downstream fish passage facility, the licensee states the existing facility appears to successfully attract and pass juvenile clupeids. For spent adult passage, the licensee plans to increase the attraction flow to 60 cfs from June 1

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through August 1 to facilitate passage of adult clupeids through the downstream fishway. The licensee notes this will occur without an increase in the required minimum flow. In the presence of spent adult clupeids, the licensee plans to operate the downstream bypass with attraction lighting. For juvenile clupeid passage, lights will also be operated June-July and September-October. The lights to be used will be 100-watt sodium vapor bulbs. For juvenile passage, the lights will be operated to provide a pulsed attraction light directed in front of the entrance gallery and a continuous attraction light directed towards the collection chamber. The pulsed light will remain on for 50 minutes, followed by 10 minutes off. The licensee plans to provide the CDEP continued access to the downstream fish passage facility. If information gathered by the CDEP indicates that minor modifications to the installed lighting system could enhance downstream passage of clupeids, the licensee plans to adjust the lighting scheme to the extent practical.

#### AGENCY COMMENTS

The CDEP provided comments on the report in letters dated March 9, 1999, and January 24, 2000. The U.S. Fish and Wildlife Service (FWS) commented on the report in letters dated March 11 and September 17, 1999, and January 24, 2000.

The CDEP agrees the fish lift effectively passes shad and river herring and that early operational problems with the lift have been rectified. The CDEP notes that installation of the trash boom significantly reduced leaf litter problems and associated maintenance necessary for proper fish lift operation. Both FWS and CDEP remain concerned about fish passage through the bypassed reach. These agencies are concerned that depths in the riffle areas (with 250 cfs minimum flow) may inhibit movement of adult migrants towards the fishway entrance. The FWS and CDEP state the licensee's determination of flow adequacy is partially based on a ratio of body depth to length that is inconsistent with recent data collected from the Connecticut River. Further, the agencies express concern on the amount of spill that is expected during upstream migration.

The CDEP and FWS did not recommend re-evaluation of passage in the bypassed reach, but request the licensee include spill data and re-evaluate the frequency and magnitude of spill for the months of March-June in the final report. Although no problems with passage through the bypassed reach were observed during the evaluation, the CDEP recommends the licensee should reconsider this issue if future observations indicate migrants are having difficulty passing through the bypassed reach during low flow periods, when spill may be at a minimum.

Regarding downstream passage, the CDEP and FWS agree the facility appears effective at passing spent adult clupeids when attraction flow is 60 cfs. However, both

agencies feel that effective juvenile passage remains uncertain. However, the CDEP agrees the licensee has documented juvenile clupeids used the downstream bypass as currently designed. The CDEP provides minor recommendations for the type of lighting to be used as attraction and recommends that the lighting scheme be flexible to provide for future adjustments in operation. The CDEP offers a commitment to remain active in the monitoring of fish passage at the project. The FWS agrees the licensee should install the lighting as proposed, with the understanding the licensee remain open to changes in light operation, in the event, that changes are deemed necessary by the CDEP.

In the licensee's response to comments, the licensee provided spillway records and operational data, along with explanations of the spillway data, as requested by the agencies. Regarding the zone of passage, the licensee states the criteria for assessing the adequacy of the river bypass depths was addressed at a meeting in 1998. During that meeting, the resource agencies agreed that, if at 250 cfs a significant portion of the channel width had depths of at least 30 centimeters (12 inches), then 250 cfs would be considered adequate. The licensee notes that during the evaluation it was determined that a substantial portion of two of the transects had depths ranging from 10-12 inches and the remaining transect had these depths along five feet of the transect.

The licensee notes CDEP will continue to be allowed access to the downstream fish passage facility. If information gathered by the CDEP indicates that minor modifications to the lighting system would enhance downstream passage, the licensee plans to implement the recommendations to the extent practical.

## DISCUSSION

The licensee's report, with the supplements, documents use of the fishlift and the downstream fishway. As currently operated, the fishlift appears effective on passing fish upstream of the dam. One question that remains is the adequacy of the required minimum flow (250 cfs) in providing fish an acceptable passage route through the bypassed reach. As the CDEP notes, American shad were observed passing through the bypassed reach without difficulty during the evaluation, when the required minimum flow was supplemented by spill.<sup>4</sup> However, when flows are only at the required minimum (250 cfs), it is unclear whether the depths observed are adequate in passing adults through the bypassed reach. If in the future there is evidence that suggests flows released into the bypassed reach are problematic for adult migration, the licensee plans to evaluate options that may enhance passage, including increasing water depth through channelization. This

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<sup>4</sup>According to the licensee's approved fishway maintenance plan, the licensee releases 100 cfs in spill (See 73 FERC ¶ 62,028).

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is an acceptable approach. If in the future evidence suggests the minimum flow is inadequate in providing adequate adult passage through the bypassed reach, the licensee should notify the Commission as soon as possible. The licensee's report should include recommendations for enhancing passage in the bypassed reach and should include comments from the agencies. As the licensee and resource agencies acknowledge, a migration season where flows are limited to 250 cfs may not occur for several years.

Through this evaluation, the licensee has also documented use of the downstream fish passage facility by juvenile and spent adult fish. Similar to the upstream facility, the licensee is open to minor modifications that may enhance passage, such as adjustments to the lighting scheme. For passage of juveniles the licensee plans to operate the facility with pulsed lighting to enhance attraction to the facility. For the passage of spent adults from June 1-August 1, the licensee also plans to use lighting in addition to increasing attraction flow through the facility to 60 cfs. The licensee agrees to provide facility access to CDEP and plans to make minor adjustments, to the extent practical, to improve passage. If in the future, additional modifications are deemed necessary, the Commission should reserve the right to require changes to the facilities or operation of the facilities to improve passage.

According to the approved fishway maintenance plan, the licensee will operate the upstream facility from mid-March through mid-July with operation of the lift occurring every four hours. Through this evaluation, the licensee has fine-tuned this schedule to begin spring operation mid-March and end on June 30. Fall operation will remain the same (October 1 to November 15). The licensee also provides approximate times for lifting on weekdays and weekends. Regarding downstream fish passage, the facility is to be operated year-round. Changes to the downstream facility recommended after completion of this evaluation, include attraction lighting and increasing attraction flow through the facility to 60 cfs, rather than 50 cfs, for spent adult passage from June 1-August 1. This additional flow will likely come from spill through the notched flashboards. Therefore, the partitioning of flow during this time will be 90 cfs spill over the flashboards, 100 cfs released through the upstream fishlift, and 60 cfs released through the downstream facility. As noted in the report, the licensee does not propose any increase in the minimum flow.

The changes in fishway operation recommended by the licensee are based upon three years experience in operating the new facilities and should be approved. Further, the licensee indicates a willingness to continue to work with the CDEP and FWS in further fine-tuning operation of the upstream and downstream fishways. The licensee's plans for continued operation of the upstream and downstream facilities should be approved.

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The Director orders:

(A) The licensee's recommendations for continued operation of the upstream and downstream fish passage facilities, filed on March 15, 1999, and supplemented on January 31, 2000, as modified in paragraph (B) and (C), is approved.

(B) If evidence suggests the minimum flow is inadequate in providing safe adult passage through the bypassed reach, the licensee shall consult with the U.S. Fish and Wildlife Service (FWS) and the Connecticut Department of Environmental Protection (CDEP) and develop measures for enhancing passage in the bypassed reach. The licensee shall file a report with the Commission, for approval, that includes recommendations for enhancing passage. The report should include comments from the FWS and CDEP. The agencies should be provided 30 days to comment on the licensee's report.

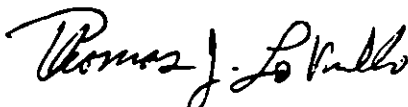
(C) The Commission shall reserve the right to require changes to the upstream and downstream fish passage facilities or operation of the facilities to improve passage.

(D) Unless otherwise directed in this order, the licensee shall file seven copies of any filing required by this order with:

The Secretary  
Federal Energy Regulatory Commission  
Mail Code: DHAC, PJ-12.3  
888 First Street, NE  
Washington, DC 20426

In addition, the licensee shall serve copies of these filings on any entity specified in this order to be consulted on matters related to these filings. Proof of service on these entities shall accompany the filings with the Commission.

(E) This order constitutes final agency action. Requests for rehearing by the Commission may be filed within 30 days of the date of issuance of this order, pursuant to CFR § 385.713.



Thomas J. LoVullo  
Team Leader  
Division of Hydropower Administration  
and Compliance

**ENVIRONMENTAL INSPECTION REPORT  
(ELECTRONICALLY SUBMITTED)  
FEDERAL ENERGY REGULATORY COMMISSION**

**New York Region**

**Date of Inspection - May 11, 2005**

**Name** Greenville **Project No.** 2441-CT

**Licensee** City of Norwich **License Type** Major

**License Issued** March 31, 1993 **License Expires** January 1, 2044

**Location** Shetucket River None  
(Waterway) (Reservation)  
New London Connecticut  
(County) (State)

**Inspector** Joseph Enrico

**Licensee Representatives** Messrs. Roy Borque, Maintenance Engineer &  
Christopher La Rose, Operations Integrity Manager.

**Other Participants** None

**Summary of Findings**

The project was found in good condition with all safety and environmental requirements being met. A sign in compliance with Part 8.2(a) of the regulations was not posted at the Greenville recreation area. A follow up letter was sent to request a schedule for sign installation.

**Submitted** July 29, 2005

Joseph G. Enrico  
**Environmental Protection Specialist**

**A. INSPECTION FINDINGS**

<b>Requirements*</b>	<b>Date of Requirement</b>	<b>Follow-up Needed</b>	<b>Photo Nos.</b>
<b>CULTURAL RESOURCES</b>			
Article 412 requires the licensee to implement a Memorandum of Agreement with the State executed on February 11, 1993. The CMP was filed on 3-31-95 and 7-28-97. <b>C-184</b>	<b>O: 3-31-93 Ap: 8-21-97</b>	N	
Article 413 requires the Licensee to consult with the SHPO and conduct a cultural resource survey prior to any ground disturbance at the project other than authorized in the license. <b>C-184</b>	<b>O: 3-31-93</b>	N	
<b>FISH AND WILDLIFE RESOURCES</b>			
Article 401 requires the licensee to file a Soil Erosion Control Plan prior to the installation of fish passage facilities. Filed 7-20-94. <b>C-120</b>	<b>O: 3-31-93 Ap:10-19-94</b>	N	
Article 402 requires the licensee to operate the project in a run of river mode. <b>C-204</b>	<b>O: 3-31-93</b>	N	
Article 403 requires the licensee to release a minimum flow of 250cfs from the Greenville dam, or inflow. <b>C-089</b>	<b>O: 3-31-93</b>	N	3
Article 404 requires the licensee to install stream flow gages to monitor compliance with the ROR operation and minimum flow release. Plan filed on 4-3-95 and 6-5-95. <b>C-017</b>	<b>O: 3-31-93 Ap:9-19-95</b>	N	1,2
Article 405 requires the licensee to file design drawings and begin construction and complete the installation of an upstream Denil fish ladder by 4-1-96. Filed 7-20-94. Amendment filed 3-14-94 to install lift instead of ladder. Filed revised drawing for V-trap gate design on 12-2-94. <b>C-071</b>	<b>O: 3-31-93 Ap:4-12-94 Ap:10-19-94 Ap:3-20-95</b>	N	4-6
Article 406 requires the licensee to file design drawings and begin construction and complete the installation of downstream fish passage facilities by 4-1-96. Filed 7-20-94. <b>C-018</b>	<b>O: 3-31-93 Ap:10-19-94</b>	N	7,8
Article 407 requires the licensee to file a plan to assess upstream fish passage. The plan is to include post construction evaluation of the facilities as well as attraction flow needed for the fishway. Filed 4-3-95. <b>C-027</b>	<b>O: 3-31-93 Ap:5-7-96</b>	N	
Article 408 requires the licensee to file a plan for post construction evaluation plan to assess the efficiency of the downstream fish passage facilities. Filed 4-3-95. <b>C-027</b>	<b>O: 3-31-93 Ap:5-7-96</b>	N	
Article 409 requires the licensee to file a fishway maintenance plan for operation of the fish passage facilities. Filed 4-3-95 & 6-5-95. <b>C-026</b>	<b>O: 3-31-93 Ap:10-17-95</b>	N	

Requirements*	Date of Requirement	Follow-up Needed	Photo Nos.
<b>PUBLIC SAFETY</b>			
Facilities and measures to assure public safety (18 CFR, Part 12). Filed 5-8-2000. <b>C-218</b>	<b>O: 3-31-93</b> <b>Ap:6-14-00</b>	N	3,9-10
<b>RECREATION RESOURCES</b>			
Article 410 requires the licensee to implement the recreation plan filed with the license application on 8-7-92 and 11-4-92. <b>C-113</b>	<b>O: 3-31-93</b>	N	12-14
Article 411 requires the licensee to monitor recreation use to determine if the facilities are adequate, within five years of license issuance and report in conjunction with the Form 80. Report filed 6-16-00. <b>C-112</b>	<b>O: 3-31-93</b> <b>Ap:6-29-00</b>	N	
Recreation signing and posting (18 CFR, Part 8) <b>C-186</b>	<b>O: 3-31-93</b>	Y	
Standard Article 13 requires the Licensee to allow public free access to project waters and adjacent lands <b>C-110</b>	<b>O: 3-31-93</b>	N	
Submission of the Commission's Form 80 monitoring report. Filed 3-31-03. <b>C-112.</b>	<b>18CFR4-1-03</b>	N	
<b>OTHER ENVIRONMENTAL RESOURCES</b>			
Standard Article 15 requires the Licensee to install fish passage and other wildlife facilities when requested by state and federal resource agencies. <b>C-071</b>	<b>O: 3-31-93</b>	N	
Standard Article 19 requires the Licensee to take reasonable measures to control sedimentation and other pollution at the project. <b>C-120</b>	<b>O: 3-31-93</b>	N	
Article 202 gives the Licensee authority to grant conveyances for non-project use of project lands and waters, for certain types of use without prior Commission approval. <b>C-202</b>	<b>O: 3-31-93</b>	N	

O:=Order C=OEP-IT Code 18CFR=Title 18 Code of Federal Regulations , Ap=Approved

### **COMMENTS AND FOLLOW-UP ACTION**

This project consists of an overflow spillway, gatehouse, power canal and two powerhouses. Upstream and downstream fish passage facilities are also in place and functional. The project's fish lift was in operation and is controlled remotely from the licensee's control center in Norwich (**Photo Nos. 4-6**). The lift began operation in April and lifting is started at 8:30am each day. The licensee's control center, which is manned full time, 24 hours per day and seven days per week, remotely monitors and operates this project as well as the licensee's other project, P-11574, Occum. Equipment at the control center



allows the operator to monitor all project information including generation, flows, headpond and tailwater levels. This information is recorded hourly on manual logs which are available at the licensee's office. Cameras in the control center allow the operator to monitor the fish lift as well as certain areas around the intake canal/headgates. The downstream fish passage facility consists of an angled bar rack with one-inch spacing and discharge chute located in power canal (**Photo Nos. 7 & 8**).

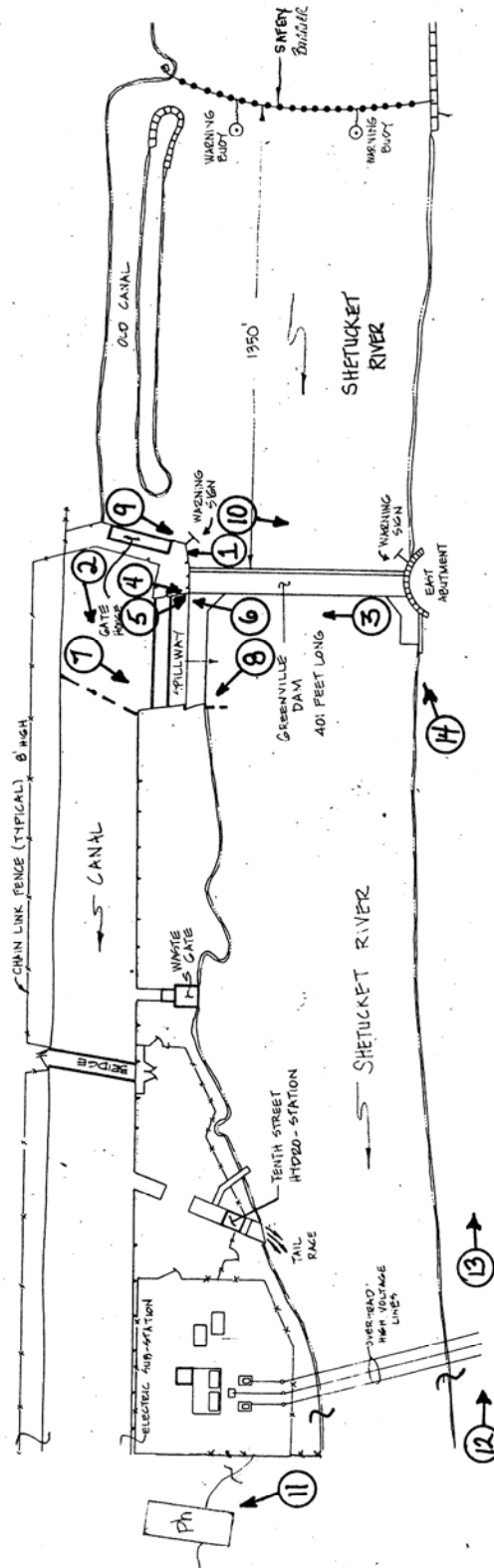
The project provides a fairly good size parking/access area along the left side of the river, downstream of the dam. The powerhouse and intake canal areas are fenced and off limits to the public. The access area is used by hikers, fishermen and canoeists portaging down from upstream areas. The area was in fair condition and is consistently used, according to the licensee. It was noted that there was no sign posted in compliance with Part 8, Section 8.2(a) of the regulations at the recreation area. Signs are posted indicating that the area is open for public use, however. The licensee was advised that the applicable Part 8 information should be included either on the main sign at the entrance or at the kiosk, within the area itself.

## **B. EXHIBITS AND PHOTOGRAPHS**

The following are provided to show the location of the project and to illustrate project features: 14 photographs and photograph location map.

**Cc: FERC-DHCA  
FERC-NYRO  
Enrico, J./di**

L.P. 2441-CT, GREENVILLE  
PHOTOGRAPH LOCATION MAP





**Photo No.1** - View of staff gage and pond level transducer at intake gatehouse.



**Photo No.2** - View of power canal transducer.





**Photo No.3** - View of gatehouse and spillway from left abutment. Arrow denotes camera. Note warning sign. Minimum flow is discharged over the spillway.



**Photo No.4** - View of portion of fish lift.



**Photo No.5** - View of interior of fish lift.



**Photo No.6** - View of eel ladder, looking down from fish lift structure. Facility is operated by the CT Department of Environmental Protection during passage season.





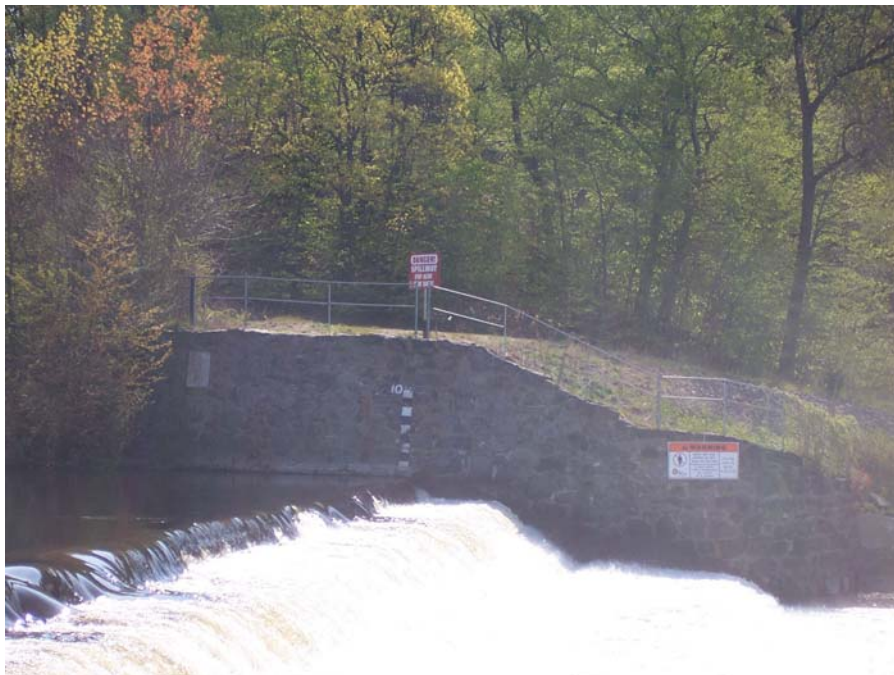
**Photo No.7** - View of downstream fish passage entrance.



**Photo No.8** - View of discharge from downstream fish passage facility.



**Photo No.9** - Upstream warning sign on face of fish lift structure.



**Photo No.10** - View of warning signs and fencing on left abutment. The lower sign is directed to fishermen/canoeists accessing the downstream areas of the river.