

CRESCENT PROJECT

LIHI APPLICATION

ATTACHMENT C

FISH PASSAGE AND PROTECTION



LITTLEVILLE POWER COMPANY, INC.
A SUBSIDIARY OF ENEL GREEN POWER NORTH AMERICA, INC.

Green Power

Enel Green Power North America, Inc.

One Tech Drive, Suite 220
Andover, Massachusetts USA 01810
T 978 681 1900 F 978 681 7727

Via eMail

January 30, 2015

Mr. Michael J. Sale, Ph.D.
Executive Director
Low Impact Hydropower Institute
704 Potters Falls Road
Wartburg, TN 37877

Re: Crescent (Texon) Hydroelectric Project (FERC No. 2986-MA);
Upstream Catadromous Fish Passage Commitment.

Dear Mr. Sale:

Littleville Power Company, Inc. (LPC) has received the intake review comments for our application for Low Impact Hydropower Institute certification for the Crescent (Texon) Hydroelectric Project (FERC No. 2986), located on the Westfield River in Russell, MA. The reviewer's comments under section C.3(b) (Fish Passage and Protection) discuss the potential need for future upstream passage for catadromous species. LPC is providing this letter to confirm its commitment to providing upstream passage for catadromous fish species at the Crescent Project, if and when requested to do so by the resource agencies. While at this time no request has been made, LPC understands and supports the need to provide timely passage facilities at this project once such request is made.

If you have any questions concerning or need additional information regarding this subject please do not hesitate to contact me at (978) 681-1900, extension 809, or by email at Kevin.Webb@enel.com.

Sincerely,
Littleville Power Company, Inc.

A handwritten signature in blue ink, appearing to read "Kevin M. Webb", with a long horizontal line extending to the right.

Kevin M. Webb
Hydro Licensing Manager

cc: R. Bartlett, LPC
Al Nash, Renewable Power Consulting

EagleTribune.com, North Andover, MA

July 15, 2012

Feds end Connecticut River salmon restoration effort

The Eagle-Tribune

--- — MONTPELIER, Vt. (AP) — The federal government is ending its conservation effort to restore Atlantic salmon in the Connecticut River basin because the nearly half-century old program that has stocked about 100 million small fish in tributaries throughout western New England is not working well enough to justify the continued cost, an official said.

The U.S. Fish and Wildlife Service also is beginning a three-year evaluation of a similar program in the Merrimack River basin in Massachusetts and New Hampshire, which could lead to the end of its participation in Atlantic salmon restoration programs there as well, said Fish and Wildlife Regional Assistant Director for Fisheries Bill Archambault.

The only bright spot for Atlantic salmon in the northeastern United States is in Maine where salmon, which were once common throughout the region, continue to return in relatively large numbers to the Penobscot River basin after growing to adulthood in the North Atlantic and returning to the small rivers and streams to spawn, he said.

“I think I speak for most of the biologists for the U.S. Fish and Wildlife Service in that we would very much like to see Atlantic salmon restored to the Connecticut River,” Archambault said. “These are by far the most high-profile, majestic fish of the Connecticut River.”

In 2010 Fish and Wildlife stocked around 6 million tiny fry and 75,000 to 90,000 larger salmon smolts throughout the Connecticut River estuary at a cost of about \$2 million. This spring about 50 adult salmon returned to the Connecticut to spawn in the tributaries where they were released, Archambault said.

To build a self-sustaining population would require the return of at least 1,000 fish a year, Archambault said.

“The fact is there was a lot of money thrown at this for a long time. And the fact that the agency with the statutory responsibility for recovering these fish has admitted failure is significant,” said Chris Wood, the president of Trout Unlimited the national group that works to promote the health of cold-water fish. “The larger perspective is that trout and salmon are the ultimate indicators of the health of the land because every single thing that we do on the land is indicated by the health of the rivers that surround us.”

When Europeans first arrived in what is now New England almost 400 years ago, hundreds of thousands of Atlantic salmon swam up the Connecticut River every year almost to the Canadian border. But the stocks were wiped out around 1800 after the construction of dams kept the fish from making it upstream.

In 1967 Vermont, New Hampshire, Massachusetts and Connecticut got together with the U.S. Fish and Wildlife Service and started working to restore Atlantic salmon to the Connecticut River basin.

If scientists learn more from successful Atlantic salmon programs elsewhere the Connecticut River program could be brought back. “But the science right now just doesn’t justify continued effort from the Fish and Wildlife Service standpoint. I totally agree and am very comfortable with the science that allowed us to redirect,” Archambault said.

Wood said there were too many obstacles in the Connecticut River to successful Atlantic salmon restoration, including dams that block fish access to the tributaries where they breed. He pointed to Maine’s Penobscot River, where conservation efforts are removing dams that block fish access to their breeding grounds, opening up more than 1,000 miles of tributaries.

Archambault called the Penobscot “the last great hope for salmon in the lower 48.”

The Fish and Wildlife decision, announced Tuesday at a meeting in Hadley, Mass., ends the federal participation in the Atlantic salmon restoration. Connecticut and Massachusetts could choose to continue their own programs, Archambault said.

The fish released into the tributaries of Vermont, New Hampshire, Massachusetts and Connecticut live there until they are two years old and then swim downstream into the Connecticut River and then the Atlantic Ocean. They will spend their adult lives in the North Atlantic before returning to the streams where they were released to breed.

Enough of the fish are making it into the Atlantic Ocean. Scientists don’t know why so few fish are able to return from the Atlantic.

The Fish and Wildlife Service is helping to run a similar program in the Merrimack River. Scientists are doing a three-year evaluation of the program there as well. If the rates of return continue to remain low the federal participation in that program will likely end as well.

Despite of the failure of the Atlantic salmon program to restore a breeding population, it had other benefits, including an improved habitat, the removal of some dams and installation of fish ladders that have benefited other species, Archambault said.

LITTLEVILLE POWER COMPANY
SUBSIDIARY OF CHI ENERGY, INC.



CHI Energy, Inc.

Andover Business Park
200 Bulfinch Drive
Andover, MA 01810
(978) 681-1900
Fax (978) 681-7727

February 4, 1999

David P. Boergers, Secretary
Federal Energy Regulatory Commission
Dockets Room, Room 1A, East
888 First Street, N.E.
Washington, D.C. 20426

Re: Crescent Hydroelectric Project (FERC No. 2986-MA)

Dear Secretary Boergers:

At the request of Mr. Michael Monahan of the Commission's New York Regional Office, we are providing the Commission with the following information concerning recent changes to fish passage operations at the Crescent Hydroelectric Project (FERC No. 2986-MA). This information is being supplied for sole purpose of updating the Commission's records on this exempted project, and does not constitute a formal submission requiring Commission action.

During 1993, Littleville Power Company installed a downstream fish bypass facility at the Crescent Project at the request of the U.S. Fish and Wildlife Service (USFWS) and the Massachusetts Division of Fish and Wildlife (MDFW). In accordance with the USFWS's standard requirements, the modifications at the project included installation of a new 45° angle intake structure with 1 inch clear space trashracks and a drop box and pipe downstream bypass facility. The downstream fish bypass is operated from April 1 to June 30, and upon request from October 1 through November 30 each year.

Since installation of the bypass facility and new 1 inch trashracks, power production and provisions for paper mill process water at the site have been seriously impacted by heavy debris and frazil ice loading. This condition is most severe during periods of high flow, during which debris is scoured off of the river banks, and during winter when frazil and anchor ice forms in rapids upstream of the project. The project has experienced severe generation losses due to ice and debris buildup on the racks.

Since the sole purpose of the new 1 inch racks is to prevent entrainment of outmigrating anadromous fishes during the downstream passage season, on September 30, 1996 LPC requested permission from the fishery agencies to seasonally replace the 1 inch racks with coarser racks outside of the normal downstream fish passage season (copy of letter attached). The USFWS responded by letter dated November 30, 1996

David P. Boergers
February 4, 1999
Page 2

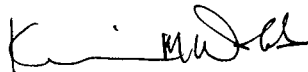
(copy attached), raising a number of areas of concern that would need to be addressed prior to agreeing to any modifications to the existing fish passage facility design.

On December 18, 1996 LPC met with the USFWS and MDFW to discuss the proposal (copy of meeting minutes attached). The fishery agencies and LPC agreed that 1 inch trashrack overlays would be seasonally installed at the Crescent Project between April 1 and June 30 of each year, and as requested by the fishery agencies during the fall. Off season, it was tentatively agreed that 2 inch clear space trashracks would be installed to protect any adult brood stock salmon released into the Westfield River upstream of the project. However, it was also agreed that fish hatchery personnel would measure head widths on available brood stock to determine the maximum trash rack spacing capable of preventing entrainment of adult salmon. Subsequent to the meeting, it was determined that this dimension was 2.25 inches (copies of USFWS fish measurement data attached). Subsequent to the measurements being taken, MDFW and USFWS verbally agreed to the revision on trashrack spacing from 2 inches to 2.25 inches.

The above-described seasonal change of trashracks is considered to be an operational issue which does not affect fisheries resources in the project area. All aspects of the proposed operational change were carried out in full consultation with and with the approval of the appropriate agencies. As the Crescent Project is exempted from the requirements of licensing, this change in project operations does not constitute an issue requiring Commission action.

If you have any questions concerning this information, please do not hesitate to contact me at our Andover, MA office, at (978) 681-1900, extension 1202.

Sincerely,



Kevin M. Webb
Environmental Affairs Coordinator

Littleville Power Company

cc: A. Sidoti, FERC-NYRO
M. Monahan, FERC-NYRO
J. Bogert, CHI
V. Engel, CHI
J. Grenier, CHI



Hydro Development Group
(A Subsidiary of Consolidated Hydro, Inc.)

September 30, 1996

**Re: Crescent Hydroelectric Project
FERC Project 2986-MA
Seasonal Trash Rack Spacing**

Mr. John Warner
U. S. Fish and Wildlife Service
400 Ralph Pill Marketplace
22 Bridge Street
Concord, New Hampshire 03301

Dear Mr. Warner:

As discussed during our 9-26-96 phone conversation, we are submitting a request to use "seasonal" trash rack spacing at the above mentioned site on the Westfield River. The station has been plagued by severe operational problems associated with the new trash racks installed in 1993, as part of the downstream fish passage facilities. These racks, with a spacing of one inch, replaced racks with a four inch spacing.

Due in part to the "flashy" nature of the river and in part to the flood-control reservoirs operated upstream, Crescent Station experiences unusually large amounts of bottom debris during high flow. This debris builds up very quickly, plugging the trash racks, which in turn prevents the station from operating. A Hawke trash rake had been installed at the site and was deficient at keeping up with the debris during periods of high flow. Following flooding, it was not unusual for operators to clean the racks around the clock for up to forty-eight hours. More recently, an automated trash rake has been installed; this rake is also having trouble keeping up with the debris during high flow.

Additionally, during the winter months the station experiences considerable outage time due to both slush ice and anchor ice. This is complicated by the high flow released from the upstream flood control facilities. High winter flows break up the surface ice layer, which normally provide protection from icing problems at hydroelectric intake structures. In the past, it has not been unusual for flood releases to wash out the surface ice three or four times during the winter. With the surface ice gone, Crescent Station is again plagued by the problems associated with slush and anchor ice while the surface ice reforms.

The downstream fish passage facilities are operated from April 1 through June 30 and from October 1 through November 30 each year. Should the station be able to operate with a larger rack spacing the rest of the year, considerable operational problems could be avoided. A larger rack spacing during nonpassage periods would help alleviate problems seven months of the year and would be a significant determinate during the winter months.

We propose to replace the existing trash racks with a new set of racks with spacing of 4". The new racks would be permanently mounted on the intake structure. The 1" spaced racks would be kept on site and installed over the 4" racks during downstream fish passage, specifically from April 1 through June 30 and from October 1 through November 30 each year. The installation could easily be done with a crane, and depending on the mount design, be assisted by a diver. It is estimated that removal or replacement could be accomplished in a day.

Attached are site location plans for the Crescent Hydroelectric Project. Your engineering office should have the Northeast Engineering Associates, Inc. drawings for the intake and downstream fish passage modifications. Should you require copies of these drawings, CHI can provide them.

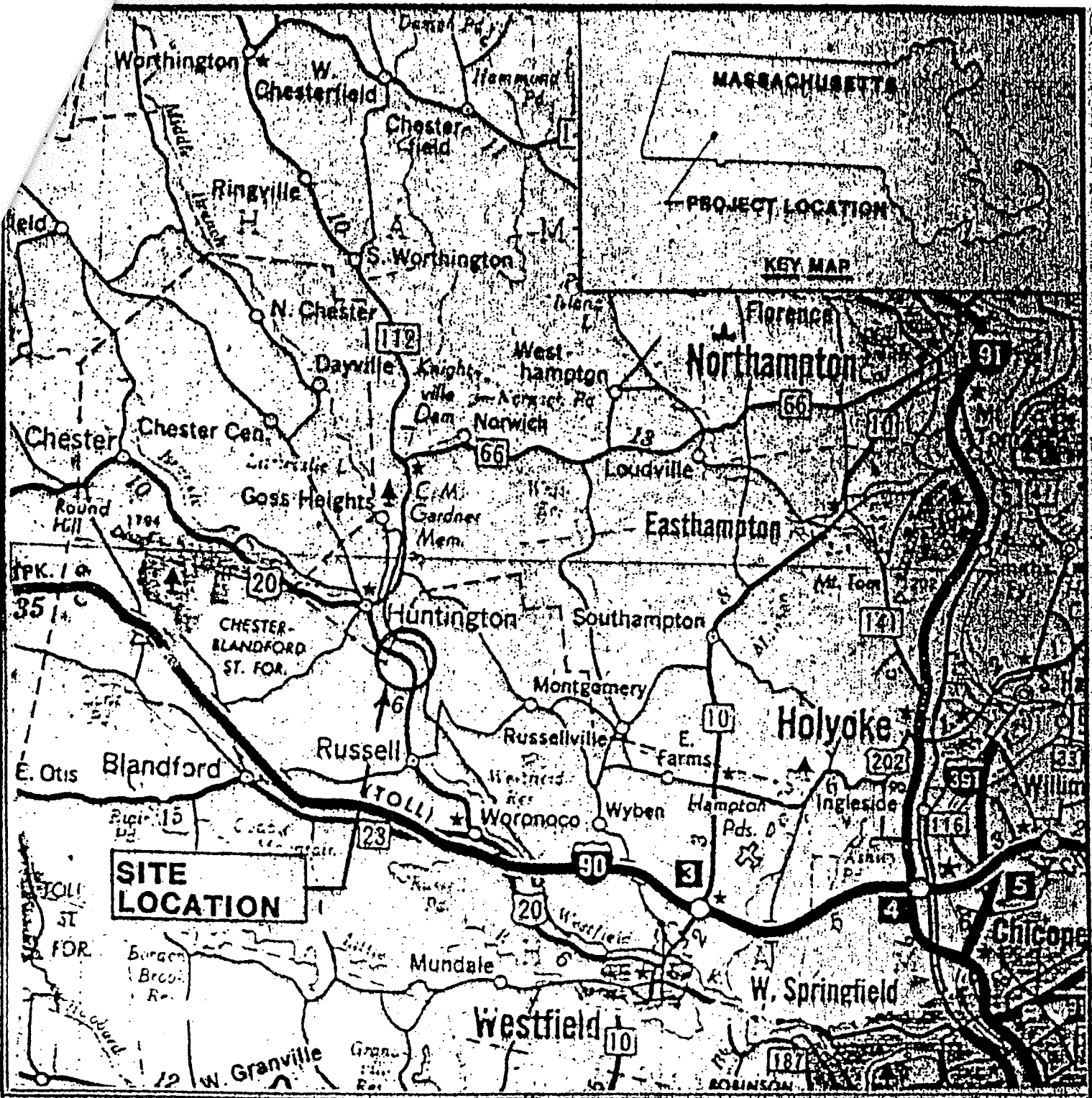
Your time and consideration of this issue would be greatly appreciated. Should you have any questions or require further information, feel free to contact me in our Andover, MA office at 508 681-1900 ext. 1206. Again, thank-you for your time and consideration.

Sincerely,



Greg Bove
Project Engineer

cc: Richard Quinn
John O'Leary
V. Engel
J. Grenier

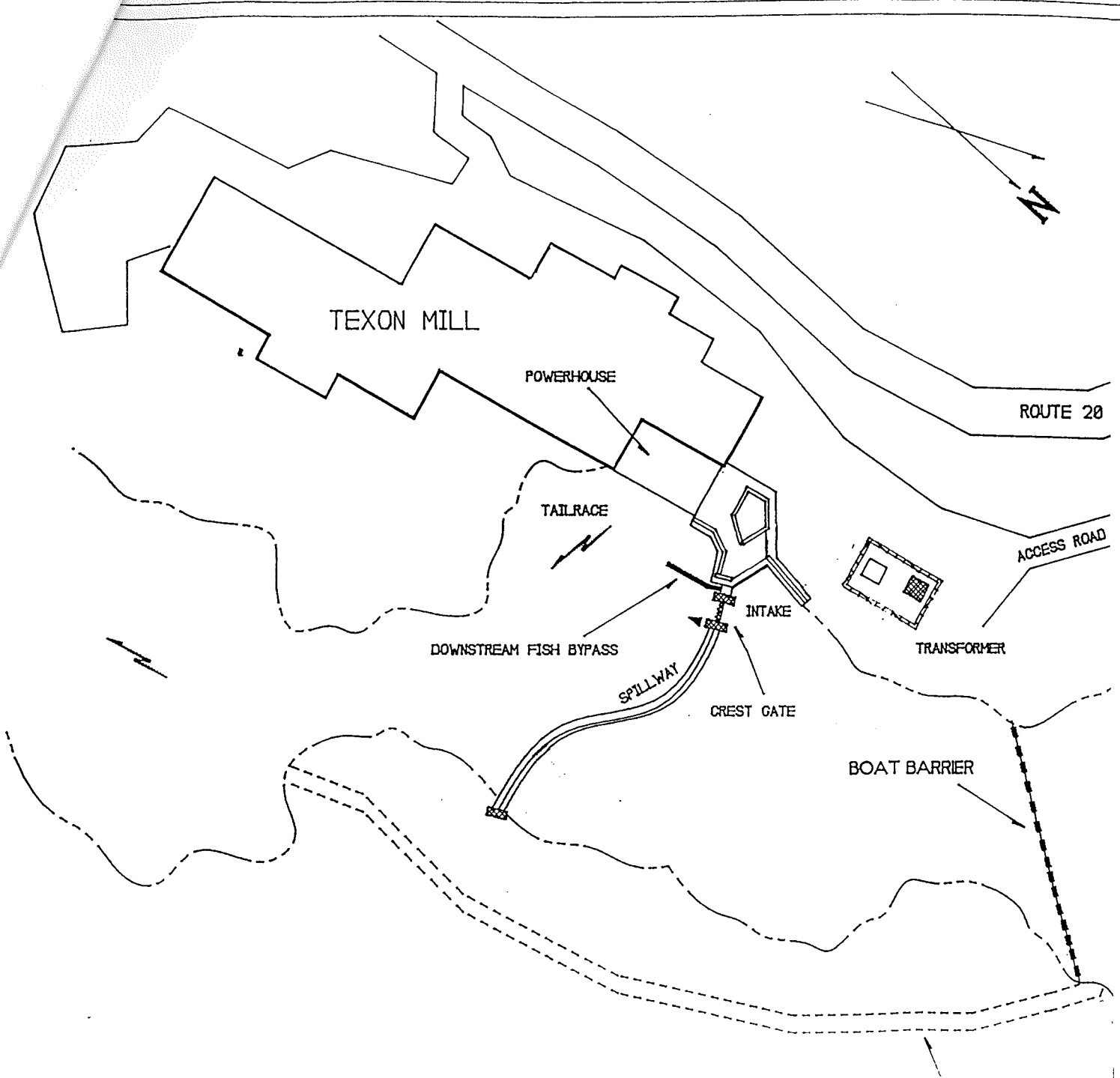


SITE LOCATION MAP

NO SCALE



NORTH



LITTLEVILLE POWER CORP.
CRESCENT DAM
HYDROELECTRIC PROJECT
FERC No. 2986-MA



United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Field Office
22 Bridge Street, Unit #1
Concord, New Hampshire 03301-4986

REF: FERC No. 2986

November 5, 1996

Mr. Greg Bove
Consolidated Hydro Inc.
Andover Business Park
200 Bullfinch Drive
Andover, MA 01810

Dear Mr. Bove:

This is in response to your letter dated September 30, 1996 regarding your interest in modifying the trashrack design at the Crescent Hydropower Project, located on the Westfield River, MA.

In your letter, you discuss the operational problems that have occurred at the project as a result of the one-inch spaced trashrack that was installed in 1993 as part of the downstream passage facility. The narrow-spaced rack, coupled with a bypass gate and sluice were installed to protect emigrating salmon smolts from being entrained into the project turbines or delayed at the project dam.

You propose to replace the 1-inch spaced racks with permanent 4-inch spaced racks, which would be seasonally overlaid with the 1-inch racks during the smolt passage periods. Switching to wider-spaced racks would reduce problems associated with trash and ice buildup on the racks.

Since the installation of downstream passage facilities including the 1-inch racks, we have been assured of safe and efficient downstream passage at the site. We must emphasize that we cannot accept any changes that compromise passage effectiveness, given the importance of the Westfield River to the overall salmon restoration program on the Connecticut River. Before we can agree to changing project trashrack configuration, all other alternatives should be explored. Your letter indicates that operation of the U.S. Army Corps of Engineers dams upstream from your site is a major cause of the trash and icing problems you encounter. John O'Leary of the Massachusetts Division of Fisheries and Wildlife has suggested to us that the Corps' operations be explored to see if some of the problems can be resolved. John offered to help facilitate a joint meeting to discuss this issue. Another possible solution may

be installation of a trash boom coupled with spill through your new hydraulic gate, to sluice trash before it clogs the intake.

If it is determined that changes in the racks are the only solution to the problems at the site, we will seek resolution of a number of concerns regarding the proposed changes. First, we must be assured that the narrow racks/overlay can be installed under all river flow conditions. Installation would be needed by the start date for downstream passage of April 1, regardless of river flows. Second, although we have accepted your proposed approach at other projects, the Westfield differs from many other rivers in that adult salmon are being released upstream from the project. These releases are part of an investigation of habitat and behavior of pre-spawned sea-run salmon during the summer and fall spawning periods. The adult salmon study is expected to continue in upcoming years. Depending upon the results of these studies and future sea-run returns, greater numbers of adult salmon may be released above your project in the future to provide natural spawning.

It is expected that adult salmon will move downstream after spawning, but this could occur from November through to early spring. Based on the outcome of the adult salmon studies, it may be necessary, therefore, to provide bypass operations for adult salmon in periods other than the current smolt passage period. Providing only the proposed 4-inch racks during these periods would not be acceptable. We also note that during periods of adult passage we will not allow any trashrack to be placed in front of the bypass entrance. As stated above, we have accepted the use of seasonal trashrack overlays in the past and on some projects in Maine a punched plate overlay has proven to be an acceptable alternative to the narrow-spaced rack overlay. However, alternatives to modifying the racks should be explored first.

To proceed further on these issues, a meeting of all parties including the Corps of Engineers may be appropriate. You may want to contact John O'Leary of the MDFW regarding the appropriate contact at the Corps. Thank you for this opportunity to comment. If you have any questions, please contact John Warner of this office at (603) 225-1411.

Sincerely yours,



Michael J. Bartlett
Supervisor
New England Field Office

NOV 7 1996

cc: FERC, DPCA - Robinson
Engineering Field Office - Dick Quinn
MDFW - John O'Leary
Connecticut River Coordinator - Jan Rowan
Mass. Coop Fish and Wild. Unit - Don Pugh
Reading File
ES: JWarner:11-5-96:(603)225-1411

Crescent Hydroelectric Trashrack Modification
F.E.R.C. 2986-MA
Minutes of 12-18-96 Meeting

In Attendance:

John Warner	USFWS
Richard Quinn	USFWS
John O'Leary	MDF&W
Victor Engel	CHI
James Grenier	CHI
Kevin Webb	CHI
Greg Bove	CHI

Items of Discussion:

- Description of Crescent Hydroelectric Station.
- Description of the 1993 intake modification to accommodate downstream fish passage.
- Video of normal and heavy debris loading.
- Description of heavy debris loading, high flow conditions, Army Corp. reservoir operation, production loss, mill process water loss.
- Discussion of the effectiveness of the modified intake, source of debris.
- Description of the Atlantic Salmon restoration plan - Connecticut River Basin, Westfield River, Crescent Station impoundment.
- Description of the adult Salmon monitoring program in the east branch of the Westfield River.
- Discussion of trashracks and other fish barriers.
- Discussion of the pros and cons of a wider trashrack spacing.
- Discussion of increasing the trashrack spacing at Crescent Station to 2", during non-passage periods.
- Discussion of obtaining post-spawn adult Salmon head width data from the Nashua and Richard Cronin fish hatcheries to research the acceptability of a wider trashrack spacing.

Conclusion:

Agreement was reached that a 2" space trashrack could be installed at Crescent Station. The 1" spacing will be installed from April 1st through June 30th and as requested in the autumn. The effectiveness of this modification will be monitored and the possibility of a wider spacing will be investigated based on the 2" modification at Crescent and fish hatchery information.

Action Plan:

- Determine cost-benefits of installing 2" spaced trashracks at Crescent.
- Investigate data availability from the fish hatcheries.
- Inform participating agencies of any modifications to operations or the intake at Crescent Station.

Follow-up:

Any questions or comments may be directed to: Greg Bove, Consolidated Hydro, Inc., Andover Business Park, 200 Bulfinch Drive, Andover, MA 04255 (508) 681-1900 x.-1206.

cc: Ed Lippman Army Corp.
Anton Sidoti F.E.R.C.
Dave Santos REXAM, DSI
Ed Champagne IP - Strathmore

PETERSON DISC Tagged
 ATS - Release
 Richard Cronin National Salmon Station
 Post-Spawn Adult Salmon Head Width Study

When Complete, please submit to:

Greg Bove
 Consolidated Hydro, Inc.
 Andover Business Park
 200 Bulfinch Drive
 Andover, MA 01810

PR2
 RFO
 RNS
 P-1
 P3
 R17
 R12

Date	Head Width	Body Width	Date	Head Width	Body Width
1-6-92	2 3/16	2 13/16			
2659	2 13/16	2 13/16			
	2 5/8	2 3/4			
	2 5/8	2 5/8			
	2 5/8	2 5/8			
	2 7/16	2 7/16			
2668	3 1/16	3 1/16			
R17	2 3/4	2 3/4			
2677	2 1 1/16	2 1 1/16			
R02	2 5/8	2 5/8			
2650	2 13/16	2 13/16			
R12	2 3/4	2 3/4			
2633	2 5/8	2 5/8			
R15	2 3/4	2 3/4			
	2 1/2	2 5/8			
	2 1/2	2 1 1/2			
R104	2 5/8	2 5/8			
R17	2 5/8	2 5/8			
R15	2 5/8	2 5/8			
R56	2 3/4	2 5/8			
R1	2 3/16	2 3/16			
2609	2 9/16	2 9/16			
R16/2655	2 3/4	2 3/4			
R17	2 5/8	2 5/8			
	2 5/8	2 3/4			