LAWRENCE HYDROELECTRIC PROJECT

LIHI APPLICATION

ATTACHMENT C

FISH PASSAGE AND PROTECTION

COMPREHENSIVE FISH PASSAGE PLAN
FOR THE
LAWRENCE HYDROELECTRIC PROJECT
FERC PROJECT NO. 2800

Lawrence Hydroelectric Associates
Subsidiary of CHI Energy, Inc.
Andover Business Park
200 Bulfinch Drive
Andover, MA 01810

Revised September, 2013

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INTRODUCTION

The Lawrence Hydroelectric Project (FERC Project No. 2800) is located on the Merrimack River in Lawrence, Massachusetts. The project's license includes provisions for the design and installation of upstream and downstream fish passage facilities at the project, and for evaluating the effectiveness of the installed fish passage facilities for passing upstream and downstream migrating anadromous fish species.

Lawrence Hydroelectric Associates (LHA), owner of the Lawrence Project and the member agencies of the Policy and Technical Committees for the Restoration of Anadromous Fish to the Merrimack River (U.S. Fish and Wildlife Service, U.S. Forest Service, National Marine Fisheries Service, Massachusetts Division of Marine Fisheries, Massachusetts Division of Fisheries and Wildlife and the New Hampshire Fish and Game Department - hereinafter referred to as the "Fishery Agencies") agree that ensuring safe and effective upstream and downstream passage at the project is critical to the success of the Federal and state efforts to restore Atlantic salmon, American shad and other anadromous fish species to the Merrimack River Basin.

Therefore, all parties agree that this Comprehensive Fish Passage Plan is needed to establish an agreed-to schedule and procedure for operation of the fish passage facilities, and for resolving fish passage issues at the project. All parties agree that this plan should be submitted to the Federal Energy Regulatory Commission for incorporation into the project license in order to establish a definitive procedure and schedule for further evaluations and passage facility installation and modification.

The original Comprehensive Fish Passage Plan for this project was filed with the FERC on January 5, 1993. On September 18, 1997 the FERC sent a letter to the licensee requesting that the Comprehensive Plan be revised and updated to include studies and facility modifications undertaken since the plan was originally issued.

The provisions of this plan are divided into upstream and downstream fish passage issues. The first subsection for each of these sections deals with standard, ongoing fish passage operations protocols. The second subsection provides a review of fish passage studies undertaken at the project since this plan was originally issued, and facility modifications undertaken as a result of those studies.

I. UPSTREAM PASSAGE

A. BASIC OPERATIONS PROTOCOLS

1. Fish Lift Operations

Operation of the fish lift will commence as reasonably requested by the Fishery Agencies on or about May 1 of each year. However, based on downriver observations, river conditions (flow and temperatures), or other appropriate information, the Lawrence fish lift may begin operation at an earlier or later date upon timely and reasonable notification by the Fishery Agencies. To the extent safely possible, the fishway shall be operational at all river flows from 500 cfs up to 25,000 cfs.

Upon commencement of fish passage operations, the fish lift will be operated on a daily basis. LHA agrees to ensure that station staff is available and made responsible for all fish passage operations as reasonably requested by the Fishery Agencies. The attraction water flow for the fish lift of 120 cfs will be engaged at 6:00 AM each lift day with the first lift occurring as requested by the cooperating Fishery Agencies. Attraction water may be suspended following the final lift on any particular lift day, except during periods of spill if agreed to by the Fishery Agencies. Daily duration and frequency of fish lifts will be determined by the Fishery Agencies personnel responsible for counting fish and collecting data. The Fishery Agencies will provide LHA with reasonable advance notification of required schedules. Both parties recognize that the movement of fish will dictate changes that are needed, including changes that occur during a lift day. Fish lifting will normally continue through mid to late July depending on fish movement, flows, and water temperatures. Following cessation of the spring/early summer fish passage operations, periodic fish passage operations may be required during the August/early September period as agreed to by both parties. From mid-September through October, daily fish passage operations will be required for Atlantic salmon passage and trapping, with the duration and frequency of fish lifts determined by the Fishery Agencies.

Following internal lift efficiency studies in 1995 (NAI February 1996; see below), LHA and the Fishery Agencies agreed that entrance weir 2 would be closed off for the present, since operation of this weir resulted in a net loss of fish entering the lower fishway (i.e., more fish exited than entered through weir 2). The Fishery Agencies have

reserved the right to have weir #2 re-opened and operated at combined flows up to 200 cfs in the future, if shad and herring runs exceed the capacity of weir 1.

The fish lift will be operated by LHA generally between 8:00 AM and 4:00 PM. Exact hours of operation and the number of lifts per day will be determined each year in consultation with the Fishery Agencies. Hours of operation will be reassessed periodically and may be modified within or between years based on experience.

LHA will coordinate project operations and construction activities with the Fishery Agencies to ensure that monitoring and salmon trap and transport may be adequately performed. LHA will provide as needed, electrical power, lights, telephone connection and maintenance to the fish trap, fish lift, entrance weirs and appurtenant structures to assist the Fishery Agencies fish counting and trapping activities.

LHA will conduct all routine maintenance and minor repairs (repairs that require stopping fish passage operations and that are not of a significant nature) after fish passage operations have ceased for any particular day. However, maintenance and minor repairs that can be initiated without disrupting fish passage operations should be completed as soon as possible. LHA agrees to minimize, to the extent possible, repairs that necessitate shutdown of the lift during normal lift operation periods.

LHA agrees to implement the maintenance and equipment inventory plan, a copy of which is attached to this plan as Appendix II.

2. Operations Logs

The Fisheries Agencies and LHA will jointly develop protocols and log forms for recording accurate data on fish lift operations. Operation logs will be available for Fishery Agency inspection and copies will be made available to the Fishery Agencies within 30 days of request.

3. Fishery Statistics

The Fishery Agencies will be responsible for monitoring fish passage at the Lawrence fish lift and will maintain a formal fish sampling protocol, for the collection of statistical data (length, weight, sex, and scale samples for aging) on Atlantic salmon, American shad, river herring, or other important fish species. This information will normally be

provided annually to LHA within 30 days of its request. The extent and nature of fishery statistics collection may be re-evaluated and modified by the Fishery Agencies and LHA in the future.

B. SPECIAL INVESTIGATIONS

1. Summary of Studies Completed

The following studies of the upstream passage facilities at the Lawrence Project have been completed:

Normandeau Associates, Inc. (NAI). January 1996. *Lawrence Hydroelectric Project Upstream Fish Passage Efficiency Study 29 May – 16 June 1993.*

Major Findings:

- The internal efficiency of the Lawrence fish lift for passing adult American shad was studied using underwater videography.
- The system was studied in its original design configuration, i.e., with both entrance weirs operating, 200 cfs attraction flow, and a 12 inch 'V' trap crowder gate configuration.
- The internal lift efficiency for shad was 10%. However, because shad would make repeated attempts before being lifted (on average 33 attempts), the overall lift efficiency for shad was 30%. It took an average of 5 days for shad to be lifted upstream.
- Internal lift efficiency for adult Atlantic salmon was 5%.

Study Conclusions & Recommendations:

- Problem areas identified in the fish lift system which may limit efficiency included the crowder gates, attraction flow entering the fishway downstream of the crowder gates, entrained air in the attraction water, and a low velocity "resting area" downstream of the crowder gates.

Follow-Up Actions:

- See below.

NAI. February 1996. *Lawrence Hydroelectric Project Internal Fish Lift Efficiency Monitoring Program Spring 1994 and 1995*.

Major Findings:

- The internal efficiency of the Lawrence fish lift for passing adult American shad was studied using underwater videography.
- The system was tested using several modifications, including closing off entrance weir 2, attraction flow reduced to 100 cfs, a prototype brail floor was installed downstream of the crowder gate, the main entrance channel was split in half, and the crowder was fished with only one gate open.

- Internal efficiency was much higher with the prototype modifications, reaching as high as 72%
- Changing crowder gate openings did not significantly affect passage efficiency.

Study Conclusions & Recommendations:

- The lift system should be operated using weir 1 only, and weir 2 should be closed off;
- The total system flow should be reduced from 200 cfs to 100 cfs, and air entrained in the attraction flow should be eliminated;
- The main entrance channel should be split in half to reduce the area that shad can congregate in downstream of the crowder gate;
- The crowder should be fished using a single crowder gate, keeping one gate partially open;
- A brail floor should be installed between the crowder gate and entrance weir 1, to further restrict congregation of fish in that area;
- A constant water flow should be provided to the hopper to prevent mortality due to overcrowding.

Follow-Up Actions:

The following system modifications were installed during spring, 1997, following Fishery Agency consultation:

- Entrance weir 2 was closed off and a cut-off wall was installed at the junction of the two entrance channel. This cut-off wall also reduces the width of the entrance channel downstream of the crowder gate.
- The total attraction flow was reduced to 100 cfs.
- The fishing position of the crowder gates was moved as far downstream as possible;
- The crowder gate closing mechanism was modified to allow for faster closing of the gates, and to allow for variable crowder gate openings;
- A false floor was installed between the crowder gate and entrance weir 1 to prevent fish from congregating in a low-velocity refuge in that area.
- Aeration in the fish lift attraction water was significantly reduced.

2. Future Studies

If deemed necessary, LHA will develop a plan and schedule for evaluating the impact of the project's operations and structures on upstream anadromous fish passage in the project tailrace/tailwater in consultation with the Fishery Agencies. Development of plans and schedules for any such evaluations may be eliminated upon mutual agreement between of Fishery Agencies and LHA.

During each lifting season, Fishery Agency personnel overseeing fish counts and lift operations will observe normal lift operations and fish behavior at the fishway entrance, gates and other structures, to acquire information concerning the response of fish to

project and passage facility operations. Fishery Agency personnel will inform project supervisors or managers of any operational problems observed at the lift.

The plans and schedules for performing any future observations of fish passage and fish lift system operations will be developed by the LHA and the Fishery Agencies. These plans will be finalized prior to May 1 of each year.

Any measures proposed by LHA or ordered by the FERC to enhance upstream fish passage will be implemented according to a schedule agreed to by the Fishery Agencies and LHA or as ordered by the FERC.

3. Sturgeon Evaluations

Any assessments or other activities by LHA regarding potential impacts of the Lawrence Hydroelectric facility on shortnose and Atlantic sturgeon are currently indefinitely deferred. Further consideration of this issue may be warranted in the future, if information becomes available which indicates a need for evaluation.[1]

II. DOWNSTREAM PASSAGE

A. BASIC OPERATIONS PROTOCOLS

1. Downstream Bypass Facility

The downstream bypass facility was completed during the summer of 1992. The downstream bypass facility will be operated annually for juvenile clupeids, Atlantic salmon smolts, and adult clupeids.

During initial operation of the bypass facility in the fall of 1992, the bypass could not be properly operated at its high design flow of 160 cfs, due to the presence of a steel ogee spillway section below the flap gate. This section, which was provided for low (20 cfs) flow operation in conjunction with the operation of a future attraction water turbine, was subsequently removed. Additional observations of the operation of the bypass facility, with the ogee spillway section removed, were conducted during 1993 (see below).

[1] For example, studies were recently undertaken on the Connecticut River investigating sturgeon movements and spawning sites and their relationships to dams and river flows.

The bypass will be operated on a 24 hour basis from April 1 through July 15, and in the fall from September 1 to November 15. The operating schedule (regarding dates and hours of operation) may be modified upon mutual agreement between the Fishery Agencies and LHA, or by FERC order, based on information that indicates that such changes are warranted.[2]

When over 50 multi-sea winter salmon are given access to, or are transported to, spawning grounds upstream of the Lawrence Project, LHA will operate downstream passage facilities for sea-run kelts on a schedule cooperatively developed by the Fishery Agencies and LHA, or upon FERC order.

2. South Canal Closure

The South Canal will be closed annually during the spring and fall outmigration seasons. The South Canal will be closed each year after the 3-day average Merrimack River flow (as recorded at USGS gage No. 01000000, Merrimack River below Concord River) drops to 12,000 cfs or lower. The South Canal may be reopened on July 15. In the fall, the South Canal will be closed from September 1 to November 15.[3]

The canal closure schedule and re-opening provisions can be modified in the future by mutual agreement between LHA and the Fishery Agencies, or by FERC order based on new information.

B. SPECIAL EVALUATIONS

1. Summary of Studies Conducted to Date

The following studies of the downstream fish bypass facility have been completed at the Lawrence Project:

Normandeau Associates, Inc. (NAI). July 1994. *Use of the Fish Bypass System at the Lawrence Hydroelectric Project During Spring 1993*.

[2] Ongoing fish passage studies to be carried out as part of this agreement and other studies being conducted throughout the Merrimack and Connecticut River Basins may provide information that can refine bypass operation schedules.

[3] In comments on the pending license applications for the Aquamac and Merrimac Projects (FERC No.'s 2927 and 2928, respectively), the U.S. Department of the Interior recommended that the South Canal remain closed throughout the summer months to further protect outmigrating anadromous species.

Major Findings:

- The Lawrence bypass was very effective in passing spent adult American shad downstream. Of 8,599 adult shad lifted upstream of the Lawrence Project during 1993, 1,564 (18%) passed downstream through the Lawrence bypass after completing their spawning run. The bypass was sampled only 30% of the time during this period.
- Peak passage rates for river herring and salmon smolts were 33 fish/hour and 1.2 fish/hour, respectively. Passage rates for salmon were probably higher due to problems with the bypass net.
- The highest passage rates for Atlantic salmon, American shad and river herring occurred when bypass flows were between 40 and 80 cfs.
- Passage rates were greatest when the triple leaf gate at the entrance to the downstream bypass was set in a spill mode, which prevented fish from escaping back into the forebay and increased entrance velocities.

Conclusions & Recommendations:

- The Lawrence fish bypass effectively passes adult American shad and river herring and salmon smolts.
- The bypass should be operated with the triple leaf gate at the entrance set in a spill mode.

Follow-Up Actions:

- Triple leaf gate at the bypass entrance is set in a spill mode during normal operations.

NAI. August 1994. *Use of the Fish Bypass at the Lawrence Hydroelectric Facility During Fall 1993*.

Major Findings:

- Percent use of the downstream fish bypass by juvenile clupeids (shad, alewives and blueback herring) was conservatively estimated at 67.4% and 42.5% during two separate tests. respectively.
- Juvenile clupeids moved downstream predominantly between dusk and midnight.
- Juvenile clupeids began emigrating at water temperatures below 20ºC, and peaked at temperatures between 12º and 10ºC. Emigration continued into the second week of November.
- Increases in river flow were usually followed by an increase in bypass usage.

Conclusions & Recommendations:

- The Lawrence fish bypass effectively passes juvenile American shad and river herring.

Follow-Up Actions:

- None

NAI. February 1996. *Downstream Passage routes of Radio-Tagged Atlantic Salmon Smolts at the Lowell and Lawrence Hydroelectric Projects on the Merrimack River*.

Major Findings:

- Downstream passage routes used by salmon smolts at the Lowell and Lawrence Projects was assessed using radio telemetry. Smolts used in this study were both hatchery reared and wild (captured in the Project's forebay areas). A total of 49 fish were released upstream of Lowell and 47 were released upstream of Lawrence.
- The majority of salmon smolts passed both projects through the turbines. At Lawrence, 21 passed through the turbine and 1 (5%) used the bypass.
- Of the 22 fish that passed the Lawrence Project, 77% continued downstream movement 2 miles below the project.
- The hatchery-reared salmon apparently had not smoltified, which may explain why the majority of fish did not pass the project. This is supported by the fact that wild fish passed the project more readily than hatchery-reared fish.
- The majority of fish that passed through the facility did so at night.

Conclusions & Recommendations:

- None.

Follow-Up Actions:

- None.

2. Future Facility Monitoring

LHA will continue to consult with the Fishery Agencies regarding the need for any such studies. If deemed necessary, LHA will develop a plan and schedule for evaluating the efficiency of the downstream passage facility in consultation with the Fishery Agencies. Development of plans and schedules for any such evaluations may be eliminated upon mutual agreement between of Fishery Agencies and LHA.

The plans and schedules for performing any future observations of fish passage and fish bypass system operations will be developed by LHA and the Fishery Agencies. These plans will be finalized prior to May 1, each year.

Any measures proposed by LHA or ordered by the FERC to enhance upstream fish passage will be implemented according to a schedule agreed to by the Fishery Agencies and LHA or as ordered by the FERC.

IV. FACILITY IMPROVEMENTS

LHA agrees to undertake reasonable improvements in the facility and/or its operation based on the results of any future evaluations or monitoring. Any proposed modifications will be completed in consultation with the Fishery Agencies.

V. FERC APPROVAL

This Comprehensive Plan will be submitted to the FERC for its approval and for incorporation of the provisions of the plan in the subject license.

APPENDIX I

LAWRENCE HYDROELECTRIC PROJECT
ANNUAL SCHEDULE OF FISH PASSAGE EVENTS

APRIL 1
- Downstream passage facility opened.

mid-APRIL
- Pre-startup inspection of fish passage facilities by LHA and Fishery Agency personnel.

APRIL - MAY
- South Canal at Lawrence closed when the 3-day average Merrimack River flow drops to 12,000 cfs or lower.

MAY 1
- Lawrence Fish Lift begins operation. Day of first operation may vary year-to-year, depending upon Fishery Agency notification.

MAY – JUNE
- Agency/LHA cooperative evaluation of fish lift.

LATE JUNE to EARLY JULY
- Upstream Passage Facilities closed upon notification from Fishery Agencies.

JULY 15
- Downstream passage facility closed. South Canal may be reopened at the option of LHA and Merrimac Paper Company.

SUMMER / FALL
- The fish lift may be periodically operated from its spring/summer closing into the fall for upstream salmon passage and trapping, upon request by the Fishery Agencies. Summer/Fall operation dependent upon the need for upstream passage.

SEPTEMBER 1
- Downstream fish bypass opened and South Canal closed.

NOVEMBER 15
- South Canal reopened and fish bypass closed.

FALL
- Joint coordinating meeting between LHA and Fishery Agencies to discuss any operational issues which may have developed during the preceding passage season, and any follow-up actions required.

ALL YEAR
- Facility modifications and operational changes as identified by previous evaluations.

- Reasonable modifications to project structures or operations, that are identified during operations or monitoring will be implemented as identified in reports, plans or FERC orders.

APPENDIX II

LAWRENCE FISH PASSAGE FACILITY MAINTENANCE PLAN

Revised September 1999

The following is a working document intended to reflect LHA's philosophy toward maintaining and operating the fish passage facilities at the Lawrence Project.

- Prior to startup of each fish passage season a thorough inspection and test of the facility will be performed.
- Should a breakdown occur during the passage season every reasonable effort will be made to complete the repair in a timely fashion.
- As soon as possible after the close of the fall fish passage season agency representatives will be notified when the facilities are dewatered. An inspection will be performed and a site specific punch list created.

SPARE FISHWAY PARTS LISTING
LAWRENCE HYDROELECTRIC PROJECT

MECHANICAL

Parts on hand:

- Master links for Crowder Chain
- Master links for Main Hopper Chain
- Hopper Wheel
- Spare limit switch parts

Parts to be ordered or replaced:

- In most cases, mechanical parts can be delivered overnight, or purchased locally. As the search continues, parts that should be stocked by LHA will be purchased and this list updated.

ELECTRICAL

Parts on hand:

Main Hoist:
- Brake Contactor
- Control Transformer
- Rectifier Bridge

Small Hoists:
- Trolley Contactor
- Hoist Contactor
- Control Transformer
- Main Contactor
- Push-button Switch
- Spare Contact Sets
- Overload Heaters
- Rectifier Bridge
- Limit Switches

Parts to be ordered:

Main Hoist:

- Trolley Contactor
- Hoist Contactor

Note 1: Rewind service for the hoist motors can be obtained locally with a 1 to 2 day turnaround. Our current objective is to identify all common components and order spares accordingly.

Note 2: Our focus has been on those parts that can be stocked, and the stocking of those parts. As we progress the more long lead time items will be addressed.

FISHWAY O&M LIST
LAWRENCE HYDROELECTRIC PROJECT

FALL

_____ 1) Address all items listed on agency-provided Punch List

_____ 2) De-water upper channel, clean and make any necessary repairs.

_____ 3) De-water lower channel, clean and make any necessary repairs.

_____ 4) Inspect flow direction vanes in attraction water chamber, clean and repair as necessary.

_____ 5) Inspect floor grating over attraction water chamber to verify that fish cannot pass through grating, and that grating is firmly attached to floor.

_____ 6) Inspect all floor grating and crowder brailles in entrance and exit channels to verify that fish cannot pass through any openings, and that the grating/ braille is firmly attached to the floor or wall.

SPRING

_____ 1) Complete punch list items, if not finished.

_____ 2) Grease all bearings, gears, gearboxes and chains where applicable in the following:

- _____ a) Attraction water gates
- _____ b) Crowder
- _____ c) Separation Gate
- _____ d) Hopper Lift Mechanism
- _____ e) Hopper door
- _____ f) Fish trapping door and mechanisms
- _____ g) Attraction water inlet gate operators

_____ 3) Clean and lubricate gate stems

_____ 4) Clean fish counting room, including windows and paint reflector.

_____ 5) Hoist inspection by Dwight Foote or other reputable company.

_____ 6) De-water lower channel if possible and clean.

_____ 7) Test run all equipment for proper operation, adjust if needed.

_____ 8) Install Trash Boom at exit channel

_____ 9) Calibrate differential gages at fishway entrances.

APPENDIX III

AGENCY CONSULTATION

ORIGINAL

United States Department of the Interior

FISH AND WILDLIFE SERVICE

New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5087
http://www.fws.gov/newengland

May 2, 2012

REF: FERC Nos. 2800 and 2790

Mr. Victor Engel
ENEL North America, Inc.
Andover Business Park
One Tech Drive, Suite 220
Andover, MA 01810

Dear Mr. Engel:

This responds to the revised design plans for permanent upstream passage facilities for American eel at the Lawrence Hydroelectric Project, and plans for upstream passage operations and fishway entrance modifications of American shad and other species at the Lowell Project, both located on the Merrimack River in Lawrence and Lowell, Massachusetts, respectively. We received these plans by electronic mail on April 10, 2012.

We have completed our review and coordinated this response with the Massachusetts Division of Fisheries and Wildlife, Massachusetts Division of Marine Fisheries, New Hampshire Fish and Game Department and National Marine Fisheries Service. The design drawings for eel passage measures at Lawrence were also reviewed by Dr. Alex Haro of the U.S. Geological Service's S.O. Conte Anadromous Fish Research Center.

Lawrence Eel Ladder

The submitted drawings, dated April 3, 2012, depict a permanent eel ladder to be located in the pool below the south end of the dam that is perched on ledge above the normal tailwater elevation. The drawings include revisions that the U.S. Fish and Wildlife Service and other agencies requested on a conference call between ENEL and the resource agencies on April 2, 2012. The requested and indicated changes include a separate attraction water source to discharge at the bottom end of the eelway, and use of Milieu substrate for the bed of the ramp sections. The drawings also include data on dimensions and elevations not included in the preliminary drafts of this design.

It is understood that a range of eelway flows and attraction flows are indicated on the drawings, and that these operational flows will be determined during field testing of the facility. As discussed on our conference call on April 2, 2012, some form of evaluation of the eelway's

effectiveness will be needed. This could entail a mark-recapture approach or closing off a holding area just outside the eelway entrance and releasing a known number of eels into the holding area. The protocol and timing of this evaluation will require additional consultation between ENEL and the resource agencies.

Lowell Shad Passage Improvements

Given the ongoing problems with fish passage effectiveness at Lowell, and limited time this spring to implement substantial structural changes at the site, ENEL is proposing two measures to improve passage this year: prioritization of higher fishway attraction flows, and entrance guidance screens.

The agencies have asked for flows to be increased to the extent possible to increase the entrance jet out of the fishway entrance. ENEL and the agencies agreed to conduct an on-site review of the entrance gate and flows on April 30, 2012 to reach agreement on gate and attraction flow protocols. That review was completed with John Warner of this office, Service fishway engineer Bryan Sojkowski, and representatives from the National Marine Fisheries Service and the Massachusetts Division of Marine Fisheries. The outcome was an operation protocol for ENEL staff to follow for the upstream fishway as follows:

- keep the "150 valve" attraction flow at 75 percent open;
- keep the "50 valve" attraction flow setting at 18" of stem;
- continue keeping the fishway entrance gate fully open;
- monitor the differential regularly; and
- if/when the tailrace elevation falls due to lower river flow and differential exceeds 10", slowly reduce the "50 valve" flow to achieve differentials of less than or equal to 10".

ENEL also agreed to record site parameters daily and setting changes when made. Data that would be collected include:

- headpond elevation;
- forebay elevation;
- tailwater Elevation;
- entrance gate setting;
- differential at entrance gate;
- "50 valve" setting; and
- "150 valve" setting.

We also recommend that the turbine discharge flow and MW power output be recorded. We request that this information be provided on a weekly or bi-weekly basis, along with fish passage data, so we can understand how operations change over the season. Based on this information, we may conduct another site visit to observe operational settings under different conditions than occurred on April 30, 2012.

ENEL also proposes to install two metal screen guidance curtains downstream from the fishway entrance to serve as a guidance device for shad searching for an upstream passage route. This device is limited in length and depth. The fishery agencies have identified that we believe the long-term solution for ongoing low passage efficiencies at the site would be the construction of an extended fishway entrance downstream along the river-side tailrace wall to a point below the turbine upwelling area. Construction of such a device was not going to be possible for this spring's passage season. The device proposed by ENEL is not expected to result in substantially improved passage effectiveness, but it may provide some level of passage benefit and could provide some more information on shad behavior and passage at the project. Therefore, we have no objection to the device as proposed.

We appreciate the efforts to develop an effective eelway, and look forward to its construction and operation this year. We also look forward to the implementation of improved passage operations protocols at Lowell for this year. Please contact Mr. Warner at 603-223-2541, extension 15, or via e-mail at john_warner@fws.gov, if you have any questions or need assistance.

Sincerely yours,

Thomas R. Chapman
Supervisor
New England Field Office

4-17-09

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Paul J. Diodati
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P-2800

April 9, 2009

Skip Medford
Regulatory Specialist
Essex Company
Enel North America, Inc.
One Tech Drive, Suite 220
Andover, MA 01810

Re: Lawrence Hydroelectric Associates (FERC No. 2800-MA)

Dear Skip:

In preparation for the spring 2009 upstream anadromous fish passage season, the Fishery Agencies would like to provide LHA with advance notification of required schedules and operational expectations. These requests, which are in keeping with the FERC approved Comprehensive Fish Passage Plan (as revised in March 2000), are being made to guarantee that fish lifting is conducted consistently. In addition to ensuring good passage success, a consistent lift schedule is critical for collecting accurate biological and population data on American shad and river herring, as mandated by the Atlantic States Marine Fisheries Commission (ASMFC). The requests listed below are only slightly modified from those specified in 2008. We appreciate LHA's cooperation in 2008 and seek to assure coordination of fish passage protocols for 2009. Requests and clarifications are as follows:

- Engage attraction water of 120 cfs at 6:00am each day during the fish passage season with the first lift at 8:00am
- For each day and for the duration of the fish passage season, conduct hourly fish lifts (at a minimum), with the first lift at 8:00am and the last lift at 4:00pm.
- If high numbers of fish are observed in hourly lifts, more frequent lifting (e.g., every 30 minutes) should be implemented, as determined by on-site Fishery Agency personnel.
- If high numbers of fish are observed during afternoon passage operations, fish lifting after 4:00pm should be implemented, as determined by on-site Fishery Agency personnel.
- Conduct fish lifting as described above seven days per week, including holidays.
- Any reduction in the lifting schedule outlined above must be approved by Caleb Slater (MADFW), Kristen Ferry (MADMF) or Kyle Flanery (USFWS). Under continued high flow conditions, when fish lifting is deemed ineffective by Fishery Agency personnel listed above, the Fishery Agencies will authorize a modification or suspension of the lift schedule.
- Coordinate project operations and construction activities with the Fishery Agencies to ensure that monitoring and salmon trap-and-transport may be adequately performed.

Additionally, as the goal of annual operations is to facilitate fish passage upriver, the Fisheries Agencies request that all fish be immediately released into the exit channel upon lifting to allow the hopper to be lowered and fished as much as possible between lifts. Approved agencies/programs seeking American shad for propagation (or trap-and-transfer) purposes should use the onsite net pen for retaining fish, while obtaining broodstock. The Fisheries Agencies will notify these agencies/programs of this requested change. Exceptions requiring temporary suspension of the hopper in the raised position include (a) intermittent ASMFC mandated biological sampling for American shad conducted by MA Division of Marine Fisheries staff, (b) the occasional need for direct access to the hopper deemed necessary by Fishery Agency staff, and (c) unanticipated operational circumstances (e.g., equipment failure/repair).

Provided river flow is amenable and per our discussion at the onsite meeting on March 25, 2009, we anticipate the target opening date for the fish lift as April 20, 2009. We also anticipate an onsite meeting with LHA in late April—early May 2009 to review options for American eel passage with Dr. Alex Haro of the Conte Anadromous Fish Research Center, Turners Falls, MA. Thank you for your cooperation. We look forward to a successful fish passage season.

Sincerely,

Kristen Ferry
Aquatic Biologist
Massachusetts Division of Marine Fisheries

Caleb Slater
Anadromous Fish Project Leader
Massachusetts Division of Fisheries and Wildlife

cc: The Merrimack River Technical Committee & Advisors
K. Bose, FERC
P. Diodati, M. Armstrong, P. Brady, MA DMF
N. Gray, J. Valliere, ME DMR

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Lawrence Hydroelectric Associates — Project No. 2800-027

ORDER APPROVING AND MODIFYING FISH PASSAGE PLAN

(Issued July 20, 2000)

On November 1, 1999, Lawrence Hydroelectric Associates (LHA; licensee) filed its "Comprehensive Fish Passage Plan" (CFPP) for the Lawrence Project (FERC No. 2800). The plan was subsequently revised in response to comments from the resource agencies and re-filed on March 8, 2000. The plan was filed pursuant to article 31 of the project license, issued on December 4, 1978. The Lawrence Project is located on the Merrimack River, in Essex County, Massachusetts.

BACKGROUND

The Lawrence Project is the downstream-most hydroelectric project on the Merrimack River and is thus the first dam encountered by upstream migrating anadromous fish, including Atlantic salmon, American shad, alewife, and blueback herring. As pertinent to fish passage, the Lawrence Project features include: (1) a 33-foot high and 900-foot-long dam of rubble masonry construction; (2) a 9.8-mile-long reservoir having a surface area of 655 acres at normal high water elevation 44.17 msl and a maximum storage capacity of approximately 19,900 acre-feet; (3) the South Canal, approximately 35 feet wide and 10 feet deep, originating at the south abutment of the Essex Dam and generally paralleling the Merrimack River bed, downstream of the Essex Dam, for a distance of approximately 2,750 feet, with a gatehouse at its head; (4) a fish elevator (with trapping facilities [1]) installed at the dam; (5) a downstream fish bypass facility located in the project's forebay; and (6) a powerhouse containing two 7.4 MW hydroelectric generating units and a tailrace channel extending into the Merrimack River Channel.

[1] Adult salmon returning to the Merrimack River from the sea are captured in the trapping facility associated with the fish-lift at the Lawrence Project. Captured salmon are transported to an adult holding facility at the Nashua National Fish Hatchery until they mature sexually in the fall and eggs can be taken. The facility is capable of holding 300 adult salmon, and any number greater than 300 would be transported to the spawning grounds within the headwaters. Since 1982, there has been only one occasion, in 1991, when the number of returning fish exceeded 300.

Conversely, the Lawrence project is the final hydroelectric project and dam on the Merrimack River encountered by downstream migrating anadromous fish. In 1992, the licensee constructed a downstream fish passage facility to reduce the entrainment of fish through the project's turbines and facilitate their movement to downstream of the dam. Target species/life stages are juvenile clupeids, Atlantic salmon smolts, and adult clupeids. Fish protection or passage is also needed at the South Canal, the head of which is located just upstream of the Lawrence Project's forebay. As noted above, the gatehouse that regulates flow into the South Canal is part of the Lawrence Project. Fish that enter the South Canal may pass downstream through two small hydroelectric projects located on the canal (the Aquamac Project (FERC No. 2927) and the Merrimac Project (FERC No. 2928)), or become stranded in the canal. Since 1993, fish protection here has been provided by seasonal closure of the South Canal headgates, in accordance with the South Canal Closure Plan, an agreement among the licensees of the Lawrence, Aquamac, and Merrimac Projects.

THE PROPOSED PLAN

The CFPP details the facilities and operational measures to be implemented by LHA to provide protection to upstream and downstream migrating anadromous fish. With respect to upstream fish passage, the licensee proposes to operate and maintain the existing fish lift at the project. In summary, the lift would be operated from on or about May 1 of each year, with the exact date being based on downriver observations, river conditions (flow and temperature), other appropriate information, and recommendations of the resource agencies. The lift would be operated daily, with the daily duration and frequency of fish lifts being determined by the on-site resource agency personnel responsible for counting fish and collecting data. Fish lift operation would normally continue through mid to late July, depending on fish movement, flows, and water temperatures. From mid-September through October, lifting would be conducted for Atlantic salmon passage and trapping, with the duration and frequency of lifts determined by the resource agencies.

According to the CFPP, downstream passage at the Lawrence Project would consist of operation of the downstream bypass facility located at the powerhouse, as well as closure of the South Canal headgates to prevent fish from entering the canal. The licensee proposes to operate the bypass facility on a 24-hour basis from April 1 through July 15 for Atlantic salmon smolts and adult clupeids, and from September 1 to November 15 for juvenile clupeids. The plan further states that in years when more than 50 multi-sea winter salmon are given access to, or are transported to, spawning grounds upstream of the Lawrence Project, LHA will operate downstream passage facilities for sea-run kelts on a schedule cooperatively developed by the resource agencies and LHA, or upon Commission order.

The CFPP states that the South Canal will be closed annually during the spring and fall outmigration periods. More specifically, LHA proposes to close the South Canal in the spring when the three-day average flow of the Merrimack River, measured at USGS gage No. 01000000, falls below 12,000 cubic feet per second (cfs). The CFPP states that the canal may be re-opened on July 15. In the fall, the South Canal would be closed from September 1 to November 15.

For both upstream and downstream fish passage, the CFPP describes the results of studies conducted to date and outlines a mechanism for conducting future studies of upstream and downstream fish passage. The CFPP states that if deemed necessary, LHA will develop a plan and schedule for further evaluating the facilities. The CFPP proposes no specific studies.

AGENCY COMMENTS AND LICENSEE RESPONSES

By letter dated January 13, 2000, the U.S. Fish and Wildlife Service (FWS), on behalf of the Technical Committee for the Restoration of Anadromous Fish to the Merrimack River Basin (Technical Committee), provided comments on the CFPP. The Technical Committee is composed of representatives of the Massachusetts Department of Marine Fisheries (MDFW), the Massachusetts Division of Fisheries and Wildlife, the New Hampshire Fish and Game Department, the National Marine Fisheries Service, and the U.S. Forest Service. The FWS stated that the CFPP represented a substantial improvement from the April 1998 draft plan and that many aspects of the plan were acceptable.

The licensee's response to the FWS letter was contained in a letter dated March 7, 2000. The licensee's response included a CFPP that was revised in light of some of the agencies comments, and also its reasons for not incorporating all of the agencies comments into the revised plan.

Upstream Fish Passage

The FWS stated that the section of the plan concerning upstream fish lift operations had been revised to address some of their concerns. The FWS then provided recommended additional changes. These changes included a fish lift start date of "generally ... between April 15 and the first week of May" and hours of operation "when reasonable and appropriate as specified by the Fisheries Agencies."

With respect to upstream fish passage, the licensee stated that the existing CFPP language was flexible enough to accommodate a fish lift start date as early as April 15 and fish lift operation times beyond those specified in the plan.

The FWS also commented that LHA should consult and coordinate with the resource agencies prior to installation of the flashboards whenever flashboard repair or re-installation was needed during the time period that the fish lift was operating. The FWS stated that it was not requesting veto authority over flashboard installation decisions, but that it believed that the installation of flashboards and associated reservoir drawdown and refill should be done more slowly and consistently, thereby minimizing the impacts of these procedures on project discharge levels, and that some provisions for flow ramping during these events should be incorporated into the CFPP.

The licensee stated it had already agreed to notify the resource agencies of its intentions regarding flashboard maintenance and, to the extent possible, coordinate such actions with fish passage requirements. The licensee pointed out that it had demonstrated its good faith in willingness to carry through with this commitment during the 1999 fish passage season, to the satisfaction of the resource agencies. The licensee stated that there were numerous other parties along the Lawrence impoundment (e.g., recreational users, marinas, and municipal water supplies) with an interest in restoration of impoundment water levels following the loss of flashboards, and that it could not in any way commit to relinquishing any of its exclusive right to control headpond levels within the confines of the existing FERC license and Commonwealth of Massachusetts Charter.

Downstream Fish Passage

The FWS stated that the section of the CFPP dealing with downstream fish passage was not adequate. The FWS detailed concerns with both the proposed dates of operation of the downstream passage facility and the proposed dates of the South Canal closure. The FWS also expressed its concerns about the effectiveness of the downstream fish passage facility.

The FWS commented that wording should be added to provide for operation of the downstream fish passage facility from July 15 to September 1 (in addition to spring and fall operation) for outmigration of late-spawning shad or early-migrating juvenile clupeids, and that operation during this period would be established by the resource agencies, in consultation with LHA.

The licensee states that the April 1 to July 15 and September 1 to November dates were based on previous recommendations of the resource agencies. The licensee points out that the resource agencies admit that the new dates are based on limited information and a late shad run that occurred in a single year. The licensee concludes that any marginal gain in fish protection would certainly not balance against the generation losses that would be incurred during this water critical period.

The FWS further commented that in any years when sea-run salmon are given access to, or transported to spawning areas upstream of the Lawrence Project, LHA should operate downstream fish passage facilities for post-spawned adult salmon between November 15 and December 30, as directed by the Technical Committee.

The licensee responded that the proposed 50-fish trigger provides an appropriate level of balance between fish protection and electric generation, because it requires expanded downstream passage operations only with a concerted upstream stocking effort, rather than by incidental stocking of excess fish as is the present case. The licensee points out that the proposed 50-fish trigger was accepted by the agencies in earlier drafts of the CFFP. The licensee also notes that the schedules proposed by the resource agencies would result in the operation of the Lawrence Project's downstream passage facility from April 1 (or earlier) to December 30.

With respect to South Canal Closure, the FWS noted that, during the ongoing relicensing of the Aquamac and Merrimac Projects, it recommended that the South Canal be closed from April 1 through June 15 for the protection of salmon smolts and to prevent false attraction of upstream migrating fish, and September 1 to November 15 for the downstream migration of juvenile clupeids. During those same proceedings, the MDFW recommended that South Canal closure extend through the summer to protect emigrating American eels and early migrant alewives.

The LHA responded that, in previous comments, the resource agencies recommended that the South Canal be closed in concert with the operation of the project's downstream fish bypass facility, i.e., from April 1 to July 15 and from September 1 to November 15, and that it adopted those recommendations in the CFPP, with the exception of the April 1 closure date. The licensee stated that its proposed 12,000 cfs flow trigger would provide a minimum of 3,700 cfs in spill flow, which should protect any outmigrating smolts. The licensee pointed out that its 12,000 flow trigger roughly coincided with Commission staff's recommendation of a closure date of April 22 in the Aquamac and Merrimac project's relicensing proceedings. [2]

The licensee further stated that, since the inception of South Canal closures in 1993, while it had the ability to reopen the canal during the July 16 to August 31 time

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[2] Draft Environmental Assessment for Hydropower Licensing. Aquamac Hydroelectric Project (FERC Project No. 2927-004) and Merrimac Hydroelectric Project (FERC Project No. 2928-004). Federal Energy Regulatory Commission, Office of Hydropower Licensing, Division of Licensing and Compliance. Washington DC. October 1999.

period, it had never exercised that option. However, it objected to the codification of its practice of canal closure during that time of the year into a license requirement.

Future Studies

The FWS states that it disagrees with the licensee's characterization of the downstream passage facility as being highly effective. The FWS states that the studies conducted indicate that the bypass facility is not effective in passing these fish. The FWS recommends that the CFPP be amended to include the initiation of further consultation with the agencies and evaluation by LHA of potential modifications to facility design or operation to improve passage success.

The licensee responded that it believed that the inclusion of specific studies into the CFPP was inappropriate, but that it fully expected to consult with the agencies on the need for future monitoring and testing, in accordance with the language in the CFPP. The licensee further stated that they have had no specific discussions with the Technical Committee regarding specific study requests at this time.

DISCUSSION AND CONCLUSIONS

The licensee's CFPP provides a long-term blueprint for the operation, maintenance, testing, and improvement of the Lawrence Project's fish passage facilities throughout the remaining 28 years of the project's license. The plan is based on studies conducted and experience gained at the project since the installation of the project's fish lift and fish bypass facilities, and since South Canal closures began in 1993 to protect downstream migrating fish. The plan was developed in consultation with the resource agencies, and many of the agencies' recommendations have been incorporated into the plan. There are, however, a few areas where the licensee did not adopt the recommendations of the resource agencies.

With respect to upstream fish passage, the licensee did not adopt some of the wording proposed by the resource agencies to describe the lifting start date and hours of operation. The licensee contends that its proposed language was flexible enough to allow operation of the lift consistent with the resource agencies proposed language. We agree that the licensees' plan is not inconsistent with the resources agencies desired facility operation and see no need to revise the wording. The licensee should, however, be prepared to exercise that flexibility upon the receipt of reasonable requests from the resource agencies.

The licensee did not agree to adopt changes to its proposed 50-fish trigger for extending the operation of downstream passage facilities for adult salmon from

November 15 to December 30. The licensee essentially argued that under the agencies proposed language, the release of one adult salmon would trigger the extended operation of these facilities, and that any benefits that might accrue from such operation would not be commensurate with the generation lost as a result. We agree with the licensee. Inasmuch as the restoration program is based on removal of adult salmon to fish cultural facilities, there is no pressing need to provide downstream fish passage for adult salmon, particularly at current levels of abundance.

The licensee also did not agree to the resource agencies' recommendation to incorporate language requiring consultation and coordination with the agencies prior to repair or replacement of flashboards during the fish lifting season. The licensee stated that it already had an agreement to consult with the resource agencies on this matter, but that it could not in any way commit to relinquishing its exclusive right to regulate headpond levels. We agree with the agencies that fish migrations may be influenced by licensee actions during reservoir drawdown and refilling associated with flashboard maintenance. However, we also understand the licensee's concerns. The licensee should consult with the resource agencies to memorialize the existing flashboard maintenance consultation agreement. The agreement should be filed with the Commission, for approval.

With respect to South Canal closure, there is agreement among the parties that closure of the canal eliminates the problems of fish entrainment through the Aquamac and Merrimac projects and fish stranding in the canal. There remains disagreement between the licensee and the resource agencies as to the appropriate closure date in the spring, and whether there should be a requirement that the South Canal remain closed during the July 16 to August 31 time period.

The licensee proposes to close the canal in the spring, when the three-day average flow drops below 12,000 cfs. The resource agencies recommend that the South Canal be closed annually on April 1. In its Draft Environmental Assessment for the relicensing of the Aquamac and Merrimac projects, Commission staff determined, based on a review of factors influencing the timing of salmon smolt emigration, that fish protection at the South Canal should be required beginning April 22, annually. We still consider this date to be appropriate. Consequently, the CFPP should be modified to indicate that closure of the South Canal will begin on April 22, annually.

The licensee did not agree with the MDFW's recommendation that the CFPP indicate that the South Canal also be closed during the summer (i.e., from July 16 to September 1) for the protection of potentially early migrating American eels and juvenile clupeids during this period. The licensee points out that even though under the existing South Canal closure plan it could reopen the canal during the summer, it never had, but

objects to this practice being made a requirement. We agree with the licensee, particularly in the absence of site-specific evidence that such a required closure is routinely needed. The licensee should, however, consult with the Technical Committee should it choose to vary from its practice of voluntarily keeping the canal closed during the period July 16 through September 1, annually.

The licensee did not include in the CFPP, as the resources agencies believed they should have, specific studies or facility modifications aimed at improving fish passage (particularly downstream fish passage) at the project. The licensee stated that they fully expected to consult with the agencies on future monitoring and testing needs, but that the inclusion of such specifics in the CFPP was inappropriate. In either event, future studies and improvements in fish passage at the project are warranted, and the licensee should consult with the resource agencies to develop a plan and schedule to conduct and implement such studies and improvements.

Implementation of the licensee' proposed comprehensive fish passage plan would benefit anadromous fish populations in the Merrimack River Basin by facilitating upstream and downstream fish passage at the dam. However, the modifications to the plan described above would result in greater benefits to those populations. Consequently, the plan, modified as described above, should be approved.

The Director orders:

(A) The licensee's March 8, 2000, comprehensive fish passage plan, as modified by paragraphs (B) through (E), below, is approved.

(B) Within 120 days of the date of issuance of this order, the licensee shall consult with the Technical Committee for the Restoration of Anadromous Fish to the Merrimack River Basin to memorialize their agreement regarding consultation and coordination with the agencies prior to flashboard maintenance activities during the fish lifting season. Within 180 days of the date of issuance of this order, the licensee shall file an executed agreement with the Commission, for approval.

(C) The licensee shall begin the seasonal South Canal closure on April 22, annually.

(D) The licensee shall consult with the Technical Committee for the Restoration of Anadromous Fish to the Merrimack River Basin prior to reopening the South Canal headgates following the spring closure of the canal for the protection of migrating fishes.

(E) Within 120 days of the date of issuance of this order, the licensee shall consult with the Technical Committee for the Restoration of Anadromous Fish to the Merrimack River Basin to identify any remaining fish passage facility improvements and/or evaluations needed and develop a plan and schedule to implement those studies or improvements. Within 180 days of the date of issuance of this order, the licensee shall file its plan and schedule to conduct and implement such studies and improvements, including any comments of the Technical Committee on the plan and schedule.

(F) 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 18 C.F.R. § 385.713.

George H. Taylor
Group Leader
Division of Hydropower Administration
and Compliance

UNITED STATES OF AMERICA 61 FERC ¶ 62, 076
FEDERAL ENERGY REGULATORY COMMISSION

Lawrence Hydroelectric Associates — Project No. 2800-012
Massachusetts

ORDER APPROVING FUNCTIONAL DESIGN DRAWINGS
(ISSUED OCTOBER 26, 1992)

On May 20, 1992, Consolidated Hydro, Inc., acting as agent for the Lawrence Hydroelectric Associates (licensee), filed functional design drawings for a facility to protect downstream migrating fishes at the intakes to the Lawrence Project (FERC No. 2800). The filing of this information was required by article 30 of the project license.1

Article 30 requires the licensee to construct and operate facilities for the upstream and downstream passage of anadromous fishes at the project.2 Article 30 also requires the submission of as-built drawings of the facilities within six months from the completion of construction.

Licensee's Filing

The licensee's filing of May 20, 1992 consisted of functional design drawings, dated June 10, 1991, for a downstream passage facility to be located on the east side of the powerhouse.3 Downstream migrating fish would be transported from the forebay to the tailrace in a concrete bypass canal. Flow through the upstream end of the canal would be 160 cubic

1 5 FERC - 61,202 (1978)

2 The Lawrence Project is the downstream-most project on the Merrimack River, and located in Essex County, Massachusetts. A downstream fish passage facility is needed at the project powerhouse to reduce turbine entrainment and provide safe and efficient passage of anadromous fishes to the marine environment. Fish protection or passage is also needed at the South Canal, the head of which is located just upstream of the Lawrence Project's forebay. The gatehouse that regulates flow into the South Canal is part of the Lawrence Project. Fish that enter the South Canal may pass downstream through two small projects located on the canal (Aquamac, FERC No. 2927 and Merrimac, FERC No. 2928), or become stranded in the canal.

3 The filing does not address downstream passage at the project's South Canal headgates. The licensee is planning on executing an agreement with the Aquamac and Merrimac licensees that would result in the seasonal closure of the South Canal for the protection of migrating fishes.

feet per second (cfs). In mid-canal, approximately 140 cfs could be diverted to run a small turbine and provide attraction flow to the project's fish lift.

Agency Comments

The functional design drawings were reviewed by the U.S. Fish and Wildlife Service (FWS), the Massachusetts Division of Fisheries and Wildlife (MDFW), and the National Marine Fisheries Service (NMFS). By letters dated July 3, July 9, and July 23, 1992, the FWS, MDFW, and NMFS, respectively, stated that the functional design drawings incorporated previously requested modifications, and thus these agencies endorsed construction of the facility.

Additionally, the FWS stated that along with the yet-to-be-finalized South Canal closure plan, the facility should greatly improve downstream fish passage at the project. The FWS recommended a meeting to discuss the operation and effectiveness monitoring of the facility.

Discussion

The licensee's proposed downstream fish passage facility was developed following consultation with the resource agencies, and is based on current knowledge regarding the behavior of fishes at the project and potential measures for facilitating their safe downstream passage. Consequently, the functional design drawings should be approved. As required by article 30, the licensee should file as-built drawings of the facility within six months following the completion of construction.

The design of effective downstream fish passage facilities is, however, an inexact science and fine-tuning of the facility may be necessary. Article 31 of the project license requires the licensee to conduct studies to assess the effectiveness of the constructed facility. These studies should identify what measures, if any, should be implemented to optimize the functioning of the facility. The Commission should reserve the right to require the licensee to make any changes in project structures or operation that are warranted.

The Director orders:

(A) The functional design drawings for a downstream fish passage facility, filed on May 20, 1992, are approved.

(B) The licensee shall file as-built drawings of the facility within six months following the completion of construction.

(C) The Commission reserves the right to require any changes in project structures or operation to improve downstream fish passage at the project.

(D) 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 18 C.F.R. - 385.713.

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