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October 6, 2009

Mr. Fred Ayer, Executive Director
Low Impact Hydropower Institute
34 Providence St.
Portland, ME 04103

RE: Draft Application Reviewer Report for the Ice House Power Project

Dear Fred:

Attached please find my draft reviewer's report on the application by Ice House Partners, Inc., for certification of the Ice House Power Project by the Low Impact Hydropower Institute (LIHI). Please contact me with any questions or concerns.

Sincerely,

s// Ron

Ronald A. Kreisman

Attachment

REVIEW OF LOW IMPACT HYDROPOWER INSTITUTE APPLICATION FOR LOW IMPACT HYDROPOWER CERTIFICATION: ICE HOUSE POWER PROJECT

Introduction

This report reviews the application submitted by Ice House Partners, Inc. (applicant) to the Low Impact Hydropower Institute (LIHI) for Low Impact Hydropower Certification for the Ice House Power Project (project). This 270-kilowatt installed-capacity, 2,500 MWh project is located on the Nashua River in the northeastern Massachusetts towns of Ayer, Harvard and Shirley. The project very recently completed the Federal Energy Regulatory Commission (FERC) license exemption and conditioning process, receiving a license exemption (Exemption) on March 31, 2008 (FERC # 12769). The exemption permits the applicant to use the recently-restored hydroelectric infrastructure to re-start hydropower generation at the site, after a hiatus of several decades.

Due to unexpected problems encountered by the applicant with the new Kaplan-style turbines (in certain safety design aspects), start-up of the turbines and generation of electricity has not occurred in the eighteen months since FERC issued its exemption. However, the applicant has recently represented to this consultant that it expects start-up to begin as early as eight weeks from mid-October, and certainly within the next 3-4 months. The energy generated by the project partially will be used onsite (for powering a medical device manufacturing facility that is co-located at the site and owned by the applicant), with the unused power sold into the NEPOOL power grid.

Project and Site Characteristics

Project Characteristics. The Ice House project contains a spillway that is 190 feet long and 12 feet high, and is topped with 24-inch-high flashboards. It was originally built in the 1790s. In 1907 a powerhouse was installed at the dam, providing electricity to operate trolley cars in the nearby community until the 1920s and then to power ice-making machinery, particularly prior to the advent of refrigerators. Operation of the powerhouse and generation of hydroelectricity were discontinued in 1967, and the entire infrastructure fell into disrepair. In the 1980s the powerhouse was largely destroyed by fire.

The applicant, a small family-run private entity, purchased the site in 1999 and has spent the last nine years restoring all aspects of the property, including the dam, powerhouse, and headgate structure. In addition to the rebuilt powerhouse, a mill building on the site has been completely reconstructed and houses the medical device company owned by the applicant. A photograph of the site provided by the applicant is attached to this report and shows the rebuilt powerhouse and mill building.

Under the exemption granted by FERC in March 2008, the project will operate in a run-of-river mode and includes four, 8-foot-high, 10-foot-wide gates that lead to a 50-foot-wide, 109-foot power canal. The powerhouse is located in the canal and about 75 feet downstream of the

headgate. Water used for generation will be discharged from the powerhouse into a 50-foot-wide tailrace. The bypass channel (from the dam to the tailrace outlet) is approximately 300 feet long. A 100-foot-long underground transmission cable connects the powerhouse to the mill building and the local transmission distribution system.

Site characteristics. The project is located on the Nashua River, a tributary of the Merrimack River. The Nashua River, with a watershed of approximately 540 square miles, flows south to north and is the largest tributary of the Merrimack. The area around the project was historically comprised of industrial and urban development. While the dam and powerhouse are situated just outside the U.S. Fish and Wildlife Service's 1,667-acre Oxbow National Wildlife Refuge, the dam creates a 137-acre impoundment located within the refuge. The impoundment has existed at the site long before the national wildlife refuge was created. The river and riparian habitat upstream of the project is comprised mostly of a very large wetland area. The next downstream dam on the Nashua River is approximately eleven miles north of the project, in the town of East Pepperell. This East Pepperell dam does not yet have upstream and downstream fish passage, although the management plan of the federal and state fisheries agencies is to restore anadromous fish populations to the river, and the FWS is now stocking river herring above the East Pepperell dam. The next upstream dam is the Wachusett Dam in Clinton, approximately seventeen miles south of the project.

Environmental, Recreational, Cultural Issues

Because the recently-completed FERC exemption process (described below) appears to have addressed all environmental, recreational and cultural issues of concern to LIHI in its determination of whether certification should be granted for this project, the analysis I provide below focuses on this exemption process and the results emerging therefrom.

FERC exemption licensing process. In January 2007 the applicant applied for an exemption from licensing from FERC. Four entities commented on the application: the Massachusetts Department of Environmental Protection (MA DEP), the United States Department of the Interior, Fish and Wildlife Service (FWS), the Massachusetts Department of Fish and Wildlife (Department), and the Massachusetts Historical Commission. No comments were filed by the Oxbow National Wildlife Refuge, and no mention was made of the refuge in the several FWS filings in the exemption process. No municipal or regional governmental entities, non-governmental organizations or individuals commented on the application.

A brief summary of these agencies comments follows:

• The MA DEP waived issuance of a Section 401 water quality certification, and made only one request of FERC -- that FERC set a minimum bypass flow, based upon a study to be conducted "with the review and approval of state and federal fisheries agencies."

• The FWS and the Department each filed several sets of comments throughout the exemption process, including numerous, detailed Federal Power Act Section 30(c) mandatory terms and conditions. In addition, pursuant to Section 7 of the Endangered Species Act, the FWS separately filed comments stating that there was no need to prepare a Section 7 biological

assessment due to the absence of any federally-listed proposed, threatened or endangered species or critical habitat in the project area. Importantly, neither the state nor federal fishery agency opposed the restoration of hydropower generation at the site and the issuance by FERC of a license exemption to allow this renewed generation, so long as their separate 30(c) conditions were imposed by FERC and implemented by the applicant.

• The MA Historical Commission also did not oppose issuance of an exemption, and did not recommend changes to the application filed by the applicant, stating that "the project does not involve any new construction or modification of the existing facilities," but did request that certain historic property inventories be completed.

FERC released its Environmental Assessment (EA) in December 2007. Comments on the EA were filed by FWS and the Department, in which these agencies noted provisions of the FERC staff recommendations that were inconsistent with their respective Section 30(c) mandatory conditions. Based on these FWS and Department comments, in the Exemption decision FERC made changes to certain articles in the Exemption to achieve compliance with the Section 30(c) comments. From this reviewer's analysis of the FERC record prior to and following issuance of the Exemption, as well as discussions with these agencies and a review of the separate written comments filed with LIHI by the Department as part of this certification application (see below), it appears both that FERC adopted entirely these mandatory conditions (described immediately below) and that the commenting agencies are fully satisfied with the Exemption as issued.

Key Exemption articles regarding environmental, recreational, and cultural issues; current implementation status thereof. The articles contained in the Exemption address flows, water quality, fish passage, cultural resource protection and recreation. These articles, and a status report on their implementation, are briefly described below. *It is important to emphasize, however, that because the project is not yet in operation, implementation of key environmental requirements in the Exemption articles -- the setting and maintaining of a bypass flow, monitoring and maintaining a minimum run-of-river flow, and the siting, design and installation of eel passage -- have not occurred, including Department/FWS findings that the proposed actions to implement these requirements are environmentally acceptable.*

• Water flows:

-- The Exemption requires that the project operate in a run-of-river mode and maintain a real-time water level recording device to match turbine discharge to river inflow, with no units operating when the flow in the Nashua River is equal to or less than the hydraulic capacity of one turbine unit, and with only one unit operating when the flow exceeds the capacity of that one unit but is less than the capacity of both turbines.

-- Further, during periodic drawdowns due to scheduled and unscheduled maintenance, the applicant is required to implement a refill procedure after drawdown whereby 90 percent of inflow is passed downstream to re-water/protect downstream habitat, and the impoundment is refilled with the remaining 10 percent of inflow.

-- Within six months of issuance of the Exemption, the applicant was required to propose a

maintenance and monitoring plan for run-of-river operations and gain Department and FWS approval thereof. The applicant complied with this requirement, and the Department filed comments critical of the alarm and shut-down system regarding run-of-river operations. To date, FERC has taken no action on these comments, and it is my understanding that discussions are ongoing between the applicant and the Department on how to resolve the Department's concern, but have not been on a "fast track" since operations of the project have been delayed.

-- Until such time as a permanent bypass flow is established, the Exemption requires that a 1.55 cfs minimum flow be maintained in the bypass. Within one year of issuance of the Exemption, and during the first field season of operation, the applicant is required to consult with the Department and the FWS and then conduct a bypass flow reach study, for the purpose of determining an appropriate permanent habitat flow in the bypass reach. This study has not been proposed yet, due to the delay in startup. Within six months of completion of the study and approval of the bypass flows, the applicant is to submit, again for agency approval, a bypass reach maintenance and monitoring plan.

- Water quality:

-- As noted above, the MA DEP waived water quality certification, requesting only that a minimum bypass flow be established by FERC. During certain times of the year, dissolved oxygen and ph levels, as measured 15 miles upstream of the project, have not met state water quality standards, while water quality parameters measured three miles downstream have all met state standards. My discussions with MA DEP (Robert Kubit) found that DEP did not believe that the project had any impact on these upstream water quality problems and hence the waiving of certification.

-- Within six months of issuance of the Exemption, the applicant was required to propose to the Department a sediment removal plan for the periodic removal of accumulated sediment. The applicant complied with this requirement, explaining in its filing that there was no sediment buildup and the reasons therefore. The Department did not comment on this issue in its comments on the general post-licensing filing.

- Fish passage:

-- The Exemption requires that upstream and downstream eel passage, following consultation with and approval by the Department and the FWS, be constructed upon issuance of the Exemption due to the presence of elvers both upstream and downstream of the project. Specifically, within six months of issuance of the Exemption, the applicant was required to propose the design of upstream and downstream eel passage. The applicant complied with this requirement. However, in comments by the Department on this proposal, the Department found the "general outline" of the eelway to be "fine," but stated that approval of the exact location and design of the eelway could not be made and would have to wait until the project starts generation and a determination of where elvers are approaching the project could be made, and that several test sites would have to be established to make this determination. To date, FERC has taken no action on this design proposal.

-- Unlike eel passage, the Exemption does not require that upstream and downstream anadromous fish passage be immediately installed at the project, due to the absence of such passage at the next downstream project (Pepperell). Because the Pepperell project is now going through licensing, and the agencies are requesting anadromous passage at that project, the Exemption requires that the applicant construct and maintain such passage when notified to do so by the Department or FWS, with designs requiring the approval of these agencies. In the meantime, within six months of issuance of the Exemption the applicant was required to submit a plan for anadromous fishway evaluation, operation, maintenance and monitoring. The applicant complied with this requirement. In comments filed on the plan by the Department, the Department found the plan submitted to be incomplete because no provision was made for downstream passage, and that the exact location and design of the fishway will need to be determined once a flow pattern is established at the project and the target species determined.

- Cultural resource protection

-- In March 2008 the Commission executed an MOA with the Massachusetts State Historic Preservation Officer, in which the applicant has concurred, that requires the applicant to file a Historic Properties Management Plan (HPMP) with FERC within one year of issuance of the Exemption. The applicant complied with this requirement in February 2009 by filing an HPMP with the Massachusetts Historical Commission and with FERC. Shortly thereafter, the MA Historical Commission submitted comments thereon, commenting that the HPMP "provides useful advice in the operation and maintenance of the facility in accordance with professional historic preservation standards." The Commission went on to request several minor changes be made in the final HPMP, including inclusion of a table of contents, a USGS map showing the boundaries of the project, and photocopies of photographic images of the historic properties. The applicant told me that it has not yet implemented the Commission's requests, but intends to do so shortly, and that there is "nothing" in the Commission's list of requested changes "that will be a problem to include/implement." FERC has not reacted to the filing.

- Recreation

-- In addition to its Section 30(c) conditions, both FWS and the Department recommended that the project provide public access to project waters and lands. An Exemption article requires year-round recreational access and the provision of information to the public on the availability of these recreational opportunities. The applicant has informed LIHI that is has complied with this requirement by making its parking area available to groups and other organized river events with prior notice and permission, that a smaller parking area with garbage cans is also provided on the opposite side of the river allowing unrestricted river access, that it maintains a boat portage on one side of the river and directs boaters to this portage through signage, and that its site is open to the public for fishing. Confirmation of these representations were made by the Nashua River Watershed Association (see contacts).

Public Comment and Agency Letters

LIHI received no public comments. LIHI received one agency letter, from the Commonwealth of Massachusetts Department of Fish and Game, Division of Fisheries and Wildlife

(Department), stating that:

> If operated in accordance with the terms and conditions of the FERC exemption, the Ice House Project has the potential to be a "Low Impact" Hydro project. However, technical issues have delayed the start of project operations. Consequently, the mandated bypass reach minimum flow study has not been preformed, no final minimum flow has been determined, and the upstream eelway has not been constructed, all of which are required by the FERC exemption.
>
> Given the project owner's cooperation to date, it is reasonable to expect that the above terms and conditions of the FERC exemption will be met. Until then, I am not in a position to certify a project as low impact before I have seen it in operation. If LIHI chooses to certify this project I would ask that any such certification be conditioned to require the project owner to comply with the remaining FERC exemption requirements within one year and to demonstrate at that time the facility is, in fact, operating as a "low Impact" facility.

Following the receipt of this comment, I contacted by telephone Caleb Slater, Ph.D., author of the letter and the Anadromous Fish Project Leader at the Department, and briefly discussed his comments with him. Dr. Slater confirmed that so long as the terms and conditions of the Exemption were met by the applicant including, importantly, approval by the Department of certain operating conditions and fishways once proposed and implemented, that the Department would support LIHI certification for the project.

General Conclusions and Recommendation

The core question presented by the application by the Ice House Power Project is *not* whether the project will meet LIHI certification criteria once it is up and running and *assuming that the Department and the FWS are comfortable* with (1) the run-of-river monitoring and maintenance plan, (2) flows in the bypass, and the monitoring of these flows, and (3) the location and design of eel passage. If such approval occurs, both agencies are comfortable with certification.

Instead, the key question for LIHI is what to do about certifying a project that is not yet in operation, and as a result certain critical conditions on which certification could rise or fall are not yet proposed or approved by agencies whose approval may well make a big difference in LIHI's decision-making. *On the one hand*, the problem with delaying certification until the project is both operating and has fulfilled these conditions is that once hydro operations begin, compliance could take up to eighteen months, and in the case of this project we have (a) license conditions that the agencies are quite comfortable with and, assuming applicant good faith, are pretty simple and straightforward to implement successfully, and (b) an applicant who has been cooperative and reasonable throughout the regulatory process. *On the other hand*, the problem with granting a *full* 5-year certification before a project has even begun operating is that once a certification has been received, LIHI will have provided a certification that is, essentially, nothing more than a *prediction*: a prediction that an as-yet non-operating project, with no track record of operation, will indeed be operated in a manner that is low impact. Yet if this prediction proves incorrect -- if the agencies subsequently object to proposed flows and fish passage and LIHI is in concurrence with these objections -- LIHI will be living with certifying a project that, for likely 70 percent of the certification period, will be operating in a non-low impact manner.

Recommendation. Based on my review of information submitted by the applicant, my review of additional documentation, and my consultations with resource agency staff, I believe the Ice House Power Project APPEARS TO MEET all of the criteria to be certified, and I therefore RECOMMEND that the project be certified for a term of EIGHTEEN MONTHS, WITH SAID CERTIFICATION EXTENDED FOR AN ADDITIONAL FORTY-TWO MONTHS SHOULD THE APPLICANT DEMONSTRATE TO LIHI THAT IT HAS COMPLIED WITH THE CONDITIONS CONTAINED IN ARTICLES 14 AND 16 OF ITS MARCH 2008 FERC EXEMPTION.

Low Impact Certification Criteria

A. Flows

1) Is the Facility in *Compliance* with *Resource Agency Recommendations* issued after December 31, 1986 regarding flow conditions for fish and wildlife protection, mitigation and enhancement (including in-stream flows, ramping and peaking rate conditions, and seasonal and episodic instream flow variations) for both the reach below the tailrace and all bypassed reaches?

THE FACILITY WILL BE IN COMPLIANCE ONCE IT BEGINS OPERATION AND DEMONSTRATES (1) COMPLIANCE WITH FLOW CONDITIONS CONTAINED IN THE FERC EXEMPTION AND (2) RECEIVES APPROVAL FROM RESOURCE AGENCIES FOR PROPOSED BYPASS FLOWS.

If YES, go to B.
If NOT APPLICABLE, go to A2.
If NO, project fails.

2) If there is no flow condition recommended by any Resource Agency for the Facility, or if the recommendation was issued prior to January 1, 1987, is the Facility in Compliance with a flow release schedule, both below the tailrace and in all bypassed reaches, that at a minimum meets Aquatic Base Flow standards or "good" habitat flow standards calculated using the Montana-Tennant method?

If YES, go to B
If NO, go to A3.

3) If the Facility is unable to meet the flow standards in A.2., has the Applicant demonstrated, and obtained a letter from the relevant Resource Agency confirming that demonstration, that the flow conditions at the Facility are appropriately protective of fish, wildlife, and water quality?

If YES, go to B
If NO, project fails.

CONDITIONALLY PASS

B. Water Quality

1) Is the Facility either:
a) In Compliance with all conditions issued pursuant to a Clean Water Act Section 401 water quality certification issued for the Facility after December 31, 1986? Or
b) In Compliance with the quantitative water quality standards established by the state that support designated uses pursuant to the federal Clean Water Act in the Facility area and in the downstream reach?

YES, IN THAT EXCEEDANCES OF STATE WQ STANDARDS OCCURRING UPSTREAM OF THE FACILITY HAVE BEEN DETERMINED BY MASS DEP TO NOT BE CAUSED OR CONTRIBUTED TO BY THE FACILITY.

If YES, go to B2.
If NO, project fails.

2) Is the Facility area or the downstream reach currently identified by the state as not meeting water quality standards (including narrative and numeric criteria and designated uses) pursuant to Section 303(d) of the Clean Water Act?

YES.

If YES, go to B3.
If NO, go to C.

3) If the answer to question B.2 is yes, has there been a determination that the Facility is not a cause of that violation?

YES.

If YES, go to C.
If NO, project fails.

PASS

C. Fish Passage and Protection

1) Is the Facility in Compliance with *Mandatory Fish Passage Prescriptions* for upstream and downstream passage of anadromous and catadromous fish issued by Resource

Agencies after December 31, 1986?

THE FACILITY WILL BE IN COMPLIANCE WITH SECTION 30(C) MANDATORY FISH PASSAGE CONDITIONS ONCE THE PROJECT BEGINS OPERATION, AND FINAL EEL PASSAGE DESIGNS AND LOCATIONS ARE JOINTLY DETERMINED AND AGREED TO BY THE APPLICANT, MASS. FISH AND WILDLIFE, AND US FWS

If YES, go to C5.
If NOT APPLICABLE, go to C2.
If NO, project fails.

2) Are there historic records of anadromous and/or catadromous fish movement through the Facility area, but anadromous and/or catadromous fish do not presently move through the Facility area (e.g., because passage is blocked at a downstream dam or the fish run is extinct)?

YES TO HISTORIC RECORDS; ANDADROMOUS FISH (RIVER HERRING) ARE BEING STOCKED DOWNSTREAM OF THE FACILITY; EEL MOVE ABOVE AND BELOW THE FACILITY.

If YES, go to C2a.
If NO, go to C3.

a) If the fish are extinct or extirpated from the Facility area or downstream reach, has the Applicant demonstrated that the extinction or extirpation was not due in whole or part to the Facility?

NOT APPLICABLE

If YES, go to C2b.
If NOT APPLICABLE, go to C2b.
If NO, project fails.

b) If a Resource Agency Recommended adoption of upstream and/or downstream fish passage measures at a specific future date, or when a triggering event occurs (such as completion of passage through a downstream obstruction or the completion of a specified process), has the Facility owner/operator made a legally enforceable commitment to provide such passage?

YES.

If YES, go to C5.
If NOT APPLICABLE, go to C3.
If NO, project fails.

3) If, since December 31, 1986:

a) **Resource Agencies have had the opportunity to issue, and considered issuing, a Mandatory Fish Passage Prescription for upstream and/or downstream passage of anadromous or catadromous fish (including delayed installation as described in C2a above), and**
b) **The Resource Agencies declined to issue a Mandatory Fish Passage Prescription,**
c) **Was a reason for the Resource Agencies' declining to issue a Mandatory Fish Passage Prescription one of the following: (1) the technological infeasibility of passage, (2) the absence of habitat upstream of the Facility due at least in part to inundation by the Facility impoundment, or (3) the anadromous or catadromous fish are no longer present in the Facility area and/or downstream reach due in whole or part to the presence of the Facility?**

If NO, go to C5.
If NOT APPLICABLE, go to C4.
If YES, project fails.

4) If C3 was not applicable:
   a) **Are upstream and downstream fish passage survival rates for anadromous and catadromous fish at the dam each documented at greater than 95% over 80% of the run using a generally accepted monitoring methodology? Or**
   b) **If the Facility is unable to meet the fish passage standards in 4.a., has the Applicant demonstrated, and obtained a letter from the US Fish and Wildlife Service or National Marine Fisheries Service confirming that demonstration, that the upstream and downstream fish passage measures (if any) at the Facility are appropriately protective of the fishery resource?**

If YES, go to C5.
If NO, project fails.

5) Is the Facility in Compliance with Mandatory Fish Passage Prescriptions for upstream and/or downstream passage of *Riverine* fish?

NOT APPLICABLE.

If YES, go to C6.
If NOT APPLICABLE, go to C6.
If NO, project fails.

6) Is the Facility in Compliance with Resource Agency Recommendations for Riverine, anadromous and catadromous fish entrainment protection, such as tailrace barriers?

NOT APPLICABLE

If YES or NOT APPLICABLE, go to D
If NO, project fails.

CONDITIONALLY PASS

D. Watershed Protection

1) Is there a buffer zone dedicated for conservation purposes (to protect fish and wildlife habitat, water quality, aesthetics and/or low-impact recreation) extending 200 feet from the high water mark in an average water year around 50 - 100% of the impoundment, and for all of the undeveloped shoreline

NO

If YES = Pass, go to E and receive 3 extra years of certification
If NO = go to D2

2) Has the facility owner/operator established an approved watershed enhancement fund that: 1) could achieve within the project's watershed the ecological and recreational equivalent of land protection in D.1.,and 2) has the agreement of appropriate stakeholders and state and federal resource agencies?

NO

If YES = Pass, go to E and receive 3 extra years of certification
If NO = go to D3

3) Has the facility owner/operator established through a settlement agreement with appropriate stakeholders and that has state and federal resource agencies agreement an appropriate shoreland buffer or equivalent watershed land protection plan for conservation purposes (to protect fish and wildlife habitat, water quality, aesthetics and/or low impact recreation)

NO

If YES = Pass, go to E
If NO = go to D4

4) Is the facility in compliance with both state and federal resource agencies recommendations in a license approved shoreland management plan regarding protection, mitigation or enhancement of shorelands surrounding the project.

YES

If YES = Pass, go to E
If No = Fail

PASS

E. Threatened and Endangered Species Protection

1) Are threatened or endangered species listed under state or federal Endangered Species Acts present in the Facility area and/or downstream reach?

NO

If YES, go to E2.
If NO, go to F.

2) If a recovery plan has been adopted for the threatened or endangered species pursuant to Section 4(f) of the Endangered Species Act or similar state provision, is the Facility in Compliance with all recommendations in the plan relevant to the Facility?

***If YES or NOT APPLICABLE, go to* E3.**
If NO, project fails.

3) If the Facility has received authority to incidentally *Take* a listed species through: (i) Having a relevant agency complete consultation pursuant to ESA Section 7 resulting in a biological opinion, a habitat recovery plan, and/or (if needed) an incidental Take statement; (ii) Obtaining an incidental Take permit pursuant to ESA Section 10; or (iii) For species listed by a state and not by the federal government, obtaining authority pursuant to similar state procedures; is the Facility in Compliance with conditions pursuant to that authority?

If YES, go to E4.
If NOT APPLICABLE, go to E5.
If NO, project fails.

4) If a biological opinion applicable to the Facility for the threatened or endangered species has been issued, can the Applicant demonstrate that:

a) The biological opinion was accompanied by a FERC license or exemption or a habitat conservation plan? Or

b) The biological opinion was issued pursuant to or consistent with a recovery plan for the endangered or threatened species? Or

c) There is no recovery plan for the threatened or endangered species under active development by the relevant Resource Agency? Or
d) The recovery plan under active development will have no material effect on the Facility's operations?

If YES, go to F
If NO, project fails.

5) If E.2. and E.3. are not applicable, has the Applicant demonstrated that the Facility and Facility operations do not negatively affect listed species?

If YES, go to F.
If NO, project fails.

PASS

F. Cultural Resource Protection

1) If FERC-regulated, is the Facility in Compliance with all requirements regarding Cultural Resource protection, mitigation or enhancement included in the FERC license or exemption?

YES

If YES, go to G.
If NOT APPLICABLE, go to F.2

2) If not FERC-regulated, does the Facility owner/operator have in place (and is in Compliance with) a plan for the protection, mitigation or enhancement of impacts to Cultural Resources approved by the relevant state or federal agency or *Native American Tribe*, or a letter from a senior officer of the relevant agency or Tribe that no plan is needed because Cultural Resources are not negatively affected by the Facility?

If YES, go to G.
If NO, project fails.

PASS

G. Recreation

1) If FERC-regulated, is the Facility in Compliance with the recreational access,

accommodation (including recreational flow releases) and facilities conditions in its FERC license or exemption?

YES

If YES, go to G3.
If NOT APPLICABLE, go to G2.
If NO, project fails.

2) If not FERC-regulated, does the Facility provide recreational access, accommodation (including recreational flow releases) and facilities, as Recommended by Resource Agencies or other agencies responsible for recreation?

If YES, go to G3.
If NO, project fails.

3) Does the Facility allow access to the reservoir and downstream reaches without fees or charges?

YES

If YES, go to H.
If NO, project fails.

PASS

H. Facilities Recommended for Removal

1) Is there a Resource Agency Recommendation for removal of the dam associated with the Facility?

NO

If NO, facility is low impact.
If YES, the project fails.

PASS

FACILITY IS *CONDITIONALLY* LOW IMPACT

RECORD OF CONTACTS

Date of Conversation: 10/01/09 & 10/06/09
Application Reviewer: Ronald Kreisman, Consultant

Person Contacted: John P. Warner, Energy/Hydropower Coordinator
New England Field Office, U.S. Fish and Wildlife Service
Telephone/email: 603-223-2541
John_Warner@fws.gov
Areas of Expertise: Hydropower and fisheries impacts

SEE EMAIL EXCHANGE, BELOW

Ron - See comments embedded below -

John P. Warner, Energy/Hydropower Coordinator
New England Field Office, U.S. Fish and Wildlife Service
70 Commercial Street, Suite 300
Concord, NH 03301
(603) 223-2541 - ext.15
(603) 223-0104 - FAX

www.fws.gov.northeast/newenglandfieldoffice
"Ronald Kreisman" <kreisman@gwi.net>

"Ronald Kreisman" <kreisman@gwi.net>
10/01/2009 04:39 PM

Please respond to <kreisman@gwi.net>

To<John_Warner@fws.gov>, <melissa_grader@fws.gov>

cc

SubjectIce House hydro project; quick questions from LIHI

Dear John and Melissa:

As John knows, I am an environmental attorney/consultant in Maine helping Fred Ayer review applications for certification by the Low Impact Hydropower Institute (LIHI), and today am writing to you in that capacity. (In addition, as a private attorney I work closely with your Maine FWS office (Fred Seavey), Ben Rizzo and Andrew Tittler on a variety of projects, including the Presumpscot River.)

For LIHI, I am reviewing the Ice House project, which has applied to LIHI for

certification. The fact that the project is not yet up and running, and therefore that a number of licensing conditions that FWS, Mass. Fisheries and Wildlife, and FERC established in the March 2008 Exemption Order are not operational or have not been worked through poses an interesting certification issue to LIHI which I am working through now. It may be that I recommend to Fred and LIHI's Board that, assuming the project *could* be certified if all the Exemption articles are timely enacted with FWS sign-off, that the project be certified but conditionally, and that the certification be reviewed after operations have begun (significantly less than the normal 5 year term of the certification) and there is then a required demonstration of compliance with agency requirements, and that if this does not occur the certification terminates.

**** I believe that this would be an appropriate path for all such projects if the terms and conditions are all OK. It is not uncommon that a license or exemption is issued and then we end up arguing and fighting over implementation details for years with the same owner or a subsequent owner whereas leading to the issuance of the license or exemption, the applicant was very agreeable and cooperative. At this point nothing has gone wrong or delayed at this project though the design and approval of the eel passage system has not been completed and it has yet to be constructed. That alone causes me to question certification as noted above.**

In general, certifying on a promise is a real problem for me and bad policy in my opinion - deadlines slide, FERC's enforcement is slow and weak and commitments made to get a permit or in this case an economic boost via LIHI certification are not always fulfilled as promised and in a timely manner**

In this regard, I wanted to get your input on the following:

First, the basic question: given what I have read in the Environmental Assessment, your comments thereto, yours and Massachusetts' 30(c) conditions, and the fact that all of this occurred recently and it appears to me that FWS (and Mass) "got what it wanted" in the licensing (or should in the post-licensing implementation) in terms of run-of-river flows, bypass flows, eel passage, contingent anadromous passage, , and the recreational access being provided, plus the absence of endangered or threatened species affected by the project, is there any reason that you are aware that this project should not be certified? Asked another way, what more should have been done here that you requested that was not done?

****I believe that everything we asked for is required ****

Second, and more specifically, did FWS ever comment on the post-licensing, September 2008 run-of-river, sedimentation and fish passage plan that Ice House produced? I could not find anything.

**** No - we have not commented to date due to limited staff resources - Caleb**

Slater of MADFW has largely taken the lead on post-issuance issues for this project **

Finally, I wasn't clear on what role Libby Herland as Oxbox Refuge Manager was now playing in these flow, habitat, fisheries and recreational issues. Should I be contacting her as well?

**** I don't see a need to contact the refuge ****

Thanks much for your input. If it is easier for us to do this by telephone, just let me know and I'll call.

Ron Kreisman
25 Page Street
Hallowell, ME 04347
207-626-0248 (ph)
207-626-0202 (fax)

Date of Conversation:	10/06/09
Application Reviewer:	Ronald Kreisman, Consultant
Person Contacted:	Libby Herland, Project Leader, Oxbox National Wildlife Refuge, FWS.
Telephone/email:	978-443-4661
Areas of Expertise:	Impact of project on Oxbox National Wildlife Refuge

I called Ms. Herland to confirm that the absence of comment by FWS on Oxbox impacts from the project during the exemption process meant that the FWS had no issues with the project vis a vis Oxbow. Ms. Herland stated that "basically the project is fine. We have no problem with it. It does back up water into the Oxbow, but provides some benefit in doing so, in that water for waterfowl habitat remains in the refuge longer during the year. We have never tried to stop or alter the project as it was being redeveloped. We are either neutral on it or thumbs up."

Date of Conversation:	10/02/09
Application Reviewer:	Ronald Kreisman, Consultant
Person Contacted:	Robert Kubit, P.E.
Telephone/email:	robert.kubit@state.ma.us
Areas of Expertise:	Water quality licensing and compliance

SEE EMAIL, BELOW.

I called Mr. Kubit to follow up on email below. I confirmed with him that Mass DEP did not believe that the Ice House Project was causing or contributing to the upstream violations in numeric criteria for dissolved oxygen and ph. He confirmed that this was the case, and that Mass DEP was satisfied with the Exemption condition on bypass flows issued by FERC.

Dear Bob:

This is the second of the two LIHI inquiries, following my email to you yesterday. This one has to do with the Ice House Project on the Nashua in Ayer. As I noted yesterday, I am reviewing request by Ice House for certification from LIHI.

The fact that the project is not yet up and running, and therefore that a number of licensing conditions that FWS, Mass. agencies, and FERC established in the March 2008 Exemption Order are not operational or have not been implemented and approved by regulators poses an interesting certification issue to LIHI which I am working through now. It may be that I recommend to Fred and LIHI's Board that, assuming the project *could* be certified if all the Exemption articles are timely enacted with FWS and Mass. sign-off, that the project be certified but conditionally, and that the certification be reviewed after operations have begun (significantly less than the normal 5 year term of the certification) and there is then a required demonstration of compliance with agency requirements, and that if this does not occur the certification terminates.

In this regard, I wanted to get your input the basic question: given what I have read in the Environmental Assessment, the Massachusetts' 30(c) conditions, and the fact that all of this occurred recently and it appears to me that Mass "got what it wanted" in the licensing (or should in the post-licensing implementation) in terms of run-of-river flows, bypass flows, eel passage, contingent anadromous passage, and the recreational access being provided, plus the absence of endangered or threatened species affected by the project, is there any reason that you are aware that this project should not be certified? Asked another way, what more should have been done here that you requested that was not done? I received today Caleb's comment letter and talked with him, and this is where I heard him coming out, but wanted your view as well.

Thanks much for your input. If it is easier for us to do this by telephone, just let me know and I'll call.

Ron Kreisman
25 Page Street
Hallowell, ME 04347
207-626-0248 (ph)
207-626-0202 (fax)
kreisman@gwi.net (email)

Date of Conversation:	10/01/09
Application Reviewer:	Ronald Kreisman, Consultant
Person Contacted:	Caleb Slater, MA Department of Fish and Game, Division of Fisheries and Wildlife
Telephone/email:	caleb.slater@state.ma.us
Areas of Expertise:	Hydropower and fisheries impacts.

SEE EMAIL BELOW, AS WELL AS LETTER FILED BY DR. SLATER WITH LIHI. In addition, I spoke with Dr. Slater who confirmed that he thought certification would be appropriate so long as LIHI could ensure that the Exemption requirements were complied with to the satisfaction of the Department. He expected this to occur, but could not be certain at this point.

-----Original Message-----
From: Slater, Caleb (FWE) [mailto:Caleb.Slater@state.ma.us]
Sent: Thursday, October 01, 2009 9:42 AM
To: kreisman@gwi.net
Subject: RE: Low Impact Hydro certification; quick question

Ron,

I have been working on several review letters for LIHI projects this week. I've been busy wrapping up my field work, and now have to get back to the office. I will be submitting comments on both the Deer Island project and the Ice house project later today.

As for your questions- I did not start with DFW until 1998- so I was not involved with the Deer Island project during licensing. I have seen it on the list of FERC projects in MA. I have no issues. Water quality in Boston Harbor is an issue for MADEP or Marine Fisheries. I wish we had more of these conduit projects.

The Ice house is more difficult. Their exemption is very through, and I believe the project will qualify- but they are not yet running so we have not determined a bypass flow and they have not yet built the eel ladder that is required.

Caleb
Caleb Slater, Ph.D.
Anadromous Fish project Leader
MA Division of Fisheries and Wildlife
508.389.6331
508.389.7890 fax
-----Original Message-----
From: Ronald Kreisman [mailto:kreisman@gwi.net]
Sent: Wednesday, September 30, 2009 6:08 PM
To: Slater, Caleb (FWE)
Subject: Low Impact Hydro certification; quick question

Dear Caleb:

I am an environmental attorney/consultant in Maine helping Fred Ayer review applications for certification by the Low Impact Hydropower Institute (LIHI). I don't believe we have met, although your name is familiar to me.

For full disclosure (!), this is the first of two emails you will get from me in the next day, as I am reviewing two projects requesting certification from LIHI in which you are listed by the owner in their LIHI application as the Division of Fisheries and Wildlife contact person. The first of these projects is the Deer Island hydroelectric facility located at the wastewater treatment plant in Boston Harbor, where the Mass. Water Resources Authority operates two turbines at the end of two sewage treatment conduit pipes, before the

outfall. The second is the recently-licensed Ice House project on the Nashua River in Ayer. This first email concerns the Deer Island hydro facility. Thanks in advance for helping out.

First, from the records I have available to me, I am not even sure if you or the Division have even been involved in this project, or involved recently, so if you haven't, I apologize and just let me know.

I have been reviewing the record of the hydro facility at FERC (both when it was first licensed in 1993 and since it first began generating power in 2001), and have found a complete absence of any negative comments, or even comments of concern from either federal and state regulatory agencies dealing with water quality and fisheries. In fact, since the facility was licensed by FERC in 1993, and since the turbines began operating in 2001, at least at FERC there has not been a single comment at all on FERC's docket from any agency. Thus, while I understand that there are ongoing water quality issues concerning Boston Harbor and the impact to the Harbor of discharges from the treatment plant, I have not been made aware of any *turbine-related or turbine-caused* habitat or fishery issues, meaning discharge problems that are caused uniquely by the hydro generation or to which the hydro generation contributes (as opposed to issues that have nothing to do with the hydro, but are related to operations of a large sewage treatment plant discharging into a harbor). Am I missing something that you/the Division are aware of and monitoring? I am obviously focusing in on this aspect since LIHI's sole focus is on the potential involvement of the hydro project in adverse impacts to the environment.

Also, if you have suggestions of other people with whom I should be conferring on this matter, I would be most appreciative, as LIHI is trying to be thorough and comprehensive in its evaluation. Particularly I am seeking a contact at NOAA in Gloucester, but do not have one, so if you have a suggestion here that would be most appreciated.

Thank you in advance for your input. If it would be easier or more comfortable to talk by phone, my contact information is below.

Sincerely,

Ron Kreisman
25 Page Street
Hallowell, ME 04347
207-626-0248 (ph)
207-626-0202 (fax)
kreisman@gwi.net (email)

Date of Conversation:	10/06/09
Application Reviewer:	Ronald Kreisman, Consultant
Person Contacted:	Elizabeth Ainsley Campbell, Executive Director Nashua River Watershed Association
Telephone/email:	EAC@NashuaRiverWatershed.org
Areas of Expertise:	Recreational use of Nashua River watershed

SEE EMAIL BELOW

Hi --

The staff member is on the river with a class right now. I will try reaching her in the late afternoon, and may or may not be successful. Meanwhile:
With regard to what Liisa wrote up, it sounds right (though I don't have any personal knowledge of their interactions with the police patrols and such). Liisa and John have been 100% accommodating & enthusiastic when the NRWA has requested permission to use their parking lot as part of one of our recreatoinal events -- indeed, we were at their site quite recently for a river outing.

Elizabeth

From: Ronald Kreisman [mailto:kreisman@gwi.net]
Sent: Tuesday, October 06, 2009 11:06 AM
To: Elizabeth Ainsley Campbell
Subject: RE: Quick question re: Ice House hydo project

Thanks much for getting back to me. Is there a staff member whom I could quickly call or you could gently nudge to email me, as I am writing up my report today?

Ron Kreisman
25 Page Street
Hallowell, ME 04347
207-626-0248 (ph)
207-626-0202 (fax)
kreisman@gwi.net (email)

-----Original Message-----
From: Elizabeth Ainsley Campbell [mailto:EAC@nashuariverwatershed.org]
Sent: Tuesday, October 06, 2009 11:23 AM
To: kreisman@gwi.net; Martha Morgan
Subject: RE: Quick question re: Ice House hydo project

Mr. Kreisman --

Liisa Grady Down and John Grady of the Ice House Project in Ayer have indeed allowed public access for outdoor recreational purposes, and the NRWA has utilized the site numerous times. I have forwarded your inquiry on to an NRWA staff person who is on the river a lot and may have more to add. We'll be back to you before too long.

Elizabeth Ainsley Campbell
Executive Director

*****

Dear Mr. Kreisman,

I apologize for the delay in getting back to you, I have been teaching on the river these last two beautiful days! I can confirm that John and Lisa Grady have been very accomodating and helpful in our endeavors to take canoeists on the Nashua to and from their location. We have used their parking lot on several occasions for program participant parking...and the added bonus is that their beautiful facility is a lovely backdrop and interesting history lesson to add to our program content!

I hope this is helpful to you.

Sincerely,

Stacey Chilcoat
River Classroom Director
Nashua River Watershed Association

From: Ronald Kreisman [mailto:kreisman@gwi.net]
Sent: Friday, October 02, 2009 1:57 PM
To: Martha Morgan; Elizabeth Ainsley Campbell
Subject: Quick question re: Ice House hydo project

Dear Ms. Morgan and Ms.Campbell:

Liisa Grady Dowd, consultant to the Ice House dam redevelopment project in Ayer suggested I contact you. I am an environmental consultant/attorney working with a non-profit called the Low Impact Hydropower Institute, which certifies selected hydropower projects as producers of "green" power. (Further information about the Institute can be found at http://www.lowimpacthydro.org/) The new Ice House Project in Ayer has applied to us for certification, and we are evaluating now the impacts (if any) of the project.

One of the issues we examine is what kind of recreational amenities have been required by regulators at the project site, and what are being offered by the owner. (My understanding is that you helped design the canoe portage?) Under its federal license (issued in 2008), Ice House is required to:
"allow public access to the project for outdoor recreational purposes. The [project] shall make reasonable efforts to inform the public of the availability of recreational opportunities at the project. Such efforts shall include the posting of signs at major points of access to the project."
So my quick questions to you/NRWO:

In response to the question I posed to Liisa requesting "a description of what you have done to comply with Article 15 recreation access requirements," she wrote:

Our parking area is available to groups and other organized river events, with prior notice and permission. We maintain portage on the Shirley side of the river and direct recreational users to that

safe portage. Our site is open to fishing – and we have managed it somewhat informally. Most fishermen will ask permission, since the site is posted against trespassing. We have had some issues with weekend warriors coming onto the "island" (between the bypass reach and the tail race) – leaving trash and camp fires. The police to patrol our site – at our request , since we are at the very edge of town. One way we have managed fishing access – on the Ayer side of the river is to provide the fishermen with one of our business cards – and the police know to ask for that, if they suspect property abuse or trespassing. On the Shirley side of the river there is also a small parking area, we provide some garbage cans for trash and allow unrestricted recreational river access.

Does all this sound right to you? Have you had any public access/public use concerns with the project, or reasonable requests of Ice House that have not been addressed?

Thanks much for your help. If it is easier to just give me quick call to discuss, feel free at contact information below.

Ron Kreisman
25 Page Street
Hallowell, ME 04347
207-626-0248 (ph)
207-626-0202 (fax)
kreisman@gwi.net (email)

Date of Conversation:	September & October, 2009
Application Reviewer:	Ronald Kreisman, Consultant
Person Contacted:	Liisa Grady Dowd, Applicant and Co-owner, Ice House Power Project
Telephone/email:	liisa@gradyresearch.com; 978-772-3303

SEE SEVERAL EMAILS BELOW

From: Ronald Kreisman [mailto:kreisman@gwi.net]
Sent: Tuesday, September 22, 2009 4:52 PM
To: liisa@gradyresearch.com
Subject: Ice House application for Low Impact Hydro certification; quick question

Dear Liisa:

I am the consultant working with Fred Ayer at the Low Impact Hydropower Institute to evaluate your Ice House application for certification. I have just completed an initial review of the file, and in an effort to speed along your application, I have a few, hopefully quick, immediate questions below, for which I am requesting your assistance, as promptly as possible. **If anything below is confusing, don't hesitate to either email or call me at contact information below, and we'll figure it out.**

First, concerning the contacts list that you provided with your application/questionnaire (question #11). From this list or otherwise, could you identify for me the names, phone numbers and email addresses of the following agency people that you are/have dealt with, post-issuance of exemption, to implement Articles 14, 15 and 16 of your exemption, including but not limited to:

1. The USFWS person(s) dealing with Article 14 issues (e.g., river flows, eel passage and monitoring of need for upstream anadromous passage). Is this John Warner, or Melissa Grader, or someone else?

Post-exemption documents sent to USFWS – have been addressed to both John Warner and Melissa Grader at the Concord, NH Office. They are both familiar with our project.

Most of our "face-to-face" and historical interaction with USFWS has been with the Oxbow Refuge Managers – Tim Prior (now retired) and replaced by the current Project Leader, Libby Herland. The Oxbow Federal Refuge is our immediate abutter both upstream & downstream.

Libby Herland, Project Leader, c/o U.S. Fish and Wildlife Service, 73 Weir Hill Road, Sudbury, Massachusetts 01776

(978) 443-4661 FW5RW_EMNWR@fws.gov

2. Same question for Mass Division of Fisheries and Wildlife. Is this Caleb Slater or someone else?

Yes, Caleb has been our contact all along.

3. Same question for Article 16 -- Mass State Historic Preservation Office?

Most of my direct correspondence has been through our Historic Preservation Consultant – Sanford Johnson, 653 Martin's Pond Road, Groton, MA 01450, fredhpp@charter.net

At the MHC we have dealt mainly with Edward L. Bell, 220 Morrissey Boulevard, Boston, MA 02125, Ph: (617) 727-8470

4. For Article 15, recreation access, is this someone from the town and if so, who?

Originally the information for canoe portage came from Nashua River Watershed Association, Martha Morgan, Water Programs Director MarthaM@NashuaRiverWatershed.org & Elizabeth Ainsley Campbell, Executive Director EAC@NashuaRiverWatershed.org

Second, pursuant to Articles 14, 15 and 16 of your exemption, do you now have:

(a) an approved run-of-river monitoring and maintenance plan, including minimum flows, and if so, could you send me a copy plus the consultation comments filed on it?

The only thing I have on (a), (b), (c), & (d) was included in the original package sent to Fred. I have attached another copy (APPENDIX D) for your reference. Other than Caleb's input (letter attached) we have not received any additional information from FERC or other resource agency. Much of the details for these will have to be worked out over an operational year – to see how the site changes. As per the Exemption order and "hooks" included in it – we are bound by that contract to adjust, as needed going forward when the various resource agencies are able to present a case for modification(s). Caleb and I just discussed this on the phone. Not only is it operationally-dependent but it is also seasonally and weather-dependent. We fully expect to have an ongoing conversation about these items – and are prepared to go forward with eel & fish passage, when appropriate.

(b) same question for bypass reach discharge plan, and if so, could you send me a copy plus the consultation comments filed on it?

See (a)

(c) same question for sediment removal plan, and if so, could you send me a copy plus the consultation comments filed on it ?

See (a)

(d) same question for fishway operation, maintenance, monitoring and evaluation plan, and if so, could you send me a copy plus the consultation comments filed on it?

See (a)

(e) a description of what you have done to comply with Article 15 recreation access requirements?
Our parking area is available to groups and other organized river events, with prior notice and permission. We maintain portage on the Shirley side of the river and direct recreational users to that safe portage. Our site is open to fishing – and we have managed it somewhat informally. Most fishermen will ask permission, since the site is posted against trespassing. We have had some issues with weekend warriors coming onto the "island" (between the bypass reach and the tail race) – leaving trash and camp fires. The police to patrol our site – at our request , since we are at the very edge of town. One way we have managed fishing access – on the Ayer side of the river is to provide the fishermen with one of our business cards – and the police know to ask for that, if they suspect property abuse or trespassing. On the Shirley side of the river there is also a small parking area, we provide some garbage cans for trash and allow unrestricted recreational river access.

(f) same question for Article 16 Historic Properties Management Plan, and if so, could you send me a copy plus the consultation comments filed on it?
Copy attached. I tried to make it a PDF, but the formatting got pretty messed up – so a WORD document it is.

Third, has upstream and downstream eel passage, pursuant to Article 14, been installed? If so, could you send me a copy of FERC documentation on this, plus consultation comments?

No. Eel passage has not been installed. Again, this is operation-dependent to evaluate correct location, etc. So, until we have some operational history – we are in a bit of a holding pattern. We have discussed our preliminary plans with Caleb – see MADFW comment latter attached.

Fourth, I assume that you have NOT been "notified" by FWS or Mass Division of Fisheries that other fish passage is needed at Ice House. Is this correct?

That is correct, we have NOT yet been notified that fish passage is required.

Thanks much Liisa. Again, call if this is unclear, overwhelming, etc.

This is all very clear. No problem. Let me know if you need anything else. The conference was pretty good this morning. Fred's presentation was certainly the clearest of all – I wanted to let him know that. So much of this process (for a small family operation) is incredibly convoluted – but the LIHI portion is the easiest to understand both from the regulatory perspective and from the common sense perspective.

I can be reached at 978-772-3303 if you have more questions or would like to talk further about any of the above.

Thanks!

Ron Kreisman
25 Page Street
Hallowell, ME 04347
207-626-0248 (ph)
207-626-0202 (fax)
kreisman@gwi.net (email)

*****

From: Ronald Kreisman [mailto:kreisman@gwi.net]
Sent: Monday, October 05, 2009 11:54 AM
To: 'liisa grady dowd'
Subject: Quick LIHI questions

Hi Liisa:

Couple of quick questions for my writeup:

Prior to your restoration, was hydropower ever generated at the site, and if so, when was the last time that hydropower generation occurred? I couldn't find this from either the materials you submitted or in FERC's write ups, but may have just missed it. Or was the site just used for mechanical power, i.e., gristmill, sawmill etc and when was the last time it was so used? I am assuming that since there is a powerhouse there was some electrical generation?

The site history includes gristmill & sawmill activities from the 1700's-1800's. There were many fires and mill "rebuilds" throughout that historical period. Fitchburg & Leominster RR built the "current"

powerhouse and inlet structures in 1906 (or so…) to run their DC trolley cars – they had a number of these dams along the Nashua, spread out ~2 miles or so apart and used the power generated for their trolleys. This business died in the 20's with the automobile. The Horgan family in Ayer bought the site and used the water to power an ammonia compressor which they used to make ice for the US Army (across the street at Fort Devens). The advent of the refrigerator essentially killed that business and the family added oil to their business activities. There was a fire on site here in the 80's that ultimately burned the "Icehouse" to the ground. The mill building that houses our business is brand new – although built to "look like" the 1900's architecture of the F&L Powerhouse. See Globe article & Ice House Fire article attached.

Do you have any sense of when the dam/spillway were originally put in the river? Late 1700s?
Yes, c. 1790.

Are we still talking that there are two Kaplan turbines?
Yes, two Kaplan type turbines – see "turbine & draft tube assembly" photo. The Powerhouse was originally built to house three turbines – the right and left ones spun the same direction whereas the center one, spun in the opposite direction. Our renovation included only two in the right & left hand position. The center "hole" is used as a drain, when we need to access the turbines directly. See the condition of the powerhouse when we purchased the property in 1999 – ("pre-construction" and in the "looking into PH hole" you can see the center "square" hole… for the 3rd turbine.

Thanks.

You are very welcome.
Hope that helps.
☺liisa

Ron Kreisman
25 Page Street
Hallowell, ME 04347
207-626-0248 (ph)
207-626-0202 (fax)
kreisman@gwi.net (email)

*****

I cannot answer these with any authority….

The next dam downstream from us is Pepperell Paper Mill – I would guess ~ 11 miles (the river flows North, from here to Pepperell).

I don't know the answer to Question 2… I might have something in past paperwork about the other dams between us & the Merrimack. I would guess, though that it is at least ~25 miles from the confluence to us…. ROUGH ESTIMATE.

The next dam upstream from us is the Wachusett Dam in Clinton which is probably ~17 miles or so South of us.

Definitely rough guesses…

From: Ronald Kreisman [mailto:kreisman@gwi.net]
Sent: Monday, October 05, 2009 3:29 PM
To: 'liisa grady dowd'
Subject: Yet again

Liisa, sorry for this string of questions that are arising as I am doing the write-up... Three more quickies:

How far down is the East Pepperell dam?

How far up from the confluence with the Merrimack is Ice House, and how many dams are there between the confluence and Ice House?

How far upstream from Ice House is the next dam, if there is one?

Thanks.

Ron