Appendix O: Impoundment Fluctuation and Minimum Flow Release Plan

WORONOCO HYDRO, LLC.

WORONOCO PROJECT
(FERC No. 2631)

COMPREHENSIVE FISH PASSAGE PLAN

APPENDIX A Consultation

TRIP AND TRUCK FUNDING

[illegible] funding for trip and truck operation to the [illegible]. The funds will be [illegible] are determined. The funds will be [illegible] beginning of each [illegible] (June).

[illegible] installation of the ladder systems in 2004 and in the fall of 2005.

SCHEDULE

Downstream Fish Passage System Installation:

Woronoco Hydro will continue operation of the existing downstream passage system. Woronoco Hydro will prepare conceptual design drawings for the proposed angled lead in May [illegible] for review and comment. Upon receipt of comments (June [illegible]), the lead design will be finalized and submitted for final [illegible] initial operation testing of [illegible] 2004 and will be self performed by [illegible] of the angled lead [illegible] to occur. If [illegible] devices would be [illegible] construction season.

Upstream Eel Passage Installation:

Woronoco Hydro [illegible] final design drawings for the proposed eel [illegible] in May 2004. [illegible] to the FERC [illegible] in August 2004 with Woronoco staff.

[illegible] Testing of Passage Systems:

[illegible] September 2004 and [illegible] comments the plan will be [illegible] of the license. [illegible] Downstream passage [illegible] 2005 after [illegible] passage of post spawn [illegible] Upstream eel

recording spill conditions during the period of adult movements and observations within the bypass reach. Observation for out-migrating eels will be conducted during the evening hours when other sites in the area have reported eel movement.

Upstream Eel Passage System:

Woronoco Hydro will conduct a qualitative assessment of the upstream eel passage effectiveness for migrating eels. The assessment will generally include visual observation from the surface of the passage systems to document use. Observations will include visual review of the Project's dam structure, dam tail pool areas and the grassed embankments near the dam. Observations for eel migration will begin when other sites in the area indicate eel movements are occurring. Observations will be conducted at dusk and early evening and will employ the use of lights when and if appropriate. The observations will continue nightly for the first week after migration is observed and continue a minimum of once per week during the passage season after installation of the system has been documented.

EFFECTIVENESS TESTING

Downstream Fish Passage System:

Worrenco Hydro will conduct a quantitative assessment of the downstream fish passage effectiveness following the installation of the downstream fish passage facility modifications at the Project. A meeting will be conducted with the MDFW and USFWS to finalized the details of the testing procedures and location of monitoring devices. In general the assessment will entail releasing electronically tagged live smolts (Atlantic Salmon) upstream of the Project and monitoring their subsequent downstream passage movements to determine the proportion of fish using the bypass facility. The smolts would be equipped with either a Radio Frequency Identification (RFID) or a Passive Integrated Transponder (PIT) tag. The downstream passage route would be equipped with an in-water antenna, tag reader and datalogger to document the number of fish using the bypass. Bypass efficiency will be calculated as:

*% Effectiveness = 100 * Number of fish using the downstream bypass / Number fish released*

Test fish will be released in the project forebay area immediately upstream of the forebay. The fish passage effectiveness assessment will be scheduled to coincide with peak downstream movements of smolts (i.e., early May). The results of the study, including any recommendations, will be presented in a report format to the resource agencies for review and comment prior to filing with the FERC. If it is determined that bypass efficiency is low, Worrenco Hydro will consult with the resource agencies on modifications to the system to enhance passage efficiency.

Worrenco Hydro will conduct a qualitative assessment of the downstream fish passage effectiveness for passing of post spawn Atlantic Salmon and out migration of American Eel following the installation of the downstream fish passage facility modifications at the Project. The assessment will generally include visual observation from the surface of the passage area, including the plunge pool, to document passage of either species. Observations will include visual review of the Project's tailrace and bypass reach areas. Observations for Atlantic Salmon will be conducted at dusk and early evening and will employ the use of lights where and if appropriate. Possible downstream passage over the Project's spillways will be documented by

OPERATION AND MAINTENANCE

Downstream Fish Passage:

The downstream fish passage facility with the required attraction flow of 20 cubic-feet-per second (cfs) will be operated from May to mid-June for passage of juvenile Atlantic Salmon (smolts) and from mid-September to mid-November for passage of post-spawn adult salmon. Future refinement of the timing will be made as information on the behavior of migrants at the Project is obtained. Since the bypass system will also provide passage of the required minimum flow releases, it will operate on a year-round basis. Flows in the bypass system during the passage season will be maintained through the open entrance gate and controlled by impoundment level. Flows in the bypass system during the non-passage season will be limited to those required to satisfy minimum flow requirements at the project. The settings for the minimum flow required flows will be based on calculations of the opening necessary to provide the required minimum flow with the impoundment at the dam crest. Typically the gate will be in a partially open position and will not require adjustment except for occasional flushing if they become partially blocked by debris. The partial gate openings were calculated by Dick Quinn of the USFWS and provided to Woronoco Hydro.

A Woronoco Hydro roving operator routinely visits the project typically three times per week during unit operation and once per week during non-operational periods. The operator will check the bypass system for debris clogging, perform gate adjustment, and clean the angled lead bars as needed. Lead cleaning will be accomplished with standard rack brushing equipment and by tipping the lead to a horizontal position so that the forebay flow transports the debris to the trash racks for removal by the trash rake system. During cleaning the unit flow will be used to assist in cleaning operations. During the non passage season the angled lead may be removed to avoid clogging. Due to the use of the open straight bypass system, debris clogging within the bypass system has historically been and is anticipated to be infrequent. Maintenance of the system will include as needed (if necessary) dewatering to remove accumulated debris within the bypass system and check the structure's integrity. Woronoco Hydro will maintain minimum flow requirement releases over the dam, by the use of two deep gates, or by some combination of the available project features. Increased minimum flow releases of short duration (less than a

from an 8-inch high by 8-inch wide crest notch at the southern abutment. The entrance and exit point of the ladder are opposite of the June 2000 FERC filing.

The North dam ladder will consist of a metal elevated ladder attached to existing structures on the north end of the dam (opposite of the June 2000 FERC filing figure 1). The ladder entrance would be located in a calm area adjacent to a natural high point within the bypass channel, slightly off from the north shore. The ladder would be attached to the existing concrete abutment and be sheltered from debris by the north abutment. The ladder sections would be routed to follow the exterior of the abutment and terminate approximately 5 feet upstream of the dam crest. The exit from the ladder would be located approximately 5 feet above normal impoundment levels. Water supply for the ladder will be supplied from a submersible pump located within the impoundment at the North dam north abutment. Water will be pumped into the ladder's high point to provide transport flow and a separate pipe installed to provide entrance attraction flow. The upstream, exposed section of ladder and pump would be removed during the non-passage season to prevent damage to the system.

Upstream Eel Passage System:

Condition 2 of Article 404 requires the installation of upstream eel ladder systems at the South dam, adjacent to the downstream fish passage facility, and enhanced passage within the North and South channels. Westbrook Hydro will install a three ladder system, one at each location noted in the license article. Appendix B contains the conceptual drawings for the ladder systems.

The ladder system near the existing downstream passage will use existing rock ledges and pools and the dam surface to promote passage over the dam. The system entrance will be located in a calm area downstream of the plunge pool on the north side of the pool flow area (opposite side of that indicated in the July 2003 Figure 1 FERC filing). The existing rock outcrops will be partially removed to create a minimum 3-foot wide channel. The gradient between existing ledge pools will be reduced to an average 26-degrees with a maximum gradient of 45-degrees. The existing dam surface will be roughened to promote passage over the existing surface. Attraction and transport water supply and an exit into the impoundment will be provided by a 8-inch wide by 6 inch high notch in the dam crest at the interface of the crest and south abutment.

The southern area immediately downstream of the South Dam consists of an elevated rock pool and deep rock ledges with narrow seams. Discharge from the dam's deep gate, near the dam center, discharges flow into a narrow channel leading to a low level pool and ultimately discharges the flow through a slot between two high ledge outcrops. The USFWS has suggested that a ladder entrance be located at the lower pool. The South Dam ladder will be comprised of both natural ledge and pool passage and pre-fabricated metal sections with a roughened bottom. The ladder entrance will be located in the lower pool as suggested by the USFWS and traverse existing rock seams to the upper pool area. Removable sections of metal ladder, bolted to the existing rock, will provide passage between natural passage sections. The metal ladder sections will, to the extent possible, be located behind ledge outcrop for protection and removable during the non-passage season. The existing rock seams will be selectively filled with partially concrete around them to provide a roughen passage way to the upper pool area. Passage though the upper pool will lead to a natural rock passageway to the dam crest at the southern dam abutment. Flows to the passage systems will be through gravity. The ladder exit and transport flow will be

FISH PASSAGE FACILITIES

Downstream Fish Passage System:

The downstream fish passage facilities at the Woronoco Project currently consist of an interim bypass facility installing in 1997 to promote passage of fish and for passage of the minimum flow requirements of the project. The system consists of a metal, open topped chute, a vertical downward closing timber maintenance gate, and a natural rock and timber walled plunge pool. The system is located immediately upstream of the Project's intake racks.

Woronoco Hydro intends to install an angled lead immediately upstream of the passage entrance to enhance passage effectiveness (Appendix B). The angled lead would be extend into the water column a minimum of ten (10) feet and be comprised of close mesh bar grating or similar product with a net opening of 1-inch or less. The lead would be suspended in the water column from cables attached to the surrounding support structures. The system would be permitted to rotate to a nearly horizontal orientation during cleaning operations and returned to a vertical position after cleaning operations are completed. The lead would extend from the passage entrance to a point approximately half the distance to the opposite side of the forebay.

The existing forebay dewatering structure will be utilized to further promote passage efficiency. The forebay's bottom configuration permits the flow to be directed to the forebay side nearest the downstream passage entrance (east side). Woronoco Hydro will install a portion of the forebay dewatering timber logs to reduce the flow area of the forebay to the entrance side of the forebay causing all intake flows to be directed between the angled lead and passage entrance.

Exclusion devices to deter turbine entrainment are not proposed. Rather, the effectiveness of the bypass system will be documented and additional measures engaged only if the effectiveness testing indicates low bypass efficiency. Should exclusion devices be required after effectiveness testing, the exclusion devices may consist of seasonal bar or plate overlays over the existing intake trashracks or vibration inducers to deter the fish from the area. Additional measures, if required, would be installed after consultation with the agencies.

6) A schedule for implementing the plan.

In addition, the plan is to include provisions to:

- Evaluate the effectiveness of the downstream passage facility for passing salmon smolts, post-spawn adult salmon.
- Evaluate the effectiveness of the upstream eel passage measures.
- Evaluate American eel out-migration.

A draft of this plan was submitted to the Massachusetts Department of Environmental Protection (MDEP), the Massachusetts Division of Fisheries and Wildlife (MDFW) and the U.S. Fish and Wildlife Service (USFWS) on April 5, 2004. Appendix A provides a copy of the comments received from the MDEP, the MDFW and the USFWS. Clarifications and discussions of comments not incorporated into this final plan are contained in the cover letter at the front of this plan. This plan is being submitted in accordance with the requirements of Article 404 of the license and in accordance with the February 12, 2004 order granting extension of time under Articles 403 and 404.

WORONOCO HYDRO, LLC

WORONOCO PROJECT
(FERC NO. 2631)

COMPREHENSIVE FISH PASSAGE PLAN

INTRODUCTION

Woronoco Hydro, LLC (Woronoco Hydro) owns and operates the Woronoco Hydroelectric Project (Project), which is licensed by the Federal Energy Regulatory Commission (FERC) as FERC Project No. 2631. The Project is located on the Westfield River in Hampden County, Massachusetts. Article 404 of the Project license, issued April 30, 2003 (99 FERC ¶ 62,075), requires Woronoco Hydro to develop a comprehensive fish passage plan (Plan). The Plan is to include provisions to install, operate, maintain, and evaluate, as appropriate, upstream and downstream fish passage facilities at the Woronoco Project for Atlantic Salmon and American Eel. The Plan is required to include:

1) A provision to continue operating and maintaining the existing downstream fish passage facility;

2) functional design drawings of the licensee's proposed upstream passage measures for American Eel (in accordance with the plans filed June 6, 2003);

3) Quantification of the flows required to operate the licensee's proposed fish passage facilities;

4) An operation and maintenance plan, including a schedule for operating the licensee's proposed fish passage facilities;

5) Funding support towards implementing the Massachusetts Division of Fisheries and Wildlife's upstream trap-and-truck program for Atlantic salmon on the Westfield River; and

WORONOCO HYDRO, LLC
HAMILITON, MASSACHUSETTS

WORONOCO HYDROELECTRIC PROJECT
FERC NO. 2631

COMPREHENSIVE FISH PASSAGE PLAN

APRIL 2004

Prepared by:

Kleinschmidt
Energy & Water Resource Consultants

WORONOCO HYDRO, LLC

HAMILTON, MASSACHUSETTS

WORONOCO HYDROELECTRIC PROJECT

FERC NO. 2631

COMPREHENSIVE FISH PASSAGE PLAN

APRIL 2004

Prepared by:

Kleinschmidt

Energy & Water Resource Consultants

If you have any questions or need additional information regarding this Plan, please call me at (207) 657-3373 (email: AJNash@KleinschmidtUSA.com) or Peter Clark at (978) 468-3993 (email: pclark@swiftriverhydro.com). Woronoco Hydro is required to file the Plan with the FERC by April 30, 2004. We recognize that additional time beyond this date may be required to fully review the Plan. Please provide any comments you can by April 28, 2004. Alternately, we can discuss the plan either on site or via conference call at your convenience. Thank you for your expeditious review.

Sincerely,

KLEINSCHMIDT ASSOCIATES

Alfred J. Nash, P.E.
Project Manager

AJN:fhw
Enclosure
cc: Peter Clark (Woronoco Hydro)
William Fay (Woronoco Hydro)
Donald Pugh (Trout Unlimited)

Kleinschmidt
Energy & Water Resource Consultants

April 12, 2004

VIA EMAIL AND OVERNIGHT

Mr. Caleb Slater
Anadromous Fish Team Leader
Commonwealth of Massachusetts
Division of Fisheries and Wildlife
Field Headquarters
1 Rabbit Hill Rd
Westboro, MA 01581

Mr. John P. Warner
Energy/Hydropower Coordinator
New England Field Office
U.S. Fish and Wildlife Service
70 Commercial Street, Suite 300
Concord, NH 03301

Mr. Robert Kubit
Massachusetts Department of Environmental Protection
Division of Water Quality
627 Main Street, 2nd Floor
Worcester, MA 01608

Westfield Project (FERC No. 2631)
Fish Passage Plan – Article 404

Dear Sirs:

Woronoco Hydro, LLC (Woronoco Hydro) owns and operates the Woronoco Hydroelectric Project (Project), which is licensed by the Federal Energy Regulatory Commission (FERC) as FERC Project No. 2631. The Project is located on the Westfield River in Hampden County, Massachusetts. Article 404 of the Project license, issued April 30, 2002 (99 FERC ¶ 62,075), requires Woronoco Hydro to develop a comprehensive fish passage plan (Plan). On behalf of our client, enclosed for your review and comment is a draft of the Plan.

The current downstream fish passage system is anticipated to have low effectiveness based upon the studies results of other similar systems. Woronoco Hydro is proposing to modify the current downstream passage system to enhance passage effectiveness before undertaking testing of the system. These modifications include the installation of a partial depth angled lead upstream of the existing passage entrance and rerouting the flow into the forebay towards the dam. The attached plan provides additional details regarding the proposed lead and schedule for implementation of the modifications. The Plan also provides details of the proposed testing plan and eel passage systems for the Project.

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– Offices Nationwide –

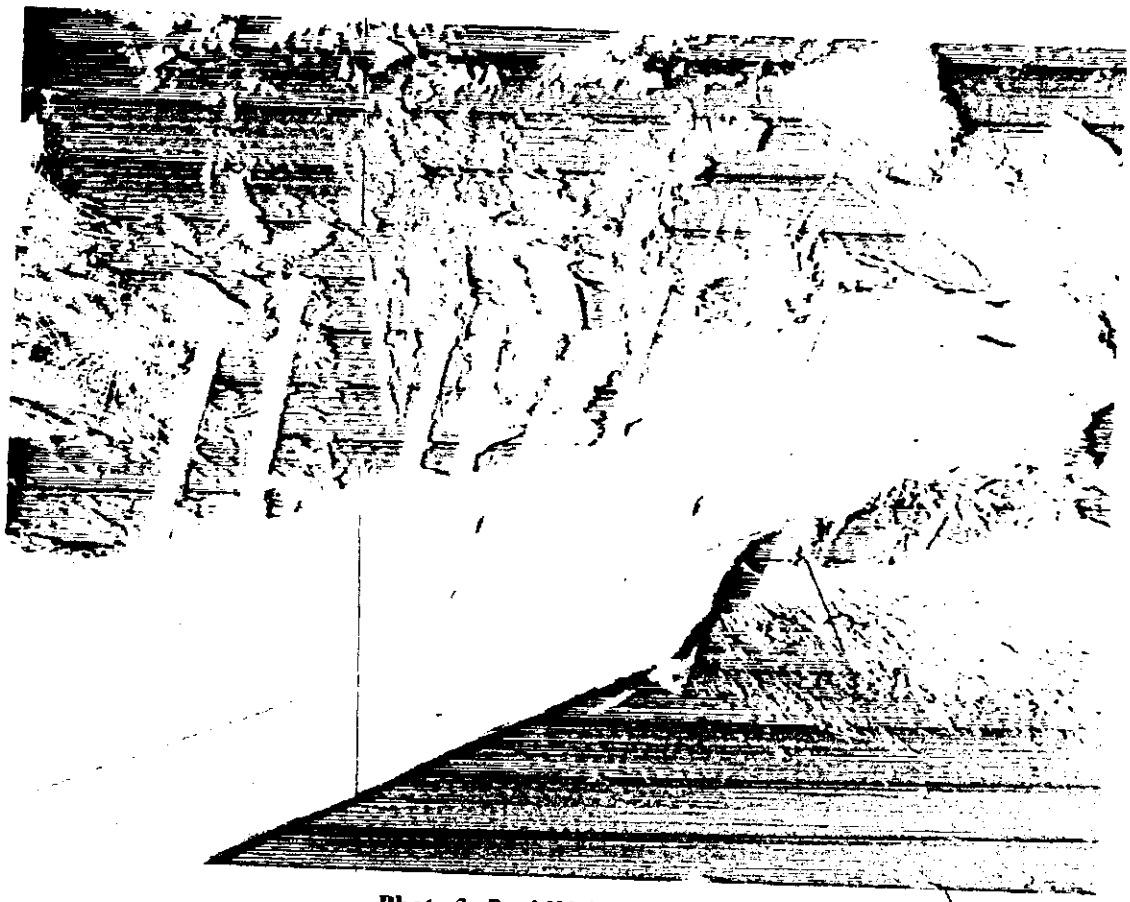

Photo 3: Pool Wall and Gap

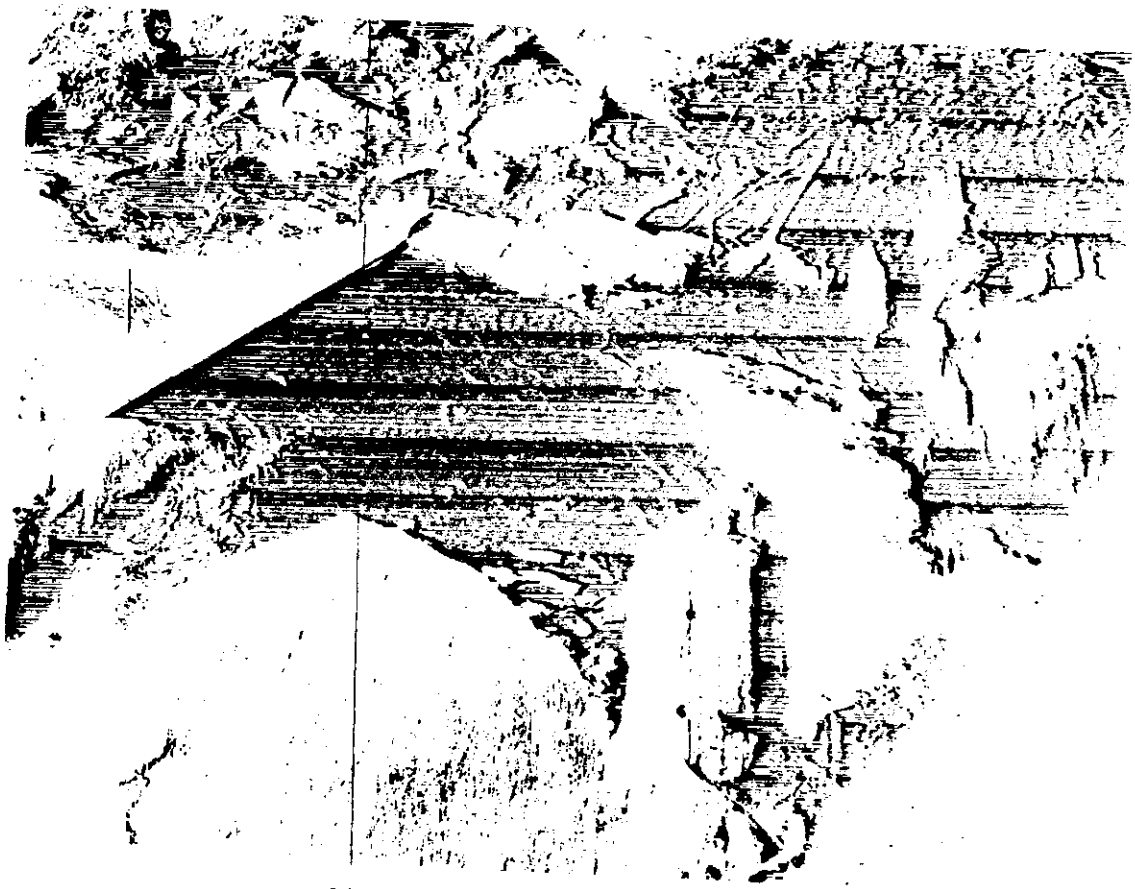

Photo 2: Plunge Pool Rock Outcrops

Photo 1: Plunge Pool Overview

the configuration of the partially installed pool wall. The photographs were taken without flow into the pool to show the original pool configuration. Once complete, the water depth within the pool would be near the top of the new pool wall.

Woronoco Hydro intends to finalize and further enhance the plunge pool through the closure of side gaps between the wall and rock outcrops (shown in the photographs) to permit the migrants to exit the pool at one location only. The October 2002 meeting notes indicated that the details of the flashboard system would be submitted to resource agencies for review. Pursuit to the meeting conditions, please review and provide your written comments regarding the proposed pool configuration and depth. Woronoco Hydro will undertake the additional enhancements upon receipt of agency approvals.

If you have any questions or need additional information regarding this modification to the plunge pool, please call me at (207) 437-3323 (email: AL.Nash@KleinschmidtUSA.com) or Peter Clark at (978) 463-3989 (email: pclark@swiftriverhydro.com).

Sincerely,

KLEINSCHMIDT ASSOCIATES

Alfred Nash / fhw

Alfred Nash, P.E.
Project Manager

AJN:fhw
Attachments
cc: Peter Clark (Woronoco Hydro)
William Fay (Woronoco Hydro)
Donald Pugh (Trout Unlimited)

Kleinschmidt
Energy & Water Resource Consultants

April 27, 2004

Mr. Caleb Slater
Anadromous Fish Team Leader
Commonwealth of Massachusetts
Division of Fisheries and Wildlife
Field Headquarters
1 Rabbit Hill Rd
Westboro, MA 01581

Mr. John P. Warner
Energy/Hydropower Coordinator
New England Field Office
U.S. Fish and Wildlife Service
70 Commercial Street, Suite 300
Concord, NH 03301

Mr. Robert Kubit
Massachusetts Department of Environmental Protection
Division of Water Quality
57 Main Street, 2nd Floor
Worcester, MA 01608

Woronoco Project (FERC No. 2631)
Downstream Fish Passage Plunge Pool

Dear Sirs:

Woronoco Hydro, LLC (Woronoco Hydro) owns and operates the Woronoco Hydroelectric Project (Project), which is licensed by the Federal Energy Regulatory Commission (FERC) as FERC Project No. 2631. The Project is located on the Westfield River in Hampden County, Massachusetts. The project is equipped with a downstream fish passage system which discharges into a naturally formed plunge pool. Woronoco Hydro staff met with representatives of the U.S. Fish and Wildlife Service (USFWS) and Massachusetts Division of Fisheries and Wildlife (MDFW) on October 11, 2002 to discuss various aspects of the project's license requirements and to review the passage system features. During the meeting the USFWS suggested that the plunge pool at the project be modified to increase the pool depth and enhancements be made in the pool exit area.

The proposed modifications consisted of the installation of a braced wooden wall system (pool wall) between rock outcroppings at the downstream edge of the pool. The new pool wall was originally proposed to have a notch in the boards to permit exiting from the pool. An acceptable alternate exit location was the use of an existing channel between rock outcrops. Woronoco Hydro has partially installed the proposed system to expedite the modifications and increase the pool depth for the current migration season. The enclosed photographs document

taping would be performed the following Monday to determine if a reduction in flows occurred and to maintain documentation. Any violation during a weekend event would fall under the reporting requirements for the project.

Shut-down of Passage Flows: The downstream passage flows during winter conditions result in significant ice accumulation. Woronoco Hydro requested that the flows through this system be stopped during the winter. The parties agreed that flows through the bypass system could be eliminated beginning in December. Flows would need to be resumed immediately after ice-out or when river temperatures reached 5 degrees Celsius. Any flow not passed through the passage system would need to be passed through the South Dam gate.

Reporting: A copy of any reports to FERC should be provided to the MDEP.

Flow Interruptions: The MDFW will not agree to two consecutive 12-hour interruptions to the minimum flow requirements without prior approval. Interruptions are anticipated to limited to unit repairs requiring the forebay to be dewatered or rare occasions requiring a diver to remove gate discharge obstructions. The forebay has been equipped with a dewatering device to permit unit repairs. Leakage through the dewatering device is discharged through a low level gate near the downstream fish passage plunge pool. The parties agreed that leakage flow would suffice for the minimum flow requirements into the channel during a forebay dewatering period. All other river flows are automatically discharged over the dams during a forebay dewatering effort. Should diver services or similar events require interruption to the flow releases, Woronoco Hydro will notify the MDFW in advance of the interruption.

On site Inspection: The group determined that many of the items discussed during the call could and should be confirmed in the field. An on-site field review would be conducted as soon as river conditions permitted (currently spilling at the Project). If required, a supplemental filing of the Plans would be made based on the site review results.

Comprehensive Fish Passage Plan

MDFW Comments: Caleb noted that the MDFW comments and concerns are identical to those noted by the USFWS in their comment letter.

Plunge Pool: A concern was noted regarding rock outcrops in the plunge pool area. The option to shorten the passage discharge chute was discussed but deemed unlikely to eliminate the concern with migrants hitting the rock outcrop. Woronoco Hydro agreed to remove the rock outcrops within the pool area near the passage discharge area. The pool depth was also noted as being around seven feet but need confirmation. TU requested that pools downstream of the plunge pool area also be modified. Several of the pools discharge the flow over wide shallow lips. Enhanced passage was believed to be achievable if a narrow, deep notch was cut into the wide lip areas to provide deeper water passage through the area. Woronoco Hydro agreed to modify the areas during work on the plunge pool and after the site visit confirm which pool(s) should be modified.

cc: Attendees
John Warner (USFWS)
Robert Kubit (MDEP)
Wayne Sonntag (USGS – Monitoring Plan only)

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Woronoco Project (FERC No. 2631)
Teleconference Notes of May 10, 2004

Participants:

Caleb Slater – Massachusetts Division of Fisheries and Wildlife (MDFW)
Don Pugh – Trout Unlimited (TU)
Peter Clark – Woronoco Hydro (WH)
William Fay – WH
Alfred Nash – Kleinschmidt Associates (Kleinschmidt)

Purpose:

The purpose of the call was to solicit initial comments regarding the Impoundment Fluctuation and Minimum Flow Monitoring Plan submitted to the agencies on May 5, 2004. Final comments to the plan would be provided at a later date. Additional comments regarding the Comprehensive Fish Passage Plan were also discussed.

Comments:

USGS Comments: The USGS was not able to participate in the call but relayed their comments via electronic mail.

Monitoring Sensitivity: The MDFW and TU expressed concern with debris blockage reducing the flow through the narrow gate opening. The observations by Woronoco staff of the gate discharge may not necessarily determine is some blockage is occurring. In addition, the ability to determine small changes in the discharge rate may not be readily observable with the camera. An on-site review of the water level changes at the marked locations would need to be preformed to determine the level of accuracy of the proposed equipment.

Backwater Effect: One area of concern for the MDFW and TU was the potential for water flow from one channel artificially raising water levels in the adjacent channel near the proposed water level mark. The concern is that should flow in one channel upstream of the water level mark be reduced (though gate clogging or similar reductions), the backwater effect of the adjacent channel and the video monitoring system may not be able to detect this reduced flow. Should flows in the adjacent channel be elevated, the backwater effect may be compounded further masking the reduced flow through the channel. After discussion it was agreed that the water level mark for each area would be evaluated on-site by review of the area. The discharge devices in each channel would be temporarily shut to determine the extent of the backwater effect for each channel. Once the magnitude of the effect, if any, was determined, appropriate changes to the measuring device(s), if required, could be implemented.

Pressure Transducers: The use of pressure transducers rather than video monitoring was discussed. The vulnerability of such a system to vandalism and the need to deploy exposed electrical cables over irregular, periodically inundated areas caused this technology to be inapplicable for this site.

Frequency of Observations: The MDFW requires more documentation of the minimum flow releases. The frequency of recordings will be increased to hourly recordings during the daylight periods via video recordings. Woronoco staff will be responsible to review the recordings to maintain compliance. Weekend hourly recordings will also be obtained. Review of weekend

Figure 1. Woronoco plunge pool, September 8, 2003.

The photographs attached to the April 27 letter are of the plunge pool with only leakage entering the pool and, as such, do not represent operational conditions.

TU is concerned that the present configuration may negatively impact downstream passage rather than improve passage survival.

Thank you for the opportunity to comment. If you have any questions regarding these comments, I can be reached at the above address, at 413 863 3832 during the day, or at don_pugh@usgs.gov.

Sincerely,

Donald Pugh

cc:
USFWS - John Warner, Dick Quinn
MADFW - Caleb Slater,
MADEP - Bob Kubit, Bob McCollum
TU - Jonas Kron,
Woronoco Hydro - Peter Clark, William Fay
FERC –

DEERFIELD/MILLERS CHAPTER

10 Old Stage Road
Wendell, MA 01379

May 6, 2004

Alfred Nash
Kleinschmidt Associates
75 Main Street
PO Box 576
Pittsfield, ME 04967

Re: Woronoco Project, FERC No. 2631

Dear Mr. Nash,

Following are Trout Unlimited's (TU) comments concerning your letter of April 27, 2004 regarding the downstream fish passage plunge pool at the Woronoco project.

TU was first notified that a plunge pool had been constructed in Woronoco Hydro's letter to the FERC dated August 13, 2003 requesting an extension of time for fish passage design. In an earlier memo dated October 25, 2002 to John Warner, Dick Quinn, and Caleb Slater, Peter Clark reviews the recommendations and conclusions of a site visit of October 11. The memo explicitly states that plans for construction of the plunge pool would be sent to the agencies for final approval. This did not occur as noted in a letter from Caleb Slater to William Fay following observations I made on September 8, 2003 of low flow in the bypass reach and what I perceived as a poorly designed plunge pool.

In their 10(j) recommendations for the Woronoco license the Massachusetts Division of Fisheries and Wildlife included a plunge pool depth requirement of five feet and the removal of a rock outcrop that intrudes into the plunge pool from the west side. The present configuration has not been shown to comply with these requirements.

Additionally the exit channel for the pool is located in an area that may delay or prevent migration rather than expedite passage. The plunge from the bypass enters the pool just upstream of the exit creating a significant upwelling/boil at the exit from the pool (Figure 1). Fish that are not immediately swept out of the pool will likely have difficulty detecting the flow out of the pool and may become trapped for a prolonged period of time. TU recommends that the outlet be located on the opposite side of the pool from its present location. This will allow smolts to more readily find the flow exiting the pool.

Upstream Passage- Eels

Evaluation of upstream eel passage should include:

- Dates, numbers, and sizes of eels passed.
- Any location within the eelways where eels do not pass.
- Presence and locations of eels below the dam that are not using the eelways.
- Dropback of eels passed over the dam.

Modifications to the eelways or the location of the eelways may be required based upon the evaluation of passage performance.

Thank you for the opportunity to comment. If you have any questions regarding these comments, I can be reached at the above address, at 413 863 3832 during the day, or at don_pugh@usgs.gov.

Sincerely,

Donald Pugh

cc:
USFWS - John Warner, Dick Quinn
MADFW - Caleb Slater,
MADEP - Bob Kubit, Bob McCollum
TU - Jonas Kron,
Woronoco Hydro - Peter Clark, William Fay

There is no mention of the plunge pool for the downstream bypass. Modifications to the downstream passage plunge pool were made but no plans were submitted to the agencies for approval as required. The present configuration has not been shown to comply with requirements for depth or removal of rock ledges that intrude into the pool. Additionally the exit channel for the pool is located in an area that may delay or prevent migration rather than expedite passage. The plunge from the bypass enters the pool just upstream of the exit creating a significant upwelling/boil at the exit from the pool. Fish that are not immediately swept out of the pool will likely have difficulty detecting the flow out of the pool and may become trapped for a prolonged period of time. Timing and duration of outmigration of smolts is critical to survival upon entering salt water. The plunge pool should facilitate survival of fish using the downstream passage facility, not contribute to delay in migration.

Effectiveness Testing

Downstream Fish Passage System – Smolts

TU recommends the use of radio telemetry for monitoring salmon smolts released at the project. This will allow assessment of passage route (bypass, turbine, low level minimum flow gates, or spill), delays in passage when smolts are in close proximity to the downstream bypass entrance (insufficient flow in bypass, poorly configured entrance), and survival downstream of the project. Determining the percent effectiveness as described in the plan (percent of fish using the bypass) is insufficient to assess project impacts on smolt passage.

Test fish should be released upstream of the bridge above the dam in the main flow channel (where smolts would be expected to approach the project). There should be 3 releases of between 15 to 20 fish over a 10 day to 2 week period during the natural smolt run. Releases should not be done during periods of spill. It is important to assess the survival of smolts passing the project. To assess this, a radio receiver should be placed more than 1 mile downstream of project to detect smolts that have safely passed the project (there was significant mortality of salmon smolts on the Deerfield River 1.5 mile below the #2 Dam during evaluation of that project).

The acceptable passage efficiency for the project should be determined by the agencies, including the MADEP.

Downstream Passage– Eels

During monitoring of downstream adult eel passage Woronoco Hydro should quantify passage – dates, times, numbers and lengths. Surface observations are insufficient to assess passage periods as passage occurs at night and fish are not oriented at the surface where ambient light might penetrate the water. Additionally, eels are repelled by light complicating monitoring at night with lights. The plunge pool is far too turbulent to observe fish even during daylight.

Route selection, other than the bypass, also should be quantified as should survival past the project.

While not required in the FERC license an evaluation of downstream passage of resident fish is required by the Massachusetts 401 Water Quality Certification. This issue is not addressed in the draft Comprehensive Fish Passage Plan. It is immaterial to TU if the plan submitted to the FERC includes resident fish but if not a separate plan should be submitted to the MADEP for their approval. As the due date for that plan was April 30, 2003, this plan should be prepared in the near future.

Please include TU in any meetings, conference calls, or site visits regarding fish passage, fish passage evaluation, minimum flows, or pond drawdowns.

In the Downstream Fish Passage section, adjustments of the low level gate openings for debris clearing is discussed. No mention is made of how minimum flow requirements will be met upon reducing flow after any debris is cleared. Please explain how this will be accomplished and how this will comply with Article 402 of the FERC license. Additionally, I cannot find a copy of the monitoring plan required in Article 403 in my files or in the FERC record using their eLibrary search. When it is convenient, could you please forward me a copy of that plan?

Upstream Eel Passage System:

Several concerns regarding upstream eel passage need to be addressed prior to installation of the eelways. These include:

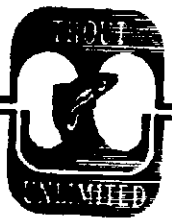
- The location of the south channel eelway for the in a small cove with no flow.
- The location of the toe of the eelway in the downstream bypass channel (above or below the plunge pool boards) and the possible false attraction of eels to the plunge pool if the toe of the fishway is below the plunge pool. Conversely if the eelway is located in the plunge pool velocities at the exit of the plunge pool may prevent passage by eels into the pool.
- Attraction water for the eelways.
- The type of substrate to be used in the technical sections of the eelways.
- Consistency of flow in the eelways depending on the pond elevation and at the transition of rock ledge to the technical eelway sections.
- The ability of eels of all sizes to pass over the rock ledges.

TU anticipates that an additional site visit will be required once actual plans for the eelways are developed.

Data from the DSI eelway indicates that the upstream eelways should remain open through October until site specific data indicates otherwise.

Downstream Fish Passage:

Downstream fish passage for smolts should start April 1.



DEERFIELD/MILLERS CHAPTER

10 Old Stage Road
Wendell, MA 01379

April 22, 2004

Alfred Nash
Kleinschmidt Associates
75 Main Street
PO Box 576
Pittsfield, ME 04967

Re: Woronoco Project, FERC No. 2631

Dear Mr. Nash,

Following are Trout Unlimited's (TU) comments concerning the Comprehensive Fish Passage Plan for the Woronoco Project.

General comments:

An order issuing a new license for the Woronoco Project was granted by the Federal Energy Regulatory Commission (FERC) on April 30, 2002. At that time Article 404 require the project owner submit a comprehensive fish passage plan within 180 days. Since that time extensions for filing the plan have been granted by the FERC on three occasions (Feb 12, 2003, June 18, 2003, and Feb 12, 2004). On April 12, 2004 an electronic copy of the fish passage plan was e-mailed to the agencies with hard copy following. Comments were requested by April 28. While providing a plan with an anticipated submittal date is an improvement over past performance, this does not comply with the 30 day comment period of Article 404. TU is encouraged that there is movement toward fish passage. Hopefully deadlines will be met in the future and mitigations required by the FERC license and the state 401 Water Quality Certification can proceed at an appropriate pace. In regard to the late submittal date of the draft Comprehensive Fish Passage Plan, TU anticipates that agency comments received after April 28 will be incorporated into a revised plan and that plan submitted to the FERC.

Any planned "dewatering" for downstream bypass or colway structure inspection or repair resulting in bypass flows below minimum flow or the dewatering of the downstream fish bypass channel should be preceded by a plan submitted to the agencies and initiated only upon approval from the Massachusetts Department of Environmental Protection (MADEP).

cc: CRC – Jan Rowan
MDFW - Caleb Slater
Engineering FO – Dick Quinn
TU- Don Pugh
FERC- Div. Of Hydropower Administration and Compliance
es: JWarner:dw:04-29-04:603-223-2541

SCHEDULE

We generally agree with the proposed schedule. The completion of plans and construction of passage devices need to be done in 2004. Likewise, we agree that monitoring as soon as facilities are completed is needed. There have already been delays in implementing required license conditions and further delays are not acceptable.

The last sentence of the section is unclear. Eel passage should be monitored as soon as the eelways are in place in summer and fall of 2004.

We note that in all cases, additional years of monitoring may be needed to get conclusive information on passage effectiveness or to evaluate refinements made to the facilities.

Lastly, the schedule for report preparation, agency review, and submittal of the final report to the FERC and implementation of needed modifications should be specified in the passage plan.

If you have any questions please contact John Warner of this office at 603-223-2541 ext. 15.

Sincerely,

William J. Neidermyer
Assistant Supervisor Federal Activities
New England Field Office

Upstream Eel Passage

The end of this section references the minimum flow release mechanisms. This discussion is not relevant to the subject of the section and is confusing. To clarify overall project conditions, the minimum bypass flows and release mechanisms should be stated in a separate section.

EFFECTIVENESS TESTING

Downstream Fish Passage System:

Either radio-telemetry or PIT tags are proposed as tools for monitoring passage effectiveness. Although PIT tags can be used, we strongly recommend use of radio-telemetry at this site in order to assess the efficiency of the bypass, the safety of the plunge pool and downstream survival past the project. Monitors in the headpond, bypass, lower bypass near bridge and downstream from the whole project would provide needed information on fate of released smolts. Only bypass efficiency can be tested using PIT tags. We also note that the number of hatchery smolts used for testing would be significantly greater with the PIT tagging. In order to secure salmon smolts for study, you will need to request smolts from the Connecticut River Atlantic Salmon Commission through the Connecticut River Coordinator's Office in Sunderland, Massachusetts. The request for smolts should be made prior to December 31, 2004.

Smolts are proposed to be released just upstream from the project forebay. This is not acceptable. Smolts should be released in the river upstream from the head of the project impoundment, in order to allow acclimation to the river, and to elicit normal movement patterns downstream to the project. With this release location, observed behavior should most closely resemble behavior of wild smolts.

While qualitative assessment is acceptable for adult salmon, downstream eel passage needs to be quantitatively assessed. With a surface-only guidance device, adult eels could pass undetected through the project, so a qualitative assessment would be inconclusive. Therefore, a PIT tagging or radio-telemetry study, similar to the proposed smolt study, is needed to assess whether eels are searching for, finding and using the bypass.

Upstream Eel Passage System:

While a relatively simple assessment of the eelways is acceptable, monitoring needs to include some enumeration of eels observed in various sections of each eelway, downstream of the eelways and in other areas downstream from the three dam sections. Specific observation locations should be established that are then monitored on each visit to the site. All observations need to be conducted during hours of darkness, preferably in the middle of the night when eel movements would be greatest.

Design plans need to be provided and the as-built system observed on site to determine the adequacy of this facility.

Upstream Eel Passage System:

The plan does not include design drawings of the proposed eelways. While agency representatives met with the project owner on site on October 11, 2002 to discuss the eelways, we agreed only in concept as to the designs. Design drawings with more details were to be developed by the project owner and are needed to assess the adequacy of the proposed designs. Of special concern are the entrances to the eelways and any transition points between natural rock channels and man-made eelway sections.

While on site, we agreed to the concept of the eelway for the South Dam section. Further thinking on this facility, however, raises concerns about the fact that the eelway is on the opposite side of a rock outcropping from the minimum bypass flow release. Whether eels would ever find the eelway in the proposed location given the minimal amount of flow that would run down the eelway is a concern. It is possible that some additional attraction flow is needed to assure that eels would move to the eelway side of the rock outcropping. This flow could be provided by cutting an additional notch in the dam. It is possible that this notch could even be used as the permanent bypass flow release mechanism.

Two of the proposed three eelways rely on flow provided by gravity through an 8-inch wide by 6-inch deep notch on the dam crest. The amount of flow provided through this notch should be identified over the normal range of impoundment elevations. Also, the eelway located near the fish bypass discharge is not depicted on Figures 1 or 2, and should be added.

OPERATION AND MAINTENANCE

Downstream Fish Passage

The downstream passage facilities for Atlantic salmon need to be operated from April 1 through mid-June, not starting in May.

The proposed maintenance schedule is insufficient to assure that passage facilities are functioning properly. During the downstream passage season for Atlantic salmon smolts, daily site inspections and cleaning are needed to assure that the fishway entrance is free from debris and functioning properly. The migration window for salmon smolts is limited, and any delay caused by clogged bypass facilities is unacceptable. In addition to the bypass entrance, the plunge pool needs to be regularly inspected and debris needs to be removed to prevent injury of smolts caused by logs or other debris in the plunge pool.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

New England Field Office
70 Commercial Street, Suite 300
Concord, New Hampshire 03301-5087

FERC No. 2631

April 29, 2004

Mr. Alfred Nash, P.E.
Kleinschmidt Associates
P.O. Box 576
Pittsfield, ME 04967

Dear Mr. Nash:

This is in response to your letter dated April 12, 2004, which transmitted the Draft Comprehensive Fish Passage Plan for the Woronoco Hydroelectric Project, located on the Westfield River, Massachusetts.

We have completed our review of the draft plan and have the following comments and recommendations.

INTRODUCTION

The Introduction states that the draft plan was distributed to the agencies on April 5, 2004. However, it actually is dated and was distributed on April 12 and received here on April 13.

FISH PASSAGE FACILITIES

Downstream Fish Passage System:

It is unclear what is meant by "the lead would extend from the passage entrance to a point approximately half the distance to the opposite side of the forebay". The plan view drawings in Figures 1 and 2 depict the lead going completely across the forebay. A more detailed explanation and additional drawings of the proposed guidance device are needed to clarify the proposed design.

In addition, the designs for the plunge pool installed last year were not reviewed and approved by the Service or the Massachusetts Division of Fisheries and Wildlife. The MDFW sent the project owner a letter on this issue in 2003, but no subsequent consultation or design review has since ensued.

WORONOCO HYDRO, L.L.C.

WORONOCO PROJECT
(FERC No. 2631)

COMPREHENSIVE FISH PASSAGE PLAN

APPENDIX A – Consultation

TRAP-AND-TRUCK FUNDING

Woronoco Hydro continues to provide funding for trap-and-truck operation to the MDFW. The funding will continue until these operations are discontinued. The funds will be distributed twice per year, with half of the funds being dispensed at the beginning of each operational year (January) and the conclusion of each year's activities (June).

Effectiveness Testing of Passage Systems:

Upstream eel passage effectiveness observations will occur immediately after installation of the ladder systems. The study plan to conduct effectiveness testing of the various passage systems will be prepared by September 2004 and submitted for agency review and comment. Upon receipt of agency comments the plan will be filed with the Commission for compliance with the provisions of Article 404 of the license. Filing of the study plan is anticipated to occur by November 2004. Downstream passage effectiveness testing for the successful passage of smolts will occur in the spring of 2005 after the installation of the passage modifications. Visual monitoring for the passage of post-spawn Atlantic salmon and out-migrating American eels will occur in the fall of 2005. Woronoco Hydro will prepare a summary report of all testing results for agency review by December 2005. Upon receipt of the agency review comments and recommendations, the final report will be filed with the Commission. The final report is anticipated to be filed with the Commission by March 2006. Modifications to the passage systems or additional testing, if required, will be implemented at earliest construction period upon approval from the Commission of the report and the report recommendations. If required, testing of tagged downstream migrating eels will occur in the fall of 2006.

SCHEDULE

Downstream Fish Passage System Installation:

Woronoco Hydro will continue operation of the existing downstream passage system. The consulted agencies and organizations will meet on site in late May or early June 2004, depending on river conditions, to determine final modifications to the plunge pool area and areas downstream of the pool exit. Final plunge pool modifications are anticipated to occur in June 2004 with Woronoco staff. Woronoco Hydro will prepare conceptual design drawings for the proposed angled lead in May 2004 and submit the conceptual design to MDEP, MDFW, USFWS and TU for review and comment. Upon receipt of comments (June 2004), the lead design will be finalized and submitted for final agency and FERC approval in July 2004. Fabrication, installation and initial operation testing of the angled lead are anticipated to occur in September 2004 and will be self-performed by Woronoco Hydro staff. Operational testing and modifications (if required) of the angled lead will be finalized before April 2005 to permit effectiveness testing of the system to occur. If required by the testing results, additional modification, protection or guidance devices would be determined in 2005 with installation of the modifications occurring during the 2006 construction season.

Upstream Eel Passage Installation:

Woronoco Hydro is currently preparing final design drawings for the proposed eel passages. The consulted agencies and organizations will meet on-site in late May or early June 2004, depending upon river conditions, to review the proposed entrance locations. The design drawings will be finalized based upon the results of the on-site meeting and submitted for review and comment to the MDEP, MDFW, USFWS and TU in June 2004. Upon receipt of comments, the final passage drawings will be revised and submitted to the FERC for approval in July 2004. Installation of the new systems is anticipated to occur in September 2004 with Woronoco staff.

will be conducted at dusk and early evening and will employ the use of lights where and if appropriate. Possible downstream passage over the Project's spillways will be documented by recording spill conditions during the period of adult movements and observations within the bypass reach. Observation for out-migrating eels will be conducted during the evening hours when other sites in the area have reported eel movement.

Upstream Eel Passage System:

Woronoco Hydro will conduct a qualitative assessment of the upstream eel passage effectiveness for migrating eels. The assessment will generally include visual observation from the surface of the passage systems to document use. Observation locations will be established in consultation with the resource agencies and utilized throughout the study. Observations will include visual review of the Project's dam structures, dam tail pool areas and the grassed embankments near the dams. To the extent possible, observations will include enumeration of the eels observed in the various areas and ladder system. Observations for eel migration will begin when other sites in the area indicate eel movements are occurring. Observations will be conducted during hours of darkness and will employ the use of lights where and if appropriate. The observations will continue nightly for the first week after migration is observed and continue a minimum of once per week during the passage season after confirmation of the system use has been documented.

EFFECTIVENESS TESTING

Downstream Fish Passage System:

Woronoco Hydro will conduct a quantitative assessment of the downstream fish passage effectiveness following the installation of the downstream fish passage facility modifications at the Project. A meeting will be conducted with the MDFW and USFWS to finalize the details of the testing procedures and location of monitoring devices. In general the assessment will entail releasing tagged live smolts (Atlantic salmon) upstream of the Project and monitoring their subsequent downstream passage movements to determine the proportion of fish using the bypass facility. The smolts would be equipped with either a Radio Frequency Identification (RFID) or a Passive Integrated Transponder (PIT) tag. The downstream passage chute would be equipped with an in-water antenna, tag reader and datalogger to document the number of fish using the bypass. In addition, the forebay stop log structure would be equipped with in-water antenna, tag reader(s) and data logger(s) to document the number of fish entering the forebay area. Bypass efficiency will be calculated as:

*% Effectiveness = 100 * Number of fish using the downstream bypass / Number fish released*

Test fish will be released upstream of the project impoundment. The fish passage effectiveness assessment will be scheduled to coincide with peak downstream movements of smolts (i.e., early May). The results of the study, including any recommendations, will be presented in a report format to the resource agencies for review and comment prior to filing with the FERC. If it is determined that bypass efficiency is low, Woronco Hydro will consult with the resource agencies on modifications to the system to enhance passage efficiency.

Woronoco Hydro will conduct a qualitative assessment of the downstream fish passage effectiveness for passing of post-spawn Atlantic salmon and out-migration of American eel following the installation of the downstream fish passage facility modifications at the Project. The assessment will generally include visual observation from the surface of the passage area, including the plunge pool, to document passage of either species. Observations will include visual review of the Project's tailrace and bypass reach areas. Observations for Atlantic salmon

integrity. Annual cleaning of the plunge pool area will be conducted prior to the migration season and will consist of temporarily stopping flow into the area to permit the water levels to be reduced to enhance debris removal activities. Woronoco Hydro will maintain minimum flow requirement releases over the dam, by the use of two deep gates, or by some combination of the available project features. Increased minimum flow releases of short duration (less than a half hour) may occur to blow out and remove small debris deposits within the bypass system by releasing larger discharges of short duration. The gates will be close only if a permanent obstruction must be removed by divers or by drawing down the impoundment.

Upstream Eel Passage:

The upstream eel passage facility will be operated from June through October for passage of American Eels (eels). Future refinement of the timing will be made as information on the behavior of migrants at the Project is obtained. Two of the eel passage systems are supplied with gravity flow water for attraction and passage. The North Dam passage system's attraction and transport flow will be supplied from a submersible electric pump located in the impoundment adjacent to the dam abutment. The pump and gravity flow systems will operate continually during the passage season providing a minimum of 0.1 cfs of flow per ladder system.

A Woronoco Hydro roving operator routinely visits the project typically three times per week during unit operation and once per week during non-operational periods. The operator will check each passage system for debris clogging, damage and proper flows through the system. Repairs or equipment replacement will be implemented within one week of the discovery of damage or failure. During cleaning or repairs, the ladder flow may be periodically reduced or stopped to assist in the operations. During the non-passage season the structural portions of the ladders may be removed to prevent damage to the system. Maintenance to system will include an annual (if necessary) dewatering to remove accumulated debris or repair portions of the ladder.

OPERATION AND MAINTENANCE

Downstream Fish Passage:

The downstream fish passage facility with the required attraction flow of 20 cubic-feet-per-second (cfs) will be operated from April 1 through mid-July for passage of juvenile Atlantic salmon (smolts) and from mid-September to mid-November for passage of post-spawn adult salmon. Future refinement of the timing will be made as information on the behavior of migrants at the Project is obtained. Since the bypass system will also provide passage of the required minimum flow releases, it will operate on a year-round basis except for short periods during the winter season to avoid ice accumulation. Flow through the passage system will be annually stopped from December until "ice-out" or the river temperature reaches 5-degrees Celsius. Flows in the bypass system during the passage season will be maintained through the open entrance gate and controlled by impoundment level. Flows in the bypass system during the non-passage season will be limited to those required to satisfy minimum flow requirements at the project. The settings for the minimum flow required flows will be based on calculations of the opening necessary to provide the required minimum flow with the impoundment at the dam crest. Typically the gate will be in a partially open position and will not require adjustment except for occasional flushing if the gate becomes partially blocked by debris. The partial gate openings were calculated by Dick Quinn of the USFWS and provided to Woronoco Hydro.

A Woronoco Hydro roving operator routinely visits the project typically three times per week during unit operation and once per week during non-operational periods. During the migration season the operator will check the bypass system and plunge pool area daily for debris clogging, proper gate adjustment, and clean the angled lead when needed. Lead cleaning will be accomplished with standard rack brushing equipment and by flipping the lead to a horizontal position so that the forebay flow transports the debris to the trash racks for removal by the trash rake system. During cleaning the unit flow will be used to assist in cleaning operations. During the non-passage season the angled lead may be removed to avoid clogging. Due to the use of the open straight bypass system, debris clogging within the bypass system has historically been and is anticipated to be infrequent. Maintenance of the system will include an annual (if necessary) dewatering to remove accumulated debris within the bypass system and check the structure's

The North dam ladder will consist of a metal elevated ladder attached to existing structures on the north end of the dam (opposite of the June 2000 FERC filing figure 1). The ladder entrance would be located in a calm area adjacent to a natural high point within the bypass channel, slightly off from the north shore (Appendix C, photo #7). The ladder would be attached to the existing concrete abutment and be sheltered from debris by the north abutment. The ladder sections would be turned to follow the exterior of the abutment and terminate approximately 5 feet upstream of the dam crest. The exit from the ladder would be located approximately 5 feet above normal impoundment levels. Water supply for the ladder will be supplied from a submersible pump located within the impoundment at the North dam north abutment. Water will be pumped into the ladder's high point to provide transport flow and a separate pipe installed to provide entrance attraction flow. The upstream, exposed section of ladder and pump would be removed during the non-passage season to prevent damage to the system.

in a calm area downstream of the plunge pool on the north side of the pool flow area (opposite side of that indicated in the July 2000 Figure 1 FERC filing). The existing rock outcrops will be partially removed to create a minimum 8-inch wide channel. The gradient between existing ledge pools will be reduced to an average 26-degrees with a maximum gradient of 45-degrees. The existing dam surface will be roughened to promote passage over the existing surface (Appendix C, photo # 5). Attraction and transport water supply and an exit into the impoundment will be provided by an 8-inch wide by 6-inch high notch in the dam crest at the interface of the crest and south abutment. The passage flow will be nearly constant due to limited impoundment fluctuations with a flow rate of around 0.8 cubit-feet-per-second (cfs).

The southern area immediately downstream of the South Dam consists of an elevated rock pool and steep rock ledges with narrow seams. Discharge from the dam's deep gate, near the dam center, discharges flow into a narrow channel leading to a low level pool and ultimately discharges the flow through a slot between two high ledge outcrops. The USFWS has suggested that a ladder entrance be located at the lower pool. The USFWS also noted that additional attraction water may be required to effectively attract migrants into the ladder system. The South Dam ladder will be comprised of both natural ledge and pool passage and pre-fabricated metal sections with a roughened bottom. The ladder entrance will be located in the lower pool as suggested by the USFWS and traverse existing rock seams to the upper pool area (Appendix C, photo #6). Removable sections of metal ladder, bolted to the existing rock, will provide passage between natural passage sections. The metal ladder sections will, to the extent possible, be located behind ledge outcrop for protection and removable during the non-passage season. The existing rock seams will be selectively filled with partially concrete encased stone to provide a roughen passage way to the upper pool area. Passage though the upper pool will lead to a natural rock passageway to the dam crest at the southern dam abutment. Flows to the passage systems will be through gravity. The ladder exit and transport flow will be from an 6-inch high by 8-inch wide crest notch at the southern abutment. The entrance and exit point of the ladder are opposite of the June 2000 FERC filing. The requirement and means to provide additional attraction flow to the ladder entrance will be determined after initial testing and may include the use of submersible electric pumps.

Discharge from the downstream passage bypass will continue to exit into the existing naturally formed plunge pool. Woronoco Hydro modified the plunge pool to increase the pool's water depth based upon discussion with the USFWS on October 11, 2002. The modifications consisted of the installation of a braced wooden wall system (pool wall) between rock outcroppings at the downstream edge of the pool (Appendix C, photo #4). The modifications increased the pool depth to around seven (7) feet. Woronoco Hydro will further modify the pool and area downstream of the pool exit. The additional modifications will include the closure of existing gaps between rock outcrops and between the wall and rock outcrops to enhance the pool exit, the removal of rock outcrops near intersection of the fish passage discharge and the pool water level, and local channelization of existing pools downstream of the pool exit. The extent of channelization downstream of the plunge pool will be determined on-site by representatives of the resource agencies. The channelization will generally consist of notching existing rock ledge outcrops to promote a deeper exit area from the pool formed by the ledge outcrops.

Exclusion devices to deter turbine entrainment are not proposed. Rather, the effectiveness of the bypass system will be documented and additional measures engaged only if the effectiveness testing indicates low bypass efficiency. Should exclusion devices be required after effectiveness testing, the exclusion devices may consist of seasonal bar or plate overlays over the existing intake trashracks or vibration inducers to deter the fish from the area. Additional measures, if required, would be installed after consultation with the agencies.

Upstream Eel Passage System:

Condition 2 of Article 404 requires the installation of upstream eel ladder systems at the South dam, adjacent to the downstream fish passage facility, and enhanced passage within the North and South channels. Woronoco Hydro will install a three ladder system, one at each location noted in the license article. Appendix B contains a general location plan and typical details for the ladder systems. Final detailed drawings will be prepared separately and submitted for review to the resource agencies and organizations.

The ladder system near the existing downstream passage will use existing rock ledges and pools and the dam surface to promote passage over the dam. The system entrance will be located

FISH PASSAGE FACILITIES

Downstream Fish Passage System:

The downstream fish passage facilities at the Woronoco Project currently consist of an interim bypass facility installed in 1997 to promote passage of fish and for passage of the minimum flow requirements at the project. The system consists of a metal, open topped chute, a vertical downward closing timber maintenance gate, and a natural rock and timber walled plunge pool. The system is located immediately upstream of the Project's intake racks.

Woronoco Hydro intends to install an angled lead immediately upstream of the passage entrance to enhance passage effectiveness (Appendix B). The angled lead would be extended into the water column a minimum of ten (10) feet and be comprised of close mesh bar grating or similar product with a net opening of 1-inch or less. The lead would be suspended in the water column from cables attached to the surrounding support structures. The system would be permitted to rotate to a nearly horizontal orientation during cleaning operations and returned to a vertical position after cleaning operations are completed.

Appendix C contains photos of the forebay area and area immediately upstream of the forebay dewatering structure. The eastern half (dam side) of the forebay is significantly deeper than the western half of the forebay (Appendix C, photo #2) due to an existing rock outcrop. The presence of an abandoned timber crib dam immediately upstream of the dam and the forebay's rock outcrop causes the majority of the unit flow to enter the forebay on the eastern side of the forebay (Photo #1). The lead would extend across the deeper section of forebay (east end) from the passage entrance to a point approximately half the distance to the opposite side of the forebay (east to west), terminating near the existing rock outcrop. Photo #3 of Appendix C indicates the approximate location of the angled lead. Woronoco Hydro will install a portion of the forebay dewatering timber logs in the western slots to reduce the flow area of the forebay to the passage entrance side (east) of the forebay causing the majority of the intake flows to be directed between the angled lead and passage entrance.

6) A schedule for implementing the plan.

In addition, the plan is to include provisions to:

- Evaluate the effectiveness of the downstream passage facility for passing salmon smolts, post-spawn adult salmon.
- Evaluate the effectiveness of the upstream eel passage measures.
- Evaluate American eel out-migration.

A draft of this plan was submitted to the Massachusetts Department of Environmental Protection (MDEP), the Massachusetts Division of Fisheries and Wildlife (MDFW), the U.S. Fish and Wildlife Service (USFWS) and Trout Unlimited (TU) on April 12, 2004. Details of the downstream passage plunge pool were provided to MDEP, MDFW, USFWS and TU on April 27, 2004. Appendix A provides a copy of the comments received from the MDFW, the USFWS, and from TU. Clarifications and discussions of comments not incorporated into this final plan are contained in the cover letter at the front of this plan. The final details of the plunge pool modifications and eel passage locations will be determined though on-site reconnaissance with the MDFW, the USFWS, TU and Woronoco Hydro staff. This plan is being submitted in accordance with the requirements of Article 404 of the license and in accordance with the February 12, 2004 order granting extension of time under Articles 403 and 404.

WORONOCO HYDRO, LLC

WORONOCO PROJECT
(FERC NO. 2631)

COMPREHENSIVE FISH PASSAGE PLAN

INTRODUCTION

Woronoco Hydro, LLC (Woronoco Hydro) owns and operates the Woronoco Hydroelectric Project (Project), which is licensed by the Federal Energy Regulatory Commission (FERC) as FERC Project No. 2631. The Project is located on the Westfield River in Hampden County, Massachusetts. Article 404 of the Project license, issued April 30, 2002 (99 FERC ¶ 62,075), requires Woronoco Hydro to develop a comprehensive fish passage plan (Plan). The Plan is to include provisions to install, operate, maintain, and evaluate, as appropriate, upstream and downstream fish passage facilities at the Woronoco Project for Atlantic salmon and American eel. The Plan is required to include:

1) A provision to continue operating and maintaining the existing downstream fish passage facility;

2) functional design drawings of the licensee's proposed upstream passage measures for American eel (in accordance with the plans filed June 6, 2000);

3) Quantification of the flows required to operate the licensee's proposed fish passage facilities;

4) An operation and maintenance plan, including a schedule for operating the licensee's proposed fish passage facilities;

5) Funding support towards implementing the Massachusetts Division of Fisheries and Wildlife's upstream trap-and-truck program for Atlantic salmon on the Westfield River; and

ORIGINAL

WORONOCO HYDRO, LLC
HAMILITON, MASSACHUSETTS

WORONOCO HYDROELECTRIC PROJECT
FERC NO. 2631

COMPREHENSIVE FISH PASSAGE PLAN

MAY 2004

Prepared by:

Kleinschmidt
Energy & Water Resource Consultants

Woronoco Hydro will notify FERC within ten days of any violation of impoundment fluctuation or minimum flow requirements. The notification will include a discussion of the reasons for the violation and the corrective actions taken by Woronoco Hydro. Woronoco Hydro will consult with the MDFW and the USFWS regarding the incident and corrective measures. A report regarding the incident will be filed with the Commission within 30 days of the incident and after consultation with the resource agencies. The report will contain, to the extent possible, the cause, severity and duration of the incident and any observed or reported adverse environmental impacts resulting from the incident. The report will also provide pertinent Project data and a description of corrective measures.

Data on impoundment elevation, unit output, flow release gate settings, and fish passage operational status would be made available to the U.S. Fish and Wildlife Service, Massachusetts Department of Environmental Protection, the Massachusetts Division of Fisheries and Wildlife or the U.S. Geological Survey within 30 days of the agency's request.

No soil erosion or sediment control measures are proposed since the proposed monitoring measures will not require any soil disturbance.

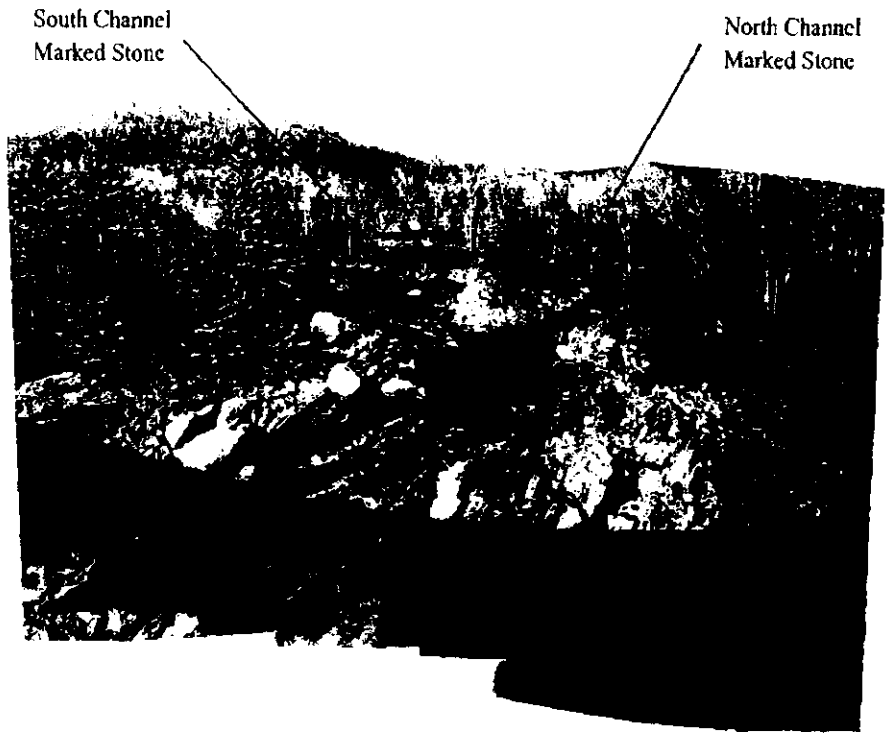


Photo 1: View of Bypass Confluence Area

SCHEDULE

The impoundment level monitoring and unit control system is currently installed and operational at the project. Impoundment level data is being continuously recorded on an hourly basis and archived as required. The minimum flow devices are existing features at the project and are currently operating. The proposed video camera monitoring equipment described herein will be installed within six (6) months of the Plan approval by the Commission.

REPORTING AND OTHER PROVISIONS

Short duration (less than 24-hour) interruption of minimum flows may occur during cleaning or maintenance to the fish passage system or gates. Woronoco staff will limited planned interruptions, if required, to no more than two consecutive 12-hour periods. Anticipated interruptions above the 12-hour period will be coordinated with the USFWS and MDFW prior to implementation of the interruption. Whenever feasible, the gate settings will be increased to maintain the required release amounts.

through the use of the paint marks will document proper gate openings since daily gate operation is not required and the gates are manually operated and locked at all times. The free discharge from the gates and passage system will be documented through the use of visual observations downstream of the gates at the confluence of the bypass reach sections.

Woronoco Hydro intends to install a video camera downstream of the confluence of the north and south channels to document flow releases through the bypass reach. Photo 1 indicates the general view of the confluence area. The confluence area will be provided with chiseled and marked rock outcrops or embedded poles visible with the camera. Photo 1 indicates the general location of the proposed marked structures. The camera will have the capability of zoom and pan to permit closer inspection of water level markings. Camera output will be provided to Woronoco Hydro staff for weekday recordings and spontaneous confirmation of the discharge. A one-time calibration of the water level marks will be conducted upon camera installation with all discharge mechanisms free of debris and properly set. Resource agency staff assistance and review will be solicited during calibration to ensure agency objectives are met. All markings, including the gate operating stems, will be repainted annually or more frequently if required for adequate confirmation of settings. Woronoco Hydro staff will be dispatched to the project should camera observations note inadequate flow releases. As appropriate Woronoco staff will clean or readjust the gate or passage areas to restore required releases.

notches were anticipated to be used for passage of the flow Subsequent to the license issuance, Woronoco Hydro met with resource agencies on October 11, 2002 and determined that minimum flow releases would be provided through existing gate structures. The minimum bypass flows have been discharged from the gates continuously since that date. The use of notches was abandoned due to potential clogging, and to prevent unintended fish passage through the notches that could result in unnecessary impact to fish from rock outcrops or depositing fish into a non-passable or shallow watered area when there is no spill occurring at the dam to mitigate such an event.

Minimum flow releases into the north channel are provided though the continuous operation of a manually operated deep (mud) gate located on the north abutment. Calculations to determine the required gate opening were provided to and approved by the USFWS. The north channel gate is required to be opened 2.6-inches. A paint mark has been added to the operating stem for easy detection of the gate opening. Daily adjustments to the gate settings will not be required.

Minimum flow releases into the south channel are provided through the continuous operation of the downstream fish passage system and a manually operated deep (mud) gate located near the middle of the northern section of the south dam. The downstream fish passage system is a free-surfaced open channel flow structure with no flow control gate. Discharge through the fish passage system is constant with the impoundment level and has operated continuously for several years. Calculations to determine the required south gate opening were provided to and approved by the USFWS. The south channel gate is required to be opened 1.125-inches. A paint mark has been added to the operating stem for easy detection of the gate opening. Daily adjustments to the gate settings will not be required.

The electronic documentation of the impoundment level through the PLC (noted above) confirms the discharge through the downstream passage system and proper impoundment levels for the gate discharge. In addition, the downstream passage system is checked daily during the week for debris accumulation during the season when trash is likely to clog the intake racks and weekly in other seasons, or will be checked more frequently if monitoring results indicate an increased level of monitoring is required. Monthly visual confirmation of the gate setting

A draft of this plan was submitted to the Massachusetts Department of Environmental Protection (MDEP), the Massachusetts Division of Fisheries and Wildlife (MDFW), the U.S. Fish and Wildlife Service (USFWS) and the U.S. Geological Survey (USGS) on May 5, 2004. Appendix A provides a copy of the comments received from the MDEP, the MDFW, the USFWS and the USGS. Clarifications and discussions of comments not incorporated into this final plan are contained in the cover letter at the front of this plan. This plan is being submitted in accordance with the requirements of Article 403 of the license and in accordance with the February 12, 2004 order granting extension of time under Articles 403 and 404.

IMPOUNDMENT FLUCTUATION

The Project is equipped with a Programmable Logic Control (PLC) based operating system that was installed before the FERC license was issued and has been operating continuously since the fall of 2001. Impoundment levels are measured through the use of an electronic pressure transducer located upstream of the intake rack structure in the forebay. The pressure transducer is located upstream of the forebay stoplog structure in a sheltered area on the dam side unaffected by flows. A second transducer is located behind the Project's intake trash racks. The transducers are calibrated annually The PLC automatically adjusts the unit settings based on the transducer input to maintain the impoundment level within 1-inch of the target elevation. The elevation data is automatically electronically recorded hourly by the control system. In the event of loss of power or the impoundment level dropping below the target elevation, the system shuts down the unit (and alarms station operating personnel) causing all flows to pass over the dam into the bypassed reach. Documentation of maintenance of the impoundment elevation at the target elevation will satisfy the requirements of Articles 401 and 403.

MINIMUM FLOW

Article 402 of the license requires a minimum flow release of 57-cfs, or inflow, into the bypass reach. The 57-cfs release is required to be released into the bypass as follows: (1) 35-cfs in the south channel (20-cfs through the downstream fish passage and 15-cfs into to the south bypass channel); and (2) 22-cfs into the north bypass channel. Article 402 notes that dam

4) The design of the devices, including any pertinent hydraulic calculations, technical specifications of proposed instrumentation, erosion and sediment control measures, as appropriate, and design drawings of the system;

5) A description of the relative extent of manned versus automatic operation of the monitoring equipment;

6) A description of the methods and schedule for calibrating the monitoring equipment;

7) The method of flow data collection, a means for recording (hourly) and reporting (yearly) impoundment elevations, and provisions for providing data to the regulatory agencies in a timely manner; and

8) A schedule for installing all elevation and flow measuring devices, as appropriate, and implementing the plan.

In addition, the plan is to include provisions for preparation of a report whenever the required flows or elevations fall below the required amounts. The report shall be filed with the Commission within 30 days of the incident and in consultation with the MDFW and the U.S. Fish and Wildlife Service (USFWS). The report shall include the following provisions:

- The report shall, to the extent possible, identify the cause, severity, and duration of the incident and any observed or reported adverse environmental impacts resulting from the incident.
- Operational data necessary to determine compliance with Article 403 of the license.
- A description of any corrective measures implemented at the time of occurrence and the measures implemented or proposed to ensure that similar incidents do not recur.
- Comments or correspondence, if any, received from the MDFW and the USFWS regarding the incident.

WORONOCO HYDRO, LLC
HAMILTON, MASSACHUSETTS

WORONOCO HYDROELECTRIC PROJECT
FERC NO. 2631

IMPOUNDMENT FLUCTUATION AND MINIMUM FLOW MONITORING PLAN

MAY 2004

Prepared by:

Kleinschmidt
Energy & Water Resource Consultants

WORONOCO HYDRO, LLC

WORONOCO PROJECT
(FERC No. 2631)

IMPOUNDMENT FLUCTUATION AND MINIMUM FLOW MONITORING PLAN

INTRODUCTION

Woronoco Hydro, LLC (Woronoco Hydro) owns and operates the Woronoco Hydroelectric Project (Project), which is licensed by the Federal Energy Regulatory Commission (FERC) as FERC Project No. 2631. The Project is located on the Westfield River in Hampden County, Massachusetts. Article 401 of the Project license, issued April 30, 2002 (99 FERC ¶ 62,075), requires Woronoco Hydro to operate the Project in a run-of-river mode with a target elevation of 229.0 feet National Geodetic Vertical Datum for the protection and enhancement of water quality, fisheries, and aquatic resources in the Woronoco impoundment and the Westfield River downstream from the Project. Article 402 of the license requires a minimum flow release of 57 cubic feet per second (cfs), or inflow, whichever is less, as measured in the separate channels of the bypassed reach, for the protection and enhancement of water quality, fisheries, and aquatic resources in the bypassed section of the Westfield River. Article 403 of the Project license requires Woronoco Hydro to develop a project operations monitoring plan (Plan) to monitor run-of-river operations as well as the minimum bypassed flow and downstream fish passage flow. This Plan has been developed in accordance with the requirements of Article 403 of the license. Article 403 requires that the Plan include:

1) A provision for maintaining the impoundment elevation at 229.0 feet National Geodetic Vertical Datum (NGVD) and notifying the Massachusetts Department of Environmental Protection (MDEP) when the impoundment elevation falls below 229.0 feet NGVD;

2) The planned location of the elevation and flow measuring devices;

3) Specific measures that would ensure that the monitoring system would operate under all conditions (including loss of external electrical power to the project);

WORONOCO HYDRO, LLC

HAMILTON, MASSACHUSETTS

WORONOCO HYDROELECTRIC PROJECT

FERC NO. 2631

IMPOUNDMENT FLUCTUATION AND MINIMUM FLOW MONITORING PLAN

MAY 2004

Prepared by:

Kleinschmidt

Energy & Water Resource Consultants

The downstream fish passage facility and minimum bypass flow discharges have operated continuously at the site since before the license was issued by FERC. As a means for continuous reporting of their performance, Woronoco Hydro has been investigating DSL and cable communications links in order to provide a real-time Internet link to the monitoring devices for instantaneous data access by the resource agencies. These efforts proved fruitless due to the lack of this form of service in the Woronoco area and difficulty in providing the data through alternate technology mediums. Woronoco Hydro's pursuit of providing instantaneous data access has caused a delay in the preparation of the enclosed plan.

The draft Plan is being sent electronically as well as in printed and mailed format. Woronoco Hydro was required to file the Plan with the FERC by April 30,2004. As noted above because of the delay in receiving approval for a dedicated cable line, or DSL line extension to the site from service in the adjacent city of Westfield, MA to provide the appropriate or feasible technology to collect or transmit the data, Woronoco Hydro did not meet the consultation and filing requirements of the FERC order.

Woronoco Hydro intends to file the draft Plan with the Commission immediately but recognizes the need and the requirement for agency review consultation. In order to expedite the Plan consultation and approval, Woronoco Hydro proposes to teleconference with as many participants as possible before filing the Plan with the Commission. We propose to teleconference by May 10, 2004 with the final date and time determined through follow-up telephone or electronic discussions with agency staff availability. We request your participation in the teleconference to provide your preliminary comments on the Plan.

We also request that your final comments be provided by June 4, 2004. A response to the comments received by the agencies and a copy of the comments will be provided to the Commission in a supplemental filing. If you have any questions or need additional information regarding this Plan, please call me at (207) 487-3328 (email: AL.Nash@KleinschmidtUSA.com) or Peter Clark at (978) 468-3999 (email: pclark@swiftriverhydro.com). Thank you for your expeditious review.

Sincerely,

KLEINSCHMIDT ASSOCIATES

Alfred Nash, P.E.
Project Manager

AJN:fhw
Enclosure
cc: Peter Clark (Woronoco Hydro)
William Fay (Woronoco Hydro)
Donald Pugh (Trout Unlimited)

Kleinschmidt
Energy & Water Resource Consultants

May 5, 2004

VIA EMAIL AND OVERNIGHT

Mr. Caleb Slater
Anadromous Fish Team Leader
Commonwealth of Massachusetts
Division of Fisheries and Wildlife
Field Headquarters
1 Rabbit Hill Rd
Westboro, MA 01581

Mr. John P. Warner
Energy/Hydropower Coordinator
New England Field Office
U.S. Fish and Wildlife Service
70 Commercial Street, Suite 300
Concord, NH 03301

Mr. Robert Kubit
Massachusetts Department of Environmental Protection
Division of Water Quality
67 Main Street, 2nd Floor
Worcester, MA 01608

Mr. Wayne H. Sonntag
Massachusetts Water District Chief
US Geological Survey
Massachusetts-Rhode Island Dist. Wrd
10 Bearfoot Road
Northborough, MA 01532-1528

Woronoco Project (FERC No. 2631)
Impoundment Fluctuation and Minimum Flow Monitoring Plan – Article 403

Dear Sirs:

Woronoco Hydro, LLC (Woronoco Hydro) owns and operates the Woronoco Hydroelectric Project (Project), which is licensed by the Federal Energy Regulatory Commission (FERC) as FERC Project No. 2631. The Project is located on the Westfield River in Hampden County, Massachusetts. Article 403 of the Project license, issued April 30, 2002 (99 FERC ¶ 62,075), requires Woronoco Hydro to develop a plan to monitor impoundment levels and minimum flow releases at the Project (Plan). On behalf of our client, enclosed for your review and comment is a draft of the Plan.

From: Al Nash
Sent: Thursday, May 13, 2004 2:55 PM
To: 'Wayne H Sonntag'; Al Nash
Cc: Bill Fay; 'Slater, Caleb (FWE)'; 'dc_ma@usgs.gov'; 'Donald Pugh'; John_Warner@fws.gov; 'Swift River Co., Inc.'; 'robert.kubit@state.ma.us'
Subject: RE: Woronoco Conference Call

Thank you for your response. The photo (page 6) in the plan is misleading in that it is looking upstream into the two separate channels. The discharge into each channel is separated by an embankment keeping the two channel flows from merging until the area indicated by the photo. Flows into each channel is controlled through separate discharge gates which we do monitor separately.

-----Original Message-----
From: Wayne H Sonntag [mailto:wsonntag@usgs.gov]
Sent: Monday, May 10, 2004 1:19 PM
To: Al Nash
Cc: Bill Fay; 'Slater, Caleb (FWE)'; 'dc_ma@usgs.gov'; 'Donald Pugh'; John_Warner@fws.gov; 'Swift River Co., Inc.'; 'robert.kubit@state.ma.us'
Subject: Re: Woronoco Conference Call

Folks:

I'm sorry I won't be able to join you in your conference call, as I'm heading off to a meeting in a few minutes. I did however, run the Monitoring Plan past one of my surface-water specialists for comment, and he had only one question. On page 3 under "Minimum Flow", the document states that of the 57-cfs release, 35-cfs goes into the south channel and 22-cfs in to the north bypass channel. His question was, if 35-cfs is mandated for the south channel and 22-cfs is mandated for the north channel, and all outflows merge into the pooled area upstream of both channels, what controls the set flows into the south and north channel? Do you monitor flows in each channel to ensure the 35 and 22 cfs set flows are being achieved?

That's the only concern he had with the Plan.

Thanks

Wayne Sonntag

****

Wayne Sonntag
District Chief
MA-RI District
U.S. Geological Survey
10 Bearfoot Road
Northborough, MA 01532
(508) 490-5002
http://ma.water.usgs.gov

USGS - Science for a Changing World

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taping would be performed the following Monday to determine if a reduction in flows occurred and to maintain documentation. Any violation during a weekend event would fall under the reporting requirements for the project.

Shut-down of Passage Flows: The downstream passage flows during winter conditions result in significant ice accumulation. Woronoco Hydro requested that the flows through this system be stopped during the winter. The parties agreed that flows through the bypass system could be eliminated beginning in December. Flows would need to be resumed immediately after ice-out or when river temperatures reached 5 degrees Celsius. Any flow not passed through the passage system would need to be passed through the South Dam gate.

Reporting: A copy of any reports to FERC should be provided to the MDEP.

Flow Interruptions: The MDFW will not agree to two consecutive 12-hour interruptions to the minimum flow requirements without prior approval. Interruptions are anticipated to limited to unit repairs requiring the forebay to be dewatered or rare occasions requiring a diver to remove gate discharge obstructions. The forebay has been equipped with a dewatering device to permit unit repairs. Leakage through the dewatering device is discharged through a low level gate near the downstream fish passage plunge pool. The parties agreed that leakage flow would suffice for the minimum flow requirements into the channel during a forebay dewatering period. All other river flows are automatically discharged over the dams during a forebay dewatering effort. Should diver services or similar events require interruption to the flow releases, Woronoco Hydro will notify the MDFW in advance of the interruption.

On-site Inspection: The group determined that many of the items discussed during the call could and should be confirmed in the field. An on-site field review would be conducted as soon as river conditions permitted (currently spilling at the Project). If required, a supplemental filing of the Plans would be made based on the site review results.

Comprehensive Fish Passage Plan

MDFW Comments: Caleb noted that the MDFW comments and concerns are identical to those noted by the USFWS in their comment letter.

Plunge Pool: A concern was noted regarding rock outcrops in the plunge pool area. The option to shorten the passage discharge chute was discussed but deemed unlikely to eliminate the concern with migrants hitting the rock outcrop. Woronoco Hydro agreed to remove the rock outcrops within the pool area near the passage discharge area. The pool depth was also noted as being around seven feet but need confirmation. TU requested that pools downstream of the plunge pool area also be modified. Several of the pools discharge the flow over wide shallow lips. Enhanced passage was believed to be achievable if a narrow, deep notch was cut into the wide lip areas to provide deeper water passage through the area. Woronoco Hydro agreed to modify the areas during work on the plunge pool and after the site visit confirm which pool(s) should be modified.

cc: Attendees
John Warner (USFWS)
Robert Kubit (MDEP)
Wayne Sorntag (USGS – Monitoring Plan only)

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Woronoco Project (FERC No. 2631)
Teleconference Notes of May 10, 2004

Participants:

Caleb Slater – Massachusetts Division of Fisheries and Wildlife (MDFW)
Don Pugh – Trout Unlimited (TU)
Peter Clark – Woronoco Hydro (WH)
William Fay – WH
Alfred Nash – Kleinschmidt Associates (Kleinschmidt)

Purpose:

The purpose of the call was to solicit initial comments regarding the Impoundment Fluctuation and Minimum Flow Monitoring Plan submitted to the agencies on May 5, 2004. Final comments to the plan would be provided at a later date. Additional comments regarding the Comprehensive Fish Passage Plan were also discussed.

Comments:

USGS Comments: The USGS was not able to participate in the call but relayed their comments via electronic mail.

Monitoring Sensitivity: The MDFW and TU expressed concern with debris blockage reducing the flow through the narrow gate opening. The observations by Woronoco staff of the gate discharge may not necessarily determine is some blockage is occurring. In addition, the ability to determine small changes in the discharge rate may not be readily observable with the camera. An on-site review of the water level changes at the marked locations would need to be preformed to determine the level of accuracy of the proposed equipment.

Backwater Effect: One area of concern for the MDFW and TU was the potential for water flow from one channel artificially raising water levels in the adjacent channel near the proposed water level mark. The concern is that should flow in one channel upstream of the water level mark be reduced (though gate clogging or similar reductions), the backwater effect of the adjacent channel and the video monitoring system may not be able to detect this reduced flow. Should flows in the adjacent channel be elevated, the backwater effect may be exasperated further masking the reduced flow through the channel. After discussion it was agreed that the water level mark for each area would be evaluated on-site by review of the area. The discharge devices in each channel would be temporarily shut to determine the extent of the backwater effect for each channel. Once the magnitude of the effect, if any, was determined, appropriate changes to the measuring device(s), if required, could be implemented.

Pressure Transducers: The use of pressure transducers rather than video monitoring was discussed. The vulnerability of such a system to vandalism and the need to deploy exposed electrical cables over irregular, periodically inundated areas caused this technology to be inapplicable for this site.

Frequency of Observations: The MDFW requires more documentation of the minimum flow releases. The frequency of recordings will be increased to hourly recordings during the daylight periods via video recordings. Woronoco staff will be responsible to review the recordings to maintain compliance. Weekend hourly recordings will also be obtained. Review of weekend

WORONOCO HYDRO, LLC.

WORONOCO PROJECT
(FERC No. 2631)

IMPOUNDMENT FLUCTUATION AND MINIMUM FLOW MONITORING PLAN

APPENDIX A – Consultation

No soil erosion or sediment control measures are proposed since the proposed monitoring measures will not require any soil disturbance.

SCHEDULE

The impoundment level monitoring and unit control system is currently installed and operational at the project. Impoundment level data is being continuously recorded on an hourly basis and archived as required. The minimum flow devices are existing features at the project and are currently operating. The proposed video camera monitoring equipment described herein will be installed within six (6) months of the Plan approval by the Commission.

REPORTING AND OTHER PROVISIONS

Short duration (less than 24-hour) interruption of minimum flows may occur during cleaning or maintenance to the fish passage system or gates. Woronoco staff will limit planned interruptions, if required, to no more than one 12-hour period. Anticipated interruptions above the 12-hour period will be coordinated with the USFWS and MDFW prior to implementation of the interruption. Whenever feasible, the gate settings will be increased to maintain the required release amounts.

Woronoco Hydro will notify FERC within ten days of any violation of impoundment fluctuation or minimum flow requirements. The notification will include a discussion of the reasons for the violation and the corrective actions taken by Woronoco Hydro. Woronoco Hydro will consult with the MDFW and the USFWS regarding the incident and corrective measures. A report regarding the incident will be filed with the Commission within 30 days of the incident and after consultation with the resource agencies. A copy of the report will be provided to the resource agencies. The report will contain, to the extent possible, the cause, severity and duration of the incident and any observed or reported adverse environmental impacts resulting from the incident. The report will also provide pertinent Project data and a description of corrective measures.

Data on impoundment elevation, unit output, flow release gate settings, and fish passage operational status would be made available to the U.S. Fish and Wildlife Service, Massachusetts Department of Environmental Protection, the Massachusetts Division of Fisheries and Wildlife or the U.S. Geological Survey within 30 days of the agency's request.

A one-time calibration of the water level marks will be conducted upon camera installation with all discharge mechanisms free of debris and properly set. Resource agency staff assistance and review will be solicited during calibration to ensure agency objectives are met. During the calibration effort a sensitivity review of the system will be conducted to determined the ability to detect small changes in the discharge rate of the passage systems due to debris clogging or similar events. In addition, the potential for water flow from one channel artificially raising water levels in the adjacent channel near the proposed water level mark will also be reviewed. The discharge systems will be shut or otherwise adjusted to determine if flows from one channel impact water levels in the adjacent channel at the water level mark locations. As required the water level marks will be adjusted to address the impacts if present.

All markings, including the gate operating stems, will be repainted annually or more frequently if required for adequate confirmation of settings. Woronoco Hydro staff will be dispatched to the project should camera observations note inadequate flow releases. As appropriate Woronoco staff will clean or readjust the gate or passage areas to restore required releases.

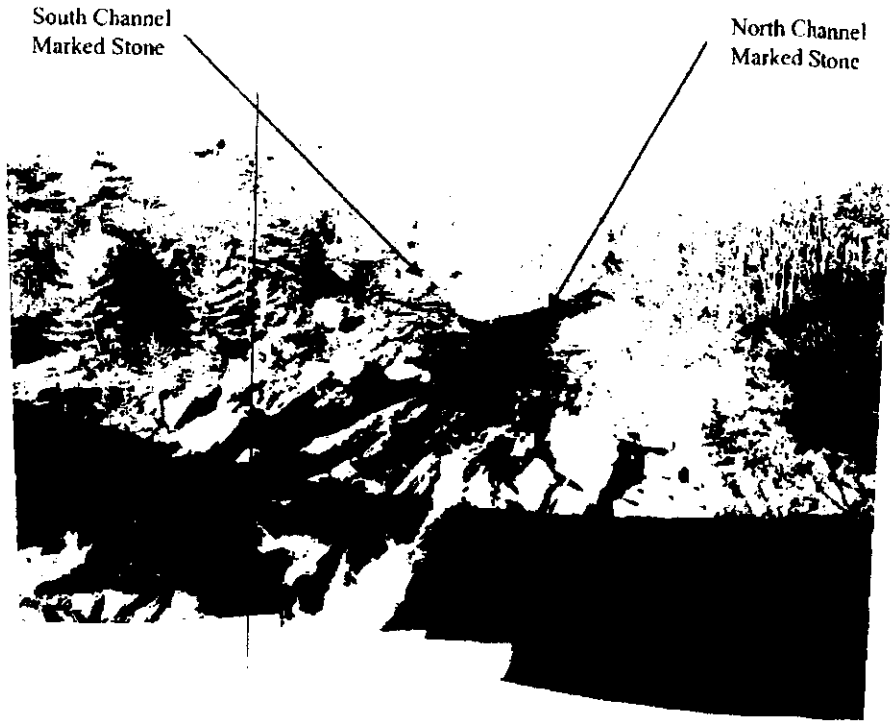

Photo 1: View of Bypass Confluence Area

approved by the USFWS. The south channel gate is required to be opened 1.125-inches to pass the required 15-cfs flow. A paint mark has been added to the operating stem for easy detection of the gate opening. Daily adjustments to the gate settings will not be required.

The forebay has been equipped with a dewatering device to permit unit repairs. Leakage through the dewatering device is discharged through a low level gate near the downstream fish passage plunge pool. During forebay dewatering events, discharge through the downstream passage system will be discontinued and leakage flow will be provided though the area. All other river flows will be automatically discharged over the dams during a forebay dewatering effort.

The electronic documentation of the impoundment level through the PLC (noted above) confirms the discharge through the downstream passage system and proper impoundment levels for the gate discharge. In addition, the downstream passage system is checked daily during the week for debris accumulation during the season when trash is likely to clog the intake racks and weekly in other seasons, or will be checked more frequently if monitoring results indicate an increased level of monitoring is required. Monthly visual confirmation of the gate setting through the use of the paint marks will document proper gate openings since daily gate operation is not required and the gates are manually operated and locked at all times. The free discharge from the gates and passage system will be documented through the use of visual observations downstream of the gates at the confluence of the bypass reach sections.

Woronoco Hydro intends to install a video camera downstream of the confluence of the north and south channels to document flow releases through the bypass reach. Photo 1 indicates the general view of the confluence area. The confluence area will be provided with chiseled and marked rock outcrops or embedded poles visible with the camera. Photo 1 indicates the general location of the proposed marked structures. The camera will have the capability of zoom and pan to permit closer inspection of water level markings. Camera output will be provided to Woronoco Hydro staff for hourly weekday recordings and spontaneous confirmation of the discharge. Weekend hourly recordings will also be obtained and reviewed of water level recordings will be performed the following Monday to determine if a reduction in flows occurred and to maintain documentation.

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A draft of this plan was submitted to the Massachusetts Department of Environmental Protection (MDEP), the Massachusetts Division of Fisheries and Wildlife (MDFW), the U.S. Fish and Wildlife Service (USFWS), the U.S. Geological Survey (USGS) and Trout Unlimited (TU) on May 5, 2004. A teleconference was conducted on May 10, 2004 to solicit initial comments on the draft plan. The USGS provided electronic comments prior to the conference and representatives from the MDFW and TU participated in the conference call. Appendix A provides a copy of the comments received from the MDEP, the MDFW, the USFWS, the USGS and TU. Clarifications and discussions of comments not incorporated into this final plan are contained in the cover letter at the front of this plan. This plan is being submitted in accordance with the requirements of Article 403 of the license and in accordance with the February 12, 2004 order granting extension of time under Articles 403 and 404.

IMPOUNDMENT FLUCTUATION

The Project is equipped with a Programmable Logic Control (PLC) based operating system that was installed before the FERC license was issued and has been operating continuously since the fall of 2001. Impoundment levels are measured through the use of an electronic pressure transducer located upstream of the intake rack structure in the forebay. The pressure transducer is located upstream of the forebay stoplog structure in a sheltered area on the dam side unaffected by flows. A second transducer is located behind the Project's intake trash racks. The transducers are calibrated annually. The PLC automatically adjusts the unit settings based on the transducer input to maintain the impoundment level within 1-inch of the target elevation. The elevation data is automatically electronically recorded hourly by the control system. In the event of loss of power or the impoundment level dropping below the target elevation, the system shuts down the unit (and alarms station operating personnel) causing all flows to pass over the dam into the bypassed reach. Documentation of maintenance of the impoundment elevation at the target elevation will satisfy the requirements of Articles 401 and 403.

WORONOCO HYDRO, LLC

WORONOCO PROJECT
(FERC No. 2631)

IMPOUNDMENT FLUCTUATION AND MINIMUM FLOW MONITORING PLAN

INTRODUCTION

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1) A provision for maintaining the impoundment elevation at 229.0 feet National Geodetic Vertical Datum (NGVD) and notifying the Massachusetts Department of Environmental Protection (MDEP) when the impoundment elevation falls below 229.0 feet NGVD;

2) The planned location of the elevation and flow measuring devices;

3) Specific measures that would ensure that the monitoring system would operate under all conditions (including loss of external electrical power to the project);

4) The design of the devices, including any pertinent hydraulic calculations, technical specifications of proposed instrumentation, erosion and sediment control measures, as appropriate, and design drawings of the system;

5) A description of the relative extent of manned versus automatic operation of the monitoring equipment;

6) A description of the methods and schedule for calibrating the monitoring equipment;

7) The method of flow data collection, a means for recording (hourly) and reporting (yearly) impoundment elevations, and provisions for providing data to the regulatory agencies in a timely manner; and

8) A schedule for installing all elevation and flow measuring devices, as appropriate, and implementing the plan.

In addition, the plan is to include provisions for preparation of a report whenever the required flows or elevations fall below the required amounts. The report shall be filed with the Commission within 30 days of the incident and in consultation with the MDFW and the U.S. Fish and Wildlife Service (USFWS). The report shall include the following provisions:

- The report shall, to the extent possible, identify the cause, severity, and duration of the incident and any observed or reported adverse environmental impacts resulting from the incident.
- Operational data necessary to determine compliance with Article 403 of the license.
- A description of any corrective measures implemented at the time of occurrence and the measures implemented or proposed to ensure that similar incidents do not recur.
- Comments or correspondence, if any, received from the MDFW and the USFWS regarding the incident.

WORONOCO HYDRO, LLC
HAMILITON, MASSACHUSETTS

WORONOCO HYDROELECTRIC PROJECT
FERC NO. 2631

IMPOUNDMENT FLUCTUATION AND MINIMUM FLOW MONITORING PLAN

MAY 2004

Prepared by:

Kleinschmidt
Energy & Water Resource Consultants

The Passage Plan comments received from TU were specific to the detailed design of the eel passage ways or effectiveness studies. TU comments will be incorporated or addressed during development of the detailed study plan and design drawings submitted separately after Commission approval of the Passage Plan. The remainder of the TU comments have been incorporated into the Passage Plan.

A draft of the Flow Plan was submitted to the MDEP, the MDFW, the USFWS, the U.S. Geological Survey (USGS), and TU on May 5, 2004. A teleconference call with the MDFW and TU was conducted on May 10, 2004 to solicit initial comments on the Flow Plan prior to filing the Flow Plan with the Commission. A copy of the conference notes is included in the Flow Plan. The comments received during the call, and those received electronically from the USGS, have been incorporated into the Flow Plan. Any future comments will be filed with the Commission upon receipt.

If you have any questions or need additional information regarding this filing, please call me at (207) 487-3328 (email: AL.Nash@KleinschmidtUSA.com) or Peter Clark at (978) 468-3999 (email: pclark@swiftriverhydro.com).

Sincerely,

KLEINSCHMIDT ASSOCIATES

Alfred J. Nash, P.E.
Project Manager

AJN:fhw

cc: Peter Clark (Woronoco Hydro)
Bill Fay (Woronoco Hydro)
John Warner (USFWS)
Caleb Slater (MDFW)
Robert Kubit (MDEP)
Wayne Sonntag (USGS – Monitoring Plan only)
Don Pugh (TU)

Kleinschmidt
Energy & Water Resource Consultants

ORIGINAL

May 13, 2004

VIA FEDERAL EXPRESS

Magalie Roman Salas, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

Woronoco Project (FERC No. 2631) -017 (Art. 403) -018 (Art. 404)
Article 403 and 404 Filing

Dear Secretary Salas:

Woronoco Hydro, LLC (Woronoco Hydro) owns and operates the Woronoco Hydroelectric Project (Project), which is licensed by the Federal Energy Regulatory Commission (FERC) as FERC Project No. 2631. The Project is located on the Westfield River in Hampden County, Massachusetts and received its operating license on April 30, 2002 (99 FERC ¶ 62,075). Article 403 of the Project license requires Woronoco Hydro to develop a plan to monitor impoundment levels and minimum flow releases at the Project (Flow Plan). Article 404 of the Project license requires Woronoco Hydro to develop a comprehensive fish passage plan (Passage Plan). The February 12, 2004 Order Granting Extension of Time Under Articles 403 and 404 extended the filing deadline to April 30, 2004. On behalf of our client and in accordance with the February 12, 2004 order, we are filing an original and eight (8) copies of the Flow Plan and Passage Plan.

A draft of the Fish Passage Plan was submitted to the Massachusetts Department of Environmental Protection (MDEP), the Massachusetts Department of Fisheries and Wildlife (MDFW), the U.S. Fish and Wildlife Service (USFWS) and Trout Unlimited (TU) on April 12, 2004. Written comments were received from the USFWS and TU. Verbal comments were received from the MDFW during a teleconference on May 10, 2004. The MDFW indicated that their comments were similar to those expressed by the USFWS. No comments have been received by the MDEP.

The Passage Plan has been modified to include the comments received from the USFWS. The USFWS indicated that a radio telemetry or PIT tag study would need to be performed to document the downstream passage effectiveness for migrating eels. The owner intends to first test the system for effective passage of smolts and perform qualitative assessment for eel passage during the first year of testing. Should the qualitative result be inconclusive, as suggested by the USFWS, the owner will conduct a PIT tag study for the passage of migrating eels the following year.

75 Main Street, P.O. Box 576 • Pittsfield, ME 04967 • Phone: 207-487-3328 • Fax: 207-487-3124 • www.KleinschmidtUSA.com
– Offices Nationwide –

George H. Taylor
Chief, Biological Resources Branch
Division of Hydropower Administration
and Compliance

The licensee's impoundment fluctuation and minimum flow monitoring plan, as modified above, should be adequate to document the licensee's compliance with articles 401, 402, and 403, and should, therefore, be approved.

The Director orders:

(A) The impoundment fluctuation and minimum flow monitoring plan under article 403 of the license for the Woronoco Project (FERC No. 2631), filed on May 14, 2004, as modified by paragraph (B) and (C), is approved.

(B) The licensee shall file a report with the Commission, as indicated in the licensee's plan, any time the licensee's video equipment indicates adequate releases are not being maintained and personnel are required to go to the project to make adjustments. The report shall indicate how much flow was released prior to any adjustments being made. Based on the report and the Commission's evaluation of the incident, the Commission reserves the right to require modifications to project facilities and operations to ensure future compliance.

(C) The licensee shall install embedded poles, or chiseled and marked rock outcrops, for use with its video equipment that clearly delineate changes in flow. The embedded poles or rock outcrops shall be rated precise enough to determine how much flow is being released or under released. Further, the licensee shall install a staff gage in each of the two pools immediately below the low level gate discharges that can be observed by the project operator during routine inspections. The staff gage shall be rated at the same time the embedded poles are rated. The licensee shall file a report with the Commission within 30 days of the date that the staff gages and embedded poles are installed. The report shall include photographs documenting the delineations/markings on the embedded poles or rock outcroppings as well as the staff gages in the pools immediately below the low level gate discharges.

(D) The licensee shall file an original and seven copies of any filing required by this order with:

The Secretary
Federal Energy Regulatory Commission
Mail Code: DHAC, PJ-12.3
888 First Street, N.E.
Washington, D.C. 20426

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

logs that less frequent review during some times of the year or under some flow conditions is acceptable, adjustment to the inspection schedule can be made at that time.

The USFWS is concerned that a video will not provide precise enough data to verify compliance. Further, the USFWS states it is unclear whether the markings will be clear enough and precise enough to be an effective tool for verifying compliance. The USFWS recommends that the rock markings or driven marked poles be calibrated precisely enough to verify compliance. In addition, the USFWS recommends that in the two pools immediately below the low level gate discharges, a staff gage be established that can be observed by the project operator during routine inspections.

DISCUSSION

The licensee's impoundment fluctuation and minimum flow monitoring plan addresses all the provisions outlined in article 403. The PLC will monitor, control, and record the reservoir elevation. This will verify the target elevation is being maintained. If the reservoir elevation is adequately maintained, the gate openings which release water to each channel should release the required flows based upon the calculations. The video equipment will allow the licensee to remotely monitor the flows to each channel to ensure the required flow is being released.

The licensee indicates that should the video equipment show adequate releases are not being maintained, the licensee will send personnel to the project to inspect for problems. In the event that adequate flows are not being maintained, the licensee states personnel will make the necessary changes to ensure the required flows are restored.

So that the Commission can monitor the licensee's compliance with the requirements, the licensee should be required to file a report, as indicated in the licensee's plan and any time the licensee's video equipment indicates adequate releases are not being maintained and personnel are required to go to the project to make adjustments. The report should indicate how much flow was released prior to any adjustments being made. Based on the report and the Commission's evaluation of the incident, the Commission should reserve the right to require modifications to project facilities and operations to ensure future compliance.

The licensee should be required to install embedded poles, or chiseled and marked rock outcrops, for use with its video equipment that clearly delineate changes in flow. The embedded poles or rock outcrops should be rated precise enough to determine how much flow is being released or under released. Further, the licensee should be required to install a staff gage in each of the two pools immediately below the low level gate discharges that can be observed by the project operator during routine inspections. The staff gage should be rated at the same time the embedded poles are rated.

features at the project and are currently operating. The proposed video camera monitoring equipment will be installed within 6 months of the plan approval by the Commission.

Reporting

Short duration (less than 24-hour) interruption of minimum flows may occur during cleaning or maintenance to the fish passage system or gates. Woronoco staff will limit planned interruptions, if required, to no more than one 12-hour period. Anticipated interruptions above the 12-hour period will be coordinated with the USFWS and MDFW prior to implementation of the interruption. Whenever feasible, the gate settings will be increased to maintain the required release amounts.

The licensee will notify the Commission within 10 days of any deviation of impoundment fluctuation or minimum flow requirements. The notification will include a discussion of the reasons for the deviation and the corrective actions taken by the licensee. The licensee will consult with the MDFW and USFWS regarding the incident and corrective measures. A report regarding the incident will be filed with the Commission within 30 days of the incident and after consultation with the resource agencies. A copy of the report will be provided to the resource agencies. The report will contain, to the extent possible, the cause, severity, and duration of the incident and any observed or reported adverse environmental impacts resulting from the incident. The report will also provide pertinent project data and a description of corrective measures.

Data on impoundment elevation, unit output, flow release gate settings, and fish passage operational status would be made available to the USFWS, MDEP, MDFW or USGS within 30 days of the agency's request.

AGENCY COMMENTS

By letters dated May 5, 2004, the licensee requested comments on its plan from the USFWS, MDEP, MDFW, and USGS. The licensee held a conference call on May 10, 2004, in which all parties attended, except the USFWS and USGS, and concurred with the licensee's plan. The USGS, by correspondence dated May 13, 2004, concurred with the plan.

The USFWS, by letter dated May 24, 2004, provided comments and recommendations on the proposed plan. The USFWS states the plan was unclear as to whether the PLC makes reservoir elevation adjustments automatically or just once every hour. The USFWS recommends adjustments should be made more frequently than once per hour. The USFWS also recommends daily inspection of the facility, including weekends, to assure the gate openings are not clogged with debris. The USFWS states that if, based on a long period of monitoring, the licensee can demonstrate by operator

impoundment levels for the gate discharge. In addition, the downstream passage system is checked daily during the week for debris accumulation during the season when trash is likely to clog the intake racks and weekly in other seasons, or will be checked more frequently if monitoring results indicate an increased level of monitoring is required. Monthly visual confirmation of the gate setting through the use of paint marks will document proper gate openings since daily gate operation is not required and the gates are manually operated and locked at all times. The free discharge from the gates and passage system will be documented through the use of visual observations downstream of the gates at the confluence of the bypass reach sections.

The licensee will install a video camera downstream of the confluence of the north and south channels to document flow releases through the bypass reach. The confluence area will be provided with a chiseled and marked rock outcrops or embedded poles visible with the camera. The camera will have the capability of zoom and pan to permit closer inspection of water level markings. Camera output will be provided to Woronoco hydro staff for hourly weekday recordings and spontaneous confirmation of the discharge. Weekend hourly recordings will also be obtained and reviewed. Water level recordings will be performed the following Monday to determine if a reduction in flow occurred and to maintain documentation.

A one-time calibration of the water level marks will be conducted upon camera installation with all discharge mechanisms free of debris and properly set. Resource agency staff assistance and review will be solicited during calibration to ensure agency objectives are met. During the calibration effort, a sensitivity review of the system will be conducted to determine the ability to detect small changes in the discharge rate of the passage systems due to debris clogging or similar events. In addition, the potential for water flow from one channel artificially raising water levels in the adjacent channel near the proposed water level mark will also be reviewed. The discharge systems will be shut or otherwise adjusted to determine if flows from one channel impact water levels in the adjacent channel at the water level mark locations. As required, the water level marks will be adjusted to address the impacts if present.

All markings, including the gate operating stems, will be repainted annually or more frequently if required for adequate confirmation of settings. Woronoco hydro staff will be dispatched to the project should camera observations note inadequate flow releases. As appropriate, maintenance personnel will clean or re-adjust the gate or passage areas to restore required releases.

Schedule

The impoundment level monitoring and unit control system is currently installed and operational at the project. Impoundment level data is being continuously recorded on an hourly basis and archived as required. The minimum flow devices are existing

Minimum Flow

Subsequent to license issuance, the licensee met with the resource agencies on October 22, 2002, and determined that minimum flow releases would be provided through existing gate structures. The minimum bypass flows have been discharged from the gates continuously since that date. The use of notches was abandoned due to the potential clogging, and to prevent unintended fish passage through the notches that could result in unnecessary impact to fish from rock outcrops or depositing fish into a non-passable or shallow watered area when there is no spill occurring at the dam to mitigate such an event.

Minimum flow releases into the north channel are provided through the continuous operation of a manually operated deep (mud) gate located on the north abutment. Calculations to determine the required gate opening were provided to and approved by the USFWS. The north channel gate is required to be opened 2.6 inches. A paint mark has been added to the operating stem for easy detection of the gate opening. Daily adjustments to the gate settings will not be required.

Minimum flow releases into the south channel are provided through the continuous operation of the downstream fish passage system and a manually operated deep (mud) gate located near the middle of the northern section of the south dam. The downstream fish passage system is a free-surfaced open channel flow structure with no flow control gate. Discharge through the fish passage system is constant with the impoundment level and has operated continuously for several years. The downstream passage flows during the winter conditions result in significant ice accumulation. Flows through the passage system will be discontinued annually between December and "ice-out" conditions or when river temperatures reach 5 degrees Celsius. Minimum flow amounts into the south channel will be maintained through increasing the deep gate opening. Calculations to determine the required south gate opening were provided to and approved by the USFWS. The south channel gate is required to be opened 1.125-inches to pass the required 15 cfs flow. A paint mark has been added to the operating stem for easy detection of the gate opening. Daily adjustments to the gate settings will not be required.

The forebay has been equipped with a dewatering device to permit unit repairs. Leakage through the dewatering device is discharged through a low level gate near the downstream fish passage plunge pool. During forebay dewatering events, discharge through the downstream passage system will be discontinued and leakage flow will be provided through the area. All other river flows will be automatically discharged over the dams during a forebay dewatering effort.

The electronic documentation of the impoundment level through the PLC (noted above) confirms the discharge through the downstream passage system and proper

flows, as measured immediately downstream from the project tailrace, approximate the sum of inflows to the project impoundment.

Article 402 requires the licensee to release, from the Woronoco Project (north and south dams) a minimum flow of 57 cubic feet per second (cfs), or inflow, whichever is less, as measured in the separate channels of the bypassed reach, for the protection and enhancement of water quality, fisheries, and aquatic resources in the bypassed section of the Westfield River. The 57-cfs minimum flow must be released to the bypassed reach as follows: (1) 35 cfs in the south channel, as measured immediately downstream from the confluence of the south dam channel and downstream fish bypass channel; and (2) 22 cfs in the north channel, as measured immediately downstream from the north dam.

The licensee must release the south channel flow (35 cfs) through either the downstream fish passage facility (20 cfs) and a notch cut in the center of the south dam (15 cfs), or the notch in the south dam when the downstream fish passage facility is not operating (35 cfs). The north channel flow (22 cfs) must be released through a notch cut in the north dam. The licensee must consult with the MDEP, MDFW, USFWS, and the Commission's New York Regional Office (Division of Dam Safety) regarding the timeframe, location, and design of notches to be installed. The licensee must maintain the minimum flow release structures, as necessary, to ensure release of the 57-cfs minimum flow.

LICENSEE'S PLAN

Impoundment Fluctuation

The licensee indicates the project is equipped with a programmable logic control (PLC) based operating system that was installed before the license was issued and has been operating continuously since the fall of 2001. Impoundment levels are measured through the use of an electronic pressure transducer located upstream of the intake rack structure in the forebay. The pressure transducer is located upstream of the forebay stoplog structure in a sheltered area on the dam side unaffected by flows. A second transducer is located behind the project's intake trash racks. The transducers are calibrated annually. The PLC automatically adjusts the unit settings based on the transducer input to maintain the impoundment level within 1-inch of the target elevation. The elevation data is automatically electronically recorded hourly by the control system. In the event of loss of power or the impoundment level dropping below the target elevation, the system shuts down the unit (and alarms station operating personnel) causing all flows to pass over the dam into the bypassed reach. The licensee states documentation of maintenance of the impoundment elevation at the target elevation will satisfy the requirements of articles 401 and 403.

The project operations monitoring plan is to include provisions consistent with the emergency notification requirements for run-of-river operation and the bypass minimum flow required by this license. In addition, should impoundment elevations or bypass minimum flows, as measured according to the approved monitoring plan, fall below the levels required by this license, the plan is to include a provision whereby the licensee files with the Commission a report of the incident within 30 days of the incident. The licensee must prepare the report in consultation with the Massachusetts Division Fisheries & Wildlife (MDFW) and the U.S. Fish and Wildlife Service (USFWS).

The report must, to the extent possible, identify the cause, severity, and duration of the incident, and any observed or reported adverse environmental impacts resulting from the incident. The report also shall include: (1) operational data necessary to determine compliance with this article; (2) a description of any corrective measures implemented at the time of the occurrence and the measures implemented or proposed to ensure that similar incidents do not recur; and (3) comments or correspondence, if any, received from the MDFW and the USFWS regarding the incident. Based on the report and the Commission's evaluation of the incident, the Commission reserves the right to require modifications to project facilities and operations to ensure future compliance.

The licensee is to prepare the project operations monitoring plan in consultation with the MDEP, the MDFW, the USFWS, and the U.S. Geological Survey (USGS). The licensee is to include, with the plan, documentation of agency consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on site-specific information.

The Commission reserves the right to require changes to the plan. No ground disturbing or land-clearing activities for installation and use of monitoring devices can begin until the licensee is notified the plan is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

RELATED REQUIREMENTS

Article 401 requires the licensee to operate the Woronoco Project in a run-of-river mode, with a target elevation of 229.0 feet National Geodetic Vertical Datum, for the protection and enhancement of water quality, fisheries, and aquatic resources in the Woronoco impoundment and the Westfield River downstream from the project. The licensee must, at all times, act to minimize the fluctuation of the impoundment water surface elevation by maintaining a discharge from the project so that, at any point in time,

20040727-3005 Issued by FERC OSEC 07/27/2004 in Docket#: P-2631-017

UNITED STATES OF AMERICA 108 FERC ¶ 62,092
FEDERAL ENERGY REGULATORY COMMISSION

Woronoco Hydro, LLC Project No. 2631-017

ORDER MODIFYING ANDAPPROVING IMPOUNDMENT FLUCTUATION AND MINIMUM FLOW MONITORING PLAN UNDER ARTICLE 403

(Issued July 27, 2004)

On May 14, 2004, Woronoco Hydro, LLC (licensee) filed its impoundment fluctuation and minimum flow monitoring plan under article 403 of the license for the Woronoco Project (FERC No. 2631). The project is located on the Westfield River in the town of Russel, Hampden County, Massachusetts.

ARTICLE 403 REQUIREMENTS

Article 403 requires the licensee to file, for Commission approval, a project operations monitoring plan to monitor run-of-river operations, as well as the minimum bypassed flow and downstream fish passage flow, as required by Articles 401 and 402, respectively. The plan must provide a means to independently verify compliance with run-of-river operation and the bypass minimum flow requirements of this license. The plan must identify the monitoring methods and locations of monitoring devices necessary to ensure that the project is operated in a manner consistent with Article 401 and the bypass flow is released in a manner consistent with Article 402.

The plan must include, at a minimum: (1) a provision for maintaining the impoundment elevation at 229.0 feet National Geodetic Vertical Datum (NGVD) and notifying the Massachusetts Department of Environmental Protection (MDEP) when the impoundment elevation falls below 229.0 feet NGVD; (2) the planned locations of the elevation and flow measuring devices; (3) specific measures that would ensure that the monitoring system would operate under all conditions (including loss of external electric power to the project); (4) the design of the devices, including any pertinent hydraulic calculations, technical specifications of proposed instrumentation, erosion and sediment control measures, as appropriate, and design drawings of the system; (5) a description of the relative extent of manned versus automatic operation of the monitoring equipment; (6) a description of the methods and schedule for calibrating the monitoring equipment; (7) the method of flow data collection, a means for recording (hourly) and reporting (yearly) impoundment elevations, and provisions for providing data to the regulatory agencies in a timely manner; and (8) a schedule for installing all elevation and flow measuring devices, as appropriate, and implementing the plan.

Appendix P: MDFW Letter to LIHI about Woronoco Hydro LLC Project's Qualification for LIHI Certification

Woronoco Hydro LLC
Attn: Peter Clark, Manager
P.O. Box 149 A
Hamilton, Massachusetts 01936
(Phone)- (978) 468-3999
(Fax) - (978) 468-1210
pclark@swiftriverhydro.com

Low Impact Hydropower Institute
34 Providence Street,
Portland, ME 04103

December 15, 2009

Dear Sirs:

Woronoco Hydro LLC is currently in contact with Massachusetts Department of Fisheries and Wildlife regarding their conditional approval of Woronoco Hydro for Low Impact Hydro Certification. We held a meeting with Dr. Caleb Slater of the MDFW on December 9, 2009 in which he promised to submit a conditional approval of Woronoco Hydro. The MDFW required a review period for their decision and when Woronoco Hydro LLC receives correspondence back from Dr. Slater it will be forwarded to the Low Impact Hydro Institute. If you have any further questions please don't hesitate to contact me.

Sincerely,

Peter B. Clark

Manager,

Woronoco Hydro LLC