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FEDERAL ENERGY
REGULATORY COMMISSION

February 19, 1999

Mr. David P. Boergers, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, DC 20426

Subject: *Request for Extension of Time -- Articles 404, 405, and 406*
City of Crystal Falls Hydroelectric Project; FERC Project No. 11402-023
Crystal Falls, Michigan

Dear Mr. Boergers:

On behalf of the City of Crystal Falls (City), Michigan, we are hereby filing one original and eight copies of the City's *Request for Extension of Time* concerning Articles 404, 405, and 406 of the Crystal Falls Hydroelectric Project. Copies have been sent to the project's official service list. Proof of service is also included.

Thank you for your consideration in this matter. If you have any questions, please contact me.

Sincerely,

MEAD & HUNT, Inc.

Arie DeWaal
Senior Project Scientist

Enclosures

cc: Official Service List

9902250222-3

FERC DOCKETED

FEB 24 1999

Certificate of Service

I hereby certify that I, on behalf of the City of Crystal Falls, Michigan, have this day served the foregoing document upon each person designated on the official service list compiled by the Secretary in this proceeding.

Dated this 19th day of February, 1999.

A handwritten signature in cursive script, reading "Arie De Waal", positioned above a horizontal line.

Arie De Waal
MEAD & HUNT, Inc.

Service List

Crystal Falls Hydroelectric Project

FERC Project No. 11402-023

Mr. David P. Boergers, Secretary Federal Energy Regulatory Commission 888 First Street, N.E. Washington, DC 20426	Mr. Ashok K. Rajpal Mead & Hunt, Inc. 6501 Watts Road, Suite 101 Madison, WI 53719-2700
Ms. Carol L. Sampson, Director Division of Project Review Office of Hydropower Licensing Federal Energy Regulatory Commission 888 First Street, N.E. Washington, DC 20426	Ms. Janet Smith U.S. Department of the Interior U.S. Fish & Wildlife Service 1015 Challenger Court Green Bay, WI 54311
Mr. Charles Nordman, City Manager City of Crystal Falls 401 Superior Avenue Crystal Falls, MI 49920	Mr. Don Henne Regional Environmental Officer U.S. Department of the Interior Office of the Secretary Office of Environmental Policy & Compliance Custom House, Room 217 200 Chestnut Street Philadelphia, PA 19106-2904
Mr. Tom Dean Federal Energy Regulatory Commission 888 First Street, N.E. Washington, DC 20426	Ms. Jan Fenske FERC Program Manager Michigan Department of Natural Resources Stevens T. Mason Building 530 West Allegan Lansing, MI 48933
Mr. Stanley Pruss Michigan Department of Natural Resources Environmental Protection Division Knapp's Office Centre, Suite 530 300 South Washington Lansing, MI 48913	
Ms. Priscilla A. Wilfahrt U.S. Fish & Wildlife Service Office of the Field Solicitor 1 Federal Drive, Room 686 Fort Snelling, MN 55111-4007	

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FEDERAL ENERGY
REGULATORY COMMISSION

**United States of America
Federal Energy Regulatory Commission**

City of Crystal Falls, Michigan

**Project No. 11402-023
Michigan**

**Request for Extension of Time of
City of Crystal Falls, Michigan**

Introduction

By Order dated October 18, 1995, the Federal Energy Regulatory Commission ("Commission" or "FERC") issued a minor project license to the City of Crystal Falls (City), Michigan, for its 1.00 megawatt (MW) Crystal Falls Project, located in the State of Michigan on the Paint River.

By Order dated February 27, 1998, the Commission modified and approved a barrier net effectiveness monitoring plan, which was required under Article 406 of the license for the Crystal Falls Hydroelectric Project. A copy of the Order is included herein as Appendix 1.

Article 406 was developed by the Commission in conjunction with Article 405 (see Appendix 2, included herein) of the license to address fish entrainment at the Crystal Falls Hydroelectric Project. Article 405, which was approved by the Commission on May 10, 1996, involves the construction, installation, and monitoring of a barrier net.

In addition, by Order dated April 10, 1997, the Commission approved a water quality monitoring plan, which was required under Article 404 of the license for the Crystal Falls Hydroelectric Project. A copy of the Order is included herein as Appendix 3.

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On March 24, 1998, the City filed a request for rehearing of the Commission's order approving, with modifications, the City's barrier net effectiveness monitoring plan (Article 406 of the license). Because Article 405 of the license (design and construction of a barrier net) is directly related to Article 406, the City's request for rehearing entailed the City of Crystal Falls respectfully requesting the Commission to eliminate Article 406 (and subsequently, Article 405) from the license.

On February 2, 1999, the Commission issued an Order Denying Rehearing concerning the City's March 24, 1998, request. A copy of the Order is included herein as Appendix 4.

In its February 2, 1999, Order, the Commission ordered the City to install and have the barrier net operational on May 1, 1999. The Commission further ordered the City to file documents with the Commission to verify installation and operation of the barrier net by May 10, 1999.

The City of Crystal Falls, Michigan, respectfully requests that the Commission grant an extension of time concerning the implementation of Articles 404, 405, and 406 of the license issued on October 18, 1995.

The Commission-approved plan for installation and monitoring of a barrier net (Article 405) indicates the need to conduct flow and bottom contour studies prior to final design and construction of the barrier net. This work effort cannot be done until the ice-free period. Given current conditions at the project site, it is estimated that the necessary information cannot be collected until an approximate May 1-15, 1999, time frame. This alone would not meet the May 1, 1999, and May 10, 1999, dates ordered in the Commission's February 2, 1999, Order Denying Rehearing.

The City of Crystal Falls, Michigan, respectfully proposes the following schedule for implementation of Article 405:

May 1, 1999 to May 15, 1999	Conduct flow and bottom contour study.
May 15, 1999 to August 1, 1999	Final design, construction, and installation of a barrier net.
August 10, 1999	The City of Crystal Falls files documents with the Commission to verify installation and operation of the barrier net.

The Commission-approved plan for monitoring barrier net effectiveness (Article 406) indicates that if the barrier net is not deployed for the first time until after July 1, then initiation of the effectiveness study would not begin until the following May, upon reinstallation of the barrier net following ice-out. The City's current anticipated installation date of the barrier net is August 1, 1999. As a result, the City of Crystal Falls, Michigan, respectfully proposes the following schedule for implementation of Article 406.

August 1, 1999 to October 15, 1999	Installation of barrier net and testing to make sure barrier net is functionally operational.
October 15, 1999 to October 31, 1999	Removal of barrier net.
May 1, 2000 to October 31, 2000	Installation of barrier net, barrier net effectiveness monitoring, removal of barrier net.
May 1, 2001 to October 31, 2001	Installation of barrier net, barrier effectiveness monitoring, removal of barrier net.

The Commission-approved plan for water quality monitoring (Article 404) indicates that water quality would be conducted in conjunction with the barrier net effectiveness study (Article 406). As a result, the City of Crystal Falls, Michigan, respectfully proposes to begin the water quality monitoring program May 1, 2000.

Conclusion

For the reasons set forth above, the City of Crystal Falls, Michigan, respectfully requests the Commission to grant an extension of time for implementing the Commission-approved plans associated with Articles 404, 405, and 406. The proposed time frames associated with each Article (404, 405, and 406) are outlined in the *Introduction* portion of this document.

Respectfully submitted,

MEAD & HUNT, Inc.

A handwritten signature in cursive script, reading "Arie DeWaal", written over a horizontal line.

Arie DeWaal
Consultant for
City of Crystal Falls, Michigan

Arie DeWaal
MEAD & HUNT, Inc.
6501 Watts Road, Suite 101
Madison, WI 53719-2700
Telephone: (608) 276-6380

APPENDIX 1

City of Crystal Falls)
Project No. 11402-008

ORDER MODIFYING AND APPROVING BARRIER NET EFFECTIVENESS
MONITORING PLAN

(Issued February 27, 1998)

On October 8, 1996, the City of Crystal Falls (Licensee) filed a revised barrier net effectiveness study plan. The plan is required under article 406 of the License for the Crystal Falls Project, 1/ located on the Paint River in Iron County, Michigan.

Article 406 requires the Licensee to file, for Commission approval, a plan for post-construction studies to monitor the effectiveness of the barrier net to reduce entrainment of fish into the turbine intake. The monitoring plan must include, at a minimum, a schedule for: (1) implementation of the plan; (2) consultation with the appropriate Federal and state agencies concerning the results of monitoring; and (3) filing the results, agency comments, and the Licensee's response to the agency comments with the Commission. The Licensee was to prepare the plan after consultation with the United States Department of Interior (DOI) and the Michigan Department of Natural Resources (MDNR).

BACKGROUND

On April 12, 1996, the Licensee filed a barrier net effectiveness study plan. 2/ In that plan the Licensee proposed to perform an entrainment study to assess the number, species, and size of fish passing through the project turbines after the barrier net was in place. The Licensee proposed to use a single net to sample the entire tailrace flow of the project, and to use electrofishing within the netted tailrace to improve recovery rates from the deep areas and draft tubes. MDNR, in a letter dated April 9, 1996, questioned the use of a single net to sample rates from the deep areas and draft tubes. MDNR, in a letter dated April 9, 1996, questioned the use of a single net to sample all the turbine units and the usefulness of electrofishing as an aid in recovery of entrained fish.

1/ 73 PERC 62, 036 (1995).

2/ The Commission approved the design of the barrier net on May 10, 1996. The approved design of the barrier net includes two, 100-foot-long sections of 4-inch net enclosing 9,000 square feet of the south corner of the project impoundment, where water depths range from 12 to 20 feet.

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In an August 7, 1996 letter to the Licensee, the Commission described methods used in other barrier net effectiveness studies conducted in recent years at the Pine (FERC No. 2486) and Ludington (FERC No. 2680) projects in Michigan. These studies used fish sampling conducted both upstream and downstream of the barrier net to evaluate the effect of the net on fish abundance in the vicinity of the project intake. The Commission's letter suggested that the Licensee consider these methods and either (1) justify the selection of the originally proposed plan in light of other alternatives, or (2) submit a revised plan.

LICENSEE'S PROPOSED PLAN

The Licensee filed a revised plan on October 8, 1996, in which they proposed to use a variety of fish collection nets including gill nets, trap nets, and a purse seine to collect fish in the 9,000-square-foot area between the barrier net and the powerhouse. The Licensee recognizes that each of the proposed sampling methods contains biases for type and size of species and proposes this combination of sampling nets to collect the variety of species common to the Paint River.

The Licensee also proposes to release tagged fish inside the 9,000-square-foot barrier net enclosure to determine the effectiveness of the sampling gear to collect fish. Native fish would be collected from the impoundment by electrofishing the evening before the fish release. Native fish collected would be tagged and held until 12 hours prior to a trap net or gill net set or 1 hour prior to a purse seine collection. The released fish would be used to determine the effectiveness of the sampling gear to collect fish in the 9,000-square-foot barrier net enclosure.

The proposed testing schedule includes twice-per-month sampling efforts for each gear type over the six months of the year (May through October) that the barrier net is deployed. The Licensee would conduct the study over two seasons of barrier net deployment.

AGENCY COMMENTS AND LICENSEE'S RESPONSE

In a letter dated November 1, 1996, MDNR stated that the revised plan would not identify the rate of fish passage through the net or entrainment through the project fish barrier. MDNR states that the revised plan will only identify fish between the barrier net and the intake. Although MDNR questioned the suitability of the sampling gear types selected by the Licensee to conduct the study, it provided no detailed analysis of the study plan. MDNR recommended a meeting among the agencies, the Licensee, and the Commission to jointly develop a study plan that addresses their concerns. MDNR also states that it will need to know how much

money the licensee will commit to the study, and how much the effort would cost.

In a letter dated November 5, 1996, DOI states that the revised plan does not meet the study objectives for determining the rate of fish passage through the barrier net and the numbers of fish entrained through the Crystal Falls Project. DOI also recommended a meeting to resolve issues related to the objectives of the study plan.

By letter dated November 13, 1996, the licensee stated that they believe the revised study plan is adequate and made no additional revisions to the proposed plan.

DISCUSSION AND CONCLUSIONS

The intent of the license article is to document the effectiveness of the barrier net in preventing fish from being entrained into the turbine intakes. The MNR stated that the licensee's plan would only identify fish between the barrier net and the intake, rather than providing an estimate of the rate of fish passage through the net. We agree that sampling only inside the 9,000-square-foot area between the barrier net and the intake, as the licensee proposed, will not provide enough information to obtain an estimate of the numbers of fish crossing the barrier net. An appropriate method of obtaining this estimate is sampling to determine the relative abundance of fish inside and outside of the barrier net.

The licensee's proposed fish collection methods will provide the information needed for inside the barrier net, but not outside. The same type of sampling outside of the net is necessary for comparison to the number and types of fish caught inside the barrier net, in order to get an accurate measure of the relative abundance of fish. Therefore, we will require the licensee to conduct sampling using equivalent fish collection methods and frequencies outside the barrier net as described in the plan for the sampling conducted inside the barrier net enclosure.

The licensee's plan does not contain a schedule for reporting the results of the study to the agencies and the Commission, and should be modified to include one. The licensee should provide the agencies a draft interim report for their review and comment by February 1 of the year following the first year of study. The final interim report should be filed with the Commission by April 1 of that year. The report should include copies of agency comments, as well as, for Commission approval, any proposed modifications for the second year of the study. Similarly, a draft final report should be provided to the agencies by February 1 following the second year of the study and

the final report should be filed with the Commission by April 1 of that year. The final report should include copies of agency comments as well as any recommendations, for Commission approval, for further study, if needed, or changes to the barrier net or other project structures or operation needed for the protection of fishery resources.

The licensee's proposed plan for monitoring the effectiveness of the barrier net to reduce entrainment of fish in the turbine intakes, with the modification described above, satisfies the requirements of article 406. Therefore, the licensee's plan, as modified in ordering paragraph (B) below, is approved by this order.

The Director orders:

(A) The licensee's barrier net effectiveness plan filed October 8, 1996, pursuant to article 406, as modified by paragraph (B) below, is approved.

(B) The licensee shall conduct sampling using equivalent fish collection methods and frequencies outside the barrier net as described in the plan for the sampling conducted inside the barrier net enclosure.

(C) The licensee should provide the agencies a draft interim report for their review and comment by February 1 of the year following the first year of study. The final interim report should be filed with the Commission by April 1 of that year. The report should include copies of agency comments, as well as, for Commission approval, any proposed modifications for the second year of the study.

A draft final report should be provided to the agencies by February 1 following the second year of the study and the final report should be filed with the Commission by April 1 of that year. The final report should include copies of agency comments as well as any recommendations, for Commission approval, for further study, if needed, or changes to the barrier net or other project structures or operation needed for the protection of fishery resources.

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

Carol L. Sampson
 Director
 Office of Hydropower Licensing

APPENDIX 2

City of Crystal Falls
Project No. 11402-005ORDER MODIFYING AND APPROVING PLAN FOR THE INSTALLATION
AND MONITORING OF A BARRIER NET
(Issued May 10, 1996)

The City of Crystal Falls (Licensee) filed, on February 12, 1996, a proposal for the installation and monitoring of a barrier net under article 405 of the license for the Crystal Falls Hydroelectric Project (FERC No. 11402), located on the Paint River in Iron County, Michigan. /

BACKGROUND

A. Project Description

The project consists of a 270-foot-long, 16-foot-high concrete gravity dam with a 92-foot-long ungated overflow spillway and a 101-foot-long gated spillway topped with four radial steel gates. The project impoundment has a surface area of about 100 acres and a storage capacity of 990 acre-feet at water surface elevation 1,333.69 feet National Geodetic Vertical Datum. The powerhouse contains three turbine generators with a combined installed capacity of about 1,000 kW.

B. Article Requirements

Article 405 requires the licensee, within four months of license issuance, to file with the Commission, for approval, a plan for the installation and monitoring of a barrier net to reduce the entrainment of resident fish. The plan must also include, at a minimum, the following items: (1) data on water velocities in the proposed location of the barrier net; (2) functional design drawings of the barrier net; (3) a schedule for the installation and removal of the barrier net in the spring and fall to coincide with deployment and removal of the fishboards; and (4) methods and schedule of net maintenance including periodic brushing and backflushing using the spill gates. The licensee is to prepare the plan after consultation with the U.S. Fish and Wildlife Service (FWS) and the Michigan Department of Natural Resources (MDNR).

Article 406 requires the licensee, within six months of plan for post-construction studies to monitor the effectiveness of the barrier net to reduce entrainment of fish in the turbine

intakes. The monitoring plan must include, at a minimum, a schedule for: (1) implementation of the plan; (2) consultation with the appropriate federal and state agencies concerning the results of monitoring; and (3) filing the results, agency comments, and licensee's response to agency comments with the Commission. The licensee is to prepare the plan after consultation with the FWS and the MDNR. The Commission reserved the right to require changes to these plans. Upon Commission approval, the licensee shall implement the plans, including any changes required by the Commission.

C. Licensee's Preliminary Net Design

During the relicensing process, the licensee provided a preliminary barrier net design that included placing the net with a configuration aligned along the existing outer log boom. This net would have been approximately 100 feet long with a maximum depth of 20 feet. The proposed net material was knotted nylon with one-half-inch square mesh. A flow rate model and bottom contour study was conducted to provide information regarding the feasibility of placing a barrier net along the outer log boom. The results of the flow rate model indicated that flow velocities through portions of the barrier net would reach about 1.20 feet per second (fps), but with much of the net area having flows less than 0.90 fps. These estimates would apply when the plant was at or near maximum capacity, which occurs usually during April, May, part of June, and October.

The Environmental Assessment (EA) prepared by Commission staff related to the relicensing of the Crystal Falls Project identified that the estimated flows through the preliminary barrier net design would probably result in impairment of problems. / The EA recommended that a larger net, situated farther from the intake structures, would be more effective.

LICENSEE'S PLAN

A. Net Configuration

The licensee proposes to construct a barrier net with basic characteristics similar to that proposed during relicensing. The licensee proposes a modified configuration to lessen flow rates through the net by putting a jog in the net to place it further

2/ The EA prepared for the Crystal Falls Hydroelectric Project is dated October 18, 1995, and is attached to the license.

from the turbine intakes. 3/ This design would require the construction of two 100-foot-long nets; the two segments would be joined at an anchor point approximately 90 feet from the nearest intake structure. The angle of the net to the river flow should not pass most of the debris toward the spillway and reduce net clogging.

The licensee states the proposed configuration of the barrier net would extend the distance of the net from the higher

flow areas to a distance considerably greater than those provided in the preliminary design. The preliminary design would have placed the net at a distance of only about six feet from the closest point of intake #3 and about 25 feet from the other two intakes. These distances, according to the licensee, placed large portions of the net within an area of flow velocities shown to exceed 1.0 fps (i.e., from 28 feet to 60 feet along the observation line). The new configuration would extend the distance of the net, as measured parallel to the direction of water flow, to more than 100 feet from the intake structures. The portions of the net that would be nearer than this to the intakes would not be perpendicular to the water flow, and also are generally removed from the area of higher flows along the observation line (i.e., flows less than 0.4 fps). The licensee estimates that no portions of this new barrier net design would be subjected to flow rates above 0.5 fps during the highest expected flow velocities at the turbine intakes.

The licensee states it would be necessary to conduct flow and bottom contour studies along the line of the new net configuration during the ice-free period of 1996. These studies would confirm that estimated maximum through goal of not greater than 0.5 fps in any portion of the net, and generally less than 0.1 fps for most of the net surface. If these studies indicate that flows through the proposed net configuration are in excess of these goals, then alternative net configurations would be evaluated at further distances from the intakes to indicate the location for a net configuration that would achieve the velocity goals. The river bottom mapping used to provide a new flow model would also be used to determine the exact shape of the barrier net.

H. Net Construction and Installation

The net would consist of knotted one-half inch square mesh strand coated with an anti-fouling compound. The exact vertical projection extends away from Intake No. 3. As referred to here, the net is positioned in a V-shape such that the

dimension of the net would be determined following detailed bottom contour mapping along the line of deployment to be conducted prior to finalization of this plan during 1996. The height of the net would be sized to match the bottom contour within an additional four feet to allow for current induced bow and provide a skirting of heavier netting to provide a good seal between the net and the river bottom. Link steel chain would be sewn into the bottom of the net to provide a weight of approximately two pounds per linear foot to keep the skirting firmly against the bottom.

A new log boom, with a raised walking and work platform, would be installed along the line of the net configuration. The top of the net would be fastened at 10-foot intervals to large eyebolts on the downstream face of the log boom. The upstream portion of the log boom, which would be aligned nearly perpendicular to the current, would be anchored with concrete-filled 55-gallon drums spaced at approximately 20-foot intervals. These anchors would be located at sufficient distance upstream of the log boom to provide a 45-degree angle on the log boom anchor cable. The junction point of the two sections would have two anchors to increase the support of this point on log boom configuration stability. Because the downstream portion of the log boom, which would be attached to the dam, is nearly parallel to the current, it would not require a strong anti-current anchor log boom. The licensee proposes to locate concrete-filled 55-gallon drums spaced approximately at 33-foot intervals; these anchors would be located nearly directly below the log boom, having no anchor fetch line.

The log boom would be designed to safely support the entire weight of the net as well as up to four maintenance personnel simultaneously. Floating poles and high density styrofoam billets. The boom platform would be no less than four feet wide and have a four foot high safety railing. The upstream face of the log boom will be covered with pressure-treated plywood to a depth of approximately four feet to facilitate skidding of snags and other debris to prevent large floating logs from entrapment in the net.

C. Barrier Net Operation, Maintenance, and Monitoring

Vertical lines would be attached to the bottom of the net at ten foot intervals to facilitate the periodic raising and redeployment of the net for cleaning and inspection. The licensee proposes that the net be raised periodically to inspect and brush any accumulated debris from the net. A four-foot-deep pressure-treated plywood backing on the downstream side of the styrofoam billet may be installed to serve as a scrubbing surface. As the

net is raised, in four-foot sections, brooms will be used to brush the net along this plywood surface. An initial trial period of one or two years may refine the method of scrubbing the net, as well as provide information for design of a suitable inspection and cleaning schedule. The licensee states it would also be necessary, especially during a 1- or 2-year trial period, to have a diver periodically inspect the net and all supporting materials, including the anchor lines and weights, to ensure that the net and its supporting structure are maintaining their design proportions with time and flow stresses.

Additional lines would be installed, also at the ten foot intervals specified for net raising, to allow the entire net to be removed from the river for seasonal storage and repair. The licensee proposes to remove the net for winter storage just prior to winter ice-over and to re-deploy immediately following the spring ice melt. The timing of these operational events would depend upon seasonal variation, but the licensee anticipates that the net should be deployed between May 1 and November 1. The licensee recommends that the spring deployment of the net occur approximately the same time as the spring installation of flashboards.

AGENCY COMMENTS

The FWS, in a February 5, 1996, telephone conversation with the licensee, stated it had received a copy of the MNR's comments and concurred with those comments; and that it had no further comments.

The MNR, by letter dated February 2, 1996, commented on the licensee's plan. The licensee incorporated all but three of the MNR's comments into the plan filed with the commission. By letter dated March 18, 1996, the MNR concurred with the licensee's incorporation of its comments into the plan except for three points: (1) the frequency of net inspection in the first year; (2) the availability of a spare net; and (3) net cleaning and repair criteria.

The MNR states a more intensive underwater monitoring and net cleaning program in the first year is necessary to ensure the net will physically perform as designed. The MNR recommends the net be cleaned and examined underwater on a bi-weekly and as needed basis. The MNR also recommends the licensee keep one full spare net on hand in case of a major net failure. The MNR states this will allow for the prompt reinstallation of fish protection at the site instead of waiting for weeks or months before a new net is delivered and installed.

Further, the MNR recommends that a set of criteria be developed for net cleaning and repair. The MNR states this is

DISCUSSION AND CONCLUSIONS

As discussed in the EA, the project impoundment and the corresponding upstream aquatic habitat are suitable for supporting fish species with seasonal migratory habits such as walleye, smallmouth bass, pike, and muskellunge. These migratory species may move downstream seasonally to seek alternative feeding or overwintering habitat. These fish may then be susceptible to entrainment in the turbines at the Crystal Falls project. Thus, prior to relicensing, the licensee proposed to install a barrier net.

The EA noted that the licensee's preliminary design may be effective with certain modifications. The EA indicated that by: (1) making the net larger; (2) anchoring the net further upstream; and (3) tying the downstream end of the net to the pier between gates 1 and 2 or 2 and 3, or putting a jog in the net to put the net further from Intake No. 3; an effective barrier net should be feasible.

The EA also identified the need for the licensee to evaluate the effectiveness of the barrier net once it is installed. As cited in the EA, an effectiveness evaluation would determine the rate and numbers of fish that are passing through the barrier net. 4/ This would help determine if mitigation is effective and continued net maintenance is justified. The EA notes that a two-season evaluation would be necessary. In the first year, site-specific maintenance issues may be identified but may plan net effectiveness until maintenance is updated to include any unforeseen events for the second year of the study.

The licensee's filing incorporates the comments provided in the EA into the barrier net plan. The licensee's proposal, as described above, will use a larger net anchored further upstream such that the net is positioned away from Intake No. 3. This design should ensure approach velocities less than 0.5 fps under the highest flow velocities at the turbine intakes, while average approach velocities are anticipated to be less than 0.1 fps for most of the surface of the barrier net.

4/ This recommendation was incorporated into article 400 of the project license.

The licensee states its schedule for cleaning, inspecting, and repairing the net is dependent on the results of the first year's observations. The licensee proposes to inspect the net daily from the log boom to determine the rate of debris accumulation and to raise the net at least once a month to inspect and clean. The licensee also proposes to have a diver inspect the net once each month. The MDR requests a more intensive underwater monitoring and net cleaning program during the first year.

The licensee's proposal to inspect the net daily to determine the rate of debris accumulation is essential during the first year. However, this visual inspection will be unable to determine the debris accumulation at the middle to bottom of the net; only the inspection conducted by the diver once a month will determine the debris accumulation at such depths. The underwater monitoring recommendation of every two weeks, as proposed by the MDR, would be more useful in determining the debris accumulation below the water surface. Further, underwater monitoring every two weeks would also provide additional information on whether the net design will properly seal the net bottom under all types of flow conditions. Therefore, the licensee should be required to conduct daily inspections from the log boom; to raise the net as often as necessary, but at least once a month, for cleaning and inspecting; and to conduct the underwater monitoring and inspection every two weeks for the first year of deployment; to develop a monitoring, cleaning, and inspection protocol.

From this first year of monitoring, cleaning, and inspecting the barrier net, the licensee should be able to develop a set of criteria and protocol for net cleaning and repair. This protocol can be refined during the second year of deployment the barrier net. A refined protocol and set of criteria will be important for consistent operation of the net over the years if the barrier net is found to be effective in preventing fish entrapment into the turbines. Therefore, the licensee should develop the net cleaning and inspecting protocol, in consultation with the MDR and the FWS, and file the protocol with the commission for approval, within 90 days of removing the barrier net after the first year of deployment. The agencies should be given 30 days to comment on the protocol, prior to the licensee filing the protocol with the commission. The licensee's response to the agencies' comments, The commission should reserve the right to require changes to the protocol. Upon commission approval, the licensee should implement the protocol, including any changes required by the commission.

As far as the MDR's recommendation that the licensee keep, at a minimum, one full spare net on hand in case of a complete net failure, we concur this will be necessary in the future if

The net effectiveness evaluation indicates the nets mitigation effectiveness is appropriate. For the two years of effectiveness testing, the licensee should not be required to keep a spare net. The licensee will be undertaking an intensive monitoring, cleaning, and repairing (if necessary) schedule during the first year of deployment. Therefore, the licensee should not have to have a spare net on hand during these first two years. If, from the results of the effectiveness testing, it is concluded that a barrier net is effective in preventing fish entrapment at the Crystal Falls project, the licensee should be prepared to keep a spare net, or sufficient pieces of netting, to repair or replace a damaged net.

The licensee's proposed barrier net plan, with the modifications described above, should be adequate to protect the fishery resources of the Paint River below the project and should, therefore, be approved.

The Director orders:

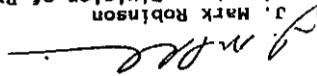
(A) The licensee's barrier net plan for the Crystal Falls project (PERC No. 11402), filed on February 12, 1996, as modified by paragraph (B) below, is approved.

(B) The licensee shall conduct daily inspections from the log boom; raise the net as often as necessary, but not less than once a month, for cleaning and inspecting; and conduct the underwater inspections every two weeks for the first year of deployment, in order to develop a monitoring, cleaning, and inspection protocol. The licensee shall develop the net cleaning and inspecting protocol, in consultation with the Michigan Department of Natural Resources and the U.S. Fish and Wildlife Service, and file the protocol with the commission for approval, within 90 days after removing the barrier net upon completion of the first year of deployment. The agencies shall be given 30 days to comment on the protocol, prior to the licensee filing the protocol with the commission. The licensee's response to the agencies' comments and the licensee's response to the agencies' comments, The commission reserves the right to require changes to the protocol. Upon commission approval, the licensee shall implement the protocol, including any changes required by the commission.

(C) Unless otherwise directed in this order, 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: DPCA, III-21.1
888 First Street, N.E.
Washington, D.C. 20426

In addition, the licensee shall serve copies of these filings on any entity specified in this order to be consulted on matters related to these filings. Proof of service on these entities shall accompany the filings with the commission.
(D) This order constitutes final agency action. Requests for rehearing by the Commission may be filed within 30 days of the date of issuance of this order, pursuant to 18 CFR § 385.713.



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

APPENDIX 3

Regarding reports, the MDRR requests that DO values be compared hourly to the state DO standard and delta temperature values be compared instantaneously. Plausible explanations for any deviations should be provided in the reports, along with a description of the effectiveness of any measures implemented to improve water quality. The MDRR also requests quarterly transmission of raw data along with information pertaining to the calibration of equipment during that quarter.

Other comments by MDRR were incorporated into the licensee's proposed plan.

DISCUSSION

The licensee's proposed water quality monitoring plan includes those requirements stipulated in article 404 of the license. Implementation of the proposed plan should enable the licensee to monitor the effects of project operation on water temperatures and DO. Calibration of the monitoring equipment according to manufacturer's recommendations, as proposed by the licensee, should be adequate to ensure accurate data are collected. To the extent practicable, the licensee should choose monitoring locations in coordination with the MDRR and FWS. Article 404 of the license states the purpose of the plan is to ensure that water quality below the project, maintain the Michigan standards for DO and water temperature. Further, article 404 requires the licensee develop operating procedures to address when deviations from state standards occur. Monitoring from June-September, as proposed by the licensee, encompasses the period when warmer temperatures are expected, thus affecting low DO. Therefore, deviations from state standards should be detected upon implementation of the licensee's proposed plan. However, monitoring for only two years, as proposed by the licensee, will not meet the purpose of the plan. Article 404 requires monitoring to ensure state water quality standards are met. The licensee cannot meet this goal if monitoring is discontinued.

Commission staff acknowledges that water quality data collected prior to licensing indicate project operations do not result in violations of the state water quality standards. 4/ If after implementation of monitoring, the data still indicates that project operations do not adversely affect water quality in the project area, the licensee may file a request to modify the water quality standards for the Cryстал Falls project, issued on October 18, 1995 (73 FERC ¶ 62,036).

4/ See the Environmental Assessment for Application for License for the Cryстал Falls project, issued on October 18, 1995

quality monitoring plan, as recommended by the MDRR. Any recommendations to amend the water quality monitoring plan should be filed for Commission approval, as discussed below.

Providing annual reports to the agencies and immediately contacting the FWS and MDRR upon detection of any deviation from the state standards, as proposed, should provide the agencies with the results of the monitoring in a timely manner. These reports should include, to the extent possible, explanations for any deviations and the effectiveness of any measures implemented to improve water quality, as recommended by MDRR. Quarterly reports of water quality data, as requested by MDRR, are not necessary. The licensee did not provide a schedule for submitting these reports to the agencies or to the Commission. The licensee should provide annual report(s) to these agencies by December 15 of each year of monitoring.

It is only necessary to provide the annual report to the Commission for the first three years of monitoring. Our review of the annual report for a three year period will allow us to evaluate water quality during project operations. The annual report to the Commission should be filed by February 15 of the year following monitoring. The filing should include agency comments, the licensee's response to agency comments, and any recommendations, for Commission approval, for modifying or discontinuing water quality monitoring. Each agency should be given 30 days to comment. If there are no changes to the water quality monitoring plan, the licensee should continue to provide the annual reports to the consulted agencies as identified in the licensee's proposed plan. So that the Commission can monitor compliance with article 404, the licensee should notify the Commission of any deviation from the state standards for DO and water temperature.

The MDRR recommends the licensee analyze data in real time to immediately determine if a problem in water quality exists. The licensee proposes to retrieve data biweekly. Given that the available data indicates no existing water quality problems, as discussed above, the licensee's schedule appears adequate. Further, when the licensee does detect a problem, the licensee plans to retrieve data daily, after contacting the agencies to determine what measures should be implemented in efforts to improve water quality. Therefore, the licensee can timely note any improvements in water quality resulting from any measures implemented.

The licensee proposes to consult with the FWS and MDRR to determine what measures are appropriate in efforts to improve water quality. The licensee specifies that the most likely measure to improve DO is to increase aeration. This should be adequate. However, if additional measures are necessary, or if the parties disagree on which measures are appropriate, the

Commission should determine which, if any, additional measures are necessary to improve water quality.

The licensee's water quality monitoring plan, with the modifications discussed, should be adequate to monitor the requirements of article 404 and should be approved.

The Director orders:

(A) The licensee's water quality monitoring plan, filed with the Commission on November 19, 1996, and supplemented on November 20, 1996, as modified in paragraph (B), is approved.

(B) The licensee shall monitor dissolved oxygen

concentrations and water temperature at the project for the remainder of the license term. The licensee shall file annual

reports with the Commission for the first three years of monitoring. These reports shall be filed by February 15 of the

year following monitoring and shall include agency comments, the licensee's response to agency comments, and any recommendations,

for Commission approval, on modifying the water quality monitoring plan.

(C) If DO or water temperature, as measured by the approved monitoring system, falls below that required by article 404, the

licensee shall file a report with the Commission within 30 days of the date the data becomes available indicating an incident has

occurred. The report should, 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 should include: (1) operational

data necessary to determine compliance with article 404; (2) 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; and (3) comments or

correspondence, if any, received from the resource agencies regarding the incident. Based on the report and the Commission's

evaluation of the incident, the Commission shall reserve the right to require modifications to project facilities and

operations to ensure future compliance.

(D) Unless otherwise directed in this order, 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: DDC, HL-11.2

888 First Street, NE

Washington, DC 20426

In addition, the licensee shall serve copies of these filings on any entity specified in this order to be consulted on matters related to these filings. Proof of service on these entities shall accompany the filings with the Commission. This order constitutes final agency action. Requests for rehearing by the Commission may be filed within 30 days of the date of issuance of this order, pursuant to CFR § 385.713.

Kevin P. Madden
Acting Director
Office of Hydropower Licensing

APPENDIX 4

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Before Commissioners: James J. Hoecker, Chairman;
Vicky A. Bailey, William L. Massey,
Linda Breathitt, and Curt Hebert, Jr.

City of Crystal Falls, Michigan)
Project No. 11402-023

ORDER DENYING REHEARING

(Issued February 2, 1999)

On March 24, 1998, the City of Crystal Falls, Michigan (City), filed a request for rehearing of a February 27, 1998 order of the Director of the Commission's Office of Hydropower Licensing (Director) approving, with modifications, the City's barrier net effectiveness monitoring plan for its 1-megawatt Crystal Falls Hydroelectric Project. The City argues that because of the economic hardship to the City of installing and monitoring the barrier net, it should instead be allowed to fund compensatory mitigation for fish mortality caused by entrainment of fish into the project turbines. For the reasons discussed below, we deny rehearing.

BACKGROUND

The Crystal Falls Project, first licensed in 1995, is located in Iron County, Michigan, on the Paint River, a major tributary to the Menominee River, which empties into Green Bay some 121 river miles downstream of the project. The project comprises a dam 270 feet long and 16 feet high, a 100-acre reservoir, and a powerhouse with three turbine-generating units. 4/

The project impoundment and upstream habitat are suitable to support resident fish species -- such as walleye, smallmouth bass, pike, and muskellunge -- that may migrate downstream to seek alternative feeding or overwintering habitat. Young-of-the-year

1/ 82 FERC ¶ 62,135.
2/ 73 FERC ¶ 62,036, reh'g, 75 FERC ¶ 61,174 (1996). The City has owned and operated the project since 1914.

3/ See 73 FERC at p. 64,099.

4/ Id. at p. 64,078.

fish would be susceptible to entrainment. 5/ These migrating bass and sunfish may also relocate downstream. These migrating fish would be susceptible to entrainment. 5/

In its license application, the City proposed to install a barrier net to exclude fish from the turbine intake area, in lieu of conducting an entrainment and mortality study. A two-year trial period would determine the most effective barrier net operating procedures. 5/

The license issued for the project adopted the City's barrier net proposal. Article 405 required the City, in consultation with the state and federal fishery agencies, to file a plan to construct and install a barrier net, and Article 406 required the City to file a plan for post-construction studies of the net's effectiveness.

The City next filed a plan to monitor the net's effectiveness, which the Director modified and approved in his February 27, 1998 order.

On rehearing of the Director's order, the City states that it proposed the installation of a barrier net in part to avoid having to conduct expensive entrainment mortality studies. 8/ The City states that the Commission staff's cost estimate for installing, operating, and monitoring the net was \$104,800 (1995 dollars).

8/ Rehearing request at 2.

7/ 75 FERC ¶ 62,102.

6/ Id. at p. 64,110. The net would be deployed each spring and removed each fall, encompassing the months most downstream movement occurs. Id. at p. 64,111. The record contained no specific data on numbers, species, and life stages of fish that could be subject to entrainment and mortality at the Crystal Falls Project. However, based on experience at a nearby project, staff estimated that a barrier net could reduce entrainment by 75 to 90 percent. Id.

5/ The project dam is built at a natural 11-foot waterfall that has historically been a barrier to upstream fish passage. Although the license reserved the Department of the Interior's fishway prescription authority under Section 18 of the Federal Power Act (at Interior's request), neither Interior nor the Michigan Department of Natural Resources has sought the installation of fishways at the project at this time. Id. at pp. 64,111-12.

dollars), 2/ while the city now estimates that the cost of these measures is \$246,932 (1997 dollars). 10/ Asserting that the revised cost estimate "would drastically change the economics of the project," the city argues that requiring it to proceed with the barrier net would be unjust and unreasonable, and would impose "an extreme economic hardship." It proposes instead to pay \$1,000 annually for compensatory mitigation for fish entrainment mortality at the project. 11/

DISCUSSION

The city seeks to alter the fishery-related measures included in its project license, based solely on its recalculation of what approach will cost it the least. However, while project economics are a relevant consideration, we decline to relieve the city of the measures it voluntarily undertook in the licensing proceeding. 12/ The reduction of adverse impacts

2/

73 FERC at p. 64,125. The city misstated the staff's estimate. Staff estimated (in 1995 dollars) the capital cost of installing the net to be \$26,900; operation and maintenance to be \$7,900 annually; and the capital cost of the staff's estimate of total costs for the 30-year license term would be \$333,900.

10/ The city estimates (in 1996 dollars) the capital cost of installing the net to be \$54,740; operation and maintenance to be \$60,000 over the 30-year license term (averaging \$2,000 per year); and the capital cost of the two-year net effectiveness study to be \$125,000. Updated to 1997 dollars, the city states the total is \$246,932. Rehearing request, Appendix 3.

11/

The Michigan Department of Natural Resources filed on April 17, 1998, an answer to the city's rehearing request. The Commission's regulations do not allow answers to rehearing requests (18 C.F.R. § 385.213(a)(2)), and we see no need to waive that rule here. Accordingly, the Department's answer is rejected.

12/

In City of New Martinsville, W.Va., v. FERC, 102 F.3d 567 (D.C. Cir. 1996) (not referenced in Crystal Falls' rehearing request), the court held that a licensee cannot be required to provide or fund compensatory mitigation for project-related fish mortality in the absence of any evidence that such mortality has an adverse effect on fish populations. Pursuant to this ruling, if the lack of evidence regarding project damage to the fish population precludes the requirement of a barrier net, that lack would also preclude (continued...)

12/

(...continued)

the requirement that the licensee give \$1,000 annually for compensatory mitigation in lieu of a barrier net. However, in this proceeding we are dealing not with measures voluntarily imposed by the Commission but with the city's unilateral imposition of which the Commission agreed to forego the development of an evidentiary record on the matter.

13/

See Ohio Power Co., 71 FERC ¶ 61,092 at pp. 61,311-13 (1995). Ohio Power describes what was the Commission's policy for approving the use of licensee-funded compensatory mitigation budgets in lieu of direct mitigation of adverse project impacts (entrainment mortality) on fisheries. To even consider such a fund, the Commission had to determine that the adverse impacts did not warrant denial of the project application or the imposition of direct mitigation measures, regardless of cost.

We no longer employ compensatory mitigation funding as an appropriate measure in most cases. The funding policy was designed to pay for compensatory measures that would be identified after licensing. 71 FERC at p. 61,314. If the record supports the imposition of (as opposed to application for) mitigation measures, whether impact-specific or compensatory, see n. 12, supra, then those measures will be either identified in the license or required to be developed subsequently, but without the imposition of a funding mechanism.

14/

If we accept the city's higher cost estimate for the capital cost of installing the barrier net (\$54,740) and higher estimate for the net effectiveness study (\$125,000) and use our higher estimate for annual operating costs (\$7,900), the annual net economic benefit is reduced from \$96,300 (see 73 FERC at pp. 61,125-26) to \$89,134. If the city's estimated annual operation and maintenance cost of \$2,000 is accurate, the net economic benefit would be \$95,034.

The Commission orders:

(A) The Michigan Department of Natural Resources' April 17, 1998 answer to the City of Crystal Falls' rehearing request is rejected. 15/

(B) The City of Crystal Falls' March 24, 1998 request for rehearing is denied.

(C) The City of Crystal Falls is required to install and have the barrier net operational on May 1, 1999. By May 10, 1999, the City shall file documents to verify installation and operation of the barrier net.

By the Commission.

(S R A L)

David P. Boergers
David P. Boergers,
Secretary.