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Wisconsin Public Service Corporation
(a subsidiary of WPS Resources Corporation)
700 North Adams Street
P.O. Box 19002
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October 31, 1997

FERC Project No. 2433
Articles 403,404,405,406,410, and 411

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The Secretary
Federal Energy Regulatory Commission
Mail Code: DTCA, HL 21.3
888 First Street, N.E.
Washington, D.C. 20426

Dear Honorable Secretary:

Enclosed is the original and eight copies of the Instream Bypassed Flow Plan (Article 403), the Operational Compliance Plan (Article 404), the Two Year Operational Evaluation Plan (Article 405), the Reservoir Drawdown Plan (Article 406), the Woody Debris Passage Plan (Article 410), and the Purple Loosetrife and Eurasian Milfoil Monitoring Plan (Article 411) for the Grand Rapids Hydroelectric Project (FERC Project No. 2433). The Plans were developed through consultation with the U. S. Fish and Wildlife Service (USFWS), the Wisconsin Department of Natural Resources (WDNR), and the Michigan Department of Natural Resources (MDNR). Documentation of consultation is also included.

The USFWS and did not respond with comments. The WDNR and MDNR provided comments pertaining to all of the plans. All of the comments received were addressed as explained:

Article 403-Instream Bypassed Flow Plan

a) *Release location and method* - By MDNR and WDNR request, WPSC agrees there is a need to account for varying flow releases because of changes in head pressures. However, WPSC proposes to accomplish the task by adjusting the gate discharge calculation while assuming the head pressure to be at the lowest allowable level (664.45 feet NGVD during "ice-free" periods and 663.95 feet NGVD during periods of "ice-cover"). This will assure that the flow released into the by-pass channel will always meet or exceed the prescribed flows of 134 CFS and 800 CFS. WPSC has amended the plan accordingly.

b) *Flow verification* - By MDNR and WDNR request, WPSC agrees to provide an on-sight briefing to the resource agencies, Wisconsin Department of Natural Resources (WDNR), Michigan Department of Natural Resources (MDNR), and U.S. Fish and Wildlife Service (FWS)

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on the location and operation of this gauge.

WPSC does not agree with the MDNR recommendation to have the gauge re-calibrated on an annual basis by USGS. However, since the flow in the bypass channel is described as flow through a physical opening, it will not vary unless the gate opening varies. Therefore, if the gauge indicating the proper gate opening has not moved or remains properly attached to the wall, the flow does not need to be verified. WPSC agrees to inspect the gauge to verify it is properly attached to the wall and has not been damaged. WPSC will provide access to the gauge at the request of the agencies.

WPSC agrees there is a need to install a real-time water temperature probe. However, WPSC proposes to install the temperature probe in the tailrace of the powerhouse instead of the bypass channel to minimize the financial burden upon WPSC. Until such time as the real-time temperature gauge is installed, WPSC agrees a "spring spawning date" of April 15 should be used. The temperature data will be be recorded by a strip recorder or similar recording device and will be monitored by the plant operator on a daily basis each year from March 15 to a time when the average water temperature exceeds 10 degrees Celsius for a period of two consecutive days.

c) *Spring Drought Consultation* - WPSC agrees with the MDNR and WDNR recommendation to consult with the agencies over dividing minimum flows between the spillway channel and the powerhouse if river inflow into the flowage falls below 1600 cfs, during the April 15 to May 31 period. If inflow into the project is equal to or greater than 1600 CFS, no consultation would be required with the minimum flow of 800 CFS released into the spillway channel and the remainder of the inflow going through the powerhouse. Spring drought consultation will continue on a weekly period or less until the cessation of the drought or June 1.

d) *Schedule* - The MDNR and WDNR both concur with the proposed schedule for installing a by-pass channel gauge, 30 days after plan acceptance.

e) *Evaluation Plan, Sampling Frequency* - MDNR recommended that the spillway channel evaluation be repeated every 10 years during the term of the license following completion of the initial three-year evaluation study. WPSC concurs with the MDNR recommendation

and has amended the plan to include subsequent one year evaluation studies following the same protocol at ten year intervals for the term of the licence.

f) *Evaluation Plan, Fish Sampling* - MDNR recommended specific agency contacts and coordination for the fish sampling activities. Regulatory agency coordination was included in the proposed fish sampling plan forwarded to the agencies for review.

MDNR recommended that WPSC visually observe the number of adult sturgeon using the spillway channel for spawning. WPSC does not concur with this recommendation based upon personal communications with Tom Thuemler of the WDNR. Mr. Thuemler recommends against attempting visual observations because of the minimal potential for actually observing spawning sturgeon in the spillway channel due to the unpredictability of spawning timing, limited spawning fish numbers, and the potential for use of other spawning areas in the river area downstream from the Grand Rapids Project. Furthermore, the chance observation of spawning sturgeon would not provide information of any scientific value for use in evaluating the spillway channel flows.

WPSC is against the MDNR recommended use of drift nets to sample larval fish in the spillway channel for the same reasons justifying the noneffectiveness of visual observations. Likewise, the potential for successful capture of larval fish in the spillway channel environment is minimal and will not provide information of value considering the potential risk and effort. In addition, contrary to the MDNR opinion, sampling in the spillway channel during high flow periods will result in potential significant safety problems. As a result, WPSC <u>will not</u> place our employees or contractors at risk to satisfy an unsupported study recommendation of minimal value for evaluating the effectiveness of spillway channel flow. No amendments were required for the fish sampling plan.

g) *Evaluation Plan, Macroinvertebrate Sampling* - The MDNR recommendations for macroinvertebrate sampling are excessive for evaluating the recovery of the aquatic community in the spillway channel. The MDNR recommendation for six samples to be collected in each habitat type is not necessary to evaluate the recovery of the macroinvertebrate community in the spillway channel. Additional samples would only serve to provide an unnecessary duplication of

density information for the study. There is no added value to the evaluation study for the MDNR recommendation for a qualitative analysis of the macroinvertebrate community through identification to the lowest possible classification, as the purpose of the study is to provide a quantitative analysis using wet weight and taxonomic identification by family. Furthermore, the value added to the evaluation study for the additional macroinvertebrate sampling techniques proposed by MDNR has not been demonstrated by the agency. The scope of the WPSC proposed macroinvertebrate study was developed with WDNR water quality personnel to satisfy the information needs for evaluation the recovery of the aquatic community of the spillway channel. MDNR provided no documentation supporting their position, while the WPSC study plan follows the protocol outlined in "Macroinvertebrate Field & Laboratory Methods foe Evaluating the Biological Integrity of Surface Waters," (EPA-Nov.1990). Therefore, the macroinvertebrate study plan has not been amended to include the MDNR recommendations.

WPSC concurs with the MDNR recommendation for completion of a mussel survey in conjunction with the spillway channel evaluation study. The study plan has been amended to include a mussel survey during one of the two sampling periods conducted each year the study will be completed. The MDNR recommendation for a mussel survey to be completed during all sampling periods is not warranted to the relative immobility of mussel species.

Article 404-Operational Compliance Plan

a) *Installation* - By MDNR and WDNR request, a staff gauge showing the reservoir elevation should be installed within 30 days of the acceptance of this plan by the FERC. WPSC has installed the staff gauge showing the reservoir elevation. This staff gauge was installed on Oct. 16, 1997.

b) *Staff gauge calibration* - By MDNR request, WPSC agrees and has installed a staff gauge that is marked in tenths of a foot. The staff gage was surveyed by a certified land surveyor at installation to match Nation Geodetic Vertical Datum (NGVD) elevation.

By MDNR request, WPSC agrees that it is our responsibility for maintaining the reservoir staff gauge. If the resource agencies (MDNR, WDNR and FWS) provide evidence that the reading from the

staff gage is inaccurate WPSC will, as soon as possible, re-survey the gauge. Furthermore, if the staff gauge becomes dislodged or damaged, WPSC will re-survey the gauge.

By MDNR request, WPSC agrees to re-survey the staff gage at a minimum of every five years to ensure its accuracy.

c) *Sensor calibration* - MDNR recommends that every time an operator arrives on site a manual reading be taken in the tailwater and headwater and these readings compared to the electronic sensor reading within 5 days or another agreed upon frequency. Anytime the measurements (the manual and sensor reading) are not within 0.1 foot, the sensors should have their calibration checked. WPSC does not agree with the recommended frequency of manual checks.

Monthly, manual checks of the headwater and tailwater elevations will assure the electronic sensors are in agreement. The electronic sensors have proven to be very accurate and stable over prolonged periods of time. WPSC will verify the headwater sensor by comparison with the staff gauge and will verify the tailwater by comparison with a benchmark on the tailrace deck. WPSC agrees with the recommendation to check the calibration anytime the measurements (the manual and sensor reading) are not within 0.1 foot.

During "ice-cover" periods, the reservoir staff gage will likely be iced-in and possibly covered with drifted snow, making gauge reading very difficult. When this occurs, manually checking the headwater level and verifying against the sensor reading, as recommended by the MDNR, will not be accomplished in a manner that would provide useful and accurate information.

In the tailrace area, out-flow from the powerhouse causes considerable wave action. This wave action will result in the manual tailwater readings being very subjective.

d) *Data availability* - By MDNR request, WPSC agrees that data for up to and including 3-day periods will be provided to the resource agencies within 2 working days of the request. The WPSC proposed delivery period for other time periods is acceptable.

e) *Ice free shutdown periods* - The MDNR and WDNR recommend that

during a plant shutdown an attempt should be made by a project dispatcher, located at the 24-hour manned dispatch center, to remotely restore plant power and generator operation. It is standard WPSC procedure to attempt to remotely restore plant power whenever there is a plant shutdown.

During shutdown in "ice free' periods, the plant operator will be summoned immediately and the following actions will be automatically initiated:

1) A five minute pre-gate opening audible alarm will be enabled.
2) When the alarm ceases, the remote operated tainter gate will be ramped to a maximum capacity discharge of 2000 CFS, or the last recorded project outflow (from the plant operating log), whichever is the lesser. The remote tainter gate has a ramp speed of 1 ft/min, or a 200 CFS change in flow per minute. Time from tainter gate closed position to full open position is about 10 minutes.

Whenever the electrical system serving the project is restored, the generating equipment will automatically attempt a remote re-start. As generating equipment is put "on-line", the remote controlled tainter gate will automatically adjust to match outflow to inflow.

Upon arrival, the plant operator will assist in the restoration of project generating equipment and/or will regulate dam tainter gates to match project outflow to inflow. An automatic start emergency electric generator at the dam is capable of powering tainter gate hoisting equipment.

WPSC does not agree with the recommendation that outflow be matched to the upstream USGS gage. WPSC will determine the amount of flow to be matched during shutdown periods by storing the previous hour's generating equipment outflow, in CFS, at the station control equipment. Outflow through the dam will not be accounted for because, in the event of a shutdown, the outflow through the dam will not be changed. Additional outflow through tainter gates will be matched to the previous hours generator outflow.

MDNR and WDNR note the average annual flow through the project is 3,140 CFS and believe WPSC needs to make further arrangements to

pass river flow within 10 minutes during plant shutdown. WPSC contends that moving the automated gate to full open position provides compliance with the license requirement of "a manner consistent with safe project operation...". The single automated gate can physically pass a maximum of 2,000 CFS at normal headwater level. Outflow will be matched to inflow when the operator arrives. To provide additional, remote-controlled flow passing capability would require a considerable financial investment. More importantly, WPSC is very concerned with automatically opening a gate to release excessive flows (up to 2,000 CFS) at an excessive rate (200 CFS per minute) into the spillway channel which will be flowing only 134 CFS for most of the year. If the five minute warning is ignored, an extremely dangerous situation will result.

f) *Ice cover plant shutdown operation* - The MDNR and WDNR recommend that during a plant shutdown in "ice-cover' periods an attempt be made by a project dispatcher located at the 24-hour manned dispatch center to remotely restore plant power and generator operation. It is standard WPSC procedure to attempt to remotely restore plant power whenever there is a plant shutdown. Once plant power is restored the generating equipment is automatically returned to its original operating mode and re-started.

If plant power cannot be restored, the plant operator will begin opening the dam tainter gates to pass project inflow. Attempting to remotely open a dam tainter gate without the benefit of visual inspection for ice formation, could result in damage to the gate hoisting equipment and failure of the gate. Failure of the gate could result in catastrophic consequences.

WPSC immediately summons the plant operator whenever there is a plant shutdown. The operator will manually adjust the dam tainter gates to pass project inflow if the generating equipment cannot be restored to its operating mode.

WPSC does not agree with the recommendation that outflow be matched to the upstream USGS gage. WPSC will determine the amount of flow to be matched during shutdown periods by storing the previous hours generating equipment outflow, in CFS, at the station control equipment. Outflow through the dam will not be accounted for because in the event of a shutdown the outflow through the dam will not be changed. Additional outflow through

tainter gates will be matched to the previous hours generator outflow.

g) The MDNR and WDNR concur with the plans proposed definition for "ice-free" and "ice-cover" periods.

Article 405-Two Year Operation Evaluation Plan

The MDNR and WDNR concur with the plan to install, calibrate and maintain a USGS type streamflow gauge upstream of the project.

WPSC will download data from the USGS gauge on a weekly basis, and manually compare the recorded flows to the plant operating log data, compensating for flow time through the reservoir and possible winter ice effects. Deviations between the USGS gauge readings and the plant logs will be determined recorded, and utilized to verify run-of-river operation.

The draft and final reports on the operational testing program will be prepared and submitted in accordance with the license requirements.

Article 406-Reservoir Drawdown Plan

a) *Maintenance Drawdowns, Inland Lakes and Streams Act Permits* - The MDNR recommended an Inland Lakes and Streams Act Permit be issued for all planned maintenance drawdowns greater than the agreed upon operational band. WPSC has in the past and will continue to work with MDNR to satisfy the State of Michigan Inland Lakes and Streams Act requirements as they apply to our hydroelectric projects. However, because of federal pre-emption it is not appropriate to include compliance with state statutes as part of the FERC relicensing process.

b) *Maintenance Drawdowns, Preferred Timing Rates and Flows* - By MDNR request, WPSC agrees with the preferred timing of the planned drawdowns in August and September. However, there may be occasions where construction is required that cannot be completed in the time frame that exists prior to the winter freeze. Therefore, WPSC has not addressed preferred timing in the drawdown plan. The preferred timing will be addressed in consultation with the agencies at the time of planning for the drawdown. WPSC also agrees with the agency recommendation to customize the drawdown rate and minimum flow while refilling for each drawdown as necessary during

planning consultation for the planned drawdown.

c) *Maintenance Drawdowns, Fish Stranding* - By MDNR and WDNR request, WPSC has modified the drawdown plan to include an inspection of the impoundment for stranded fish instead of the shoreline.

d) *Emergency Drawdowns, Notifications* - By MDNR and WDNR request, WPSC agrees with the agency recommendation to notify the appropriate agencies within 2 working days of the start of an emergency drawdown and has amended the plan accordingly to provide the reason for the drawdown, expected final reservoir level, and anticipated duration of the drawdown.

e) *Emergency Drawdowns, Inland Lakes and Streams Act Permits* - WPSC does not agree with the agency recommendation to obtain an Inland Lakes and Streams Act permit for all emergency drawdowns. WPSC has in the past and will continue to work with MDNR to satisfy the State of Michigan Inland Lakes and Streams Act requirements as they apply to our hydroelectric projects. However, because of federal pre-emption it is not appropriate to include compliance with state statutes as part of the FERC relicensing process.

f) *Emergency Drawdowns, Other Recommendations* - WPSC agrees with the WDNR and MDNR recommendation to conduct the fish stranding survey of the impoundment after an emergency drawdown. WPSC also agrees with the MDNR recommendation to customize minimum flows during refilling after the emergency drawdown and has amended the drawdown plan accordingly. However, WPSC will not abide by the MDNR request to consult with the agencies to determine a drawdown rate in the event an emergency drawdown or the WDNR request to develop appropriate operating procedures during an emergency drawdown. In the event of a major emergency, it is often necessary to lower the level of the reservoir quickly as was the case at this project in 1988. In 1988, a major failure to Unit #4 allowed an uncontrolled flow of 1400 cfs through the powerhouse. WPSC attempted to obtain emergency permission from the MDNR to draw the reservoir down due to concerns about undermining of the powerhouse. The WDNR granted permission within ½ hour ,but MDNR would not grant permission to draw it down without first going through the process of obtaining a drawdown permit. The permit was finally issued one day later through verbal approval following verbal

pressure by WDNR. The one day delay resulted in increased undermining of the powerhouse. We are fortunate the incident did not result in a catastrophic outcome. Through this past experience, WPSC will not consult with the agencies to negotiate conditions in the event an emergency drawdown is required. Therefore, the WPSC emergency drawdown plan reflects a verbal notification to each agency.

Article 410-Woody Debris Passage Plan

The MDNR and WDNR concur with the proposed plan to pass woody debris through the project. WPSC agrees with the MDNR recommendation that all vegetative materials should also be sluiced downstream and all human generated trash will be disposed of properly. WPSC has amended the plan accordingly.

Article 411 Purple Loosestrife and Eurasian Milfoil Monitoring Plan

a) *Purple Loosestrife, Objective*-MDNR and WDNR interpret Article 411 of the license to include provisions for control/elimination if purple loosestrife becomes established at this project. It is clearly the intent of Article 411 that the licensee should cooperate with the agencies to control or eliminate purple loosestrife from the project if deemed necessary by the agencies. It is not the intent of Article 411 to make the licensee solely responsible to control purple loosestrife at the project. There have been no indications by past agency actions to indicate control of purple loosestrife has become a necessity. WPSC's interpretation of cooperation with the agencies is based upon experience with other FERC project licenses (FERC Project No. 2476 and FERC Project No. 1999) which are in similar areas of purple loosestrife infestation and have FERC accepted purple loosestrife monitoring plans. The accepted plans include the same provision about cooperation with the agencies for control/elimination as proposed in the monitoring plan for this project.

b) *Purple Loosestrife, Monitoring Period*-WPSC agrees with the WDNR and MDNR recommendation to survey all wetlands and waters within the project boundary and has amended the plan accordingly. WPSC also agrees with the MDNR recommendation to survey in late July or early August, depending upon the weather, when the plants are in full bloom and has amended the plan accordingly.

c) *Purple Loosestrife, Monitoring Methods*-Based upon experience with other FERC accepted purple loosestrife monitoring plans (FERC Project No. 2476 and FERC Project No. 1999) which are in similar areas of purple loosestrife infestation, the MDNR recommended monitoring method is burdensome and unnecessary. The purpose of the monitoring plan is to monitor the spread of purple loosestrife and control on the macro-scale. Therefore, the WPSC-proposed monitoring method should be acceptable. The data that will be collected by the WPSC-proposed monitoring plan has a defined use for eventual control/elimination, whereas the MDNR-proposed method of monitoring would provide no added value, but it would generate unnecessary information which has no demonstrated need or use.

d) *Purple Loosestrife, Monitoring Reports*-WPSC agrees with the MDNR and WDNR recommendation to provide the monitoring data to the agencies annually no later than October 31 of each year and has amended the plan accordingly.

e) *Purple Loosestrife, Control*-WPSC agrees with the WDNR and MDNR recommendation to control small pioneer colonies (less than five) on WPSC-owned property within the project boundary, but proposes to hand pull or hand cut the stems of the small colonies and spray the remaining stems with an appropriate herbicide. If in the future an effective control measure is established and standardly applied, WPSC will cooperate with the agencies for control of medium to dense colonies of purple loosestrife provided the agencies demonstrate the necessity.

f) *Purple Loosestrife, Public Awareness*-WPSC agrees with the MDNR recommendation to display MDNR fact sheets about purple loosestrife, but will only display them at WPSC-owned public access areas within the project boundary. WPSC will not agree to display information at public access areas it does not own.

g) *Eurasian Milfoil, Objective*-MDNR and WDNR interpret Article 411 of the license to include provisions for control/elimination if eurasian milfoil becomes established at this project. It is clearly the intent of Article 411 that the licensee should cooperate with the agencies to control or eliminate eurasian milfoil from the project if deemed necessary by the agencies. It is not the intent of Article 411 to make

the licensee solely responsible to control eurasian milfoil at the project. There have been no indications by past agency actions to indicate control of eurasian milfoil has become a necessity. According to Tim Rasman of WDNR, the WDNR has been allowing lakes where eurasian milfoil has been established to naturally devoid themselves of the problem. According to recent research, large populations of eurasian milfoil have been in decline in some areas due to control by a native weevil (*euhrychiopsis lecontei*) which feeds upon eurasian milfoil. The weevil does not need to be introduced to the project because it is native to the area. Also according to Tim Rasman, the weevil requires a relatively undeveloped shoreline covered with leaf litter for its terrestrial wintering habits which makes the Grand Rapids Project a good candidate for this method of control. The proposed monitoring plan includes a provision about cooperation with the agencies for control/elimination at this project.

h) *Eurasian Milfoil, Monitoring*-MDNR and WDNR recommend fifteen transects on each water body sampled. Further conversation by WPSC with Tim Rasman of WDNR, indicate fifteen transects would be required to provide accurate data about the eurasian milfoil population in the reservoir. However, fifteen transects are only required in the first study period. The second study period consists of approximately ten transects which are selected using a best judgement/random selection process. The study plan has been amended accordingly.

The MDNR also recommended the entire surface be visually inspected for all eurasian milfoil mats and any mats present be identified by GPS coordinates and/or floating markers around the perimeter. The MDNR also recommended the mats be measured for density and mat thickness at multiple locations within the mat. WPSC does not agree with the MDNR recommendation to mark the matted areas with floating markers due to the hazards to boat traffic and the liability issues associated with placing floating markers. WPSC also finds the need to determine mat density and thickness an excessive burden that does not have a demonstrated use or need and is beyond the scope of Article 411. The study plan reflects the identification of existing aquatic beds of plants when choosing the original transects and allows for determining relative abundance at varying depths within the colonies or mats. Therefore, WPSC's plan incorporates a visual inspection, but does not include data collection on mat density because the monitoring plan is based upon the methodology utilized by Tim Rasman of WDNR to survey aquatic macrophytes.

l) *Eurasian Milfoil, Public Awareness*-WPSC agrees with the MDNR recommendation to display MDNR fact sheets/signs about eurasian milfoil, but will only display them at WPSC-owned public access areas within the project boundary. WPSC cannot agree to display information at public access areas it does not own.

Should you have any questions relative to this material, we would be pleased to discuss them with you at your earliest convenience.

Sincerely,

Thomas P. Meinz
Vice President - Power Supply and Engineering
Telephone: (414) 433-1293

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Enclosures

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Grand Rapids Hydroelectric Project - FERC License No. 2433-004

Article 403 The Licensee shall file with the Commission, for approval, an instream bypassed flow plan to document the licensee's proposed measures to ensure the release of instream flows downstream of the project spillway as described in Article 402.

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(1) Guarantee the release of required instream flows to the bypassed reach;

Plan for Guaranteeing Release of Required Instream Flow to Bypassed Reach

The release of the required instream flows to the bypassed reach shall be accomplished by opening one (1) taintor gate, taintor gate nine (9), in the gated spillway section of the dam to a prescribed opening. This prescribed opening will provide either 134 CFS or 800 CFS to be released to the bypassed reach. The flow through the gate will be based upon the calculated discharge at the lowest allowable headwater elevation (664.45 feet NGVD during "ice-free" periods and 663.95 feet NGVD during periods of "ice-cover"). The location of taintor gate number nine (9) is shown on drawing WSK-500, Exhibit-1.

(2) Verify the amount of flow being released;

Plan for Verifying the Amount of Flow Being Released to the Bypassed Reach

Flow being released to the bypassed reach shall be verified by measurement. The taintor gate shall be opened to a prescribed amount and the flow will be measured by the USGS. The USGS will calibrate the taintor gate opening to ensure that the outflow of the taintor gate is either 134 CFS or 800 CFS. The amount of taintor gate opening that produces the required flow will be documented and used as the prescribed opening(s) for 134 CFS and 800 CFS. A gauging device shall be installed on the taintor gate to indicate that the gate is at its prescribed opening for 134 CFS and 800 CFS releases.

(3) Install, including the schedule, necessary structures or equipment;

Plan for Installing, Including the Schedule, Necessary Structures or Equipment

Installing Gauging Equipment - Gauging equipment shall be installed on taintor gate nine, to the bypassed reach. The gauge shall indicate the prescribed opening of the taintor gate for both the 134 CFS flow and the 800 CFS flow.

The gauge will be attached to the right pier of taintor gate number nine (9). The upper structural support arm of the taintor gate shall be used as the gate position indicating device as it moves up or down across the front of gauge. Gauge

Article 403 continued:

markings will be at the prescribed positions for 134 CFS discharge and 800 CFS discharge. Gauge will be visible from the left side of the dam.

WPSC will provide an on-site briefing for the gauge to Michigan Department of Natural Resources, and U.S. Fish and Wildlife Service on the location and operation of the gauge.

WPSC will install a real-time water temperature probe in the tailrace of the powerhouse to determine when a minimum flow of 800 cfs should be released from the dam into the spillway channel for spring spawning. The temperature probe will be recorded by a strip recorder or similar device and monitored on a daily basis by the plant operator each year from March 15 to a time when the average water temperature exceeds 10 degrees Celsius for a period of two consecutive days.

If river inflow falls below 1600 cfs during the April 15 to May 31 period, WPSC will consult with the agencies over dividing minimum flows between the spillway channel and the powerhouse. Spring drought consultation will continue on a weekly period or less until the cessation of the drought or June 1.

Schedule for installing Gauging Equipment -The gauge system shall be installed within thirty (30) days after plan approval.

(4) Consult with Michigan Department of Natural Resources (Michigan DNR), Wisconsin Department of Natural Resources (Wisconsin DNR), and U.S. Fish and Wildlife Service (FWS) regarding the operation of the flow release mechanism and methods to verify flow releases on an annual basis;

Plan for Consulting with Agencies regarding the Operation of the Flow Release Mechanism and Methods to Verify Flow Releases on an Annual Basis
WPSC will on an annual basis inspect the gauge to verify it is properly attached to the wall, is free of obstructions and has not been damaged. WPSC will provide access to the gauge at the request of the agencies.

(5) Evaluate, in consultation with Michigan DNR, Wisconsin DNR, and FWS, the effectiveness of minimum flows in spillway channel to enhance fish and other aquatic resources;

Plan for Evaluating the Effectiveness of Minimum Flows in The Spillway Channel for Fish and Other Aquatic Resources
The effectiveness of the minimum flows in the Grand Rapids spillway channel will

Article 403 continued:

during a three year period (1998, 1999, & 2000).

Fish Population Estimates

Fish population estimates will be determined using the Zippin Removal Method, as recommended by the Wisconsin DNR. The Zippin Removal method is a recommended method for making population estimates in small warmwater streams.

The Zippin Removal Method is used to calculate the population graphically. Catch will be plotted versus cumulative catch and the population estimated as the x intercept (see Figure 1).

When making the population estimates using the Zippin Removal Method, the following will be assumed:

- The population is closed such that there is no immigration, emigration, or mortality.
- There is no natural mortality.
- All fish being estimated have an equal probability of capture.

If catchability is different between different size groups of species then the size groups will be split and estimated separately. Young-of-the-year estimates will be made separately from adult fish estimates.

The sampling effort will be completed in two 900 foot long sample sections that will be established in the spillway channel area. The sample sections will be located to ensure they represent habitat similar to the spillway channel in general. Each sample section will be sampled two times annually (late Jule/early July and late August/early September) for an initial three-year study period. Following completion of the three-year study, the sample sections will be sampled for a one year study period every ten years following the same protocol as the initial study. The 134 cubic feet per second (cfs) minimum flow will be maintained during the sampling efforts. Block nets will be used at both ends of the sample sections to insure the populations are closed. At least three passes with electric shocking equipment will be completed in each sample section during each sampling event. Captured fish numbers and lengths will be recorded. All captured fish will be returned to the spillway channel outside the two sample sections.

Michigan DNR, Wisconsin DNR, and FWS (agencies) will be informed of the proposed sampling event a minimum of two weeks in advance of the schedule.

Article 403 continued:

date. The agencies will be informed as soon as possible should high river flows and/or other unforseen circumstances require sample date rescheduling.

Based upon personal communications with Wisconsin DNR there are no safe and/or accurate sampling methods available to evaluate the effectiveness of the spring spawning 800 cfs flow.

Macroinvertebrate Population Survey

The macroinvertebrate population in the spillway channel will be surveyed annually in June during the three-year study period. A study that provides a quantitative analysis using wet weight (biomass) and taxonomic identification by family will be conducted.

Four samples will be taken during each study event using a Surber Sampler, as recommended by Wisconsin DNR. The Surber Sampler consists of two 30.5-cm frames, hinged together. They are designed to be placed by hand onto sand, gravel, or rubble substrate types in shallow streams, or shallow areas of rivers. When in use one frame rests on the substrate and the other remains upright and holds a nylon net. The Sampler is position with its net mouth open, facing upstream. The two frames are located at right angles, one frame marking off the

areas of substrate to be sampled and the other frame supporting the net to strain out organisms washed into it from the sample area. Sampling protocol will use as guidelines the general operating procedures outlined in"Macroinvertebrate Field & Laboratory Methods for Evaluating the Biological Integrity of Surface Waters," (EPA - Nov. 1990).

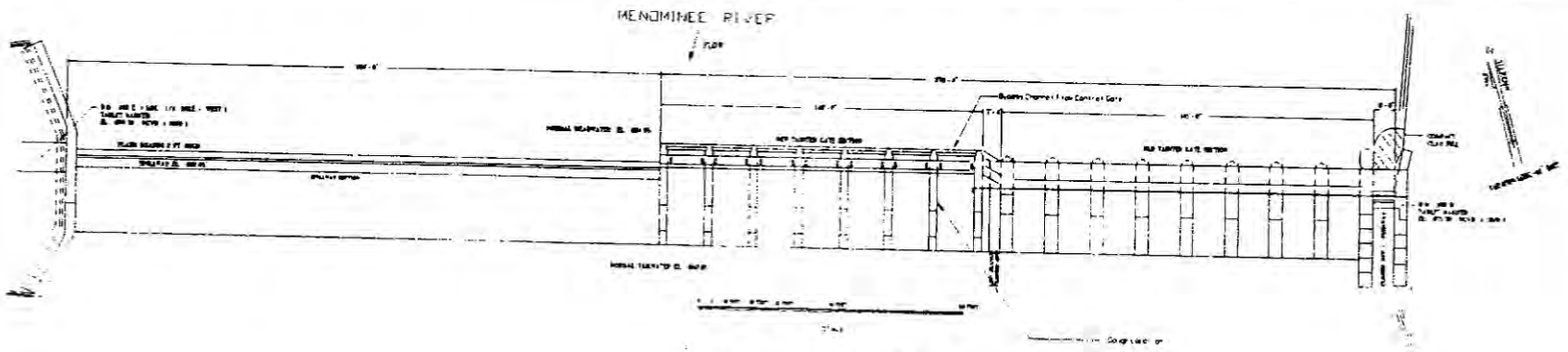
Upon field collection, organisms will be placed into a sample container (wide mouthed jar) and preserved for laboratory analysis. As organisms are identified during the laboratory analysis, the individuals in each taxonomic family will be counted and the numbers recorded on bench sheets. To determine wet weights, following taxonomic identification, the organisms will be soaked in distilled water for 30 minutes, centrifuged for one minute at 140 g in wire mesh cones, and weighed to the nearest 0.01mg.

A mussel survey will be completed one time annually during each year studied. The purpose of the survey is to determine the presence of various clam species in the spillway channel. Mussels will be collected, identified by species, and returned to the spillway channel. If field identification is not possible, mussels will be preserved for further identification. A list of mussel species found in the spillway

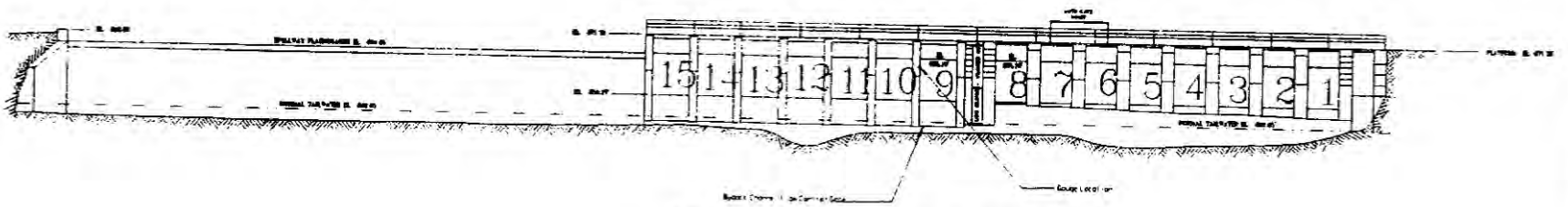
Article 403 continued:

channel on an annual basis will be included in the report documenting the evaluation study results.

Annual fish and macroinvertebrate 1998 and 1999 survey summaries will be provided to the agencies. A report documenting the results of the three-year survey will be provided to the agencies and FERC within 180 days of the completion of the late August/early September 2000 study event.



PLAN OF DAM



SPILLWAY AND TAINTER GATES
DOWNSTREAM ELEVATION

Gate 9 used for flow to Bypass Channel

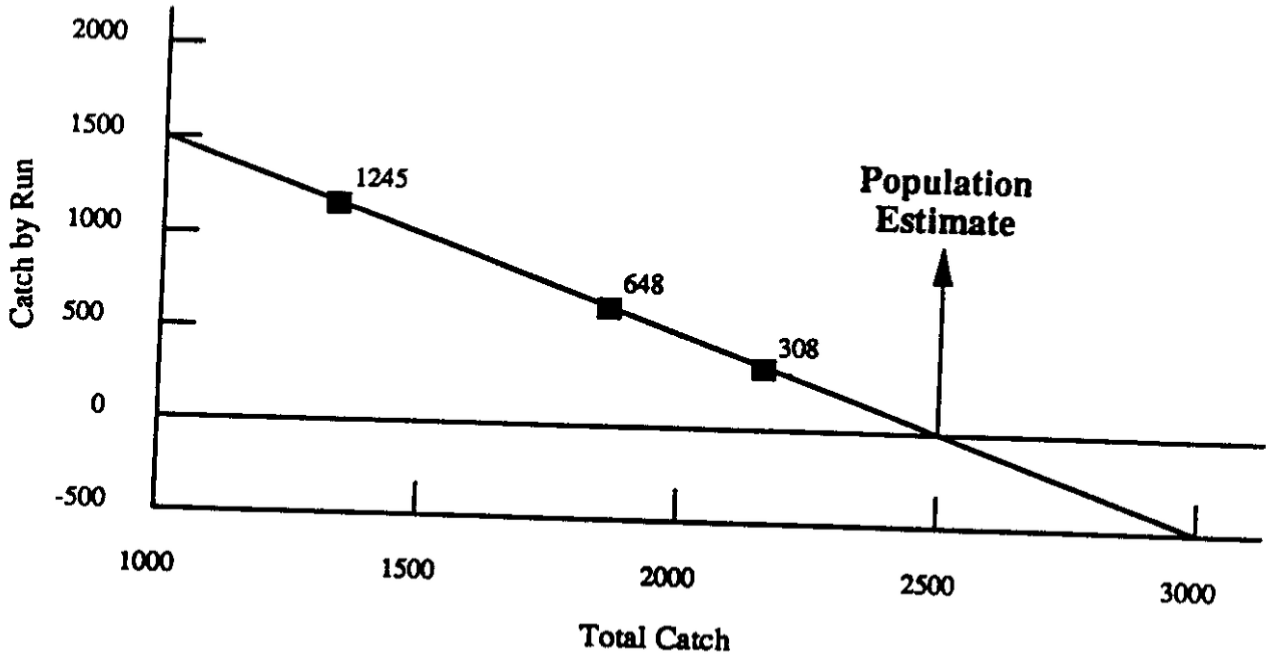
WISCONSIN PUBLIC SERVICE CORPORATION
GREEN BAY, WISCONSIN

GRAND RAPIDS HYDRO PLANT
PLAN OF DAM AND PROFILE

WSK-500

2433-3

Figure 1. Hypothetical Zippin Estimate



ORIGINAL

Article 404 The Licensee shall file with the Commission, for approval, an operations compliance plan to document compliance with run-of-river operations and reservoir elevation range specified by Article 401.

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(1) Install, calibrate, and maintain a staff gauge in the reservoir that is visible to the public with the prescribed operating levels clearly marked;

Plan for Installing, Calibrating, and Maintaining Reservoir Staff Gauge

Staff Gauge Installation - A staff gauge showing the reservoir elevation was installed on October 16, 1997 on the east side of the dam. The staff gauge will be visible from the dam driveway. A sign listing the operating limits will be installed on the concrete pier above the staff gauge.

Staff Gauge Calibration - The staff gauge will be calibrated in increments of 0.1 foot. The upper and lower operating limit will be marked by a "notch" on the staff gauge. The staff gauge was surveyed at time of installation by a certified land surveyor.

Staff Gauge Maintenance - The staff gauge and information sign will be checked monthly by WPSC as part of the Operators Monthly Dam Inspection. If the resource agencies provide evidence that the reading from the staff gauge is inaccurate or the gauge becomes dislodged or damaged, WPSC will, as soon as possible, re-survey the gauge. WPSC will resurvey the gauge at a minimum every five years.

(2) Operate automatic water level sensors to record headwater and tailwater elevations, and devices to record power generation, capable of providing record at 60-minute intervals;

Plan for Installing, Calibrating, and Maintaining Headwater Sensor

Installing Headwater Sensor - A headwater sensor is already installed and in service at the dam. The headwater sensor is a pressure transducer that measures the water pressure above sensor datum. The output of the pressure transducer, a 0 - 1 milliamp signal, is used for the alarm, operating, recording and monitoring systems. This headwater signal is sent via phone line to a SCADA system at the Energy Control Center in Green Bay.

Calibrating Headwater Sensor - The headwater sensor is calibrated by raising or lowering the sensor in its standpipe until the reading matches the reservoir staff gauge reading. Sensor and staff gauge reading comparisons will be part of the

Article 404 continued:

monthly dam inspection.

Maintaining Headwater Sensor - The headwater sensor shall be checked by manually comparing the staff gauge to the sensor reading. WPSC will recalibrate any time the readings are not within 0.1 foot.

Plan for Installing, Calibrating, and Maintaining Tailwater Elevation Sensor

Installing Tailwater Elevation Sensor - A tailwater sensor is already installed and in service at the tailrace of the powerhouse. The tailwater sensor consists of a pressure transducer lowered into the tailwater well. The transducer operates on water pressure and contains a breather tube for sensing atmospheric pressure to maintain the highest possible accuracy. The transducer produces a four to 20 milliamp signal proportional to the water depth above sensor datum. The tailwater signal is also sent via phone line to a SCADA system at the Energy Control Center in Green Bay.

Calibrating Tailwater Elevation Sensor - The tailwater sensor is calibrated by raising or lowering the transducer until the reading matches the measured elevation of the tailwater. The tailwater elevation shall be measure from a tailrace deck benchmark whose elevation is 646.85 ft. NGVD.

Maintaining Tailwater Elevation Sensor - Manual sensor and bench mark reading comparisons will be part of the monthly dam inspection. WPSC will recalibrate any time the readings are not within 0.1 foot.

(3) Maintain records of headwater and tailwater elevations and power generation;

Plan for Maintaining Headwater, Tailwater, and Power Generation Records

Maintaining Headwater Elevation Records - Hourly headwater elevations records are maintained through the Distributed Energy Management System (DEMAXX) at the Energy Control Center in Green Bay. These records will indicate hourly headwater elevation at the dam and are part of the daily operating log. Presently, this is an operational system.

Maintaining Tailwater Elevations Records - Hourly tailwater elevations records are maintained through the Distributed Energy Management System (DEMAXX) at the Energy Control Center in Green Bay. These records will indicate hourly tailwater elevation at the powerhouse tailrace and are part of the daily operating

Article 404 continued:

log. Presently, this is an operational system.

Maintaining Power Generations Records - Hourly generation records are maintained through the Distributed Energy Management System (DEMAXX) at the Energy Control Center in Green Bay. These records will indicate total plant power generation, individual unit power generation, and generating unit starts or shut-downs during the hour. This information is part of the daily operating log. Presently, this is an operational system.

(4) Provide operational data to the interested agencies in a timely manner;

Plan for Providing Operational Data

Providing Operational Data to the Interested Agencies in a Timely Manner - Upon request for operational data from an interested agency the requested data shall be sent to the requesting agency by U.S. mail within five (5) working days after receipt of a request for data.

Data that is routinely recorded is as follows: unit hourly generation, plant hourly generation, discharge through the generating units, gate discharge, headwater elevation, tailwater elevation, and substation bus voltage.

Requests for operational data can be made by calling the Grand Rapids Hydro Plant at 906-653-6925 or the Crivitz Operation Center at 715-854-7498.

(5) Pass project inflow downstream within 10 minutes or in a manner consistent with safe project operation, in the event of project shutdown during "ice-free" periods;

Plan for Passing Project Inflow Downstream in the Event of Project Shutdown During "Ice-Free" Periods

Passing Project Inflow during "Ice-Free" Periods - In the event of a project shutdown during "ice-free" periods, WPSC will attempt to remotely restore plant power. If plant power cannot be restored, a remote sequence of events for automatic tainter gate operation will be initiated and plant operating personnel

Grand Rapids Hydroelectric Project - FERC License No. 2433-004

Article 404 continued:

shall be immediately dispatched to the project.

Article 404 continued:

The sequence of operation for the automated tainter gate operation is as follows:

1) A five (5) minute warning period to alert anyone in the bypassed channel that a rapid increase in flow is about to occur.
2) Tainter gate is ramped to a prescribed set point to pass 2000 CFS.

Tainter gate rate of change is one (1) minute per foot. For the automated tainter gate to change from full closed position to the prescribed 2000 CFS discharge position will take about five (5) minutes for warning period and five (10) minutes for the gates to be opened. A total of ten (15) minutes after project shutdown.

A member of the plant operating staff is on call at all times. The plant operator, upon arrival at the plant, shall attempt to restart the generating unit to pass project inflow. If unable to restart the generating units, the tainter gates will be opened to match project outflow to project inflow. WPSC will determine amount of flow to be matched during shutdown periods by storing the previous hour's generating equipment outflow, in CFS, at the station control equipment.

An automatic start emergency generator at the dam is capable of powering the gate hoisting equipment in the event of loss of plant power.

(6) Pass project inflow downstream as soon as possible and practicable, in a manner consistent with safe project operation, in the event of project shutdown during "ice-cover" periods;

Plan for Passing Project Inflow Downstream in the Event of Project Shutdown During "Ice-Cover" Periods

Passing Project Inflow during "Ice-Cover" Periods - In the event of a project shutdown during "ice-cover" periods, WPSC will attempt to remotely restore plant power. If plant power cannot be restored, plant operating personnel shall be immediately dispatched to the dam to match the dam discharge with the project inflow.

One member of the plant operating staff is on call at all times. The plant operator, upon arrival at the plant, shall attempt to restart the generating unit to pass project inflow. If unable to restart the generating units, the tainter gates will be opened to pass project inflow. WPSC will determine the amount of flow to be matched during shutdown periods by storing the previous hour's generating equipment outflow, in CFS, at the station control equipment.

Article 404 continued:

If tainter gate operation is required, one (1) tainted gate is heated during "ice-cover" periods. This gate shall be manually opened by plant operating personnel to match the dam discharge with the project inflow.

An automatic start emergency generator at the dam is capable of powering the gate hoisting equipment in the event of loss of plant power.

(7) Develop a definition of "ice-free" and "ice-cover" periods applicable to Article 401.

Definitions of "Ice-Free" and "Ice-Cover" Periods

Defining "Ice-Free" Periods - Ice Free is defined as the period of time beginning after March 15 when the previous winters ice has melted from the power canal and the entire historic river channel is not iced over.

Defining "Ice-Cover" Periods - Ice-Cover is defined as the period of time beginning after November 1 when the backwaters and bays of the reservoir have become iced over for the winter.

ORIGINAL

Grand Rapids Hydroelectric Project - FERC License No. 2433-004

Article 405: The Licensee shall file with the Commission, for approval, a plan to conduct a two-year evaluation to determine whether operation of the project in a run-of-river mode as required by Article 401 has been achieved.

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011

(1) Installation, calibration, and maintenance of a U.S. Geological Survey (USGS) type recording streamflow gauge upstream of the project;

Plan for Installing, Calibrating, and Maintaining a USGS type Streamflow Gauge Upstream of the Project

Installing a USGS Type Streamflow Gauge - WPSC will contract with the USGS to install a recording streamflow gauge upstream of the project to determine if the project is operated in the run-of-river mode, as required in Article 401. The installation of this stream gauge will occur in 1998. A letter of agreement with the USGS is part of the installation plan.

Maintaining USGS Type Streamflow Gauge - WPSC will contract with the USGS to maintain the recording streamflow gauge upstream of the project to determine if the project is operated in the run-of-river mode for the two year operation evaluation plan, as required in Article 401.

(2) The licensee's proposed location for gauge installation, a schedule for installation, and measures to maintain its operation over the 2-year testing period.

Plan for Proposed Gauge Location, Schedule of Installation, and Measures to Maintain its operation over the 2-Year test Period

The proposed gauge location:
In the vicinity of the "Koss Bridge," at County Highway JJ.

Timing of installation:
The year 1998.

Measures to maintain the gauge:
The USGS will be contracted to maintain the gauge for a minimum of two years.

Article 405 Continued:

Plan for Assessing Run-Of-River Mode Operation and Reporting Results of Operational Testing Program

Data Collection/Comparison - WPSC will download data from the USGS gauge on a weekly basis during the 2-year test period, and manually compare the recorded flows to the plant operating log data, compensating for flow time through the reservoir and possible winter ice effects. Deviations between the USGS gauge readings and the plant logs will be determined and recorded, and utilized to verify run-of-river operation.

Reporting - Within 6 months after the end of the 2-year test period, WPSC will prepare, and submit to the agencies for comment, a draft report detailing the results of the operational testing program. Within 6 months of receiving comments on the draft report, WPSC will submit a final report to the Commission for approval, including the required documentation to address the agencies comments.

ORIGINAL

Grand Rapids Hydroelectric Project - FERC License No. 2433-004

Article 406 The licensee shall file with the Commission, for approval, a reservoir drawdown plan.

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Reservoir Drawdown Plan

Objective: To minimize the impact of any project maintenance requiring a reservoir drawdown upon aquatic and wetland resources. Wisconsin Public Service Corporation (WPSC) agrees to consult with the Wisconsin Department of Natural Resources (WDNR), the Michigan Department of Natural Resources (MDNR) and the U.S. Fish and Wildlife Service (USFWS) in advance of any planned drawdowns. WPSC also agrees to consult with the agencies after an emergency drawdown prior to returning to normal reservoir operating levels.

I. Planned Drawdowns

A. Agency Consultation

Upon planning the drawdown, WPSC will consult with the agencies allowing them a minimum of 30 calendar days to comment.
The consultation will include:

1) The reason for the drawdown.
2) The anticipated duration of the drawdown.
3) The date the drawdown will begin.
4) The rate at which the elevation of the reservoir will decrease and the amount of time required to draw the reservoir down to its required level.
5) The lowest pool elevation reached.
6) The date refilling will begin and the rate at which refilling will take place including minimum flow.
7) The date at which the reservoir will be returned to its normal operating level.

B. Request For Federal Energy Regulatory Commission (FERC) Approval

Upon expiration of the thirty day comment period, documentation of consultation will be provided to FERC along with the following information:

1) The reason for the drawdown.
2) The date the drawdown will begin.
3) The rate at which the elevation of the reservoir will decrease and the amount of time required to draw the reservoir down to its required level.
4) The lowest pool elevation reached.
5) The date refilling will begin and the rate at which refilling will take place.
6) The date when the reservoir will be returned to its normal operating level.

Article 406 continued:

All agency concerns will be addressed in the request for FERC approval. If WPSC does not adopt an agency recommendation, the request for FERC approval will include WPSC's reasons based upon project-specific information. If after 90 calendar days of FERC receiving the Request For Drawdown Approval, WPSC has not received notification from FERC, the drawdown will be conducted as outlined in the Request For Drawdown Approval.

C. Fish Stranding

All planned drawdowns will incorporate an inspection of the impoundment at least once as water levels are decreasing for the drawdown and again after the drawdown has arrived at the lowest pool level for stranded fish. Any discovered fish will be returned to the reservoir and a record will be kept of the species and whether each organism was dead or alive when it was returned to the reservoir.

II. Emergency Drawdowns

A. Agency Consultation

In the event an emergency drawdown is required, attempts will be made by telephone to consult with a representative of each of the agencies if possible, in advance of the drawdown and/or before the reservoir is refilled. If WPSC cannot contact the appropriate agencies before the emergency drawdown, WPSC will continue to attempt to contact the agencies for a period of two working days. The agency contact will include the reason for the drawdown, expected final reservoir level, and anticipated duration of the drawdown. WPSC will also consult with the agencies to determine minimum flows during refilling. Agency recommendations will be documented and provided to FERC. If WPSC cannot adhere to the agency recommendations before re-filling the reservoir, WPSC will document their reasons to FERC.

B. FERC Notification

As soon as possible, but within 10 of refilling the reservoir, WPSC will provide to FERC an outline of the emergency drawdown including the following:

1) The reason for the emergency drawdown.
2) The date and time the drawdown began.
3) The date and time the lowest pool elevation was reached.
4) Documentation of agency consultation and if required, project-specific reasons for not adopting agency recommendations.

Article 406 continued:

4) The date and time refilling began and the rate at which the reservoir was refilled or the anticipated date refilling will begin.
5) The date and time the reservoir reached its normal operating level (including subsequent FERC notification if the reservoir is not yet refilled when FERC is initially notified).

C. Fish Stranding

All planned drawdowns will incorporate an inspection of the impoundment at least once as water levels are decreasing for the drawdown and again after the drawdown has arrived at the lowest pool level for stranded fish. Any discovered fish will be returned to the reservoir and a record will be kept of the species and whether each organism was dead or alive when it was returned to the reservoir.

III. Amendments To The Drawdown Plan

WPSC reserves the right to request an amendment to the reservoir drawdown plan in consultation with the agencies and FERC.

ORIGINAL

Article 410 The licensee shall file with the Commission, for approval, a plan for the passage of large woody debris that collect near the project intake to the project tailrace to improve fish habitat downstream of the project.

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013

Plan for Passage of Large Woody Debris that Collect Near the Project Intake into the Project Tailrace to Improve Fish Habitat Downstream of the Project

Passage of Large Woody Debris at the Dam - Large woody debris and vegetative materials that collect near the dam structure shall be hydraulically passed into the tailrace of the dam. A taintor gate will be opened to the extent necessary to allow the collected debris to be passed into the dam tailrace. All human generated trash will be removed and disposed of properly.

Passage of Large Woody Debris at the Powerhouse - Large woody debris and vegetative materials that collect near power house intake shall be hydraulically passed into the tailrace of the powerhouse. The collected debris shall be directed to the opened drop gate (73 inches wide by 43 inches deep) located at the right side of the intake works and then passed hydraulically into the tailrace of the powerhouse. All human generated trash will be removed and disposed of properly.

Passage of Large Woody Debris at the Guard-Lock Bridge - Large woody debris and vegetative materials that collect at the guard-lock bridge shall be passed under the bridge into the power cannel and then passed around the powerhouse intake into the powerhouse tailrace. All human generated trash will be removed and disposed of properly.

To facilitate the passage of large woody debris under the guard-lock bridge the outflow through the powerhouse will be reduced as the outflow through the dam is increased to relieve the pressure on the debris mass. The debris will then be guided under the bridge into the power canal. Care will be taken to assure the inflow matches outflow during the time of decreasing powerhouse outflow and increasing dam outflow.

ORIGINAL

Grand Rapids Hydroelectric Project - FERC License No. 2433-004

Article 411 The licensee shall develop and file with the Commission, for approval, a plan to monitor and control the spread of Eurasian Milfoil (*Myriophyllum spicatum*) in project waters.

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014

Eurasian Milfoil Monitoring Plan

Objective: To monitor the presence and abundance Eurasian Milfoil (*Myriophyllum spicatum)* on Grand Rapids hydroelectric project lands. Eurasian Milfoil is an exotic aquatic macrophyte that exhibits aggressive characteristics. The plant is becoming increasingly common to inland lakes and rivers. In consultation with the Wisconsin Department of Natural Resources (WDNR) and the U.S. Fish and Wildlife Service (USFWS), Wisconsin Public Service agrees to periodically monitor the species.

I. Methods

A. Through consultation with Tim Rasman-WDNR, the following monitoring methods were developed. The monitoring methods will include a routine aquatic macrophyte survey utilizing a boat to take samples at fifteen transects of approximately 40 feet in length in the first study period. The transects will be marked located by use of GPS coordinates. The number of transects in the second monitoring period will be reduced to about ten using a best judgement/random selection process. Transects will be selected based upon location of macrophyte colonies and areas of likely infestation. The transect samples will be analyzed for presence and approximate abundance of Eurasian Milfoil.

Each transect will be sampled with a rake in three twelve foot diameter sections. Each section will be sampled in quarters. The first quarter will be sampled at a depth of 0-0.5 meters below the surface, the second 0.5-1.5 meters below the surface, the third 1.5-3.0 meters below the surface and the fourth beyond 3.0 meters below the surface.

II. Frequency of Survey

A. The survey will be taken beginning in August or September 1998 and every three years thereafter.

III. Documentation existing colonies.

A. The results of the survey at each transect will be displayed in table form indicating relative abundance (none, low, medium, and high) of Eurasian milfoil in the aquatic macrophyte samples taken. The completed table will be provided to the WDNR,

Article 411 continued:

MDNR and USFWS no later than December 31, every year in which the monitoring was completed.

IV. Control of existing colonies.

A. If the abundance of eurasian milfoil within the reservoir becomes great, there will exist an excellent habitat for the native weevil (*euhrychiopsis lecontei)*. Therefore, WPSC is proposing to allow the nautural features of the reservoir to maintain the population of eurasian milfoil.

V. Public Awareness.

A. Public awareness about Eurasian Milfoil will be increased by providing informational notices supplied by the MDNR and WDNR at WPSC owned public access areas in the project boundary.

Grand Rapids Hydroelectric Project - FERC License No. 2433-004

Article 411 The licensee shall develop and file with the Commission, for approval, a plan to monitor and control the spread of Purple Loosestrife (*Lythrum Salicaria)* in project waters.

Purple Loosestrife Monitoring Plan

Objective: To monitor the spread of Purple Loosestrife (*Lythrum Salicaria)* on Grand Rapids hydroelectric project lands. Purple Loosestrife is an invasive plant that exhibits aggressive characteristics. The plant is becoming increasingly common to wetland areas. In consultation with the Wisconsin Department of Natural Resources (WDNR) and the U.S. Fish and Wildlife Service (USFWS), Wisconsin Public Service agrees to periodically monitor the species.

I. Methods

A. The monitoring methods will include a shoreline survey of the impoundment the Menominee River, all water bodies, and all wetlands that occur within the project boundary. The surveys will be conducted by boat and on foot to determine a baseline of existing colonies and then continued monitoring to determine the increase of density and abundance of the species.

II. Frequency of Survey

A. The survey will be taken annually in July or August 1998, depending upon the weather, during the time when the plants are in bloom and annually thereafter.

III. Documentation existing colonies.

A. The results of the survey will be displayed on a map of the total project area. A copy of the completed map will be provided to the WDNR and USFWS no later than October 31, every year.

B. The map will indicate relative populations based on the following criteria:

a. Small Colonies of 1-5 plants
b. Medium Colonies of 6-50 plants
c. Dense Colonies of >50 plants

C. The need for further action will be discussed with the Wisconsin Department of Natural Resources.

Article 411 continued:

IV. Control of existing colonies.

A. Small colonies of 1 to 5 plants will be cut by hand and the remaining stems will be hand pulled or cut and sprayed by an appropriate aquatic herbicide.

V. Public Awareness.

A. Public awareness about purple loosestrife will be increased by displaying fact sheets supplied by the WDNR and MDNR at all WPSC owned public access areas in the project boundary.

Documentation of Consultation

cc - R P Weber CRI
R C Steinhaus CRI
R H Schmidt D2
W A Bloczynski MERH

STATE OF MICHIGAN
JOHN ENGLER, Governor
DEPARTMENT OF NATURAL RESOURCES
STEVENS T MASON BUILDING, PO BOX 30028, LANSING MI 48909 7528
K. L. COOL, Director

REPLY TO:
FISHERIES DIVISION
PO BOX 30446
LANSING MI 48909 7946

October 10, 1997

Mr. Greg Egtvedt
Assistant Director
Environmental Services
Wisconsin Public Service Corporation
P.O. Box 19002
Green Bay, WI 54307-9002

Dear Mr. Egtvedt:

Re: Grand Rapids Hydroelectric Project (FERC No. 2433)
Plan Reviews for Articles 403, 404, 405, 406, 410, and 411

The Michigan Department of Natural Resources (Department) has reviewed your proposed compliance plans for the Grand Rapids Hydroelectric Project (FERC No. 2433) as stated in your September 10, 1997 letter, received by the Department on September 12, 1997. We have the following comments:

1) Article 403 - Instream Bypassed Flow Plan

a) Release location and method - WPSCo needs to account for varying flow releases because of changes in head pressure due to the fluctuation in the reservoir. This could be done by having the U. S. Geological Survey (USGS) calibrate the tainter gate when the reservoir was at its lowest allowable level (663.95 feet NGVD). This would assure that the flow released into the spillway channel would always either meet or exceed the minimum flows.

b) Flow verification - Once the gauging system for verifying flow releases is installed on the tainter gate, WPSCo should provide an on-sight briefing to the resource agencies (WDNR, Michigan Department of Natural Resources (MDNR), and the U.S. Fish and Wildlife Service (FWS)) on the location and operation of this gauge. The plan also needs to provide for periodic verification of the gauge operation along with bypassed channel flows. We recommend that the gauge be calibrated annually and USGS should re-measure and verify that the flows in the bypassed channel are at their prescribed values, 134 CFS and 800 CFS, on an annual basis for the

period of the license. We also request that easy access to the gauge be provided to the resource agencies so we can independently verify the compliance at this project.

WPSCo also needs to install a "real-time" water temperature gauge in the spillway channel of the project to properly determine the timing of the "spring spawning date". This date is defined as the period when the average water temperature equals or exceeds 10 degrees Celsius for a period of two consecutive days (Article 402). Until such time as this temperature recorder is installed, we recommend that a "spring spawning date" of April 15 should be used.

c) Spring drought consultation - The order issuing the Grand Rapids project license, requires the licensee to consult annually with the agencies regarding the distribution of flows between the channel and tailrace during years when low spring flows are predicted. This has not been addressed in the proposed plan. The Department proposes to handle this consultation in the following manner. If river inflow to the flowage, during the April 15 through May 31 period, is equal to or greater than 1,600 cfs, no consultation would be required with the minimum flow of 800 cfs in the spillway channel and the remainder of inflow going through the powerhouse. Once river inflow fell below 1,600 cfs, the licensee should consult with the resource agencies to determine how river inflow should be split between the spillway channel and the powerhouse flow. Spring drought consultation should continue on at minimum a weekly period or less, if necessary, until the cessation of the drought or June 1.

d) Schedule – The proposed schedule for installation of gauging equipment is acceptable.

e) Evaluation plan, sampling frequency – We recommend that the evaluation be repeated every 10 years during the life of the license as the proposed one three year period is insufficient to adequately evaluate the minimum flow. In addition, the proposed period will only cover the initial colonization period not the equilibrium period that occurs later in the license period. The additional sampling periods will provide an adequate long-term analysis of how this channel is responding to the minimum flows.

f) Evaluation plan, fish sampling - Overall, the fish sampling protocol is acceptable and we appreciate the proposed notice of these sampling events. We also recommend that you contact the District Fisheries Biologist (Dell Siler, Crystal Falls) before sampling so the Conservation Officers will also be notified of your work. In addition, we will need a State of Michigan Scientific Collectors Permit.

We recommend that during the three year sampling periods that you try to visually observe the number of adult sturgeon using the bypassed river channel for spawning as an index of use of this channel. Twice weekly sampling should be done on a random schedule during the spawning flow period. Larval fish sampling using drift nets should also be conducted starting two weeks after the spawning flows are started and should be continued for two weeks after the spawning flows are discontinued. This should be done on a similar random schedule to the visual sampling on an agreed upon frequency. These two techniques are safe to do and will provide reasonable measures of the effectiveness of the spawning flow.

g) Evaluation plan, macroinvertebrate sampling The proposal to conduct macroinvertebrate sampling is a good idea but the amount of sampling is insufficient to adequately sample this group. We recommend that a minimum of 6 samples be collected in each habitat type in the bypassed river channel (riffle, run and pool). This should be sufficient to adequately sample each of the habitats in this reach and provide reasonable density information. In addition, a timed kick samples should be conducted in each macrohabitat type to adequately describe the macroinvertebrate community in this reach. We also recommend that a mussel survey be conducted in each macrohabitat type once during each sampling period following the sequential sampling procedure of the WDNR. Macroinvertebrates should be identified to the lowest possible classification possible. At minimum, macroinvertebrates should be identified to genera (except for chironomids which can be left at family) and mussels should identified to species. The combination of these techniques will fully describe the changes in the macroinvertebrate community in this channel over the life of the license and will fully evaluate the minimum flow.

2) Article 404 - Operational Compliance Plan

a) Installation - The staff gauge showing the reservoir elevation should be installed within 30 days of the acceptance of this plan by the FERC.

b) Staff gauge calibration - The proposed staff gauge should be marked in tenths of a foot and surveyed at installation to match National Geodetic Vertical Datum (NGVD) elevation. The plan should state that WPSCo is responsible for maintaining the reservoir staff gage. If the resource agencies (MDNR, WDNR and USFWS) provide evidence to WPSCo that the readings from the staff gage are inaccurate, WPSCo should immediately resurvey the gauge. If the staff gage becomes dislodged or damaged, WPSCo should resurvey the gage. The staff gauge should be re-surveyed every five years to ensure its accuracy. The plan should include all of these items to be complete.

c) Sensor calibration - The plan denotes a method by which the electronic sensors are checked against staff gauges to verify the readings. The plan states that the impoundment elevation will be checked manually at minimum monthly. Will you also check tailwater elevations manually? The plan does not indicate whether this is the case. We recommend that every time an operator arrives on site that a manual reading be taken in the tailwater and headwater and these are compared to the electronic sensor readings within 5 days or another agreed upon frequency. Anytime these measurements (the manual and sensor readings) are not within 0.1 foot of each other the sensors should have the calibration checked.

d) Data availability – We recommend that data for up to and including 3-day periods be provided to the resource agencies within 2 working days of the request. Your proposed delivery period for other periods is acceptable.

e) Ice free shutdown periods - Article 401 of the license requires WPSCo in case of project shutdown during "ice-free" periods to pass river inflow through the project within 10 minutes, or in a manner consistent with safe project operation, if longer. The plan as proposed will not pass river inflow through the project within 10 minutes of project shutdown. In the event of a power

outage that results in loss of flow through the generators, the WPSCo dispatcher should attempt to restore plant power and generator operation using remote control capabilities. If the plant does not currently have the capabilities to be started by remote control from the 24-hour manned dispatch center, this capability needs to be installed. If the plant cannot be restored by remote control, the dispatcher should operate a remote controlled tainter gate(s) to restore the river flow to the spillway. The plant should be equipped with an automatic start emergency generator to provide power to operate the tainter gate(s). This should be done from a remote location that is manned 24 hours a day, because it would take too long for an operator to arrive on site. If a single tainter gate cannot pass project inflow, than a second gate should be opened to match river flows at the time of the shutdown.

The Department concurs with the five minute warning period prior to opening a tainter gate, however we do not concur with the release of only 1000 cfs. The average annual flow through this project is 3,140 cfs and a flow of 1000 cfs is exceeded 100 percent of the time. Further arrangements have to be made at this project to pass river inflow within 10 minutes during project shutdowns. How will you determine the amount of flow to be matched during shutdown periods? We recommend that you match the USGS gauge flows immediately upstream of your project. This plan should be revised accordingly.

f) Ice cover plant shutdown operation - During plant blackout during the "ice-cover" period, an attempt should be made by a project dispatcher located at the 24-hour manned dispatch center to remotely restore plant power and generator operation. If the plant generators cannot be restored to power by remote control, the heated tainter gate should be opened by remote control to pass project inflow. A project operator should be summoned to the plant at the first knowledge of a plant blackout. This operator can manually open other tainter gates that may be needed if the plant cannot be brought back on line and if the one heated tainter gate does not have a large enough capacity to pass river inflow. How will you determine the amount of flow to be matched during shutdown periods? We recommend that you match the USGS gauge flows immediately upstream of your project. The plan should be revised accordingly.

g) Definitions - The Department concurs with the definitions proposed for "ice-free" and "ice-cover" periods.

3) Article 405 - Two Year Operation Evaluation Plan - The plan includes details of how a USGS gauge will be installed upstream of the project impoundment. The Department concurs with the proposed installation, calibration, and maintenance of this gauge.

The draft and final reports must assess how closely the Grand Rapids Project operates in a run-of-river mode. This plan does not identify how the USGS gauge data and the headwater and tailwater hourly gauge readings will be used to quantify run-of-river compliance. What criteria are you proposing to use to verify compliance using your data and USGS data? This issue must be dealt as soon as possible and we expect a proposal from you on this issue in the near future.

4) Article 406 - Reservoir Drawdown Plan

a) Maintenance Drawdowns, Inland Lakes and Streams Act Permits - The Department recommends that an Inland Lakes and Streams Act (Public Act 346) permits be applied for all planned maintenance drawdowns greater than the agreed upon operational band. This measure allows for the necessary coordination between our Department and the your company along with any mitigative measures. It also allows for the customization of mitigative measures for each drawdown. The permit will act as an individual drawdown plan and should be filed with the Commission at minimum 45 days before the drawdown is to occur.If the Inland Lakes and Streams Act (Public Act 346) is changed to not require permits for such operations, then WPSCo should consult with the Department on drawdown and refill rates and necessary mitigation at least 120 days before such drawdowns (when possible) are to commence which are greater than the agreed upon operational band. The company should then submit the individual drawdown plan with the necessary drawdown and refill rates and mitigation to the Commission for approval along with the Department's recommendations at minimum 60 days before the drawdown is to occur.

b) Maintenance Drawdowns, Preferred Timing, Rates and Flows - The Department prefers that all planned drawdowns be conducted during August and September. We recommend that a maximum drawdown rate of 0.2 feet per hour be used but this rate will be customized for each drawdown as necessary. Additionally, we recommend that minimum flow of 75% of inflow be provided from this project during refill periods but this value will be customized for each drawdown as necessary. Both of these values are excellent starting points for agency consultation or permit application.

c) Maintenance Drawdowns, Fish Stranding - The Department recommends that during each drawdown, the impoundment should be surveyed for stranded fish. All fish should be accounted for and stranded fish returned to the main river channel.

d) Emergency drawdowns, Notification - The Department recommends that the resource agencies be notified of any emergency drawdowns within 2 working days.

e) Emergency drawdown, Inland Lakes and Streams Act Permits - Within 7 days, the Department recommends that an Inland Lakes and Streams Act (Public Act 346) permit be applied for all emergency drawdowns greater than the agreed upon operational band. This measure allows for the necessary coordination between our Department and the your company along with any mitigative measures. It also allows for the customization of all mitigative measures for each emergency drawdown. The permit will act as the emergency drawdown plan for each instance and should be filed with the Commission at minimum 7 days before the drawdown is to occur, when possible, or within 30 days of the notification of emergency drawdowns when early notification is not possible.

If the Inland Lakes and Streams Act (Public Act 346) is changed to not require permits for such operations, then WPSCo should consult with the Department on emergency drawdown and refill rates and necessary mitigation within 7 days of such drawdowns are to commence which are

greater than the agreed upon operational band. The company should then submit the individual emergency drawdown plans with the necessary drawdown and refill rates and mitigation to the Commission for approval along with the Departments recommendations 7 days before the drawdown is to occur, when possible, or within 30 days of the notification of emergency drawdowns when early notification is not possible.

f) Emergency Drawdowns, Other Recommendations - The fish stranding, drawdown and minimum flow recommendations as stated above are also applicable to emergency drawdowns.

5) Article 410 - Woody Debris Passage Plan - The Department concurs with your plan to pass large woody debris through the project. In addition to large woody debris, all vegetative materials should also be sluiced downstream. All human generated trash should be removed and properly disposed of in accordance with state law.

6) Article 411 - Purple Loosestrife and Eurasian Milfoil Monitoring Plan

a) Purple Loosestrife, Objective - The objective of this plan should not only include the monitoring of the spread of this invasive exotic plant species, but also provide for its control and elimination if it becomes established at this project. This is clearly the intent of Article 411 of the license. In addition, the Department should also be involved in the consultation on the provisions of this plan as the Project is located on a Wisconsin -Michigan boundary water.

b) Purple Loosestrife, Monitoring Period - Monitoring should include the entire shoreline of the Grand Rapids Impoundment, the shoreline of the Menominee River downstream of the project's powerhouse and spillway, as well as any other waters and wetlands within the project boundary. The Department recommends that the last week of July and the first week of August should be the typical survey period. The recommended period will ensure that both plants will be at their maximum blooming and would be the easiest to identify. However, weather conditions each year will be the determining factor when surveys are actually done.

c) Purple Loosestrife, Monitoring Methods - We recommend using US Agricultural Stabilization and Conservation Service (ASCS) true color aerial photos of the project area to assist in your surveys of the impoundments, if available. The prominent color of purple loosestrife will show up well on photos. The area of each stand should be estimated. In addition to the relative abundance estimate that you propose, stem densities should be estimated at a minimum of 3 locations within the stand using a meter square frame. At least 10% of each stand should be measured for plant density and an average stem density computed. Locations for this species should be permanently marked using a shoreline benchmark with a known GPS coordinate.

d) Purple Loosestrife, Monitoring Reports - The results of the annual surveys should be sent to the resource agencies no later than October 31 of each year. Because of the fast nature of the spread of this exotic plant, we feel that it is necessary that the resource agencies be kept abreast of the spread of this plant more frequently than every other year. Since the map has to be updated annually to send this information out to the resource agencies should not be a great hardship to WPSCo.

e) Purple Loosestrife, Control We recommend that WPSCo remove all purple loosestrife plants at the earliest stage of an infestation, therefore you should not wait to consult with the resource agencies prior to removal of the plants. All small colonies of plants should be removed immediately upon detection. It is imperative that the entire plant, including the root system, be removed. By simply pulling the stems by hand, the root system can be left in the ground. A sharp garden spade should be carried along on the annual surveys to aid in the complete removal of any plants found.

If medium or dense colonies of purple loosestrife are found on project lands, the licensee should work to control or eliminate purple loosestrife, upon the request of the WDNR, MDNR and/or the FWS at any time during the period of the license.

f) Purple Loosestrife, Public Awareness – The Department and the Michigan Department of Environmental Quality also has fact sheets that should be displayed at all public access areas near your project.

g) Eurasian Milfoil, Objective - The objective of this plan should not only include the monitoring of the spread of this invasive exotic plant species, but also provide for its control and elimination if it becomes established at this project. This is clearly the intent of Article 411 of the license. In addition, the Department should also be involved in the consultation on the provisions of this plan as the Project is located on a Wisconsin-Michigan boundary water.

h) Eurasian Milfoil, Monitoring - The proposed plan recommends that only five transects be conducted on the Grand Rapids Flowage. It is the recommendation of Tim Rasman of the WDNR that at least fifteen transects be made on each water body sampled. Therefore, we feel that this plan should be modified to include at least fifteen transects to monitor for the presence of Eurasian Milfoil on the Grand Rapids Flowage. This method will provide information on the abundance of this species but does not provide information on the overall distribution of this plant on the impoundment.

To obtain overall distribution of this plant on the project waters, the entire surface should be visually inspected and all Eurasian milfoil mats should be identified on the impoundment Locations for this species should be permanently marked using GPS coordinates around the perimeter of the mat, if large. If it is a small mat then a single GPS coordinate in the center of the mat will be sufficient. The perimeter should be marked around each matted area with floating markers. The perimeter should be measured and the identified mat(s) within each area measured for density. Overall mat thickness should be estimated using multiple locations within each mat.

i) Eurasian Milfoil, Public Awareness – The Department and the Michigan Department of Environmental Quality also has fact sheets that should be displayed at all public access areas near your project.

With the incorporation of the above comments, these plans will be acceptable to the Department. We appreciate the opportunity to comment on these plans. If you have any questions on this matter, please contact me.

Sincerely,

Gary E. Whelan
MDNR FERC Project Coordinator
FISHERIES DIVISION
(517) 373-1280

cc: Mr. Thomas Thuemler, WDNR
Mr. James Fossum, USFWS
Ms. Angela Tornes, NPS
Mr. James Schramm, MHRC
Mr. Gary Schnicke, MHRC

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Tommy G. Thompson, Governor
George E. Meyer, Secretary
William R. Selbig, District Director

Department of Natural Resources
Box 127, 101 N. Ogden Rd.
Peshtigo, Wisconsin 54157
TELEPHONE 715-582-5000
FAX 582-5005

October 9, 1997

IN REPLY REFER TO: 3600

Mr. Greg Egtvedt
Wisconsin Public Service Corporation
700 North Adams Street
P.O. Box 19002
Green Bay, WI 54307-9002

cc - R H Schmidt D2
W A Bloczynski MERH
R P Weber CRI
E N Newman A2
S C Puzen A2

SUBJECT: Comments on Plans Developed for Grand Rapids Hydroelectric Project, FERC No. 2433

Dear Greg:

The Wisconsin Department of Natural Resources (WDNR) has reviewed your proposed compliance plans for the Grand Rapids Hydroelectric Project (FERC No. 2433) and has the following comments .

Article 403 - Instream Bypassed Flow Plan

The licensee needs to account for varying flow releases because of changes in head pressure due to the fluctuation in the reservoir. This could be done by having the U. S. Geological Survey (USGS) calibrate the taintor gate when the reservoir was at its lowest allowable level (663.95 feet NGVD). This would assure that the flow released into the spillway channel would always either meet or exceed the minimum flows.

Once the gauging system for verifying flow releases is installed on the taintor gate, within 30 days of the approval of this plan, the licensee should provide an on-sight briefing to the resource agencies (WDNR, Michigan Department of Natural Resources (MDNR), and the U.S. Fish and Wildlife Service (FWS)) on the location and operation of this gauge.

There needs to be some "real-time" water temperature gauge installed in the spillway channel of the project. This is needed to determine the timing of the "spring spawning date", defined as the date when the average water temperature equals or exceeds 10 degrees Celsius for a period of two consecutive days (Article 402). Until such time as this temperature recorder is installed, a "spring spawning date" of April 15 should be used.

The USGS should re-measure and verify that the flows in the bypassed channel are at their prescribed values, 134 CFS and 800 CFS, on an annual basis for the period of the license.

The order issuing the Grand Rapids project license, requires the licensee to consult annually with the agencies regarding the distribution of flows between the channel and tailrace during years when low spring flows are predicted. This has not been addressed in the proposed plan. The WDNR proposes to handle this consultation in the following manner. If river inflow to the flowage, during the April 15 through May 31 period, is equal to or greater than 1,600 cfs, no consultation would be required with the minimum flow of 800 cfs in the spillway channel and the remainder of inflow going through the powerhouse. Once river inflow fell below 1,600 cfs, the licensee should consult with the resource agencies to determine how river inflow should be split between the spillway channel and the powerhouse flow.

Article 404 - Operational Compliance Plan

The staff gauge showing the reservoir elevation should be installed within 30 days of the acceptance of this plan by the FERC.

Article 401 of the license requires the licensee in case of project shutdown during "ice-free" periods to pass river inflow through the project within 10 minutes, or in a manner consistent with safe project operation, if longer. The plan as proposed will not pass river inflow through the project within 10 minutes of project shutdown. In the event of a power outage that results in loss of flow through the generators, the licensee's dispatcher should attempt to restore plant power and generator operation using remote control capabilities. If the plant does not currently have the capabilities to be started by remote control from a 24 hour manned dispatch center, this capability needs to be installed. If the plant cannot be restored by remote control, the dispatcher should operate a remote controlled tainter gate(s) to restore the river flow to the spillway. The plant should be equipped with an automatic start emergency generator to provide power to operate the tainter gate(s). This should be done from a remote location that is manned 24 hours a day, because it would take too long for an operator to arrive on site. If a single taintor gate cannot pass project inflow, than a second gate should be opened to match river flows at the time of the shutdown. The WDNR concurs with the five minute warning period prior to opening a taintor gate, however we do not concur with the release of only 1000 cfs. The average annual flow through this project is 3,140 cfs and a flow of 1000 cfs is exceeded 100 percent of the time. Further arrangements have to be made at this project to pass river inflow in the result of a project shutdown within 10 minutes. This plan should be revised accordingly.

In the result of a plant blackout during the "ice-cover" period, an attempt should be made by a project dispatcher located at a 24 hr manned dispatch center to remotely restore plant power and generator operation. If the plant generators cannot be restored to power by remote control, the heated taintor gate should be opened by remote control to pass project inflow. A project operator should be summoned to the plant at the first knowledge of a plant blackout. This operator can manually open other taintor gates that may be needed if the plant cannot be brought back on line and if the one heated taintor gate does not have a large enough capacity to pass river inflow.

The WDNR concurs with the definitions proposed for "ice-free" and "ice-cover" periods.

Article 405 - Two Year Operation Evaluation Plan

The plan includes details of how a USGS gauge will be installed upstream of the project impoundment. The WDNR concurs with the proposed installation, calibration, and maintenance of this

gauge. The draft and final reports that are to assess how closely the Grand Rapids Project operates in a run-of-river mode need to identify how the USGS gauge data and the headwater and tailwater hourly gauge readings will be used to quantify project operations. If this is not addressed in this plan, consultation will be needed with the agencies prior to the licensee's preparation of these reports.

Article 406 - Reservoir Drawdown Plan

The WDNR recommends that the licensee consult with the resource agencies at a minimum of 30 days prior to any planned drawdown to assure that these agencies have sufficient time to review operating procedures designed to minimize adverse environmental impacts.

For emergency drawdowns the licensee should notify the resource agencies within two working days of any emergency or Commission ordered drawdown. The licensee should provide the resource agencies with the reason for the drawdown, expected reservoir level, and anticipated duration of the drawdown. In coordination with the resource agencies the licensee should plan to develop appropriate operating procedures during the drawdown. A stranded fish survey should occur during the drawdown with all stranded fish being returned to the main river channel.

Article 410 - Woody Debris Passage Plan

The WDNR concurs with the licensee's plan to pass large woody debris through the project.

Article 411 - Purple Loosestrife and Eurasian Milfoil Monitoring Plan

Purple Loosestrife

The objective of this plan should not only include the monitoring of the spread of this invasive exotic plant species, but also provide for its control and elimination if it becomes established at this project. This is clearly the intent of Article 411 of the license. In addition the MDNR should also be involved in the consultation on the provisions of this plan, being that the Project is located on a Wisconsin - Michigan boundary water.

Monitoring should include the entire shoreline of the Grand Rapids Impoundment, the shoreline of the Menominee River downstream of the project's powerhouse and spillway, as well as any other waters and wetlands within the project boundary.

The results of the annual surveys should be sent to the resource agencies no later than October 31 of each year. Because of the fast nature of the spread of this exotic plant, we feel that it is necessary that the resource agencies be kept abreast of the spread of this plant more frequently than every other year. Since the map has to be updated annually to send this information out to the resource agencies should not be a great hardship to the licensee.

It is advisable to remove all purple loosestrife plants at the earliest stage of an infestation, therefore the licensee should not wait to consult with the resource agencies prior to removal of the plants. All small colonies of plants should be removed immediately upon detection. It is imperative that the entire plant, including the root system, be removed. By simply pulling the stems by hand, the root system

can be left in the ground. A sharp garden spade should be carried along on the annual surveys to aid in the complete removal of any plants found.

If medium or dense colonies of purple loosestrife are found on project lands, the licensee should work to control or eliminate purple loosestrife, upon the request of the WDNR, MDNR and/or the FWS at any time during the period of the license.

Eurasian Milfoil

The objective of this plan should not only include the monitoring of the spread of this invasive exotic plant species, but also provide for its control and elimination if it becomes established at this project. This is clearly the intent of Article 411 of the license. In addition the MDNR should also be involved in the consultation on the provisions of this plan, being that the Project is located on a Wisconsin - Michigan boundary water. The proposed plan recommends that only five transects be conducted on the Grand Rapids Flowage. It is the recommendation of Tim Rasman of the WDNR that at least fifteen transects be made on each water body sampled. Therefore we feel that this plan should be modified to include at least fifteen transects to monitor for the presence of Eurasian Milfoil on the Grand Rapids Flowage.

Thank you for the opportunity to review these plans and if you have any questions feel free to contact me.

Sincerely,

Thomas F. Thuemler
Regional FERC Coordinator

cc: Jim Fossum - FWS
Gary Whelan - MDNR

c:\data\wp\tom\grandrap.pln

bcc - R H Schmidt D2
W A Bloczynski Mer Hydro
R P Weber Cri
R C Steinhaus Cri
S C Puzen A2

Wisconsin Public Service Corporation
(a subsidiary of WPS resources corporation)
700 North Adams Street
P.O. Box 19002
Green Bay, WI 54307-9002

September 10, 1997

Jim Fossum
U.S. Fish & Wildlife Service
1015 Challenger Court
Green Bay, WI 54311

Dear Jim:

Re: Grand Rapids Hydroelectric Project - New FERC License
Articles 403, 404, 405, 406, 410, & 411

Enclosed are the following Wisconsin Public Service Corporation - Grand Rapids Hydroelectric Project compliance plans for U.S. Fish & Wildlife Service review as per Articles 403, 404, 405, 406, 410, & 411 of the new Federal Energy Regulatory Commission license (License #2433-004):

Article 403 - Instream Bypassed Flow Plan
Article 404 - Operational Compliance Plan
Article 405 - Two Year Operation Evaluation Plan
Article 406 - Reservoir Drawdown Plan
Article 410 - Woody Debris Passage Plan
Article 411 - Purple Loosestrife and Eurasian Milfoil Monitoring Plan

To comply with license article requirements, please provide your response within 30 days of this letter. Should you require clarifications or additional information, don't hesitate to contact me. Thank you.

Sincerely,

Gregory W. Egtvedt
Assistant Director
Environmental Services

Enclosure

bcc - R H Schmidt D2
W A Bloczynski Mer Hydro
R P Weber Cri
R C Steinhaus Cri
S C Puzen A2

Wisconsin Public Service Corporation
(a subsidiary of WPS resources corporation)
700 North Adams Street
P.O. Box 19002
Green Bay, WI 54307-9002

September 10, 1997

Gary Whelan
Michigan Department of Natural Resources
Steven T. Mason Building
P.O. Box 30028
Lansing, MI 48909

Dear Gary:

Re: Grand Rapids Hydroelectric Project - New FERC License
Articles 403, 404, 405, 406, 410, & 411

Enclosed are the following Wisconsin Public Service Corporation - Grand Rapids Hydroelectric Project compliance plans for Michigan Department of Natural Resources review as per Articles 403, 404, 405, 406, 410, & 411 of the new Federal Energy Regulatory Commission license (License #2433-004):

Article 403 - Instream Bypassed Flow Plan
Article 404 - Operational Compliance Plan
Article 405 - Two Year Operation Evaluation Plan
Article 406 - Reservoir Drawdown Plan
Article 410 - Woody Debris Passage Plan
Article 411 - Purple Loosestrife and Eurasian Milfoil Monitoring Plan

To comply with license article requirements, please provide your response within 30 days of this letter. Should you require clarifications or additional information, don't hesitate to contact me. Thank you.

Sincerely,

Gregory W. Egtvedt
Assistant Director
Environmental Services

Enclosure

bcc - R H Schmidt D2
W A Bloczynski Mer Hydro
R P Weber Cri
R C Steinhaus Cri
S C Puzen A2

Wisconsin Public Service Corporation
(a subsidiary of WPS resources corporation)
700 North Adams Street
P.O. Box 19002
Green Bay, WI 54307-9002

September 10, 1997

Tom Thuemler
Wisconsin Department of Natural Resources
P.O. Box 127
411 E. Front Street
Peshtigo, WI 54157

Dear Tom:

Re: Grand Rapids Hydroelectric Project - New FERC License
Articles 403, 404, 405, 406, 410, & 411

Enclosed are the following Wisconsin Public Service Corporation - Grand Rapids Hydroelectric Project compliance plans for Wisconsin Department of Natural Resources review as per Articles 403, 404, 405, 406, 410, & 411 of the new Federal Energy Regulatory Commission license (License #2433-004):

Article 403 - Instream Bypassed Flow Plan
Article 404 - Operational Compliance Plan
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Article 406 - Reservoir Drawdown Plan
Article 410 - Woody Debris Passage Plan
Article 411 - Purple Loosestrife and Eurasian Milfoil Monitoring Plan

To comply with license article requirements, please provide your response within 30 days of this letter. Should you require clarifications or additional information, don't hesitate to contact me. Thank you.

Sincerely,

Gregory W. Egtvedt
Assistant Director
Environmental Services

Enclosure

Article 403 The Licensee shall file with the Commission, for approval, an instream bypassed flow plan to document the licensee's proposed measures to ensure the release of instream flows downstream of the project spillway as described in Article 402.

(1) Guarantee the release of required instream flows to the bypassed reach;

Plan for Guaranteeing Release of Required Instream Flow to Bypassed Reach

The release of the required instream flows to the bypassed reach shall be accomplished by opening one (1) taintor gate, taintor gate nine (9), in the gated spillway section of the dam to a prescribed opening. This prescribed opening will provide either 134 CFS or 800 CFS to be released to the bypassed reach. The location of taintor gate number nine (9) is shown on drawing WSK-500, Exhibit-1.

(2) Verify the amount of flow being released;

Plan for Verifying the Amount of Flow Being Released to the Bypassed Reach

Flow being released to the bypassed reach shall be verified by measurement. The taintor gate shall be opened to a prescribed amount and the flow will be measured by the USGS. The USGS will calibrate the taintor gate opening to ensure that the outflow of the taintor gate is either 134 CFS or 800 CFS. The amount of taintor gate opening that produces the required flow will be documented and used as the prescribed opening(s) for 134 CFS and 800 CFS. A gauging device shall be installed on the taintor gate to indicate that the gate is at its prescribed opening for 134 CFS and 800 CFS releases.

(3) Install, including the schedule, necessary structures or equipment;

Plan for Installing, Including the Schedule, Necessary Structures or Equipment

Installing Gauging Equipment - Gauging equipment shall be installed on taintor gate nine, to the bypassed reach. The gauge shall indicate the prescribed opening of the taintor gate for both the 134 CFS flow and the 800 CFS flow.

The gauge will be attached to the right pier of taintor gate number nine (9). The upper structural support arm of the taintor gate shall be used as the gate position indicating device as it moves up or down across the front of gauge. Gauge markings will be at the prescribed positions for 134 CFS discharge and 800 CFS discharge. Gauge will be visible from the left side of the dam.

Article 403 continued:

Schedule for installing Gauging Equipment -The gauge system shall be installed within thirty (30) days after plan approval.

(4) Consult with Michigan Department of Natural Resources (Michigan DNR), Wisconsin Department of Natural Resources (Wisconsin DNR), and U.S. Fish and Wildlife Service (FWS) regarding the operation of the flow release mechanism and methods to verify flow releases on an annual basis;

Plan for Consulting with Agencies regarding the Operation of the Flow Release Mechanism and Methods to Verify Flow Releases on an Annual Basis

The USGS will re-measure and verify that the flows in the bypassed channel are at their prescribed values, 134 CFS and 800 CFS.

(5) Evaluate, in consultation with Michigan DNR, Wisconsin DNR, and FWS, the effectiveness of minimum flows in spillway channel to enhance fish and other aquatic resources;

Plan for Evaluating the Effectiveness of Minimum Flows in The Spillway Channel for Fish and Other Aquatic Resources

The effectiveness of the minimum flows in the Grand Rapids spillway channel will be evaluated by surveying fish and macroinvertebrate populations in the area during a three year period (1998, 1999, & 2000).

Fish Population Estimates

Fish population estimates will be determined using the Zippin Removal Method, as recommended by the Wisconsin DNR. The Zippin Removal method is a recommended method for making population estimates in small warmwater streams.

The Zippin Removal Method is used to calculate the population graphically. Catch will be plotted versus cumulative catch and the population estimated as the x intercept (see Figure 1).

When making the population estimates using the Zippin Removal Method, the following will be assumed:

- The population is closed such that there is no immigration, emigration, or mortality.
- There is no natural mortality.
- All fish being estimated have an equal probability of capture.

Article 403 continued:

If catchability is different between different size groups of species then the size groups will be split and estimated separately. Young-of-the-year estimates will be made separately from adult fish estimates.

The sampling effort will be completed in two 900 foot long sample sections that will be established in the spillway channel area. The sample sections will be located to ensure they represent habitat similar to the spillway channel in general. Each sample section will be sampled two times annually for the three-year study period (late June/early July and late August/early September). The 134 cubic feet per second (cfs) minimum flow will be maintained during the sampling efforts. Block nets will be used at both ends of the sample sections to insure the populations are closed. At least three passes with electric shocking equipment will be completed in each sample section during each sampling event. Captured fish numbers and lengths will be recorded. All captured fish will be returned to the spillway channel outside the two sample sections.

Michigan DNR, Wisconsin DNR, and FWS (agencies) will be informed of the proposed sampling event a minimum of two weeks in advance of the scheduled date. The agencies will be informed as soon as possible should high river flows and/or other unforseen circumstances require sample date rescheduling.

Based upon personal communications with Wisconsin DNR there are no safe and/or accurate sampling methods available to evaluate the effectiveness of the spring spawning 800 cfs flow.

Macroinvertebrate Population Survey

The macroinvertebrate population in the spillway channel will be surveyed annually in June during the three-year study period. A study that provides a quantitative analysis using wet weight (biomass) and taxonomic identification by family will be conducted.

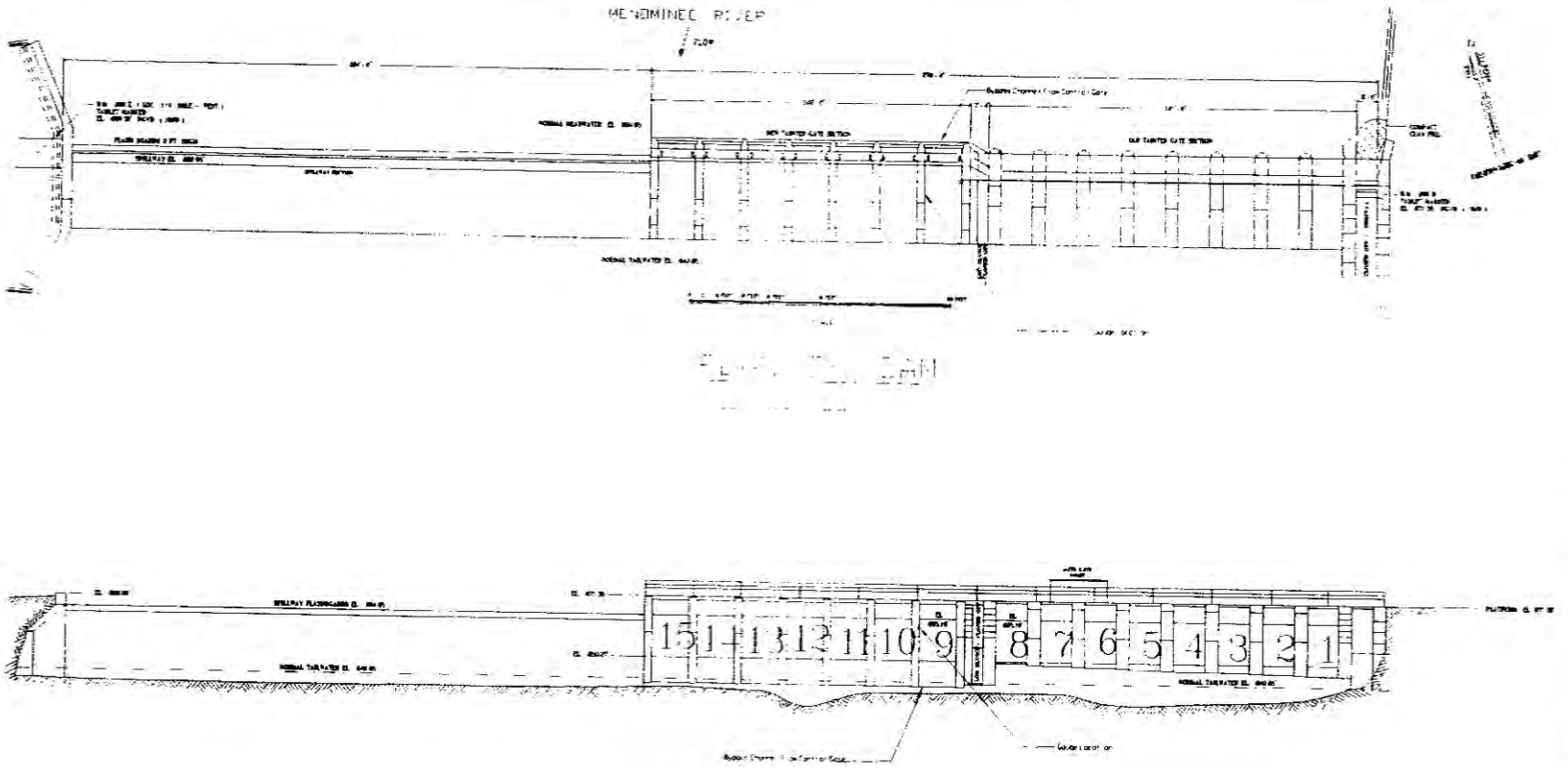
Four samples will be taken during each study event using a Surber Sampler, as recommended by Wisconsin DNR. The Surber Sampler consists of two 30.5-cm frames, hinged together. They are designed to be placed by hand onto sand, gravel, or rubble substrate types in shallow streams, or shallow areas of rivers. When in use one frame rests on the substrate and the other remains upright and holds a nylon net. The Sampler is position with its net mouth open, facing upstream. The two frames are located at right angles, one frame marking off the

Article 403 continued:

areas of substrate to be sampled and the other frame supporting the net to strain out organisms washed into it from the sample area. Sampling protocol will use as guidelines the general operating procedures outlined in"Macroinvertebrate Field & Laboratory Methods for Evaluating the Biological Integrity of Surface Waters," (EPA - Nov. 1990).

Upon field collection, organisms will be placed into a sample container (wide mouthed jar) and preserved for laboratory analysis. As organisms are identified during the laboratory analysis, the individuals in each taxonomic family will be counted and the numbers recorded on bench sheets. To determine wet weights, following taxonomic identification, the organisms will be soaked in distilled water for 30 minutes, centrifuged for one minute at 140 g in wire mesh cones, and weighed to the nearest 0.01mg.

Annual fish and macroinvertebrate 1998 and 1999 survey summaries will be provided to the agencies. A report documenting the results of the three-year survey will be provided to the agencies and FERC within 180 days of the completion of the late August/early September 2000 study event.



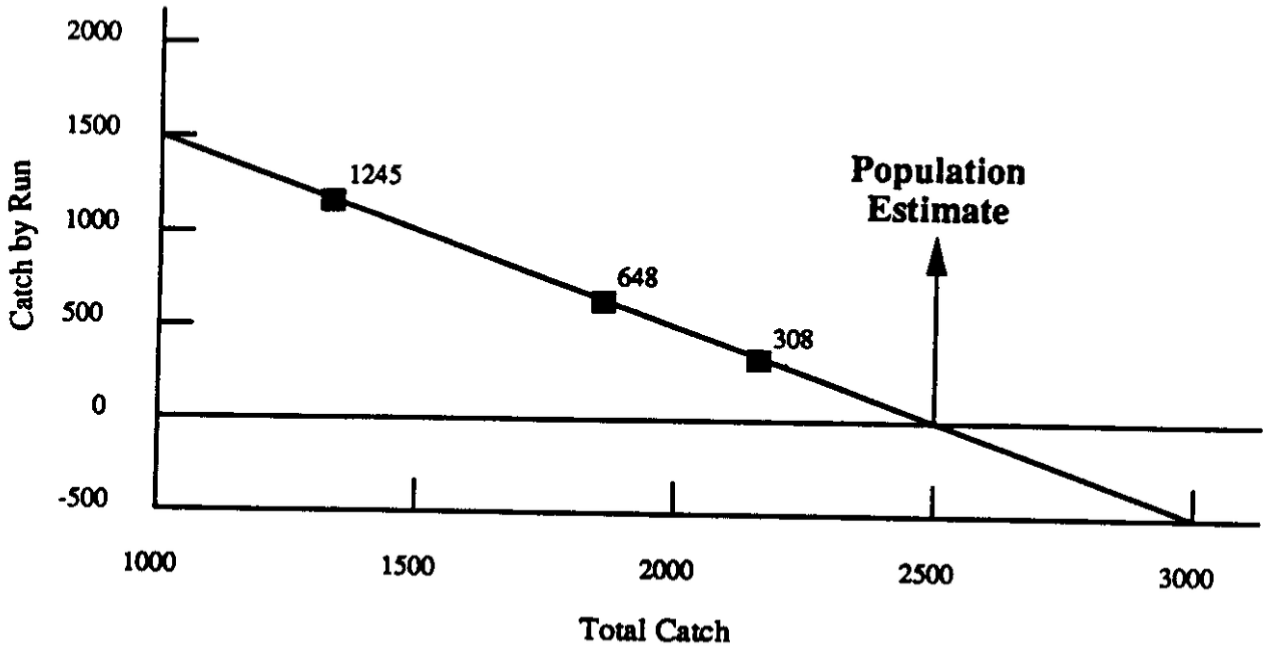
Gate 9 used for flow to Bypass Tunnel

WISCONSIN PUBLIC SERVICE CORPORATION GREEN BAY, WISCONSIN		
GRAND RAPIDS HYDRO PLANT PLAN OF DAM AND PROFILE		
DRAWN	BOOK NUMBER	SHEET NO.
DATE		WSE-500
	CADD FILE WSE500GR	
	PLOT SIZE = 40" X 28"	

Exhibit 1

2433-3

Figure 1. Hypothetical Zippin Estimate



Article 404 The Licensee shall file with the Commission, for approval, an operational compliance plan to document compliance with run-of-river operations and reservoir elevation range specified by Article 401.

(1) Install, calibrate, and maintain a staff gauge in the reservoir that is visible to the public with the prescribes operating levels clearly marked;

Plan for Installing, Calibrating, and Maintaining Reservoir Staff Gauge

Staff Gauge Installation - A staff gauge showing the reservoir elevation will be installed on the east side of the dam. The staff gauge will be visible from the dam driveway. A sign listing the operating limits will be installed on the concrete pier above the staff gauge.

Staff Gauge Calibration - The staff gauge will be calibrated in increments of 0.1 foot. The upper and lower operating limit will be marked by a "notch" on the staff gauge.

Staff Gauge Maintenance - The staff gauge and information sign will be checked monthly as part of the Operators Monthly Dam Inspection.

(2) Operate automatic water level sensors to record headwater and tailwater elevations, and devices to record power generation, capable of providing record at 60-minute intervals;

Plan for Installing, Calibrating, and Maintaining Headwater Sensor

Installing Headwater Sensor - A headwater sensor is already installed and in service at the dam. The headwater sensor is a pressure transducer that measures the water pressure above sensor datum. The output of the pressure transducer, a 0 - 1 milliamp signal, is used for the alarm, operating, recording and monitoring systems. This headwater signal is sent via phone line to a SCADA system at the Energy Control Center in Green Bay.

Calibrating Headwater Sensor - The headwater sensor is calibrated by raising or lowering the sensor in its standpipe until the reading matches the reservoir staff gauge reading. Sensor and staff gauge readings are verified for coincidence as part of the monthly dam inspection.

Maintaining Headwater Sensor - Sensor shall be checked for calibration accuracy two times per year, spring and fall. The headwater sensor shall be checked by applying a measured water column that corresponds to the minimum,

Article 404 continued:

mid, and high range of the sensor. The electrical output of the sensor shall be checked against these three calibration points and re-calibrated as required to assure sensor accuracy.

Plan for Installing, Calibrating, and Maintaining Tailwater Elevation Sensor

Installing Tailwater Elevation Sensor - A tailwater sensor is already installed and in service at the tailrace of the powerhouse. The tailwater sensor consists of a pressure transducer lowered into the tailwater well. The transducer operates on water pressure and contains a breather tube for sensing atmospheric pressure to maintain the highest possible accuracy. The transducer produces a four to 20 milliamp signal proportional to the water depth above sensor datum. The tailwater signal is also sent via phone line to a SCADA system at the Energy Control Center in Green Bay.

Calibrating Tailwater Elevation Sensor - The tailwater sensor is calibrated by raising or lowering the transducer until the reading matches the measured elevation of the tailwater. The tailwater elevation shall be measure from a tailrace deck benchmark whose elevation is 646.85 ft. NGVD.

Maintaining Tailwater Elevation Sensor - Sensor shall be checked for calibration accuracy two (2)times per year, spring and fall. The tailwater sensor shall be checked by applying a measured water column that corresponds to the minimum, mid, and high range of the sensor. The electrical output of the sensor shall be checked against these three calibration points and re-calibrated as required to assure sensor accuracy.

(3) Maintain records of headwater and tailwater elevations and power generation;

Plan for Maintaining Headwater, Tailwater, and Power Generation Records

Maintaining Headwater Elevation Records - Hourly headwater elevations records are maintained through the Distributed Energy Management System (DEMAXX) at the Energy Control Center in Green Bay. These records will indicate hourly headwater elevation at the dam and are part of the daily operating log. Presently, this is an operational system.

Maintaining Tailwater Elevations Records - Hourly tailwater elevations records are maintained through the Distributed Energy Management System (DEMAXX) at the Energy Control Center in Green Bay. These records will indicate hourly tailwater elevation at the powerhouse tailrace and are part of the daily operating log. Presently, this is an operational system.

Article 404 continued:

Maintaining Power Generations Records - Hourly generation records are maintained through the Distributed Energy Management System (DEMAXX) at the Energy Control Center in Green Bay. These records will indicate total plant power generation, individual unit power generation, and generating unit starts or shut-downs during the hour. This information is part of the daily operating log. Presently, this is an operational system.

(4) Provide operational data to the interested agencies in a timely manner;

Plan for Providing Operational Data

Providing Operational Data to the Interested Agencies in a Timely Manner - Upon request for operational data from an interested agency the requested data shall be sent to the requesting agency by U.S. mail within five (5) working days after receipt of a request for data.

Data that is routinely recorded is as follows: unit hourly generation, plant hourly generation, discharge through the generating units, gate discharge, headwater elevation, tailwater elevation, and substation bus voltage.

Requests for operational data can be made by calling the Grand Rapids Hydro Plant at 906-653-6925 or the Crivitz Operation Center at 715-854-7498.

(5) Pass project inflow downstream within 10 minutes or in a manner consistent with safe project operation, in the event of project shutdown during "ice-free" periods;

Plan for Passing Project Inflow Downstream in the Event of Project Shutdown During "Ice-Free" Periods

Passing Project Inflow during "Ice-Free" Periods - In the event of a project shutdown during "ice-free" periods plant operating personnel shall be immediately dispatched to the project and the automated taintor gate shall be ramped open to discharge 1000 CFS.

A member of the plant operating staff is on call at all times. The plant operator, upon arrival at the plant, shall attempt to restart the generating unit to pass project inflow. If unable to restart the generating units, the taintor gates will be opened to pass project inflow.

The sequence of operation for the automated taintor gate operation is as follows:

1) A five (5) minute warning period to alert anyone in the bypassed channel that a rapid increase in flow is about to occur.
2) Taintor gate is raised to a prescribed set point to pass 1000 CFS.

Article 404 continued:

Taintor gate rate of change is one (1) minute per foot. For the automated taintor gate to change from full closed position to the prescribed 1000 CFS discharge position will take about five (5) minutes for warning period and five (5) minutes for the gates to be opened. A total of ten (10) minutes after project shutdown.

(6) Pass project inflow downstream as soon as possible and practicable, in a manner consistent with safe project operation, in the event of project shutdown during "ice-cover" periods;

Plan for Passing Project Inflow Downstream in the Event of Project Shutdown During "Ice-Cover" Periods

Passing Project Inflow during "Ice-Free" Periods - In the event of a project shutdown during "ice-cover" periods, plant operating personnel shall be immediately dispatched to the dam to match the dam discharge with the project inflow.

One member of the plant operating staff is on call at all times. The plant operator, upon arrival at the plant, shall attempt to restart the generating unit to pass project inflow. If unable to restart the generating units, the taintor gates will be opened to pass project inflow.

If taintor gate operation is required, one (1) tainter gate is heated during "ice-cover" periods. This gate shall be manually opened by plant operating personnel to match the dam discharge with the project inflow.

(7) Develop a definition of "ice-free" and "ice-cover" periods applicable to Article 401.

Definitions of "Ice-Free" and "Ice-Cover" Periods

Defining "Ice-Free" Periods - Ice Free is defined as the period of time beginning after March 15 when the previous winters ice has melted from the power canal and the entire historic river channel is not iced over.

Defining "Ice-Cover" Periods - Ice-Cover is defined as the period of time beginning after November 1 when the backwaters and bays of the reservoir have become iced over for the winter.

Article 405 The Licensee shall file with the Commission, for approval, a plan to conduct a two-year evaluation to determine whether operation of the project in a run-of-river mode as required by Article 401 has been achieved.

(1) Install, calibration, and maintenance of a U.S. Geological Survey (USGS) type recording streamflow gauge upstream of the project;

Plan for Installing, Calibrating, and Maintaining a USGS type Streamflow Gauge Upstream of the Project

Installing a USGS Type Streamflow Gauge - WPSC will contract with the USGS to install a recording streamflow gauge upstream of the project to determine if the project is operated in the run-of-river mode as required in Article 401. The installation of this stream gauge will occur in 1998. A letter of agreement with the USGS is part of the installation plan.

Maintaining USGS Type Streamflow Gauge - WPSC will contract with the USGS to maintain the recording streamflow gauge upstream of the project to determine if the project is operated in the run-of-river mode as required in Article 401.

(2) The licensee's proposed location for gauge installation, a schedule for installation, and measures to maintain its operation over the 2-year testing period.

Plan for Proposed Gauge Location, Schedule of Installation, and Measures to Maintain its operation over the 2-Year test Period

The proposed gauge location:
In the vicinity of the "Koss Bridge," at County Highway JJ.

Timing of installation:
The year 1998.

Measures to maintain the gauge:
The USGS will be contracted to maintain the gauge for a minimum of two years.

Grand Rapids Hydroelectric Project - FERC License No. 2433-004

Article 406 The licensee shall file with the Commission, for approval, a reservoir drawdown plan.

Reservoir Drawdown Plan

Objective: To minimize the impact of any project maintenance requiring a reservoir drawdown upon aquatic and wetland resources. Wisconsin Public Service Corporation (WPSC) agrees to consult with the Wisconsin Department of Natural Resources (WDNR), the Michigan Department of Natural Resources (MDNR) and the U.S. Fish and Wildlife Service (USFWS) in advance of any planned drawdowns. WPSC also agrees to consult with the agencies after an emergency drawdown prior to returning to normal reservoir operating levels.

I. Planned Drawdowns

A. Agency Consultation

Upon planning the drawdown, WPSC will consult with the agencies allowing them a maximum of 30 calendar days to comment.
The consultation will include:

1) The reason for the drawdown.
2) The anticipated duration of the drawdown.
3) The date the drawdown will begin.
4) The rate at which the elevation of the reservoir will decrease and the amount of time required to draw the reservoir down to its required level.
5) The lowest pool elevation reached.
6) The date refilling will begin and the rate at which refilling will take place.
7) The date at which the reservoir will be returned to its normal operating level.

B. Request For Federal Energy Regulatory Commission (FERC) Approval

Upon expiration of the thirty day comment period, documentation of consultation will be provided to FERC along with the following information:

1) The reason for the drawdown.
2) The date the drawdown will begin.
3) The rate at which the elevation of the reservoir will decrease and the amount of time required to draw the reservoir down to its required level.
4) The lowest pool elevation reached.
5) The date refilling will begin and the rate at which refilling will take place.
6) The date at which the reservoir will be returned to its normal operating level.

Article 406 continued:

All agency concerns will be addressed in the request for FERC approval. If WPSC does not adopt an agency recommendation, the request for FERC approval will include WPSC's reasons based upon project-specific information. If after 90 calendar days of FERC receiving the Request For Drawdown Approval, WPSC has not received notification from FERC, the drawdown will be conducted as outlined in the Request For Drawdown Approval.

C. Fish Stranding

All planned drawdowns will incorporate an inspection of the shoreline at least once as water levels are decreasing for the drawdown and again after the drawdown has arrived at the lowest pool level for stranded fish. Any discovered fish will be returned to the reservoir and a record will be kept of the species and whether each organism was dead or alive when it was returned to the reservoir.

II. Emergency Drawdowns

A. Agency Consultation

In the event an emergency drawdown is required, attempts will be made by telephone to consult with a representative of each of the agencies if possible, in advance of the drawdown and/or before the reservoir is refilled. Agency recommendations will be documented and provided to FERC. If WPSC cannot adhere to the agency recommendations before re-filling the reservoir, WPSC will document their reasons to FERC.

B. FERC Notification

As soon as possible, but within 10 days of refilling the reservoir, WPSC will provide to FERC an outline of the emergency drawdown including the following:

1) The reason for the emergency drawdown.
2) The date and time the drawdown began.
3) The date and time the lowest pool elevation was reached.
4) Documentation of agency consultation and if required, project-specific reasons for not adopting agency recommendations.
4) The date and time refilling began and the rate at which the reservoir was refilled or the anticipated date refilling will begin.
5) The date and time the reservoir reached its normal operating level (including subsequent FERC notification if the reservoir is not yet refilled when FERC is initially notified).

Article 406 continued:

III. Amendments To The Drawdown Plan

WPSC reserves the right to request an amendment to the reservoir drawdown plan in consultation with the agencies and FERC.

Article 410 The licensee shall file with the Commission, for approval, a plan for the passage of large woody debris that collect near the project intake into the project tailrace to improve fish habitat downstream of the project.

Plan for Passage of Large Woody Debris that Collect Near the Project Intake into the Project Tailrace to Improve Fish Habitat Downstream of the Project

Passage of Large Woody Debris at the Dam - Large woody debris that collect near the dam structure shall be hydraulically passed into the tailrace of the dam. A taintor gate will be opened to the extent necessary to allow the collected debris to be passed into the dam tailrace.

Passage of Large Woody Debris at the Powerhouse - Large woody debris that collect near power house intake shall be hydraulically passed into the tailrace of the powerhouse. The collected debris shall be directed to the opened drop gate (73 inches wide by 43 inches deep) located at the right side of the intake works and then passed hydraulically into the tailrace of the powerhouse.

Passage of Large Woody Debris at the Guard-Lock Bridge - Large woody debris that collects at the guard-lock bridge shall be passed under the bridge into the power cannel and then passed around the powerhouse intake into the powerhouse tailrace.

To facilitate the passage of large woody debris under the guard-lock bridge the outflow through the powerhouse will be reduced as the outflow through the dam is increased to relieve the pressure on the debris mass. The debris will then be guided under the bridge into the power cannel. Care will be taken to assure the inflow matches outflow during the time of decreasing powerhouse outflow and increasing dam outflow.

Grand Rapids Hydroelectric Project - FERC License No. 2433-004

Article 411 The licensee shall develop and file with the Commission, for approval, a plan to monitor and control the spread of Purple Loosestrife (*Lythrum Salicaria)* in project waters.

Purple Loosestrife Monitoring Plan

Objective: To monitor the spread of Purple Loosestrife (*Lythrum Salicaria)* on Grand Rapids hydroelectric project lands. Purple Loosestrife is an invasive plant that exhibits aggressive characteristics. The plant is becoming increasingly common to wetland areas. In consultation with the Wisconsin Department of Natural Resources (WDNR) and the U.S. Fish and Wildlife Service (USFWS), Wisconsin Public Service agrees to periodically monitor the species.

I. Methods

A. The monitoring methods will include a shoreline survey utilizing a boat to determine a baseline of existing colonies and then continued monitoring to determine the increase of density and abundance of the species.

II. Frequency of Survey

A. The survey will be taken annually in July or August 1998 during the time when the plants are in bloom and annually thereafter.

III. Documentation existing colonies.

A. The results of the survey will be displayed on a map of the total project area. A copy of the completed map will be provided to the WDNR and USFWS no later than October 31, every second year in which the monitoring was completed.

B. The map will indicate relative populations based on the following criteria:

a. Small Colonies of 1-5 plants
b. Medium Colonies of 6-50 plants
c. Dense Colonies of >50 plants

C. The need for further action will be discussed with the Wisconsin Department of Natural Resources.

IV. Control of existing colonies.

A. Small colonies of 1 to 5 plants will be removed from WPSC project property during the annual survey. The removal will consist of pulling the stems by hand.

Article 411 continued:

V. Public Awareness.

A. Public awareness about purple loosestrife will be increased by displaying fact sheets supplied by the WDNR at all WPSC owned public access areas near the project.

Grand Rapids Hydroelectric Project - FERC License No. 2433-004

Article 411 The licensee shall develop and file with the Commission, for approval, a plan to monitor and control the spread of Eurasian Milfoil (*Myriophyllum spicatum)* in project waters.

Eurasian Milfoil Monitoring Plan

Objective: To monitor the presence and abundance Eurasian Milfoil (*Myriophyllum spicatum)* on Grand Rapids hydroelectric project lands. Eurasian Milfoil is an exotic aquatic macrophyte that exhibits aggressive characteristics. The plant is becoming increasingly common to inland lakes and rivers. In consultation with the Wisconsin Department of Natural Resources (WDNR) and the U.S. Fish and Wildlife Service (USFWS), Wisconsin Public Service agrees to periodically monitor the species.

I. Methods

A. Through consultation with Tim Rasman-WDNR, the following monitoring methods were developed. The monitoring methods will include a routine aquatic macrophyte survey utilizing a boat to take samples at five transects of approximately 40 feet in length. Transects will be selected based upon location of macrophyte colonies and areas of likely infestation. The transect samples will be analyzed for presence and approximate abundance of Eurasian Milfoil.

Each transect will be sampled with a rake in three twelve foot diameter sections. Each section will be sampled in quarters. The first quarter will be sampled at a depth of 0-0.5 meters below the surface, the second 0.5-1.5 meters below the surface, the third 1.5-3.0 meters below the surface and the fourth beyond 3.0 meters below the surface.

II. Frequency of Survey

A. The survey will be taken beginning in August or September 1998 and every three years thereafter.

III. Documentation existing colonies.

A. The results of the survey at each transect will be displayed in table form indicating relative abundance (none, low, medium, and high) of Eurasian milfoil in the aquatic macrophyte samples taken. The completed table will be provided to the WDNR and USFWS no later than December 31, every year in which the monitoring was completed.

Article 411 continued:

IV. Control of existing colonies.

A. At this time there appears to be no effective means of controlling the spread of Eurasian Milfoil. WPSC agrees cooperate with the agencies in the future if a standard method of control is developed.

V. Public Awareness.

A. Public awareness about Eurasian Milfoil will be increased by providing informational notices supplied by the WDNR at WPSC owned public access areas near the project.