72 FERC ¶ 62,190

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Wisconsin Electric Power Company — Project No. 2431-008
Wisconsin, Michigan

ORDER ISSUING NEW LICENSE
(Major Project)

(Issued August 29, 1995)

INTRODUCTION

Wisconsin Electric Power Company (Wisconsin Electric) filed a license application under Part I of the Federal Power Act (FPA) for the continued operation and maintenance of the 5.335-megawatt (MW) Brule Project located on the Brule River in Florence County, Wisconsin, and Iron County, Michigan. The project as proposed would produce about 14.6 gigawatthours (GWh) of electricity annually. 1/ The current license for this project expired on December 31, 1993.

BACKGROUND

Notice of the application has been published. On March 24, 1993, April 8, 1993, and April 26, 1993, the Wisconsin Department of Natural Resources, Michigan Department of Natural Resources, and the U.S. Department of Interior, respectively, filed timely motions to intervene. No agency or intervenor objected to issuance of this license. Comments received from interested agencies, individuals, and motions to intervene have been fully considered in determining whether or under what circumstances to issue this license.

The Commission's staff issued a draft Environmental Assessment for this project on June 29, 1994. Comments on the draft Environmental Assessment have been addressed in the final Environmental Assessment, which is attached to and made part of the license. A Safety and Design Assessment was also prepared, and is available in the Commission's public file associated with this project.

1/ The Commission issued the original license for the Brule Project on July 26, 1967, effective April 1, 1962. See 38 FPC 199. The project is located on a navigable waterway. Id.

PROJECT DESCRIPTION

The existing Brule Project's principal features consist of three earthen dikes, a reservoir with a surface area of 545 acres, a powerhouse containing 3 generating units with a total capacity of 5.335 megawatts (MW), a 345-foot-long transmission line, and appurtenant facilities.

The existing project generates about 15.19 GWh of electricity annually. Wisconsin Electric is proposing no increase in the total installed capacity of the project.

A detailed project description is contained in ordering paragraph B(2).

APPLICANT'S PLANS AND CAPABILITIES

Section 10(a)(2)(C) and Section 15(a) of the FPA, as amended by the Electric Consumers Protection Act of 1986 (ECPA), requires the Commission to consider in writing the following factors in issuing a new license:

Consumption Efficiency Improvement Program (Section 10(a)(2)(C))

Wisconsin Electric has undertaken consumption-efficiency-improvement programs which other electric power utilities have found to be cost-effective. The applicant has also implemented demand-side load management programs to reduce peak demands and thereby defer the need for additional supply resources.

Wisconsin Electric's programs directed at electric energy conservation and reduction of peak capacity demands have been reviewed and approved by the Public Service Commission of Wisconsin; and these programs are in compliance with applicable regulatory regulations and requirements. Therefore, Wisconsin Electric is making a good faith effort to conserve electricity.

The Plans and Ability of the Appliant to Comply with the Articles, Terms and Conditions of Any License Issued to it and Other Applicable Provisions of Part I of the FPA (Section 15 (a)(2))

Staff reviewed Wisconsin Electric's license application and its record of compliance with the existing license in an effort to judge its ability to comply with the articles, terms, and conditions of any license issued, and with other applicable provisions of this part of the FPA.

Our review of Wisconsin Electric compliance record shows that it has in the past complied in most cases in a good faith manner with all articles, terms and conditions of its current

FERC #2431 DNO

license. As a result of our review, we believe Wisconsin Electric can satisfy the conditions of a new license.

The Plans of the Applicant to Manage, Operate and Maintain the Project Safely (Section 15(a)(2)(B))

Wisconsin Electric has a formal safety program administered by its Industrial Health and Safety Division of Human Resources Department.

Wisconsin Electric currently operates the project in a daily peaking mode with a minimum generation flow of about 75 cubic feet per second (cfs). The headwater varies daily between 0.5 to 4 feet, with an annual average variation of about 2 feet. The project headwater elevation is lowered by 0.5 foot during the winter months in order to protect the dam and Taintor gates from ice build up and damage. The daily tailwater fluctuations are about 1 foot due to plant operation.

Wisconsin Electric is proposing to operate the project in a run-of-river mode within a 1-foot bandwidth of the year-round headwater target elevation of 1198.3 feet National Geodetic Verticle Datum (NGVD). Wisconsin Electric is also proposing a bypass enhancement flow spillage of 15 to 20 cfs or inflow, whichever is less.

The project hydroelectric turbine generators are operated remotely from the company's Iron Mountain Control Center. These units are equipped with manual override. All other functions at the plant are performed manually. A regional operator is available to handle routine maintenance, respond to alarms, and to perform any required manual operations, such as Taintor gate adjustment.

The spillway is topped with eight 12-foot-high by 14-foot-wide Taintor gates. The Taintor gates are remotely operated, with an on-site diesel generator to backup the power required for gate operation in an emergency situation. The project also has an auxiliary spillway and side channel, equipped with fuse plugs that are designed to wash out at certain flood elevation levels. The two spillways would act together to maintain a safe project operation during the normal run-of-river condition and under adverse flooding conditions.

The project facility is equipped with a siren to indicate the start-up of a generator from dead stop. Warning signs are located on project property downstream of the project site to indicate the dangers associated with gate openings.

Wisconsin Electric installed flashing amber lights and horns which operate in conjunction with the Taintor gates to warn of changing water levels.

The Brule Project is currently classified with a rating of high hazard potential according to 18 C.F.R. § 12.31(b) of the Commission's Safety Regulations. The Brule Project is currently subject to the Emergency Action Plan and Independent Consultant requirements of the Commission's Safety Regulations as described in 18 CFR, Subpart C and D of Part 12. Wisconsin Electric does not propose to significantly change the operation of the project which currently satisfies Commission safety regulations.

Wisconsin Electric is proposing run-of-river operation for the new license. The change from a limited peaking operation to a run-of-river operation would not impact the Emergency Action Plan. However, the 1990 rehabilitation of the spillway and increase in spillway capacity would result in substantial moderation of the flood passing through the project. The Emergency Action Plan is being updated by Wisconsin Electric.

None of the proposed changes to the operation of the project or downstream development should affect the project's current hazard status.

There are monitoring devices to detect structural movement or stress, seepage, uplift, equipment failure, or water conduit failure at the project. Documentation and visual inspections are performed monthly. The operational equipment at the Brule Project is automated, is controlled remotely from the power dispatcher's office, and is checked by an operator daily. The energy output is continuously monitored by the power dispatch group which is located in the Iron Mountain Control Center. Any equipment failure to water conduit failure would be noticed by the operator or the dispatch center, and remedial action would be taken immediately.

Wisconsin Electric maintains an aggressive employee safety program. No incidence of death to employees or to the public have occurred at the Brule Project. However, there was one employee lost-time accident in 1986 and three minor injuries in 1990.

As a result of our review of Wisconsin Electric's plans, we conclude that it would be able to manage, operate, and maintain the Brule Project in a safe manner.

The Plans and Ability of the Applicant to Operate and Maintain the Project in a Manner Most Likely to Provide Efficient and Reliable Electric Service (Section 15(a)(2)(C))

In an effort to operate, maintain, and increase the efficiency and reliability of their electrical service, Wisconsin Electric pursues an ongoing maintenance program. Wisconsin Electric has reviewed the operation of this project and evaluated the resource utilization. The project currently uses all the

flows available 95 percent of the time. It is not economically feasible to increase the generating capacity at this time. Wisconsin Electric will continue to investigate alternatives for upgrading the existing equipment to maximize generation at the site.

In its relicense application for the Brule Project, Wisconsin Electric proposed to change the project operation from a modified-peaking operation, with a minimum flow of 75 cfs, to a run-of-river operation with an operating bandwidth of ±0.5 foot and a minimum flow spillage range of 15 to 20 cfs. This would change the fluctuating headwater surface elevation to a constant elevation of 1198.3 feet (NGVD). The average annual energy generation would change from about 15.19 GWh to about 14.60 GWh.

Based on our review of the record in this case, we conclude that Wisconsin Electric has been operating the project in an efficient manner within the constraints of the existing license and that it would continue to provide efficient and reliable electric service in the future.

The Need of the Applicant Over the Short and Long Term for the Electricity Generated by the Project to Serve its Consumers (Section 15(a)(2)(D))

The Brule Project was constructed in 1918 and 1919 and placed in operation in 1919. The total nameplate capacity of the project's three generators is 5.335 MW and the anticipated average annual energy generation is 14.6 GWh.

The fact that Wisconsin Electric has relied on the electricity produced by its Brule Project to supply a portion of the electricity needs of its end-use customers for more than seventy years supports the conclusion that both the short-term and long-term needs of Wisconsin Electric for the electricity generated by the project are well-established.

Wisconsin Electric is a member of the Mid-America Interconnected Network (MAIN) reliability organization. The purpose of MAIN is to promote maximum coordination of planning, construction and utilization of generation and transmission facilities of its members in order to improve the reliability of electric bulk power supply in the Midwest.

Each year, MAIN and the other reliability organizations--or reliability councils--prepare a report for the U.S. Department of Energy (DOE) which is titled "Regional Reliability Council Coordinated Bulk Power Supply Program (Report)." Beginning with the 1993 issue, this Report will also be referred to as the "Department of Energy Code OE-411" Report--or shortened to "The OE-411 Report." Previous to 1993 it was "The IE-411 Report."

The MAIN reliability council collects, organizes, and coordinates the data which are required for the preparation of the OE-411 Report. These data are compiled and submitted by each electric utility member of the MAIN council. The data content and format of the OE-411 Report are specified by DOE and complied with by all of the regional reliability councils of North America. In all OE-411 council reports, data for the year prior to the reporting year for summer and winter peak demands, capacity resources and annual energy requirements are actual data. For the reporting year and the remaining years of the 10-year planning period, these data are projections or forecasts.

The MAIN OE-411 Report dated April 1995, reports actual (experienced) data for 1994 and projected or forecast data for each year from 1995 to 2003, inclusive.

According to the April 1995 OE-411 Report, the summer peak hour demand for the MAIN Council Area in 1994, was 42,562 MW and the value for 2004 is projected to increase to 50,696 MW. These data yield a compound annual growth rate of approximately 1.76 percent. For the same period, the projected data yield a compound annual growth rate in net annual energy requirements for the MAIN Council service area of approximately 1.6 percent. The MAIN Council service area plans to increase its net summer capacity resources from 50,693 MW in 1994 to 56,768 MW in 2004--a compound annual growth rate of approximately 1.4 percent. These data add further support to Wisconsin Electric's long-term need for electricity generated by the Brule Project.

The Impact of Relicensing or Not Receiving the Project License on the Operation, Planning and Stability of Applicant's Transmission System (Section 15(a)(2)(E))

Wisconsin Electric states in its application for a new license that the operation and planning of its transmission system would not be significantly impacted by receiving or not receiving the project license.

Whether the Plans of the Applicant will be Achieved to the Greatest Extent Possible in a cost Efficient Manner (Section 15(a)(2)(F))

Wisconsin Electric proposes to modify the existing project operation of the Brule Project to enhance environmental and aesthetic resources affected by the project. The project, as presently constructed and as Wisconsin Electric proposes to operate it, fully develops and uses the economical hydropower potential of the site.

Compliance History Pursuant to Section 15(a)(3)(A) of the Federal Power Act

Wisconsin Electric's overall record of making timely filings and compliance with its license is less than satisfactory. In one instance the licensee filed an emergency action plan more than six months late. In another, a Part 12 remedial plan was filed more than three months late. Other untimely filings included Operation Inspection Followup Reports (5 times). Wisconsin Electric also violated its minimum flow requirements on several occasions. These instances of non-compliance occurred between December 1980 and December 1991.

The compliance record described above does not warrant the denial of Wisconsin Electric's application for a new license. However, because of Wisconsin Electric's compliance history, special consideration must be given to ensure that Wisconsin Electric complies with the terms of this new license. Therefore, Article 501 has been added to the license requiring the licensee to develop, and file for Commission approval, a Hydropower Compliance Management Program that will ensure compliance with the terms and conditions of the new license and allow the Commission to monitor progress toward compliance.

WATER QUALITY CERTIFICATION

Under Section 401(a)(1) of the Clean Water Act, 33 U.S.C. 1341(a)(1), the Commission may not issue a license for a hydroelectric project unless the state certifying agency has either issued water quality certification for the project or has waived certification by failing to act on a request for certification within a reasonable time, not to exceed one year. 2/

The Brule Project is located between the states of Michigan and Wisconsin. The powerhouse is located in Michigan. The water is discharged from the powerhouse into the Brule River on the Michigan side of the boundary. Therefore, Michigan is the state with WQC authority.

Wisconsin Electric requested WQC from the Michigan Department of Natural Resources (MDNR) for the Brule Project on May 13 1991. The MDNR acknowleged receipt of the May 13, 1991 request (letter dated March 12, 1992, from Walter C. Houghton,

2/ Section 401(a)(1) requires an applicant for a federal license or permit to conduct any activity which may result in any discharge into navigable waters to obtain from the state in which the discharge originates certification that any such discharge will comply with applicable water quality standards.

Michigan Department of Natural Resources, to Rita Hayen, Wisconsin Electric Power Company). The Michigan Department of Natural Resources did not act on Wisconsin Electric's request for a WQC within one year from the effective date of the Commission's Order No. 533 (June 19, 1992). Therefore, the Michigan 401 WQC is deemed waived. 3/

COASTAL ZONE MANAGEMENT PROGRAM

Under the Coastal Zone Management Act (CZMA), the Commission cannot authorize development of a hydropower project within or affecting a state's coastal zone unless the state CZMA agency concurs with the applicant's certification of consistency with the state's Coastal Zone Management Act program (which has been approved by the Secretary of Commerce) or the agency's concurrence is conclusively presumed by its failure to act within 180 days of its receipt of the applicant's certification.

The Brule Project is not located in areas encompassed by the Coastal Zone Management Act, nor does it affect coastal resources (Correspondence from Gary Shultz, the Wisconsin Coastal Management Program Federal Consistency Coordinator dated October 28, 1993, and correspondence from Catherine J. Cunningham, Coastal Management Program, Land and Water Management Division, Michigan Department of Natural Resources dated December 7, 1993).

SECTION 18 - RESERVATION OF AUTHORITY TO PRESCRIBE FISHWAYS

The U.S. Department of the Interior (Interior), by letter dated May 14, 1993, requests that its authority to prescribe the construction, operation and maintenance of fishways pursuant to Section 18 of the FPA be reserved for any project licensed at Brule.

Consistent with Commission practice, Article 406 of this license reserves authority to the Commission to require the Licensee to construct, operate and maintain such fishways as may be prescribed by Interior pursuant to Section 18 of the FPA. 4/

3/ Wisconsin Electric requested Section 401 water quality certification (WQC) for the Brule Project from the Wisconsin Department of Natural Resources (WDNR) on April 11, 1990. The WQC was waived on May 4, 1990.

4/ Wisconsin Public Service Corporation, 62 FERC ¶ 61,095 (1993); aff'd, Wisconsin Public Service Corporation v. FERC, 32 F.3d 1165 (1994).

ECONOMIC ANALYSIS

In light of the specific and limited role of hydroelectric economic analyses, and ongoing changes in the electric industry, the Commission has made several clarifications. First, the economic analyses do not involve determinations of a license applicant's avoided costs for power, such as the determinations made by state regulatory commissions implementing the Public Utility Regulatory Policies Act of 1978. Second, they are not determinations that it is prudent or reasonable for an applicant to continue to operate a project. This means that it is an applicant's responsibility to determine whether continued operation of an existing project is indeed a prudent decision. Third, issuance of a new license does not bear on the issue of whether a public utility or transmitting utility can recover stranded costs associated with a hydroelectric project.

In view of the changing economics in the electric industry, and the fact that project economics is only one of the many public interest factors the Commission considers in project licensing, the Commission has changed its approach to evaluating the economics of both new and existing hydroelectric projects. The Commission no longer employs an analysis that assumes alternative fossil fuel and other costs that escalate steadily over the term of the license. 5/ Instead, it uses current costs to compare the costs of the project and likely alternative power. The analysis will not be entirely a first-year analysis, because hydropower projects are assets with long service lives, and the Commission can account for certain known factors that affect costs, such as tax depreciation rates under current laws and regulations. The analysis is for a 30-year period in all cases. However, costs for alternative fossil fuels, operation and maintenance expenses, and the like, will remain constant. No forecasts or assumptions will be made concerning potential future inflation, excalation or deflation beyond the license issuance date.

Staff has updated the data that were reported in the draft Environmental Assessment and applied the Commission's new economic analysis to the Brule Project, which is reflected in the attached final Environmental Assessment.

Due to needed project design modification, the Brule Project has an unusually high undepreciated sunk capital cost. In 1974 and 1979, the Commission's Part 12 Reports for the Brule dam identified the project's inability to safely pass the probable maximum flood (PMF). The 1979 Part 12 Report determined that the PMF was about 102,000 cfs. The spillway capacity with the water

5/ See Mead Corporation, Publishing Paper Division, 72 FERC, ¶ 61,027 (July 13, 1995).

at the dam crest was about 30,000 cfs. The Commission directed Wisconsin Electric to perform additional hydrologic and hydraulic analyses to support an evaluation of the spillway adequacy. In 1987, Wisconsin Electric completed a more detailed dam-failure simulation, and in December, 1988, the PMF was revised to about 124,000 cfs. In an evaluation, dated May 31, 1989, the Brule Project inflow design flood (IDF) was determined to be 50 percent of the PMF, about 62,000 cfs.

In order to address the inability of the project to pass the IDF, Wisconsin Electric proposed a spillway capacity expansion alternative that included rehabilitation of the existing spillway, and construction of a fuse-plug controlled auxiliary spillway through the left abutment of the dam to pass excess flood flows up to the IDF. In 1989, the Commission's Division of Dam Safety and Inspections approved Wisconsin Electric's expansion proposal. The expansion and rehabilitation of the spillway was completed in 1990 at a total cost of $7,300,000. The capitalized portion of the spillway expansion and rehabilitation is about $6,636,000. In addition, Wisconsin Electric incurred or will incur licensing costs of about $1,492,000, unit refurbishment of costs of about $265,000, and costs associated with license compliance, due to its change from a peaking to a run-of-river operating mode, of $93,000. The resulting annualized project cost would be about $1,305,000, under the existing conditions, and includes an annual operation and maintenance cost of about $197,000.

Under continued peaking operation, the project would generate about 15.19 GWh of energy annually. With a 30-year license term, the existing Brule Project would have a net annual benefit of about -$813,000 (-53.50 mills/kWh). When licensed in accordance with the conditions adopted herein, the project would produce about 14.6 GWh of energy annually and a net annual benefit of about -$1,031,000. Because the project is uneconomical without any enhancements the Environmental Assessment considered retirement as an alternative. The retirement alternative considered in the Environmental Assessment consists of removing the generation equipment from the powerhouse, sealing the powerhouse waterways with concrete bulkheads, and removing the electrical tie to the local power grid. Under the retirement alternative the project would have net annual benefit of -$934,000.

Where, as here, consideration and balancing of all public interest factors leads to a conclusion that licensing a project is in the public interest, the Commission offers a license to the applicant, even if there appears to be economic losses. While, as noted, I find that continued operation of the Brule Project would be less economical than project retirement Wisconsin Electric is ultimately responsible and best able to determine

whether continued operation of the existing project is a reasonable decision in these circumstances.

RECOMMENDATIONS OF FISH AND WILDLIFE AGENCIES

Section 10(j) Recommendations

Section 10(j)(1) of the FPA requires the Commission, when issuing a license, to include license conditions, based on recommendations of federal and state fish and wildlife agencies submitted pursuant to the Fish and Wildlife Coordination Act, to "adequately and equitably protect, mitigate damages to, and enhance, fish and wildlife (including related spawning grounds and habitat)" affected by the project.

If the Commission believes that any such recommendation may be inconsistent with the purposes and requirements of Part I of the FPA or other applicable law, Section 10(j)(2) requires the Commission and the agencies to attempt to resolve any such inconsistency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agencies. If the Commission then does not adopt a recommendation, it must explain how the recommendation is inconsistent with applicable law and how the conditions selected by the Commission adequately and equitably protect, mitigate damages to, and enhance fish and wildlife.

The following recommendations made by the resource agencies are outside of the scope of Section 10(j) in that they do not provide specific measures for the protection, mitigation of damages to, and enhancement of fish and wildlife resources: (1) Interior's, MDNR's and WDNR's recommendations concerning recreation facilities at the Brule Project including directional signage and leasing of project lands; (2) WDNR's recommendation for a state endangered/threatened/watch species inventory and periodic raptor surveys; (3) MDNR's recommendation for the inclusion of the standard re-opener clause; (4) the parts of MDNR's recommendation concerning completion of a Fishery Damage Assessment; (5) MDNR's recommendation to study project retirement and/or dam removal; 6/ (6) WDNR's and MDNR's recommendations to

---

6/ In its Policy Statement on project decommissioning (RM93-23-000), III FERC Statutes and Regulations, Regulations Preambles, ¶ 31,011 at pp. 31,233-34 (1994), the Commission found that the licensee is responsible for project decommissioning, but declined to impose a generic decommissioning requirement. Instead, the Commission decided to address the issue on a case-by-case basis and found that there may be particular facts on the record in individual cases that would justify license conditions

(continued...)

comply with applicable state laws and permits; (7) the WDNR's, MDNR's, and Interior's recommendation regarding expiration dates for licenses issued by the Commission; and (8) the WDNR's, MDNR's and Interior's recommendation regarding the design and evaluation of all possible fish passage and protection devices. Staff considered these recommendations in the attached final Environmental Assessment for the Brule Project under Section 10(a)(1) of the FPA. I concur with staff's determination.

After staff's attempt to resolve inconsistencies at the Section 10(j) meeting held September 15, 1994, in Green Bay, Wisconsin, I conclude, pursuant to Section 10(j) of the FPA, that some of the recommendations of the Federal and state fish and wildlife agencies are inconsistent with the purpose and requirements of Part I of the FPA. Specifically, I have determined that the following resource agencies' recommendations are inconsistent with Part 1 of the FPA, including the comprehensive development and balancing of resource values requirements of Sections 10(a) and 4(e) of the FPA: (1) the installation of telemetry equipment on stream flow gages, water level sensors; (2) MDNR's recommended duration of water quality monitoring; (3) maintenance of a 5°F or less change in water temperature upstream and downstream of the project; and (4) the development of a separate wildlife management plan.

Determinations Under FPA section 10(j)(2)(A) and (B)

Section 10(j)(1) of the FPA requires the Commission, when issuing a license to include license conditions, based on recommendations of Federal and state fish and wildlife agencies submitted pursuant to the Fish and Wildlife Coordination Act, to "adequately and equitably protect, mitigate damages to, and

---

6/(...continued)
requiring the establishment of decommissioning cost trust funds in order to ensure the availability of funding when decommissioning occurs. The Commission stated that it would consider, for example, whether there are factors suggesting that the life of the project may end within the license term, and whether the financial viability of the licensee indicates that the licensee would be unable to meet likely levels of expenditures without some form of advanced planning. Here the licensee is a public utility that appears to be financially stable and capable of meeting decommissioning expenses when and if they arise in the license term. Moreover, while the project has a negative economic benefit, it does not appear that the life of the project would end during the term of the license issued here, particularly in light of the licensee's high sunk costs in the project.

enhance fish and wildlife (including related spawning grounds and habitat)" affected by the project.

In determining whether to accept or reject recommendations of fish and wildlife agencies under Section 10(j), the Commission first determines whether each recommendation is supported by substantial evidence in the record; if not, the recommendation is inconsistent with the requirement of Section 313(b) of the FPA that Commission orders be supported by substantial evidence. 7/ Second, the Commission determines whether a substantiated recommendation is inconsistent with the FPA or other applicable law. Any such inconsistency is usually with the Commission's determinations under the equal consideration/comprehensive development standards of FPA Sections 4(e) and 10(a)(1), in that the recommendation conflicts unduly with another project purpose or value (including the project's economic benefits). 8/ Third, the Commisson must show how the fish and wildlife conditions that are adopted will "adequately and equitably protect, mitigate damages to, and enhance, fish and wildlife (including related spawning grounds and habitat)" affected by the project.

Interior, the MDNR and the WDNR recommend that the Brule Project operate in a run-of-river mode, and I am requiring it in Article 401. However, to ensure compliance with a run-of-river operating mode, Interior, MDNR and WDNR recommend that Wisconsin Electric provide funding for the operation and maintenance of the existing U.S. Geological Survey (USGS) gages located upstream of the Brule Project on the Brule and Paint Rivers (Nos. 04061000 and 04062000, respectively) and downstream of the Brule Project on the Brule River (No. 04062011). The Brule Project would be deemed to be in compliance with a run-of-river operating mode if outflows from the project were within 5 percent of inflows to the project impoundment. In addition, Interior, MDNR and WDNR recommend that Wisconsin Electric equip all gages with telemetry equipment and capabilities for data retrieval by phone. The MDNR, WDNR, and Interior recommend that automatic level sensors

---

7/ See IV FERC Statutes and Regulations, supra, ¶ 30,921 at p.30,157.

8/ The Commission may thus find that a very expensive mitigation measure that will yield only minor benefits is inconsistent with its balancing of development and environmental values. The Commission may on the other hand conclude that a particular natural resource needs to be protected, even if the cost of such protection severely erodes or eliminates the project's economic benefits; or it may conclude that the resource cannot be protected adequately, and the application must therefore be denied.

be installed for the headwaters and tailwaters, and that a daily log of operation, including flow, unit operation, and water surface elevation, be maintained and made available to the agencies on request. The MDNR recommends the installation of such a water level sensor for the spillway side channel. Interior and the WDNR recommend a staff gage be installed on the upstream face of the Brule dam and in the spillway channel.

The MDNR also recommends that a 2-year test period be used to verify the ability of Wisconsin Electric to maintain the target reservoir elevations and the discharge standards, as recommended by the MDNR. Should the above methods fail to maintain the reservoir elevation and the discharge standards, the MDNR states that Wisconsin Electric should modify the standard or develop an alternate standard for run-of-river operation after consultation with the resource agencies.

I agree that, in order to maintain compliance with a run-of-river operating mode, Wisconsin Electric should monitor reservoir elevation and project operation, including flows in the spillway channel and unit operation. However, for the reasons discussed in section VI.A.2.a.(2) of the final Environmental Assessment, I disagree that gaging inflows to the project impoundment and outflows from the project would provide a reliable and accurate method for determining compliance with the recommended run-of-river operating mode, and therefore because stream flow gaging would not be accurate and reliable, telemetry equipment is not needed. This topic was discussed at the Section 10(j) meeting in Green Bay, Wisconsin.

Staff and the resources agencies agreed to the following approach for determining monitoring compliance with the recommended run-of-river operating mode. The Brule Project will operate in a run-of-river mode by maintaining the impoundment at an elevation of 1198.3 ± 0.5 ft NGVD. However, any hourly fluctuation greater than ± 0.3 would be reported to the resource agencies. Wisconsin Electric would test its ability to operate in a run-of-river mode by using headpond elevation and turbine operation for a three-year period. After the three-year test period, Wisconsin Electric, after consultation with the resource agencies, will file with the Commission a report assessing its ability to maintain a run-of-river operating mode. If Wisconsin Electric and the resource agencies determine that the Brule Project cannot maintain a run-of-river operating mode by using headpond elevation and turbine operation, Wisconsin Electric will recommend an alternate method, developed in consultation with the resources agencies, for operating the project in a run-of-river mode. I will include Article 404 implementing the agreement between staff and the resource agencies.

The MDNR also recommends that the Brule Project maintain a monthly average temperature difference of 5°F or less between the

tailwater temperature and the waters upstream of the Brule impoundment, a distance of about 2 miles. However, the MDNR has provided no reasoning or evidence supporting this recommendation in terms of how its adoption would protect or enhance aquatic resources downstream of the Brule Project. Fish and aquatic resources downstream of the Brule Project are influenced by the temperatures occurring in that downstream reach, and are not affected by differences occurring between upstream and downstream of the project. Therefore, I determine that there is no basis for requiring less than a 5°F difference between upstream and downstream locales, nor in monitoring temperatures upstream of the impoundment.

Neither the MDNR or the WDNR have recommended specific measures to enhance water quality nor does the information in the public record suggest that temperatures and dissolved oxygen (DO) concentrations impact aquatic resources downstream of the Brule dam. In fact, calculated diversity and biotic indices are similar between upstream of the project and downstream. The similarity in diversity and biotic indices suggest that there is little effect on water quality in the Brule River due to operation of the project. Water quality monitoring performed in 1990 as part of the licensing process, pre-trashrack replacement monitoring conducted in 1993, post-trashrack replacement monitoring conducted in 1994, and reservoir water quality modeling show that water quality in the vicinity of the Brule Project maintains DO concentrations and temperature greater than 5.0 mg/l and the average monthly temperatures recommended by the MDNR and WDNR. 9/

Nevertheless, I have included Article 405 requiring Wisconsin Electric to maintain a 5.0 mg/l DO concentration in the project tailrace and the average monthly temperatures shown in Table 2 of the final Environmental Assessment in the Brule Project tailrace, because the MDNR and the WDNR recommend that these standards be maintained. 10/

Although water quality in the Brule River in the vicinity of the Brule Project meets Michigan and Wisconsin water quality standards, I am including Article 405 requiring Wisconsin Electric to monitor water quality in the Brule River for a five year period, and once every five years thereafter, targeting low-flow, high-temperature periods such as may occur May 1 through September 15. Considering the amount of water quality

---

9/ Due to corrosion, Wisconsin Electric replaced the Brule Project trashrack in 1993 (See the final Environmental Assessment section VI.A.1.).

10/ I am requiring MDNR's, rather than WDNR's, temperature recommendations because MDNR's are the more restrictive.

information collected to date, the required monitoring frequency should provide sufficient indication that the project is maintaining the required water quality parameters for the duration of the license, especially during critical low-flow, high-temperature periods.

In addition, Article 409 requires a 20 cfs minimum flow in the spillway channel. The quantity of aquatic habitat provided by the 20 cfs minimum flow is about 22,000 square feet, based on a channel width varying between 45 and 130 feet. The required minimum flow should provide suitable habitat for benthic invertebrates, juvenile game fish, and forage fish habitat.

Changing the operating mode of the Brule Project from the historic peaking mode to run-of-river would benefit fishery, wildlife, and recreation resources in the Brule River (see section VI.A in the final Environmental Assessment). About 2.67 miles of the Brule and Menominee Rivers would benefit as a result of restoring the natural volume and periodicity of flows downstream of the Brule Project. In addition, impoundment fluctuations, under normal circumstances, would decrease to about ±0.3 ft., which would enhance the production of aquatic vegetation and fish. Therefore, Article 401 requires the Brule Project to be operated in a run-of-river mode.

The installation of a fish barrier net would protect fish from turbine mortality. In addition other qualitative benefits would accrue. Wisconsin Electric intends to investigate the applicability of the barrier net installation to its other projects. Considering the potential broad applicability of the barrier net installation at the Brule Project and the need to protect fish from turbine mortality, Article 407 requires Wisconsin Electric to install and maintain a barrier net at the Brule Project.

To improve recreational opportunities, staff has recommended improvements to Recreation Areas 28 and 23, upgrade of the canoe portage, tailwater recreation improvement, and improved directional signs. I find that these recreation enhancements are consistent with Commission policy and the 1990 Americans with Disabilities Act; therefore Article 414 requires Wisconsin Electric to implement these recreation enhancements. The recreational enhancements (described in detail in section VI.A.5 of the final Environmental Assessment) would cost $7,800 annually.

I am also requiring Wisconsin Electric to undertake the following environmental enhancements: a) maintain a target elevation of 1198.3 ±0.5 ft. NGVD; b) operate and maintain the existing USGS gages located upstream of the Brule project on the Paint and Brule Rivers and one located downstream of the project on the Brule River; c) maintain flows in the event of project

outages; (d) develop a reservoir drawdown plan to notify the resource agencies prior to any planned reservoir drawdown; (e) implement a comprehensive land management plan (CLMP) to include erosion control measures, wildlife habitat protection and enhancement, forage enhancement, Bald eagle management; and (f) implement the provisions of the Wisconsin Statewide Programmatic Agreement. In summary, I conclude that the measures listed below will adequately and equitably protect, mitigate damages to, and enhance fish and wildlife resources (including related spawning grounds and habitat) affected by the project.

- Operate the project in a run-of-river mode;
- Design, install, and maintain a fish barrier net to minimize fish entrainment and associated turbine mortality;
- Implement a wildlife management plan, Bald eagle and grey wolf protection and enhancement measures, and inventory, control and repair present and future erosion sites, as part of the final CLMP;
- Maintain a 20 cfs minimum flow in the spillway channel;
- Develop and implement a plan to operate the project in a run-of-river mode;
- Develop a plan to provide continuous run-of-river flows during a plant outage;
- Develop and implement a plan to monitor and control/eliminate noxious plants;
- Develop a reservoir drawdown plan to be implemented in the event of a scheduled maintenance reservoir drawdown;
- Maintain a reservoir elevation of 1198.3 ± 0.5 ft. NGVD;
- Maintain a DO concentration of 5.0 mg/l in the project tailrace and average monthly temperatures;
- Develop and implement a plan to monitor water quality for a five period and once every five years thereafter; and,
- Operate and maintain three stream flow gages located on the Paint and Brule Rivers.

COMPREHENSIVE PLANS

Section 10(a) of the FPA requires the Commission to consider the extent to which a project is consistent with Federal or state comprehensive plans for improving, developing, or conserving waterways affected by the project. Under Section 10(a)(2) of the

FPA, Federal and state agencies filed a total of 118 comprehensive plans for Michigan and Wisconsin that address resources in Michigan and Wisconsin. Of these, we identified and reviewed nine plans relevant to the Brule Project. 11/ No inconsistencies were found.

COMPREHENSIVE DEVELOPMENT

Sections 4(e) and 10(a) of the FPA require the Commission to give equal consideration to all uses of the waterway on which a project is located. When the Commission reviews a hydropower project, the recreational, fish and wildlife resources, and other nondevelopmental values of the involved waterway are considered equally with its electrical energy and other developmental values. In determining whether, and under what conditions, a hydropower license should be issued, the Commission must weigh the various economic and environmental tradeoffs involved in the decision.

Although, the retirement alternative (removing generating equipment) costs less than staff's licensing alternative, I have selected staff's licensing alternative for the reasons set forth below: (1) the difference between staff's licensing alternative and the retirement alternative is less than $100,000 annually and therefore not significant when compared to the developmental and non-developmental purposes of the project; (2) with staff's recommended environmental enhancement measures the environmental effects of project operation would be minimal; (3) the recommended measures would protect and enhance environmental resources in the Menominee River basin and on the 1,603 acres of project lands; (4) the electricity generated would continue to conserve nonrenewable energy resources and reduce atmospheric

---

11/ **Michigan:** Building Michigan's recreation future: the 1985-90 Michigan recreation plan, 1985, Michigan Department of Natural Resources; Menominee River fisheries plan, 1992, Michigan Department of Natural Resources and the Wisconsin Department of Natural Resources; **Wisconsin:** Upper Green Bay water quality management plan, 1993; Wisconsin statewide comprehensive outdoor recreation plan for 1991-96, 1991, Wisconsin Department of Natural Resources; Wisconsin water quality assessment report to congress, 1992, Wisconsin Department of Natural Resources; **Federal:** North American wildlife management plan, 1986, U.S. Fish and Wildlife Service, Canadian Wildlife Service; North American waterfowl management plan, 1986, U.S. Fish and Wildlife Service, Canadian Wildlife Service; Fisheries USA: the recreational fisheries policy of the U.S. Fish and Wildlife Service, undated, U.S. Fish and Wildlife Service; The nationwide rivers inventory, 1982, National Park Service.

pollution and the associated environmental effect from fossil-fuel generation.

LICENSE TERM

In 1986, ECPA modified Section 15 of the FPA to specify that any license issued shall be for a term that the Commission determines to be in the public interest, but not less than 30 years, nor more than 50 years. The Commission's policy establishes 30-year terms for those projects that propose little or no redevelopment, new construction, new capacity or enhancement, 40-year terms for those projects that propose a moderate amount of redevelopment, new capacity or enhancement measures, and 50-year terms for those projects that propose extensive redevelopment, new construction, new capacity or enhancement measures.

Wisconsin Electric is being required to implement extensive enhancement measures, therefore the new license for the Brule Project will be for a term of 40 years.

SUMMARY OF FINDINGS

Background information, analysis of impacts, support for related license articles, and the basis for a finding of no significant impact on the environment are contained in the attached final Environmental Assessment. Issuance of the license is not a major federal action significantly affecting the quality of the human environment.

The project will be safe if operated and maintained in accordance with the requirements of this license. Analysis of related issues is provided in staff's Safety and Design Assessment.

I conclude that the Brule Project does not conflict with any planned or authorized development, and is best adapted to the comprehensive development of the Brule River for beneficial public use.

The Director orders:

(A) This license is issued to Wisconsin Electric Power Company (licensee) for a period of 40 years, effective the first day of the month in which it is issued, to continue to operate and maintain the Brule Project. This license is subject to the terms and conditions of the FPA, which is incorporated by reference as part of this license, and to the regulations the Commission issues under the provisions of the FPA.

(B) The project consists of:

(1) All lands, to the extent of the licensee's interests in those lands, as shown on exhibit G-1 (FERC Drawing Number 2431-1013 of the application.

(2) The project consists of: (a) a 157.5-foot-long earthen dike with a crest elevation of 1,206.1 feet National Geodetic Vertical Datum (NGVD); (b) a 68-foot-long concrete south gravity wall with a top elevation of 1,205.0 feet NGVD; (c) a 73-foot-long concrete north gravity wall with a crest elevation of 1,205.0 feet NGVD; (d) a 65-foot-high concrete spillway section consisting of a 139-foot-long reinforced concrete spillway with a crest elevation of 1,187.1 feet NGVD, topped with eight 12-foot-high by 14-foot-wide Taintor gates; (e) a 79-foot-long concrete west gravity wall with a crest elevation of 1,205.0 feet NGVD; (f) a 225-foot-long earth dike with a crest elevation of 1,206.1 feet NGVD; (g) a 120-foot-long auxiliary spillway composed of two bays about 60 feet long by 6 feet wide with a crest elevation of 1,204.62 feet NGVD, separated by a concrete wall, each containing an erodible fuse plug for flood control purposes; (h) a 1,050-foot-long auxiliary spillway channel; (i) an 880-foot-long earth dike located about 1.4 miles upstream of the dam with a crest elevation of 1,203.8 feet NGVD; (j) a reservoir with a water surface elevation of 1,198.3 feet (NGVD), a surface area of 535 acres, a storage capacity of 8,600 acre-feet and a useable storage capacity of 530 acre-feet; (k) a powerhouse containing three generating units rated at 1,335 kilowatts (kw), 2,000 kw and 2,000 kw; (l) a 345-foot-long transmission line, and (m) appurtenant facilities.

The project works generally described above are more specifically described in exhibit A of the license application and shown by exhibit F:

Exhibit A:

Pages A-1 through A-7 describing the existing mechanical, electrical and transmission equipment, filed December 2, 1991.

Exhibit F-	FERC No.	Showing
F-1	2431-1001	General Layout Plan
F-2	2431-1002	Plan of Project Structures
F-3	2431-1003	Cross Section of Plant
F-4	2431-1004	Plant Floor and Sectional Plans

F-5	2431-1005	Plant Elevations
F-6	2431-1006	Plan of Rehabilitated Spillway
F-7	2431-1007	Spillway Details
F-8	2431-1008	Detached Dike and Right Embankment Details
F-9	2431-1009	Auxiliary Spillway Plan
F-10	2431-1010	Left Embankment and Auxiliary Spillway Structures Details
F-11	2431-1011	Auxiliary Spillway Channel Profile
F-12	2431-1012	Auxiliary Spillway Channel Section

(3) All of the structures, fixtures, equipment, or facilities used to operate or maintain the project and located within the project boundary, all portable property that may be employed in connection with the project and located within or outside the project boundary, and all riparian or other rights that are necessary or appropriate in the operation or maintenance of the project.

(C) Exhibits A, F and G of the license application are approved and made part of the license.

(D) This license is subject to the articles set forth in Form L-3 (October 1975) entitled "Terms and Conditions of License for Constructed Major Project Affecting Navigable Waters of the United States and the following additional articles:

Article 201. The Licensee shall pay the United States the following annual charges:

For the purposes of reimbursing the United States for the Commission's administrative costs, pursuant to Part I of the Federal Power Act, a reasonable amount as determined in accordance with the provisions of the Commission's regulations in effect from time to time. The authorized existing installed capacity for that purpose is 5,335 kilowatts. This annual charge shall be effective as of the first day of the month in which this license is issued. Under the regulations currently in effect, projects with

authorized installed capacity of less than or equal to 1,500 kw will not be assessed an annual charge.

Article 202. Within 45 days of the date of issuance of the license, the licensee shall file an original set and two duplicate sets of aperture cards of the approved exhibit drawings. The set of originals must be reproduced on silver or gelatin 35mm microfilm. The duplicate sets are copies of the originals made on diazo-type microfilm. All microfilm must be mounted on type D (3 1/4" x 7 3/8") aperture cards.

Prior to microfiliming, the FERC Drawing Number (2431-1001 through 2431-1013) shall be shown in the margin below the title block of the approved drawing. After mounting, the FERC Drawing Number must be typed on the upper right corner of each aperture card. Additionally, the Project Number, FERC Exhibit (e.g., F-1, G-1, etc.), Drawing Title, and date of this license must be typed on the upper left corner of each aperture card.

The original and one duplicate set of aperture cards must be filed with the Secretary of the Commission, ATTN: DPCA/ERB. The remaining duplicate set of aperture cards shall be filed with the Commission's Chicago Regional Office.

Article 301: Within 90 days of completion of construction of the facilities authorized by this license (barrier net and recreation facilities, etc.), the Licensee shall file for approval, revised Exhibits F and G, to show those project facilities as-built.

Article 401: Upon approval of the plan required in Article 403, the Licensee shall operate the project in a run-of-river mode for the protection of aquatic resources in the Brule River. The Licensee shall at all times act to minimize the fluctuation of the reservoir surface elevation by maintaining a discharge from the project so that, at any point in time, flows, as measured immediately downstream of the project tailrace, approximate the sum of inflows to the project reservoir. Run-of-river operation may be temporarily modified if required by operating emergencies beyond the control of the Licensee, or for short periods of time upon mutual agreement between the Licensee, the Michigan Department of Natural Resources, Wisconsin Department of Natural Resources, and the U.S. Fish and Wildlife Service. If the flow is so modified, the Licensee shall notify the Commission, Michigan Department of Natural Resources and the Wisconsin Department of Natural Resources as soon as possible, but no later than 10 days after each such incident.

Article 402: Upon approval of the plan required in Article 403, the Licensee shall maintain a target reservoir surface elevation of 1198.3 ± 0.5 ft. National Geodedic Vertical Datum (NGVD).

This target reservoir surface elevation may be temporarily modified if required by operating emergencies beyond the control of the Licensee or for short periods upon mutual agreement between the Licensee and the Michigan Department of Natural Resources and the Wisconsin Department of Natural Resources. If the reservoir water surface elevation is so modified, the Licensee shall notify the Commission, Michigan Department of Natural Resources, and the Wisconsin Department of Natural Resources as soon as possible, but no later than 10 days after each such incident.

Article 403: Within 180 days from the date of issuance of this license, in order to monitor the run-of-river operating mode required by Article 401 and the impoundment elevations in Article 402, the Licensee shall develop, after consultation with the resource agencies, a plan, for Commission approval, to: (1) install, calibrate, and maintain staff gages in the project impoundment; (2) maintain automatic water level sensors to continuously record the elevation of the Brule Project's impoundment; (3) maintain a log of the elevations of the Brule Project's impoundment and turbine operation; (4) develop a generating capacity rating curve that relates generation in kilowatts to generation flow in cfs for each turbine; (5) maintain and operate stream flow gages on the Paint River (USGS Gage No 04062000) and on the Brule River upstream and downstream of the project (USGS gage Nos. 04061000 and 04062011, respectively). The Licensee shall provide these data to the U.S. Fish and Wildlife Service, the Michigan Department of Natural Resources, and the Wisconsin Department of Natural Resources upon receiving a written request for such information.

The Licensee shall include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The Licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan with the Commission. If the Licensee does not adopt a recommendation, the filing shall include the Licensee's reasons, based on project-specific information. The Commission reserves the right to require changes to the plan. Upon Commission approval, the Licensee shall implement the plan, including any changes required by the Commission.

Article 404: Within 180 days from the issuance of this license, the Licensee shall develop and implement an operation testing plan to evaluate whether operation of the project in a run-of-river mode by the Licensee is achieved through headpond control and turbine operation.

The Licensee shall develop and implement the operation testing plan as follows. For the first three years upon approval by the Commission of the operation and testing plan required under this Article, the Licensee shall evaluate how closely the Brule Project can operate in a run-of-river operating mode required by Article 401 and the impoundment elevations required by Article 402.

Within six months after the end of the three-year test period, the Licensee shall submit a report for evaluation and comment to the U.S. Fish and Wildlife Service, the Michigan Department of Natural Resources, and the Wisconsin Department of Natural Resources on the operational testing program. The report shall assess how closely the Brule Project operates in a run-of-river mode using impoundment elevation and turbine generation and its effect on reservoir surface water level fluctuations. Within six months of receiving comments on the draft report from these agencies, the Licensee shall file a final report with the Commission, including the agencies' comments.

If the above-named agencies comment that operation of the project cannot adequately meet operations standards required by Articles 401 and 402, the Licensee shall provide, in the final report filed with the Commission for approval, its plan, specifications, and schedules for installing and operating an alternative method of operation controls to meet the operation requirements of Articles 401 and 402. The Commission reserves the right to require changes to the plan, specifications, and schedules. Upon Commission approval, the Licensee shall implement the plans, including any changes required by the Commission and according to the approved schedule.

The Licensee shall include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The Licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan with the Commission. If the Licensee does not adopt a recommendation, the filing shall include the Licensee's reasons, based on project-specific information. The Commission reserves the right to require changes to the plan. Upon Commission approval, the Licensee shall implement the plan, including any changes required by the Commission.

Article 405: Within 180 days from the date of issuance of this license, the Licensee shall file with the Commission, for approval, a plan to monitor dissolved oxygen (DO) and temperature of the Brule River immediately downstream of the Brule Dam for a period of five years from the date of license issuance and for one year every five years thereafter. The purpose of this

monitoring plan is to ensure that streamflows downstream of the Brule Dam, as measured immediately downstream, maintain the following standards for DO concentration and temperature when river discharges are greater than or equal to the 95 percent exceedence flow:

a. DO concentrations in the project tailwaters not less than 5 milligrams per liter (mg/l) at any time unless the Licensee demonstrates to the Michigan Department of Natural Resources that these DO limits are not attainable through further feasible and prudent measures or the variation between the daily average and daily minimum DO concentrations in the river exceeds 1 mg/l. Further, if the Michigan Department of Natural Resources agrees with the Licensee's demonstration, DO concentrations in project tailwaters shall not be less than 5 mg/l at any time during the warm weather season (June through September) until such time as the Michigan Department of Natural Resources causes the preparation and implementation of a comprehensive plan as described in the State of Michigan's water quality standards to upgrade these waters to 6 mg/l at any time; and

b. monthly average temperatures downstream of the project no greater than:

January, February	38°F
March	41°F
April	56°F
May	70°F
June	80°F
July	83°F
August	81°F
September	74°F
October	64°F
November	49°F
December	39°F

These monthly average temperatures may be exceeded for short periods with approval from the Michigan Department of Natural Resources when natural water temperatures measured upstream of the project exceed the ninetieth percentile occurrence of water temperatures (i.e, the monthly average temperatures cited in item b).

The monitoring plan shall include provisions for (1) monitoring of DO and temperature in the project impoundment and downstream of the Brule dam with the sensor locations and monitoring frequency determined in consultation with the Michigan Department of Natural Resources, the Wisconsin Department of Natural Resources, and the U.S. Fish and Wildlife Service; and (2) the preparation of operating procedures developed in consultation with the Michigan Department of Natural Resources, Wisconsin Department of Natural Resources, and the U.S. Fish

Wildlife Service to address water quality conditions which deviate from the above limits.

The Licensee shall prepare the plan after consultation with the Michigan Department of Natural Resources, Wisconsin Department Natural Resources, and the U.S. Fish and Wildlife Service. The water quality monitoring plan shall include a schedule for:

a. implementation of the program (must be implemented within 24 months from the date of issuance of this license);

b. consultation with the Michigan Department of Natural Resources, Wisconsin Department of Natural Resources, and the U.S. Fish and Wildlife Service concerning the results of the monitoring; and

c. filing the results, agency comments, and Licensee's response to agency comments with the Commission.

The Licensee shall include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The Licensee shall allow a minimum of 30 days for the agencies to comment and make recommendations before filing the plan with the Commission. If the Licensee does not adopt a recommendation, the filing shall include the Licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Upon Commission approval, the Licensee shall implement the DO concentration and temperature monitoring plan, including any changes required by the Commission.

The Licensee may petition the Michigan Department of Natural Resources during every fifth year after the issuance of this license to modify the monitoring frequency or the dissolved oxygen or temperature limits contained herein to ensure the protection of the public health, welfare, safety, and the natural resources of the State of Michigan, including the fishery resources. Upon approval of the Michigan Department of Natural resources of all such petitions, the petition shall be submitted to the Commission as an amendment to this license article. The Licensee may also petition the Commission ever fifth year to modify the monitoring frequency.

Article 406: Authority is reserved to the Commission to require the Licensee to construct, operate, and maintain, or to provide for the construction, operation, and maintenance of, such fishways as may be prescribed by the Secretary of the Interior pursuant to Section 18 of the Federal Power Act.

Article 407: Within 180 days from the date of issuance of this license the Licensee shall file for Commission approval a plan to develop, install and maintain a barrier net at the Brule Project to minimize the entrainment of fish from the Brule impoundment through the turbine of the Brule Project.

The plan shall include, at a minimum: (1) detailed design drawings of the proposed barrier net and support structure; (2) a schedule for implementation of the plan; (3) consultation with the U.S. Fish and Wildlife Service, Wisconsin Department of Natural Resources, and the Michigan Department of Natural Resources concerning the development and implementation of the plan; and (4) a provision to evaluate the effectiveness of the barrier net at minimizing the entrainment of fish through the project turbines.

The Licensee shall include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The Licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan with the Commission. If the Licensee does not adopt a recommendation, the filing shall include the Licensee's reasons, based on project-specific information. The Commission reserves the right to require changes to the plan. Upon Commission approval, the Licensee shall implement the plan, including any changes required by the Commission.

Article 408: Within 180 days of license issuance, the Licensee shall file with the Commission, for approval, a reservoir drawdown plan. The purpose of the drawdown plan is to minimize the impact of any project maintenance requiring a reservoir drawdown on aquatic resources in the project impoundment and downstream of the project.

The plan shall include a schedule for: (1) implementation of the plan; (2) consultation with the U.S. Fish and Wildlife Service, Wisconsin Department of Natural Resources, and the Michigan Department of Natural Resources concerning the development and implementation of the plan; and (3) filing the plan, agency comments, and licensee's response to agency comments with the Commission.

The Licensee shall include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The Licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan with the Commission. If

the Licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information. The Commission reserves the right to require changes to the plan. Upon Commission approval, the Licensee shall implement the plan, including any changes required by the Commission.

Article 409: Within 180 days after the date of issuance of this license, the Licensee shall file with the Commission, for approval, a plan to provided a target minimum flow of 20 cubic feet per second (cfs) in the Brule Project spillway channel. The purpose of the plan is to: (1) ensure a continuous target minimum flow of 20 cfs in the spillway channel at all times; (2) quantify the allowable variation from the target flow of 20 cfs in the spillway channel; and install a staff gage in the spillway channel showing the target 20 cfs minimum flow and the allowable variation from the target 20 cfs minimum flow.

The Licensee shall include with the plan documentation of consultation with the U.S. Fish and Wildlife Service, the Michigan Department of Natural Resources, and the Wisconsin Department of Natural Resources, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The Licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan with the Commission. If the Licensee does not adopt a recommendation, the filing shall include the Licensee's reasons, based on project-specific information. The Commission reserves the right to require changes to the plan. Upon Commission approval, the Licensee shall implement the plan, including any changes required by the Commission.

Article 410: Within 180 days after the date of issuance of this license, the Licensee shall, in consultation with the U. S. Fish and Wildlife Service (FWS), the Wisconsin Department of Natural Resources (WDNR), and the Michigan Department of Natural Resources (MDNR), develop a plan to monitor purple loosestrife (Lythrum salicaria) and Eurasian water milfoil (Myriophyllum spicatum) in project waters annually. The plan shall include, but is not limited to: (a) the method of monitoring, (b) the frequency of monitoring, and (c) documentation of transmission of monitoring data to the U.S. Fish and Wildlife Service, Wisconsin Department of Natural Resources, and the Michigan Department of Natural Resources. The plan shall be submitted to the Commission for approval. If at any time during the period of the license, the U.S. Fish and Wildlife Service, Wisconsin Department of Natural Resources, and the Michigan Department of Natural Resources deem it necessary to control/eliminate purple loosestrife and/or Eurasian water milfoil, the Licensee shall

cooperate in this measure. The Commission reserves the right to require changes in the plan.

The Licensee shall include documentation of consultation with the U.S. Fish and Wildlife Service, Wisconsin Department of Natural Resources, and the Michigan Department of Natural Resources before preparing the plan, copies of the agencies' comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments were accommodated by the plan. The Licensee shall allow a minimum of 30 days for the to comment and to make recommendations prior to filing the plan with the Commission. If the Licensee does not adopt a recommendation, filing shall include the Licensee's reasons, based on project-specific information.

Article 411: Within 180 days after the date of issuance of this license, the Licensee shall, in consultation with the U.S. Fish and Wildlife Service, the Wisconsin Department of Natural Resources, and the Michigan Department of Natural Resources (agencies), prepare and file for Commission approval, a final Bald eagle management plan (Plan) as part of the Comprehensive Land Management Plan for the Brule Hydroelectric Project. The Plan shall include, but not be limited to: (a) a description of project specific Bald eagle protection and enhancement measures, including those contained in the Threatened and Endangered Species section of the final Environmental Assessment for the Brule Hydroelectric Project; (b) the cost of the proposed enhancement and protection measures (implementation and maintenance); (c) provisions for funding the proposed measures; and (d) an implementation schedule.

The Licensee shall include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The Licensee shall allow a minimum of 30 days for the agencies to comment and make recommendations before filing the plan with the Commission. If the Licensee does not adopt a recommendation, the filing shall include the Licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the Plan. Upon Commission approval, the Licensee shall implement the finalized Plan including any changes required by the Commission.

Article 412: The Licensee shall, in consultation with the U.S. Fish and Wildlife Service, the Wisconsin Department of Natural Resources, and the Michigan Department of Natural Resources (agencies), prepare and file for Commission approval, within 1 year after the date of issuance of this license, a final Wildlife Management Plan (WMP) as part of the Comprehensive Land

Management Plan for the Brule Hydroelectric Project. The WMP shall include, but not be limited to: (a) a description of project specific wildlife protection and enhancement measures, including those contained in the Terrestrial Resources, Wildlife management and enhancement section of the final Environmental Assessment for the Brule Hydroelectric Project; (b) the cost of the proposed enhancement and protection measures (implementation and maintenance); (c) provisions for funding the proposed measures; (d) an implementation schedule; and (e) a description of the Licensee's responsibilities in regard to cooperating with the agencies during surveys for state-listed species on project lands.

The Licensee shall include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The Licensee shall allow a minimum of 30 days for the agencies to comment and make recommendations before filing the plan with the Commission. If the Licensee does not adopt a recommendation, the filing shall include the Licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the WMP. Upon Commission approval, the Licensee shall implement the finalized WMP including any changes required by the Commission.

Article 413: The Licensee shall implement the "Programmatic Agreement Among the Federal Energy Regulatory Commission, the Advisory Council on Historic Preservation, the State of Wisconsin, State Historic Preservation Officer, and the State of Michigan, State Historic Preservation Officer, for Managing Historic Properties That May Be Affected By New and Amended Licenses Issuing For the Continued Operation of Existing Hydroelectric Projects in the State of Wisconsin and adjacent Portions of the State of Michigan," executed on 12/30/93, including but not limited to the Historic Resources Management Plan for the project. In the event that the Programmatic Agreement is terminated, the Licensee shall implement the provisions of its approved Historic Resources Management Plan. The Commission reserves the authority to require changes to the Historic Resources Management Plan at any time during the term of the license. If the Programmatic Agreement is terminated prior to Commission approval of the Historic Resources Management Plan, the Licensee shall obtain Commission approval before engaging in any ground disturbing activities or taking any other action that may affect any historic properties within the Project's area of potential effect.

Article 414. The Licensee shall implement the Comprehensive Long Range Recreation Plan filed with the Commission on December 30, 1993, as it applies to the Brule Project and within 180 days

after the date of issuance of this license, the Licensee shall file with the Commission, for approval, a final supplemental recreation plan, which incorporates the following:

Recreation Area No. 28 - the Licensee shall provide (a) an accessible boat launch pier (b) a designated shoreline fishing area accessible to persons with disabilities; (c) toilet facilities accessible to persons with disabilities; (d) accessible trails to the fishing area (as described in Appendix 16, Wisconsin Electric, application, 1993); and (e) a defined parking area with two spaces designated for persons with disabilities.

Recreation Area No. 23 - the Licensee shall (a) improve the existing boat launch area to include a concrete ramp and barrier-free skid pier; (b) provide toilet facilities accessible to persons with disabilities; (c) install signs; and (d) designate one parking space for persons with disabilities.

Canoe Portage Area - the Licensee shall (a) provide two canoe rests and benches; (b) directional signs; (c) toilet facilities along the portage path; (d) remove fence at the put-in and relocate put-in area about 75 feet downstream of existing put-in; (e) repair the erosion damage on the final section of the portage trail; and (f) consult with the Michigan and Wisconsin Departments of Natural Resources and determine the feasibility of making the existing platform at the canoe take-out accessible to persons with disabilities.

Tailrace Area: the Licensee shall maintain the existing tailwater and parking area and walking path so that foot traffic and informal tailwater fishing can occur.

Signs: the Licensee shall consult with the State of Wisconsin and the town of Florence and display directional signs to Recreation Area No. 28 on U.S. Highway 2. The Licensee shall consult with the Michigan Department of Transportation to determine if existing signs at Recreation Area No. 23 meet regulations and if not, provide a directional sign that meets regulations.

The final supplemental recreation plan shall include: (1) final design drawings of all recreation enhancements; (2) a description of signs to be used to identify the public access areas and the portage route; (3) drawings and specifications for each recreational enhancement; (4) an erosion control plan to address existing erosion at the Brule Project and measures to reduce erosion during recreation facility improvements to include: (a) a description of the actual site conditions; (b) measures proposed to control erosion and to prevent slope instability; (c) detailed descriptions, functional design drawings, and specific topographic locations of all control

measures, including costs; and (d) a specific implementation schedule and details for monitoring; (5) a description of the compatibility of the construction materials for the recreational facilities with the natural character of the surroundings; (6) costs of the improvements; (7) a construction schedule; and (8) identification of the entity responsible for operation and maintenance of the facilities and access areas.

Following approval of the final supplemental recreation plan, the Licensee shall complete the recreation improvements for the Brule Project within five years.

The Licensee shall prepare the final supplemental recreation plan after consultation with the Wisconsin and Michigan Departments of Natural Resources, the Natural Resources Conservation Service, the National Park Service, and the U.S. Fish and Wildlife Service. The Licensee shall include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the resource agencies listed above, and specific descriptions of how the agencies' comments and recommendations are accommodated by the plan. The Licensee shall allow 30 days for the agencies to comment and make recommendations before filing the plan with the Commission. If the Licensee does not adopt a recommendation, the filing shall include the Licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. No land-disturbing activities shall begin at the project until the Licensee is notified by the Commission that the plan is approved. Upon Commission approval, the Licensee shall implement the plan, including any changes required by the Commission. Within 90 days of completion of construction of the approved recreational facilities authorized by this license, the Licensee shall file for approval, revised Exhibit G, to show those recreational facilities as-built, in relation to the project features.

Article 415: (a) In accordance with the provisions of this article, the Licensee shall have the authority to grant permission for certain types of use and occupancy of project lands and waters and to convey certain interests in project lands and waters for certain types of use and occupancy, without prior Commission approval. The Licensee may exercise the authority only if the proposed use and occupancy is consistent with the purposes of protecting and enhancing the scenic, recreational, and other environmental values of the project. For those purposes, the Licensee shall also have continuing responsibility to supervise and control the use and occupancies for which it grants permission, and to monitor the use of, and ensure compliance with the covenants of the instrument of conveyance for, any interests that it has conveyed, under this article. If

a permitted use and occupancy violates any condition of this article or any other condition imposed by the Licensee for protection and enhancement of the project's scenic, recreational, or other environmental values, or if a covenant of a conveyance made under the authority of this article is violated, the Licensee shall take any lawful action necessary to correct the violation. For a permitted use or occupancy, that action includes, if necessary, cancelling the permission to use and occupy the project lands and waters and requiring the removal of any non-complying structures and facilities.

(b) The type of use and occupancy of project lands and water for which the Licensee may grant permission without prior Commission approval are: (1) landscape plantings; (2) non-commercial piers, landings, boat docks, or similar structures and facilities that can accommodate no more than 10 watercraft at a time and where said facility is intended to serve single-family type dwellings; (3) embankments, bulkheads, retaining walls, or similar structures for erosion control to protect the existing shoreline; and (4) food plots and other wildlife enhancement. To the extent feasible and desirable to protect and enhance the project's scenic, recreational, and other environmental values, the Licensee shall require multiple use and occupancy of facilities for access to project lands or waters. The Licensee shall also ensure, to the satisfaction of the Commission's authorized representative, that the use and occupancies for which it grants permission are maintained in good repair and comply with applicable state and local health and safety requirements. Before granting permission for construction of bulkheads or retaining walls, the licensee shall: (1) inspect the site of the proposed construction, (2) consider whether the planting of vegetation or the use of riprap would be adequate to control erosion at the site, and (3) determine that the proposed construction is needed and would not change the basic contour of the reservoir shoreline. To implement this paragraph (b), the Licensee may, among other things, establish a program for issuing permits for the specified types of use and occupancy of project lands and waters, which may be subject to the payment of a reasonable fee to cover the Licensee's costs of administering the permit program. The Commission reserves the right to require the Licensee to file a description of its standards, guidelines, and procedures for implementing this paragraph (b) and to require modification of those standards, guidelines, or procedures.

(c) The Licensee may convey easements or rights-of-way across, or leases of, project lands for: (1) replacement, expansion, realignment, or maintenance of bridges or roads where all necessary state and federal approvals have been obtained; (2) storm drains and water mains; (3) sewers that do not discharge into project waters; (4) minor access roads; (5) telephone, gas, and electric utility distribution lines; (6) non-project overhead electric transmission lines that do not require erection of

support structures within the project boundary; (7) submarine, overhead, or underground major telephone distribution cables or major electric distribution lines (69-kV or less); and (8) water intake or pumping facilities that do not extract more than one million gallons per day from a project reservoir. No later than January 31 of each year, the Licensee shall file three copies of a report briefly describing for each conveyance made under this paragraph (c) during the prior calendar year, the type of interest conveyed, the location of the lands subject to the conveyance, and the nature of the use for which the interest was conveyed. If no conveyance was made during the prior calendar year, the Licensee shall so inform the Commission and the Regional Director in writing no later than January 31 of each year.

(d) The Licensee may convey fee title to, easements or rights-of-way across, or leases of project lands for: (1) construction of new bridges or roads for which all necessary state and federal approvals have been obtained; (2) sewer or effluent lines that discharge into project waters, for which all necessary federal and state water quality certification or permits have been obtained; (3) other pipelines that cross project lands or waters but do not discharge into project waters; (4) non-project overhead electric transmission lines that require erection of support structures within the project boundary, for which all necessary federal and state approvals have been obtained; (5) private or public marinas that can accommodate no more than 10 watercraft at a time and are located at least one-half mile (measured over project waters) from any other private or public marina; (6) recreational development consistent with an approved Exhibit R or approved report on recreational resources of an Exhibit E; and (7) other uses, if: (i) the amount of land conveyed for a particular use is five acres or less; (ii) all of the land conveyed is located at least 75 feet, measured horizontally, from project waters at normal surface elevation; and (iii) no more than 50 total acres of project lands for each project development are conveyed under this clause (d)(7) in any calendar year. At least 60 days before conveying any interest in project lands under this paragraph (d), the Licensee must submit a letter to the Director, Office of Hydropower Licensing, stating its intent to convey the interest and briefly describing the type of interest and location of the lands to be conveyed (a marked exhibit G or K map may be used), the nature of the proposed use, the identity of any federal or state agency official consulted, and any federal or state approvals required for the proposed use. Unless the Director, within 45 days from the filing date, requires the Licensee to file an application for prior approval, the Licensee may convey the intended interest at the end of that period.

(e) The following additional conditions apply to any intended conveyance under paragraph (c) or (d) of this article:

(1) Before conveying the interest, the Licensee shall consult with federal and state fish and wildlife or recreation agencies, as appropriate, and the State Historic Preservation Officer.

(2) Before conveying the interest, the Licensee shall determine that the proposed use of the lands to be conveyed is not inconsistent with any approved exhibit R or approved report on recreational resources of an exhibit E; or, if the project does not have an approved exhibit R or approved report on recreational resources, that the lands to be conveyed do not have recreational value.

(3) The instrument of conveyance must include the following covenants running with the land: (i) the use of the lands conveyed shall not endanger health, create a nuisance, or otherwise be incompatible with overall project recreational use; (ii) the grantee shall take all reasonable precautions to insure that the construction, operation, and maintenance of structures or facilities on the conveyed lands will occur in a manner that will protect the scenic, recreational, and environmental values of the project; and (iii) the grantee shall not unduly restrict public access to project waters.

(4) The Commission reserves the right to require the Licensee to take reasonable remedial action to correct any violation of the terms and conditions of this article, for the protection and enhancement of the project's scenic, recreational, and other environmental values.

(f) The conveyance of an interest in project lands under this article does not in itself change the project boundaries. The project boundaries may be changed to exclude land conveyed under this article only upon approval of revised exhibit G or K drawings (project boundary maps) reflecting exclusion of that land. Lands conveyed under this article will be excluded from the project only upon a determination that the lands are not necessary for project purposes, such as operation and maintenance, flowage, recreation, public access, protection of environmental resources, and shoreline control, including shoreline aesthetic values. Absent extraordinary circumstances, proposals to exclude lands conveyed under this article from the project shall be consolidated for consideration when revised exhibit G or K drawings would be filed for approval for other purposes.

(g) The authority granted to the Licensee under this article shall not apply to any part of the public lands and reservations of the United States included within the project boundary.

Article 501. The Licensee, within 4 months of issuance of this license, shall file a Hydropower Compliance Management Program (HCMP) for Commission approval. The HCMP shall include the following elements for each license requirement:

a. The identification of, and schedule for, each action necessary to complete the license requirement;

b. A schedule for the start and completion of the consultation process with each resource agency required to be consulted for each action necessary to complete the license requirement; and

c. The identification of specific individuals in each agency that need to be consulted on each action necessary to complete the license requirement.

Seven copies of all submissions under this article must be filed with the Secretary of the Commission. One copy of each submission must also be filed with any agency consulted under element (b) above.

The Commission reserves the right to require the Licensee to make modifications to the HCMP and to take other measures necessary to ensure compliance by the licensee with the terms and conditions of the license.

Article 502. If the Licensee's project was directly benefitted by the construction work of another Licensee, a permittee, or the United States on a storage reservoir or other headwater improvement during the term of the original license (including extensions of that term by annual licenses), and if those headwater benefits were not previously assessed and reimbursed to the owner of the headwater improvement, the Licensee shall reimburse the owner of the headwater improvement for those benefits, at such time as they are assessed, in the same manner as for benefits received during the term of this new license.

(E) The Licensee shall serve copies of any Commission filing required by this order on any entity specified in this order to be consulted on matters related to the Commission filing. Proof of service on these entities must accompany the filing with the Commission.

(F) This order is issued under authority delegated to the Director and constitutes final agency action. Requests for rehearing by the Commission may be filed within 30 days of the date of this order, pursuant to 18 C.F.R. § 385.713. The filing of a request for rehearing does not operate as a stay of the effective date of this order or of any other date specified in this order, except as specifically ordered by the Commission.

The Licensee's failure to file a request for rehearing shall constitute acceptance of this order.

Fred E. Springer
Director, Office of
Hydropower Licensing

FINAL ENVIRONMENTAL ASSESSMENT
FOR HYDROPOWER LICENSE

Brule Hydroelectric Project

FERC Project No. 2431 - 008

Michigan and Wisconsin

Federal Energy Regulatory Commission
Office of Hydropower Licensing
Division of Project Review
825 N. Capitol Street, NE
Washington, D.C. 20426

August 23, 1995

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

SUMMARY

On December 12, 1991, Wisconsin Electric Power Company (Wisconsin Electric) filed an application for a new license for the existing Brule Hydroelectric Project (FERC No. 2431) with an installed capacity of 5.4 megawatts (MW). On January 28, 1993, Wisconsin Electric supplemented its application with additional information.

On April 11, 1990 and May 10, 1991, pursuant to Section 401 of the Clean Water Act, Wisconsin Electric applied to the Wisconsin Department of Natural Resources (WDNR), and Michigan Department of Natural Resources (MDNR), respectively, for 401 water quality certification (WQC) for the Brule Project. The WDNR waived Section 401 WQC, on May 4, 1990 without conditions. The MDNR did not act on Wisconsin Electric's request for 401 WQC within the one year waiver period under Section 401.

This final environmental assessment (FEA) analyzes the effects of the proposed action (Section VI.A.) and various alternatives to the proposed action, including project retirement (Section VI.B.), for Wisconsin Electric's Brule Project.

Licensing the project is complicated by an unusually high undepreciated sunk capital cost (owing to a safety-related rehabilitation and expansion of the project's spillway), and the project's power benefits (the cost of the project's power compared with the current cost of alternative power) under each alternative action are negative (see Section VII.) The FEA recommends 15 measures proposed or recommended by Wisconsin Electric, various agencies and staff in order to protect and enhance environmental resources. These measures are discussed in section VI.A and summarized in section VIII of the FEA.

Overall these measures along with standard articles provided in a license issued for the project would protect or enhance fishery resources, water quality, recreational resources, and protect existing and undiscovered archeological sites. In addition electricity generated from the project would reduce the use of fossil-fueled, electrical generating plants, conserve non-renewable energy resources, and reduce atmospheric pollution. Denying the license -- meaning that all of the power that would have been produced by the Brule Project would be lost and no measures would be implemented to protect, mitigate adverse impacts to, or enhance existing environmental resources -- has been considered.

Pursuant to Section 10(j) of the Federal Power Act (FPA), we make a determination that some recommendations of the Federal and state fish and wildlife agencies are inconsistent with the purposes and requirements of Part I of the FPA. Section 10(j) of

the FPA requires the Commission to include license conditions, based on recommendations of Federal and state fish and wildlife agencies, for the protection of, mitigation of adverse impacts to, and enhancement of fish and wildlife resources. We have addressed the concerns of the Federal and state fish and wildlife agencies and made recommendations some of which are inconsistent with those of the agencies.

On September 15, 1994, in an attempt resolve Section 10(j) inconsistencies, we met with representatives of the U.S. Fish and Wildlife Service, Wisconsin Department of Natural Resources, and Michigan Department of Natural Resources in Green Bay, Wisconsin. We have determined that (1) the installation of stream flow gages; (2) MDNR's recommended duration of water quality monitoring; and (3) the development of a separate wildlife management plan; and (4) maintaining Michigan's water quality standard requiring less than a 5°F difference between temperature downstream of the Brule dam and flows entering the Brule impoundment are inconsistent with the public interest and comprehensive development sections of the FPA.

Pursuant to Section 10(j) of the FPA, we make a determination that the following recommendations made by the resource agencies are inappropriate fish and wildlife recommendations, in that they do not provide specific measures for the protection, mitigation of damages to, and enhancement of fish and wildlife resources: (1) The Department of the Interior's (Interior), MDNR's and WDNR's recommendations concerning recreation facilities at the Brule Project including directional signage and leasing of project lands; (2) WDNR's recommendation for a state endangered/threatened/watch species inventory and periodic raptor surveys; (3) MDNR's recommendation for the inclusion of the standard re-opener clause; (4) the parts of MDNR's recommendation concerning completion of a Fishery Damage Assessment; (5) MDNR's recommendation to study project retirement and/or dam removal; (6) WDNR's and MDNR's recommendations to comply with applicable state laws and permits; (7) the WDNR's, MDNR's, and Interior's recommendation regarding expiration dates for licenses issued by the Commission; and (8) designing and conducting an evaluation of all fish passage and fish protection devices.

Based on our independent environmental analysis, we conclude in the FEA that issuance of a license for the Brule Project would not constitute a major Federal action significantly affecting the quality of the human environment.

FINAL ENVIRONMENTAL ASSESSMENT

FEDERAL ENERGY REGULATORY COMMISSION
OFFICE OF HYDROPOWER LICENSING, DIVISION OF PROJECT REVIEW

Brule Hydroelectric Project
FERC Project No. 2431-008, Michigan and Wisconsin
August 23, 1995

I. APPLICATION

On December 12, 1991, Wisconsin Electric Power Company (Wisconsin Electric) filed an application for a new major license for the existing 5.4 megawatt (MW) Brule Project (Figure 1, Page 2). The Brule Project consists of one development (Figure 2, Page 3).

The project is located in Michigan and Wisconsin on the Brule River 1.66 miles upstream of the confluence of the Brule River and Michigamme River, which join to form the Menominee River. The existing license for the Brule Project expired on December 31, 1993, and the project has been operating under an annual license. Within the project boundary are 2 small United States islands located on the Paint River. They are located in the NE 1/4 of the SW 1/4 of Section 35 of T42N, R32W. Lot 8 is about 1.04 acres and Lot 9 is about 0.78 acre. These lands are owned by the Bureau of Land Management (BLM) and the BLM has been consulted during the relicensing proceedings. According to the BLM, relicensing the Brule Project would not affect these federally-owned islands (personal communication, Jaime Provencio, Assistant District Manager, Lands and Renewable Resources, Bureau of Land Management, Milwaukee, Wisconsin, May 15, 1995).

II. PURPOSE AND NEED FOR POWER AND ACTION

A. Purpose of Action

Wisconsin Electric is a domestic public utility corporation which uses all the project power to serve its electric customers.

The historic annual energy generation of the Brule Project is about 15.19 gigawatthours (GWh). By letter filed on October 12, 1993, however, Wisconsin Electric reported that the energy generated at the Brule Project for the period of October 1992 through September 1993, was about 14.56 GWh. We analyzed the project's energy generation capability, and based on 30 years of U.S. Geological Survey (USGS) flow data, verified Wisconsin Electric's estimate of historic generation.

The proposed Brule Project would annually generate about 14.76 GWh of electrical energy, with a minimum flow spillage of 15 cubic feet per second (cfs), and about 14.604 GWh, with a minimum flow spillage of 20 cfs.

Note: The Brule and Menominee Rivers form the boundary between Michigan and Wisconsin.

Figure 1. Location of the Brule Hydro Project, FERC No. 2431,Wisconsin and Michigan (Source: the Staff, as modified from Wisconsin Electric Power Company 1991).

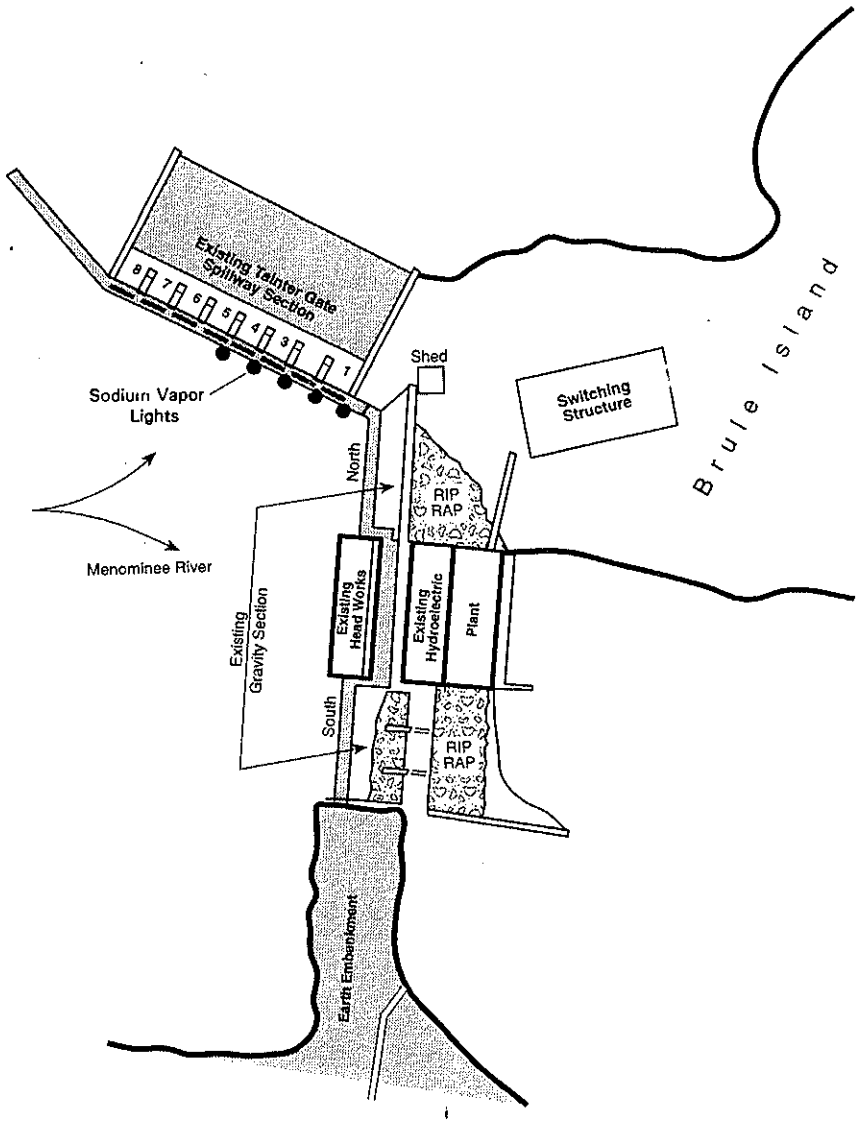

Figure 2. Location of Project Features for the Brule Hydro Project, FERC No. 2431, Wisconsin and Michigan (Source: the Staff, as modified from Wisconsin Electric Power Company 1991)

B. Need for Power

The Brule Project was constructed in the 1918 to 1919 period and placed in operation in 1919. The total nameplate capacity of the project's three generators is 5.355 MW. The fact that Wisconsin Electric has relied upon the electricity produced by the Brule Project to supply a portion of the electricity needs of its end-use customers for more than seventy years supports the conclusion that both of Wisconsin Electric's short-term and long-term needs for the electricity generated by the project are well-established.

Wisconsin Electric is a member of the Mid-America Interconnected Network (MAIN) reliability organization. The MAIN reliability council collects, organizes and coordinates the data which are required for the preparation of the Department of Energy (DOE) Code OE-411 Report. The data content and format of the OE-411 Report are specified by DOE and complied with by all of the regional reliability councils of North America. In all OE-411 council reports, data for the year prior to the reporting year for summer and winter peak demands, capacity resources and annual energy requirements are actual data. For the reporting year and the remaining years of the 10-year planning period, these data are projections or forecasts.

According to the April 1995 OE-411 Report, the summer peak hour demand for the MAIN Council Area, in 1994, was 42,562 MW and the value for 2004 is projected to increase to 50,696 MW. These data yield a compound annual growth rate of approximately 1.76 percent. For the same period, the projected data yield a compound annual growth rate in net annual energy requirements for the MAIN Council service area of approximately 1.6 percent. The MAIN Council service area plans to increase its net summer capacity resources from 50,693 MW in 1994 to 56,768 MW in 2004--a compound annual growth rate of approximately 1.4 percent. These data add further support to Wisconsin Electric's long-term need for the electricity generated by the Brule Project.

III. PROPOSED ACTION AND ALTERNATIVES

A. Applicant's Proposal

1. Project Description

The project facilities (figure 2) consist of: a. a 157.5-foot-long earthen dike, with a crest elevation of 1206.1 feet National Geodetic Vertical Datum (NGVD); b. a 68-foot-long concrete south gravity wall, with a top elevation of 1205.0 feet NGVD; c. an integral concrete and brick powerhouse, about 74.5 feet long by 48 feet wide; d. a 73-foot-long concrete north gravity wall, with a crest elevation of about 1205.0 feet NGVD; e. a 65-foot-high concrete spillway section consisting of a 139-foot-long reinforced concrete spillway, with a crest elevation of 1187.1 feet NGVD, topped with eight 12-foot-high by 14-foot-wide Taintor gates; f. a 79-foot-long concrete west gravity wall, with a crest elevation of about 1205.0 feet NGVD; g. a 225-foot-long earth dike, with a crest elevation of 1206.1 feet NGVD; h. a 120-foot-long auxiliary spillway, composed of two bays, about 60 feet long by 6 feet wide, with a crest elevation of 1204.62 feet NGVD, separated by a concrete wall, each containing an erodible fuse plug for flood control purposes; i. a 1,050-foot-long auxiliary spillway channel; j. an 880-foot-long earth dike, located about 1.4 miles upstream of the dam, with a crest elevation of 1203.8 feet NGVD; k. a reservoir with a water surface elevation of 1198.3 feet NGVD, a surface area of about 535 acres, and a storage capacity of about 8,600 acre-feet, and a useable storage capacity of about 530 acre-feet; l. a 345-foot-long, 69-kilovolt (kV) primary transmission line; and m. appurtenant facilities.

The powerhouse contains (1) three vertical Francis-type turbines, rated at 3,100 horsepower (hp), 3,300 hp and 3,100 hp; and (2) three Westinghouse generators, rated at 1,335 kilowatts (kW), 2,000 kW, and 2,000 kW.

According to the Commission's Operation Report dated November 12, 1992, the Brule dam is classified as a high hazard dam.

2. Proposed Environmental Measures

a. Construction No new construction is proposed.

b. Operation Wisconsin Electric proposes to: (1) operate the project in a run-of-river mode; (2) maintain a target elevation of 1198.3 (±0.5 ft.) NGVD; (3) maintain a minimum flow of 20 cfs in the spillway channel; (4) maintain the existing U.S. Geological Survey (USGS) gages located upstream of the Brule Project on the Paint and Brule Rivers and one located downstream of the project on the Brule River; (5) maintain flows in the event of project outages; (6) notify resource agencies prior to any planned reservoir drawdown; (7) install and maintain a barrier net to minimize entrainment related turbine mortality; and (8) monitor dissolved oxygen (DO) and temperature in the Brule tailrace for 2 years (May 15 through September 15) following replacement of the intake trashrack and every five years thereafter.

In addition Wisconsin Electric proposes to: (1) implement a comprehensive land management plan (CLMP) on 1,603 acres of project lands to include erosion and pollution control measures, wildlife habitat protection and enhancement, forage enhancement, bald eagle management; (2) file for Commission approval, a cultural resources management plan that includes biannual

shoreline surveys; and (3) make Recreation Area No. 28 accessible to disabled persons, and improve the canoe portage access area.

3. Section 18 Fishway Prescription The Department of the Interior (Interior), in a letter dated May 14, 1993, requests that its authority to prescribe the construction, operation, and maintenance of fishways at the Brule Project be reserved. 1/

B. Alternatives to the Proposed Action

1. Staff's alternative

To protect fish and wildlife resources in the event of a planned impoundment drawdown, we recommend Wisconsin Electric prepare an impoundment drawdown plan.

In addition to Wisconsin Electric's recreation proposal, the staff recommends the following measures:

a. Recreation Area No. 28 be made fully accessible to disabled persons, including parking spaces (2 for disabled persons), shoreline fishing areas, boat launch, and toilets;

b. installing a concrete boat launch ramp, barrier-free skid pier, toilet facilities, signs, and one parking space for disabled persons at Recreation Area No. 23;

c. monitoring use at recreation areas consistent with Federal Energy Regulatory Commission (FERC) Form 80 filings including parking area capacity;

d. at the canoe portage, providing signs, removing the fence at the put-in, relocating the put-in 75 feet downstream and repairing erosion impacts at the site;

e. maintaining the tailrace fishing area and providing erosion control measures if needed;

f. installing directional signs for Recreation Area No. 28;

g. preparing a final recreation plan to include a Menominee River Basin recreation plan and soil erosion control plan.

To protect land uses on the 1,603 acres of project land at the Brule Project, we recommend that Wisconsin Electric finalize

1/ Section 18 of the FPA provides the Secretary of Interior the authority to prescribe fishways.

and submit for Commission approval, the CLMP for the Brule Project, as described in the application. 2/

To protect cultural resources at the Brule Project, we recommend that Wisconsin Electric implement the provisions of the Wisconsin Statewide Programmatic Agreement, executed on December 30, 1993, among the Commission, the Wisconsin State Historic Preservation Officer, the Michigan State Historic Preservation Officer, and the Advisory Council on Historic Preservation.

2. Project Retirement The project retirement alternative involves denial of the relicense application and surrender of the existing license with appropriate conditions. We consider project retirement to consist of the removal of generation equipment from the powerhouse and the electrical tie to the local power grid. Under this alternative the dam would remain in place. The Commission would seek an application for surrender of the project's original license. This scenario is approximate and subject to change. The environmental effects of project retirement are addressed in the Environmental Analysis section of the FEA, and the development effects are addressed in the Developmental Analysis section of this FEA.

3. No-Action Alternative Under the no-action alternative, the project would continue to operate as required by the original project license and there would be no change to the existing environmental setting or project operation. The no-action alternative is addressed in the Environmental Analysis section of this FEA. The no-action alternative is the baseline from which we compare the proposed action and all action alternatives assessed in this FEA.

C. Alternatives Considered but Eliminated from Detailed Study

We considered several other alternatives to the relicensing proposals but eliminated them from detailed study because they are not reasonable in the circumstances of this case. They are: (a) recommending Federal government takeover of the project; and (b) issuance of a nonpower license upon expiration of the original license.

We don't consider Federal takeover to be a reasonable alternative. Federal takeover of the project would require Congressional approval. While that fact alone wouldn't preclude further consideration of this alternative, there is no evidence indicating that a Federal takeover should be recommended to Congress. No Federal agency has suggested that Federal takeover

2/ Land Management Plan for the Brule Hydroelectric Project, as described in Appendix 13, application for new license, filed in December, 1991.

would be appropriate and no Federal agency has expressed an interest in operating the project.

Issuing a nonpower license wouldn't provide a long-term resolution of the issues presented. A nonpower license is a temporary license which the Commission would terminate whenever it determines that another governmental agency will assume regulatory authority and supervision over the lands and facilities covered by the nonpower license. No government agency has suggested its willingness or ability to do so. No party has sought a nonpower license and we have no basis for concluding that the project should no longer be used to produce power. Thus, a non-power license is not a reasonable alternative to some form of new license with protection and enhancement measures.

IV. CONSULTATION AND COMPLIANCE

A. Agency Consultation

The following entities commented on the application by the May 24, 1993, deadline specified in our notice that the application is ready for environmental analysis. All comments became part of the record and are considered during staff's analysis of the proposed project.

Commenting agencies and other entities	Date of letter
Wisconsin Department of Natural Resources	05-20-93
Michigan Department of Natural Resources	06-01-93
Department of the Interior	05-14-93

Wisconsin Electric responded to the agency comments by letter dated July 13, 1993.

The following entities filed a motion to intervene in the proceeding. We addressed all environmental concerns raised in the interventions in appropriate sections of the FEA.

Intervenor	Date of motion
Wisconsin Department of Natural Resources	03-24-93
Michigan Department of Natural Resources	04-08-93
Department of the Interior	04-26-93

No intervenors oppose issuing a new license for the Brule Project.

The Wisconsin Department of Natural Resources (WDNR) says that it is responsible for managing and protecting natural resources in the State of Wisconsin and that licensing the Brule Project may directly affect their use. The WDNR intervention

does not raise any specific issues regarding impact on environmental resources.

The Michigan Department of Natural Resources (MDNR) says that it is the agency responsible for protecting, conserving, and managing natural resources within Michigan, including water quality and fishery resources. The MDNR states that issues at the Brule Project affecting Michigan interests include run-of-river operation, minimum flows, fish entrainment, and recreation.

The U.S. Department of the Interior (Interior) says that the U.S. Fish and Wildlife Service (FWS), an agency of Interior, is responsible for management of fish and wildlife resources and is concerned about potential impacts to fish and wildlife due to continued operation of the Brule Project. However, Interior does not identify any specific impacts.

Wisconsin Electric did not respond to the interventions.

B. Comments on the Draft Environmental Assessment

The following entities commented on the draft EA in response to the Commission's notice of availability, which was issued on June 29, 1994. The comment period ended on August 15, 1994.

Commentor	Date of letter
Department of the Interior	07/29/94
Wisconsin Department of Natural Resources	08/03/94
Michigan Department of Natural Resources	08/04/94
Izaak Walton League of America	08/05/94
Wisconsin Electric Power Company	08/04/94
Wisconsin Electric Power Company	08/24/94
Wisconsin Electric Power Company	08/24/94

C. Water Quality Certification

Wisconsin Electric requested Section 401 water quality certification (WQC), required by the Clean Water Act, for the Brule Project on April 11, 1990. The WDNR waived Section 401 WQC, on May 4, 1990 without conditions (Ronald Fassbender, Water Management Supervisor, Wisconsin Department of Natural Resources, Green Bay, Wisconsin, letter dated May 4, 1990).

Wisconsin Electric requested from the MDNR Section 401 WQC for the Brule Project on May 13, 1991. The MDNR did not act on Wisconsin Electric's request for 401 WQC within one year from the effective date of Commission Order No. 533 (June 19, 1992). Therefore, the Michigan 401 WQC for the Brule Project is considered waived.

D. Coastal Zone Management Act

The Brule Project isn't in Wisconsin's coastal zone according to Gary Shultz, the Wisconsin Coastal Management Program Federal Consistency Coordinator (letter from Rita L. Hayen, P.E., Project Engineer, Hydro Licensing, Wisconsin Electric Power Company, Milwaukee, Wisconsin, October 28, 1993). Wisconsin Electric has also applied for certification from Michigan (letter from Rita L. Hayen, P.E., Project Engineer, Hydro Licensing, Wisconsin Electric Power Company, Milwaukee, Wisconsin, October 19, 1993). According to the Michigan Coastal Management Program, the Brule Project is located outside of Michigan's coastal boundary and no adverse impacts to coastal resources are anticipated from the project (letter from Catherine J. Cunningham, Coastal Management Program, Land and Water Management Division, Michigan Department of Natural Resources, Lansing, Michigan, December 7, 1993).

V. AFFECTED ENVIRONMENT

A. General Description of the Locale

1. The Menominee River Basin (Source: Federal Energy Regulatory Commission, 1980).

The Menominee River flows 118 miles in a southeasterly direction from the confluence of the Brule and Michigamme Rivers to its discharge in Green Bay, an arm of Lake Michigan (see Figure 1, Page 2). The drainage area of the Menominee River is about 4,070 square miles. The average rainfall in the river basin is about 30 inches and average runoff is approximately 12 inches. The river is not subject to destructive floods, and irrigation in the basin is not necessary. The Menominee River Basin contains little cultivated land. Principal industries in the basin are paper manufacturing and the timber industry. The Menominee River and its tributaries are important water power streams having 20 developments with a total installed capacity of 107,177 kilowatts.

2. Hydropower Projects and Other Activities

We have compiled a list of existing projects in the Menominee River Basin as of February 26, 1993 (shown on Figure 1). Those projects are as follow (Federal Energy Regulatory Commission, 1993):

Project No.	Project Name	Water Body
2486	Pine	Pine
2536	Little Quinnesec	Menominee
2744	Park Mill/Menominee	Menominee
2433	Grand Rapids	Menominee

2357	White Rapids	Menominee
2394	Chalk Hill	Menominee
2720	Sturgeon Falls	Menominee
2471	Sturgeon River	Sturgeon
1980	Quinnesec Falls	Menominee
1980	Big Quinnesec	Menominee
2131	Kingsford	Menominee
1759	Twin Falls	Menominee
1759	Peavy Falls	Michigamme
1759	Way	Michigamme
2072	Lower Paint	Paint
11402	Crystal Falls	Paint
2073	Michigamme Falls	Michigamme
2074	Hemlock Falls	Michigamme

We have identified Crystal Falls as an unlicensed existing project in the Menominee River Basin. The Crystal Falls Project is being licensed under a separate preceding. We have not identified any exempted projects in the Menominee River Basin.

B. Cumulative effects analysis

1. Geographic Scope of Analysis

The geographic scope of analysis defines the physical limits or boundaries of the proposed action's effects on the resources. Because the proposed action affects resources differently, the geographic scope for each resource varies.

We have defined the geographical scope of our analysis as the Menominee River Basin. We decided to include the entire river basin primarily because the Brule Project is located on one of two rivers which join to form the Menominee River. The Brule River, on which the Brule Project is located, is one of the six major tributaries to the Menominee River. Licensing the Brule Project, when combined with the impacts of other water resource developments, could cumulatively impact environmental resources within the Menominee River Basin.

2. Temporal Scope of Analysis

The temporal scope of our analysis includes a discussion of past, present, and future actions and their effects on water quality, the resident fishery, recreation, and cultural resources. Based on the term of the proposed license, we looked 30 to 50 years into the future, concentrating on the effects on the resources from reasonably foreseeable future actions. The historical discussion is limited to the amount of available information for the aforementioned resources. We identified the present resource conditions based on the license application (as supplemented) and previous comments filed by interested parties. We recognize that water quality, resident fish, recreation, and

cultural resources can be affected in a cumulative manner by the Brule Project and other activities on the Menominee River. Cumulative effects on water quality, fishery, recreation, and cultural resources are discussed in section VI.

C. Resources

Only the affected resources are included in detail in this FEA. Continuing to operate the Brule Project wouldn't affect geology and soils, aesthetic quality or socioeconomics. We've excluded these resources from our detailed analysis for the following reasons:

a. Wisconsin Electric plans to construct recreational facilities at the project. Any effect--as a result of recreation use or development--on soils will be addressed in the recreation plan. Further, Wisconsin Electric proposes to conduct biannual shoreline surveys to detect any erosion impacts on cultural resources, which we address in the cultural resources section.

b. The aesthetic resources at the Brule Project include the natural scenic setting. No resource agency or tribe recommended any measures to improve aesthetic quality at the project. Wisconsin Electric doesn't propose to construct any project operating facilities. Any minor short-term effects that may occur during improvement of the recreational facilities will be addressed in the recreation plan and long-term aesthetic management will be addressed in the land management plan.

c. The project wouldn't affect the socioeconomics of the area because no major construction activities, with their associated effects on employment, business, infrastructure, and tax revenues, are proposed.

1. Water Resources

Flows in the Brule River at the Brule Project are shown in Table 0.

Located about 3 miles upstream of the Brule Dam is the U.S. Highway 2-141 bridge. The bridge marks the boundary between coldwater and warmwater water quality standards for the States of Michigan and Wisconsin. The State of Wisconsin sets the minimum warmwater water quality standards for the Brule River, downstream of the bridge, for recreation, fish and aquatic life. These standards include: a. a minimum dissolved oxygen (DO) concentration of 5.0 milligrams per liter (mg/l); b. a maximum temperature of 89°F; and c. a pH between 6.0 and 9.0 units.

Upstream of the bridge, the Brule River is designated by the State of Wisconsin as a trout stream with the following coldwater standards applying: a. a minimum DO concentration of 6.0 mg/l,

except for spawning season when the minimum DO concentration is 7.0 mg/l; b. no significant artificial increase in water temperature; and c. a pH between 6.0 and 9.0 units.

Table 1. Percent of time flows (in cfs) are exceeded in the Brule River at the Brule Project (Source: Wisconsin Electric Company, 1991).

	Cubic feet per second (cfs)
Flow exceeded 10 percent of the time.	775
Flow exceeded 50 percent of the time.	405
Flow exceeded 90 percent of the time.	310

The State of Michigan sets the minimum DO concentration standard for the Brule River downstream of the U.S. Highway 2-141 bridge for warmwater fish, partial contact recreation and total contact recreation from May 1 to October 31. These standards include: a. a minimum DO concentration of 5.0 mg/l; b. a maximum monthly water temperature for warmwater fish (Table 2); and c. monthly average temperatures in the Brule Project tailwater no greater than 5°F warmer than in the waters upstream from the impoundment.

Upstream of the bridge, the State of Michigan designates the Brule River for coldwater fish where the DO concentration standard is 7.0 mg/l and the maximum monthly temperatures for coldwater fish (Table 2) apply. In addition, monthly average temperatures in the Brule Project tailwater can be no greater than 2°F warmer than the waters upstream from the impoundment.

Historical data on water quality including DO concentrations and temperatures is not available, however, various activities which cumulatively affect DO concentrations in the Brule River include the operation of two hydroelectric projects on the Paint River. Other activities include, past and existing land-use

Table 2. Michigan's maximum water temperature (°F) standards in the Brule River for warmwater and coldwater fish (Source: Michigan Department of Natural Resources Water Resources Commission General Rules Part 4).

	J	F	M	A	M	J	J	A	S	O	N	D
Warmwater	38	38	41	56	70	80	83	81	74	64	49	39
Coldwater	38	38	43	54	65	68	68	68	63	56	48	40

practices (i.e. agriculture and silviculture), mining, (iron, copper, and other metals), and paper production. Upstream of the Brule Project on the Paint River, a major diversion at the Lower Paint dam diverts all Paint River flows, except 85 cfs and those exceeding the capacity of the diversion canal, to the Peavy Falls Project (FERC No. 1759) located on the Michigamme River.

Dissolved oxygen concentrations in the Brule River may be affected by the BOD load from point and non-point sources within the river basin. 2/ Hydroelectric projects can impact water quality within the Brule River by increasing flow retention time, thus the amount of time water is in contact with BOD substances. In addition, project impoundments may thermally or chemically stratify. Stratification may result in the discharge of water with low DO concentrations into the downstream receiving waters. Consumptive withdrawals decrease the quantity of water available for the assimilation of waste by decreasing the diluting ability of the system. Sources of BOD substances include wastewater treatment effluent, agricultural run-off, and industrial discharges. Silviculture and agriculture practices within the river basin impact the sediment load of the Brule River.

Wisconsin Electric conducted a year-long water quality study in the vicinity of the Brule Project. The results of the study indicate that water quality met the minimum Wisconsin and Michigan standards for DO concentrations during the study period. Continuous water quality monitoring from May through mid-November 1990 revealed that DO concentrations ranged between 5.0 mg/l and 11 mg/l. During this same period, continuous temperature monitoring indicated that the maximum temperatures recorded in the Brule tailwater were within Michigan and Wisconsin water quality standards. These data also show that the Brule Project decreases diurnal variation in water temperature downstream of the Brule dam. Temperatures in the Brule tailrace showed less diurnal variation than occurs upstream of the Brule impoundment. The variation between the temperatures of inflows to the impoundment and outflows from the project was within 5°F.

The available water quality data indicates that water quality within the Brule River exceeds the state water quality standards in the vicinity of the Brule Project. In addition, the Brule Project is not a consumptive user of Brule River flows and does not discharge BOD loading substances. However, the Brule impoundment is deep (about 65 ft.) and possesses the characteristics necessary for thermal/chemical stratification to occur.

2/ BOD stands for biochemical oxygen demand and is the amount of oxygen consumed by the biological and chemical decomposition of organic substances. It is a measure of pollution in aquatic environments.

Wisconsin Electric conducted a benthic macro-invertebrate study of the Brule River upstream and downstream of the project. As an indirect measure of water quality parameters, the study indicates that water quality in the Brule River is very good. The Biotic Index (Hilsenhoff) calculated for upstream and downstream of the project indicates that water quality upstream of the Brule Project is comparable to water quality downstream of the project. In addition, calculated diversity indices (Shannon-Wiener, Simpson's, and Brillouin's) show little difference between upstream and downstream. The biotic and diversity indices are similar between upstream and downstream of the project, suggesting that the Brule Project has no impact on water quality in the Brule River.

Operation of the Brule Project in a run-of-river mode would lessen impacts on DO concentrations and temperatures in the Brule River, and therefore, the operation of the Brule Project would not contribute to cumulative impacts to water quality within the Brule River mainstem.

As with most deep impoundments the Brule impoundment acts as a sediment trap. The trapping of sediments, particularly sediments containing contaminants (i.e. organo-chlorides such as PCB's, organo-pesticides, and heavy metals such as chromium, arsenic, and selenium), may benefit rivers and streams. Deposition of contaminants within the impoundment may eliminate the downstream deposition of such contaminants greatly reducing the affected reach of stream or river. In addition, impoundment deposition may reduce turbidity downstream of the project. If the source of contaminants are eliminated, subsequent sediment deposition isolates these materials from the environment. Wisconsin Electric's sediment testing revealed that sediments located in the Brule impoundment contain detectable amounts of cadmium, chromium, copper, lead, mercury, nickel, selenium, arsenic, and zinc. Higher concentrations of copper, zinc, nickel, and manganese detected in the sediments may reflect prior mining activities within the Brule River basin.

2. Fishery Resources

We identified fisheries as a resource that could be cumulatively affected in the river basin. Multiple developments in the basin could affect the reproductive potential of species in the basin by limiting access to spawning sites or by decreasing the suitability of those sites. Hydropower development could also adversely affect the fishery in the basin by reducing aeration, by limiting fish movements, and by impingement and turbine mortality associated with the entrainment of fish through the project turbines.

Currently, the Brule impoundment supports a warmwater-coolwater fishery. Game fish present include: walleye, northern

pike, muskellunge, largemouth bass, and smallmouth bass. The Brule impoundment also supports populations of black crappie, bluegill, yellow perch, and pumpkinseed.

The Brule dam creates a 535 acre impoundment on the Brule River. The impoundment created by the Brule dam provides lucustrine habitat for a variety of fish and wildlife species. Aquatic habitats within the impoundment include: deep water zones, steep-rocky littoral zones, and shallow littoral zones. The shallow littoral zones support a variety of submergent and emergent aquatic vegetation which provides forage areas and refugia for fish within the Brule impoundment. Historic information on the fishery of the Brule impoundment and Brule River comes from three fishery surveys conducted by the MDNR, its predecessor the Michigan Department of Conservation (MDOC) and the WDNR.

The first fish survey, conducted by the MDOC, of the Brule impoundment was in 1968. The most abundant species caught during this survey was yellow perch followed by longnose sucker. In 1978, although not the most abundant species, walleye was a significant portion (13.6 percent) of the fish species caught during a survey conducted by the WDNR. In addition, smallmouth bass constituted a significant portion (14.8 percent) of the fish caught.

In a 1978 fish survey conducted by the MDOC, panfish (bluegill, yellow perch, rock bass, pumpkinseed, and black crappie) represented the largest portion (91.4 percent) of the species caught. 3/ In a 1987 MDNR survey, walleye and yellow perch, and muskellunge represented 70.4 percent of the species caught. In a recent survey conducted by the WDNR in 1990, walleye, yellow perch, and rock bass were the most abundant species caught, making up 17.2, 18.0, and 26.6 percent of the catch, respectively.

3. Terrestrial Resources

In the mid 1800's, commercial logging began in the Menominee River Basin. Logging reached its peak in the 1890's. White pine was the primary species harvested during this period. By the early 1900's white pine was nearly depleted. Hardwoods have since replaced white pine as the primary species harvested. Other disturbances such as agriculture, fire, and fire exclusion have altered plant cover and composition from historical

3/ Because of different collection gear and survey objectives, results are not directly comparable. The results are summarized in order to provide a historical perspective of the impoundment fishery.

conditions. As a result of these past disturbances, vegetation in the project vicinity consists of secondary or tertiary growth.

The area within the Brule Project boundaries encompasses a 535 acre impoundment with about 15 miles of shoreline and 1,603 acres of terrestrial habitat. Vegetation covering the 1,603 acres of the project lands consists primarily of upland species. These species includes: sugar maple, aspen, yellow and paper birch, basswood, soft maple, elm, ash, red oak, black cherry, balsam popular, black and white spruce, red and white pine, hemlock, northern white cedar, tamarack, and jack pine.

Several Michigan and Wisconsin state interest (i.e., threatened, endangered, watch, special concern) species, including, red-shouldered hawk, common loon, double-crested cormorant, great heron, American black duck, common merganser, northern harrier, ruby-crowned kinglet, eastern blue bird, yellow-throated vireo, black-and-white warbler, field sparrow, vesper sparrow, wood turtle, and osprey, have been seen within the project boundary. Other wildlife species in the project area include: black bear, white-tailed deer, raccoon, red fox, red squirrel, gray squirrel, snowshoe hare, eastern cotton tail, ruffed grouse, and American woodcock (Letter from Jonathan P. Deason, Director, Office of Environmental Affairs, Department of the Interior, Washington, D.C., May 13, 1993).

Wetlands in the project area encompass about 248.2 acres. Palustrine emergent, forested, and scrub-shrub wetlands exist near Fisher Creek downstream from the dam, as well as, in the northern portion of the Brule project area. 4/ The most common types of aquatic vegetation found in the emergent wetlands are wild celery, northern watermilfoil, elodea, and pondweed species. Presently, there is no purple loosestrife or Eurasian milfoil in the project's waters.

Wetlands provide many environmental benefits. Wetlands help maintain and improve water quality by nutrient cycling, reducing sediment load, and reducing erosion (Kusler and Brooks, 1987; Mitsch and Gosselink, 1986). In addition, wetlands help regulate and maintain the hydrology of rivers and lakes by storing and slowly releasing flood waters (Dahl and Johnson, 1991). Wetlands also provide habitat for numerous migratory waterfowl species. Waterbirds found in the project area include: great blue and green herons, American bittern, and common loon. Muskrat, mink, beaver, and otter inhabit the wetlands and forested shorelines in the vicinity of the project (Letter from Jonathan P. Deason, Director, Office of Environmental Affairs, Department of the Interior, Washington, D.C., May 13, 1993).

4/ Wetland classification follows Cowardin et al. (1979).

Table 3. Number and type of vehicles counted at the Brule Project, July-October 1991 (Source: Wisconsin Electric Power Company, 1992).

	AUTOS	VANS	TRUCKS	CAMPERS	WITH BOAT TRAILERS	TOTAL NUMBER VEHICLES
Area No. 23	7	5	33	2	23	47
Area No. 28	40	20	112	1	109	173
Horserace Rapids	38	10	23	4	3	75
Canoe Portage	3	2	8	0	1	13
Tailwater	2	0	1	0	0	3
Total at all Sites	90	37	177	7	136	311

Decreasing the hydraulic gradient of an area is one of the factors that can influence the formation of wetlands. Other factors being equal, wetlands tend to form in areas with a low hydraulic gradient. Because hydropower projects tend to be constructed in high gradient river reaches and the construction of a dam results in a decrease in the hydraulic gradient in those impounded river reaches, it is likely that the Brule dam increased the acreage of wetlands in the Brule Project vicinity beyond the acreage that existed prior to the construction of the Brule dam.

By virtue of being included in the Brule Project boundary, the 1,603 acres of project lands have been afforded a degree of protection that might not have been provided to similar lands held under private ownership. For example, under private ownership, the lands could have been subdivided (subject to local zoning ordinances) and sold for private purposes, thus depriving the public access to, and enjoyment of these lands.

4. Threatened and Endangered Species

Project lands provide suitable habitat for the federally listed bald eagle (*Haliaeetus leucocephalus*) and gray wolf (*Canis lupis*). In a letter dated July 28, 1988, the FWS told Wisconsin Electric that the bald eagle forages in the area, but does not nest on project lands. By letter dated May 13, 1993, Interior confirmed that the assessment had not changed. The project area is also located within land designated as potentially suitable gray wolf habitat. Wolf use of the forest land in the vicinity

of the project has been documented (letter from Jonathan P. Deason, Director, Office of Environmental Affairs, Department of the Interior, Washington, D.C., May 13, 1993). As stated earlier in section V.C.3, because these lands have been included in the project boundary and managed by Wisconsin Electric, wildlife habitat for the bald eagle and gray wolf, has been protected to a greater extent than if the lands had been held for private purposes.

5. Recreation and Other Land Uses

Historically, the Menominee River Basin is one of natural and wild terrain with the early Native Americans and settlers taking advantage of the timber, fur-trading and iron ore industries (Wisconsin Electric Power Company, application, 1991). Therefore, early recreation pursuits were outdoor oriented--fishing, hunting, trapping, and canoeing. Current regional recreational use includes a variety of activities: boating, swimming, fishing, hunting, camping, picnicking, skiing, and canoeing.

Lands within the project boundary are managed for a variety of purposes including; recreation, wildlife habitat, timber production and aesthetics. According to the WDNR, the project lands are a "tremendous" public benefit. Valuable fish and wildlife habitat and multi-use recreational opportunities are among the public benefits that have been provided by the Brule Project over the previous license period. The primary recreational uses of the project are fishing and boating--especially in the impoundment. There are five recreation access sites within the Brule Project area.

- Recreation area No. 23, located in Michigan, provides boating and fishing access to the impoundment. Facilities include a boat launch, one toilet, and two trash cans.

- Recreation Area No. 28, located in Wisconsin, provides impoundment boating and fishing access, shoreline fishing and passive recreation. Facilities include a boat launch, two toilets, two trash cans, and a concrete-bumper parking area.

- Brule Dam recreation area provides access to the tailwater for canoeing or fishing. Facilities include a gravel road/path and public parking available in an area above the pole gate.

- A canoe portage is located immediately upstream of the Brule dam and includes a take-out, put-in, and portage trail.

- Horserace Rapids--located on the Paint River at the headwaters end of the Brule impoundment, Michigan--provides hiking opportunities to a high bluff for observing the rapids or

general nature study. Facilities include a trail, trash can and a parking area at the top of the bluff.

Other recreational opportunities are provided by Wisconsin Electric at other hydroelectric projects in the Menominee River Basin. Also, both Florence County, Wisconsin, and Iron County, Michigan, provide a variety of outdoor recreation opportunities and facilities.

Wisconsin Electric conducted a recreation use survey from July 4, 1991 to October 31, 1991 at Brule's five recreational access points (Table 3). The survey included ground counts as well as personal interviews. Wisconsin Electric observed 700 people during 185 ground surveys.

The survey showed that recreational use at the Brule Project was higher in the afternoons and evenings, but didn't vary significantly between the weekdays and weekends. The survey also addressed parking availability at the recreation areas. During the survey, Wisconsin Electric observed 311 vehicles: most were located at Recreation Area No. 28 and Horserace Rapids (Table 3).

Table 4. Number and type of recreational user at the Brule Project, July-October 1991 (Source: Wisconsin Electric Power Company, 1992).

	TOTAL NUMBER OF PEOPLE	NUMBER ON BOATS	NUMBER SHORE FISHING	OTHER ACTIVITIES
Recreation Area No. 23	119	85	0	34
Recreation Area No. 28	292	259	10	23
Horserace Rapids	233	62	15	212
Canoe Portage	51	42	1	8
Tailwater	5	0	5	0

Personal interviews showed that fishing and hiking were popular activities at the project recreational areas. The respondents noted the "aesthetic appeal of the area", "beautiful scenery" and "opportunities to view wildlife" as primary reasons for visiting the project area (Wisconsin Electric Power Company, application, 1992). Some respondents mentioned the need for additional signs on the highway and roads leading to the recreational areas.

6. Land Use

Historical activities along the Brule River included fur trading, mining, and lumbering. During 1882--while the river was being used for log transport--the first large power development not associated with forest products was built. Later, hydroelectricity became a major industry in the basin.

The Brule Project is characterized by a wooded, rural environment that Wisconsin Electric has named "wilderness shores". There are 1,603 acres--141 acres in Wisconsin and 1,462 acres in Michigan--within the project boundary. In the project area, regulatory land use and zoning matters are controlled by the Florence County Zoning Administrator (with assistance from the WDNR), MDNR, and the U.S. Army Corps of Engineers.

Under 18 CFR § 2.7, Wisconsin Electric, as a licensee is required to include within the project boundary enough land to assume optimum development; develop suitable recreation facilities, including the needs of disabled persons; cooperate with the local, state, and federal agencies to determine the needs of the people, and plan for those needs; and provide public access without discrimination.

The Commission's Standard Land Use Article, included in all major licenses issued, requires Licensees to obtain and retain rights in project property and conveyance of such rights requires Commission approval. The Land Use Article authorizes the Licensee to convey narrowly circumscribed rights in project property without Commission approval (only notification).

In addition, the Standard Land Use Article requires the licensee to notify the Commission at least 60 days before conveying any interest in project lands under paragraph (d) of the article describing their intent to convey the interest, describing the type of interest and location of lands to be conveyed, the nature of the proposed use, identify federal and state agencies consulted and any state or federal approvals required for the proposed use. The approved conveyance doesn't change project boundaries.

Lands within the Brule Project boundary are used primarily for project operation, recreation, and forest and wildlife management (Wisconsin Electric Power Company, application, 1991). Currently, Wisconsin Electric has a seven acre conifer plantation within the project boundary. Wisconsin Electric developed a forest management plan that included timber harvesting, wildlife management, watershed protection, and recreation (Wisconsin Electric Power Company, application, 1991).

Incorporating results of the 1990 forest inventory, Wisconsin Electric prepared a comprehensive land management plan

for the Brule Project, including 482 acres of non-project lands adjacent to Brule. The plan includes timber harvesting, electrical line rights-of-way, integrated pest management and planning for natural disaster recovery, recreation, aesthetics management, and forest management.

7. Cultural Resources

Florence County was created in 1882 from territory which included portions of Marinette and Oconto Counties in Wisconsin. Copper, and later iron, played strategic roles in the history and settlement of Michigan's western upper peninsula and Iron County. Long known and utilized by bands of Chippewa Indians that hunted and roamed the area, word of the existence of copper didn't spread until the early part of the nineteenth century. Until that time the area served primarily as a hunting grounds for valuable furs which were sold abroad (Wisconsin Electric Company, application, 1991). In the mid-1800's, the lumbering industry came to the area, and finally, iron ore was discovered.

Thousands of immigrants began to arrive in the Upper Peninsula. The majority of immigrants in Iron County came from Finland, Italy, and Sweden. Towns grew and the area prospered until after World War I, when copper mining began to decline.

Some industrial development has taken place over the years, but is very limited compared to other areas of the United States. The remote location of the Upper Peninsula places it at a disadvantage in terms of accessibility to larger population centers and markets (Wisconsin Electric Power Company, application, 1991).

In 1989, the Great Lakes Archaeological Research Center, Inc. conducted a cultural resources survey--Phase I archives, literature search, shoreline survey, and Phase II evaluation--and evaluation at the Brule River tailwaters and Paint River Pond. The archives and literature search found no historic sites within the project survey boundaries which consists of about 15 miles of shoreline. The Brule River Hydroelectric Facility meets the criteria for eligibility to the National Register of Historic Places (National Register). Wisconsin Electric completed a National Park Service, National Register of Historic Places Registration Form (NPS 10-900 form) for the Brule facility. 5/

The archives and literature search found two previously reported archaeological sites located within the project boundary; these weren't identified during the field inventory so eligibility could not be determined. However, a shoreline

5/ The National Registration form for the Brule Project was filed with the Commission on January 13, 1992.

reconnaissance found three previously unrecorded archaeological sites. None of the three sites meet National Register Criteria.

VI. ENVIRONMENTAL IMPACTS

A. Impacts of the Proposed Action

1. Water Resources. The MDNR recommends that Wisconsin Electric maintain state standards for DO concentrations and temperature when river discharges are greater than or equal to the 95 percent exceedence flow. The WDNR also recommends that Wisconsin Electric maintain state standards for DO concentration, temperature, and pH. Further, the WDNR states that natural daily and seasonal temperature variations should be maintained.

The MDNR recommends that Wisconsin Electric develop and implement a water quality monitoring program, in consultation with the MDNR, that includes continuous monitoring of DO and temperature upstream of the Brule impoundment and downstream from the Brule Dam, and the preparation of operating procedures to address water quality conditions which deviate from the recommended limits. The WDNR also recommends that Wisconsin Electric develop and implement a water quality monitoring program in consultation with the WDNR. However, the WDNR recommends that the water quality monitoring program be conducted the first and second year after trashrack replacement (discussed later in this section) and then every five years thereafter. Interior recommends water quality monitoring after replacement of the trashracks. Unlike, the MDNR and the WDNR, Interior did not specify a monitoring schedule.

The resource agencies state that replacement of the existing trashrack may alter DO concentrations and the water temperature regime in the project tailrace. The agencies state that because the lower portion of the existing trashrack is currently blocked by corrosion, installation of a new trashrack would result in water withdrawn from a larger portion of the water column. Withdrawal of water from lower in the water column may lower the temperature and/or DO concentration in the project tailrace. The MDNR premises its recommendation stating that the water quality monitoring program is necessary to determine the water quality at the site and determine if water quality emergencies have occurred.

The existing trashracks restrict the withdrawal of water to the upper portion (surface to about a depth of 6.0 meters) of the water column in the impoundment. The new trashracks could allow unrestricted water withdrawal from full depth of the intake structure (surface to a depth of 9.1 meters). Temperature and DO concentration profiles of the impoundment indicate that at about a depth of 9.1 meters, DO concentrations during the period of

summer stratification are about 3.0 mg/l. During this time temperatures at 9.1 meters in depth are about 64.4°F.

The degree of effect on DO concentrations and temperatures in the Brule tailrace depends on the strength of the impoundment stratification. The stronger the impoundment stratification, the greater the effect of trashrack replacement on DO concentrations and temperatures in the tailrace. If the impoundment stratification is not of sufficient strength, the pattern of flows and rate of withdraw in the area of the intake would remain the same following trashrack replacement, and therefore, DO concentrations and temperatures in the tailrace would remain the same. Whether the strength of impoundment stratification is sufficient to cause changes in tailrace DO concentrations and temperature is unknown.

Assuming that the impoundment stratification is sufficiently strong to change the flow pattern and rate of withdrawal in the area of the intake, the replacement of the existing trashracks should not result in any temperature increases because, as is typical for deep impoundments, temperatures decrease with depth during the summer months. A decrease in tailrace temperature is the most likely water quality change associated with trashrack replacement. Neither Michigan nor Wisconsin water quality standards applicable to the Brule River at the project location specify a minimum temperature requirement. Therefore, replacement of the trashrack should not result in violation of state water temperature requirements.

Regarding DO concentrations, replacement of the trashrack would result in the unrestricted withdrawal of water from a depth containing about 2.0 mg/l DO less than Wisconsin and Michigan standards for DO in the Brule River. During Wisconsin Electric's water quality study the minimum observed DO concentration in the tailwater was 5.3 mg/l. DO concentrations in the impoundment are maintained at levels greater than state standards to a depth of 7 to 8 meters in the impoundment.

Wisconsin Electric monitored water quality as part of the trashrack replacement. Baseline data was collected during the summer of 1993. Following trashrack replacement, Wisconsin Electric repeated the water quality monitoring in the summer of 1994. In addition, to predict the effects of trashrack replacement on the establishment and depth of the impoundment thermocline and the volume of hypolimnetic water in the impoundment, Wisconsin Electric modelled water quality within the impoundment. A final report on the effects of trashrack replacement on water quality in the Brule River was filed with the resource agencies and the Commission on December 20, 1994.

The results of the trashrack replacement water quality monitoring indicate that the replacement of the trashrack had no

effect on impoundment stratification or water quality in the impoundment and tailrace. During the 1993 pre-replacement monitoring, DO concentrations in the tailrace remained greater than 6.5 mg/l. In addison, the modelling exercise predicted that trashrack replacement would have little impact on DO concentrations in the tailrace and little effect on impoundment stratification. The results of the post-replacement monitoring confirmed the modelling results, indicating little or no effect on water quality in the tailrace or impoundment. During the post-replacement monitoring DO concentration fell below to 5.8 mg/l for only one hour, and fluctuated around 7.0 mg/l during the warmest periods of the summer.

The WDNR, upon reviewing the results of the post-replacement water quality monitoring, withdrew their recommendation for a second year of water quality monitoring (letter dated December 2, 1994, from Robert Rosenberger, WDNR, to Rita Hayen, Wisconsin Electric Power Company).

In order to provide the data necessary to evaluate future changes in water quality, if any, in the Brule River, Wisconsin Electric should monitor DO concentrations and temperature in the Brule Project impoundment and tailrace for five consecutive sampling periods and once every five years thereafter, as recommended by the WDNR. The monitoring period should target low flow, and high temperature periods, such as may occur between May 1 and September 15. We recommend that temperature be monitored because DO saturation concentrations are dependent on water temperature.

In the event that the water quality monitoring program indicates that water quality impacts have occurred due to replacement of the trashrack, Wisconsin Electric should develop and implement a plan to improve water quality in the Brule River. We envision that such a plan would involve selective blocking of the trashrack in order to restrict the flow of water through the lower portion to the trashrack, thus returning the pattern of flow through the trashracks to its original flow pattern.

Neither Michigan or Wisconsin have recommended specific measures to enhance water quality nor does the information in the public record suggest that temperatures and DO concentrations impact aquatic resources downstream of the Brule dam. In fact, calculated diversity and biotic indices are similar between upstream of the project and downstream. The similarity in diversity and biotic indices suggest that there is little effect on water quality in the Brule River due to operation of the project.The Brule River downstream of the project dam is classified as a warmwater fishery. In addition warmwater fish are more tolerant, than species such as salmonids, of warmer temperatures and require less DO concentrations. The Brule Project also tends to moderate diurnal temperature fluctuations,

thus decreasing the potential that aquatic resources are affected by high water temperatures that result from solar warming of the impoundment.

We determine that the impact of the project on water quality is negligible. In addition, any enhancement of temperature and DO concentrations would accrue to only 1.67 miles of the Brule River between the Brule dam and the confluence with the Michigamme River because of the differences in the volume of flow between the Michigamme and Brule Rivers. For the reasons discussed above, we see no reason to include a license article to require Wisconsin Electric to enhance water quality in the Brule River by maintaining Michigan and Wisconsin water quality standards because based on three years of water monitoring and the impoundment water quality modelling these standards are met. In addition, we can not identify any resource impacts due to the water quality resulting from the operation of the Brule Project.

If it becomes apparent in the future, due to unpredictable circumstances, that the operation of the Brule Project necessitates water quality enhancements, the resource agencies can request from the Commission additional water quality enhancements under the standard re-opener clause. Any request from the resource agencies should be accompanied by supporting information, including specific enhancement measures, associated costs (including power production losses), and a thorough assessment of benefits, through a resource management plan (or any other source).

Unavoidable Adverse Impacts Operating the Brule Project in a run-of-river mode would lessen impacts on DO concentrations and temperatures in the tailrace, and therefore would not contribute to cumulative impacts to water quality.

2. Fishery Resources.

a. Project operation

(1) Run-of-river Historically, the Brule Project operated as a peaking facility with an 85-cfs minimum flow requirement. Wisconsin Electric proposes to operate the project in a run-of-river mode so that outflow from the dam downstream into the river approximately equals inflow to the project impoundment.

The MDNR, WDNR, and Interior recommend that the Brule Project operate in an instantaneous run-of-river mode. Instantaneous run-of-river operation is defined by the MDNR, Interior, and WDNR as instantaneous inflow to the project reservoir approximates the instantaneous outflow from the dam

downstream into the river at all times. 6/ The MDNR, Interior, and WDNR also recommend that Wisconsin Electric develop and implement a plan, in consultation with the resource agencies, to provide run-of-river discharges for all periods when the project is not operating.

Interior, MDNR, and WDNR make an exception to the run-of-river operating mode. The resource agencies state that run-of-river operation may be temporarily modified if required by operating emergencies beyond the control of Wisconsin Electric. Interior, WDNR and the MDNR recommend that Wisconsin Electric promptly notify the agencies as soon as practical (in the case of MDNR and WDNR no later than 24 hours after each such incident) of any emergencies requiring temporary modification of instantaneous run-of-river operation.

The mean annual flow in the Brule River is about 550 cfs, and the mean annual flow in the Michigamme River is about 1380 cfs. Hence, the Brule River contributes about 28 percent of the annual flow of the upper Menominee River. The Pine River, whose confluence with the Menominee River is located about 16 miles downstream of the confluence of the Brule and Michigamme Rivers, contributes an additional 427 cfs on a mean annual basis. As measured at the Big Quinnesec Project (FERC No. 1980), the Brule River contributes about 23 percent of the mean annual flows in the Menominee River.

Because the backwater of the Twin Falls Project impoundment (FERC No. 1759) is located about 2 or 3 miles downstream of the confluence of Brule River and Michigamme River and the Twin Falls Project operates in peaking mode, the total length of river affected by the operation of the Brule Project is about 3 to 4 miles. Because the flows of the Brule River combine with the flows of the Michigamme River to form the Menominee River and the Brule River constitutes about one-third of the flows in the upper Menominee River, the environmental benefits of a run-of-river operating mode at the Brule Project would, for the most part, be accrued to the 1.67 miles of the Brule River between the Brule dam and the confluence of the Brule River and the Michigamme River. The reach of the Menominee River downstream of the confluence of the Brule River and Michigamme River would accrue less environmental benefits due a run-of-river operating mode at the Brule Project.

Operating the project in a run-of-river mode would minimize reservoir fluctuations and prevent large fluctuations in flows in the 1.67 miles of the Brule River downstream of the project that would be detrimental to aquatic resources by reducing or altering

---

6/ Approximately means that outflows are within ± 5 percent of inflows.

available habitat. Flow reductions may cause reduced spawning success and strand fish and invertebrates, subjecting them to desiccation and predation from terrestrial predators, and, if flows from the project fluctuate widely, benthic organisms, fish eggs, and larvae could be swept downstream (Rochester et al., 1984; Cushman, 1985; Orth, 1987; Bain and Boltz, 1989). Substantial water level fluctuations could also harm wetland plant species relying on saturated soil (Rochester et al., 1984). Therefore, we recommend that Wisconsin Electric operate the Brule Project in a run-of-river mode.

(2) Reservoir target elevations Wisconsin Electric proposes a normal pool elevation of 1198.3 ft. (NGVD).

Interior, the MDNR and the WDNR recommend that Wisconsin Electric maintain an impoundment target elevation of 1198.3 ft. (NGVD) from April 16 through November 14 and a target elevation of 1197.8 ft. from November 15 through April 15. 7/ The MDNR states that the target elevations may be temporarily modified if required by operating emergencies beyond the control of Wisconsin Electric and for short periods upon mutual agreement between Wisconsin Electric and the MDNR. As with the run-of-river recommendation, the MDNR and the WDNR recommend that Wisconsin Electric promptly notify the MDNR and WDNR as soon as practical (but no later than 24 hours after each such incident) of any reservoir drawdown, emergencies or incidents requiring temporary modification of the target elevations. Interior makes the same recommendation but provides no time element.

The MDNR and WDNR recommend that Wisconsin Electric, following such an emergency drawdown, consult with the MDNR and WDNR to determine appropriate response measures and environmental resource damages. In addition, following any emergency drawdowns, Wisconsin Electric would be required to submit a report to the MDNR and WDNR detailing the nature of the emergency, action taken, proposed mitigation measures, and proposed measures to prevent future reoccurrences.

The MDNR recommends that prior to any planned reservoir drawdown in excess of 1 foot, Wisconsin Electric should obtain any necessary MDNR permits. The WDNR recommends that Wisconsin Electric provide the resource agencies 60 days notice prior to any planned maintenance drawdown of the Brule impoundment and follow agency prescriptions to minimize potential environmental and social effects.

7/ The resource agencies' recommended target elevations are identical to Wisconsin Electric's previous proposal. At the Section 10(j) meeting, the resources agencies indicated that they did not object to Wisconsin Electric's current proposal.

Wisconsin Electric proposes to operate the Brule Project as unmanned run-of-river facilities to maintain a target reservoir elevation of 1198.3 ft. (NGVD) described above. Wisconsin Electric maintains the reservoir surface elevation of the Brule Project to within ±0.5 ft. Wisconsin Electric's procedures include monitoring of the reservoir surface elevation and power output from the project turbines. Power output then can be converted to flow measured in cfs. These data are then logged every hour. 8/ In addition Wisconsin Electric monitors tailwater elevations.

Wisconsin Electric studied the operation of the Brule Project in order to determine headwater control and operational constraints affecting reservoir elevation. The results indicate that under run-of-river conditions headwater fluctuations can generally be maintained at ±0.3 ft around the target elevation. However, occasionally, weather conditions and operational constraints, such as a unit down for maintenance, caused the headpond elevation to go outside of the ± 0.3 ft. fluctuation limit.

Wisconsin Electric's operating procedures would adequately ensure run-of-river requirements and minimize reservoir fluctuations that could be detrimental to aquatic resources by reducing or altering available habitat. Wisconsin Electric's procedures for maintaining the target headpond elevations minimizes the impoundment fluctuation at the Brule Project.

There is little difference between Wisconsin Electric's single target reservoir elevation and the resource agencies seasonal target elevations. Therefore, in order to protect reservoir habitat and riverine habitat downstream of the Brule Project, we recommend that Wisconsin Electric maintain a reservoir target elevation of 1198.3 ft. NGVD. We further recommend that Wisconsin Electric operate the Brule Project so as to limit reservoir fluctuations to ± 0.5 ft.

We recognize that, in some instances, it may not be possible for a Licensee to notify the MDNR prior to an impoundment drawdown. However, we recommend that, when possible, the Licensee notify the MDNR within 24 hours of any proposed or already enacted emergency drawdown and at least 60 days in advance of any proposed drawdown for dam maintenance. We disagree with the MDNR and WDNR that Wisconsin Electric should prepare a separate written report to the MDNR and WDNR describing the drawdown, proposed remedial measures, and proposed preventative measures for each emergency drawdown. Written

---

8/ The electronic gauges are monitored remotely by Wisconsin Electric dispatchers located at the Wisconsin Electric Control Center in Iron Mountain, MI.

notification to the Commission is required for any modification of project operation including emergency and planned impoundment drawdowns. We recommend that this report also be provided to the MDNR and MDNR at the time it is filed with the Commission.

The Commission has exclusive jurisdiction over the operation and maintenance of non-federal hydropower projects. Because the Commission has jurisdiction over these matters, we do not require Licensees to obtain state permits for operation and maintenance activities. Therefore, we will not recommend that the Licensee obtain MDNR permits for maintenance or emergency drawdowns of the Brule Project impoundment as a part of the Federal license.

In order to address the resource agencies' concern regarding resource protection during maintenance drawdowns, we recommend that Wisconsin Electric, after consultation with the WDNR, MDNR, and FWS, develop, for Commission approval, an impoundment drawdown plan to be implemented during any impoundment drawdowns for routine maintenance.

(3) Gaging To ensure compliance with a run-of-river operating mode, Interior, MDNR and WDNR recommend that Wisconsin Electric provide funding for the operation and maintenance of the existing USGS gages located upstream of the Brule Project on the Brule and Paint Rivers (Nos. 04061000 and 04062000, respectively) and downstream of the Brule Project on the Brule River (No. 04062011). The Brule Project would be deemed to be in compliance with a run-of-river operating mode if outflows from the project were within 5 percent of inflows to the project impoundment. In addition, Interior, MDNR and WDNR recommend that Wisconsin Electric equip all gages with telemetry equipment and capabilities for data retrieval by phone. The MDNR, WDNR, and Interior recommend that automatic level sensors be installed for the headwaters and tailwaters, and that a daily log of operation, including flow, unit operation, and water surface elevation, be maintained and made available to the agencies on request. The MDNR recommends the installation of such a water level sensor for the spillway side channel. Interior and the WDNR recommend a staff gage be installed on the upstream face of the Brule Dam and in the spillway channel.

The MDNR also recommends that a 2-year test period be used to verify the ability of Wisconsin Electric to maintain the target reservoir elevations and the discharge standards, as recommended by the MDNR. Should the above methods fail to maintain the reservoir elevation and the discharge standards, the MDNR states that Wisconsin Electric should modify the standard or develop an alternate standard for run-of-river operation after consultation with the resource agencies.

The use of stream flow gages to operate the Brule Project in a run-of-river mode is problematic. First, when comparing flow

records from two different gages one must account for gage inaccuracies which can deviate from the actual flow by as much as 10 percent. Second, one must account for evaporation and ground water accretion. Evaporation and groundwater accretion change in accordance with local and regional weather changes and can change on a daily or even hourly basis. Third, one must account for travel time which varies according to flow, also on a daily or even hourly basis.

We conclude that Wisconsin Electric's monitoring methods are sufficient to verify project operations. We would, however, recommend that Wisconsin Electric provide funds for the operation and maintenance of the USGS gages located upstream of the project on the Paint River (No. 04062000) and Brule River (No. 04061000) and downstream of the Brule Project on the Brule River (No. 04062011). Because Wisconsin Electric will maintain run-of-river operation by headwater control and unit loading, telemetry equipment for the gages is not necessary. We agree with the agencies that staff gages be installed on the upstream face of the dam in publicly-accessible locations and in the tailrace. However, because the minimum flow in the spillway channel is maintained through a valve that, once set, maintains a constant flow rate, an electronic sensor in the spillway channel recommended by the MDNR is not necessary.

As a condition of any license issued for the Brule Project, Wisconsin Electric should develop a plan, after consultation with the FWS, the MDNR, and the USGS, to install, calibrate and maintain staff gages on the upstream side of the dam and in the spillway channel in publicly-accessible locations. The plan should include an implementation schedule (for any new monitoring) and a provision for providing pond elevation, operational logs, and flow data to the consulted agencies within 30 days from the date of an agency's request for the data.

b. Fish passage The MDNR and WDNR recommend that, upon request by either agency and approval by the Commission, Wisconsin Electric complete an upstream fish passage plan. This plan would include retaining a qualified consultant to design and evaluate fish passage devices for the Brule Project, and to construct, operate, and maintain appropriate fish passage facilities and provide necessary operating flows at the project if effective fish passage provisions are determined to be economical at the site. If no device is determined to be economical at the site, the MDNR recommends that Wisconsin Electric conduct an evaluation of fish passage provisions every 5 years until fish passage is installed. If fish passage facilities are installed, the MDNR and WDNR recommend that the fish passage facilities have an effectiveness study, and that any modifications to the fish passage facility meet engineering and biological design specifications and be performed by Wisconsin Electric.

The MDNR cites a need for fish passage for resident fish. The MDNR states the disruption of fish movements may have significant implications and the fragmentation of the Brule River is also a concern. The WDNR states that the Brule dam may block resident fish from essential habitats. The MDNR and other agencies are currently evaluating the need for fish passage in the Brule River system, which will be further developed in a river management plan. The MDNR states that Denil ladders have been shown to pass resident fish, and has presented examples of species utilizing Denil ladders.

At this time there is insufficient information to support the installation of passage facilities for resident fish at the Brule Project. However, we note that the MDNR and other agencies are developing a fish management plan for the river that will address future needs.

The MDNR, WDNR and Interior are not requesting fish passage at this time, but expressed an interest to request it in the future. In response to MDNR's comments regarding the potential use of Denil fishways, we note that the limited number of studies on the effectiveness of Denil fish ladders passing resident fish indicate that some resident species may utilize Denil fishways, but that generally low percentages of sport fish tagged in the tailwaters have been observed to actually ascend the fishways (Katopodis, et al. 1991). In order to evaluate the appropriateness of providing a Denil or any other type of fishway at the Brule Project, we would require evidence to support: (1) the need for fish passage by the resident species at the project; (2) the expected use of the fishway by these fish; and (3) the expected benefits of such a passage program, in terms of fish production, recreational enhancement, and any other benefits.

The resource agencies intend to develop a river management plan that would address fish passage at the Brule Project. If the above-cited necessary supporting information is made available through the management plan (or any other source) and a fish and wildlife agency concludes that fish passage is warranted at the project, the request for fish passage and supporting documentation should be submitted to the Commission for consideration under the standard re-opener clause. 9/ Should evidence be submitted under a re-opener clause, and we determine that it is appropriate to install and operate upstream fish passage facilities at the Brule Project, we would recommend the installation and operation of such facilities.

Interior has requested that Section 18 reservation of authority be placed in any license issued for the project (letter

---

9/ The MDNR and WDNR may also seek fish passage through Interior via the Section 18 fishway prescription.

from Jonathan P. Deason, Director, Office of Environmental Affairs, Department of the Interior, Washington D.C. May 14, 1993). Section 18 of the FPA gives the Secretary of the Interior authority to prescribe fishways.

Although Interior does not recommend fish passage facilities as a condition for licensing the project, the Commission should include a license article reserving Interior's prescription authority. 10/ Commission policy recognizes that future fish passage needs and management objectives cannot always be predicted at the time the license is issued. Under these circumstances, and upon receiving a specific request from Interior, Commission policy is to reserve Interior's authority to prescribe fishways.

c. Fish entrainment and mortality Fish in the vicinity of the intakes may be entrained through the turbines at the Brule Project. Entrained fish can be subject to direct or indirect mortality due to turbine strikes or pressure changes in the water conveyance system (Rochester et al., 1984).

Wisconsin Electric conducted a year-long entrainment study at the Brule Project during 1991 and 1992. The results of the studies show that during the 12-month study period an estimated 41,921 fish were entrained at the project. Yellow perch made up about 39 percent of the entrained fish, while game fish (smallmouth bass, walleye, muskellunge, largemouth bass, brook trout, and brown trout) made up about 20 percent of entrained fish. An estimated 83 percent of entrained fish were 5.5 inches in length or less.

Wisconsin Electric estimated the number of fish that suffered turbine mortality as a result of entrainment. Wisconsin Electric's methodology involved introducing marked fish directly into the intake, and thus committing them to travelling through the turbine. In addition, Wisconsin Electric performed tests to control for net-induced mortality. However, the results of the marked fish introduction tests are inaccurate because of high mortality among control fish. In addition, control fish died at a greater rate than turbine test fish which indicates that the fish used in the study were in poor condition prior to the beginning of the study and/or fish used in the study died because of cumulative stress factors placed on the fish. These factors may include stress from transport to the project site, handling stress, holding stress, and crowding. We conclude that the

---

10/ Lynchburg Hydro Associates, 39 FERC ¶ 61,079 (1987).

Wisconsin Public Service Corporation, 62 FERC ¶ 61,095 (1993); Affimed, Wisconsin Public Service Corporation v. FERC, 32 F.3d 1165 (1994).

results of the controlled mortality study are not indicative of turbine mortality rates at the Brule Project, and therefore these data were not used in our analysis. Wisconsin Electric also collected data on mortality of naturally entrained fish. However, we recognize that these data do not account for delayed mortality.

The MDNR's evaluation of the annual **restitution** value of fishery resource damages from turbine mortality is $144,195.90 (1993$) based on Michigan Public Act 165 (1929). These restitution values include a replacement social value for the killed fish. The MDNR estimates the annual **replacement** value of fish to be $11,623.33 (1993$) These values are based on the 1992 American Fisheries Society fish replacement values (American Fisheries Society, 1992). The WDNR's evaluation of the annual **restitution** value of fishery resource damages from turbine mortality is $670,884 (1993$). The MDNR and WDNR recommend that half of the value of the fishery damage assessment be provided to each state.

The MDNR, WDNR, and Interior recommend that Wisconsin Electric install and maintain a floating barrier net system in the intake area to minimize entrainment. If the net is not successful, the MDNR recommends that Wisconsin Electric design and conduct an evaluation of all potential protective devices to prevent turbine entrainment mortality at the Brule Project. The MDNR states that all installed fish protection devices would have to be evaluated for effectiveness. The MDNR and WDNR further recommend that any residual losses after installation of the fish protection measures be valued according to the above guidelines and monies paid to the state for fisheries enhancement.

In lieu of fish protection devices or for residual turbine mortality after installation of a protection device, the MDNR recommends that Wisconsin Electric conduct a Fisheries Damage Assessment (FDA) to determine the value of fish killed by turbine mortality due to operation of the project. The MDNR states the FDA must utilize the methodologies consistent with the Comprehensive Environmental Response and Cleanup Liability Act of 1980 (CERCLA). The MDNR states that, within 36 months of completion of the FDA, Wisconsin Electric should make payment to the agencies for the amount equal to the damages to fishery resources for the 36 months during which the FDA was conducted and each year thereafter. In lieu of conducting a FDA, the MDNR states that Wisconsin Electric should pay the MDNR one-half of the state **restitution** value for fish killed at the Brule River Hydroelectric Project the other half to be paid to the State of Wisconsin.

Wisconsin Electric has prepared an evaluation of a fish entrainment protection device for the Brule Project. Wisconsin Electric's evaluation shows that the fish protection device at

the Brule Project would cost about $18,000 annually . Wisconsin Electric's device consists of a barrier net attached to a floating log boom suspended upstream of the project intake. Wisconsin Electric proposes to install the barrier net.

If the installation of the barrier net were recommended, it would not be necessary for Wisconsin Electric to further evaluate other potential fish entrainment protection devices at this time. However, in order to determine the effectiveness of the barrier net at minimizing fish entrainment, Wisconsin Electric should develop, after consultation with the WDNR, MDNR, and FWS, a plan to determine the effectiveness of the barrier net for Commission approval. Upon Commission approval, Wisconsin Electric should implement the plan.

We do not agree with WDNR's and MDNR's recommendation for Wisconsin Electric to pay the state or provide enhancement at the cost of the states' **restitution** value of the fish killed, or to conduct a FDA. For the type of fish killed from turbine entrainment at the Brule Project, we assess that the value of the fish killed by entrainment would be equivalent to the **replacement** value of the lost fish. We base our estimate of the mortality rate of fish entrained at the Brule Project on species specific data collected during the course of the entrainment study. We estimate that during the course of the entrainment study 41,921 fish were entrained at the Brule Project. Of those entrained fish, 11,346 were killed as a result of turbine mortality. Therefore, we assess the **replacement** value of fish entrained and subsequently killed by the project turbines to be about $5,970 annually (1995$).

The FWS, MDNR, and WDNR recommend the installation of a barrier net at the Brule Project. Wisconsin Electric agrees. Wisconsin Electric and the agencies state that a barrier net installed at the Brule Project would be investigated for site or physical limitation and the potential transferability of the technology to other projects. Therefore, we recommend the installation of a barrier net at the Brule Project.

d. Minimum flows in the spillway channel The MDNR, WDNR, and Interior recommend, for the protection and enhancement of aquatic resources, that Wisconsin Electric maintain a 20 cfs minimum flow in the spillway channel located at the base of the gated spillway. This flow was determined to be adequate for the protection of aquatic resources during a joint agency demonstration flow study. Wisconsin Electric agrees with the agencies' evaluation.

Wisconsin Electric states that the minimum flow will be maintained by an underwater valve located in the spillway. However, Wisconsin Electric states that in order to maintain a minimum flow of 20 cfs, Wisconsin Electric would have to ensure a

minimum flow of 25 to 30 cfs through the valve in order to maintain 100 percent compliance.

Based on the information submitted by Wisconsin Electric, and the resources agencies, we agree that a 20 cfs minimum flow in the spillway channel would protect and enhance aquatic resources in the Brule River. Therefore, we recommend that if a license is issued, the licensee maintain a 20 cfs minimum flow in the spillway channel.

We recognize that no methodology is 100 percent accurate at maintaining a specific minimum flow. In the case of maintaining a minimum flow through a sized pipe and valve, the resulting minimum flow will vary slightly in relation to headpond elevation and debris obstruction. In addition, each method to measure a specific flow will result in some amount of measurement error. Therefore, it is reasonable to allow for such variation around the 20 cfs minimum flow. We recommend that Wisconsin Electric, after consultation with the MDNR, WDNR, and FWS, develop a plan for Commission approval to quantify such flow variation due to headpond elevation and measurement error. Upon Commission approval of the plan, Wisconsin Electric should determine the flow variation in relationship to headpond elevation, and quantify the flow measurement error within the spillway channel. Such variation in flow due to headpond elevation and measurement could be incorporated into any license article to ensure compliance with the 20 cfs minimum flow in the spillway channel.

Upon completion and Commission approval of the aforementioned flow variation study, we recommend that the licensee, install and maintain a staff gage in the bypassed reach showing the target 20 cfs minimum flow and the normal flow variation around the target 20 cfs minimum flow.

e. Construction of fish and wildlife facilities The MDNR and WDNR recommend that Wisconsin Electric should, for the conservation and development of fish and wildlife resources, construct, maintain, and operate, or arrange for the construction, maintenance, and operation of such reasonable facilities, and comply with such reasonable modifications of the project structures and operation, as may be ordered by the Commission upon its own motion or upon the recommendation of the Secretary of the Interior, MDNR, or WDNR after notice and opportunity for hearing.

We recognize that future fisheries and wildlife needs and management objectives cannot always be predicted at the time of license issuance. Therefore, the Commission has a license reopener provision that can be used to require the above stated changes to projects upon Commission motion or as recommended by Interior, MDNR, or WDNR after notice and opportunity for hearing. Such provisions are included as a standard license article of

currently licensed projects. Any entity may petition the Commission at any time during the license for relief should they determine that additional environmental protection measures are necessary at the project.

The fisheries in the Brule River would be improved by operating the project in a run-of-river mode, maintaining a minimum flow of 20 cfs in the spillway channel, and implementing entrainment and mortality protection measures. In addition, fish passage facilities may be added to the project development in the future to enhance these fisheries resources in the Brule River Basin. Incorporating these enhancement measures as requirements in any license issued for the project would minimize the project's contribution to cumulative impacts on the recreational fisheries and aquatic habitats in the basin.

Unavoidable Adverse Impacts Although we recommend that Wisconsin Electric install and maintain a barrier net at the Brule Project in order minimize fish entrainment and turbine mortality, some fish will continue to be entrained and be subject to turbine mortality at the project because no entrainment protection device is 100 percent effective. Until such time as upstream fish passage facilities are implemented, fish will continue to be denied free passage at the dam.

3. Terrestrial Resources

Exotic wetland plants Interior, the MDNR, and WDNR recommend that Wisconsin Electric cooperate with resource agencies in implementing a plan to monitor and control/eliminate purple loosestrife in project waters, when deemed appropriate by the agencies. The MDNR recommends that the plan be developed within 36 months of licensing and that Eurasian milfoil be included.

Purple loosestrife and Eurasian milfoil are introduced from Europe. Often, they grow profusely, at the expense of the native wetland vegetation, reducing wildlife habitat value of wetlands. Measures available to control purple loosestrife and Eurasian milfoil are limited. Should it become necessary to control either of the two plants in the project's reservoir and associated wetlands, and safe, effective control measures become available, Wisconsin Electric should cooperate with agencies to implement the purple loosestrife/Eurasian milfoil control measures.

Wisconsin Electric states that there is neither purple loosestrife nor Eurasian milfoil in the project area. However, they are willing to cooperate with the agencies to control the spread of these plants when appropriate; but do not agree with MDNR's recommendation to formulate a plan for such control within 36 months of license issuance.

We conclude that based on the best information available and due to: (1) the potential rapid invasion of these noxious plants; (2) the difficulty of controlling these noxious plants, if established; and (3) the potential adverse affects on project wetlands and associated wildlife if the establishment of these noxious plants occurs during the term of license, we agree with the agencies that a monitoring plan is needed. Monitoring would quickly determine if and when the purple loosestrife and Eurasian milfoil invade the project area.

Therefore, we recommend that Wisconsin Electric monitor purple loosestrife and Eurasian milfoil in project waters at least annually, report the results to WDNR, MDNR, and FWS, and cooperate with these agencies should they deem it necessary to control or eliminate purple loosestrife or Eurasian milfoil from the project's waters.

Wildlife management and enhancement Interior, MDNR, and WDNR recommend that: (1) Wisconsin Electric retain the 1,603 acres of land currently within the project boundary; (2) any proposal to withdraw lands from the project boundary be reviewed by the agencies prior to final approval by the Commission; and (3) public access be allowed to these lands except to those areas that are environmentally sensitive, such as areas that provide habitat for Federal and state threatened and endangered species, or that are clearly dangerous to the public.

In addition, Interior and WDNR recommend that Wisconsin Electric implement the Comprehensive Land Management Plan (CLMP) prepared in consultation with the agencies during prefiling consultation. The CLMP should specifically include provisions for:

(1) Protecting environmentally sensitive habitat, such as habitat for Federal and state threatened species and wetlands;

(2) Ensuring that forest harvest practices, existing recreational use, and future recreational development are compatible with wildlife management;

(3) Regularly updating forest inventory and reconnaissance data for all project lands;

(4) Employing a professional resource management service to implement and oversee on the ground activities as dictated by the management plan;

(5) Updating, every five years, the forest plans which provide specific direction for resource management activities during each five year period, and prepared in consultation with WDNR, MDNR, and FWS;

(6) Consulting with WDNR, MDNR, and FWS on an annual basis on land management matters; and

(7) Adhering to resource management and timber harvesting plans as outlined in the CLMP.

The MDNR recommends that Wisconsin Electric develop and implement a separate wildlife management and land use plan that (1) protects and enhances wildlife habitat on project lands; and (2) provides for the protection of environmentally sensitive areas on project lands.

Wisconsin Electric says that future updates to the CLMP will be made in consultation with the resource agencies and their comments and input will be reviewed by Wisconsin Electric with a professional forester's assistance. Wisconsin Electric proposes to hold meetings with the resource agencies at least annually to review pertinent aspects of the CLMP (letter from Rita L. Hayen, P.E., Project Engineer-Hydro Licensing, Wisconsin Electric Power Company, Milwaukee, Wisconsin, July 13, 1993).

Contained in the Brule CLMP is a wildlife management plan. The following measures, if implemented would protect and enhance wildlife and their habitat.

a. Erosion and pollution control (e.g., water diversion techniques, vegetative buffers or filters, prevention of fuel and lubricant spills).

b. Habitat protection and enhancement:

(1) A semi-wilderness prescription would be maintained for most of the project land;

(2) Clear cuts would be small, generally no greater than 15 acres;

(3) Old hollow trees would not be destroyed, and snags would be left in clear cuts, unless there is a safety problem. A minimum of four wildlife trees > 6" dbh (diameter breast height) per acre would be left;

(4) A 150-foot buffer of trees would be left along the Brule River;

(5) Lowland stands of conifers would be maintained for winter cover;

(6) Accessways constructed during harvest operations would subsequently generally be closed to vehicles and seeding of these accessways to legumes such as white clover would be considered;

(7) All islands on the Brule impoundment would be managed for old growth forest;

(8) Nesting platforms for the eastern phoebe would be placed on the privies at all Brule recreation areas; and

(9) Nest boxes for the eastern bluebird would be maintained in the grasslands near the Brule Dam area on the Wisconsin side of the flowage.

c. Forage enhancement

(1) Fruit and mastbearing trees and shrubs would be retained in any stand improvement work when possible; and

(2) Regeneration of stands of aspen and other deciduous trees would be maintained as winter food sources.

We agree with Interior's, MDNR's, and WDNR's recommendation for Wisconsin Electric to implement the CLMP. The implementation of the CLMP, which includes implementation of a wildlife management plan, would enhance and protect the wildlife and its habitat in the project area while allowing for a balanced management of other environmental resources such as aesthetics and recreation. Consequently, preparation of a separate wildlife management plan after licensing, as recommended by the MDNR, is not necessary. We recommend that any license issued for the Brule Project require the implementation of the CLMP to include the resource agencies' recommended provisions described above.

State-listed Threatened and Endangered Species The WDNR recommends that Wisconsin Electric consult with the resources agencies when rare raptor nests (red-shouldered hawk, goshawk, osprey) are located on project lands. Further, the WDNR recommends that Wisconsin Electric, in consultation with the resource agencies, conduct periodic raptor surveys and formulate and implement a raptor protection plan. Management practices should be similar to the bald eagle protection plan.

The WDNR recommends that Wisconsin Electric conduct inventory surveys on the following state endangered, threatened, and watch species: northern blue butterfly, Dwarf Bilbery, marsh valerian, least clubtail, skillet clubtail, algal-leaved pondweed, gobbin fern, plains ragwort, white adder's mouth, blandings turtle, hairy beardtongue, and wood turtle. The surveys would be discussed at an annual WDNR, FWS and Wisconsin Electric land management plan meeting. A plan to implement the surveys should be created and funded jointly by WDNR and Wisconsin Electric.

Wisconsin Electric agrees to consult with the WDNR if and when rare raptors are found to be nesting within project lands. If found, Wisconsin Electric states that the company could help with raptor surveys, and change the CLMP if needed. Further, they are willing to support and assist with surveys for state threatened and endangered species that have a high probability of being on project lands, but Wisconsin Electric does not have any plans to conduct surveys at this time.

Wisconsin Electric does not agree with the WDNR's recommendation for a wood turtle study. A shoreline study for wood turtle nesting, however, has been proposed. Wisconsin Electric says that the measures they have proposed would afford the wood turtles, if present, greater protection.

The wildlife management section of the CLMP makes provisions for establishing management guidelines for known territories of raptors such as goshawk, red-shouldered hawk, Cooper's hawk, and broad-winged hawk. Wisconsin Electric also proposed surveys to identify potential wood turtle nesting sites and manage those areas to protect them.

We conclude that Wisconsin Electric should not be required to develop and implement a separate plan to inventory Wisconsin state-listed species. However, given the willingness of Wisconsin Electric to cooperate with the agencies in conducting wildlife surveys, we recommend that during the course of updating annual forest inventory and reconnaissance data, Wisconsin Electric also survey for state-listed species that have a high probability of occurring on the project lands. Implementing the CLMP with the inclusion of provisions for the protection of environmentally sensitive habitat, cooperating with WDNR, MDNR, and FWS in conducting wildlife surveys, and surveying for state-listed species while conducting annual forest inventories, would adequately provide for the protection of these resources. No additional protection or enhancement, specific to Wisconsin state-listed species discussed herein, is warranted at this time. If WDNR decides at a future date that specific additional protection or enhancement is needed for any of these species, or for any other fish and wildlife resources, the WDNR may make such recommendations to the Commission under the provisions of the standard re-opener clause.

4. Threatened and Endangered Species Interior determined that, if Wisconsin Electric adopts the FWS's measures to protect potential nest trees and nesting areas for bald eagles over the course of the license and implements the proposed semi-wilderness management for most of the project lands (as part of the CLMP, discussed above), the bald eagle and gray wolf would not be affected by the proposed project (Jonathan P. Deason, Director, Office of Environmental Affairs, Department of the Interior, Washington, D.C., letter dated May 13, 1993).

Interior and the WDNR recommend that Wisconsin Electric preserve all super canopy trees (e.g., white and red pine) that occur or may develop as available nesting sites for bald eagles in the future.

Wisconsin Electric states it is willing to preserve super canopy trees as practicable, dictated by hydro plant and transmission system operational needs. Although supporting the agencies' goals to increase bald eagle nest sites, Wisconsin Electric requests the ability to remove trees, even super canopy trees, that threaten continued project operations.

Wisconsin Electric proposes specific bald eagle management measures in the CLMP. These measures, which follow the FWS' "Bald Eagle Management Guidelines" and WDNR's "Bald Eagles in Wisconsin: a Management Guide for Land Owners", are outlined below.

a. For any new nest, primary and secondary zones would be established based on FWS bald eagle management guidelines (USFWS, 1981); 11/

11/ Primary zone: a 330 foot radius circle around the nest sites. Within this zone: • all land use unless in connection with eagle protection or maintenance performed by qualified individuals should be prohibited; • human entry and low-level aircraft activity should be prohibited January 1 through May 30 unless performed in connection with eagle research or management by qualified individuals; • motorized access into the zone should be prohibited; and • other human activity prior to October 1 should be discouraged unless related to bald eagle research or management (i.e., eagle banding during May and June).

Secondary zone: a 660 foot radius circle around the nest site. Within this zone: • any land use that would result in major changes to the landscape (i.e., clearcutting, landscaping, or major construction) should be prohibited; • tree trimming and other activities related to maintenance can be allowed provided it does not occur January 1 through May 30; • human entry and low-level aircraft activity should be prohibited February 1 through April 1 unless performed by qualified personnel; • roads and trails should be destroyed or at least closed January 1 though May 30; and • other human activity prior to October 1 should be discouraged unless related to bald eagle research or management (i.e., eagle banding during May and June).

b. Because any new nest would be established in an area of limited human use, those human activities occurring at the time of nest establishment would continue, but not be expanded;

c. Other human activity restrictions as detailed in FWS bald eagle management guidelines would be adopted;

d. Several mature and over-mature trees -- typically white pine -- would be left as potential eagle nest sites;

e. For feeding areas, the following measures would be adopted:

(1) chemicals toxic to eagles would not be used on project lands;

(2) no building construction would be allowed near the shoreline; and

(3) adequate fish populations in project waters would be maintained.

The specific bald eagle measures, as well as general measures identified in the CLMP, would provide for the protection of known eagle habitat, identification of new nests, and further consultation. We recommend that any license issued for the Brule Project require the implementation of the Brule CLMP to include the resource agencies recommended provisions and the specific bald eagle measures described above.

5. Recreation and Other Land Uses. Wisconsin Electric proposes to make Recreation Area No. 28 accessible to disabled persons and enhance the canoe portage access. The MDNR, WDNR, and Interior recommend enhancement measures that differ from Wisconsin Electric's proposal.

Wisconsin Electric notes that both the MDNR and WDNR refer to the potential for providing "a significant amount of additional recreation" if Wisconsin Electric follows their recommendations. Wisconsin Electric notes that the MDNR and WDNR give no support for their belief that significant increases in recreation use will occur simply because Wisconsin Electric adds recreation facilities.

Wisconsin Electric concludes that WDNR's and MDNR's reference to the project's recreational facilities as "substandard" is neither defined nor is the measurement criteria presented. Wisconsin Electric states that neither agency characterized recreation facilities as substandard during the consultation process, and the agency comments appear to be based

on site visits conducted several years ago (letter from Rita L. Hayen, P.E., Project Engineer, Hydro Licensing, Wisconsin Electric Power Company, Milwaukee, Wisconsin, July 13, 1993).

Also, Wisconsin Electric has developed, and filed with the Commission, a Comprehensive Long Range Recreation Plan (CLRRP) for their projects in the Menominee River Basin. The CLRRP was developed in consultation with local communities, local special interest groups and the resource agencies (letter from Rita L. Hayen, P.E., Project Engineer, Hydro Licensing, Wisconsin Electric Power Company, Milwaukee, Wisconsin, December 29, 1993). Wisconsin Electric reviewed all their recreation areas located at each hydroelectric project in the Menominee River Basin with respect to community and agency expressed needs and goals, and is planning future development with respect to the basin needs rather than individual project need.

The MDNR filed comments on the CLRRP (letter from James G. Truchan, FERC Program Manager, Fisheries Division, Michigan Department of Natural Resources, Lansing, Michigan, March 29, 1994). In summary, MDNR: (1) disagrees with Wisconsin Electric's policy on accessibility for persons with disabilities; (2) requests improved foot traffic access to accommodate fishing and wildlife viewing at all tailrace areas; (3) requests a minimum of one barrier-free fishing pier at all projects; (4) requests upgrades of all gravel boat launch ramps to concrete in a timely fashion as money, time, and workforce allow; (5) requests an alternate parking area to the one proposed by Wisconsin Electric at the Brule Project tailrace; (6) approves of user fees at campgrounds when the campgrounds have facilities accessible to persons with disabilities; (7) requests that the MDNR review all leases issued by Wisconsin Electric for project lands; and (8) requests a 200 foot wide buffer strip on project lands adjacent to the reservoir.

a. Impoundment Access and Facilities Wisconsin Electric proposes to make Recreation Area No. 28 accessible to disabled persons by providing an accessible boat launch and toilet facilities. Wisconsin Electric proposes to make the improvements in a 5-year capital improvement plan for recreational development. Wisconsin Electric says that the toilet improvements would cost $2,200 and the boat launch would cost $11,000.

(1) Boat Launch The WDNR recommends that within one year of license issuance, Wisconsin Electric make Recreation Area No. 28 accessible to disabled persons according to recommendations made by Wisconsin Electric's consultant and the WDNR's modifications in its October 2, 1992 letter to Ms. Rita Hayen, of Wisconsin Electric Power Company (see appendix 18, Wisconsin Electric Power Company, application, 1993). The WDNR says that existing public boat launch facilities at the Brule Project aren't accessible to

disabled persons and the launch site on the Michigan side of the river has sub-standard access due to very poor road conditions, including erosion problems. The WDNR says that the Florence County Outdoor Recreation Plan calls for more, and better access facilities in the county.

The MDNR recommends that Wisconsin Electric renovate, operate and maintain the two existing no-fee boat launching facilities on the Brule reservoir. The facilities should be accessible to disabled persons, and include a concrete boat ramp, barrier-free skid pier, parking for 54 vehicles and trailers, signs, all-weather access roads, hardened paths, and a barrier-free restroom. The MDNR notes that the existing boat launch facilities are substandard and not accessible to disabled persons: lacking proper boat launch ramps, toilet facilities, parking and access roads.

Interior recommends that Wisconsin Electric upgrade existing public boat launch facilities on the Brule impoundment to Wisconsin and Michigan standards.

Wisconsin Electric agrees to make Recreation Area No. 28 fully accessible to disabled persons and will incorporate this improvement in a five-year capital improvement plan for recreation development. Beginning in 1993, all toilet facilities installed at Wisconsin Electric recreation areas will be accessible to disabled persons. Any other accessible features will be reviewed as part of the overall basin recreation plan (letter from Rita L. Hayen, P.E., Project Engineer, Hydro Licensing, Wisconsin Electric Power Company, Milwaukee, Wisconsin, July 13, 1993).

Wisconsin Electric says that it will install a new boat launch ramp at Recreation Area No. 28. A concrete no-skid ramp will be installed, satisfying both Wisconsin and Michigan standards for this area. Wisconsin Electric will also provide improved (concrete) boat launches throughout the remainder of its recreation areas, including Area 23. The remainder of area boat launches will be upgraded as time and funding permit, provided the state doesn't object from an environmental impact standpoint (e.g., State Wild Rivers designation).

Providing an accessible recreation area at the Recreation Area No. 28 would provide additional access and improve recreational opportunities at the Brule Project. As noted by Discovery Group, Ltd, fishing is of acceptable quality at this site and the area is located on good quality roads, about 3.2

miles from Florence, Michigan, and 20 miles from Iron Mountain, Michigan. 12/

Therefore, we recommend that Wisconsin Electric improve Recreation Area No. 28 to include a boat launch pier accessible to disabled persons, accessible trails to fishing areas (as described in Appendix 16, Wisconsin Electric Power Company, application, 1993), accessible toilet facilities, and a defined parking area, with two parking spaces designated for disabled persons. We also recommend that Wisconsin Electric include the final plans and costs for Recreation Area No. 28 in the final recreation plan. Wisconsin Electric notes that they have replaced the boat launch ramp at Recreation Area No. 28 with a no-skid ramp (letter from Rita L. Hayen, PE, Project Engineer-Hydro Licensing, Wisconsin Electric Company, Milwaukee, WI, August 4, 1994).

To accommodate recreational users at Recreation Area No. 23, Wisconsin Electric should improve the existing boat launch area to include a concrete ramp, barrier-free skid pier, accessible toilet facilities, paths, and signs. We estimate that the cost of these improvements will be about $11,000 for the skid pier and boat ramp. 13/

(2) Parking Wisconsin Electric doesn't currently support adding parking spaces to Recreation Areas No. 28 or No. 23, as recommended by the MDNR. At Recreation Area No. 28, the parking capacity is 21 vehicles. Wisconsin Electric says it could designate disabled parking spaces at that lot, but additional parking at this area could only be accomplished by removing a large area of forest cover to the southwest of the current parking facility.

Recreation Area No. 23 currently has nine parking spaces. At this time, recreational demand doesn't exceed available parking. However, if recreational use increases at Recreation Area No. 23, additional parking spaces may be necessary. Additional spaces could only be provided by removing forest cover; accommodating another three to four vehicles. Wisconsin Electric notes that the use of this area doesn't justify either the disturbance of the forest lands or the expense.

12/ Discovery Group Ltd. is the consultant responsible for the recreational facilities plan for Wisconsin Electric Power Company's lands in the Menominee River Basin, revised January 5, 1993.

13/ Cost estimates are based on similar improvements for other hydroelectric projects in the region.

Further, Wisconsin Electric notes that while the MDNR has a formula for calculating the number of parking spaces for any given body of water, Wisconsin Electric states that the formula should take into account the location of the water body, population density, and the type of recreational opportunity offered as well as general recreation use patterns and parking capacity factors. 14/

It's important to provide sufficient parking at project recreation areas to accommodate users. Further, designating parking spaces for disabled persons would encourage use by the disabled community and comply with the intent of the 1992 Americans with Disabilities Act (ADA).

The MDNR's formula provides a basis for deciding the appropriate number of parking spaces but fails to address the particular characteristics of both the users and the site.

According to Wisconsin Electric's 1991 recreation study, Recreation Area No. 28 shows signs of overuse. The study notes that there's parking capacity problems at several existing boat landings--although the report doesn't specifically mention Recreation Area No. 28. The 1992 recreation survey results show that Recreation Area No. 28 had the greatest number of vehicles: 13 vehicles on one survey occasion and ten vehicles with trailers on another occasion (Wisconsin Electric, application, 1992). Parking capacity of Recreation Area No. 28 is 30 vehicles.

We recommend, therefore, that Wisconsin Electric designate three existing parking spaces for disabled persons at Recreation Areas No. 28 and No. 23, two spaces and one space, respectively. Further, we recommend that Wisconsin Electric monitor recreation use at Recreation Areas No. 28 and No. 23 to determine if future recreational use patterns show a need for additional parking. Monitoring should be done in conjunction with recreation use surveys for FERC Form 80 filings, which are filed with the Commission every six years. Wisconsin Electric should consult with Federal, state and local agencies to develop a monitoring plan (see Recreation Plans and Schedules).

(3) Access Road conditions The MDNR and WDNR refer to access road conditions, particularly to Recreation Area No. 23, as poor. Wisconsin Electric notes that the road to Recreation Area No. 23--commonly referred to as the Paint Pond Access Road--is a MDNR road located on state land. Wisconsin Electric

---

14/ One space per 15 acres of water--up to 1000 acres--and an additional two spaces for disabled users (letter from James G. Truchan, FERC Project Manager, Fisheries Division, Michigan Department of Natural Resources, Lansing, Michigan, June 1, 1993).

notified the MDNR in 1992 of the poor road condition and MDNR advised that funds weren't available for repairs. In the spring of 1993, Wisconsin Electric and MDNR met to evaluate the condition of the road and to develop a plan to cooperatively repair the road. Wisconsin Electric provided funds to MDNR and the repair was completed in June, 1993. Therefore, we don't recommend further improvements to the access road to Recreation Area No. 23.

Roadway access to Recreation Area No. 28 is primarily by county roads that aren't owned and maintained by Wisconsin Electric. Wisconsin Electric says that the poor road conditions should be discussed with the responsible party. Year-round maintenance of either recreation area depends upon the ability of Wisconsin Electric to access the area. Since the access roads to Wisconsin Electric's recreation areas don't support residences, neither the MDNR nor county provides year-round access. Wisconsin Electric says it can't commit to year-round maintenance since the access roads support only recreation areas and current recreational use patterns don't support the concept of year-round maintenance.

Wisconsin Electric surveyed winter recreational users from February through March, 1992. Wisconsin Electric concludes that although none of the project's recreation areas are heavily used, some winter use occurs: primarily ice-fishing and snowmobiling. At Recreation Area No. 28, Wisconsin Electric observed 40 people--13 on weekdays and 17 on weekend days--during five survey occasions. The FWS, MDNR, and WDNR say that low winter recreational use results from a visitor's inability to access the recreation areas. We agree that the lack of access to a particular area is a contributing factor to low recreational use of an area. However, during a survey conducted by Wisconsin Electric, access to the recreation areas-- via plowed roads--wasn't identified as a concern or demand among recreationists. According to the Commission's Chicago Regional Office staff, the majority of the public interested in accessing the Brule River for winter recreation activities use four-wheel-drive vehicles, snowmobiles, and cross country skis (personal conversation, James Kolak, FERC-Chicago Regional Office, Chicago, Illinois, December 6, 1994).

We agree that public access to the Brule River for winter recreational activities is important and encourage the state and county to plow the road for recreational users that don't have four-wheel-drive vehicles, snowmobiles, or cross-country skis. We find no evidence to suggest that the local people are demanding winter access and we think that if the demand does exist, the county should be responsible to meet that demand. Therefore, given the current winter use of the project and lack of survey response indicating a demand for winter access, we

don't recommend that Wisconsin Electric provide winter maintenance to the county road.

(4) Impoundment Shoreline Fishing The WDNR recommends that Wisconsin Electric provide barrier-free fishing opportunities at the Brule Project because none exist at the project and the Florence County Plan identifies a strong need for this type of facility in the project area (letter from Robert Rosenberger, FERC Project Manager, Wisconsin Department of Natural Resources, Marinette, Wisconsin, May 20, 1993).

The MDNR recommends that Wisconsin Electric design, construct, operate, and maintain two handicap accessible impoundment shoreline fishing accesses and associated fishing piers on the Brule impoundment. Facilities should be accessible to disabled persons and include signs, a barrier-free restroom, hardened paths, and parking for 10 vehicles, hardened fishing areas, and a railed fishing platform accessible to disabled persons. MDNR clarified their recommendation to include a fishing and viewing platform near the dam at the portage take-out location (letter from James G. Truchan, MDNR FERC Project Manager, Fisheries Division, Michigan Department of Natural Resources, Lansing, Michigan, August 4, 1994).

Interior also recommends barrier-free fishing access on the flowage, including impoundment fishing piers.

Wisconsin Electric proposes to make Recreation Area No. 28 accessible to disabled persons, to include accessible paths and shoreline fishing areas that blend with the natural, remote, wilderness-type setting and experience.

Wisconsin Electric's recreation survey noted that the number of shoreline anglers was "insignificant" compared to the total number of recreational users. The majority of anglers at the Brule Project fish from their boats. At Recreation Area No. 28, only 10 out of 292 users were shorefishing; at recreation area No. 23, no shoreline anglers were observed.

We agree with Wisconsin Electric's proposal to make Recreation Area No. 28 accessible to disabled persons, including shoreline fishing areas. However, we don't agree with the agencies' recommendation to add fishing facilities at Recreation Area No. 23, since a fishing facility will be developed at Recreation Area No. 28. Providing a fishing area at Recreation Area No. 28 and potentially at the canoe take-out area on the impoundment would satisfy the MDNR's request to provide a minimum of one shoreline fishing area at the project impoundment.

Therefore, Wisconsin Electric should consult with the agencies in developing Recreation Area No. 28, including accessible fishing areas as described in Appendix 16, Wisconsin

Electric Power Company, Response to Additional Information, January 27, 1993).

Regarding a viewing and fishing platform at the canoe take-out, we note that a railed platform exists at the canoe take-out. After viewing a photo of the deck (Wisconsin Electric, Response to Additional Information, appendix 14, January 27, 1993), we think that the existing deck is adequate for use as a wildlife viewing area. We think that anglers could also use the deck for impoundment fishing. Although it's difficult for staff to determine from the photo, it appears that Wisconsin Electric could make this deck accessible to person with disabilities by adding a ramp to allow passage of wheelchairs up on the deck. We recommend that Wisconsin Electric consult with MDNR and WDNR and discuss how the existing deck could be used as a fishing platform. Wisconsin Electric should post signs along the trail leading to the platform that will make visitors aware of the facility.

b. Canoe Portage Wisconsin Electric proposes to install two or three canoe rests and benches along the portage to assist canoeists. Wisconsin Electric has installed a toilet along the canoe portage, half-way between the canoe take-out and put-in locations.

The WDNR says that the present portage is much longer than necessary and not well marked. They recommend improving the canoe portage route following alternative B of Appendix 14 (Wisconsin Electric Power Company, Response to Additional Information, January 27, 1993), which reduces the overall length of the portage trail from about 1,200 feet to 500 feet by constructing stairs and a canoe slide. Wisconsin Electric should also move the portage take-out point to the end of the dike on the Wisconsin side of the flowage to shorten the overall length of the portage. The WDNR recommends these changes because the Brule River is a popular canoe route.

The WDNR also recommends that Wisconsin Electric install two privies at the canoe access put-in and take-out within one year of license issuance.

The MDNR recommends that Wisconsin Electric design, construct, operate, and maintain a safe canoe portage at the Brule dam, including two accessible vault toilets. The MDNR recommends a shorter route than the proposed canoe portage.

Interior recommends that Wisconsin Electric upgrade the canoe portage to a safe, well-marked portage route to include a canoe slide along the stairway leading to the tailwater, which would substantially shorten the distance of the portage compared to Wisconsin Electric's proposal.

Wisconsin Electric notes that four experienced canoeists evaluated the canoe route alternatives (Wisconsin Electric, Response to Additional Information, Appendix 14, January 27, 1993). They concluded that: (1) the steepness of the proposed stairs and canoe slide, descending down a 20 to 30 percent grade would be more difficult for the average canoeist than the current switchback route; (2) the existing portage is 1,200 feet compared to the agency's proposed 500 feet; (3) the current portage is adequate and not long enough to justify either the environmental disruption or the expense associated with alternative route construction; (4) cutting a new route down the steep grade has the high potential of creating more erosion problems than currently exist; and (5) the existing portage is significantly more pleasing from an aesthetic perspective since the alternate route would parallel a cyclone fence, presenting the user with an unscreened view of the open slopes of the dike and backside of the powerhouse.

Wisconsin Electric says that installing toilets at both the take-out and put-in areas is not practical due to sanitary servicing access requirements.

To address the agencies' concern that the portage route is too long and not well marked, Wisconsin Electric proposes to place two canoe rests along the 1,200 foot portage trail. We think that the existing portage route, although longer than the agencies' proposed route, is preferable for the following reasons: (1) the existing trail blends with the semi-primitive character of the area, while new construction of stairs and a canoe slide may not; (2) in the survey of recreational users, users didn't indicate that the current route is too long or unsatisfactory in some way; (3) Wisconsin Electric's proposal to build canoe rests along the portage route would provide a safe and adequate portage trail for canoeists.

In addition to providing canoe rests along the portage route, Wisconsin Electric should provide directional signs at the portage take-out, put-in, and along the path and continue to provide toilet facilities along the portage route to improve the portage trail at the Brule Project.

In the portage study (Wisconsin Electric Power Company, Response to Additional Information, Appendix 14, January 27, 1993), it is recommended that Wisconsin Electric remove the fence located downstream of the existing put-in and relocate the canoe put-in about 75 feet downstream: allowing canoeists to enter in calm waters. The study also recommended that erosion damage on the final section of the portage trail be repaired and ditches or culverts be constructed to prevent further erosion. The MDNR notes that railroad ties could be used to reduce erosion (letter from James G. Truchan, MDNR FERC Project Manager, Fisheries

Division, Michigan Department of Natural Resources, Lansing, Michigan, August 4, 1994).

Removing the fence would improve the aesthetic quality of the area and permit relocating the put-in to a safer location. Therefore, we recommend that Wisconsin Electric improve the canoe portage by installing canoe rests and benches and directional signs at the take-out, put-in, and along the trail. We also recommend that Wisconsin Electric remove the fence at the canoe put-in and relocate the canoe put-in about 75 feet downstream. Wisconsin Electric should also repair the erosion damage on the final section (approximately 300 feet) of the portage trail. We do not recommend that Wisconsin Electric install new toilet facilities at the put-in and take-out area but they should continue to provide facilities along the trail. We estimate that the cost of our additional enhancements will be $5,700.

c. Tailwater Recreation The WDNR recommends improved tailwater access including: (1) removing the gate that blocks vehicle access at the top of the hill; (2) constructing a parking area halfway down the hill at the old building site; (3) constructing stairs from the parking area down to the tailwater; and (4) installing signs to direct anglers to the access and parking area.

The MDNR recommends that Wisconsin Electric design, construct, operate, and maintain a tailwater fishing access at the Brule dam. Specifically, they recommend that Wisconsin Electric (1) provide vehicle access to the dam below the upper stairs and the caretaker's residence; (2) develop a 5-10 car parking lot and (3) develop a barrier-free shoreline fishing access. MDNR says that allowing vehicles to park below the dam will facilitate foot access to the tailrace and steps (railroad ties) down the access/portage trail are needed to reduce erosion (letter from James G. Truchan, MDNR FERC Project Manager, Fisheries Division, Michigan Department of Natural Resources, Lansing, Michigan, August 4, 1994).

Wisconsin Electric says that acceptable tailwater access is provided at the Brule Project. Public parking is available in an area above the pole gate, where people can walk down a stairway and gravel road to the tailwater area. To move the access point to the area suggested by the agencies would place the public in an unsafe situation. As an alternative to developing formal tailwater facilities at the Brule Project, Wisconsin Electric supports installing tailwater fishing facilities accessible to persons with disabilities at three projects, one in each of the three recreational districts. Candidate projects include White Rapids (FERC No. 2357), Kingsford (FERC No. 2131) and Hemlock Falls (FERC No. 2074). If other areas in the basin are determined to be popular fishing access areas, Wisconsin Electric can formalize these areas, generally with little modification.

Wisconsin Electric says that the public has access to the tailwater area up to the plant outlet via the gravel road to the river below the generating facilities. As we discussed in the canoe portage issue, we recommend that Wisconsin Electric provide erosion control and stabilization measures on the last 300 feet of the canoe portage trail. In addition, the access road to the plant, proposed by the agencies for use as an access road to a relocated tailwater access area, is unsafe for public use because the road is a narrow, steep, and curving one lane road with a steep slope into a ravine on one side and a rock bluff on the other. Widening the road is an expensive proposition that Wisconsin Electric says isn't warranted. We note that hiking is one of the most popular activities at the Brule Project and users noted the aesthetic appeal of the area and opportunities to view wildlife. In keeping with the semi-primitive recreation experience, we recommend more foot access and fewer road access points. The existing road, as noted in photos from the application, is wide and well maintained.

Project tailwaters are often the best place to fish; however, at the Brule Project, recreational surveys showed that only five of the 700 people counted were using the tailwaters. As we noted before, most recreational use occurs from anglers in boats on the impoundment. In addition, access and improvements from a basin-wide level will be of more benefit to users because Wisconsin Electric will provide facilities where demand exists. Further, we note that the MDNR says that "some tailrace areas could be made handicap accessible such as at White Rapids..., while others cannot [Brule Island and Chalk Hill....]" (letter from James G. Truchan, MDNR FERC Project Manager, Fisheries Division, Michigan Department of Natural Resources, Lansing, Michigan, August 4, 1994). Clearly, the MDNR sees the advantage of developing facilities accessible to persons with disabilities in areas most suitable for development. It has been the MDNR's position that all new facilities comply with the requirements of the Americans With Disabilities Act (ADA). If we were to recommend formal fishing facilities, Wisconsin Electric would be required, under the ADA, to make those facilities accessible to persons with disabilities. Wisconsin Electric's philosophy is to provide the facilities where there's demand and where the terrain is suitable for providing such facilities.

Therefore, we recommend that Wisconsin Electric ensure that the tailwater area is maintained for foot traffic and informal tailwater fishing, including the parking area and path, and also repair erosion impacts, at the tailwater access site.

d. Directional signs The MDNR and Interior recommend directional signs from all major highways in order to ensure the public's ability to find and use the recreational facilities.

Wisconsin Electric says it'll evaluate the need for any additional signs for directing the public to Recreation Area No. 28 in Florence County. Wisconsin Electric realizes that no signs exist from U.S. Highway 2 within the Town of Florence. If approval for placing a sign is received from the governing political body, Wisconsin Electric will provide a sign. A directional sign on U.S. Highway 2 and Paint Pond Road and another sign at the access entrance provide adequate direction to Recreation Area No. 23.

The public should be aware of recreational facilities associated with hydroelectric projects if adequate direction signs from major roadways are provided. Therefore, we recommend that Wisconsin Electric consult with the State of Wisconsin and Town of Florence and display directional signs to Recreation Area No. 28, on U.S. Highway 2 where the public will most likely see them.

The MDNR notes that the directional sign to Recreation Area No. 23 is illegal according to Michigan Department of Transportation (MDOT) highway regulations and is placed in a highway right-of-way without MDOT authorization. MDNR recommends that Wisconsin Electric replace the sign with one that conforms to MDOT highway regulations.

The existing signs at Recreation Area No. 23 adequately inform a visitor of the location of the recreation site. However, if the sign is located on MDOT property, Wisconsin Electric should consult with MDOT to determine if the existing sign meets regulations. If not, Wisconsin Electric should consult with MDOT and provide a sign that meets existing MDOT regulations.

e. Lease Compliance Program The MDNR recommends that Wisconsin Electric develop and implement a lease compliance program. The MDNR says that current FERC projects have little or no interaction with the department on recreational leases; thus no consideration is given to threatened or endangered species, fish and wildlife resources, public access, access for disabled persons, or the safety of the proposed facilities. Further, they note that enforcement of lease provisions is generally inadequate or uneven at best.

Wisconsin Electric has no leases for land associated with the Brule Project. Wisconsin Electric opposes the MDNR's recommendation since the MDNR has offered no resource-related justification supporting their authority to approve leases.

The Commission's Standard Land Use Article (Article), paragraph (e)(1), specifically says that "before conveying the interest, the Licensee shall consult with the Federal and state fish and wildlife or recreation agencies, as appropriate, and the

State Historic Preservation Officer." Paragraph (e) applies to any intended conveyance under paragraph (c) or (d), which includes recreational developments. Under paragraph (b) of the Article, the Licensee may grant permission for specific types of use and occupancy of project lands and water without prior Commission approval. In this case, the Licensee may establish a program for issuing permits. The Commission reserves the right to require the Licensee to file a description of its standards, guidelines, and procedures for implementing paragraph (b) and to require modification of those standards, guidelines, or procedures. Therefore, the MDNR would be consulted in accordance with paragraph (e)(1).

We conclude that a separate lease compliance program including the MDNR's review and approval on all leases isn't justified.

f. Erosion at Public Use sites The WDNR recommends that Wisconsin Electric eliminate the erosion problems on the Michigan side of the reservoir--at Recreation Area No. 23. They also say that Wisconsin Electric should repair and maintain the access road to Recreation Area No. 23.

The MDNR and Interior also recommend stabilizing all eroding areas at project public use facilities.

Wisconsin Electric says it will evaluate any existing erosion problems and correct them as necessary.

We agree that any erosion problems--as a result of project operation or public use of the facilities--should be identified and corrected in order to reduce sedimentation and loss of vegetation, and to reduce the impact on visitor safety and aesthetic quality.

Therefore, we recommend that Wisconsin Electric augment their recreation plan incorporating a soil erosion control plan with measures to address existing erosion at the Brule Project and measures to reduce erosion during recreation facility improvements. The erosion control plan should include: (1) a description of the actual site conditions; (2) measures proposed to control erosion and to prevent slope instability; (3) detailed descriptions, functional design drawings, and specific topographic locations of all control measures, including costs; and (4) a specific implementation schedule and details for monitoring. Wisconsin Electric should consult with the U.S. Soil Conservation Service, WDNR, and MDNR on the plan.

g. Recreation Plans and Schedules The WDNR says that Wisconsin Electric should develop the recommended recreation enhancements within 12 months of license issuance and that

Wisconsin Electric should continue to operate and maintain all recreation facilities associated with the project (letter from Robert Rosenberger, FERC Project Manager, Wisconsin Department of Natural Resources, Marinette, Wisconsin, May 20, 1993).

The MDNR recommends that Wisconsin Electric develop and implement a recreation plan and Interior recommends that Wisconsin Electric complete all recreational improvements within five years from license issuance and review the recreational plans for the Brule Project every five years, in consultation with the WDNR and MDNR, National Park Service (NPS) and other local agencies responsible for recreational facility planning (letters from James G. Truchan, FERC Project Manager, Fisheries Division, Michigan Department of Natural Resources, Lansing, Michigan, June 1, 1993, and Jonathan P. Deason, Director, Office of Environmental Affairs, U.S. Department of the Interior, Office of the Secretary, Washington, D.C., May 14, 1993).

Wisconsin Electric agrees with Interior that a five year schedule should be used for these recreational improvements. Wisconsin Electric notes that the one year schedule proposed by WDNR and MDNR does not give Wisconsin Electric an adequate opportunity to plan and budget for these activities.

Wisconsin Electric proposes to review recreational plans with not only the Federal and state agencies but also the local communities and special interest groups on an annual basis.

We recommend that Wisconsin Electric submit, for Commission approval, and upon approval implement, a final recreation plan including Wisconsin Electric's proposals and staff's recommended recreation enhancements. The plan should include: (1) final design drawings of all recreation enhancements; (2) a discussion of how the needs of the disabled were considered in designing each access area or facility; (3) a description of signs to be used to identify public access area and the portage route; (4) drawings and specifications for each recreational enhancement; (5) erosion control plan (as discussed in V.5.f); (6) a description of the compatibility of the construction materials for the recreational facilities with the natural character of the surroundings; (7) costs of the improvements; (8) a construction schedule; and (9) identification of the entity responsible for operation and maintenance of the facilities and access areas.

Wisconsin Electric filed their CLRRP on December 30, 1993. This plan has, and will, assist the staff in planning and analyzing proposals for the Brule Project and other hydro projects in the Menominee River Basin. The CLRRP provides a cumulative approach for assessing recreational needs and opportunities at Wisconsin Electric Projects in the Menominee River Basin.

Wisconsin Electric should complete the recreation improvements for the Brule Project within five years of license issuance and monitoring should be consistent with the FERC form 80 filings. Monitoring should include: (1) annual recreation use figures; (2) a discussion of the adequacy of the Licensee's recreation facilities at the project site to meet recreation demand; (3) a description of the methods used to collect all study data; (4) a plan for accommodating additional recreation needs; and (5) documentation of annual agency consultation, as proposed by Wisconsin Electric.

The Brule Project is one of many hydroelectric facilities located in the Menominee River Basin. Our recommended recreation plan--including Wisconsin Electric's CLRRP--would improve recreation facilities and access and provide additional recreation opportunities at the Brule Project and other project sites in the basin. Licensing the Brule Project with our recreation recommendations would have a beneficial cumulative effect on recreation resources within the river basin.

Unavoidable Adverse Impacts Under the proposed action and staff's action-alternative, minor short-term unavoidable adverse impacts due to minor erosion during the construction and improvement of the recreation areas at the Brule Project would occur. However, any potential impacts and associated soil erosion control measures are addressed in the erosion control plan discussed above.

6. Land Use. As previously discussed (see Section VI.A.3) Wisconsin Electric consulted with the agencies and prepared and implemented a Comprehensive Land Management Plan (CLMP) for the Brule Project.

The WDNR recommends that Wisconsin Electric lands continue to remain open for public use and that any proposal to remove lands from current project boundaries or restrict public access be reviewed by the WDNR and FWS prior to final approval by the Commission. The WDNR says that project lands provide valuable fish and wildlife habitat and have tremendous public benefits for multi-recreation use. Efforts to reduce project lands may jeopardize habitat and restrict public access for recreation (letter from Robert Rosenberger, FERC Project Manager, Wisconsin Department of Natural Resources, Marinette, Wisconsin, May 20, 1993).

Wisconsin Electric doesn't intend to reduce the project boundary. When and if appropriate, Wisconsin Electric reserves the right to adjust the project boundary, subject to FERC approval.

In order to provide the best management practices for the Brule Project, the recreation and erosion control plans should be

referenced in the final CLMP. An annual meeting to discuss land management practices and concerns would benefit the overall management of the Brule Project. Therefore, we recommend that Wisconsin Electric reference the recreation and erosion control plans into the CLMP (see Recreation section) and that Wisconsin Electric consult with the Federal and state agencies, local governments, and interested parties to finalize the plan and submit it for Commission approval. In addition, we recommend that Wisconsin Electric meet with the agencies and review the CLMP on an annual basis.

Incorporating by reference the recreation and erosion control plan in the CLMP would provide comprehensive management practices for land use, aesthetics, recreation, erosion control, and sensitive and protected species. A CLMP would improve management of the project lands and have a beneficial cumulative effect on land use in the basin.

Unavoidable Adverse Impacts None.

7. Cultural Resources. Wisconsin Electric proposes to file a Cultural Resources Management Plan (CRMP) for the Brule Project. The CRMP includes a shoreline survey every two years and takes into account potential project impacts from land management activities to existing and as yet unidentified, but potentially eligible, cultural resource sites. Wisconsin Electric estimates that the biannual shoreline surveys will cost $2,000.

The Wisconsin State Historical Society (SHPO) notes that the Brule Project is most likely in a historic district and recommends that Wisconsin Electric prepare the NPS 10-900 form for a determination of eligibility for the Brule Hydro Historic District (letter from Richard W. Dexter, Chief, Compliance Section, Division of Historic Preservation, The State Historical Society of Wisconsin, July 9, 1991). The SHPO also recommends that Wisconsin Electric survey the remainder of project lands, including areas proposed for timber harvesting, the logging roads or other areas of disturbance. The SHPO notes that certain land management impacts can be addressed post-licensing (letter from Richard W. Dexter, Chief, Compliance Section, Division of Historic Preservation, The State Historical Society of Wisconsin, December 4, 1991).

The Wisconsin SHPO later noted that the district is eligible for listing in the National Register of Historic Places (letter from Richard W. Dexter, Chief, Compliance Section, Division of Historic Preservation, The State Historical Society of Wisconsin, December 23, 1991).

The Michigan Department of State, Bureau of History (Michigan SHPO) recommends an eligibility study of the Brule

hydroelectric plant and says that the project will not affect known archaeological sites eligible for listing in the NRHP. Sites 20IO155, 20IO156, and 20IO157 do not meet the criteria of eligibility (letter from Kathryn Eckert, Acting State Historic Preservation Officer, Bureau of History, Lansing, Michigan, February 15, 1991).

To protect cultural resources at the Brule Project, we recommend that Wisconsin Electric implement the provisions of the Wisconsin Statewide Programmatic Agreement, which requires the Licensee to develop a Historic Resources Management Plan (HRMP) within one year of license issuance. The HRMP would require the Licensee to (1) develop an operation and maintenance plan to protect the historic project properties; (2) apply the National Register Criteria for evaluating archaeological sites; and (3) conduct biannual shoreline monitoring studies.

Therefore, we recommend that the Licensee implement the Programmatic Agreement provisions to protect cultural resources at the Brule Project.

B. Impacts of Project Retirement.

1. Water Resources.

If the Brule Project were to be retired, the flows in the Brule River downstream of the Brule dam would be about the same as flows under the proposed run-of-river operating mode. However, because the Brule dam does not have an ungated spillway, passing inflows through the Taintor gates would result in a lowering of the Brule impoundment. Failure to stabilize the impoundment may result in the exposure of sediments, built-up in the impoundment behind the dam, and the potential for these sediments to be transported downstream and deposited in riverine portions of the Brule and Menominee Rivers. Therefore, we would recommend that, as a condition of project retirement, Wisconsin Electric develop a plan to modify the Brule dam to pass inflow without lowering the Brule impoundment.

Project retirement would, assuming the impoundment were stabilized at its current elevation, result in surface waters being discharged into the Brule River downstream of the dam. Because surface waters of the Brule Project are well oxygenated and considering that additional turbulence will accompany the spillage of flows at the dam, DO concentrations would probably be maintained at or above State of Wisconsin and Michigan water quality standards.

The spillage of impoundment surface waters, warmed as a result of solar radiation, would potentially increase temperatures in the Brule River downstream of the dam. The actual amount of increase is not known, however, Wisconsin

Electric's water quality study indicates that currently the surface waters in the impoundment reach temperatures of 73°F to 77°F during the months of July and August. During this same time period, temperatures in the project tailrace were about 70°F to 73°F. Therefore, retirement of the Brule Project would most likely increase the water temperature in the Brule River downstream of the project. An increase in water temperatures downstream of the Brule dam as a result of project retirement may degrade the fishery in the Brule River if water temperature increase beyond the thermal requirements of fish in the Brule River.

Under the retirement alternative, water resources, including Paint River and Paint River Pond, within the current Brule Project boundary and downstream may be affected by changes in land uses that could accompany conversion of projects lands to strictly private ownership. Development of these lands for agricultural, silviculture, or private development purposes would affect the hydrological regime of the Brule and Menominee Rivers through increased surface run-off. In addition, water quality in the Brule and Menominee Rivers may be degraded through increased sediment loading, non-point source nutrient inputs, and increased solar warming and degradation of aquatic habitat through the potential loss of riparian vegetation.

Retirement of the Brule Project may contribute to cumulative effects on water temperatures downstream of the Brule dam, through spillage of warm impoundment surface waters. However, the effects of surface water spillage may cumulatively benefit DO concentrations in the Brule River.

Unavoidable Adverse Impacts Retirement of the Brule Project might result in an increase in water temperatures in the Brule River downstream of the Brule Dam. An increase in water temperature would be particularly evident during low-flow, high-temperature periods as may occur during June, July, and August. In addition, conversion of the surrounding project lands to strictly private ownership may result in long-term water quality impacts.

2. Fishery Resources.

a. Project operation

(1) Run-of-river Under the project retirement alternative, flows in the Brule River downstream of the dam would be directly dependent on inflows to the impoundment. Compared to the historic peaking operating mode of the Brule Project, project retirement would avoid impacts to aquatic resources, related to the peaking operating mode. However, there would be no difference in the impacts on the aquatic resources downstream of

the dam when compared to the recommended run-of-river operating mode of the project.

(2) Reservoir target elevations If the Brule Project were to be retired, the impoundment elevation would be dependent on the crest of the outflow structure. If Wisconsin Electric removed the Taintor gates at the Brule dam the reservoir elevation would be 1187.04 ft. NGVD. This elevation represents an impoundment elevation 11.76 ft. below the proposed target reservoir elevation. Lowering the impoundment by almost 12 feet would dewater large areas of aquatic habitat. This could represent a moderate to major short-term impact to aquatic resources. Therefore, in order to avoid impacts to aquatic resources in the Brule Project, we would recommend that Wisconsin Electric, as a condition for project retirement, develop and implement a plan to stabilize the Brule impoundment at approximately the current water surface elevation.

(3) Gaging Under the retirement alternative no flow gaging would be necessary, because outflow from the Brule dam would correspond in volume and periodicity to natural inflow to the Brule impoundment. Therefore, if this alternative were selected, we would not recommend that Wisconsin Electric provide funds for the operation and maintenance of the USGS gages located upstream of the project on the Paint River and Brule River and downstream of the Brule Project. In addition, we would not recommend the installation, calibration and maintenance of staff gages on the upstream side of the dam in publicly-accessible locations.

b. Fish passage Under the retirement alternative, there may be no mechanism in place for the Commission to require Wisconsin Electric to install, maintain, or operate fishways in the future. For the foreseeable future, the Brule dam may continue to block the upstream passage of fish in the Brule River.

c. Fish entrainment and mortality If the Brule Project were to be retired, there would be no turbine related mortality to fish in the Brule River as a result of project operation. Therefore, there would be no need for Wisconsin Electric to either fund fisheries enhancements in the vicinity of the Brule dam or install a barrier net to minimized turbine related mortality to fish. The absence of turbine mortality as a result of the discontinued operation, would benefit fisheries resources in the Brule River and therefore lessen any cumulative impacts to aquatic resources.

d. Minimum flows in the spillway channel Under the retirement alternative flows may not be spilled from the Brule dam into the spillway channel. Due to the methodology (a flow demonstration relying on the professional judgement of the resource agencies and Wisconsin Electric) to determine the 20 cfs

minimum flow recommended under the proposed or action alternative, discussed above, it is not possible to determine the impacts, beneficial or otherwise, of the increased flow in the spillway channel. However, we suspect that any related impact to aquatic habitat arising out of river flows (some or all) spilling into the spillway channel would be beneficial.

Under the retirement alternative, the natural stream flow in the Brule River would be maintained downstream of the Brule dam. In the same manner as the recommended run-of-river operating mode aquatic resources downstream of the Brule dam would be enhanced compared to the historic peaking operation. With respect to fish passage, the proposed alternative has a mechanism under which the Commission may require the installation of fish passage facilities. Selection of the retirement alternative may preclude the installation of future fish passage facilities. There would be no fish killed as a result of turbine mortality, consequently there would be no need for a fish protection device nor would there be any fishery enhancements as compensation for turbine mortality as a result of entrainment.

Unavoidable adverse impacts Under the retirement alternative fishery resources in the Brule River downstream of the Brule dam and upstream in the Brule impoundment, Paint River and Paint River Pond would be impacted because, for the foreseeable future the dam may prevent fish from moving upstream.

3. Terrestrial Resources.

Exotic wetland plants Under the retirement alternative, Wisconsin Electric may not be required to monitor the Brule impoundment for purple loosestrife and Eurasian milfoil. If purple loosestrife or Eurasian milfoil eventually invades the Brule impoundment, the Commission may not have the authority to require Wisconsin Electric to control or eliminate these pest species. Therefore, these species could become established in the Brule impoundment. In order, to preserve the approximately 248.2 acres of wetlands in the area of the Brule Project, we would recommend that Wisconsin Electric retire the Brule dam so that the impoundment level would be maintained at an elevation of about 1198.8 ft. NGVD.

Wildlife management and enhancement Under the retirement alternative, lands owned by Wisconsin Electric within the project boundary would no longer be under Commission jurisdiction or protection, as described in section V.C.6. Therefore, Commission protection relating to the use of these lands may be lost. In addition, there may be no Commission requirement for Wisconsin Electric to implement the measures of the CLMP. Wildlife habitat within the 1,603 acres of project lands would be subject to local, state, or Federal law governing the usage of private lands.

State-listed Threatened and Endangered Species Under the retirement alternative, there may be no vehicle by which the resources agencies could seek Commission action regarding existing or additional fish and wildlife protection or enhancement measures in the future.

Unavoidable Adverse Impacts If the Brule Project were retired the CLMP may not be implemented. Without oversight by an independent entity, there would be the potential for wildlife habitat degradation associated with the potential for development of the project lands under private ownership.

The potential for wetland degradation due to the invasion and establishment of exotic wetland species would increase as a result of the Brule Project's retirement.

4. Threatened and Endangered Species. Under the retirement alternative, there may be no Commission requirement to implement the bald eagle protection measures outlined above, and all current bald eagle protection measures may be lost. In addition, if the 1,603 acres of land were to be subdivided, as might occur if the lands were removed from the Commission's jurisdiction, increased human disturbance could result in a loss of suitable bald eagle habitat.

Unavoidable Adverse Impacts Human disturbances, from private development or utilization of natural resources on the 1,603 acres of project lands (i.e. unchecked timber harvesting) may make the land unsuitable for bald eagles.

5. Recreation and Other Land Uses. Under the retirement alternative, Wisconsin Electric may not be required to improve Recreation Area No. 28. Therefore, a boat launch pier accessible to disabled persons, accessible trails to fishing areas, accessible toilet facilities, and a defined parking area, with two parking spaces designated for disabled persons would not be installed. Further, there may be no requirement for Wisconsin Electric to maintain the existing facilities at Recreation Area No. 28. Recreation Area No. 28 could be closed to the public.

Wisconsin Electric may not be required to improve Recreation Area No. 23. Therefore, there would be no improvement to the existing boat launch area to include a concrete ramp, barrier-free skid pier, accessible toilet facilities, paths, and signs. Further, there may be no requirement for Wisconsin Electric to maintain the existing facilities at Recreation area No. 23. Recreation Area No. 23 could be closed to the public.

Because the recreational facilities may not be improved or maintained, and may be closed to the public, Wisconsin Electric would not be required to provide directional signs to the recreation facilities.

In addition, there may be no requirement for Wisconsin Electric to monitor recreation use at Recreation Areas Nos. 23 and 28.

There may be no requirements for canoe rests and benches and directional signs at the take-out, put-in, and along the trail. The fence at the canoe put-in may not be relocated. Wisconsin Electric may also not be required to repair the erosion damage on the final section of the portage trail. Further, there may be no provisions for Wisconsin Electric to maintain the existing portage. There may be no requirement to maintain the tailwater area, including the parking area and path.

Because no new recreation facilities would be installed, there would be no need for soil erosion control measures to be implemented. We would recommend that, as a condition of retirement, Wisconsin Electric repair existing erosion damage at the canoe portage.

Wisconsin Electric would be free to enter into lease agreements or land sales contracts, including sub-division of the 1,603 acres of project lands, subject to state and federal laws governing private leases and land sales.

The closing of the recreation facilities would have a cumulative impact on recreation in the Menominee River Basin in two ways. First, closing the facilities would be a loss in the number of recreational opportunities in the Menominee River Basin. Second, recreational users of the closed facilities would seek recreational opportunities at other facilities in the river Basin, thus increasing use at those facilities. The increased use of the remaining recreation facilities in the Menominee River Basin may result in over-use of those facilities, thus decreasing the enjoyment of the experience and adversely impacting the physical environment.

Unavoidable adverse impacts Under the retirement alternative, recreation in the Menominee River Basin would be cumulatively impacted. The existing recreation facilities may not be improved. In fact, because no entity has volunteered to assume operation and maintenance of the existing facilities, the existing recreation facilities may be closed. Closing of the existing recreation sites at the Brule Project may promote increased unauthorized recreation use. Alternatively, users may seek similar recreation opportunities within the basin which may affect the social and physical carrying capacity of other recreational sites within the Menominee River basin.

6. Land Use. Retirement of the Brule project would result in the removal of the 1,603 acres from the Commission's jurisdiction. If the lands had not been within the Commission's jurisdiction under the previous license term, Wisconsin Electric

would have been free to sub-divide the 1,603 acres of project lands. This sub-division of lands may have led to increased human disturbance at the expense of terrestrial habitat for wildlife and botanical resources including threatened and endangered species.

Removal of the 1,603 acres of lands within the project boundary from the Commission's jurisdiction would likely result in the lands being sold or leased for timber harvesting. Plans to incorporate recreation and erosion control into a CLMP would not occur. The existing lands under federal license would not be protected from shoreline development and excessive timbering. Property conveyances could occur without Commission approval and agency comment, thus potentially reducing the amount of land available for recreation, wildlife management, and watershed protection.

Unavoidable Adverse Impacts See discussion in sections VI.B.3, VI.B.4

7. Cultural Resources. The retirement of the Brule Project could have an adverse effect on the historic dam and powerhouse because: (1) retirement may alter the characteristics that qualify these properties for inclusion on the National Register of Historic Places; and (2) these alterations may diminish the integrity of those characteristics. Pouring concrete bulkheads in the interior of the turbine chambers and disconnecting the generators from the local electric grid would physically alter part of the powerhouse property. Such physical alterations and the deterioration that may result from neglect of the dam and powerhouse properties after their retirement, could diminish the properties' historical values.

Transferring title to the dam and powerhouse could also have an adverse effect because it could ultimately result in an effect that could diminish the properties' historic values. There are no assurances that the properties would be transferred to an entity that intends to continue to preserve the structures as originally intended. Transfer of these properties would not have an adverse effect if adequate restrictions or conditions were included in the transfer to ensure preservation of the properties' significant historic features. If the Commission determined that the project should be retired, we would consult with Wisconsin Electric, the Advisory Council, and the Wisconsin and Michigan SHPOs to seek ways to avoid or reduce the effects on historic properties.

Project retirement on the 1,603 acres of land within the project boundary wouldn't affect or threaten any known archeological resources, but the possibility would remain that previously undiscovered National Register-eligible properties could be affected in the future, either through ground-disturbing

activities (i.e. logging) or as a result of bank erosion along the shoreline of the impoundment. The licensing alternative's Programmatic Agreement, which includes contingency provisions to cover such eventualities, would not be in effect under a project retirement situation.

Unavoidable Adverse Impacts Although we would seek ways to avoid or reduce adverse effects to known cultural resources within the Brule Project boundary as a condition to project retirement, there is no guarantee that we would be successful. Further, previously undiscovered National Register-eligible properties could be affected in the future, through ground-disturbing activities or as a result of bank erosion along the shoreline of the impoundment.

C. Impacts of the No-Action Alternative

Under the no-action alternative the project would continue to operate as it has in the past and without any changes to the existing physical, biological, or cultural components of the area.

VII. DEVELOPMENTAL ANALYSIS

A. Power and Economic Benefits

In view of the changing economics in the electric industry, and the fact that project economics is one of the many public interest factors the Commission considers in project licensing, the Commission is changing its approach to evaluating the economics of both new and existing hydroelectric projects. We no longer will employ an analysis that assumes alternative fossil fuel and other costs escalate steadily over the term of the license.15/

We have updated the data that were reported in the DEA and applied our new economic analysis to the Brule Project. The assumptions used in our new economic analysis are given in Table 5.

The Brule Project, a high hazard dam, has an unusually high undepreciated sunk capital cost. In 1974 and 1979, the Commission's Part 12 Reports for the Brule dam identified the project's inability to safely pass the probable maximum flood (PMF). The 1979 Part 12 Report determined that the PMF was about 102,000 cfs. The spillway capacity with the water at the dam crest was about 30,000 cfs. The Commission directed Wisconsin Electric to perform additional hydrologic and hydraulic analyses

15/ See Mead Corporation, Publishing Paper Division, 72 FERC, ¶ 61,027 (July 13, 1995).

to support an evaluation of the spillway adequacy. In 1987, Wisconsin Electric completed a more detailed dam-failure simulation, and in December, 1988, the PMF was revised to about 124,000 cfs. In an evaluation, dated May 31, 1989, the Brule Project inflow design flood (IDF) was determined to be 50 percent of the PMF, about 62,000 cfs.

Table 5. Economic analyses assumptions for Wisconsin Electric's Brule Project (Source: the Staff).

Date of which cost data are based	January, 1993
Current date	1995
Term of analysis	30 years
Construction cost escalation	0 percent
Operation and maintenance escalation	3 percent[a]
Environmental enhancement escalation	4 percent[b]
Maximum Federal tax	34 percent
State and local taxes	Varied[c]
Interest rate	10 percent
Discount rate	10 percent

[a] Operation and Maintenance costs were based on 1993 net present values, therefore an escalation rate of 3 percent was used to derive the 1995 O&M annual cost. However, no escalation rate was used in the economic analysis.

[b] Based on the Consumers Price Index (CPI) and used to escalate costs to 1995 dollars.

[c] State and local taxes vary according to proposed costs and are calculated based on information provided in the license application. The project's total federal, state, and local taxes are listed as $123,000 annually.

In order to address the inability of the project to pass the IDF, Wisconsin Electric proposed a spillway capacity expansion alternative that included rehabilitation of the existing spillway, and construction of a fuse-plug controlled auxiliary spillway through the left abutment of the dam to pass excess flood flows up to the IDF. In 1989, the Commission's Division of Dam Safety and Inspections approved the Wisconsin Electric's expansion proposal. The expansion and rehabilitation of the spillway was completed in 1990 at a total cost of $7,300,000. The capitalized portion of the spillway expansion and rehabilitation is about $6,636,000. In addition, Wisconsin Electric incurred or will incur licensing costs of about $1,492,000, unit refurbishment of costs of about $265,000, and

costs associated with license compliance of $93,000. The resulting annualized project cost would be about $1,305,000, under the existing conditions, and includes an annual operation and maintenance cost of about $197,000.

Under continued peaking operation, the project would generate about 15.19 GWh of energy annually. With a 30-year license term, the existing Brule Project would have a net annual benefit of about -$813,000 (-53.50 mills/kWh), which is the difference between the annual power benefit of about $492,080 (32.40 mills/kWh) and the annual project cost, including necessary compliance measures, of about $1,305,000 (85.94 mills/kWh).

Because the net economic benefits of all alternatives, as well as the proposed action, are negative, we express the economic effects of the various combinations of enhancement measures in terms of their projected net cost to the ratepayers.

B. Environmental Enhancement Options

We analyzed recommendations made by Wisconsin Electric and the resource agencies for enhancing environmental resources in the area affected by the Brule Project. Measures considered would affect the project in a variety of ways, including: 1. adding directly to project cost through construction or conducting post-licensing monitoring; 2. reducing project energy generation by diverting flows for purposes other than power generation, or causing an increase in spilled water; and 3. moving the energy generation from on-peak to off-peak demand periods when it is less valuable. All of these effects translate into economic costs that are ultimately borne by Wisconsin Electric's ratepayers. In this section, we look at the net economic cost to the ratepayers of the principal enhancement measures under consideration.

The principal environmental enhancement options we evaluated are as follows:

(1) changing the existing project peaking operation to a proposed run-of-river operation;
(2) recreation site improvements;
(3) fish-barrier net-construction;
(4) fish-damage restitution assessment;
(5) water quality monitoring; and
(6) minimum-flows spillage alternative.

(1) Run-of-River Operation

As part of its environmental enhancement measures, Wisconsin Electric proposes operating the project in a run-of-river mode within a 1-foot bandwidth (± 0.5-foot) of a year-round

headwater target elevation of 1198.3 feet NGVD, and maintaining a year-round spillage flow of about 20 cfs. However, because Wisconsin Electric cannot assure an exact flow of 20 cfs, it would prefer that the minimum flow be established at 15 cfs, allowing them to operate as near to 20 cfs as practical without violating the license article. We analyzed the economic impact and calculated the additional annual cost of the proposed run-of-river operation, with the proposed minimum flow range of 15 cfs to 20 cfs, as compared to the baseline condition.

The project, under the proposed run-of-river operation with a 20-cfs bypass minimum flow, would generate about 14.604 GWh of energy annually. The Brule Project operating in a run-of-rive mode with a 20 cfs minimum flow, without any other environmental enhancements, would have a net annual benefit of about -$1,002,000 (-68.63 mills/kWh), which is the difference between the annual power benefit of about $458,870 (31.42 mills/kWh) and an annual project cost, with only the necessary compliance measures, of about $1,461,000 (100.05 mills/kWh). Therefore, the 30-year annual cost of switching from a peaking to run-of-river operating mode with a 20-cfs minimum flow, would be about $189,000 ($1,002,000-$813,000). The $189,000 decrease in net annual benefits is attributed to the reduction in project annual energy generation and annual power value due to changing the existing peaking project operation to the proposed run-of-river operation, including a minimum flow of 20 cfs, and increased operation and maintenance costs.

(2) Recreation Site Improvements

We analyzed the impacts on project economic benefits of the recreation site improvement proposals, made by Wisconsin Electric, the resource agencies, and Commission staff. A detail comparison of the capital costs and the 30-year annual costs of the recreational site improvements are shown in Table 6.

(3) Fish Barrier Net

We analyzed the impacts on project economic benefits of the fish-barrier net construction proposal, made by Wisconsin Electric, Commission staff, and the resource agencies.

In a clarification letter dated October 10, 1994, Wisconsin Electric estimated the cost for the barrier net material and construction. We used these costs to derive the 30-year annual cost of installing, evaluating, and maintaining the fish-barrier net, expressed in 1995 dollars. According to Wisconsin Electric the barrier net, including log boom support structures, would cost about $55,000. The net would need to be replaced about once every five years at a cost of about $8,000. The supporting log boom would need to be replaced once every 10 years at a cost of about $25,000. The annual operation and maintenance of the

barrier net and support structure is estimated to be about $3,000. The recommended evaluation study of the barrier net is

Table 6. Comparison of recreational site improvement costs. (Source: Staff)

Description	(1995 $) Recommended Recreational Capital Costs in thousands of dollars				
	Applicant (000's)	FERC (000's)	FWS (000's)	MDNR (000's)	WDNR (000's)
Recreation area 28	15.1	16.2	16.2	51.9	26
Recreation area 23	N/R	13.0	19.5	51.9	4.3
Monitoring recreation use	Neg	Neg	Neg	Neg	Neg
Canoe portage	6.5*	6.5	27.0	15.1	59.5
Tailwater fishing area	N/R	22.7	16.2	11.9	9.7
Directional signs	2.2*	2.2	1.1	1.1	N/R
Erosion control plan	Neg	Neg	Neg	N/R	N/R
Final recreation plan	Neg	Neg	Neg	N/R	N/R
TOTAL CAPITAL COST (Yr 1 - 1995 $)	23.8	60.6	80	132	99.5
ANNUAL COST (1995$)	3.1	7.8	10.3	17.0	12.8

Key:
N/R - not recommended
Neg - cost is negligible
* - recommended, but data not provided, use FERC's estimate

estimated to cost about $49,000. We calculate the 30-year annual cost, in 1995 dollars, of installing, evaluating, and maintaining the barrier net to be about $18,402.

(4) Fish Damage Payment

We analyzed the impacts on project economic benefits of the fish-damage payment proposal, made by the MDNR (by letter dated June 1, 1993) and the WDNR (by letter dated May 20, 1993). The agencies stated that their estimates of the 1993 payment value should be escalated according to the Consumers Price Index (CPI). By using the CPI escalation rates from 1993 to 1995 dollars, we developed the 30-year annual costs of our fish replacement cost estimate and each of the agencies' fish-damage restitution estimate (Table 7).

Table 7. The costs of the fish-damage payment assessment (Source: MDNR, WDNR, and Staff).

	FERC's Estimate (000's $)	MDNR's Estimate (000's $)	WDNR's Estimate (000's $)
Value for Yr 1 in 1995	5.97 [1]	156.0 [2]	725.6 [3]

[1] Based on staff's calculation of AFS replacement value escalated to 1995 dollars.
[2] Based on Michigan Public Act 165 of 1929.
[3] Based on WDNR's Guidelines for fish entrainment and Mortality Mitigation at FERC Licensed Hydropower Projects.

(5) Water Quality Monitoring

We analyzed the impacts on project economic benefits of the water quality monitoring proposal made by the MDNR and the WDNR. Neither agency provided a cost estimate of their water quality monitoring proposal; thus, we derived the cost. 16/ To analyze the cost of the water quality monitoring program, which would take place from May 1 through September 15, for the first two years and every five years, thereafter, we used the Hydrolab Datasonde as the water quality monitoring system (yr-1 capital cost $4,240) for our analysis and assumed an average labor cost of about $7,640 per year in 1995 dollars. 17/

Based on the above information, we calculate the 30-year annual cost of the water quality monitoring proposal to be about $3,000, expressed in 1995 dollars.

(6) Minimum Flows

We analyzed the impacts on project generation and the project benefits of the minimum flow proposals, made by Wisconsin Electric and the resource agencies. We also looked at

16/ Source: Electric Power Research Institute's (EPRI) publication: Assessment and Guide for Meeting Dissolved Oxygen Water Quality Standards for Hydroelectric Plant Discharges, 1990

17/ We estimated the total labor cost as an average between a company's in-house ($10/hr) and a contracted labor costs ($30/hr), with about 20-hour per week of working time involved for data collection, analysis, and system maintenance.

intermediate minimum flow options to provide a more complete analysis. The change in net annual benefits we calculated reflects the value of the lost power that the existing peaking project would incur for the minimum flow spillage. The results of our analyses are shown in Table 8.

Table 8. Mean annual effects of the minimum flow spillage alternatives on the project economics and generation (Source: Staff).

Description	Generation [GWh]	Change in Energy Generation from Baseline Condition [GWh]	Change in Energy Value from Baseline Condition[2] (000's $)
Historic Operation	15.187[1]	Baseline Condition	
Min. Q=15 cfs, All year	14.760	-0.43	-13.8
Min. Q=20 cfs, All year	14.604	-0.58	-18.9
Min. Q=25 cfs, All year	14.447	-0.74	-24.0
Min. Q=30 cfs, All year	14.290	-0.90	-29.1
Min. Q=50 cfs, All year	13.664	-1.52	-49.4
Min. Q=75 cfs All year	12.815	-2.37	-76.9

[1] The existing minimum flow of 75 cfs is accounted for in the energy generation estimate of 15.187 GWh.

C. Project Retirement

If the project were decommissioned, Wisconsin Electric and its ratepayers would have to pay capital recovery expenses for the sunk project cost of $6,636,000 which is the undepreciated net investment resulting from the $7,300,000 for the recently completed Commission-ordered spillway improvements for public safety, and $1,377,943 for environmental studies and license application preparation.

In addition, we assume it would cost Wisconsin Electric a minimum of an additional $87,000 to decommission the project -- $33,000 to seal the powerhouse waterways with concrete bulkheads and remove the electric tie, and about $54,000 for additional legal fees. If the Commission were to require dam removal as a condition of decommissioning, the additional expense would be in the millions of dollars.

Assuming minimal decommissioning expense, the total capitalized cost of decommissioning the project would be about $8,100,000, which equates to an annual expense of $934,000. This annual expense includes interest, capital recovery, and Federal income tax on the return on equity. We assume the stock return would be 10 percent and that stock equity would constitute 50 percent of the total debt.

If the project were retired it would provide no power benefits and the net benefits of the project would be $934,000 annually.

We disagree with the MDNR's recommendation to develop a plan to either maintain the dam in perpetuity or remove the dam when the project is no longer economically viable. The project will be under the Commission's jurisdiction and the Commission will require the owner operate and maintain the dam properly according to the Commission's standards. If the project would ever have to be retired, Wisconsin Electric would have the financial resources to retire the project, whatever form that retirement might take.

Atmospheric Pollution Resulting from Retiring the Brule Project

Historically, the Brule Project has been generating about 15.19 GWh of electrical energy annually, on average. This amount of hydropower generation--when contrasted with the generation of an equal amount of energy by fossil-fueled facilities--avoids the unnecessary production of substantial quantities of atmospheric pollutants. Assuming that the 15.19 GWh of hydropower generation would be replaced by an equal amount of coal-fired generation, generating electric power equivalent to that produced by the project would require the combustion of about 6,374 tons of pulverized bituminous coal annually.

Without pollution control, and assuming the sulfur content of the coal to be 1.0 percent, the following approximate quantities of atmospheric pollutants would be produced annually:

Oxides of Sulfur	124 tons
Oxides of Nitrogen	57 "
Carbon Monoxide	3 "
Carbon Dioxide	14,700 "
Particulates	380 "

State-of-the-art pollution technology is capable of removing about 95 percent of the oxides of sulfur and 60 percent of the

oxides of nitrogen from the uncontrolled flue gases. The cost of removing 95 percent of the 124 tons of the oxides of sulfur would be approximately $59,000 annually. The cost of removing 60 percent of the 57 tons of the oxides of nitrogen would be approximately $13,300 annually.

Combustion of the coal would also produce approximately 380 tons of particulates (fly-ash). Nearly 100 percent of the particulates can be removed from the flue gases before being released to the atmosphere.

Sulfur and nitrogen oxides from the combustion of fossil fuels when combined with atmospheric water vapor causes acid precipitation. Acid precipitation leads to significant changes in the biological component of ecosystems through simplification of trophic structure and decline in species richness (Leivestad et al., 1976). Reproductive failure is often cited as a cause for the loss of natural fish populations in acidified lake and rivers. Additionally, acidification of lakes and streams results in poor fish survival (Beamish, 1976).

Fossil fuel generation and the associated emissions of sulfur and nitrogen oxides impacts terrestrial resources. Impacts range from alterations of plant communities due to changes in soil pH from acid precipitation. In addition, mining of coal results in significant land disturbances. In 1981, the U.S. Environmental Protection Agency estimated that 1.6 million hectares (ha) in 31 states have been affected by strip mining. Of that only 607,500 (ha) have been properly reclaimed. Strip mining impacts terrestrial and aquatic resources through erosion and acid mine drainage. Strip mines are difficult to revegetate because of a lack of soil nutrients and organic matter, low soil pH, low water holding capacity, toxic levels of trace metals and poor physical characteristics (Sopper and Kerr, 1981).

VIII. COMPREHENSIVE DEVELOPMENT AND RECOMMENDED ALTERNATIVE

Sections 4(e) and 10(a)(1) of the FPA require the Commission to give equal consideration to all uses of the waterway on which a project is located. When the Commission reviews a proposed project, the recreational, fish and wildlife resources, and other nondevelopmental values of the involved waterway are considered equally with power and other developmental values. In determining whether, and under what conditions, a hydropower license should be issued, the Commission must weigh the various economic and environmental tradeoffs involved in the decision.

A. Recommended Alternative

Based on our independent review and evaluation of the project as proposed by Wisconsin Electric, the project with staff and agency recommendations, and the no-action alternative as

documented in the EA, we have selected issuing a license for the Brule Project, with staff-recommended mitigative and/or enhancement measures as the preferred option. We recommend this option because (1) the environmental effects of project operations would be relatively minor; (2) the environmental measures would protect and enhance fish and wildlife resources, water quality, recreational resources, and cultural resources; and (3) the electricity generated from a renewable resource would be beneficial because it would reduce the use of fossil-fueled, steam-electric generating plants, thereby, conserving nonrenewable energy resources and reducing atmospheric pollution.

This EA analyzes the effects of Wisconsin Electric's existing Brule Project on the Brule River and recommends 15 measures to protect and enhance the environmental resources. These measures are:

- Operate the project in a run-of-river mode;
- Design, install, and maintain a fish barrier net to minimize fish entrainment and associated turbine mortality;
- Implement a wildlife management plan, Bald eagle and grey wolf protection and enhancement measures, and inventory control and repair present and future erosion sites, as part of the final CLMP;
- Maintain a 20 cfs minimum flow in the spillway channel;
- Develop and implement a plan to operate the project in a run-of-river mode;
- Develop a plan to provide continuous run-of-river flows during a plant outage;
- Develop and implement a plan to monitor and control/eliminate noxious plants;
- Develop a reservoir drawdown plan to be implemented in the event of a scheduled maintenance reservoir drawdown;
- Maintain a reservoir elevation of 1198.3 ± 0.5 ft. NGVD;
- Maintain a DO concentration of 5.0 mg/l in the project tailrace and the average monthly temperature in Table 2;
- Develop and implement a plan to monitor water quality for a five period and once every five years thereafter;
- Operate and maintain three stream flow gages located on the Paint and Brule Rivers;

- Upgrade the canoe portage and Recreation Areas 23 and 28 and improve the directional signs to those areas;

- Include the Commission's standard re-opener article in any license issued for the Brule Project; and

- Implement the provisions of the Wisconsin Statewide Programmatic Agreement.

B. Developmental and Non-developmental uses of the Waterway

The licensing of the Brule Project is complicated by an unusually high undepreciated sunk capital cost, related to a Commission ordered spillway expansion. Recognizing that the annual net benefits of the project to Wisconsin Electric's ratepayers are negative, any additional enhancements would be an added financial burden on Wisconsin Electric's ratepayers. However, as a result of our independent analysis we conclude that the existing project with the environmental enhancements listed above would prove beneficial even though those enhancements would increase the negative net benefits of the project.

Changing the operating mode of the Brule Project from the historic peaking mode to run-of-river, without including the costs of a 20 cfs minimum flow in the spillway channel, would decrease the annual value of project power by about $170,000. However, operating the project in a run-of-river mode as recommended would benefit fishery, wildlife, and recreation resources in the Brule River (see section VI.A). About 2.67 miles of the Brule and Menominee Rivers would benefit as a result of restoring the natural volume and periodicity of flows downstream of the Brule Project. In addition, impoundment fluctuations, under normal circumstances, would decrease to about ±0.3 ft., under most conditions, which would enhance the production of aquatic vegetation and fish. Therefore, we recommend that the Brule Project be required to operate in a run-of-river mode.

We recommend, as Wisconsin Electric proposes and the resource agencies recommend, the installation of a fish barrier net to protect fish from turbine mortality. The annual cost of installing and maintaining a barrier net is about $18,402. The annual AFS replacement value of the fish protected by the barrier net would be about $5,970 annually. Based on a strict comparison of costs vs. benefits, the installation of the barrier net is not warranted given the high costs associated with the barrier net compared to the value of fish protected. However, other qualitative benefits would be accrued. Wisconsin Electric intends to investigate the applicability of the barrier net installation to its other projects. Considering the broad programmatic implications associated with the installation of the

barrier net at the Brule Project, we recommend that Wisconsin Electric install and maintain a barrier net at the Brule Project.

The Brule River downstream of the project dam is classified as a warmwater fishery. Warmwater fish are more tolerant, than species such as salmonids, of warmer temperatures and lower DO concentrations. The Brule Project tends to moderate diurnal temperature fluctuations, thus decreasing the potential that aquatic resources are affected by high water temperatures that result from solar warming of the impoundment.

Neither the MDNR or the WDNR have recommended specific measures to enhance water quality nor does the information in the public record suggest that temperatures and DO concentrations impact aquatic resources downstream of the Brule dam. In fact, calculated diversity and biotic indices are similar between upstream of the project and downstream. The similarity in diversity and biotic indices suggest that there is little effect on water quality in the Brule River due to operation of the project. Water quality monitoring performed in 1990 as part of the licensing process, pre-trashrack replacement monitoring conducted in 1993, post-trashrack replacement monitoring conducted in 1994, and reservoir water quality modeling show that water quality in the vicinity of the Brule Project maintains DO concentrations greater than 5.0 mg/l and temperatures recommended by the MDNR and WDNR. Therefore, we determine that the impact of the project on water quality is negligible. In addition, any enhancement of temperature and DO concentrations, due to run-of-river operations, would accrue to only 1.67 miles of the Brule River between the Brule dam and the confluence with the Michigamme River because of the differences in the volume of flow between the Michigamme and Brule Rivers.

Despite the reasons discussed in Sections V.B.1, VI.A.1, and above, we recommend Wisconsin Electric maintain a 5.0 mg/l DO concentration and the average monthly temperatures shown in Table 2 in the Brule Project tailrace, because the MDNR and the WDNR recommend that these standards be maintained. 18/ Further, we do not find any compelling reason not to require these as a condition of the license.

The MDNR also recommends that the Brule Project maintain a monthly average temperature difference of 5°F or less between the tailwater temperature and the waters upstream of the Brule impoundment, a distance of about 2 miles. However, the MDNR has provided no reasoning or evidence supporting this recommendation in terms of how maintaining this difference would protect aquatic

---

18/ We are recommending MDNR's, rather than WDNR's, temperature requirements because MDNR's are the more restrictive standards.

included in any water quality certificate issued by the MDNR for the Brule Project. 19/ Fish and aquatic resources downstream of the Brule Project are influenced by the temperatures occurring in that downstream reach, and are not affected by the temperatures occurring upstream of the Brule impoundment. Therefore, there is no basis for requiring less than a 5°F difference between upstream and downstream locales, nor in monitoring this.

Because 3 years of water quality data and a water quality model shows that DO concentrations of 5.0 mg/l and the average monthly temperatures shown in Table 2 in the vicinity of the Brule Project tailrace are maintained, we anticipate that this requirement would not impact the annual economic benefits of the Brule Project.

Although water quality in the Brule River in the vicinity of the Brule Project meets Michigan and Wisconsin water quality standards, we recommend that Wisconsin Electric monitor water quality in the Brule River for a five year period, and once every five years thereafter, targeting low-flow, high-temperature periods such as may occur May-1 through September 15. The annual cost of our recommended water quality monitoring is about $3,000. Our recommended monitoring frequency should provide a sufficient indication that the project will maintain the required water quality parameters for the duration of the license, considering the amount of water quality information collected to date.

Our recommended 20 cfs minimum flow in the spillway channel would result in a cost of $18,900 annually. The quantity of aquatic habitat provided by the 20 cfs minimum flow is about 22,000 square feet, based on a varying width between 45 and 130 feet. According to the FWS the spillway channel has suitable habitat for benthic invertebrates, juvenile game fish, and forage fish habitat (letter from Janet M. Smith, Field Supervisor, U.S. Fish and Wildlife Service, Green Bay to Rita Hayen, Project Engineer, Wisconsin Electric, dated June 23, 1992).

Interior, the MDNR and the WDNR recommend that the Brule Project operate in a run-of-river mode and so do we. However, to ensure compliance with a run-of-river operating mode, Interior, MDNR and WDNR recommend that Wisconsin Electric provide funding for the operation and maintenance of the existing USGS gages located upstream of the Brule Project on the Brule and Paint Rivers (Nos. 04061000 and 04062000, respectively) and downstream of the Brule Project on the Brule River (No. 04062011). The Brule Project would be deemed to be in compliance with a run-of-river operating mode if outflows from the project were within 5 percent of inflows to the project impoundment. In addition,

19/ We noted that the MDNR has not issued a water quality certificate for the Brule Project.

Interior, MDNR and WDNR recommend that Wisconsin Electric equip all gages with telemetry equipment and capabilities for data retrieval by phone. The MDNR, WDNR, and Interior recommend that automatic level sensors be installed for the headwaters and tailwaters, and that a daily log of operation, including flow, unit operation, and water surface elevation, be maintained and made available to the agencies on request. The MDNR recommends the installation of such a water level sensor for the spillway side channel. Interior and the WDNR recommend a staff gage be installed on the upstream face of the Brule Dam and in the spillway channel.

The MDNR also recommends that a 2-year test period be used to verify the ability of Wisconsin Electric to maintain the target reservoir elevations and the discharge standards, as recommended by the MDNR. Should the above methods fail to maintain the reservoir elevation and the discharge standards, the MDNR states that Wisconsin Electric should modify the standard or develop an alternate standard for run-of-river operation after consultation with the resource agencies.

We agree that, in order to maintain compliance with a run-of-river operating mode, Wisconsin Electric should monitor reservoir elevation and project operation, including flows in the spillway channel and unit operation. However, for the reasons discussed in section VI.A.2.a.(2), we disagree that gaging inflows to the project impoundment and outflows from the project would provide a reliable and accurate method for determining compliance with the recommended run-of-river operating mode. This topic was discussed at the section 10(j) meeting in Green Bay, Wisconsin.

We and the resources agencies agreed to the following approach for determining monitoring compliance with the recommended run-of-river operating mode. The Brule Project will operate in a run-of-river mode by maintaining the impoundment at an elevation of 1198.3 ± 0.5 ft NGVD. However, any hourly fluctuation greater than ± 0.3 would be reported to the resource agencies. Wisconsin Electric would test its ability to operate in a run-of-river mode by using headpond elevation and turbine operation for a three-year period. After the three-year test period Wisconsin Electric, after consultation with the resource agencies, would file with the Commission a report assessing its ability to maintain a run-of-river operating mode. If Wisconsin Electric and the resource agencies determine that the Brule Project can not maintain a run-of-river operating mode by using headpond elevation and turbine operation, Wisconsin Electric will recommend an alternate method, developed in consultation with the resources agencies, for operating the project in a run-of-river mode.

Our recommendations for improving recreational opportunities at the Brule Project (described in detail in section VI.A.5) is consistent with Commission policy, and the 1990 Americans with Disabilities Act. Our recreational enhancements (described in detail in section VI.A.5) would cost $7,800 annually.

We also recommend the following environmental enhancements: a) maintain a target elevation of 1198.3 ±0.5 ft. NGVD; b) operate and maintain the existing USGS gages located upstream of the Brule project on the Paint and Brule Rivers and one located downstream of the project on the Brule River; c) maintain flows in the event of project outages; (d) develop reservoir drawdown plan to notify the resource agencies prior to any planned reservoir drawdown; (e) implement a comprehensive land management plan (CLMP) to include erosion control measures, wildlife habitat protection and enhancement, forage enhancement, bald eagle management; (f) develop a drawdown management plan; and (g) implement the provisions of the Wisconsin Statewide Problematic Agreement. We anticipate the these recommended enhancement measures would not add significantly to the economic burden of Wisconsin Electric's ratepayers, and the environmental benefits of the measures listed above would protect and enhance resources in the project vicinity and the Menominee River basin.

Because the project is uneconomical without any enhancements, we considered project retirement as an alternative for the Brule Project. We find that retirement of the Brule Project would provide certain environmental enhancements (see sections VI.B.1 and VI.B.2.c). Fish would not be entrained through the Brule Project, thus eliminating turbine mortality, and there could be some increase in DO concentrations downstream of the Brule dam. Flows in the Brule River would maintain a natural periodicity. Because all flows, except for 85 cfs, up to the hydraulic capacity of the Paint River diversion would continue to be transferred from the Brule River Basin to the Michigamme River the natural volume of the Brule River would not be restored.

We also find that retirement of the Brule Project would have some negative environmental impacts on water, fishery, and wildlife resources including threatened and endangered species. Negative impacts on recreation and land uses in the Menominee River basin may also occur. Water quality impacts could include increased sediment loading, higher water temperatures, and non-point source nutrient input. The future option to install fish passage may also be lost. Terrestrial and wildlife resources, including threatened and endangered species might not be protected through the implementation of the Comprehensive Land Management Plan. In addition, the Commission would no longer have jurisdiction over the 248.2 acres of wetlands within the project boundary. Protection against the invasion of exotic wetland species may be lost.

The sale or lease of the 1,603 acres of project lands could lead to changes in land use practices. Increased human disturbances through timbering, agricultural or residential development could reduce the amount and quality of lands for recreation, and wildlife including threatened and endangered species, and botanical resources.

If the Brule Project were retired, additional recreation facilities may not be provided and existing facilities may not be enhanced. In fact, because no entity has stated a willingness to assume the cost of operating and maintaining the existing recreation facilities at the Brule Project, the facilities could be closed to public access. Under these circumstances, other existing recreation facilities within the Menominee River basin may experience increased public use beyond their social and physical carrying capacity, therefore decreasing the quality of the recreational experience at those facilities.

Cultural resources associated with the project would not receive the benefits and protections afforded to them through implementation of the provisions of the Wisconsin Statewide Programmatic Agreement or a cultural resources management plan. Retirement may affect the characteristics that qualify the properties for inclusion on the National Register of Historic Places. Any undiscovered cultural resources on the 1,603 acres of project lands might not be protected from human disturbances.

The costs associated with our licensing alternative are slightly greater, but not significantly so, than project retirement. However, the replacement of 14.6 GWh of lost energy with coal-fired generation would require the combustion of approximately 6,129 tons of pulverized bituminous coal annually, with the attendant production of air pollution and environmental degradation associated with mining and transporting the fuels (see section VII.C). Wisconsin Electric would incur the cost to amortize sunk project expenses without the benefit of the 14.6 GWh electrical energy generated by the Brule Project annually. In addition the costs associated with project retirement, amortization of sunk project expenses, and the cost of replacement energy are not significantly different than the costs of continued operation of the Brule Project. Further, we note that our retirement alternative is a minimal scenario, and therefore any retirement alternative beyond ours (i.e. dam removal) would result in a significant and substantial cost. In addition there would be the potential for significant environmental impacts that would need to be addressed and would greatly add to the cost of project retirement.

Wisconsin Electric, also, has projected a need for new generating capacity, and will purchase its needs from other companies until it has completed installation of two new combustion turbine generating units. If a new license is denied

and the Brule Project output were lost, it would be necessary to replace the loss with increased purchases in the short term and replace it with 1.73 MW of new creditable capacity in the long term.

In summary, we believe that the environmental benefits associated with continued operation of the Brule Project with our recommended enhancement measures are outweighed by the potential environmental and developmental impacts of project retirement, even assuming a minimal retirement alternative. Thus, we do not find project retirement to be the preferred alternative.

Summary of Economic Comparison of Alternatives

Table 9 shows the results of our economic studies of various alternatives including no action, licensing the project with various environmental enhancements, and project retirement.

Table 9. Summary of economic comparison of alternatives for the Brule Project (Source: staff).

	AVERAGE ANNUAL COST	AVERAGE ANNUAL POWER BENEFITS	AVERAGE ANNUAL NET COST TO RATEPAYERS
No Action	$ 1,305,000	$ 492,000	$ 813,000
Wisconsin Electric's Proposal	$ 1,482,100	$ 459,000	$ 1,024,000
FWS's Proposal	$ 1,493,100	$ 459,000	$ 1,034,000
MDNR's Proposal	$ 1,655,000	$ 459,000	$ 1,196,000
WDNR's Proposal	$ 2,221,000	$ 459,000	$ 1,762,000
Project Retirement	$ 934,000	$ 0	$ 934,000
Staff's Proposal	$ 1,490,000	$ 459,000	$ 1,031,000

Licensing the Brule Project even with our enhancement measures would ensure that Wisconsin Electric ratepayers would continue to receive the benefits of non-fossil-fueled hydroelectric power while providing environmental enhancement measures that we believe are in the public interest.

Therefore, based on our independent review and evaluation of the proposed Brule Project, agency recommendations, the proposed project with our recommended enhancement measures, project retirement, and the no-action alternative as documented in this FEA, we have selected issuing a new license for the Brule Project, with additional staff-recommended enhancement measures,

as the preferred option. We recommend this option because: (1) with our enhancement measures the environmental effects of project operation would be minimal; (2) the recommended measures would continue to protect and enhance environmental resources in the Menominee River basin and on the 1,603 acres of project lands; and (3) the electricity generated would continue to conserve nonrenewable energy resources and reduce atmospheric pollution and the associated environmental impacts from acid precipitation, fossil fuel extraction and transportation.

IX. CONSISTENCY WITH FISH AND WILDLIFE RECOMMENDATIONS

After attempting to resolve inconsistencies at the Section 10(j) meeting in Wisconsin we conclude, pursuant to Section 10(j) of the FPA, that some of the recommendations of the Federal and state fish and wildlife agencies may not be consistent with the purpose and requirements of Part I of the FPA. Section 10(j) of the FPA requires the Commission to include license conditions, based on recommendations of Federal and state fish and wildlife agencies, for the protection of, mitigation of adverse impacts to, and enhancement of fish and wildlife resources. We have addressed the concerns of the Federal and state fish and wildlife agencies and made recommendations some of which are inconsistent with those of the agencies. Specifically, we have determined that the following resource agencies' recommendations may be inconsistent with Part 1 of the FPA, including the comprehensive development and balancing of resource values requirements of Sections 10(a) and 4(e) of the FPA: (1) the installation of telemetry equipment on stream flow gages, water level sensors; (2) the development of a fish passage plan; (3) MDNR's recommended duration of water quality monitoring; and (4) the development of a separate wildlife management plan.

Pursuant to Section 10(j) of the FPA, we make a determination that the following recommendations made by the resource agencies are inappropriate fish and wildlife recommendations in that they do not provide specific measures for the protection, mitigation of damages to, and enhancement of fish and wildlife resources: (1) Interior's, MDNR's and WDNR's recommendations concerning recreation facilities at the Brule Project including directional signage and leasing of project lands; (2) WDNR's recommendation for a state endangered/threatened/watch species inventory and periodic raptor surveys; (3) MDNR's recommendation for the inclusion of the standard re-opener clause; (4) the parts of MDNR's recommendation concerning completion of a Fishery Damage Assessment; (5) MDNR's recommendation to study project retirement and/or dam removal; (6) WDNR's and MDNR's recommendations to comply with applicable state laws and permits; (7) the WDNR's, MDNR's, and Interior's recommendation regarding expiration dates for licenses issued by the Commission; and (8) design and conduct an evaluation of all possible fish passage and protection devices.

Table 10 summarizes resource agency recommendations made under Sections 10(a) and 10(j) of the FPA.

Table 10. Summary of fish and wildlife resource agency recommendations under Sections 10(j) and 10(a) and their associated costs.

	Agency Recommendation (recommending agency)	Within Scope of § 10(j)	Annual cost of environmental measures (1995 $)	Adopted ?
1	Operate in an instantaneous run-of-river mode (MDNR, WDNR, Interior)	Yes	$170,000	Yes
2	Installation of a fish protective barrier net (MDNR, WDNR, Interior)	Yes	$18,402	Yes
3	Implement a wildlife management plan. (MDNR, WDNR, and Interior)	Yes	indeterminate	Yes (recommend incorporating specific measures in final CLMP)
4	Maintain a 20 cfs minimum flow in the spillway channel (MDNR, WDNR, Interior)	Yes	$18,900	Yes
5	Develop and implement a plan to monitor and control/eliminate noxious plants (MDNR, WDNR, Interior)	Yes	indeterminate	Yes
6	Implement Bald eagle and grey wolf protection and enhancement measures (WDNR, Interior)	Yes	indeterminate	Yes (recommend incorporating specific measures in final CLMP)
7	Evaluate feasibility of upstream fish passage options. (MDNR, WDNR)	No	indeterminate	No
8	Maintain reservoir elevation at 1198.3 ft. (NGVD) (MDNR, WDNR, Interior)	Yes	indeterminate	Yes
9	Develop reservoir drawdown plan (WDNR)	Yes	indeterminate	Yes
10	Pay restitution values for fishery resource damages from turbine mortality. (MDNR) (WDNR)	No	 $156,000 $726,000	No (barrier net recommended)
11	Conserve fish and wildlife resources (MDNR, WDNR)	Yes	indeterminate	Yes
12	Conduct survey for state threatened, endangered, or special concern species (WDNR)	No	indeterminate	No (protection and inventory included in CLMP)
13	Upgrade canoe portage MDNR WDNR Interior	No	 $1,900 $7,600 $3,500	Partially (recommend relocation of put-in, canoe rests, signs, erosion repair)
14	Upgrade facilities at Recreation Area 28. MDNR WDNR Interior	No	 $6,700 $3,300 $2,100	Partially (recommend accessible boat launch pier, trails, toilet, parking)

	Agency Recommendation (recommending agency)	Within Scope of § 10(j)	Annual cost of environmental measures (1995 $)	Adopted ?
15	Upgrade facilities at Recreation Area 23 MDNR WDNR Interior	No	 $6,700 $500 $2,500	Partially (recommend concrete boat launch, accessible pier, toilet, paths, signs)
16	Tailwater recreation improvements MDNR WDNR Interior	No	 $1,500 $1,200 $2,100	No
17	Improve directional signs to recreation areas (MDNR)	No	$300	Yes
18	Consult with MDNR on all leases and develop and implement a lease compliance program (MDNR)	No	indeterminate	No
19	Maintain DO concentrations and average temperatures (DO, Temperature, and Delta T) (MDNR, WDNR)	Yes	indeterminate	Yes (DO and Temperature. No Delta T standard)
20	Develop and implement continuous water quality monitoring plan (MDNR, WDNR, Interior)	Yes	$3,000	No (partial: once every year during summer low flows for first 5 years, then reevaluate the need)
21	Develop and implement a plan to provide run-of-river discharges at all times (MDNR WDNR Interior)	No	indeterminate	No (required as part of run-of-river operations)
22	Inventory, control and repair present and future erosion sites (MDNR, WDNR, Interior)	Yes	indeterminate	Yes (recommend measures in final CLMP)
23	Design and conduct an evaluation of all possible fish protective devices (study only). (MDNR, WDNR)	No	indeterminate	No (recommend installation barrier net)
24	Maintain current project lands within the project boundary (MDNR, WDNR, Interior)	No	indeterminate	Yes
25	Coordinate license expiration date with other projects (WDNR, MDNR)	No	indeterminate	No
26	Install, operate, and provide funding for 3 stream flow gages with continuous flow monitoring capabilities. Install staff gage in spillway channel (MDNR., WDNR, Interior)	No	indeterminate	Partially (recommend headpond elevation and generation for compliance, staff gage in spillway channel)
27	Compliance with applicable state laws (WDNR)	No	indeterminate	No
28	Begin consultation with MDNR on a project retirement plan (MDNR)	No	indeterminate	No

X. CONSISTENCY WITH COMPREHENSIVE PLANS

Section 10(a) of the FPA requires the Commission to consider the extent to which a project is consistent with Federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the project. Under Section 10(a)(2), Federal and state agencies filed a total of 119 comprehensive plans for Michigan and Wisconsin that address various resources in Michigan and Wisconsin. Of these, we identified and reviewed nine plans relevant to this project. 20/ No conflicts were found.

Based upon a review of the agency and public comments filed on the project, and on our independent analysis pursuant to Sections 4(e), 10(a)(1), 10(a)(2) of the FPA, we conclude that issuing a new license for the Brule Project, with our required enhancement measures and other special license conditions, would permit the best comprehensive development of the Brule River.

XI. FINDING OF NO SIGNIFICANT IMPACT

On the basis of our independent environmental analysis, issuance of a license for the Brule Project would not constitute a major Federal action significantly affecting the quality of the human environment.

20/ **Michigan:** Building Michigan's recreation future: the 1985-90 Michigan recreation plan, 1985, Michigan Department of Natural Resources; Menominee River fisheries plan, 1992, Michigan Department of Natural Resources and the Wisconsin Department of Natural Resources; **Wisconsin:** Upper Green Bay water quality management plan, 1993, Wisconsin Department of Natural Resources; Wisconsin statewide comprehensive outdoor recreation plan for 1991-96, 1991, Wisconsin Department of Natural Resources; Wisconsin water quality assessment report to congress, 1992, Wisconsin Department of Natural Resources; **Federal:** North American wildlife management plan, 1986, U.S. Fish and Wildlife Service, Canadian Wildlife Service; North American waterfowl management plan, 1986, U.S. Fish and Wildlife Service, Canadian Wildlife Service; Fisheries USA: the recreational fisheries policy of the U.S. Fish and Wildlife Service, undated, U.S. Fish and Wildlife Service; The nationwide rivers inventory, 1982, National Park Service.

XII. LITERATURE CITED

Bain, M. B., and J. M. Boltz. 1989. Regulated streamflow and warmwater stream fish: a general hypothesis and research agenda. U.S. Fish and Wildlife Service, Auburn, Alabama. Biological Report 89(18). 28 pp.

Beamish, R.J. 1976. Acidification of lakes in Canada by acid precipitation and the resulting effects on fishes. Water Air Soil Pollut. 6:501-514.

Cowardin, L; V. Carter; F. Golet; and E. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. FWS/OBS-79/31. 131 pp.

Cushman, R.M. 1985. Review of ecological effects of rapidly varying flows downstream from hydroelectric facilities. N. Amer. Jour. of Fish. Manag. (5:330-339).

Dahl, T.E., and C.E. Johnson. 1991. Status and trends of wetlands in the conterminous United States, mid-1970's to mid-1980's. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. 28 pp.

Eckstein, R. G. 1990. Bald Eagles in Wisconsin. A Management Guide for Landowners. Wisconsin Department of Natural Resources. 21 pp.

Grier, J. W., J. B. Elder, F. J. Gramlich, N. F. Green, J. V. Kussman, J. E. Mathisen, and J. P. Mattson. 1983. Appendix E Management Guidelines for Breeding Areas of the Northern States Bald Eagle Recovery Plan. U. S. Fish and Wildlife Service. 76 pp plus appendices - H.

Federal Energy Regulatory Commission. 1981. Planning Status Report. Menominee River Basin, Michigan and Wisconsin, Federal Energy Regulatory Commission, Office of Electric Power Regulation, Chicago Regional Office.

Katopodis, C., Derksen, A.J., B.L. Christensen. 1991. Assessment of two Denil fishways for passage of freshwater species. American Fisheries Society Symposium. 10:306-324.

Kusler, J.A. and G. Brooks (eds.). 1987. Proceedings of the national wetlands symposium: wetlands hydrology. Association of State Wetlands Managers. Berne, New York. 339 pp.

Wisconsin Electric Power Company. 1991. Application for new license for a major water power project. Brule Hydroelectric Project. FERC No. 2431. December 1991.

_____. 1991. Report correcting deficiencies, Brule Hydroelectric Project, FERC No. 2431. August 1992.

_____. 1992. Entrainment studies at the Brule Hydroelectric Project. (Wisconsin Electric Power Company, 1992). Brule Hydroelectric Project, FERC No. 2431. July 1992. 4 volumes.

_____. 1993. Applicant's response to request for additional information, Brule Hydroelectric Project, FERC No. 2431. January, 1993.

Mitsch, W.J. and J.G. Gosselink. 1986. Wetlands. Van Nostrand Reinhold Company, Inc. New York. 537 pp. found in: Dahl, T.E. 1990. Wetland losses in the United States: 1780's to 1980's. Fish and Wildlife Service, Washington, D.C. 21 pp.

Orth, D. J. 1987. Ecological considerations in the development and application of instream flow-habitat models. Regulated Rivers: Research and Management. 1:171-181.

Rochester, H., Jr., T. Lloyd, and M. Farr. 1984. Physical impacts of small-scale hydroelectric facilities and their effects on fish and wildlife. FWS/OBS-84-19. Office of Biological Services, U.S. Fish and Wildlife Service, Department of the Interior. 191 pp.

Sopper, W.E. and S.N. Kerr. 1981. Revegetating Strip-mined land with municipal sewage sludge (Project Summary). EPA-600/S2-81-182. Municipal Environmental Research Laboratory, U.S. Environmental Protection Agency. 7 pp.

U.S. Fish and Wildlife Service. 1981. Bald Eagle Management Guidelines. U.S. Department of the Interior. Washington, D.C. 7 pp.

XIII. LIST OF PREPARERS

Mark Pawlowski -- Environmental Coordinator, Water Resources and Fishery Resources (Ecologist; B.S., Biology).

Nancy Beals -- Terrestrial Resources, Threatened and Endangered Species (Ecologist, M.S., Range and Wildlife Management).

Dr. Frank Miller -- Purpose and Need for Power (Electrical Engineer; Doctor of Engineering and Electrical Engineering).

Kelly Fargo -- Recreation and Land Use Resources, and Cultural Resources (Environmental Protection Specialist; M.S., Recreation).

Doan Pham -- Description of Project Facilities, Economic Analysis, and Safety and Design Assessment (Civil Engineer, B.S. Civil Engineering).

Form L-3
(October, 1975)

FEDERAL ENERGY REGULATORY COMMISSION

TERMS AND CONDITIONS OF LICENSE FOR CONSTRUCTED MAJOR PROJECT AFFECTING NAVIGABLE WATERS OF THE UNITED STATES

Article 1. The entire project, as described in this order of the Commission, shall be subject to all of the provisions, terms, and conditions of the license.

Article 2. No substantial change shall be made in the maps, plans, specifications, and statements described and designated as exhibits and approved by the Commission in its order as a part of the license until such change shall have been approved by the Commission: Provided, however, That if the Licensee or the Commission deems it necessary or desirable that said approved exhibits, or any of them, be changed, there shall be submitted to the Commission for approval a revised, or additional exhibit or exhibits covering the proposed changes which, upon approval by the Commission, shall become a part of the license and shall supersede, in whole or in part, such exhibit or exhibits theretofore made a part of the license as may be specified by the Commission.

Article 3. The project area and project works shall be in substantial conformity with the approved exhibits referred to in Article 2 herein or as changed in accordance with the provisions of said article. Except when emergency shall require for the protection of navigation, life, health, or property, there shall not be made without prior approval of the Commission any substantial alteration or addition not in conformity with the approved plans to any dam or other project works under the license or any substantial use of project lands and waters not authorized herein; and any emergency alteration, addition, or use so made shall thereafter be subject to such modification and change as the Commission may direct. Minor changes in project works, or in uses of project lands and waters, or divergence from such approved exhibits may be made if such changes will not result in a decrease in efficiency, in a material increase in cost, in an adverse environmental impact, or in impairment of the general scheme of development; but any of such minor changes made without the prior approval of the Commission, which in its judgment have produced or will produce any of such results, shall be subject to such alteration as the Commission may direct.

Article 4. The project, including its operation and maintenance and any work incidental to additions or alterations authorized by the Commission, whether or not conducted upon lands

of the United States, shall be subject to the inspection and supervision of the Regional Engineer, Federal Energy Regulatory Commission, in the region wherein the project is located, or of such other officer or agent as the Commission may designate, who shall be the authorized representative of the Commission for such purposes. The Licensee shall cooperate fully with said representative and shall furnish him such information as he may require concerning the operation and maintenance of the project, and any such alterations thereto, and shall notify him of the date upon which work with respect to any alteration will begin, as far in advance thereof as said representative may reasonably specify, and shall notify him promptly in writing of any suspension of work for a period of more than one week, and of its resumption and completion. The Licensee shall submit to said representative a detailed program of inspection by the Licensee that will provide for an adequate and qualified inspection force for construction of any such alterations to the project. Construction of said alterations or any feature thereof shall not be initiated until the program of inspection for the alterations or any feature thereof has been approved by said representative. The Licensee shall allow said representative and other officers or employees of the United States, showing proper credentials, free and unrestricted access to, through, and across the project lands and project works in the performance of their official duties. The Licensee shall comply with such rules and regulations of general or special applicability as the Commission may prescribe from time to time for the protection of life, health, or property.

Article 5. The Licensee, within five years from the date of issuance of the license, shall acquire title in fee or the right to use in perpetuity all lands, other than lands of the United States, necessary or appropriate for the construction maintenance, and operation of the project. The Licensee or its successors and assigns shall, during the period of the license, retain the possession of all project property covered by the license as issued or as later amended, including the project area, the project works, and all franchises, easements, water rights, and rights or occupancy and use; and none of such properties shall be voluntarily sold, leased, transferred, abandoned, or otherwise disposed of without the prior written approval of the Commission, except that the Licensee may lease or otherwise dispose of interests in project lands or property without specific written approval of the Commission pursuant to the then current regulations of the Commission. The provisions of this article are not intended to prevent the abandonment or the retirement from service of structures, equipment, or other project works in connection with replacements thereof when they become obsolete, inadequate, or inefficient for further service due to wear and tear; and mortgage or trust deeds or judicial sales made thereunder, or tax sales, shall not be deemed voluntary transfers within the meaning of this article.

Article 6. In the event the project is taken over by the United States upon the termination of the license as provided in Section 14 of the Federal Power Act, or is transferred to a new licensee or to a non-power licensee under the provisions of Section 15 of said Act, the Licensee, its successors and assigns shall be responsible for, and shall make good any defect of title to, or of right of occupancy and use in, any of such project property that is necessary or appropriate or valuable and serviceable in the maintenance and operation of the project, and shall pay and discharge, or shall assume responsibility for payment and discharge of, all liens or encumbrances upon the project or project property created by the Licensee or created or incurred after the issuance of the license: Provided, That the provisions of this article are not intended to require the Licensee, for the purpose of transferring the project to the United States or to a new licensee, to acquire any different title to, or right of occupancy and use in, any of such project property than was necessary to acquire for its own purposes as the Licensee.

Article 7. The actual legitimate original cost of the project, and of any addition thereto or betterment thereof, shall be determined by the Commission in accordance with the Federal Power Act and the Commission's Rules and Regulations thereunder.

Article 8. The Licensee shall install and thereafter maintain gages and stream-gaging stations for the purpose of determining the stage and flow of the stream or streams on which the project is located, the amount of water held in and withdrawn from storage, and the effective head on the turbines; shall provide for the required reading of such gages and for the adequate rating of such stations; and shall install and maintain standard meters adequate for the determination of the amount of electric energy generated by the project works. The number, character, and location of gages, meters, or other measuring devices, and the method of operation thereof, shall at all times be satisfactory to the Commission or its authorized representative. The Commission reserves the right, after notice and opportunity for hearing, to require such alterations in the number, character, and location of gages, meters, or other measuring devices, and the method of operation thereof, as are necessary to secure adequate determinations. The installation of gages, the rating of said stream or streams, and the determination of the flow thereof, shall be under the supervision of, or in cooperation with, the District Engineer of the United States Geological Survey having charge of stream-gaging operations in the region of the project, and the Licensee shall advance to the United States Geological Survey the amount of funds estimated to be necessary for such supervision, or cooperation for such periods as may mutually agreed upon. The Licensee shall keep accurate and sufficient records of the foregoing determinations to the satisfaction of the Commission, and shall make return of such records annually at such time and in such form as the Commission may prescribe.

Article 9. The Licensee shall, after notice and opportunity for hearing, install additional capacity or make other changes in the project as directed by the Commission, to the extent that it is economically sound and in the public interest to do so.

Article 10. The Licensee shall, after notice and opportunity for hearing, coordinate the operation of the project, electrically and hydraulically, with such other projects or power systems and in such manner as the Commission any direct in the interest of power and other beneficial public uses of water resources, and on such conditions concerning the equitable sharing of benefits by the Licensee as the Commission may order.

Article 11. Whenever the Licensee is directly benefited by the construction work of another licensee, a permittee, or the United States on a storage reservoir or other headwater improvement, the Licensee shall reimburse the owner of the headwater improvement for such part of the annual charges for interest, maintenance, and depreciation thereof as the Commission shall determine to be equitable, and shall pay to the United States the cost of making such determination as fixed by the Commission. For benefits provided by a storage reservoir or other headwater improvement of the United States, the Licensee shall pay to the Commission the amounts for which it is billed from time to time for such headwater benefits and for the cost of making the determinations pursuant to the then current regulations of the Commission under the Federal Power Act.

Article 12. The United States specifically retains and safeguards the right to use water in such amount, to be determined by the Secretary of the Army, as may be necessary for the purposes of navigation on the navigable waterway affected; and the operations of the Licensee, so far as they affect the use, storage and discharge from storage of waters affected by the license, shall at all times be controlled by such reasonable rules and regulations as the Secretary of the Army may prescribe in the interest of navigation, and as the Commission may prescribe for the protection of life, health, and property, and in the interest of the fullest practicable conservation and utilization of such waters for power purposes and for other beneficial public uses, including recreational purposes, and the Licensee shall release water from the project reservoir at such rate in cubic feet per second, or such volume in acre-feet per specified period of time, as the Secretary of the Army may prescribe in the interest of navigation, or as the Commission may prescribe for the other purposes hereinbefore mentioned.

Article 13. On the application of any person, association, corporation, Federal agency, State or municipality, the Licensee shall permit such reasonable use of its reservoir or other project properties, including works, lands and water rights, or parts thereof, as may be ordered by the Commission, after notice and opportunity for hearing, in the interests of comprehensive development of the waterway or waterways involved and the

conservation and utilization of the water resources of the region for water supply or for the purposes of steam-electric, irrigation, industrial, municipal or similar uses. The Licensee shall receive reasonable compensation for use of its reservoir or other project properties or parts thereof for such purposes, to include at least full reimbursement for any damages or expenses which the joint use causes the Licensee to incur. Any such compensation shall be fixed by the Commission either by approval of an agreement between the Licensee and the party or parties benefiting or after notice and opportunity for hearing. Applications shall contain information in sufficient detail to afford a full understanding of the proposed use, including satisfactory evidence that the applicant possesses necessary water rights pursuant to applicable State law, or a showing of cause why such evidence cannot concurrently be submitted, and a statement as to the relationship of the proposed use to any State or municipal plans or orders which may have been adopted with respect to the use of such waters.

Article 14. In the construction or maintenance of the project works, the Licensee shall place and maintain suitable structures and devices to reduce to a reasonable degree the liability of contact between its transmission lines and telegraph, telephone and other signal wires or power transmission lines constructed prior to its transmission lines and not owned by the Licensee, and shall also place and maintain suitable structures and devices to reduce to a reasonable degree the liability of any structures or wires falling or obstructing traffic or endangering life. None of the provisions of this article are intended to relieve the Licensee from any responsibility or requirement which may be imposed by any other lawful authority for avoiding or eliminating inductive interference.

Article 15. The Licensee shall, for the conservation and development of fish and wildlife resources, construct, maintain, and operate, or arrange for the construction, maintenance, and operation of such reasonable facilities, and comply with such reasonable modifications of the project structures and operation, as may be ordered by the Commission upon its own motion or upon the recommendation of the Secretary of the Interior or the fish and wildlife agency or agencies of any State in which the project or a part thereof is located, after notice and opportunity for hearing.

Article 16. Whenever the United States shall desire, in connection with the project, to construct fish and wildlife facilities or to improve the existing fish and wildlife facilities at its own expense, the Licensee shall permit the United States or its designated agency to use, free of cost, such of the Licensee's lands and interests in lands, reservoirs, waterways and project works as may be reasonably required to complete such facilities or such improvements thereof. In addition, after notice and opportunity for hearing, the Licensee shall modify the project operation as may be reasonably prescribed by the Commission in order to permit the maintenance and operation of the fish and wildlife facilities constructed or improved by the United States under the provisions of this article. This article shall not be interpreted to place any obligation on the United States to construct or improve fish and wildlife facilities or to relieve the Licensee of any obligation under this license.

Article 17. The Licensee shall construct, maintain, and operate, or shall arrange for the construction, maintenance, and operation of such reasonable recreational facilities, including modifications thereto, such as access roads, wharves, launching ramps, beaches, picnic and camping areas, sanitary facilities, and utilities, giving consideration to the needs of the physically handicapped, and shall comply with such reasonable modifications of the project, as may be prescribed hereafter by the Commission during the term of this license upon its own motion or upon the recommendation of the Secretary of the Interior or other interested Federal or State agencies, after notice and opportunity for hearing.

Article 18. So far as is consistent with proper operation of the project, the Licensee shall allow the public free access, to a reasonable extent, to project waters and adjacent project lands owned by the Licensee for the purpose of full public utilization of such lands and waters for navigation and for outdoor recreational purposes, including fishing and hunting: Provided, That the Licensee may reserve from public access such portions of the project waters, adjacent lands, and project facilities as may be necessary for the protection of life, health, and property.

Article 19. In the construction, maintenance, or operation of the project, the Licensee shall be responsible for, and shall take reasonable measures to prevent, soil erosion on lands adjacent to streams or other waters, stream sedimentation, and any form of water or air pollution. The Commission, upon request or upon its own motion, may order the Licensee to take such measures as the Commission finds to be necessary for these purposes, after notice and opportunity for hearing.

Article 20. The Licensee shall clear and keep clear to an adequate width lands along open conduits and shall dispose of all temporary structures, unused timber, brush, refuse, or other material unnecessary for the purposes of the project which results from the clearing of lands or from the maintenance or alteration of the project works. In addition, all trees along the periphery of project reservoirs which may die during operations of the project shall be removed. All clearing of the lands and disposal of the unnecessary material shall be done with due diligence and to the satisfaction of the authorized representative of the Commission and in accordance with appropriate Federal, State, and local statutes and regulations.

Article 21. Material may be dredged or excavated from, or placed as fill in, project lands and/or waters only in the prosecution of work specifically authorized under the license; in the maintenance of the project; or after obtaining Commission approval, as appropriate. Any such material shall be removed and/or deposited in such manner as to reasonably preserve the environmental values of the project and so as not to interfere with traffic on land or water. Dredging and filling in a navigable water of the United States shall also be done to the satisfaction of the District Engineer, Department of the Army, in charge of the locality.

Article 22. Whenever the United States shall desire to construct, complete, or improve navigation facilities in connection with the project, the Licensee shall convey to the United States, free of cost, such of its lands and rights-of-way and such rights of passage through its dams or other structures, and shall permit such control of its pools, as may be required to complete and maintain such navigation facilities.

Article 23. The operation of any navigation facilities which may be constructed as a part of, or in connection with, any dam or diversion structure constituting a part of the project works shall at all times be controlled by such reasonable rules and regulations in the interest of navigation, including control of the level of the pool caused by such dam or diversion structure, as may be made from time to time by the Secretary of the Army.

Article 24. The Licensee shall furnish power free of cost to the United States for the operation and maintenance of navigation facilities in the vicinity of the project at the voltage and frequency required by such facilities and at a point adjacent thereto, whether said facilities are constructed by the Licensee or by the United States.

Article 25. The Licensee shall construct, maintain, and operate at its own expense such lights and other signals for the protection of navigation as may be directed by the Secretary of the Department in which the Coast Guard is operating.

Article 26. If the Licensee shall cause or suffer essential project property to be removed or destroyed or to become unfit for use, without adequate replacement, or shall abandon or discontinue good faith operation of the project or refuse or neglect to comply with the terms of the license and the lawful orders of the Commission mailed to the record address of the Licensee or its agent, the Commission will deem it to be the intent of the Licensee to surrender the license. The Commission, after notice and opportunity for hearing, may require the Licensee to remove any or all structures, equipment and power lines within the project boundary and to take any such other action necessary to restore the project waters, lands, and facilities remaining within the project boundary to a condition satisfactory to the

United States agency having jurisdiction over its lands or the Commission's authorized representative, as appropriate, or to provide for the continued operation and maintenance of nonpower facilities and fulfill such other obligations under the license as the Commission may prescribe. In addition, the Commission in its discretion, after notice and opportunity for hearing, may also agree to the surrender of the license when the Commission, for the reasons recited herein, deems it to be the intent of the Licensee to surrender the license.

Article 27. The right of the Licensee and of its successors and assigns to use or occupy waters over which the United States has jurisdiction, or lands of the United States under the license, for the purpose of maintaining the project works or otherwise, shall absolutely cease at the end of the license period, unless the Licensee has obtained a new license pursuant to the then existing laws and regulations, or an annual license under the terms and conditions of this license.

Article 28. The terms and conditions expressly set forth in the license shall not be construed as impairing any terms and conditions of the Federal Power Act which are not expressly set forth herein.