

[62,192]

**Wolverine Power Corporation, Project No. 2785-001
Order Issuing License (Major Constructed Project-5MW or Less)
(Issued December 1, 1987)**

Fred E. Springer, Acting Director, Office of Hydropower Licensing.

Wolverine Power Corporation has filed a license application under Part I of the Federal Power Act (Act) to operate and maintain the Sanford Water Power Project, located in Midland County, Michigan, on the Tittabawassee River, a navigable waterway of the United States.

Notice of the application has been published. No protests or motions to intervene were filed in this proceeding, and no agency objected to issuance of this license. Comments received from interested agencies and individuals have been fully considered in determining whether to issue this license, as discussed below.

*Recommendations of Federal and State
Fish and Wildlife Agencies*

Section 10(j) of the Act, as amended by the Electric Consumers Protection Act of 1986 (ECPA), Public Law No. 99-495, requires the Commission to include license conditions, based on recommendations of federal and state fish and wildlife agencies, for the protection, mitigation, and enhancement of fish and wildlife. In the environmental assessment (EA) for the Sanford Water Power Project, the staff addresses the concerns of the federal and state fish and wildlife agencies, and makes recommendations consistent with those of the agencies.

Comprehensive Plans

Section 10(a)(2) of the Act, as amended by ECPA, requires the Commission to consider the extent to which a project is

consistent with comprehensive plans (where they exist) for improving, developing, or conserving a waterway or waterways affected by the project. The plans must be prepared by an agency established pursuant to federal law that has the authority to prepare such a plan or by the state in which the facility is or will be located. The Commission considers plans to be within the scope of section 10(a)(2), only if such plans reflect the preparers' own balancing of competing uses of a waterway, based on their data and on applicable policy considerations (i.e., if the preparers consider and balance all relevant public use considerations). With regard to plans prepared at the state level, such plans are within the scope of section 10(a)(2), only if they are prepared and adopted pursuant to a specific act of the state legislature and developed, implemented, and managed by an appropriate state agency.¹

The Commission- has concluded that comprehensive planning under section 10(a)(2)(A) should, like comprehensive planning under section 10(a)(1), take into account all existing and potential uses of a waterway relevant to the public interest, including navigation, power development, energy conservation, fish and wildlife protection and enhancement, recreational opportunities, irrigation, flood control, water supply, and other aspects of environmental quality. In order that the Commission may fully understand or independently confirm the content and conclusions of a comprehensive plan, it provided general guidelines for developing such plans which

should contain the following: (1) a description of the waterway(s) subject to the plan, including pertinent maps; (2) a description of the significant resources of the waterway(s); (3) a description of the various existing and planned uses for these resources; and (4) a discussion of goals, objectives, and recommendations for improving, developing, or conserving the waterway(s) in relation to these resources. The more closely a plan conforms to these guidelines, the more weight it will have on the Commission's decisions. However, the Commission will consider plans that do not meet the criteria for comprehensive plans, as it considers all relevant studies and recommendations, in its public interest analysis pursuant to section 10(a)(1) to the extent that the documentation supports the plan.²

The staff identified no comprehensive plans of the types referred to in section 10(a)(2) of the Act relevant to this project. The staff reviewed one resource plan³ that addresses various aspects of waterway management in relation to the proposed project, as part of a broad public interest examination under section 10(a)(1) of the Act. No conflicts were found.

Staff has determined that the best adapted plan for the Tittabawassee River is achieved with outflows from the Sanford Water Power Project which approximate natural river flows. This mode of operation may require substantial changes in the operation of the upstream Smallwood, Secord, and Edenville hydroelectric projects. These changes would result in project operation similar to the run-of-river operation which is best adapted for the Tittabawassee River.

Based on a review of agency and public comments filed in this proceeding, and on the staff's independent analysis, the Sanford

Water Power Project is best adapted to a comprehensive plan for the Tittabawassee River, taking into consideration the beneficial public uses described in section 10(a)(1) of the Act.

Applicant's Energy Management and Energy Conservation Programs

Section 10(a)(2)(C) of the Act, as amended by ECPA, requires that the Commission, in considering license applications submitted by a state or municipal applicant, or by an applicant which is primarily engaged in the generation or sale of electric power (other than electric power solely from cogeneration or small power production facilities), consider the electricity consumption efficiency improvement programs of the applicant, including its plans, performance, and capabilities for encouraging or assisting its customers to conserve electricity cost-effectively, taking into account the published policies, restrictions, and requirements of relevant state regulatory authorities applicable to such applicant.

The applicant is applying for a license to continue operation of a project that was constructed in the past, but not previously licensed. The entire net output of the project is being sold to a major investor owned electric utility for resale to end-use customers. The applicant has no opportunity to implement electricity consumption efficiency improvement programs which affect the electrical systems and end-use customers beyond the project switchboard. This applies also to load-management practices.

As a facility generating power for wholesale purchase by a major electric utility, the applicant has an easily recognized financial incentive to improve the efficiency of the project's operation and thereby increase its saleable output.

The sale of project power to Consumers Power Company (CPC) could be affected by additional conservation efforts on the CPC system but there is little likelihood that additional conservation resources could compete economically with the delivery of energy from an existing, already amortized, hydroelectric facility.

It is concluded that the applicant has made, and will continue to make, a successful good-faith effort to reduce the consumption of electric energy and system peak demand with the sale of power to CPC.

License Term

This project should have been licensed on the date when the Tittabawassee River was determined to be a navigable waterway of the United States or April 1, 1962, whichever is earlier.⁴ Absent extraordinary circumstances, the Commission's policy is to issue licenses for a term expiring at least 20 years from the date of issuance. The effective date of this license will therefore be backdated to April 1, 1962, with the term of the license expiring 20 years from the date of issuance.⁵

Summary of Findings

An EA was issued for this project. 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 EA attached to this order. Issuance of this license is not a major federal action significantly affecting the quality of the human environment.

The design of this project is consistent with the engineering standards governing dam safety. The project will be safe if operated and maintained in accordance with

the requirements of this license. Analysis of related issues is provided in the Safety and Design Assessment attached to this order.

The Director, Office of Hydropower Licensing, concludes that the project would not conflict with any planned or authorized development, and would be best adapted to comprehensive development of the waterway for beneficial public uses.

The Director orders:

(A) This license is issued to Wolverine Power Corporation (licensee), for a period effective April 1, 1962, and terminating 20 years from the date of issuance, to operate and maintain the Sanford Water Power Project. This license is subject to the terms and conditions of the Act, which is incorporated by reference as part of this license, and subject to the regulations the Commission issues under the provisions of the Act.

(B) The project consists of:

- (1) All lands, only insofar as it shows the general project location, as shown by Exhibit G:

<i>Exhibit</i>	<i>FERC No.</i>	<i>Showing</i>
G -	2785 -	
1	6	Project Lands and Boundaries
2	7	Project Lands and Boundaries

(2) Project works consisting of: (a) a dam approximately 26 feet high and 1,600 feet long consisting of a 71-foot-long powerhouse section, a 149-foot-long spillway section controlled by six Taintor gates, and a 1,380-foot-long earth embankment; (b) a 1,526-acre reservoir with a storage capacity of 15,000 acre-feet at elevation 625 m.s.l.; (c) a masonry powerhouse housing three generating units for a total installed capacity of 3,300 kW; (d) the 2.3-kV generator leads; (e) a 40-foot-long, 2.3-kV transmission line; (f) a 2.3/4.6-kV, 4.5-MVA transformer bank; and (g) appurtenant facilities.

The project works generally described above are more specifically shown and described by those portions of Exhibits A and F recommended for approval in the attached Safety and Design Assessment.

(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) The Exhibit G described above and those sections of Exhibits A and F recommended for approval in the attached Safety and Design Assessment are approved and made part of the license.

(D) This license is subject to the articles set forth in Form L-3 (October 1975) (reported at 54 FPC 1817), entitled "Terms and Conditions of License for Constructed Major Project Affecting Navigable Waters of the United States," except Article 20. The license is also subject to the following additional articles:

Article 201.

(1) The licensee shall pay the United States the following annual charge, effective April 1, 1962:

For the purpose of reimbursing the United States for the cost of administration of Part I of the Act, a reasonable amount as determined in accordance with the provisions of the Commission's regulations in effect from time to time. The authorized installed capacity for that purpose is 4,400 horsepower.

(2) The licensee shall, within 90 days from the date of issuance of this license, file with the Commission, in accordance with the provisions of § 11.20(a)(4) of the Commission's regulations, a statement showing the gross amount of power generation for the project in kilowatt-hours for each calendar year

commencing April 1, 1962.

(3)

Article 202.

Pursuant to Section 10(d) of the Act, after the first 20 years of operation of the project under license, a specified reasonable rate of return upon the net investment in the project shall be used for determining surplus earnings of the project for the establishment and maintenance of amortization reserves. One-half of the project surplus earnings, if any, accumulated after the first 20 years of operation under the license, in excess of the specified rate of return per annum on the net investment, shall be set aside in a project amortization reserve account at the end of each fiscal year. To the extent that there is a deficiency of project earnings below the specified rate of return per annum for any fiscal year after the first 20 years of operation under the license, the amount of that deficiency shall be deducted from the amount of any surplus earnings subsequently accumulated, until absorbed. One-half of the remaining surplus earnings, if any, cumulatively computed, shall be set aside in the project amortization reserve account. The amounts established in the project amortization reserve account shall be maintained until further order of the Commission.

The annual specified reasonable rate of return shall be the sum of the annual weighted costs of long-term debt, preferred stock, and common equity, as defined below. The annual weighted cost for each component of the rate of return shall be calculated based on an average of 13 monthly balances of amounts properly includable in the licensee's long-term debt and proprietary capital accounts as listed in the Commission's Uniform System of Accounts. The cost rates for long-term debt and preferred stock shall be their respective

weighted average costs for the year, and the cost of common equity shall be the interest rate on 10-year government bonds (reported as the Treasury Department's 10-year constant maturity series) computed on the monthly average for the year in question plus four percentage points (400 basis points).

Article 203.

The licensee shall clear and keep clear to an adequate width all 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 result from maintenance, operation, 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 lands and disposal of unnecessary material shall be done with due diligence to the satisfaction of the authorized representative of the Commission and in accordance with appropriate federal, state, and local statutes and regulations.

Article 204.

Within 90 days from the date of issuance of this order, the licensee shall file a revised Exhibit G for approval showing the project boundary of the Sanford Water Power Project.

Article 401.

The licensee shall operate the Sanford Water Power Project in a run-of-river mode for the protection and enhancement of fish and wildlife resources in the Tittabawassee River. The licensee, in operating the project in a run-of-river mode, shall at all times act to minimize the fluctuations of the reservoir surface elevations

specified in article 404 and maintain a discharge from the project so that flow in the Tittabawassee River, as measured immediately downstream from the project, is the average of the cumulative inflows to the reservoir on a daily basis. Moreover, the flows from the project shall approximate the inflow to the project reservoir that would occur if there were no upstream regulation of the Tittabawassee River upstream of the Sanford Project. The run-of-river operation may be temporarily modified if required by operating emergencies beyond the control of the licensee or for short periods upon mutual agreement among the licensee, the Michigan Department of Natural Resources and the U.S. Fish and Wildlife Service.

Article 402.

The licensee, after consultation with the Michigan Department of Natural Resources (MDNR) and the Geological Survey, shall develop a plan to install stream flow and pool level gages in the Tittabawassee River, to monitor compliance with the requirements of articles 401 and 404. The plan shall include an implementation schedule, a determination of the location and design of the gages, the method of flow data collection, and a provision for providing the flow data to the MDNR within 30 days from the date of the agency's request for the data. The plan shall be filed with the Commission for approval by the Chicago Regional Director within 6 months from the date of issuance of this license, and shall include comments from the consulted agencies on the plan. The Commission reserves the right to require modifications to the plan.

Article 403.

The licensee, after consultation with the Michigan Department of Natural Resources and the U.S. Fish and Wildlife Service, shall develop a plan to monitor the entrainment and the turbine-induced injury and mortality of fish resources. Within 6 months after the date of issuance of this license, the licensee shall file for Commission approval the monitoring plan and a schedule for filing the results of the monitoring program. Comments of the consulted agencies on the monitoring plan shall be included in the filing. The Commission reserves the right to modify the proposed plan or schedule.

The results of the monitoring shall be submitted to the Commission according to the schedule, along with the comments from the consulted agencies. If the results of the monitoring indicate that changes in project structures or operation are necessary to minimize adverse project effects on fish resources, the licensee also shall include for Commission approval a schedule for implementing the specific measures, along with comments from the consulted agencies on the proposed measures. The Commission reserves the right to require changes in the measures to protect the fish resources.

Article 404.

The licensee, after consulting with the National Park Service and the Michigan Department of Natural Resources, shall develop a plan for recreational development at the project. The plan shall include but not be limited to the following: development of public access to the reservoir and to the downstream Tittabawassee River; the short- and long-term need for recreational facilities and a timetable for their construction; a

schedule of reservoir pool levels and maximum daily pool level fluctuations to enhance recreational use; and a drawing showing the existing and proposed recreational facilities at the Sanford Water Power Project. Within 1 year after the date of issuance of this license, the licensee shall file the recreational development plan for Commission approval, along with comments of the consulted agencies on the plan. Until approval of this plan, the licensee shall maintain the reservoir at the normal pool level (625.G feet mean sea level). Any temporary deviations from 625 feet m.s.l. are permitted for the control of unusual flood events or as otherwise approved by the Director, Office of Hydropower Licensing.

Article 405.

(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 other 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 uses 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 types of use and occupancy of project lands and waters for which the licensee may grant permission without prior Commission approval are: (1) landscape plantings; (2) noncommercial 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; and (3) embankments, bulkheads, retaining walls, or similar structures for erosion control to protect the existing shoreline. 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 uses 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 and roads for which 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 (9- 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.

(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 certificates 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 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 the edge of the project reservoir at normal maximum 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 45 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 covenants running with the land adequate to ensure that: (1) the use of the lands conveyed shall not endanger health, create a nuisance, or otherwise be incompatible with overall project recreational use; and (ii) the grantee shall take all reasonable precautions to ensure 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,

(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.

(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 that 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 is final unless appealed under Rule 1902 to the Commission by any party within 30 days from the issuance date of this order. Filing an appeal does not stay the effective date of this order or any date specified in this order. The licensee's failure to appeal this

order shall constitute acceptance of the license.

— **Footnotes** —

¹ See Fieldcrest Mills, Inc., 37 FERC 61,264 (1986).

² See Order No. 481, Final Rule, issued October 20, 1987, *FERC Statutes and Regulations* 30,773.

³ Michigan Department of Natural Resources, no date, Building Michigan's Recreation Future: The 1985-90 Michigan Recreation Plan.

⁴ See Federal Power Commission's "Order Denying Petition for Declaratory Order. Finding Jurisdiction and Requiring Filing of an Application for License", issued February 18, 1976.

Environmental Assessment

Federal Energy Regulatory Commission

Office of Hydropower Licensing,
Division of

Environmental Analysis

Date: October 19, 1987

Project Name: Sanford Water Power Project

FERC Project No. 2785-001

A. Application

1. Application type: Major Constructed less than 50 MW;
Date filed: 4/05/83

2. Applicant: Wolverine Power Corporation

3. Water body: Sanford Lake, Tittabawassee; River basin: Saginaw River Basin

4. Nearest city or town: Sanford

5. County: Midland;
State: Michigan

B. Purpose and Need for Action

1. Purpose: Licensing the Sanford Water Power Project (Sanford Project) would permit

continued project operation and continued sale of hydropower produced to the Consumers Power Company, of Michigan.

2. Need for power: The Sanford Project began operation in 1925. The average annual energy output of the facility during the last 25 years has been 9,000,000 kilowatt-hours (kWh) with a minimum of 5,080,000 kWh and a maximum of 12,200,000 kWh. The entire net output of the plant is sold to the Consumers Power Company for resale to end-use customers. The need for the project power has been established by 62 years of operating history.

C. Proposed Project and Alternatives

1. Description of the proposed action: The project consists of a 1,600-foot-long, 26-foot-high dam; a reservoir with a normal maximum surface area of approximately 1,500 acres; a powerhouse with a total installed capacity of 3.3 megawatts; and related facilities.

2. Applicant's proposed mitigative measures.

a. Construction: The project is constructed.

b. Operation: The applicant proposes to release a minimum flow of 130 cubic feet per second (cfs) as measured in the Tittabawassee River below its confluence with Salt River (approximately 0.5 mile below the project powerhouse); to conduct a fish entrainment and impingement study; and to gage project inflows and releases.

3. Federal lands affected. None.

4. Alternatives to the proposed action.

The alternative to the proposed action is denial of license and cessation of operation.

Since the presently unlicensed Sanford Project represents approximately one-third of the applicant's generating capacity, denial of license would seriously reduce the applicant's sales, and could jeopardize the financial feasibility of the remaining two-thirds of the applicant's generating resources.

Denial of license would force Consumers Power Company to replace power from the Sanford Project with power from other sources. This action may unnecessarily consume nonrenewable primary energy resources and would increase atmospheric pollution.

D. Consultation and Compliance

1. Fish and wildlife consultation (Fish & Wildlife Coordination Act).

a. U.S. Fish & Wildlife Service (FWS): Yes

b. State(s): Yes

c. National Marine Fisheries Service (NMFS): No

2. Section 7 consultation (Endangered Species Act).

a. Listed species: None

b. Not required.

3. Section 401 certification (Clean Water Act).

Required; the applicant requested §401 certification on 03/28/83.

Waived; section 401 certification is waived if not acted on by the certifying agency within 1 year from the date of the certifying agency's receipt of the request. (See Commission Order No. 464 [FERC *Statutes and Regulations* 30,730], issued February 11, 1987.)

Remarks: After the

Commission issued Order No. 464, the Michigan Department of Natural Resources (MDNR) was requested to submit comments and recommendations regarding water quality. The MDNR submitted no comments or recommendations.

4. Cultural resource consultation (Historic Preservation Act).

- a. Register status: None.
- b. State Historic Preservation Officer (SHPO): Yes
- c. National Park Service (NPS): Yes
- d. Council: Not required.
- e. Further consultation: Not required.

5. Recreation consultation (Federal Power Act).

- a. U.S. Owners: Yes
 - b. NPS: Yes
 - c. State(s): Yes
6. Wild and scenic rivers (Wild and Scenic Rivers Act).

Status: None.

7. LWCFA lands and facilities affected (Land and Water Conservation Fund Act).

Status: None.

E. Comments

1. The following agencies and other entities provided comments on the application in response to the public notice dated 11/15/83.

Commenting agencies and other entities—

Date of letter

Department of the Interior (Interior)— 01/13/84, 02/03/84 and 09/18/87

Michigan Department of Natural Resources (MDNR)- 01/27/84, 04/06/84, 12/29/86, 05/04/87, and 09/09/87

James J. Blanchard,

Governor, State of Michigan- 05/08/84

Midland County Department of County Development-01/06/84 and 08/16/84

Midland County Board of Commissioners-01/24/84

2. The applicant responded to the comments by letter dated 07/23/84.

F. Affected Environment

1. General description of the locale.

The Sanford Project is one of four unlicensed hydroelectric projects the Wolverine Power Corporation has operated on the Tittabawassee River since 1925. These four projects impound approximately 50 miles of the Tittabawassee River, with little free-flowing water between the projects. The Sanford Project is located farthest downstream, with the Edenville, Secord, and Smallwood projects located sequentially upstream.

The project area is nearly level to gently sloping. Temperatures are moderated by the Great Lakes. The mean annual temperature is 45.7 degrees Fahrenheit; annual precipitation is 29 inches.

2. Descriptions of the resources in the project impact area affected by the proposed action. (Source: Wolverine Power Corporation, 1983, application, exhibit E, unless otherwise indicated).

a. Geology and soils: Soils in the project area are primarily lacustrine deposits of sand and clays. Erosion and sedimentation rates are relatively high in the area. Bedrock is the Pennsylvania-Saginaw Group and interbedded shale and limestone

b. Streamflow: low flow: 111 cfs; flow parameter: historical

low flow.

high flow: 34,000 cfs; flow parameter: historical high flow.

average flow: 1,647 cfs; period of record is 44 years.

c. Water quality: The Sanford reservoir is a mesotrophic reservoir that does not stratify. During the summer low-flow period, dissolved oxygen levels drop intermittently below the level of 5.0 milligram per liter required by state standards.

d. Fisheries:
Anadromous: Absent.

Resident: Present.

Warmwater fishery, including walleye, northern pike, smallmouth bass, bluegill, burbot, perch, and black crappie.

e. Recreation: Both public and private recreational facilities provide access to the project reservoir. Use of the recreational facilities at Sanford reservoir is high.

f. Other resources: The proposed action would not affect other resources.

G. Environmental Issues and Proposed Resolutions

Mitigative measures recommended by the staff are in addition to those proposed by the applicant, Section C(2), and any conditions identified in Section C(3). There are 4 issues addressed below.

1. Operation. The Sanford project is currently operated in a peaking mode. The rapid variation in flows associated with the peaking operation of a hydropower facility reduces the amount and stability of aquatic habitat below the powerhouse discharge (Nestler, 1986). The FWS and the MDNR recommend that the project be operated in a run-of-river mode to do the following: increase the

fishery forage base, improve spawning habitat, help ensure fish passage past the downstream Dow Chemical dam at Midland (Dow dam), and reduce the pool level fluctuations in the reservoir.

The applicant proposes to continue the peaking mode of operation. To protect the downstream aquatic environments, however, the applicant would maintain a minimum flow of 130 cfs in the Tittabawassee River below the confluence with Salt River. The applicant concludes in a minimum flow study that if a minimum flow of 130 cfs is maintained in the river below the Sanford Project, valuable habitat would be submerged and the fish would have unrestricted passage to Sanford dam.

The applicant's proposed minimum flow would reduce the amount of dewatered habitat during project shut-down. Fish passage would still, however, be restricted by the downstream Dow dam. The habitat provided by the proposed minimum flow would be of limited value since this habitat would be subject to daily flow fluctuations of over 2,000 cfs, which would cause a daily fluctuation of 5.4 feet in the tailwater elevation. These daily flow fluctuations would reduce the value of fishery habitat provided by any minimum flow

Improved water quality in the Saginaw River basin has led to resurgence in the walleye population in the Tittabawassee River. The MDNR estimated in 1981 that 25,000 walleye accumulated below the Dow dam; estimates in 1986 indicated that 250,000 adult walleye were present. Recent modifications to the Dow dam allow fish passage over the dam during high flows. These modifications opened new habitat to the walleye in the 10 miles of the Tittabawassee River and tributaries between the Dow dam

and the Sanford dam. While some successful spawning does occur below the Sanford dam, the fishery habitat and the spawning success of the walleye is limited by the peaking operation of the Sanford Project.

Variable flows impede movement of fish over obstacles (Bell, 1986). The peaking operation at the Sanford Project limits the success of passage over the downstream Dow dam, Natural river flows, while variable, change gradually, and do not have the same impact on fish migration as peaking flows. Natural flows in the Tittabawassee River would result in greater numbers of fish successfully passing the Dow dam and gaining access to the upstream habitat.

The effects of peaking operation are well documented (Gore et al., 1981; Spence et al., 1971; Munn et al., 1987; and Walburg 1981, 1983). These effects include reduced habitat and species diversity below the peaking facility, species replacement, degraded water quality, reduced spawning success, elimination of riparian habitat, and changes in the downstream channel morphometry. The Tittabawassee River below the Sanford dam has undergone these changes as a result of the historical peaking operation of the Sanford Project. Modifying the peaking operation would significantly improve the fishery and other aquatic life in the Tittabawassee River below the Sanford dam. Operating the Sanford Project in a run-of-river mode would increase the fishery forage base, improve spawning habitat, help to ensure fish passage over the Dow dam, and reduce pool level fluctuations in the reservoir. The licensee should operate in a run-of-river mode to stabilize the downstream aquatic habitat and the reservoir pool level.

Inflows to the Sanford

Project are regulated by the applicant's three upstream projects, Edenville, Secord, and Smallwood. Because the upstream projects are operated as peaking facilities, and because the Edenville Project constitute the inflow to the Sanford Project, run-of-river operation, defined as instantaneous inflow equaling instantaneous outflow, would mirror the operation of the Edenville Project and would continue the historical peaking operation at the Sanford Project.

To stabilize the downstream aquatic environment, the outflow from the Sanford Project should be made to approximate the natural stream flow. An approximation of the natural stream flow may be determined by adding together the instantaneous inflow of the Smallwood Project plus all downstream tributary inflows between Smallwood and Sanford dams and subtracting losses caused by evaporation or withdrawals. To achieve the desired effects of run-of-river operation, the outflow from the Sanford Project should equal the instantaneous inflow to the Smallwood Project plus the instantaneous inflows of the tributaries to the Tittabawassee River between Smallwood dam and Sanford dam, and minus the losses from evaporation or withdrawals.

To achieve this mode of operation the licensee, after consultation with the MDNR and the Geological Survey, should prepare a plan for continuously gaging: the inflow to the Smallwood Project, all the tributary inflows to the Tittabawassee River, and all the withdrawals between the Smallwood dam and the Sanford dam. The licensee also should gage the Sanford reservoir and all releases from the Sanford Project. These gaging operations would permit the licensee to operate the Sanford Project such that the instantaneous system net inflow

equals the instantaneous outflow from Sanford dam. This mode of operation at the Sanford Project may require modification of the mode of operation at the Edenville, Secord, and Smallwood Projects.

2. Future Fish Passage. The FWS recommends that the applicant install fish passage facilities at the Sanford Project when requested by the MDNR. The MDNR, while not requiring installation of fish passage facilities at this time, expects that these facilities will be necessary in the future. The MDNR recommends that the licensee be required to install fish passage facilities within 1 year of a determination by the state or by FWS that fish passage is required. The resurgence of the walleye and salmonid populations in the Tittabawassee River indicates that fish passage facilities may be required in the future; currently, however, the Sanford dam is a barrier for sea lamprey, as well as for walleye and salmonids. Requiring fish passage facilities at this time would also give the sea lamprey access to the upper Tittabawassee River and would not benefit the fishery. As sea lamprey control measures are refined and the habitat requirements of the walleye and salmonids increase, the installation of fish passage facilities at the Sanford dam may be appropriate. The terms and conditions of the license accordingly provide for future fish passage facilities when recommended by the MDNR and the FWS.

3. Entrainment Study. Fish mortality caused by entrainment through a hydropower facility is not uncommon. The rate of mortality and the effect of the mortality on the fishery varies widely among hydroelectric facilities. The applicant, the FWS, and the MDNR agree that some entrainment mortality does occur;

they also agree that a study should be conducted to determine the amount of mortality and effect on the fisheries. Historical operation of the Sanford Project has not resulted in major fish kills below the Sanford dam. While historical operation would suggest that fish screens should not be required at this time, the licensee should monitor fish entrainment and mortality and modify project features or operation to minimize fishery losses.

The licensee, in cooperation with the FWS and the MDR, should monitor the reservoir and downstream fishery to determine the effects of entrainment. If the results of the monitoring shows the need, the licensee should propose project modifications to minimize entrainment and entrainment mortality. The licensee should file with the Commission the monitoring results and any proposed project modifications, along with comments from the consulted agencies.

4. Recreational Plan. The applicant, MDNR, and FWS agree on the need for planning future recreational use and preventing overuse. A recreational plan is necessary to effectively utilize the recreational opportunities at the project. The licensee, after consultation with the MDNR, should develop a comprehensive recreational plan that meets both short-term and long-range recreation needs for Sanford reservoir. The licensee should identify the project facilities necessary to meet existing and long-range needs, and should provide a timetable for developing these facilities.

Reservoir pool levels would affect the available recreational opportunities. The MDNR and the applicant have stated a need to reduce pool level fluctuations. Seasonal stabilization of the

reservoir pool level would provide for boating access and egress, and establish stable perimeters for lakeside recreational use. The required run-of-river mode of operation should moderate pool level fluctuations. A schedule of seasonal reservoir pool levels would enhance the recreational opportunities at Sanford reservoir. The licensee, after consultation with the MDNR, should establish a schedule of reservoir pool levels to provide for recreational opportunities at the project and should included the schedule with the recreational plan.

H. Environmental Impacts

1. Assessment of adverse and beneficial impacts expected from the project as proposed by the applicant (P); the proposed project with the staff's recommended mitigation (Ps') [Section G]; and any other alternative considered (A).*

- a. Geology-Soils—P: 0
- b. Streamflow—P: 2AL; Ps: 0

Remarks: b. Peaking operation would be replaced by a run-of-river mode of operation.

- c. Water quality: Temperature—P: 1AL; Ps: 0; Dissolved oxygen—P: 1AL; Ps: 0; Turbidity and sedimentation—P: 1AL; Ps: 0

Remarks: c. A run-of-river mode of operation would stabilize downstream water quality,

- d. Fisheries: Anadromous—P: 0; Resident—: 2AL; Ps: 0

Remarks: d. Operation which destabilized downstream habitat would cease.

- e. Vegetation—P: 0
- f. Wildlife—P: 0
- g. Cultural: Archeology—P: 0; History— P: 0

- h. Visual quality—P: 0
- i. Recreation-13: IBL; Ps: 2BL
- Remarks: 1. Stabilization of reservoir and downstream Tittabawassee River would enhance fishing and boating.
- j. Land use—P: 0
- k. Socioeconomics-13: 0

* The assessment reflects the adoption of any federal land management agency's conditions, in addition to the applicant's proposed mitigation. Assessment symbols indicate the following impact levels:

0 -No impact; 1 Minor impact; 2 - Moderate impact, 3 = Major impact; A - Adverse; B Beneficial; L = Long-term impact; S = Short-term impact,

2. Impacts of the no-action alternative.

Under the no-action alternative, there would be no change in the operation of the Sanford Project and no changes to the existing physical, biological, or cultural components of the area.

3. Recommended alternative (including proposed, required, and recommended mitigative measures): Proposed project,

4. Reason(s) for selecting the preferred alternative.

Licensing the Sanford Project, with the staff's recommendations, would improve the streamflow, fishery, and recreational resources in the Tittabawassee River. The staff's recommendations provide a reasonable balance between environmental protection or enhancement and resource utilization.

1. *Unavoidable Adverse Environmental Impacts of the Recommended Alternative None.*

J. Conclusion

Finding of No Significant Impact. Approval of the recommended alternative [H(3)] would not constitute a major federal action significantly affecting the quality of the human environment; therefore, an environmental impact statement (EIS) will not be prepared.

K. Literature Cited

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8. Wolverine Power Corporation. 1983. Application for license for the Sanford Plant on the Tittabawassee River in Midland County, Michigan. April 1983 as amended by supplements of the license dated July 1983, July 1984, and January 1987.

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Safety and Design Assessment

Sanford Water Power Project

FERC Project No. 2785-001, MI

Dam Safety

The Sanford Dam is located on the Tittabawassee River in Midland County, Michigan less

than 0.5 miles upstream from the Village of Sanford. The dam is about 30 feet high and consists of a multiple-arch spillway, an instream powerhouse, and earthen dikes. The dam impounds approximately 15,000 acre-feet of water and has been classified as high hazard by the Chicago Regional Office (CHRO).

Our review of the applicant's stability analyses for the spillway and powerhouse structures indicates that adequate factors of safety exist against sliding and overturning for normal pool, ice loading, and flood flow conditions up to the PMF. Earthquake loading was not considered as a credible case since the dam site is located in Seismic Zone 1. The flow seepage pressure distributions along the powerhouse and spillway structure/foundation interfaces were found by staff not to be excessive for the type of soil foundation encountered at the site.

The spillway capacity of the project is estimated by the applicant to be 29,000 cfs and the peak inflow to the reservoir from a PMP type storm was calculated to be 131,400 cfs. A reservoir routing study shows that the peak outflow from such a storm would be about 115,400 cfs with a lag time of 11.7 hours. The PMF would overtop the earthen dikes by about eight feet.

In order to assess the safety of the earthen dikes under overtopping flood flow conditions, staff has performed an independent dam break analyses for a range of breach parameters that are characteristic of embankment erosion failures. These include breach bottom widths from 75 to 150 feet and the time of breach formation from 0.5 to 10 hours for flood flows of 30,000 cfs, 35,000 cfs, 0.5 PMF, and 0.75 PMF with crest overtoppings of 0.6, 1.3, 3.7, and 5.5 feet, respectively. In addition, staff has varied the downstream reach Manning's "n"

values from 0.025 to 0.055 for the channel and from 0.060 to 0.080 for the overbanks to test the overall sensitivity of the model. Lastly, staff has examined a potential catastrophic failure of the right earthen dike having a breach bottom width of 500 feet and a 2.0 hour time of breach formation under the 0.5 PMF.

The results of our dam break study show that in the Village of Sanford for the flood flow of 30,000 cfs under the most adverse breach formation conditions the resulting incremental flood wave would be about 2.7 feet high with a velocity of 1.9 feet per second. Higher flood flows would have a lesser wave impact upon life and property in the village. Decreasing the Manning's "n" values for the channel and overbank areas would only increase the height of the resulting flood wave to 3.2 feet at the maximum with no increase in wave velocity. Finally, the catastrophic failure of the right earthen dike under the 0.5 PMF would create an additional flood wave of 2.1 feet with a velocity of 1.3 feet per second in the community. Based on the magnitude and range of the resulting flood wave heights and velocities, we believe that dike erosion failure would not significantly increase the downstream flood stages or create hazardous wave velocities in the floodplain and would not pose a threat to downstream life and property.

The applicant's stability analyses for the earthen dikes show that adequate factors of safety exist against upstream and downstream slope failures under normal pool steady state seepage and maximum pool conditions. Sudden reservoir drawdown does not occur during routine project operation and was not considered as a credible loading condition. We concur with the

applicant that the dikes' upstream and downstream slopes are stable for all credible loading conditions.

CHRO had conducted its most recent prelicense inspection of the existing dam facilities on March 27, 1987. The inspector observed that many of the deficiencies identified in earlier inspections were still present. These included riprap erosion of the right dike upstream slope, the existence of depressions and gullies in the right dike crest and downstream slope, cracking and spalling of the powerhouse substructure, leakage of the spillway Taintor gate seals, cracking and swelling of the spillway gate piers, and concrete deterioration of the spillway ogee sections. The applicant plans major repair and maintenance work for the facility in 1988 which would correct some of the deficiencies. Generally, the project structures were found in satisfactory condition.

Water Resource Planning

The existing project has three equal-sized Francis turbine-generating units with a total installed capacity of 3,300 kW. The powerplant units are rated at a design head of 28.0 feet with a total hydraulic capacity of 2160 cfs. The probability of occurrence of streamflows 2160 cfs or greater is less than 0.10.

The 15,000-acre-foot reservoir is operated primarily to provide head and to a lesser extent to store water for project generation during peak demand periods of the day. The water surface level of the reservoir is rarely fluctuated beyond about one to two feet from the normal pool elevation of 625.0 feet (m.s.l.) for these purposes.

The project generates on the average about 9,000,000 kWh

annually which includes no minimum flow releases except for a 40 cfs leakage and a cessation of powerplant operations on weekends and holidays. The applicant proposes to modify the operation of the project to provide a minimum instream flow release of 130 cfs throughout the year including leakage and streamflows from Salt Creek. However, the Michigan Department of Natural Resources and the U.S. Department of the Interior have recommended a change in the mode of project operation to strictly run-of-river to enhance the downstream fishery resources. Staff concurs with the recommendation made by the agencies.

Based on the applicant's operational model study, staff estimates that for a year-round minimum flow release of 130 cfs on-peak generation would be reduced by 1,400,000 kWh in an average water year while off-peak generation would be increased by 1,100,000 kWh. Overall annual project generation would decrease from 9,000,000 to 8,700,000 kWh. Our estimate of the impact of the agencies' and staff's recommended run-of-river mode of operation on project generation is that overall annual energy production would remain about the same. However, on-peak generation would decrease by 1,200,000 kWh.

Our review of the state and federal agency comments indicates that the project is not in conflict with any existing or planned water resource developments in the basin. No specific comments or recommendations were made addressing flood control, navigation or water supply requirements for the Tittabawassee River.

Staff's Saginaw and Au Sable River Basin Planning Status Report includes no hydroelectric projects, either proposed or constructed on

the Tittabawassee River that this project would impact and the project would not conflict with any pending applications for exemption, license or preliminary permit.

In summary, our analysis shows that the existing project adequately develops the hydropower potential of the Tittabawassee River.

Economic Feasibility

Staff has examined the economic impacts of modifying project operations as proposed by the applicant and recommended by the agencies.

Based on the cost of oil and coal fuels in the Midwest as projected by the Energy Information Administration, we have calculated the levelized alternative energy costs for on-peak and off-peak generation to be 106.6 and 28.4 mills/kWh, respectively. The project as modified by the applicant's proposed increase in minimum flow releases would lose about 1,400,000 kWh in on-peak generation entailing an overall annual loss of about 300,000 kWh for an average water year. Based on this project generation, we estimate an annual benefit loss of \$118,000 with a cumulative present worth value of \$1,075,000 over a 50-year license period.

However, the project as recommended by the agencies and staff to be modified in a strictly run-of-river mode of operation would lose about 1,200,000 kWh annually in on-peak generation with no net change in overall generation. Our estimate of the annual benefit loss for this mode of project operation is \$93,800 with a cumulative present worth value of \$854,000 over a 50-year license period.

Exhibits

The following parts of Exhibit A and the following Exhibit F drawings conform to the Commission's rules and regulations and are approved and made part of the license:

Exhibit A, page 8; sections 1(i), (ii), (iii)- paragraph 1, of the application for license filed April 3, 1983.

<i>Exhibit F</i>	<i>FERC No.</i>	<i>Title</i>
	2785-	
1	1	General Plan
2	2	Plan View Powerhouse and Spillway
3	3	Powerhouse Section
4/1	4	Spillway Section
4/2	5	Bay No. 5 Section
5	6	Embankment Section