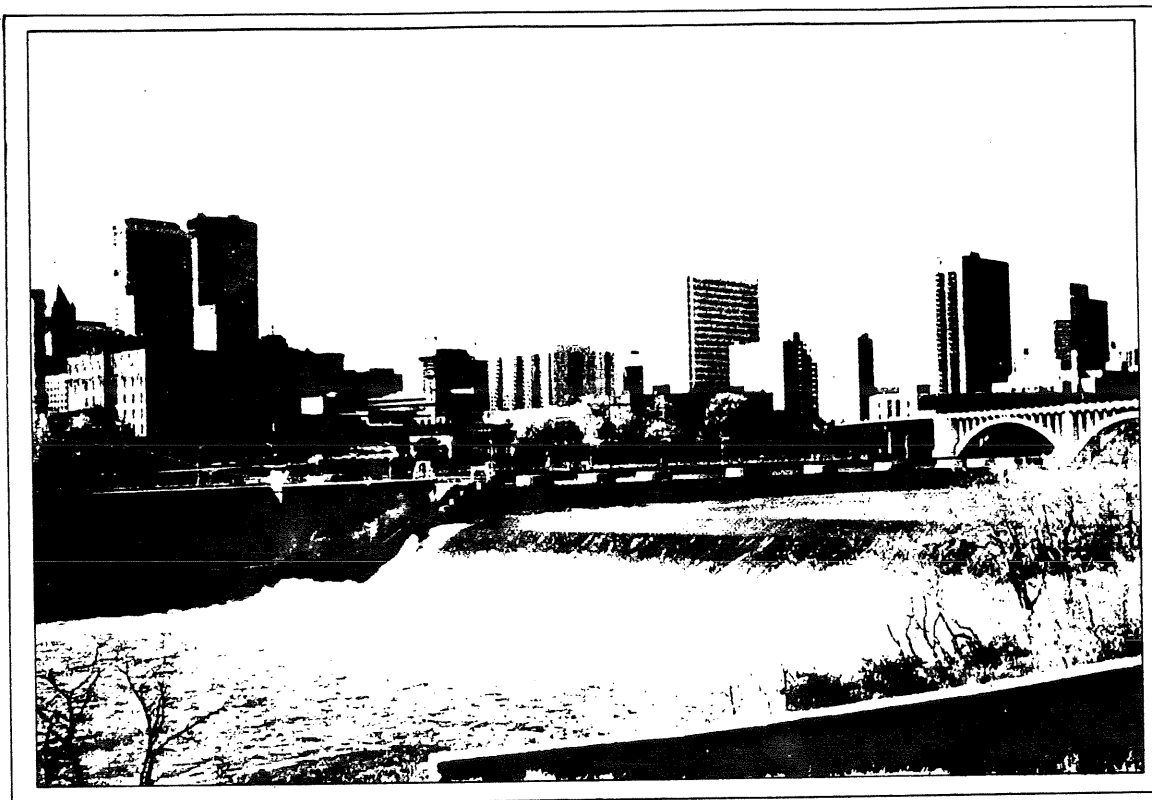




Guidelines for Hydropower Developers and Agency Review



MINNESOTA AD HOC HYDROPOWER
TASKFORCE

MAY 30, 1986

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PREFACE

This document was prepared through the cooperative efforts of the Ad Hoc Hydropower Task Force (see enclosure), utilizing existing published data (see references. Appendix A).

It is intended to aid and assist existing and potential developers in addressing data requirements and environmental aspects relating to the design, construction, maintenance and operation of hydropower projects in Minnesota under the Federal Energy Regulatory Commission (FERC) licensing process. It provides guidance to governmental agencies in the review and evaluation of hydropower projects.

It also provides developers with a list of a number of significant questions which need to be addressed to satisfy environmental concerns. Hopefully, the documents will be helpful in establishing an effective process for the orderly development and operation of hydropower projects in Minnesota.

These guidelines consist of 5 parts:

I. A developers checklist - Pages 1-4.

To aid developers in submitting information for agency review of hydropower projects and to facilitate actions under FERC Licensing and Exemptions.

II. An "Impact Cause" Table - Pages 5-11

To assist developers by identifying potential environmental and natural resources management impact concerns relating to facility design, construction and operation and maintenance activities.

III. Agency Review Guidelines - Pages 12-20

To aid agencies in reviewing and commenting on projects during the FERC process and to provide developers with a list of many major issues which should be addressed.

IV. Hydropower Projects Review Process Flow Chart - Page 21

V. Appendices - Pages 22-26

AD HOC HYDROPOWER TASK FORCE ORGANIZATIONAL DETAILS

Introduction

Rivers played an important role in the early development of Minnesota. Many of the early communities were located near good waterpower sites and a substantial number of existing communities remain at those locations. The development of the waterpower of the Mississippi River at St. Anthony Falls made Minneapolis the flour milling capitol of the world in the 1890's. Records indicate that over 500 dams were constructed for waterpower purposes from 1838 to the present time.

Hydroelectric development began at St. Anthony Falls in 1882 when the first hydroelectric station in the United States was placed in operation.

Many hydroelectric plants were built from 1900 to 1930 with the greatest increase in waterpower development activity between 1900 and 1920. Many of the hydropower facilities were abandoned after the late 1930's due to the greatly increased use of fossil fuels to produce electricity.

Alternative renewable energy sources, such as hydropower, became more appealing in the 1970's as fossil fuels became less abundant and more expensive. The enactment of the Public Utilities Regulatory Act of 1979 (PURPA) and the Energy Security Act of 1980 (ESA) provided more incentives to produce electricity from alternative energy sources. This has created a renewed interest in hydroelectric projects in Minnesota.

To comply with the intent of PURPA and ESA, the Federal Energy Regulatory Commission (FERC) developed regulations addressing the licensing and exemption of the development of renewable energy sources. These regulations require developers to consult with various federal, state and local agencies that participate in the FERC permit process.

Purpose

In order to facilitate the process, with emphasis on environmental concerns, an ad hoc hydropower task force was created in 1983 to provide an informal mechanism for addressing hydropower related issues through cooperative interaction of governmental agencies. The Ad Hoc Hydropower Task Force consists of representatives from the following:

- Department of Natural Resources
- Pollution Control Agency
- Department of Energy and Economic Development
- State Planning Agency
- U.S. Fish and Wildlife Service
- U.S. Corps of Engineers - St. Paul District
- St. Anthony Falls Hydraulic Laboratory
- William Maher, Private Consultant

There is a need to continue to provide for coordination of hydropower activities.

Goal: The goal of the Ad Hoc Hydropower Task Force is:

To provide an informal coordinated process for insuring the orderly review and evaluation of the development, redevelopment and operation of hydropower projects in Minnesota so that the socioeconomic benefits of hydropower production may be realized in concert with natural resources management and environmental protection.

Objectives:

In order to meet the goal the Ad Hoc Hydropower Task Force will.

1. Provide an informal forum for coordinated intergovernmental review and discussion of:
 - general issues or concerns relating to hydropower
 - specific issues and concerns relating to natural resources management and environmental aspects of hydropower projects
 - general informational areas relating to hydropower, such as new technologies, analytical methodologies and state and federal legislation
 - possible means of resolving any conflicts between agencies in order to maximize a coordinated, consistent perspective for submittals to FERC.
2. Provide an opportunity for developers to meet with Task Force members, at an early date, to discuss potential projects.
3. To develop and provide, to existing and potential hydropower developers, procedural guidelines which outline informational needs on project descriptions, site descriptions and environmental considerations and related socioeconomic aspects.

4. To develop and provide, to existing and potential hydropower developers and governmental agencies with regulatory responsibilities, a document which addresses potential effects from construction, operation and maintenance activities which can be used to evaluate potential "impact-cause" relationships of hydropower facility design, construction and operation and maintenance.
5. To develop a standardized format for agency review and comment on specific projects.

Implementation Actions

In order to meet the goal and objectives, the Ad Hoc Hydropower Task Force will accomplish the following:

1. Convene meetings of the Task Force at such times as may be necessary to discuss any matters relating to fulfillment of Objectives 1 and 2. Meetings will be scheduled by the chairperson from the DNR at the chairperson's initiative or when requested by a Task Force member or advisor/contributor. Notices of meetings will include a proposed agenda, and appropriate enclosures relating to agenda subjects. If agenda items involve specific projects, the chairperson may invite the developers of those projects to attend.
2. Provide a document containing the products outlined in Objectives 3, 4 and 5 to existing and new developers no later than June 30, 1986.

I. Developers Checklist.

This checklist should aid developers in preparing information needed by State and Federal agencies in reviewing FERC license and exemption proposals and for state agency approvals. If the information is not included in the FERC submittals, it should be submitted as a separate document to the Ad Hoc Hydropower Task Force. Information should be submitted to the Ad Hoc Hydropower Task Force, c/o Division of Waters, Department of Natural Resources, Box 32, 500 Lafayette Road, St. Paul, MN 55146.

The information does not necessarily meet all agency informational requirements. Agencies may request additional information and/or meetings with the developer. For more information on FERC requirements, please refer to the FERC Applications procedures for Hydropower Licenses, License amendments, exemptions and preliminary permits, Dec. 1985 (bluebook) and FERC Guidelines for completing FERC Exhibit E.

The DNR representative who serves as the Chairperson for the Ad Hoc Hydropower Task Force (see Enclosure 1) will distribute the information to participating members. The Task Force will review the information and attempt to provide coordinated comments to FERC on the proposal. Individual agency actions relating to specific permits and/or approvals will be handled separately by these agencies. However, it is anticipated that as many problems or issues as can reasonably be resolved through cooperative Task Force actions, will aid in the permit or approval process.

CHECKLIST (Specific details relating to items on this checklist, including the types of specific information required will be further defined during discussions with the agencies which approve projects).

A. Description of project. Adequate information must be provided to fully identify the project and to describe the various project activities which will be involved with respect to the designs, specifications and schedules for construction, operation and maintenance. This includes at a minimum:

1. Map of project area.
2. Engineering specifications including turbine type and size; dam safety, dredging, etc.
3. Construction schedule with separate schedule for work in-water and the estimated times for both including:
 - a. site access and preparation;
 - b. project facilities;
 - c. compensation/mitigation/protection measures.
4. Operations and maintenance design and schedule including water fluctuations (reservoir and tailwater). Describe specific water control plan to be employed.
5. Ownership of project area lands/structures and mechanism to transfer ownership.

6. Location of spoil and borrow areas.
7. Alternative operation/maintenance designs.

B. Site Description.

Adequate information must be provided to fully identify the specific existing conditions and characteristics of the site at which the development will occur. This includes, at a minimum:

1. Bank, bottom conditions.
2. Topographic, geologic and soil stability factors that may cause adverse impacts on land and water use during construction, operation and maintenance.
3. Aquatic/terrestrial vegetation.
4. Existing operations and maintenance.
5. Sediment history related to dredging and cleaning out reservoir including past maintenance.
6. Stream classifications - water quality, fisheries, wildlife, recreation, land use classifications (e.g. shoreland; flood plain, including locations; wild and scenic rivers; canoe and boating routes; trout stream, etc.).
7. Water regime - water availability based on yearly and monthly flow duration curves and other monthly flow occurrence statistics; sources of water; diversions.
8. Observed pollution problems.
9. Flooding and ice formation (including ice jams) that may pose hazards to project construction and operation and may require special protection methods to lessen environmental, economic or social impacts.
10. Fish present; fisheries management plans; commercial fishing; key habitat areas.
11. Wildlife present; wildlife management plans; wildlife use (e.g. breeding, nesting, feeding, etc.); key habitat areas; commercial use (trapping).
12. Recreational use: public access; angler use; boating; canoeing; swimming, etc.; public parks, waysides, etc.; recreation plans.
13. Rare, threatened or endangered species. (State and Federal).

C. Environmental Considerations.

Adequate information must be provided to identify and analyze the effects of the proposed project on the natural resources and the environment including, but not limited to flows and water levels, water quality, ecosystems and special management areas. This includes, at a minimum:

1. Effects of proposed project operations, storage and/or water diversion, construction and maintenance on streamflow and reservoir levels.
2. Effects of altering streamflow on instream uses and protection or enhancement measures.
3. Effects of altering reservoir levels on reservoir uses including any provisions for compensation, mitigation and enhancement.
4. Project effects of potential adverse impacts on aquatic life, fish life, including, for important fisheries areas, larval drift and fish movement, and wildlife including any provisions for compensation, mitigation and enhancement. (Project meaning construction, operation and maintenance).
5. Project effects on recreation including any provisions for compensation, mitigation and enhancement.
6. Project effects on water quality, including erosion and sedimentation, and measures for protecting, maintaining and enhancing water quality.
7. Project effects on scenic and aesthetic resources and mitigation and enhancement measures.
8. Project effects on other identified environmental resource uses and provisions for mitigation, compensation and enhancement.
9. Description of methods used to determine impacts and protection measures (e.g. method used to determine instream flows).
10. A description of additional studies necessary to adequately assess project efforts identified above in 1-9.
11. Impacts/effects of alternative operating plans as identified above in 1-9.
12. Provisions for protection of special management areas or areas otherwise restricted from development (e.g. wild and scenic rivers; wildlife management areas; scientific and natural areas; etc).

D. Socio-economic Considerations.

Adequate information must be provided to address the project's social and economic effects and impacts. This includes, at a minimum:

1. Economic analysis identifying sources or procedure used for determining forecasts, prices and interest rates including:
 - a. Economics of project and alternatives (e.g. run-of-river vs. peaking; use of multiple turbine sizes, use of different turbine types, etc.).
 - b. Cost estimate of construction.
 - c. Cost of producing power including operation and maintenance costs.
 - d. Details of contracts for sale of power.
2. Existing water use in project area.
3. Compatibility of project with present and potential uses of the water.
4. Compatibility of project with present and planned uses of area lands including comprehensive land use plans and land use (zoning) regulations of affected jurisdictions and state and federal land management policies or programs.
5. Project effects (adverse or beneficial) on other beneficial uses of water.
6. Project effects on public facilities including compensation and mitigation measures.
7. Provisions for protecting and preserving historical and archeological resources.
8. Project effect on other identified social and economic uses including protection or compensation measures.

II. IMPACT-CAUSE TABLE

F - Facility Design including appurtenances
C - Construction
OM - Operation and Maintenance

This Table indicates many of the potential impacts and their causes which may result from Facility Design, Construction and Operation and Maintenance of Hydropower projects. The Developer may find it useful to review the Impact-Cause table as a starting point to determine initial impacts and other research or study needs in planning, developing and implementing hydropower projects.

IMPACT	CAUSE OF IMPACT	IMPACT CATEGORY
<u>Water Quality/Quantity/Habitat Quality/Recreational Quality</u>		
<ul style="list-style-type: none"> ◦ Increase in water temperature downstream due to: <ul style="list-style-type: none"> - change in surface outlet - inadequate flows 		F,OM
<ul style="list-style-type: none"> ◦ Decrease in water temperature downstream due to: <ul style="list-style-type: none"> - deep release 		F,OM
<ul style="list-style-type: none"> ◦ Lack of seasonal temperature pattern downstream due to: <ul style="list-style-type: none"> - deep release - change in outlet level - change in flow regime 		F,OM
<ul style="list-style-type: none"> ◦ Abrupt temperature changes due to: <ul style="list-style-type: none"> - peaking 		OM
<ul style="list-style-type: none"> ◦ Change in Dissolved Oxygen levels in reservoir due to: <ul style="list-style-type: none"> - diurnal fluctuations - thermal stratification - dredging (O₂ consumption by oxidation of resuspended organic matter) - change in water level control plan - change in outlet level - dredging effects - changes in thermal stability resulting from water control plan 		F, OM

IMPACT - CAUSE OF IMPACT	IMPACT CATEGORY
<u>Water Quality/Quantity/Habitat Quality/Recreational Quality (cont'd.)</u>	
<ul style="list-style-type: none"> ◦ Decrease in Dissolved Oxygen below dam due to: <ul style="list-style-type: none"> - deep release - change in flow regime - change in aeration at dam - change in outlet level 	F, OM
<ul style="list-style-type: none"> ◦ Turbidity injury to fish, invertebrates and habitats due to: <ul style="list-style-type: none"> - excess sediment - resuspended toxins, sediments, organic matter 	C, OM
<ul style="list-style-type: none"> ◦ Excess sediment in stream/lake due to: <ul style="list-style-type: none"> - diversions and flushing - dredge spoil and construction waste/disposal - bank and bed erosion - dredging and sediment resuspension - erosion of adjacent lands - toxins resuspended from sediment - effects of reservoir dewatering - effects of cofferdam construction and removal during construction 	F, C, OM
<ul style="list-style-type: none"> ◦ Soil/bank erosion due to: <ul style="list-style-type: none"> - vegetation removal - runoff - water level fluctuations 	C, OM
<ul style="list-style-type: none"> ◦ Soil compaction due to: <ul style="list-style-type: none"> - construction 	C
<ul style="list-style-type: none"> ◦ Eutrophication/nutrient increase in reservoir due to: <ul style="list-style-type: none"> - land runoff - sediment mobilization 	C, OM
<ul style="list-style-type: none"> ◦ Eutrophication downstream due to: <ul style="list-style-type: none"> - reservoir sediment releases - dredging overflows 	C, OM

IMPACT	- CAUSE OF IMPACT	IMPACT CATEGORY
<u>Water Quality/Quantity/Habitat Quality/Recreational Quality (cont'd.)</u>		
°	Pollution in streams and reservoirs due to: - herbicides, pesticides - road salt and sand - misc. chemicals (oils, fuels, paints, wastes, etc.)	C, OM
°	Aquatic plant species loss/aquatic habitat diversity decrease due to: - sedimentation/siltation - inundation - fluctuating flows - dredging	C, OM
°	Terrestrial plant species loss/terrestrial habitat diversity decrease due to: - loss of flood plain wetlands - filling - vegetative cutting - facilities - transmission lines	F, C, OM
°	Change in habitat quality from change in channel morphology due to: - inadequate flows downstream of facility - increase in sediment load with loss of scouring flows - decrease in sediment load with excessive scouring - fluctuating flows - substrate instability - diversions	C, OM
°	Change in habitat quality from loss of floodplain wetlands due to: - inadequate flows downstream - flooding of wetlands - filling - dredging - fluctuating flows - diversions	C, OM

IMPACT - CAUSE OF IMPACT	IMPACT CATEGORY
<u>Water Quality/Quantity/Habitat Quality/Recreational Quality (cont'd.)</u>	
<ul style="list-style-type: none"> ◦ Habitat loss due to: <ul style="list-style-type: none"> - dewatering - inadequate flows - fluctuating flows - channelization - fill/debris disposal - inundation - drawdown - borrow pits - structures - dredging 	F, C, OM
<ul style="list-style-type: none"> ◦ Fluctuating flows/water levels due to: <ul style="list-style-type: none"> - reservoir filling - maintenance - peaking 	C, OM
<ul style="list-style-type: none"> ◦ Flow cutoff downstream due to: <ul style="list-style-type: none"> - reservoir filling - maintenance (canal and tailrace areas) 	C, OM
<ul style="list-style-type: none"> ◦ Dewatering reservoir due to: <ul style="list-style-type: none"> - maintenance - construction (cofferdams, gates, etc.) 	C, OM
<ul style="list-style-type: none"> ◦ Change in watershed equilibrium due to: <ul style="list-style-type: none"> - change in sediment loads - change in storage - change in flow regime 	OM
<ul style="list-style-type: none"> ◦ Change in channel morphology (channel width, depth) due to: <ul style="list-style-type: none"> - increase in stream discharge (increases width, depth) - decrease in stream discharge (decreases width, depth) 	0

IMPACT - CAUSE OF IMPACT	IMPACT CATEGORY
<u>Water Quality/Quantity/Habitat Quality/Recreational Quality (cont'd.)</u>	
<ul style="list-style-type: none"> ◦ Conflict in water use due to: <ul style="list-style-type: none"> - competing consumptive users - competing non-consumptive users - instream flow needs - ground water level declines in wells 	OM
<ul style="list-style-type: none"> ◦ Change in instream flow uses due to: <ul style="list-style-type: none"> - change in flow regime - fluctuating flows - change in water quality/quantity 	OM
<u>Impacts on Organisms</u>	
<ul style="list-style-type: none"> ◦ Fish mortality due to: <ul style="list-style-type: none"> - turbines - impingement - predators (on weakened or stunned fish) 	OM
<ul style="list-style-type: none"> ◦ Bird mortality due to: <ul style="list-style-type: none"> - transmission lines - loss of habitat 	F
<ul style="list-style-type: none"> ◦ Fish and invertebrate stranding due to: <ul style="list-style-type: none"> - fluctuating flows (peaking) - dewatering - reservoir filling 	C, OM
<u>Physical Setting</u>	
<ul style="list-style-type: none"> ◦ Change in <u>remoteness</u> (relatively undisturbed area) due to a change in man made sights and sounds. 	C, F, OM
<ul style="list-style-type: none"> ◦ Change in <u>naturalness</u> due to a change in nonrenewable and renewable resource modification (structure, roads, vegetative cutting). 	C F

IMPACT - CAUSE OF IMPACT	IMPACT CATEGORY
<u>Water Quality/Quantity/Habitat Quality/Recreational Quality (cont'd.)</u>	
° Change in size/length of the present recreation setting and <u>experience opportunity due to changes in remoteness and naturalness of the area.</u>	F
° Change in the attractiveness due to a change in landscape variety, outstanding or unique landscape features, and/or special areas.	C, F
° Change in the existence or degree of hazards due to changes in water level and downstream obstacles.	C, OM
° Change in navigability due to changes in water level and changes in flow regime.	OM
° Change in shoreline configuration due to changes in water level and bank and stream erosion.	OM
° Change in the health and aesthetic quality of water due to dredge spoil, and construction disposal and waste.	C, OM
<u>Managerial Setting</u>	
° Change in the ease, means and conveyance of access to the site and recreational facilities due to a change in roads and recreational facilities.	C F
° Change in the location, extent, consistency with setting, complexity and type of facilities due to change in the quantity and quality of facilities.	F
° Change in need for existing and proposed facilities due to changes in the physical and social settings.	F, OM
° Change in the degree and prevalence of user impact on site due to change in user type and user motivation.	F

IMPACT - CAUSE OF IMPACT	IMPACT CATEGORY
<u>Water Quality/Quantity/Habitat Quality/Recreational Quality (cont'd.)</u>	
◦ Change in the nature, extent and level of use regulation and regimentation (enforcement, information, site design, rescue) due to change in user type and motivation, hazards, health and safety factors.	F, OM
<u>Social Setting</u>	
◦ Change in recreation activity opportunities being supplied due to changes in the physical and managerial settings.	F, OM
◦ Change in recreation experience opportunity being supplied due to changes in the existing situational attributes and physical and managerial settings.	F, OM
◦ Change in user type (displacement) using or embarking from the site due to change in the recreation setting and attractiveness.	F, OM
◦ Change in user motivation and orientation (relationship w/nature, escape physical pressure, family or group relation, risk taking/avoidance, etc.) due to change in the physical and managerial settings.	F, OM
◦ Change in the probability of encountering other people due to changes in the amount of work and recreation related activity.	F
◦ Change in temporal and spatial use patterns due to change in attractiveness and user type and motivation.	F, OM
◦ Change in attractiveness of the site due to changes in the perceived attributes and motivations of different user types.	F, OM

III. AGENCY REVIEW GUIDELINES.

The following is to be used only as a guideline to review hydropower projects. Some questions may not apply to a specific project just as questions/issues not covered may occur on any project.

When reviewing a project, it is important to assign priorities to the impacts. This is more time effective and allows more effort to be allocated to reviewing impacts likely to be significant rather than spending time on those that are insignificant or not likely to occur at all. Each project impact priority may be different.

The review checklist should be used in conjunction with the developers checklist and the impact-cause guidelines.

REVIEW CHECKLIST

Project: _____
Developer: _____
Reviewer: _____
Date: _____

General

1. Does project have existing operation and maintenance plans?
2. Is proposed operation and maintenance different from existing?
Explain:
3. Is project a relicensing?
4. Has a FERC application been filed?
5. Is project a retro-fit?
6. Is construction/rehabilitation extensive?
Explain:

7. Are schedules for construction and engineering specifications included?

8. Are operation and maintenance designs included?

Socio-Economic Resources:

1. Is project part of a multiple purpose project?

Is is compatible?

2. Are alternative operations analyzed for impact?

economic feasibility?

3. Are there funds available to cover estimated costs?

Source(s):

4. Is there a need for the project power?

5. Is there a contract to buy the power?

Who?

6. Does the developer own the property and facilities?

If not, what agreements will be made for transfer of rights?

7. Are project facilities designed to withstand the probable maximum flood and other damages?

8. Will project affect flooding? How? Where?

9. Is project located in areas of geologic or soil instability?

Measures to safeguard?

10. Will the project contribute to sedimentation and erosion?

Measures to mitigate/control?

11. Dam safety repairs necessary?

extent:

12. Is project located on specially classified river?

13. Is project consistent with all comprehensive plans, zoning?

14. Is project consistent with controlling waters for public beneficial purpose including water quality, flooding, recreation, other commercial uses (e.g. fishing, trapping, etc.)?

15. Does project affect historical, archeological sites?

Are these sites documented?

Are there protection measures?

16. Comments:

Fish and Wildlife Resources:

1. Fisheries/wildlife management plans present or proposed?
2. Is project consistent with management plans/programs?
3. Habitat areas likely to be affected:
4. Fish/wildlife species likely to be affected:
5. Is dredging and disposal to be conducted?
 - a. quantity of material and extent of area to be dredged?
 - b. degree of contamination especially the mobility and bioavailability of potentially toxic substances?
 - c. release of contaminants from sediments during dredging and fill activities, bulk chemical analyses, particle size, elutriate tests?
6. Impacts on fish/wildlife resources:
 - a. blockage of upstream and downstream movement of fish and other aquatic organisms including migration and larval drift.
 - b. direct mortality could be attributed to: (e.g. transmission lines, turbine design, etc.)
 - c. indirect mortality could be attributed to: (e.g. construction activities, predators, etc.)

d. loss or degradation of habitat (e.g. aquatic, riparian, flood plain, wetlands, uplands) due to: (e.g. inundation, tailwater, fluctuation, filling, dewatering, etc.)

e. habitat type lost: (e.g. spawning, nesting, food production, cover, etc.)

f. Concentration, entrapment, impingement, entrainment by intake:

g. degradation of water quality:

h. changes in temperature:

i. reservoir sedimentation, stratification:

j. Sedimentation:

7. Are instream flow(s) determined to protect fish and wildlife needs?

How are they determined?

Quantity?

8. Are project construction, timing and procedures designed to minimize impacts?

9. Are project facilities, operation and maintenances designed to mitigate, compensate and/or enhance resources?

Type:

10. Are all protection measures scheduled to be fully operational at the time the project begins construction and operation?

Explain, if no:

11. Are there cumulative impacts?

12. Comments:

Recreation Resources:

1. Does the project affect any public recreation lands/uses?

a. limit access

b. safety problems

c. inundate existing facilities

d. limit boating, canoeing, etc.

e. limit angling

2. Does project construction, operation, maintenance include acceptable compensation, mitigation and/or enhancement provisions?

Explain:

3. Are instream flows determined for recreational use?

Method of determination:

4. Is project consistent with recreation plans/programs?

Water Resources

1. Water available to meet operation needs as well as other uses

2. Are there other water appropriators in the project vicinity?

Amount of allocations _____ cfs.

a. Are there existing allocation plans?

3. Will the proposed operation interfere with any existing or potential water users?

4. Is proposed operation consistent with achieving maximum economic development of the water or is it uneconomic, impractical, or unreasonable use of the waters?

Explain:

5. Does the project preserve, enhance and provide for the wise use of the natural, educational, recreational and economic values of the water and adjacent lands?
6. Will the project cause significant effects on instream uses or other potential development of greater public benefit than project?

Are there existing protected flow levels?

7. Will instream flow releases be required?

How will they be determined?

8. Is there potential for flow augmentation at the site or through agreements with upstream or downstream dam owners?
9. Are diversions, dewatering or other consumptive use of the water required during any phase of project construction, operation or maintenance?

10. Will excavation and/or filling occur during any aspect of the project?

How much?

Where?

11. Will spoil sites be necessary?

Where located?

12. Are any state water permits required? (work in protected waters; dam safety; water allocation; 401 certification)

13. Have any state permits been applied for?

14. Will water quality/sedimentation be affected during any phase of the project?

15. Are mitigation, compensation and/or enhancement measures addressed for water quality and quantity?

16. Are monthly flow statistics used for operation design?

17. Is project consistent with water resource management plans/programs?

18. Other Questions or Comments:

IV. HYDROPOWER PROJECT REVIEW PROCESS FLOW CHART

This flow chart provides an outline of the process which is used in reviewing proposed hydropower projects including FERC submittals and Agency approvals. It identifies the various steps which will be followed.

<u>DEVELOPER</u>	<u>AD HOC HYDROPOWER TASK FORCE¹</u>	<u>AGENCIES²</u>	<u>FERC</u>
1. License/exemption pre-application consultation initiated with state/federal agencies ² .	Developer meets with Task Force to describe project and seek preliminary comments. Obtains <u>Guidelines for Hydropower Developers and Agency Review.</u>	Formal agency comments provided to developer.	
2. Project/planning process revised by developer. Pre-license/exemption studies conducted			
3. Draft license/exemption prepared by developer and submitted to state/federal agencies ² for formal consultation.	Developer meets with Task Force to discuss revised project and completed <u>Guidelines</u> as referenced above.	Formal agency comments provided to developer.	
4. Project/planning process revised by developer.			
5. License/exemption application submitted to FERC.			6. NEPA documents (EA,EIS) prepared, if necessary. License/exemption deficiencies corrected by developer.
			7. License/exemption application accepted by FERC.
	Task Force reviews final project.	Formal agency comments provided to FERC.	8. FERC submits license/exemption application to state/federal agencies ² for review and comment.
9. Developer obtains necessary federal/state/local permits, 401 water quality certification, necessary agreements, etc. ³			10. License/exemption issued to developer.

¹Minnesota Ad Hoc Hydropower Task Force. Members and advisors include:
 Minnesota Department of Natural Resources Governor's Office
 Minnesota Pollution Control Agency St. Anthony Falls Hydraulics Lab
 Department of Energy & Economic Development State Attorney General's Office
 State Planning Agency U.S. Fish & Wildlife Service
 U.S. Army Corps of Engineers

²Agencies to be consulted are identified in the FERC Application Procedures for Hydropower Licenses, License Amendments, Exemptions and Preliminary Permits ("Blue Book").

³Certain permits or approvals from state agencies may be required after Licenses/exemption is issued by FERC.

V. Appendix A

References used in developing Parts I - II

Oak Ridge National Laboratory - "Analysis of Environmental Issues Related to Small-Scale Hydroelectric Development" Series:

- I. Dredging, J.M. Loar, L.L. Dye, R.R. Turner, S.G. Hildebrand.
Environmental Sciences Division Publ. No. 1565. July, 1980.
 - II. Design Considerations for Passing Fish Upstream Around Dams, S.G. Hildebrand, ed. Envir. Sci. Div. Publ. No. 1567, August, 1980.
 - III. Water Level Fluctuation - S.G. Hildebrand, ed. Envir. Sci. Div. Publi. No. 1591, October, 1980.
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Appendix B.

Definitions of terms referred to in the document:

- A. "Appropriation" means the withdrawal or taking of water regardless of the use to which the water is put for consumptive or non-consumptive purposes.
- B. "Available water" means the water available to satisfy existing and projected water allocation permits, instream flows, and other uses. Water availability is determined by stream gage records or flow estimates using accepted hydrologic analysis methods where gage information is not available or there is less than 10 years of record. Water availability will be determined on a monthly basis.
- C. "Compensation" means full recovery through payments or enhancement measures of all unavoidable or inadvertent losses of resource values from project construction, operation and maintenance.
- D. "Consumptive use" means water withdrawn and not directly returned to the same waters as the source for immediate and/or future use in the area.
- E. "Diversion" means any removal of water from original channels to another channel or a structure such as a conduit or flume, or withdrawal by pumping to another area.
- F. "Enhancement" means the improvement of resource values beyond that which previously existed.
- G. "401 Certification" refers to the MN Pollution Control Agency certification provisions on any discharge into U.S. waters to bring the discharge into compliance with prescribed effluent and water quality standards. No federal license or permit may be granted until certification has been obtained or waived.
- H. "Instream needs" refers to such uses as water-based recreation, navigation, aesthetics, fish and wildlife and water quality that are non-consumptive and require flow within the channel to be sustained at an acceptable level.
- I. "Protected (instream) flow(s)" means the amount of water required in the watercourse to accommodate instream needs and needs by downstream higher priority users located in reasonable proximity to the site of appropriation.
- J. "Mitigation" means avoiding or minimizing losses of resource values by implementing structural or operational measures or by replacing lost resource values with resources of equal or greater value.
- K. "Peaking" refers to any store-and-release type operation. Any peaking operation will require establishment of protected instream flow releases.

- L. "Project" refers to the entire power development and all related construction, operation and maintenance aspects.
- M. "Project area" refers to all lands and water required for the project facilities or affected by the construction, operation and maintenance of the project.
- N. "Project facilities" refers to all structures related to power generation in the project.
- O. "Protected waters permits" refers to the DNR, Division of Waters permit required under M.S. § 105.42 and 105.482 for any work in protected waters or wetlands identified under M.S. § 105.37, Subd. 14 or 15 or § 105.391, Subd. 1 including construction, reconstruction, removal, abandonment, transfer of ownership or any change in any reservoir, dam or waterway obstruction.
- P. "Run-of-river" means instantaneous outflow equals instantaneous inflow minus evaporation in the upstream reservoir. (No changes in temporal flow patterns are expected).
- Q. "Water appropriation permit" refers to the DNR, Division of Waters permit required under M.S. § 105.409 and § 105.417 to appropriate and/or divert any waters of the State.

Appendix C.

May 30, 1986 List of State and Federal Agency Contacts for information on Hydropower Licensing/exemption Review and Agency permits and approvals*

Agency/Address	Area of Involvement	Contact person(s) c/o	Phone Number
Minnesota Department of Natural Resources DNR Building, 500 Lafayette Road St. Paul, MN 55146	Chairperson Hydropower Task Force	Gene Hollenstein c/o Division of Waters, Box 32	612-297-3877
	Instream Flows Water Appropriation	Hedia Adelsman or Pat Olson c/o Division of Waters	612-296-0508 612-296-0445
	Hydropower Dams Technical aspects Dam Safety Permits for work in beds of waters	Craig Regalia c/o Division of Waters	612-296-0525
	Fish and Wildlife related aspects	Jack Skrypek or Joe Geis c/o Ecological Services Division of Fish and Wildlife	612-296-0781
	Coordination of DNR review comments and Environmental Impact Documents	Ken Wald c/o Office of Planning Environmental Review	612-296-4790
Minnesota Pollution Control Agency 1935 W. Co. Rd. B2 Roseville, MN 55113	Water quality pollution control permits and approvals	Lou Flynn c/o Water Quality Division Permits Section	612-296-7355

Minnesota State Planning
Agency
100 Capitol Square Building
550 Cedar Street
St. Paul, MN 55155

General area of
Hydropower
development
policy/planning
perspectives

Bob Cupit

612-296-2096

Minnesota Department of
Energy and Economic
Development
900 American Center Building
150 E. Kellogg Blvd.
St. Paul, MN 55101

Energy &
Economic
development
related aspects

John Dunlop

612-296-4737

St. Anthony Falls
Hydraulic Lab
Miss. River at 3rd Ave. S.E.
Minneapolis, MN 55414

Technical
Hydraulics and
Hydropower
development

Dr. John Gulliver

612-373-2782

U.S. Fish and Wildlife
Service
St. Paul Field Office
Park Square Court

Fish and Wildlife
aspects
(federal
perspective)

Gary Wege

612-725-7131

U.S. Corps of Engineers
St. Paul District
1135 U.S. P.O. and
Custom House
St. Paul, MN 55101

Corps of
Engineers
related aspects
of Hydropower
development

Dan Wilcox

612-725-5923

*Note - The various contact people listed may change from time to time -
Revised lists will be developed in Jan. or Feb. each year to reflect any
changes.