

GAO

Report to the Chairman, Subcommittee  
on Oversight and Investigations,  
Committee on Energy and Commerce,  
House of Representatives

September 1992

# ELECTRICITY REGULATION

## Electric Consumers Protection Act's Effects on Licensing Hydroelectric Dams



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United States  
General Accounting Office  
Washington, D.C. 20548

Resources, Community, and  
Economic Development Division

B-249467

September 18, 1992

The Honorable John D. Dingell  
Chairman, Subcommittee on Oversight  
and Investigations  
Committee on Energy and Commerce  
House of Representatives

Dear Mr. Chairman:

In response to your request, this report provides information on the Federal Energy Regulatory Commission's (FERC) efforts at implementing the Electric Consumers Protection Act of 1986, use of temporary licenses for projects seeking relicensing, and requirements for ensuring public safety at hydroelectric projects. In addition, it contains information on requests for additional power capacity at existing hydroelectric power facilities and the method FERC uses to determine if projects are located on "navigable" waters.

As arranged with your office, unless you publicly announce its contents earlier, we will make no further distribution of this report until 30 days after the date of this letter. At that time, we will send copies to appropriate congressional committees and the Chairman of FERC. We will also make copies available to others upon request.

Please contact me on (202) 275-1441 if you or your staff have any questions. Major contributors to this report are listed in appendix IV.

Sincerely yours,

Victor S. Rezendes  
Director, Energy and Science Issues

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# Executive Summary

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## Purpose

The Federal Energy Regulatory Commission (FERC) currently faces a challenge: By the end of 1993, the long-term operating licenses for more than 15 percent of the nation's 1,061 nonfederal hydroelectric power projects will expire. In determining the conditions under which these projects may be relicensed, FERC must follow the 1986 Electric Consumers Protection Act's (ECPA) requirement to balance electricity needs with environmental and other considerations.

To assess how FERC achieves this balance, the Chairman, Subcommittee on Oversight and Investigations, House Committee on Energy and Commerce, asked GAO to, among other things, (1) review ECPA's effects on FERC's licensing process for and decisions about hydroelectric power projects, (2) provide information on FERC's use of temporary licenses for projects seeking relicensing, and (3) identify FERC's requirements for ensuring public safety at hydroelectric projects.

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## Background

Under the Federal Power Act, as amended, FERC is responsible for regulating, licensing, and inspecting nonfederal hydroelectric projects. Licenses can be issued for a period of up to 50 years, after which the projects must be relicensed in order to continue operating. Licenses that expire while undergoing relicensing automatically receive temporary 1-year extensions, called annual licenses, until relicensing is completed.

ECPA amended the Federal Power Act to require that FERC not only consider the power and other developmental values of hydroelectric projects, but also give "equal consideration" to nondevelopmental values, including conserving energy; protecting, mitigating damage to, and enhancing fish and wildlife and related habitat; protecting recreational opportunities; and preserving other features of environmental quality.

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## Results in Brief

To implement ECPA's requirements, FERC has made procedural changes that generally require more interaction between FERC, applicants, and federal and state resource agencies (agencies responsible for fish and wildlife, recreation, water, and other resources). While FERC began applying ECPA's balancing requirements after the law's 1986 enactment, regulations to implement the procedural changes were phased in between November 1987 and January 1992. GAO's analysis, as well as other studies, indicate that hydroelectric project licenses issued by FERC after ECPA have incorporated a higher percentage of resource agencies' recommendations than those issued before ECPA.

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FERC has historically exceeded the time established for relicensing, resulting in a number of projects operating under an annual license for some period of time. This number is likely to increase as FERC processes relicensing applications for a large number of projects. Annual licenses generally perpetuate existing license terms and conditions, thus effectively delaying new terms and conditions that may better achieve ECPA's goal of balancing power and nondevelopmental needs. Delays in relicensing, contributing to the need for annual licenses, are caused by a variety of factors, not all of which are under FERC's control.

FERC attempts to ensure public safety at hydroelectric power facilities by promulgating regulations and guidelines to be followed by licensees, inspecting hydroelectric power projects for compliance, and reporting safety-related incidents and investigating their causes. To enforce these requirements, FERC is authorized to impose civil penalties and to revoke licenses if necessary. FERC's public safety program is similar to the programs of other federal agencies that operate dams, such as the U.S. Army Corps of Engineers.

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## Principal Findings

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### Studies Suggest More Consideration of Nondevelopmental Values Under Revised Process

According to FERC officials, FERC began implementing ECPA on a case-by-case basis after the law's 1986 enactment. However, the final implementing regulations did not take effect until January 1992. Since then, only 15 licenses and 5 renewed licenses (called "relicenses") have been issued.

Under the revised regulations, resource agencies have more opportunities to present their views and FERC has more formal requirements to respond to them. For example, before submitting a license application to FERC, potential applicants are required to (1) provide preliminary information to, and meet with, resource agencies and others, which have 60 days to request studies or additional information; (2) submit environmental studies and a draft license application to the agencies, which have 90 days to respond; and (3) meet with any agencies that disagree with the documents. After accepting a license application for filing, FERC allows resource agencies and the public 60 days to provide comments and/or recommendations. In addition, FERC must explain the basis for not incorporating fish and wildlife agencies' recommendations.

GAO analyzed samples of licenses issued between 1982 and 1986 (before ECPA's enactment) and between 1988 and 1991 (after ECPA's enactment). Overall, the data show that from the first period to the second, the portion of recommendations accepted without modification by FERC increased from about two-thirds to about three-fourths. Studies by FERC, the Fish and Wildlife Service, and the Electric Power Research Institute<sup>1</sup> (EPRI) show similar results. The studies also show that FERC accepted a majority of resource agencies' recommendations before ECPA; for example, a FERC-commissioned study shows that the agency accepted an increasing proportion of recommendations in the years preceding ECPA, from a low of 52 percent in 1980 to 89 percent in 1986.

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### Projects Operating Under Annual Licenses Can Delay ECPA's Goals

With some exceptions, when a project is placed under an annual license, the existing license terms and conditions do not change; thus, annual licenses in effect delay implementation of resource agencies' potential recommendations to protect and enhance fish and wildlife. While FERC's procedures require applicants to file applications for relicensing 2 years before their current licenses expire, the median processing time for the 111 projects applying for relicensing between January 1982 and May 1992—from application to license issuance—was 2.5 years. Thus, according to FERC's records, 43 (about 39 percent) of these projects were placed under an annual license for some period of time. While FERC has increased its staffing and hired a contractor to assist in processing its current record number of relicensing applications, resource agencies and applicants have expressed concern that the use of annual licenses will increase.

FERC's data show 29 projects operating under annual licenses as of August 1992. GAO reviewed FERC's categorization of factors contributing to delays in these projects and found that nine of the projects—about 30 percent—experienced delays attributable to the applicant; seven projects—or 23 percent—were delayed primarily because of federal or state agencies' actions, or inactions; and two projects entailed legal/jurisdictional factors not solely under FERC's control. The remaining 11 projects were under annual licensing because of more than one of these factors.

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<sup>1</sup>EPRI was founded by the nation's electric utilities to develop and manage a technology program for improving electric power.

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## FERC's Public Safety Program Is Similar to Other Water Resource Agencies'

FERC, primarily concerned with the hazards created by projects' structures and operations, attempts to ensure public safety at hydroelectric power facilities by promulgating regulations and guidelines to be followed by licensees, inspecting hydroelectric power projects for compliance, and reporting safety-related incidents and investigating their causes.<sup>2</sup> To enforce its public safety requirements, FERC is authorized to impose civil penalties and to revoke licenses if necessary.

While a number of public safety incidents at FERC-regulated facilities are reported by licensees and others each year, not all such incidents are caused by licensees' violations of public safety requirements. Public safety incidents at FERC-licensed facilities increased from 137 in 1987 to 190 in 1991; however, FERC determined that only 10 of these incidents were caused by the operation of the project. In one case, FERC levied the largest civil penalty it has issued to date.

FERC's public safety program is similar in many respects to those operated by the U.S. Army Corps of Engineers, the Bureau of Reclamation, and the Tennessee Valley Authority—agencies with long histories of operating water resource projects. These agencies' public safety programs encompass requirements for warning signs; audible devices, lights, and/or boat barriers; and public awareness and educational outreach.

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## Recommendations

GAO is making no recommendations in this report.

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## Agency Comments

GAO discussed the contents of a draft of this report with FERC hydrolicensing officials, who generally agreed with the facts presented. However, as requested, GAO did not obtain written comments on a draft of this report.

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<sup>2</sup>Public safety refers to actions/measures that can be employed to enhance the protection of the public that utilize projects' lands and waters.

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# Contents

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<b>Executive Summary</b>		2
<b>Chapter 1</b>		8
<b>Introduction</b>	FERC's Hydroelectric Project Licensing Activities	8
	Objectives, Scope, and Methodology	11
<b>Chapter 2</b>		14
<b>Revised Process and Acceptance of Resource Agencies' Recommendations Suggest Greater Consideration of Nondevelopmental Values</b>	Revised Process Provides for More Interaction Between FERC and Resource Agencies	14
	FERC Has Accepted Higher Proportion of Resource Agencies' Recommendations	18
	Conclusions	23
<b>Chapter 3</b>		24
<b>Projects Operating Under Annual Licenses Can Delay ECPA's Effects</b>	Number of Projects Operating Under Annual License May Increase	24
<b>Chapter 4</b>		30
<b>FERC Requires Public Safety Programs at Hydroelectric Power Facilities</b>	FERC's Regulations Require Public Safety Measures	30
	FERC's Public Safety Program Is Similar to Other Federal Water Resource Agencies'	35
<b>Appendixes</b>		
	Appendix I: Consideration, During Relicensing, of Environmental Impacts of Increased Power Output	38
	Appendix II: FERC's Policies and Procedures for Determining Jurisdiction Based on Navigability of Waters	40



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**Contents**

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	Appendix III: Data on Studies of FERC's Disposition of Agencies' Recommendations	42
	Appendix IV: Major Contributors to This Report	45
<hr/>		
<b>Related GAO Products</b>		48
<hr/>		
<b>Tables</b>	Table 1.1: FERC's Hydroelectric Project Licensing Workload, 1982-97	11
	Table 2.1: Major Regulations Implementing ECPA	17
	Table 4.1: Safety Incidents Reported at FERC-Regulated Hydropower Projects	33
	Table III.1: Comparison of Studies on Resource Agencies' Recommendations	44
<hr/>		
<b>Figures</b>	Figure 2.1: Pre-ECPA Treatment of Resource Agencies' Recommendations for License Conditions	20
	Figure 2.2: Post-ECPA Treatment of Resource Agencies' Recommendations for License Conditions	21
	Figure 3.1: Relicensing Application Processing Time, 1984-89 Relicense Issuances	26
	Figure 3.2: Reasons That Projects Were Under Annual License	28
	Figure 3.3: FERC's Office of Hydropower Licensing, Authorized Staffing Changes, 1989-93	29

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**Abbreviations**

ECPA	Electric Consumers Protection Act of 1986
EPRI	Electric Power Research Institute
FERC	Federal Energy Regulatory Commission
FWS	U.S. Fish and Wildlife Service
GAO	General Accounting Office
MW	megawatts
NEPA	National Environmental Policy Act of 1969
NWSC	National Water Safety Congress
OGC	Office of General Counsel
OHL	Office of Hydropower Licensing
TVA	Tennessee Valley Authority

# Introduction

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Under the Federal Power Act, as amended, the Federal Energy Regulatory Commission (FERC) is responsible for regulating, licensing, and inspecting the nation's nonfederal hydroelectric projects. As of June 1992 FERC had 1,061 projects under license, accounting for about 46,000 megawatts (MW) of generating capacity, or about 6.2 percent of the nation's installed electric generating capacity.<sup>1</sup>

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## FERC's Hydroelectric Project Licensing Activities

Hydroelectric projects under FERC's jurisdiction are those that (1) are located on navigable waters of the United States, (2) occupy public lands or reservations of the United States, (3) utilize the surplus water or waterpower from a federal dam, or (4) are located on waters that are nonnavigable but over which the Congress has jurisdiction under its authority to regulate interstate and foreign commerce, affect interstate or foreign commerce, and have been constructed or modified since 1935. Certain small projects, such as a dam with a power production capacity of 5 MW or less, may be exempted from the license requirement.

Under the Federal Power Act, licenses to operate new, previously unlicensed hydroelectric projects—called original licenses—can be issued for a period of up to 50 years, after which the projects must be relicensed in order to continue operating. (Before applying for an original license, an applicant may request a “preliminary permit” in order to obtain a priority position for its application for a particular hydroelectric site.) FERC processes applications for relicensing in basically the same manner as those for original licenses.

Hydroelectric project licensing is a public process; FERC publishes in local newspapers and in the Federal Register notices of all relicensing applications and original license applications that receive preliminary approval so that affected parties may comment. FERC reviews each application to determine whether each is adequate (i.e., includes all of the information required by law and regulation); if the application is adequate, FERC then formally accepts it for filing. Competing license applications are processed on a “first-come, first-served” basis; that is, if two or more equally well qualified applications are received, FERC gives priority to the first complete application accepted for filing. Licensing and relicensing decisions can be made by FERC's five-member Commission or, more often, by its Director of the Office of Hydropower Licensing (OHL), which operates under the Commission's authority.

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<sup>1</sup>A watt is the basic unit of measurement for electric power; a megawatt is 1 million watts.

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## 1986 Law Placed New Requirements on FERC's Hydroelectric Project Licensing Activities

Historically, FERC granted licenses to applicants if proposed hydroelectric power projects were found to be economically feasible and met other criteria established in the Federal Power Act and other laws. Environmental and fish and wildlife interests were incorporated into the licensing process in various ways. The National Environmental Policy Act of 1969, as amended (NEPA) (42 U.S.C. 4321 *et seq.*), requires FERC to evaluate the environmental impacts of its hydrolicensing decisions. In addition, some federal and state agencies may prescribe mandatory license conditions under the authority granted them by other legislation, such as the Clean Water Act (33 U.S.C. 1251 *et seq.*).

The Electric Consumers Protection Act of 1986 (ECPA) placed additional requirements on the hydroelectric project licensing process to further environmental interests. ECPA amended the Federal Power Act by, among other things, adding subsection 10(j), which requires FERC to

- include in each license for a hydroelectric power project conditions to adequately and equitably protect, mitigate damages to, and enhance fish and wildlife affected by the development, operation, and management of the project;
- base such license conditions on recommendations from federal and state fish and wildlife agencies unless FERC determines that such recommendations are inconsistent with the law;
- attempt to resolve any inconsistencies in recommendations, giving due consideration to each agency's expertise; and
- explain the basis for rejecting any recommendations, including how the license conditions meet the section 10(j) standard.

ECPA also amended section 4(e) of the Federal Power Act, requiring FERC to give equal consideration to developmental and nondevelopmental values in the hydrolicensing process. Developmental values include power, irrigation, and flood control, while nondevelopmental values include the protection of fish and wildlife and their habitat and spawning grounds, energy conservation, recreation, and other features of environmental quality. ECPA also required FERC to consider state, regional, and federal comprehensive waterway development plans when making licensing and relicensing decisions.

Major federal and state resource agencies <sup>2</sup> with authority to prescribe mandatory licensing conditions or to recommend licensing conditions

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<sup>2</sup>According to FERC, a resource agency is a federal, state, or interstate agency exercising administration over areas of flood control, navigation, irrigation, recreation, fish and wildlife, or other relevant resources of the state or states in which a project is or will be located.

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include the Department of Commerce's National Marine Fisheries Service; the U.S. Fish and Wildlife Service (FWS) and Bureau of Reclamation, within the Department of the Interior; the Department of Agriculture's Forest Service; the U.S. Army Corps of Engineers; and state fish and wildlife agencies. For example, the Federal Power Act authorizes FWS to mandate certain license conditions that mitigate a project's impacts on fish (such as requiring fishways or other bypass structures). Others, including state agencies with interests in natural resources, state historic preservation officers, Indian tribes, and the Environmental Protection Agency, must also be consulted during the licensing process.

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**FERC Faces a Relicensing  
"Bubble"**

As shown in table 1.1, FERC's licensing activity in the last decade peaked in 1986, when 125 projects were licensed or relicensed in 1 year. However, in 1993, 167 licenses will expire—covering almost 16 percent of FERC's licensed projects—and all but 10 project operators have applied for relicensing. FERC's relicensing application forecast shows that from 1994 through 1997 the number of licenses expiring annually will range from three to seven.

The Federal Power Act provides that if a project's license expires before FERC relicenses it, the licensee is automatically issued 1-year extensions (called annual licenses). An annual license contains the same terms and conditions as the expired license it replaces, unless a "reopener clause," which permits FERC to alter license conditions during the license term, exists in the expired license.

**Table 1.1: FERC's Hydroelectric Project Licensing Workload, 1982-97**

<b>Calendar year</b>	<b>Original licenses</b>	<b>Relicenses</b>	<b>Total</b>
1982	59	6	65
1983	77	5	82
1984	72	4	76
1985	68	4	72
1986	119	6	125
1987	87	5	92
1988	46	7	53
1989	42	22	64
1990	24	3	27
1991	27	4	31
1992	N.A.	2	2
1993	N.A.	167	167
1994 <sup>a</sup>	N.A.	3	3
1995	N.A.	4	4
1996	N.A.	7	7
1997	N.A.	5	5

Note: "N.A." stands for "not available."

<sup>a</sup>For 1994 to 1997, the numbers are estimates based on FERC's forecast of licenses expiring.

Source: FERC.

## Objectives, Scope, and Methodology

The Chairman of the Subcommittee on Oversight and Investigations, House Committee on Energy and Commerce, asked GAO to (1) review the effects of ECPA's amendments to the Federal Power Act on FERC's licensing/relicensing process for and decisions about hydroelectric power projects, (2) provide information on FERC's use of annual (temporary) licenses for projects seeking relicensing, and (3) identify FERC's requirements for ensuring public safety at licensed hydroelectric projects. The Chairman also asked us to identify the implications of increased hydropower output at projects seeking relicensing and to explain FERC's policies and procedures for deciding whether a project is located on "navigable" waters in determining jurisdiction.

To review how ECPA has affected FERC's licensing/relicensing process for and decisions about hydroelectric power projects, we reviewed relevant laws, regulations, and other documents and attended a congressional

hearing. We also obtained documents from and interviewed officials at FERC's OHL and Office of General Counsel (OGC). We also interviewed officials and obtained documents from federal resource agencies, including the FWS, the National Marine Fisheries Service, the Bureau of Land Management, the Bureau of Reclamation, the Forest Service, and the U.S. Park Service and from state fish and wildlife agencies in New York, Pennsylvania, West Virginia, Washington, and Wisconsin. We also obtained information from the National Wildlife Federation, American Rivers (a group that promotes the preservation and restoration of American river systems), and the National Hydropower Association (which represents hydroelectric power developers).

We obtained statistics from FERC on the number of projects licensed or relicensed. We compiled data on FERC's use of resource agencies' recommendations by reviewing two random samples of FERC's licensing orders; one sample group of orders was issued between 1982 and 1986 and the second group, between 1988 and 1991. However, subsequent to our analysis, FERC revised its list of licenses and renewed licenses (called "relicenses"), increasing the number of orders in both of our two groups of orders. Our estimates do not reflect any of the subsequently added licensing orders. Appendix III contains the details of our samples.

We also reviewed several studies by other organizations on the extent to which FERC has incorporated resource agencies' recommendations in licensing and relicensing decisions made since ECPA's enactment: (1) data from a study performed for FERC's OHL by a private contractor; (2) a study dealing only with FWS' recommendations, performed by FWS; and (3) a study performed by the Electric Power Research Institute (EPRI), a research organization funded by the nation's electric utilities. Appendix III also contains the details of these studies.

To provide information on FERC's use of annual licenses, we reviewed pertinent rules and regulations and obtained documents from and interviewed officials at FERC, FWS, the National Wildlife Federation, American Rivers, the Forest Service, the National Hydropower Association, and state fish and wildlife agencies.

To obtain information on FERC's public safety program for hydroelectric projects, we interviewed FERC officials in the Offices of Dam Safety and Inspections, Compliance and Administration, and Project Review. We obtained statistics on public safety incidents and other pertinent documents from FERC. We also interviewed officials at the Tennessee

Valley Authority (TVA), Army Corps of Engineers, and Department of the Interior's Bureau of Reclamation about their public safety programs and obtained statistics on public safety incidents at their projects. We also obtained information from the National Water Safety Congress (NWSC) about its participants, objectives, and goals. We did not evaluate the adequacy of the procedures used by FERC for inspections or compliance actions.

To identify the effects of increased hydropower at projects seeking relicensing, we obtained data and interviewed officials at FERC and resource agencies. In addition, we obtained data from an EPRI study. To assess how FERC applies the "navigability" criterion for determining jurisdiction, we reviewed FERC's procedures for determining jurisdiction and interviewed officials in FERC's OGC, Division of Compliance and Review, and OHL. OHL furnished statistics on the number of cases in which determinations about navigability were made. Information on the effects of increased power output and on determinations about navigability is included as appendix I and appendix II, respectively.

Our work was conducted from July 1991 to August 1992 in accordance with generally accepted government auditing standards. We discussed a draft of this report with FERC officials, including the Director and Assistant Director of OHL and a representative of OGC. The officials expressed general agreement with the contents of the report but suggested some changes to improve its technical accuracy. We have included these officials' comments where appropriate. However, as requested, we did not obtain written comments on a draft of this report.

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# Revised Process and Acceptance of Resource Agencies' Recommendations Suggest Greater Consideration of Nondevelopmental Values

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Although ECPA was enacted in 1986, FERC's implementing regulations were not completed until the end of 1991. Generally, the regulations revise the hydrolicensing process to require more interaction between resource agencies, FERC, and applicants: Resource agencies have more opportunity to present their views concerning projects up for licensing or relicensing, and FERC has more formal requirements to respond to these views. Since ECPA's enactment, FERC has made efforts to improve coordination between affected groups.

Our analysis and similar studies by others indicate that FERC's hydroelectric project licenses issued after 1986 have generally incorporated a higher percentage of all recommendations made by resource agencies. The studies also show that FERC accepted a majority of such recommendations before 1986—that is, before ECPA. FERC's acceptance of recommendations considered more critical to nondevelopmental values was about the same as for all recommendations.

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## Revised Process Provides for More Interaction Between FERC and Resource Agencies

While FERC began applying ECPA's balancing requirements after the act's 1986 enactment, regulations to implement the procedural changes were phased in between November 1987 and January 1992. According to FERC officials, the agency began implementing ECPA's provisions on a case-by-case basis following the law's October 1986 enactment. FERC's final regulations implementing ECPA did not take effect until January 2, 1992. As a result, only 15 licenses and 5 relicenses have been issued under the complete set of revised procedures, including the critical 10(j) process.

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## Resource Agencies and Applicants Have More Opportunities to Comment

The major changes to the licensing process are more structured mechanisms for increased interaction between agencies, applicants, and FERC, and requirements for FERC to formally consider and discuss fish and wildlife agencies' recommendations. According to FERC, before ECPA's enactment, resource agencies had four major opportunities for interaction with FERC on the license terms and conditions for hydroelectric projects. During the "prefiling" phase, the agencies could (1) formally comment on an applicant's project plans and/or (2) comment on a draft application submitted to, but not yet formally accepted by, FERC. During the "postfiling" phase, the agencies could (1) comment on the proposed project within 60 days after FERC formally accepted the application for filing and/or (2) file to appeal the license within 30 days of its issuance (if the license was issued by OHL) or request a rehearing (if the license was issued by the Commission).



Under the rules adopted pursuant to ECPA, resource agencies, Indian tribes, and the public have more opportunity to present their views in both the prefiling and postfiling phases of the hydroelectric project licensing process, as summarized below.

### Prefiling Phase

The prefiling phase has three stages. During the first stage a series of interactions occurs between the applicant, resource agencies, affected Indian tribes, the public, and FERC in which the applicant provides preliminary information about the project, such as the location of all proposed facilities, the engineering designs, and a report on affected environmental resources. FERC's instructions to applicants calls for this process to begin as early as possible. For relicensing, an applicant is required to notify FERC of its intent to apply for a renewal at least 5 years before the existing license expires. After furnishing preliminary information to the resource agencies and others, the applicant is required to hold a public meeting, after which resource agencies and affected Indian tribes have 60 days to request studies or information from the applicant.<sup>1</sup> The first stage ends when these groups provide written comments or 60 days (unless the time is extended) after the joint meeting, whichever occurs first.

During the second stage, the applicant conducts engineering and environmental studies and prepares a draft license application, both of which are submitted to the resource agencies and Indian tribes. The agencies and Indian tribes must respond within 90 days; if there are any major disagreements, the applicant must hold a joint meeting with the disagreeing agency or tribe. During stage three, the application is formally filed with FERC and made available to all affected resource agencies and tribes, giving them and the public another opportunity, within 60 days after FERC issues a public notice of acceptance, to request additional scientific studies.

At any point during the prefiling phase, a resource agency or tribe may request that FERC resolve disputes concerning the need for scientific studies. Scientific studies are necessary to determine what measures should be taken at a hydroelectric power project to protect, mitigate damages to, and enhance fish and wildlife and/or to achieve other resource goals.

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<sup>1</sup>The period can be extended to 120 days.

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**Postfiling Phase**

After the final application is submitted, FERC takes a more active role, beginning with OHL's review to ensure that the application is complete and can be accepted for filing. For relicensing, ECPA requires that applications be filed no later than 2 years before the license's expiration date. Simultaneously, OHL determines if any additional information—such as data on environmental impacts or the dam's structure—is needed from the applicant. An applicant typically receives from 30 days to 1 year to provide this information.<sup>2</sup> The application and additional information, as well as public comments and agencies' recommendations, generally provide the starting point for FERC's environmental analyses pursuant to NEPA and other applicable laws.

After FERC notifies the applicant that the application is accepted for filing, FERC initiates the procedures for incorporating resource agencies' recommendations pursuant to the Fish and Wildlife Coordination Act (16 U.S.C. 661 *et seq.*) and to section 10(j) of the Federal Power Act. Under these procedures,

- FERC declares an application ready for environmental analysis;
- resource agencies and the public have 60 days to provide comments and/or recommendations (as well as any mandatory conditions authorized by other provisions of law);
- the applicant may file comments in reply within 105 days;
- OHL may, within 45 days of receiving a recommendation concerning fish and wildlife, request clarification of the recommendation;
- in conjunction with issuance of the environmental impact statement or environmental assessment, FERC writes a preliminary determination on whether each recommendation is inconsistent with the purposes and requirements of the Federal Power Act or other applicable law;
- any party, affected resource agency, or Indian tribe may file comments within 45 days in response to a preliminary determination of inconsistency;
- OHL may conduct a meeting and or employ other procedures in an attempt to resolve any inconsistency, giving due weight to the recommendations, expertise, and statutory responsibilities of the fish and wildlife agencies; and
- OHL or the Commission either grants or denies the license application in question.

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<sup>2</sup>Applicants may need several months to 1 year to obtain information that requires gathering seasonal and/or complex data.

**Chapter 2**  
**Revised Process and Acceptance of**  
**Resource Agencies' Recommendations**  
**Suggest Greater Consideration of**  
**Nondevelopmental Values**

If FERC and the agencies have not resolved an inconsistency, FERC must include in the licensing order a finding of why a recommendation is inconsistent with the law and how the project will protect, mitigate damage to, or enhance fish and wildlife.

Before or concurrently with the 10(j) process, OHL prepares a project environmental document—either an environmental assessment or a more detailed environmental impact statement—to fulfill NEPA's requirements. Resource agencies have 60 days after the completion of an environmental assessment in which to submit their final mandatory license conditions. In addition, intervenors may seek rehearing on an issued license within 30 days.

Table 2.1 summarizes the procedural changes under FERC's regulations implementing ECPA.

**Table 2.1: Major Regulations Implementing ECPA**

<b>Regulation</b>	<b>Date</b>	<b>Major provisions</b>
Order 480	Nov. 1987	Requires increased public notice of intent to file for a license permit
Orders 481 and 481-A	Nov. 1987 June 1988	Requires project operation plan to be consistent with comprehensive plans for the waterway(s)
Order 487	Jan. 1988	Provides for payment to compensate fish and wildlife agencies for their costs in setting terms and conditions for projects
Orders 513 and 513-A	July 1989 Jan. 1990	Changes relicensing procedures to include, among other things, additional consultation between applicants, resource agencies, and the public; establishes process for resolving disputes arising during prefilling; recognizes special rights of Indian tribes to participate
Order 533, Final order, Revised final order	June 1991 Jan. 1992	Sets forth definitions of "resource agencies," "fish and wildlife recommendations," and "fishway"; revises prehearing procedures and the resolution process for disputes about scientific studies; provides for additional public notice and participation in the licensing process; codifies the 10(j) process; and clarifies and codifies the notice and comment procedures for hearings

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## **FERC Has Taken Steps to Improve Coordination During Licensing Process**

In recognition of the relicensing "bubble" that it faces just as final regulations implementing ECPA are put into effect, FERC has taken or initiated a number of steps to smooth the transition to the new licensing process. These include (1) entering into memorandums of understanding and other working agreements with resource agencies; (2) participating in a joint task force to improve the working relationship between FERC and FWS; (3) conducting training classes with other agencies' staff; and (4) meeting with federal, state, and local resource agencies to explain the 10(j) process. FERC has also provided more guidance to license applicants and added OHL staff to more quickly process the large volume of relicensing applications.

To make licensing more efficient, FERC has entered into memorandums of understanding or other working agreements with state agencies, the Army Corps of Engineers, the Bureau of Reclamation, and the Forest Service. As of May 1992, FERC had begun discussions aimed at improving its working relationships with EPA and the Bureau of Land Management. In 1991-92, FERC and the Forest Service have conducted five regional training sessions for each agency's staff about the other agency's procedures for reviewing hydroelectric power projects.

FERC has attempted to minimize the number of defective applications by (1) issuing handbooks on relicensing and licensing, (2) providing applicants with information on common mistakes in filing applications, and (3) reviewing draft applications and advising applicants on the applications' adequacy. FERC has also initiated an incentive awards program among its own staff to increase motivation.

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## **FERC Has Accepted Higher Proportion of Resource Agencies' Recommendations**

Studies by GAO and others show that FERC has accepted a higher proportion of resource agencies' recommendations since ECPA's 1986 enactment, suggesting that the act has resulted in FERC's better "balancing" hydropower with nondevelopmental considerations. The studies also show that FERC accepted a majority of such recommendations before ECPA. FERC accepted about the same proportion of recommendations considered more important to nondevelopmental values as it did of all recommendations both before and after ECPA's enactment.

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**FERC Accepted a Majority  
of Agencies'  
Recommendations Before  
ECPA**

Typical issues on which resource agencies make recommendations for license conditions include minimum water flows, construction of fish passage facilities, installation of screens and other devices to prevent injury to and the death of fish, reservoir drawdown limitations, and the purchase and restoration of lands affected by projects.

In our analysis of a sample of licenses, including relicenses, issued between 1982 and 1986 (before ECPA's enactment), we categorized each recommendation by resource agencies as either accepted (included as a license condition), modified (accepted with modification), or rejected (not appearing in the license). These 38 licenses contained a total of 124 recommendations. Our analysis shows that FERC accepted 66 percent of the agencies' recommendations, modified 26 percent, and rejected 8 percent.

Studies by others show results similar to those of our analysis. For example, a FWS study of FERC's actions on FWS' recommendations made between May 1983 and April 1986 shows that FERC accepted 79 percent of the recommendations, modified 9 percent, and rejected 12 percent. A FERC-commissioned study of all recommendations made by resource agencies between January 1980 and October 1986 shows that FERC accepted 75 percent of the recommendations, modified 20 percent, and rejected 5 percent. The FERC study also shows an annual increase in the percentage of recommendations accepted, from a low of 52 percent in 1980 to 89 percent in 1986. These data are consistent with statements by OHL officials that FERC was already giving increased emphasis to nondevelopmental resource values before ECPA's enactment.

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**Studies Show FERC's  
Increased Acceptance of  
Agencies'  
Recommendations After  
ECPA**

Our analysis and the other studies show that FERC accepted a somewhat higher percentage of agencies' recommendations after ECPA's enactment than before.<sup>3</sup> Our analysis of a sample of 35 licenses (including relicenses) issued between 1988 and 1991, containing 191 recommendations, shows that FERC accepted 77 percent of the recommendations, modified 18 percent, and rejected 5 percent. The results for our sample are consistent with those of similar studies by others. (Appendix III contains details of our sample, including estimated sampling errors, as well as a comparison of our analysis with the other studies.)

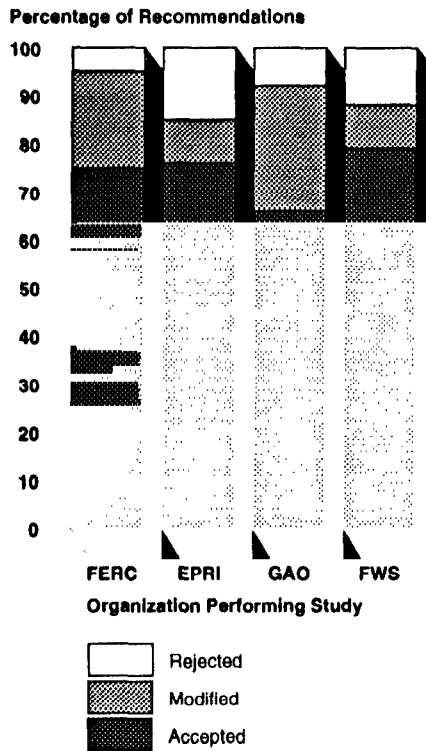
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<sup>3</sup>Our estimate of the difference between the percentage of recommendations accepted by FERC between 1982 and 1986 and the percentage accepted between 1988 and 1991 is 11.4 ± 10.5 at the 95-percent confidence level.

**Chapter 2**  
**Revised Process and Acceptance of**  
**Resource Agencies' Recommendations**  
**Suggest Greater Consideration of**  
**Nondevelopmental Values**

A study by EPRI that looked at relicenses issued between 1984 and 1991 shows that FERC accepted 76 percent of resource agencies' recommendations before ECPA's enactment, compared with 85 percent after the enactment. A FERC study of licenses issued between January 1990 and March 1992 shows that FERC accepted 97 percent of resource agencies' recommendations. <sup>4</sup> Figures 2.1 and 2.2 compare the pre- and post-ECPA acceptances reported by the studies.

**Figure 2.1: Pre-ECPA Treatment of Resource Agencies' Recommendations for License Conditions**

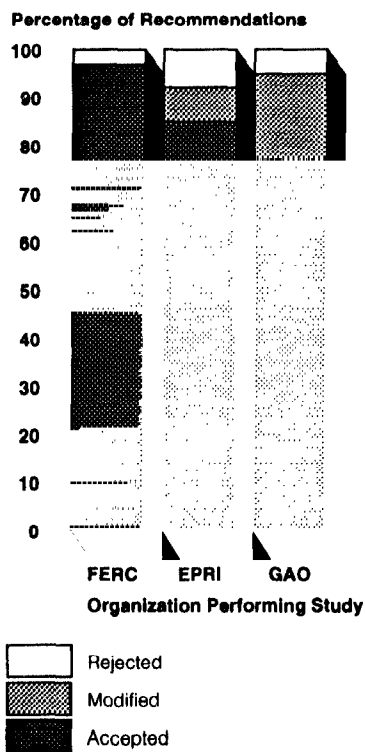


Note: FERC's, EPRI's, GAO's, and FWS' data are for 1980-86, 1984-86, 1982-86, and 1983-86, respectively.

<sup>4</sup>About 3 percent of the recommendations that FERC considered as accepted were modified, with the resource agency's agreement, during the dispute resolution process.

**Chapter 2**  
**Revised Process and Acceptance of**  
**Resource Agencies' Recommendations**  
**Suggest Greater Consideration of**  
**Nondevelopmental Values**

**Figure 2.2: Post-ECPA Treatment of Resource Agencies' Recommendations for License Conditions**



Notes: FERC's, EPRI's, and GAO's data are for 1990-91, 1986-91, and 1988-91, respectively.

FERC did not categorize any recommendations as modified. Fourteen accepted recommendations (3 percent) were arrived at via the 10(j) consultation process. In addition, in considering the treatment of recommendations, FERC included those found in five license amendments.

While it is not certain that ECPA caused the increase in the percentage of recommendations accepted, the data and comments from fish and wildlife agencies indicate that ECPA may have added impetus to FERC's growing acceptance of fish and wildlife recommendations. The trend toward fewer rejections and modifications and more acceptances appears in all of the studies.

**FERC Has Accepted the Majority of "Critical" Recommendations**

Certain types of recommendations are more critical to natural resources than others; moreover, certain hydroelectric power projects affect natural resources to a much larger extent than others. Recommendations

pertaining to minimum water flow, dissolved oxygen content, and fish entrainment<sup>5</sup> mitigation often have large effects on fish and wildlife resources compared with others, such as a recommendation that the licensee install water flow gauges. In addition, a FWS report noted that recommendations may be interdependent; that is, the efficacy of one recommended condition may depend on the acceptance of another recommendation. For example, if FERC does not accept a recommendation to maintain a minimum water flow downstream from the project, then a recommendation for recreational fishing facilities—even though accepted—would not result in the intended condition, since fishing would be degraded.

Projects also vary in their impact on nondevelopmental resources, and thus similar recommendations, on two separate projects—even if both are accepted—could have greatly different effects. For example, a recommendation pertaining to a hydroelectric project with potential impacts on rare and/or sensitive fish and wildlife may hold more importance for natural resources than a similar recommendation pertaining to a project that will not greatly change the environment for fish or wildlife species that are not unique or particularly sensitive.

We did not design our samples of FERC's licenses so as to distinguish between "critical" and "noncritical" recommendations. Both the FWS study and the EPRI study mentioned above show that the proportion of critical recommendations FERC accepted was about the same as that of all recommendations accepted. The EPRI study shows that recommendations about minimum flows were accepted at an 82-percent rate, while the overall acceptance rate was 83 percent. Fish passage/screening issue recommendations were accepted at an 87-percent rate.

According to the FWS study, FERC accepted 75 percent of the recommendations about minimum flows and 79 percent of all of the recommendations. FERC accepted higher proportions of recommendations about fish passage and fish entrainment/impingement—83 percent and 82 percent, respectively. In addition, the study found that FERC accepted 75 percent of the recommendations concerning water quality, slightly below the average proportion of all recommendations accepted.

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<sup>5</sup>Entrainment refers to the passage of fish through the turbines of the hydroelectric generators, which results in injury and death to the fish.



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## **Conclusions**

FERC regulations implementing ECPA require more interaction between resource agencies, FERC, and applicants. In addition, since ECPA's enactment, FERC has made efforts to further improve coordination between the affected groups. Our analysis and similar studies by others indicate that FERC's hydroelectric project licenses issued after ECPA's enactment in 1986 have generally incorporated a higher percentage of resource agencies' recommendations.

In part because relatively few decisions have been made since FERC's final procedural changes took effect in January 1992 and because recommendations differ in their significance, it is difficult to say precisely how much ECPA affected FERC's responsiveness to resource agencies' recommendations. However, the changes to the regulations, steps to improve coordination, and the analyses of FERC's treatment of agencies' recommendations suggest that ECPA has resulted in greater consideration of nondevelopmental issues.

# Projects Operating Under Annual Licenses Can Delay ECPA's Effects

FERC faces the challenge of processing relicensing applications for a large number of projects by the end of 1993, when the projects' existing licenses will expire. Because projects for which the relicensing process is not complete are automatically issued an annual operating license, the number of projects operating under an annual license may increase. Such licenses perpetuate existing license terms and conditions and in effect delay the implementation of terms and conditions that potentially could better achieve ECPA's goal of balancing hydroelectric power and nondevelopmental needs.

## Number of Projects Operating Under Annual License May Increase

FERC has taken steps to deal with the unprecedented number of relicensing applications it must process; however, because FERC has historically exceeded the time established for relicensing and now faces a relicensing "bubble," resource agencies and applicants are concerned that the number of projects under annual license will likely increase. The Federal Power Act provides that if a hydroelectric project's existing license expires while an application for relicensing is being processed, FERC is to issue an annual license for the project. If, after 1 year, the annual license expires and FERC has still not completed a relicensing decision, the project is granted another annual license, and so on until a relicensing decision is reached.

Increases in the number of projects under annual licenses could have significant negative impacts on resource agencies' and FERC's workloads, fish and wildlife resources, and applicants. When a project is placed under an annual license, the existing license terms and conditions do not change.<sup>1</sup> This means that resource agencies' potential recommendations to protect and enhance fish and wildlife, as well as other relicensing recommendations, are delayed, which potentially leads to negative impacts on natural resources. Relicensing applicants seeking to increase power output or make other modifications to their projects may also be adversely affected because (1) economic or other conditions that could affect projected construction may change and (2) applicants may have to fund studies as environmental or legal conditions change during the relicensing process.

## FERC Has Historically Exceeded Time Established for Relicensing

Applicants are required to notify FERC of their intent to apply for a license renewal at least 5 years before the existing license expires. ECPA requires

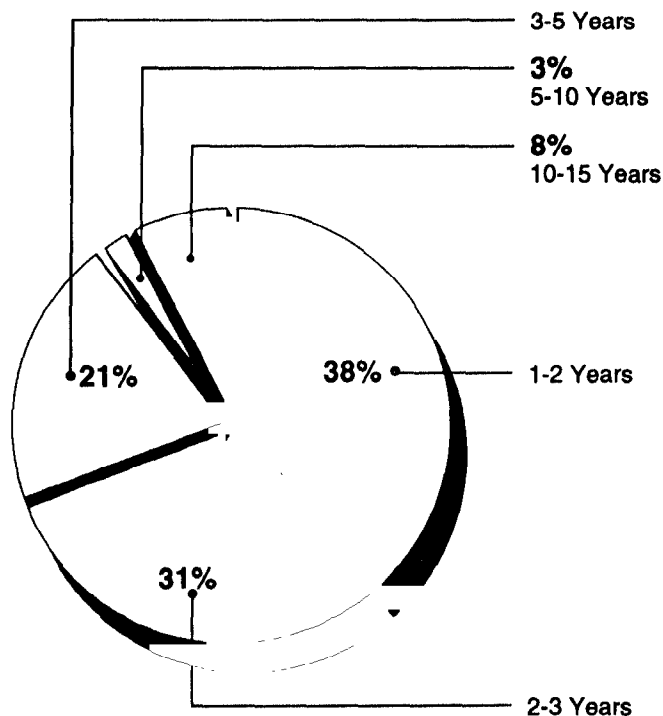
<sup>1</sup>Beginning in 1975, FERC added standard "reopener" clauses to licenses and relicenses that permit FERC to alter license conditions during the license term.

that relicensing applications be filed no later than 2 years before the license's expiration date.

According to FERC's records, 43 (about 39 percent) of the 111 projects applying for relicensing between January 1982 and June 1992 have been placed under an annual license for some period of time. The median processing time—from application to license issuance—was 2.5 years. In addition, as shown in figure 3.1, over 30 percent of the relicenses issued from 1984 to 1989 took more than 3 years to process; 8 percent took between 10 and 15 years. If the 1984-92 averages were to extend to the future, then 61 of the 157 projects requesting relicensing by the end of 1993 would be placed under an annual operating license for at least some period of time.

An EPRI study that focused only on relicenses issued between 1984 and 1989—a period that included the peak year, 1986, for licensing and relicensing combined—found that over 60 percent of the relicensing applications took longer than 2 years, and because of this, the projects operated under annual licenses for some period of time.

Figure 3.1: Relicensing Application Processing Time, 1984-89 Relicense Issuances



Note: Percentages total 101 percent because of rounding.

Source: Prepared by GAO using a study by EPRI.

Federal and state resource agency officials told us that FERC will need to place a large number of the projects, whose relicensing applications are now undergoing processing, under annual licenses in 1993 and 1994 because of FERC's limited resources, the need for studies at many projects, and the difficulty in performing environmental assessments for many of the projects. FERC officials could not estimate the number of projects likely to undergo annual licensing after 1993, citing that each project is unique and any one or more of the participants could cause a delay in the relicensing process. The Associate Director of OHL's Division of Project Review noted that because of the large number of licenses needing relicensing and increasing environmental review, the use of annual licenses is unlikely to decrease. On the other hand, the Division Director

told us that the 157 relicensing applications received for licenses expiring in 1993 appeared to be the best prepared of any group that he had reviewed, which could speed their processing.

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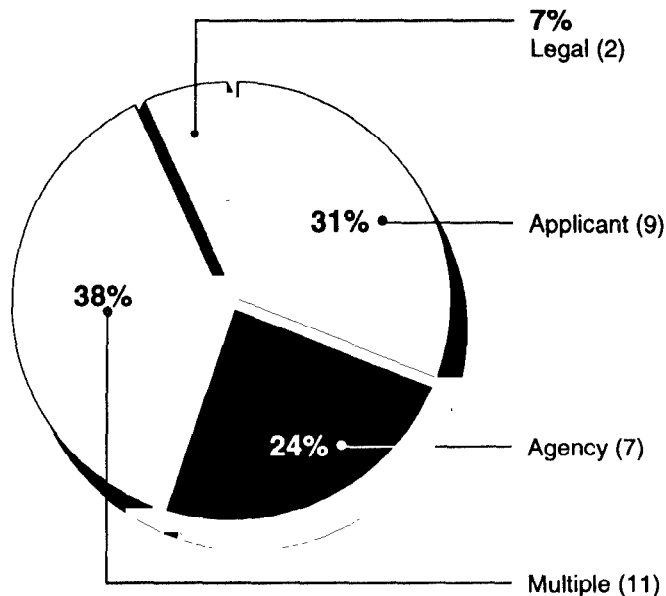
### **Relicensing Delays Are Attributable to a Variety of Factors**

As of August 1992, FERC's data showed that 29 projects were operating under an annual license. Eight projects had been operating under an annual license for over 10 years, and five of those projects had operated at least 15 years past the expiration date of their long-term license. Of the remaining 21 projects, 11 were between 5 and 10 years beyond their long-term license expiration date, while the remaining 10 projects had operated under an annual license less than 5 years.

According to FERC officials, delays in the relicensing process may be caused by resource agencies, applicants, and FERC itself. Among the factors cited were legal challenges, protracted studies, disputes about studies, and jurisdictional disputes. Using data supplied by FERC, we analyzed the factors contributing to delays in the 29 projects and categorized them as attributable to a resource agency, the applicant, a legal/jurisdictional problem, or FERC. The applicant for relicensing one project, for example, requested a delay in order to challenge the water quality certificate issued by the state.

As shown in figure 3.2, nine of the projects—about 30 percent—experienced delays attributable to the applicant; seven projects—about 25 percent—were primarily the result of federal or state agencies' actions; and two projects entailed legal/jurisdictional factors not solely under FERC's control. The remaining 11 projects were under annual licensing because of more than one of the above factors.

Figure 3.2: Reasons That Projects Were Under Annual License

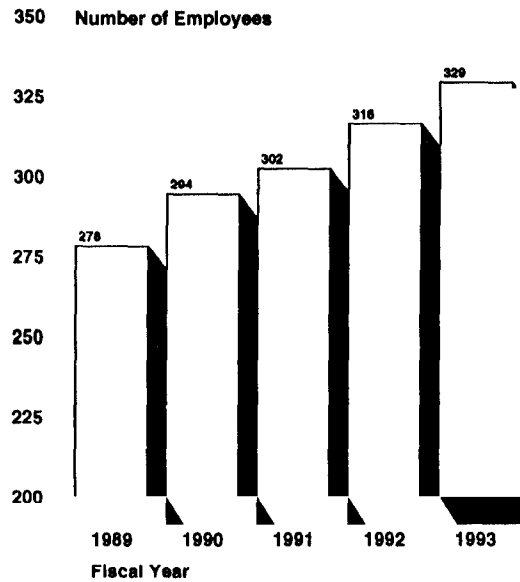


Source: Prepared by GAO using data from FERC.

### FERC Has Acted to Avoid Relicensing Delays

FERC has taken steps to deal with the large number of relicensing applications it must process. These steps include increasing OHL staff and hiring a contractor to help perform project environmental reviews. OHL has hired additional staff in recent years and is authorized to hire more, thus increasing its authorized staffing from 278 staff-years in fiscal year 1989 to 329 staff-years in fiscal year 1993. The staff includes a mix of members from disciplines related to both developmental and nondevelopmental resources: 36 percent are civil engineers, and 15 percent are environmental protection specialists, fishery biologists, or ecologists. (The remainder are technical, administrative, or managerial staff.) Figure 3.3 details OHL's staffing changes.

Figure 3.3: FERC's Office of  
Hydropower Licensing, Authorized  
Staffing Changes, 1989-93



Source: FERC.

In addition, FERC has hired a contractor to handle the larger environmental assessments and to perform the work required by the increase in relicensing applications. The contractor is expected to prepare between 40 and 50 environmental assessments for the relicensing applications submitted in 1991.

# FERC Requires Public Safety Programs at Hydroelectric Power Facilities

About half of the 2,000 hydroelectric power projects that FERC regulates have recreational areas used by the public. At or near hydroelectric power facilities, conditions may exist that could be dangerous or conducive to injurious or fatal accidents. The Federal Power Act authorizes FERC to establish regulations requiring owners of hydroelectric power projects under its jurisdiction to operate and properly maintain such projects for the protection of life, health, and property. While a number of public safety incidents at FERC-regulated facilities are reported by licensees and others each year, not all such incidents are the result of public safety violations.<sup>1</sup>

FERC, primarily concerned with the hazards created by projects' structures and operations, attempts to ensure public safety at hydroelectric power facilities by promulgating regulations and guidelines to be followed by licensees, inspecting hydroelectric power projects for compliance, and reporting safety-related incidents and investigating their causes. To enforce its public safety requirements, FERC is authorized to impose civil penalties and to revoke licenses if necessary. FERC's public safety program is similar to those of other federal water resource agencies.

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## FERC's Regulations Require Public Safety Measures

Public safety programs are intended to enhance the protection of the public, when they utilize projects' lands and waters, by describing the types of hazards that can exist at hydroelectric power facilities and the safety devices or other measures that can be employed. Safety measures may include preventing recreational activities in hazardous areas by constructing fences or other barriers. FERC promotes public safety by requiring licensees to take specific safety measures and to report all safety-related incidents and by undertaking some educational/outreach efforts.

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## Licensees Must Take Appropriate Public Safety Measures

FERC's regulations require that

... an applicant or licensee must install, operate, and maintain any signs, lights, sirens, barriers, or other safety devices that may reasonably be necessary or desirable to warn the public of fluctuations in flow from the project or otherwise to protect the public in the use of project lands and waters.<sup>2</sup>

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<sup>1</sup>Public safety refers to actions/measures that can be employed to enhance the protection of the public that utilize project lands and waters, while dam safety refers to measures to ensure the structural integrity of dams.

<sup>2</sup>FERC's regulations relevant to the public safety at hydroelectric projects are found in 18 C.F.R. part 12 subpart E.



The primary responsibility for ensuring that project owners install and maintain appropriate safety devices rests with FERC's Division of Dam Safety and Inspections. The implementation of this responsibility is carried out by FERC's five regional offices.<sup>3</sup>

Public safety must be addressed in each hydroelectric project licensing and relicensing application. FERC requires for each project a public safety plan listing public safety devices and their location. Applicants must provide information on specific measures in place and the public safety record for the facility (i.e., accidents related to public safety). This information is reviewed by FERC staff to determine the adequacy of existing measures. If a potentially unsafe situation exists—for example, a project that lacks a barrier to prevent boats from going over the dam—then FERC is authorized to include a specific reference in the license that addresses the public safety issue.

Projects with limited public use may not require the same level of public safety measures as projects with extensive use and recreational development. FERC staff, in cooperation with project owners, are expected to assess the overall need for safety devices or other safety measures at all projects, on a case-by-case basis, in order to develop the most effective solution to identified safety problems. FERC determines cases on the basis of its review of proposed projects at the time of license approval, a periodic inspection program, and any concerns raised by the public and the agency after licensing. Project owners are expected to expeditiously install and properly maintain any needed safety measures at their projects, even if the measures are not specifically required by FERC.

In 1990, FERC issued guidelines for Public Safety at Hydropower Projects, which supplements the regulations and specifically addresses various public safety measures. For example, the guidelines discuss hazardous features at projects and the appropriate safety measures to install, such as warning signs, lights, audible devices, buoys, barriers, fences, and guards. According to a FERC official, the guidelines have been provided to licensees on an informal basis since the 1970s.

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## Safety Incidents Must Be Reported

FERC requires hydroelectric power project licensees to report deaths or serious injuries that occur at a project for review by the appropriate FERC regional office. In addition, information on safety-related incidents is

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<sup>3</sup>FERC has regional offices located in Atlanta, Chicago, New York, Portland (Oreg.), and San Francisco.

maintained in FERC's Public Safety Data Base, which FERC uses to evaluate public safety needs at licensed projects and projects with pending license applications.

The FERC regional director reviews each incident to determine if it is project-related. Under FERC's regulations, incidents defined as "project-related" include deaths or serious injuries that involve a dam, spillway, intake, or power line or that take place at or immediately above or below a dam. In addition, any incident involving water flow fluctuations may be project-related. In those cases that are or appear to be project-related, the regional director determines if the incident was considered or alleged to have been caused by the project (i.e., by powerhouse operations; spillway or intake gate operations; or a failure to install, operate, or maintain signs, lights, barriers, or other safety devices that would warn or protect the public).

FERC regional office staff also review an incident to identify any need for additions or improvements to public safety devices or measures to preclude a similar incident in the future. If necessary, FERC issues directives to the licensee to install or improve safety devices, modify operating practices, or take other necessary measures. If the licensee fails to comply with FERC's directives, the agency can take enforcement action by, among other things, imposing civil penalties.

Even though a project fully complies with FERC's public safety requirements, accidents can occur because of poor judgment by users. As shown in table 4.1, over the past 5 years, 758 public safety incidents were reported at FERC-regulated facilities, 112 of which were project-related. FERC determined that 10 of the 112 project-related incidents were caused by the project. FERC investigated the 10 cases and found that 1 resulted from a violation of the public safety requirements. According to FERC officials, the remaining nine accidents were caused by poor judgment by public users or by a boat failure.

**Chapter 4**  
**FERC Requires Public Safety Programs at**  
**Hydroelectric Power Facilities**

**Table 4.1: Safety Incidents Reported at FERC-Regulated Hydropower Projects**

<b>Year</b>	<b>Total reported Incidents</b>	<b>Project-related Incidents</b>	<b>Incidents caused by project</b>	<b>Public safety violation</b>
1987	137	19	4	0
1988	136	20	0	0
1989	144	17	4	1
1990	151	20	2	0
1991	190	36	0	0
<b>Total</b>	<b>758</b>	<b>112</b>	<b>10</b>	<b>1</b>

Source: FERC.

**FERC Promotes Compliance Through Inspections and Educational Outreach**

FERC periodically inspects hydroelectric power projects to determine if appropriate safety measures and devices are in place. Inspections are required at least once each year for about 800 high- and significant-hazard dams and every 2 to 3 years for about 1,200 low-hazard, smaller dams.<sup>4</sup> In addition, inspections are required at any time that a specific concern is raised by the public or under unusual conditions, such as an earthquake or flood. Inspections are performed by FERC regional office staff, guided by FERC's Operating Manual for Inspection of Projects and Supervision of Licenses for Water Power Projects.

If a staff inspection or an evaluation of a public concern reveals that a public safety deficiency exists or that additional safety measures are necessary because of increased or altered use of the project, the FERC regional office directs the licensee to install the necessary safety devices or implement other safety measures. According to FERC, most licensees cooperate fully with these directives. However, if a licensee fails to comply with a public safety requirement or to maintain an existing safety device, enforcement action may be taken.

In addition to conducting its program of regular on-site inspections and follow-up investigations for alleged compliance deficiencies, FERC promotes public safety education. FERC staff meet periodically with industry associations, project owners and operators, and other agencies to discuss public safety at hydroelectric power projects. FERC also encourages its licensees to participate in the National Water Safety Congress (NWSC), an association recognized as a leader in enhancing the

<sup>4</sup>FERC designates a dam as high-, significant-, or low-hazard on the basis of the potential impact that a sudden release of water would have in terms of loss of life or property damage.

public's awareness of safe water recreation.<sup>5</sup> FERC has a staff member on the board of directors of the NWSC. Furthermore, information on public safety devices and measures is disseminated through a network of entities, including federal, state, and local agencies, licensees, and vendors that manufacture public safety devices.

The current president of the NWSC characterized FERC's role in promoting public safety as improved. He said that FERC, compared to the Bureau of Reclamation and the Army Corps of Engineers, is still the "new kid on the block" in terms of participation in the NWSC. Both of these federal water resource agencies have been heavily involved in the NWSC and have given attention to public safety for years. The president stated that FERC is now taking a more active role in the activities of the NWSC, including participating in meetings, giving presentations, and encouraging its licensees to also participate. NWSC has noticed increased participation by FERC's licensees.

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### **FERC May Take Enforcement Action for Noncompliance**

The inspections conducted by FERC may reveal that a project is not in compliance with a safety plan or that a public safety violation needs to be remedied. If the licensee does not correct the violation in a timely manner on its own, then FERC may issue such orders as necessary to require compliance with the public safety guidelines. If any project operator fails or refuses to comply with issued orders, then FERC is authorized by the Federal Power Act to levy civil penalties to enforce provisions of the act.

A variety of actions can be taken depending on the seriousness of a violation and the responsiveness of the licensee. Initially, FERC staff instruct the licensee to comply with the directive. A second step is issuing a compliance order stating that the licensee is in violation of its license, the regulations, or the Federal Power Act and informing the licensee that failure to comply may result in civil penalties. Finally, staff may recommend to FERC that civil penalties be imposed and/or that an injunction be sought in the courts.

According to a FERC official, licensees usually cooperate with FERC directives and therefore safety-related compliance matters seldom reach the civil penalty stage. However, FERC has imposed civil penalties, wholly or partially based on safety violations. For example, \$500,000 is the largest civil penalty levied by FERC on a hydroelectric power project licensee. The

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<sup>5</sup>Other members include the Corps of Engineers, Bureau of Reclamation, Tennessee Valley Authority (TVA), and other hydroelectric power project owners and operators.

penalty resulted from a public safety violation at the project. Three persons drowned when their boat went over a dam that did not have a required boat barrier; replacement of the boat barrier following routine dam maintenance had been inadvertently overlooked. According to a FERC official, this is the only case in which a fine was charged for a public safety violation.

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## FERC's Public Safety Program Is Similar to Other Federal Water Resource Agencies'

Several federal agencies have long histories of constructing and operating dams and hydroelectric power facilities, including the Army Corps of Engineers, the Tennessee Valley Authority (TVA), and the Bureau of Reclamation. Our review shows that FERC's public safety program is similar in many respects to these agencies' programs, which include requirements for signs, audible devices, lights, and/or boat barriers; public awareness and educational outreach; and participation in the NWSC.

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### Corps of Engineers

The Corps of Engineers implements a public safety program for its 461 projects, 75 of which include hydroelectric facilities. Approximately 4,300 recreation areas are available at these projects, including those for swimming, boating, fishing, camping, and hiking. According to the Corps, approximately 200 fatalities were reported for the past few years for all of its projects.

The public safety program of the Corps includes (1) developing and implementing public safety requirements for its leased and self-maintained projects, (2) inspecting projects to determine compliance with public safety requirements, (3) reporting and evaluating public safety incidents, and (4) performing public/water safety educational outreach.

Public safety requirements include fencing off hazardous areas, posting adequate signs to warn the public of danger; and installing warning lights, audible devices, boat barriers, buoys, or other devices. Periodic inspections are made of the Corps' projects to ensure that adequate public safety measures are maintained. A project that does not meet requirements may be shut down until the situation is remedied.

All public safety incidents are reported to the Corps. All incidents are investigated, and the fatalities are reviewed by the Public Safety Advisory Committee. This committee evaluates the project where the accident occurred to determine if adequate public safety measures were implemented and if additional measures are necessary. According to a

Corps official, in 1985 the Corps centralized the administration of its public/water safety program at headquarters to provide consistency and aid the park rangers in implementing the public safety requirements.

The Corps is an active participant in the NWSC. Other educational outreach activities include stationing park rangers at projects with heavy public use to inform the public of hazards and giving presentations on public/water safety (e.g., beach demonstrations and boating seminars) at NWSC meetings and meetings at schools, civic associations, and the projects. Two other popular outreach methods include (1) emphasizing public safety by using the media of radio and television to broadcast public service announcements and using other media such as milk cartons to convey printed messages and (2) offering, at Corps facilities, water safety products such as a water safety fun book to educate children on water hazards, videotapes, posters, booklets, and audio cassettes.

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## Tennessee Valley Authority

TVA operates 50 hydroelectric power projects. Not all of these projects have official recreational areas for public use, but public safety measures and devices of some sort are required at all facilities. For example, projects that have boating, swimming, and fishing amenities are required to install fences to limit access to hazardous areas, post signs, and operate public safety patrols. TVA does not use warning lights or audible devices, but it does have a 24-hour patrol service at all hydroelectric power facilities. The patrol staff are state-certified law enforcement officers who ensure that the use of the recreational dam areas is carried out as safely as possible. Also, the public can call a phone number to find out when a particular dam will be operating and when water will be flowing through the turbines.

Public safety incidents at TVA projects are reported to the Public Safety Service and entered in a data base. Approximately 200 public safety incidents are reported each year, and a total of 221 water-related fatalities have occurred during the past 5 years. According to a TVA public safety official, the reporting of accidents is a tool used to evaluate how well the program is being carried out to (1) achieve the goals of operating facilities in a safe and healthy manner and (2) facilitate an ongoing education program on public/water safety. The safety staff at TVA investigate each incident to determine if more public safety devices are needed.

TVA has an outreach/education program carried out by a group of retired employees; the group makes presentations about public and water safety

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**Chapter 4**  
**FERC Requires Public Safety Programs at**  
**Hydroelectric Power Facilities**

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at meetings at schools and civic associations and at boating and recreational shows throughout the area. TVA also participates in the NWSC.

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**Bureau of Reclamation**

The Bureau of Reclamation maintains 52 hydroelectric power facilities. The requirements of the Bureau's public safety program include posting signs at dangerous areas, fencing off hazardous areas from public access areas, and installing lights and audible devices to warn the public of hazardous situations at or around dams. The Bureau annually inspects projects for compliance with public safety requirements and tracks and evaluates public safety incidents. According to the Bureau's safety engineer, the Bureau maintains records for all reported public safety incidents. The Bureau's safety engineer estimated that about 200 incidents related to public safety are reported annually. The Bureau is a participant in the NWSC.

# Consideration, During Relicensing, of Environmental Impacts of Increased Power Output

Twenty-four of the 157 projects for which the Federal Energy Regulatory Commission (FERC) received relicensing applications in 1991 proposed increases in hydroelectric power output. The impacts of such increases on the environment and fish and wildlife, if approved during relicensing, are project specific and will be identified during FERC's environmental analysis. An Electric Power Research Institute (EPRI) study of hydropower projects relicensed from 1984 to 1989 showed that although some projects gained power generation capacity during relicensing, more projects lost power generation capacity. In addition, the requests for increased power output at relicensing do not represent the total potential increase in power because project operators can request increases at any time during the license term.

FERC received requests from 24, or 15 percent, of the 157 projects requesting relicensing by the end of 1993 that they be allowed to increase their hydroelectric power capacity. The additional capacity requested represents an increase of 132 megawatts, or about 24 percent of the current operating capacity of the 24 projects. This additional capacity would not have a significant effect on the national energy supply (the increase represents less than one-half of 1 percent of FERC-licensed hydroelectric power generating capacity), but project-specific local or regional effects are possible, such as an improved ability to meet the system's peak demands.

According to a resource agency official, the additional capacity, if installed, could have environmental impacts on the water, land, flora, fish, and wildlife on a case-by-case basis. The specific impacts cannot be assessed, however, until FERC completes its environmental analyses. Examples of the potential impacts of increased power capacity, which were cited by resource agency officials, include decreased water flow, which can harm plant and fish life; construction, which can erode river banks and increase sediment in rivers; and an increase in the number of fish killed by turbines. However, increased capacity does not necessarily harm fish and wildlife; for example, installing more efficient turbines may increase power output without significant, or unavoidable, adverse impacts on the number of fish killed that pass through the turbines.

Relicensing does not always result in increased power output. An EPRI study of the 39 projects relicensed from 1984 to 1989 showed that while 8 projects gained generating capacity, 16 projects lost capacity.



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**Appendix I  
Consideration, During Relicensing, of  
Environmental Impacts of Increased Power  
Output**

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Because licensees may seek to increase power at any time during a license term, through a license modification, requests for additional power during relicensing may not reflect the total potential for additional capacity at FERC-licensed projects. FERC does not maintain historical data on changes in power output at licensed projects.

The National Energy Strategy calls for additional power from existing FERC facilities. However, major increases in hydroelectric power capacity at existing facilities are unlikely because of economic and environmental concerns. Economic factors that inhibit capacity increases include increased costs from mitigating environmental damage and uncertainty in obtaining approval for the increase. Opposition to new power production facilities from resource agencies and other groups that have environmental concerns also impedes capacity increases.

# FERC's Policies and Procedures for Determining Jurisdiction Based on Navigability of Waters

The Federal Power Act requires that hydroelectric power projects subject to FERC's jurisdiction must have a license or exemption from licensing in order to operate and also defines the criteria for determining whether a project is subject to FERC's jurisdiction. FERC often determines whether an existing project is required to be licensed. Such projects may be brought to FERC's attention by various means, the most common of which occurs when a state agency raises engineering safety or environmental concerns about a project for which the jurisdiction is unknown.

In such cases, FERC looks first to three criteria contained in the Federal Power Act:

1. Does the project occupy public lands or federal reservations of the United States?
2. Does the project utilize surplus water or waterpower from a federal dam?
3. Is the project one that is located on a nonnavigable body of water over which the Congress has commerce clause jurisdiction, and was constructed or modified on or after August 26, 1935, and affects interstate or foreign commerce?

If the project meets any of these criteria, then it is subject to FERC's jurisdiction and FERC does not have to investigate any further. If the project does not meet any of these criteria, then FERC looks to a fourth criterion in the act: Is the project located on navigable waters of the United States?

Section 3(8) of the Federal Power Act defines navigable waters essentially as those parts of streams or other bodies of water that were used, are used, or are suitable for use for the transportation of persons or property in interstate or foreign commerce.

Initial navigability determinations are usually made by FERC's Office of Hydropower Licensing (OHL), but they are subject to review by FERC's Office of General Counsel (OGC), the Commission, and ultimately the courts, if they are appealed.

According to OHL officials, the research that forms the basis for navigability determinations is carried out in accordance with Navigation Research Guidelines. The focus of this research is to determine if a waterway has been used for transportation. The guidelines include legal standards written by FERC's OGC and detailed instructions prepared by OHL.

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**Appendix II  
FERC's Policies and Procedures for  
Determining Jurisdiction Based on  
Navigability of Waters**

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In the researching of whether a body of water was or is used for transportation in interstate or foreign commerce, the guidelines state that (1) all time periods are relevant; (2) research should review published histories and treaties, newspapers, journals, census data, U.S. Army Corps of Engineers reports, and navigation legislation from the 18th and 19th centuries; (3) all research shall be documented, including information sources in which no evidence of navigation use was found; and (4) after preliminary research, if it is determined that further research is needed, a report shall be prepared after approximately 21 days, followed by, if needed, a final report that contains complete documentation.

If a navigability decision by OHL is appealed, OHL will conduct a new review, after which OGC reviews the research and, if needed, conducts its own independent research. According to the Assistant General Counsel, OGC often finds significant additional information pertaining to the case. On the basis of its analysis, OGC prepares a draft order setting forth its conclusions as to whether the project is located on a navigable waterway and submits the draft order to FERC for a decision. According to the Assistant General Counsel, FERC rarely takes issue with a draft order by OGC on navigability; that is, FERC usually decides the case on the basis of OGC's conclusion. If FERC's decision on navigability is appealed to the courts, FERC's Office of the Solicitor is responsible for the litigation.

From January 1986 through December 1991, FERC made navigability determinations for 153 projects, ruling that 60 projects were located on navigable waters (and thus were required to be licensed) and that 93 projects were not located on navigable waters. FERC's determinations were appealed on 26 projects. In nine cases, the determination was overturned within FERC.

# Data on Studies of FERC's Disposition of Agencies' Recommendations

To determine how the Electric Consumers Protection Act of 1986 (ECPA) may have affected FERC's consideration of nondevelopmental values in the hydrolicensing process, we analyzed FERC's disposition of resource agencies' recommendations for pre- and post-ECPA samples of licensing orders. We also reviewed similar studies performed by others.

## GAO's Sample

In February 1992, we obtained statistics from FERC on the number of licenses and relicenses (called "licensing orders") issued annually from 1980 to 1991. Using this information, we selected two random samples of licensing orders: One sample group included licensing orders issued between 1982 and 1986 (the pre-ECPA sample), and the second group, between 1988 and 1991 (the post-ECPA sample). We sampled orders rather than recommendations because FERC does not maintain records showing the total number of recommendations made or their disposition. We excluded orders issued in 1987 from our analysis because FERC officials told us that that year was a transitional year during which they were developing initial procedures to apply ECPA's provisions.

For each licensing order in the samples, we looked at each recommendation made by resource agencies and FERC's disposition of the recommendation in the order. We categorized each recommendation as either accepted (included as a license condition), modified (accepted with modification), or rejected (not appearing in the order).

We used these samples (called probability samples) to develop estimates of the proportions of all recommendations accepted, modified, and rejected by FERC for the pre-ECPA and post-ECPA periods. Each estimate has a measurable precision, or sampling error, which may be expressed as a plus/minus figure. The sampling errors are shown in parenthesis in table III.1 following the pre-ECPA and post-ECPA percentages of recommendations that were accepted, modified, or rejected.

A sampling error indicates how closely we can reproduce a sample estimate from a complete count of the universe using the same measurement methods. By adding the sampling error to and subtracting it from the estimate, we can develop upper and lower bounds for each estimate. This range is called a confidence interval. Sampling errors and confidence intervals are stated at a certain confidence level—in this case, 95 percent. This means that in 95 out of 100 instances, the sampling procedure we used would produce a confidence interval containing the universe value we are estimating.

The sampling errors in our study are based on our sample of 38 license orders from 386 pre-ECPA license orders and our sample of 35 license orders from 163 post-ECPA orders. Subsequent to completing our sampling, FERC revised the numbers originally given to us in February by adding 33 pre-ECPA licenses and 22 post-ECPA licenses. Additional licenses were shown for each year in our samples. The estimates from our samples, therefore, apply only to the original list of licenses, not the additional licenses.

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## **Studies by Other Organizations**

We also reviewed several studies by other organizations on the extent to which FERC incorporated resource agencies' recommendations in licensing and relicensing decisions made since ECPA's enactment: (1) a study performed for FERC's Office of Hydropower Licensing by a private contractor; (2) a study dealing only with the U.S. Fish and Wildlife Service's (FWS) recommendations, performed by the Service; and (3) a study performed by EPRI, a research organization funded by the nation's electric utilities. These studies differed in the time periods chosen and the extent of licensing orders/recommendations included. Table III.1 contains summary data on our analysis and on each of the other studies.

In addition to having the differences noted above, the studies do not necessarily use a consistent definition of "accepted," "modified," and "rejected." While FERC must explicitly show the disposition of recommendations in orders issued after ECPA, pre-ECPA orders are not as explicit, leaving some room for judgment.

**Appendix III  
Data on Studies of FERC's Disposition of  
Agencies' Recommendations**

**Table III.1: Comparison of Studies on Resource Agencies' Recommendations**

	<b>FERC</b>	<b>EPRI</b>	<b>FWS</b>	<b>GAO</b>
Type of decision, licenses/ relicenses	Licenses and relicenses	Relicenses only	Licenses and relicenses	Licenses and relicenses
Period(s) covered	Jan. 1980-Oct. 1986 Jan. 1990-Mar. 1992	Jan. 1984-Dec. 1991 <sup>a</sup>	May 1983-Apr. 1986	Jan. 1982-Dec. 1986 Jan. 1988-Dec. 1991
Types of recommendations	All resource agencies'	All resource agencies'	Only those made by FWS	All resource agencies'
Study methodology	All issued in study period	All issued in study period	All issued in study period	Random sample
Number of projects/ recommendations reviewed	558 licenses, 3,471 recommendations	47 licenses, 666 recommendations	242 licenses, 512 recommendations	73 licenses, 315 recommendations
Pre-ECPA percentage:				
Accepted	75	76	79	66 (±9)
Modified	20	09	09	26 (±10)
Rejected	05	15	12	08 (±5)
Post-ECPA percentage:				
Accepted	97 <sup>b</sup>	85	N.A.	77 (±5)
Modified	<sup>c</sup>	07	N.A.	18 (±4)
Rejected	03	08	N.A.	05 (±3)

Note: "N.A." stands for "not available."

<sup>a</sup>EPRI's 1990-92 data are preliminary results obtained by an EPRI contractor, to be published by EPRI in late 1992.

<sup>b</sup>FERC did not categorize any recommendations as modified. Fourteen accepted recommendations (3 percent) were arrived at via the 10(j) consultation process. In addition, in considering the treatment of recommendations, FERC included those found in five license amendments.

<sup>c</sup>FERC's analysis combined modifications and rejections.

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# Related GAO Products

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Hydroelectric Dams: Interior Favors Removing Elwha River Dams, but Who Should Pay Is Undecided (GAO/RCED-92-168, June 5, 1992).

Energy Reports and Testimony: 1991 (GAO/RCED-92-120, Mar. 1992).

Electricity Regulation: Issues Concerning the Hydroelectric Project Licensing Process (GAO/RCED-91-120, May 10, 1991).

Hydroelectric Dams: Costs and Alternatives for Restoring Fisheries in the Elwha River (GAO/RCED-91-104, Mar. 27, 1991).

Hydroelectric Dams: Issues Surrounding Columbia River Basin Juvenile Fish Bypasses (GAO/RCED-90-180, Sept. 6, 1990).

Energy: Bibliography of GAO Documents January 1986-December 1989 (GAO/RCED-90-179, July 1990).

Energy Regulation: Opportunities for Strengthening Hydropower Cumulative Impact Assessments (GAO/RCED-88-82, Mar. 10, 1988).

Energy Regulation: Enforcement of Requirements Imposed on Hydropower Projects Needs Strengthening (GAO/RCED-88-60, Mar. 4, 1988).

Energy Regulation: Allegations Concerning the Development of Fishways at Hydropower Projects (GAO/RCED-88-186, July 28, 1988).

Energy Regulation: Hydropower Impacts on Fish Should Be Adequately Considered (GAO/RCED-86-99, May 20, 1986).

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