

Dam Safety Guidelines

Part I: *General Information & Owner Responsibilities*



WASHINGTON STATE
DEPARTMENT OF
E C O L O G Y

July 1992 (Revised September 2004)
92-55A

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DAM SAFETY GUIDELINES

PART I GENERAL INFORMATION AND OWNER RESPONSIBILITIES



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DAM SAFETY GUIDELINES

PART I GENERAL INFORMATION AND OWNER RESPONSIBILITIES

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GENERAL INFORMATION AND OWNER RESPONSIBILITIES

1. INTRODUCTION

The **Dam Safety Guidelines** are intended to provide dam owners, operators, and design engineers with information on activities, procedures, and requirements involved in the planning, design, construction, operation, and maintenance of dams in the State of Washington. In particular, they provide guidance in meeting the requirements identified in the **Dam Safety Regulations** Chapter 173-175 WAC. For convenience of the various expected users, the guidelines have been organized into four basic units entitled:

- Part I - General Information and Owner Responsibilities**
- Part II - Project Planning & Approval of Dam Construction or Modification**
- Part III - An Owner's Guidance Manual**
- Part IV - Dam Design and Construction**

Technical Notes have also been prepared to provide detailed technical information on engineering design and analysis of various project elements. For clarity, all important definitions and terms pertinent to State of Washington dam safety activities are summarized in Appendix A of Part IV.

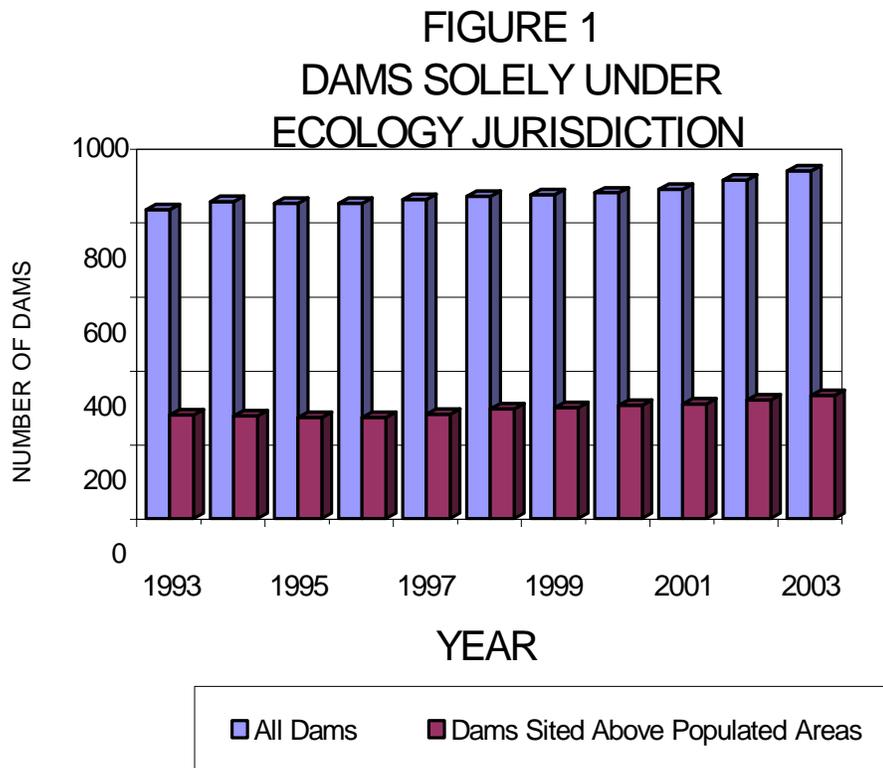
Part I of the guidelines contains general information about statutory authority, dam safety activities, and dam owner responsibilities for completed projects.

2. DAM SAFETY IN WASHINGTON

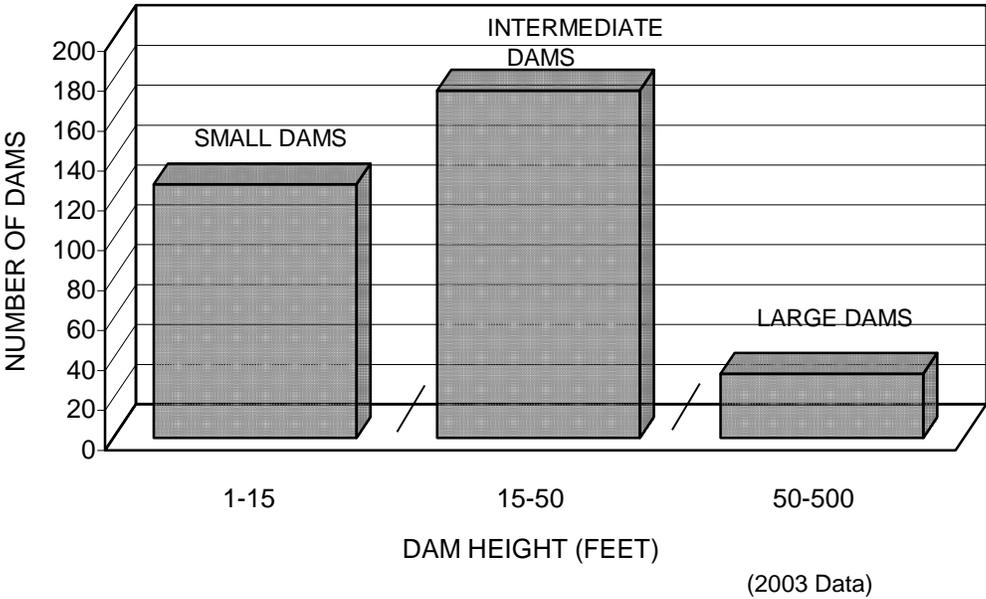
2.1 CHARACTERISTICS OF DAMS IN WASHINGTON

As of July 2003, there are 940 dams in the State of Washington that are regulated by the Dam Safety Office (DSO). This number continues to increase as 10 to 15 new dams are constructed each year (Figure 1). About 330 (35%) of the 940 dams under Ecology jurisdiction are located above populated areas (Figure 2), and are therefore classified as having high or significant downstream hazards. This number also continues to increase as new dams are built and development continues to occur downstream of existing dams.

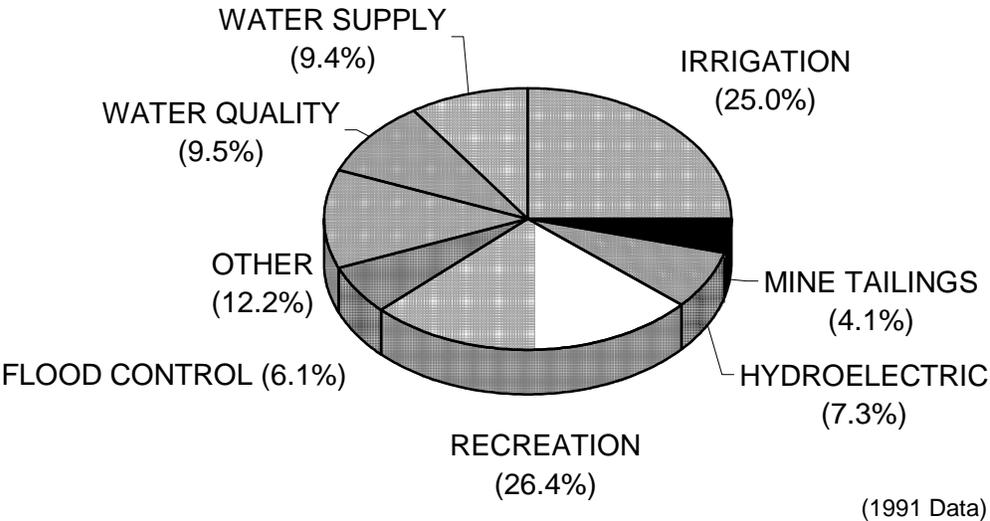
These dams have been built for a variety of purposes including: irrigation water supply; domestic water supply; recreation; waste water treatment or storage; flood control; mine tailings storage; and hydropower production. While irrigation and recreation currently account for the majority of facilities, dams have been built for a wide range of purposes (Figure 3). This diversity in project purposes in combination with the many geologic and hydrologic settings found in the state poses a variety of operational and engineering design considerations.



**FIGURE 2
DAMS SITED ABOVE POPULATED AREAS
IN WASHINGTON STATE**



**FIGURE 3
TYPES OF DAMS
UNDER ECOLOGY JURISDICTION**



2.2 DAM SAFETY - STATUTORY AUTHORITY AND PURPOSE

The authority and responsibility to regulate dams in Washington and to provide for public safety is contained in the following laws:

- State Water Code (1917) - Chapter 90.03 RCW
- Flood Control Act (1935) - Chapter 86.16 RCW
- Department of Ecology (1970) - Chapter 43.21A RCW

Where water projects involve dams and reservoirs with a storage volume of 10 acre-feet or more, provisions were made in the laws for the engineering review of the construction plans and specifications, for the inspection of dams, and for requiring remedial action, as necessary, to reasonably secure proper operation, maintenance, and continued safe performance. As part of its administrative charge, the Washington State Department of Ecology (Ecology) is the agency of state government vested with the authority and responsibility to perform these functions.

A listing of these statutes in the Revised Code of Washington (RCW) and pertinent sections of the Washington Administrative Code (WAC) are provided in Appendix A and are summarized below.

2.2.1 RCW 43.21A.064(2) - Powers and Duties (Synopsis)

The Department of Ecology has powers and duties, insofar as it may be necessary to assure safety to life or property, to inspect the construction of all dams, and to require necessary changes in construction or maintenance.

2.2.2 RCW 86.16.035 - Control of Dams and Obstructions (Synopsis)

The Department of Ecology shall have supervision and control over all dams and obstructions in streams and may make regulations concerning the flow of water, as necessary, for the protection of life and property below these works from flood waters.

2.2.3 RCW 90.03.350 - Plans and Specifications (Synopsis)

Anyone intending to construct or modify any dam or controlling works for the storage of 10 acre-feet or more of water shall submit plans and specifications thereof to the Department of Ecology for approval as to safety. Any dam not constructed according to approved plans and specifications or not maintained as may be ordered, shall be presumed to be a public nuisance and may be abated.

2.2.4 RCW 90.03.470(8),(9) - Fees for Inspection, Plan Review (Synopsis)

Fees are required for the review of construction plans and specifications and for safety inspections. Fees for review of construction plans and specifications are based on actual costs or a minimum of ten dollars. Fees for safety inspection are to be based on actual costs.

2.2.5 WAC 173-175 - Dam Safety Regulations (Synopsis)

The Dam Safety Regulations provide for the design, construction, operation, maintenance, inspection, and supervision of dams in a manner consistent with accepted engineering practice. These regulations:

- Designate the types of dams to which regulations are applicable.
- Establish and administer a program for permitting of construction work for new dams and for modifications of existing dams.
- Establish a fee schedule based on dam size that reflects the actual cost to the department of engineering review of plans and specifications and for construction inspections.
- Establish the requirements and owner responsibilities for developing and executing plans for Operation and Maintenance, and Emergency Actions.
- Establish a program for the periodic inspection by the department of existing dams, and a fee schedule for these inspections based on the downstream hazard classification and frequency of inspections. This fee schedule reflects the actual cost to the department.
- Require Ecology to develop and maintain engineering guidelines for the purpose of aiding dam owners and project engineers in developing design reports, construction plans, operation and emergency plans, and conducting dam inspections.

2.3 DAM SAFETY FUNCTIONS

In order to carry out the foregoing statutory responsibilities and associated activities, the Dam Safety Office (DSO) was established within the Water Resources Program of the Department of Ecology. The DSO acts in the interest of general public safety, by providing reasonable assurance that impoundment facilities will function adequately and not pose a threat to lives and property. It is emphasized, however, that dam owners are primarily responsible for the safety of their structures and this is achieved through proper design, construction, operation, and maintenance of their facilities.

The Dam Safety Office neither advocates nor opposes the construction and operation of dams. The DSO regulates dams with the sole purpose of reasonably securing public safety. Environmental and

natural resource issues are addressed by other governmental units through separate regulations and/or permits.

The following is a brief description of the basic functions performed by the Dam Safety Office:

2.3.1 Plan Review and Approval

To reasonably assure adequacy of design, engineering design reports, and construction plans and specifications for dams and appurtenant works are examined and approved in accordance with statutory requirements and accepted engineering practice. Plan review is required for all projects with an impounding capability of 10 acre-feet or more at the dam crest level. A Construction Permit is issued when the construction plans and specifications, and Construction Inspection Plan have been found to be acceptable and upon payment of applicable plan review fees. Copies of all approved plans are retained on file in the DSO office.

The Dam Safety Office also reviews Operation and Maintenance (O&M) Plans and Emergency Action Plans. An O&M Plan is required for all projects and is used to develop an O&M Manual following completion of the project. An Emergency Action Plan is required for those projects where a failure of the dam could pose a threat to life. Both plans must be submitted for review prior to startup or resumption of project operations following construction (see Section 3 for more details on O&M and Emergency Action Plans).

2.3.2 Construction Inspection

Construction inspections are performed to verify that the field conditions encountered are compatible with the conditions assumed in design and that the construction is proceeding in accordance with the approved plans, specifications, and construction inspection plan. Particular emphasis is placed on observing and documenting the construction of elements which are critical to the safe performance of the facility. The frequency of DSO site inspections are commensurate with the size and complexity of the project.

2.3.3 Periodic Inspection

Periodic inspections are conducted on existing dams that are located in areas where dam failure and release of the reservoir contents could pose the potential for loss of life. The inspections are intended to identify deficiencies, and to reasonably assure safe operation and confirm that maintenance is being adequately performed. Inspections are performed by the department every 5 years for dams with high downstream hazard classifications, and every 10 years for dams with significant hazard classifications. The inspections are performed by professional engineers from the DSO and involve: review and analysis of available data on the design, construction, operation, and maintenance of the dam and its appurtenances; visual inspection of

the dam and its appurtenances; evaluation of the safety of the dam and its appurtenances, which may include assessment of the hydrologic and hydraulic capabilities, structural stabilities, seismic stabilities, and any other condition which could constitute a hazard to the integrity of the structure; evaluation of the downstream hazard classification; evaluation of the operation, maintenance, and inspection procedures employed by the owner and/or operator; and review of the emergency action plan for the dam including review and/or update of dam breach inundation maps. The department will prepare a comprehensive report of the findings, which includes findings from the inspection, and any required remedial work to be performed.

2.3.4 Compliance and Enforcement

Enforcement actions are taken as necessary to secure compliance with safety requirements and to correct identified deficiencies. The compliance and enforcement activity involves a variety of possible actions including restrictions on reservoir operation, draining of the reservoir, assessment of fines, and court actions. When a dam owner is not responsive in correcting deficiencies, the dam may be declared a public nuisance and removed through an abatement proceeding in Superior Court.

2.3.5 Records and Inventory

Records of all activities associated with a project, including design reports, plans and specifications, inspection reports, and correspondence, are retained on file with the DSO. As a basic source of information on the physical characteristics of projects, a computerized inventory is maintained in the Dam Safety office for all dams in the state.

3. OWNER RESPONSIBILITIES FOR COMPLETED PROJECTS

It is the responsibility of dam owners to operate and maintain their dam(s) in a safe manner and condition and to notify the Dam Safety Office (DSO) when modifications to the dam are proposed or unusual or unsafe circumstances occur. The following sections list responsibilities of the dam owner and identify activities that require review, approval or acceptance by the Dam Safety Office.

3.1 PROJECT OPERATION AND MAINTENANCE

Dam owners are required to develop and maintain an Operation and Maintenance (O&M) Manual. An O&M Manual describes procedures for the operation of the project under normal and extreme reservoir inflow conditions and provides technical guidance and procedures for monitoring, inspection, and long term maintenance. Proper attention to project operation and maintenance is critical for ensuring the continued safe functioning of the dam, and continued productive use of the dam and reservoir.

Owners are required to submit an Operation and Maintenance *Plan* to the DSO for review and acceptance prior to startup of project operations following construction (see section 2.3.1 and *Part II, Dam Safety Guidelines* for information on the Construction Permit process). The O&M *Plan* presents an outline of how the facility is to be operated and maintained and is to be later used by the owner to develop detailed procedures for the O&M *Manual*. In addition, DSO personnel will review O&M Manuals during periodic inspections performed by the DSO (see section 2.3.3 for details of periodic inspections performed by the DSO).

The sophistication of the O&M Manual should be commensurate with the complexity of dam operations. However, as a minimum, an O&M Manual should contain the following information.

- General information about the project and important features.
- Details of how the reservoir and equipment at the dam are to be operated.
- Detailed information and instructions on performing periodic maintenance and upkeep at the dam.
- Information on performing regular surficial inspection of the dam by the owner or the dam operator.
- Information about instrumentation and monitoring, and instructions for monitoring and recording of data.
- Information on procedures for the continued updating of the manual.

Detailed discussions of the above items and a description of the contents of an O&M Manual are contained in Ecology Publication 92-21, Guidelines for Developing Dam Operation and Maintenance Manuals².

If changes to an existing O&M Manual are proposed which could have an effect on public safety (such as significant changes to project operation), owners are required to submit the proposed changes for review and acceptance prior to implementing the changes. In addition, the O&M Manual must be updated within 180 days after a periodic inspection has been completed by the DSO.

3.2 CHANGE OF DAM OWNERSHIP

The Dam Safety Office maintains an inventory of information on dams in the state. This inventory includes such information as the dam name, ownership, and physical characteristics of the project. Thus, when a change in dam ownership occurs, the new dam owner is required to notify the DSO within 90 days and identify the personnel responsible for operation and maintenance. This allows the DSO to maintain an up to date inventory on the project characteristics and to correspond with dam owners and operators as necessary.

3.3 INSPECTION

Owners are required to evaluate the safety of their dams and all appurtenant works, and to make modifications, as needed, to reasonably secure safety to life and property.

Owner Conducted Annual Inspections - Owners are *required* to conduct annual surficial inspections and submit a copy of the inspection checklist to the department within 30 days following the inspection. Information to assist owners in performing these inspections can be found in *Chapter 5 of Part III, Dam Safety Guidelines*.

Copies of inspection records must be provided to the DSO upon request. Typical inspection items would include: condition of the dam crest and upstream and downstream dam faces with particular attention to settlement, cracking, slumps or other distress; condition of the outlet works and spillways noting any erosional damage; testing of infrequently used valves, control works, and other hydraulic mechanisms; observation and measurement of seepage, noting location and concurrent reservoir water level; observation and recording of any conditions which are a change from previous inspections.

Periodic Inspections Conducted by Ecology - The DSO conducts periodic inspections of particular projects to reasonably secure safety to life and property. These inspections are performed on dams where there is the potential for loss of life and significant property damage in the event of a dam failure. Dam with *high* hazard classifications are inspected on a 5-year cycle, while dams with *significant* hazard classifications are inspected on a 10-year cycle. Dams classified as low hazard are

not included in the periodic inspection program. Fees shall be charged for periodic inspections conducted by the department. The amount of the fees and owner requirements for the fee payment are described in WAC 173-175-755 through 173-175-775. The DSO will give at least 30 days advance notice of the date of the periodic inspection and advise the owner of any requirements such as gates or valves that are to be operated during the inspection. Owners are encouraged to accompany DSO personnel during these inspections to provide DSO personnel with background information on the project and discuss any deficiencies found during the inspection.

Following the inspection, the DSO will issue a report describing the analyses performed, findings from the inspection, and any remedial work to be performed. Owners are required to correct safety deficiencies as identified by the department on existing dams and to take actions as prescribed by the department to preserve the structural stability and integrity of the project and attain levels of safety in accordance with accepted engineering practice. The owner is responsible for paying for any needed remedial work. Owners are also required to develop an Operation and Maintenance Manual and Emergency Action Plan within 180 days following completion of a periodic inspection conducted by the DSO.

3.4 EMERGENCY ACTION

In those cases where a failure of the dam could pose a threat to life, the owner is required to develop an Emergency Action Plan (EAP). The EAP describes procedures for responding to unusual or emergency situations and procedures for initiating notification or warning of individuals who may be at risk in downstream areas.

Owners are required to submit an EAP to the DSO for review and acceptance during the Construction Permit process (see section 2.3.1 and *Part II, Dam Safety Guidelines* for information on the Construction Permit process).

Typically, the EAP should include the following information:

- Notification procedures (preferably in the form of a flow chart) and responsibilities for notifying downstream residents in the event of an impending dam failure.
- A notification list that includes the names and telephone numbers of all affected downstream residents, dam owner and operator, local emergency officials, and appropriate government agencies (including the Dam Safety Office).
- Specific instructions to be followed by responsible parties at the dam site in response to emergencies such as floods, equipment failures, or other unusual events where the situation might lead to dam failure and immediate remedial action can be effective to prevent failure or reduce hazards to downstream residents.

Detailed information on the development of EAPs is contained in Ecology Publication 92-22, Guidelines for Developing Dam Emergency Action Plans³.

Owners are required to coordinate the development of the EAP with representatives from the local Emergency Services staff, the State Department of Community Development, Emergency Management Division, and other appropriate local authorities. Copies of the completed EAP must be provided to the State Emergency Management Division, local Emergency Services, and to the DSO.

Any proposed changes to existing emergency action plans which could have an effect on public safety, must be coordinated with the local Emergency Services staff and be reviewed and accepted by the DSO. In addition, an EAP must be developed or updated within 180 days after a periodic inspection has been completed by the DSO.

3.5 REPORTING OF INCIDENTS

Owners are required to notify the DSO when problems or conditions arise which may pose a threat to life or property, or threaten the integrity of the dam. The owner is required to report by telephone to the DSO on any condition affecting the safety of the project or when an incident has occurred. The initial oral report must be made as soon as practicable after the condition is discovered or following any incident. In addition, dam owners are required to notify the DSO prior to resumption of normal reservoir operation following any emergency actions.

The DSO may require that the owner prepare a written report within 30 days following the discovery of the condition or after the incident. The report shall describe the condition affecting the safety of the project or the incident which has occurred, and shall describe the preliminary plans for correcting the condition and for preventing the recurrence of similar incidents.

Examples of incidents that would require notification of the DSO would include:

- Failure or partial failure of gates and valves associated with spillways and outlet works.
- Significant damage associated with an extreme event such as an earthquake or flood.
- Unforeseen facility operations that result in a condition that threatens the structure, dam operators, or lives or property in downstream areas.
- Any significant change in the physical characteristics of the dam, foundation, or outlet works. These could include significant changes in seepage through the embankment or foundation, or the occurrence of slumps or slides on earthen embankments.

3.6 MODIFICATIONS TO EXISTING DAMS

Dam owners are required to submit construction plans and specifications to the DSO for review and approval prior to beginning construction on any structural modification to a dam. A modification is defined as any structural alteration of a dam, its reservoir, spillway(s), outlet(s), or other appurtenant works that could significantly influence or affect the project safety. Modifications do not include activities related to routine maintenance. DSO review and approval is also required for removal or abandonment of a dam.

The Construction Permit process for modification or removal of a dam proceeds through a similar series of activities as for the construction of new dams (see *Part II, Dam Safety Guidelines*). The DSO should be contacted as early in the project development phase as possible, preferably when conceptual plans are developed, to expedite the Dam Safety construction permitting process.

REFERENCES

1. State of Washington, Department of Ecology, Various Statutes and rules related to Water Resources: State Water Code (1917), Chapter RCW 90.03 RCW; Powers and Duties, Department of Ecology, (1970), RCW 43.21A; Flood Control Act (1935), Chapter 86.16 RCW; Dam Safety Regulations, (1992), WAC 173-175; Olympia, WA.
2. State of Washington, Department of Ecology Publication Number 92-21, Guidelines for Developing Dam Operation and Maintenance Manuals, April 1992, Olympia, WA.
3. State of Washington, Department of Ecology Publication Number 92-22, Guidelines for Developing Dam Emergency Action Plans, April 1992, Olympia, WA.

APPENDIX A
STATE STATUTES AND ADMINISTRATIVE RULES
PERTAINING TO DAM SAFETY

Dam Safety Guidelines

Part I:
*General Information &
Owner Responsibilities*

WASHINGTON STATE STATUTES

RCW 43.21A.064 Powers and duties - Water resources.

Subject to RCW 43.21A.068, the director of the department of ecology shall have the following powers and duties:

(2) Insofar as may be necessary to assure safety to life or property, he shall inspect the construction of all dams, canals, ditches, irrigation systems, hydraulic power plants, and all other works, systems and plants pertaining to the use of water, and he may require such necessary changes in the construction or maintenance of said works, to be made from time to time, as will reasonably secure safety to life and property;

RCW 43.21A.068 Federal power act licensees - Exemption from state regulations.

(1) With respect to the safety of any dam, canal, ditch, hydraulic power plant, reservoir, project, or other work, system or plant that requires a license under the federal power act, no licensee shall be required to:

- (a) submit proposals, plans, specifications or other documents for approval by the department;
- (b) seek a permit, license or other form, permission, or authorization from the department;
- (c) submit to inspection by the department; or
- (d) change a design, construction, modification, maintenance, or operation of such facilities at the demand of the department.

(2) For the purposes of this section, "licensee" means an owner or operator, or any employee thereof, of a dam, canal, ditch, hydraulic power plant, reservoir, project, or other work, system, or plant that requires a license under the federal power act.

RCW 86.16.035 Department of Ecology - Control of dams and obstructions.

Subject to RCW 43.21A.068, the department of ecology shall have supervision and control over all dams and obstructions in streams, and may make reasonable regulations with respect thereto concerning the flow of water which he deems necessary for the protection to life and property below such works from flood waters.

RCW 90.03.350 Construction or modification of storage dam - Plans and specifications.

Except as provided in RCW 43.21A.068, any person, corporation or association intending to construct or modify any dam or controlling works for the storage of ten acre feet or more of water, shall before beginning said construction or modification, submit plans and specifications of the same to the department for examination and approval as to its safety. Such plans and specifications shall be submitted in duplicate, one copy of which shall be retained as a public record, by the department, and the other returned with its approval or rejection endorsed thereon. No such dam or controlling works shall be constructed or modified until the same or any modification thereof shall have been approved as to its safety by the department. Any such dam or controlling works constructed or modified in any manner other than in accordance with plans and specifications approved by the department or which shall not be maintained in accordance with the order of the department shall be presumed to be a public nuisance and may be abated in the manner provided by law, and it shall be the duty of the attorney general or prosecuting attorney of the county wherein such dam or controlling works, or the major portion thereof, is situated to institute abatement proceedings against the owner or owners of such dam or

controlling works, wherever he is requested to do so by the department

A metal minings and milling operation regulated under chapter 232, Laws of 1994, is subject to additional dam safety inspection requirements due to the specific hazards associated with failure of a tailings impoundment. The department shall inspect these impoundments at least quarterly during the project's operation and at least annually thereafter for the postclosure monitoring period. in order to ensure the safety of the dam or controlling works. The department shall conduct additional inspections as needed during the construction phase of the mining operation in order to ensure the safe construction of the tailings impoundment.

RCW 90.03.470 Schedule of fees.

The following fees shall be collected by the department in advance:

- .
- .
- (8) For the inspection of any hydraulic works to insure safety to life and property, the actual cost of the inspection, including the expense incident thereto.
- (9) For the examination of plans and specifications as to safety of controlling works for storage of ten acre feet or more of water, a minimum fee of ten dollars, or the actual cost.

**Chapter 173-175 WAC
DAM SAFETY**

Last Update: 8/4/04

WAC SECTIONS

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- 173-175-010 Purpose and authority.
- 173-175-020 Applicability.
- 173-175-030 Definitions.
- 173-175-040 Activities that require department review, approval, acceptance, authorization, or notification.
- 173-175-050 Provision of guidelines.
- 173-175-060 Change of ownership.

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- 173-175-250 Construction records summary.
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173-175-765 Periodic inspection fee schedule.
173-175-775 Periodic inspection fee computation.
173-175-785 Periodic inspection fee payments.
173-175-795 Periodic inspection fees for transfer of ownership or control.

DISPOSITIONS OF SECTIONS FORMERLY CODIFIED IN THIS CHAPTER

- 173-175-070 Effective date. [Statutory Authority: 1995 c 8. 95-22-030 (Order 94-15), § 173-175-070, filed 10/24/95, effective 11/24/95. Statutory Authority: RCW 43.21A.064, [43.21A].080 and 86.16.061. 93-01-090 (Order 92-35), § 173-175-070, filed 12/16/92, effective 1/16/93; 92-12-055 (Order 91-17), § 173-175-070, filed 6/1/92, effective 7/2/92.] Repealed by 04-16-122 (Order 03-08), filed 8/4/04, effective 9/4/04. Statutory Authority: RCW 43.21A.064, 43.21A.080, 86.16.061, 90.03.350 and [90.03].470.
- 173-175-700 Applicability to projects licensed or exempted by the Federal Energy Regulatory Commission (FERC). [Statutory Authority: RCW 43.21A.064, [43.21A].080 and 86.16.061. 93-01-090 (Order 92-35), § 173-175-700, filed 12/16/92, effective 1/16/93.] Repealed by 95-22-030, filed 10/24/95, effective 11/24/95. Statutory Authority: 1995 c 8.
- 173-175-710 Coordination between the department and the Federal Energy Regulatory Commission (FERC). [Statutory Authority: RCW 43.21A.064, [43.21A].080 and 86.16.061. 93-01-090 (Order 92-35), § 173-175-710, filed 12/16/92, effective 1/16/93.] Repealed by 95-22-030, filed 10/24/95, effective 11/24/95. Statutory Authority: 1995 c 8.
- 173-175-720 Construction or modification of FERC licensed projects and FERC exempted projects. [Statutory Authority: RCW 43.21A.064, [43.21A].080 and 86.16.061. 93-01-090 (Order 92-35), § 173-175-720, filed 12/16/92, effective 1/16/93.] Repealed by 95-22-030, filed 10/24/95, effective 11/24/95. Statutory Authority: 1995 c 8.
- 173-175-730 Construction permit fee for FERC licensed projects and FERC exempted projects. [Statutory Authority: RCW 43.21A.064, [43.21A].080 and 86.16.061. 93-01-090 (Order 92-35), § 173-175-730, filed 12/16/92, effective 1/16/93.] Repealed by 95-22-030, filed 10/24/95, effective 11/24/95. Statutory Authority: 1995 c 8.
- 173-175-740 Construction inspection of FERC licensed projects and FERC exempted projects. [Statutory Authority: RCW 43.21A.064, [43.21A].080 and 86.16.061. 93-01-090 (Order 92-35), § 173-175-740, filed 12/16/92, effective 1/16/93.] Repealed by 95-22-030, filed 10/24/95, effective 11/24/95. Statutory Authority: 1995 c 8.
- 173-175-750 Construction records reporting for FERC licensed projects and FERC exempted projects. [Statutory Authority: RCW 43.21A.064, [43.21A].080 and 86.16.061. 93-01-090 (Order 92-35), § 173-175-750, filed 12/16/92, effective 1/16/93.] Repealed by 95-22-030, filed 10/24/95, effective 11/24/95. Statutory Authority: 1995 c 8.
- 173-175-760 Exceptions to construction permit for FERC licensed projects and FERC exempted projects. [Statutory Authority: RCW 43.21A.064, [43.21A].080 and 86.16.061. 93-01-090 (Order 92-35), § 173-175-760, filed 12/16/92, effective 1/16/93.] Repealed by 95-22-030, filed 10/24/95, effective 11/24/95. Statutory Authority: 1995 c 8.
- 173-175-770 Operation of FERC licensed projects and FERC exempted projects. [Statutory Authority: RCW 43.21A.064, [43.21A].080 and 86.16.061. 93-01-090 (Order 92-35), § 173-175-770, filed 12/16/92, effective 1/16/93.] Repealed by 95-22-030, filed 10/24/95, effective 11/24/95. Statutory Authority: 1995 c 8.
- 173-175-780 Periodic inspection of FERC licensed projects and FERC exempted projects. [Statutory Authority: RCW 43.21A.064, [43.21A].080 and 86.16.061. 93-01-090 (Order 92-35), § 173-175-780, filed 12/16/92, effective 1/16/93.] Repealed by 95-22-030, filed 10/24/95, effective 11/24/95. Statutory Authority: 1995 c 8.
- 173-175-790 Emergency action plans for FERC licensed projects and FERC exempted projects. [Statutory Authority: RCW 43.21A.064, [43.21A].080 and 86.16.061. 93-01-090 (Order 92-35), § 173-175-790, filed 12/16/92, effective 1/16/93.] Repealed by 95-22-030, filed 10/24/95, effective 11/24/95. Statutory Authority: 1995 c 8.
- 173-175-800 Right of entry at FERC licensed projects and FERC exempted projects. [Statutory Authority: RCW 43.21A.064, [43.21A].080 and 86.16.061. 93-01-090 (Order 92-35), § 173-175-800, filed 12/16/92, effective 1/16/93.] Repealed by 95-22-030, filed 10/24/95, effective 11/24/95. Statutory Authority: 1995 c 8.

- 173-175-810 Enforcement at FERC licensed projects and FERC exempted projects. [Statutory Authority: RCW 43.21A.064,[43.21A].080 and 86.16.061. 93-01-090 (Order 92-35), § 173-175-810, filed 12/16/92, effective 1/16/93.] Repealed by 95-22-030, filed 10/24/95, effective 11/24/95. Statutory Authority: 1995 c 8.
- 173-175-820 Appeals for FERC licensed projects and FERC exempted projects. [Statutory Authority: RCW 43.21A.064,[43.21A].080 and 86.16.061. 93-01-090 (Order 92-35), § 173-175-820, filed 12/16/92, effective 1/16/93.] Repealed by 95-22-030, filed 10/24/95, effective 11/24/95. Statutory Authority: 1995 c 8.

PART ONE

GENERAL

WAC 173-175-010 Purpose and authority. These regulations provide for the comprehensive regulation and supervision of dams in order to reasonably secure safety to life and property pursuant to chapters 43.21A, 43.27A, 86.16, 90.03, 90.28, and 90.54 RCW. The purposes of these regulations are to:

- (1) Designate the types of dams to which these regulations are applicable;
- (2) Provide for the design, construction, operation, maintenance, and supervision of dams in a manner consistent with accepted engineering practice;
- (3) Establish and administer a program for permitting of construction work for new dams and for modifications of existing dams;
- (4) Establish a fee schedule based on dam size that will reflect the actual cost to the department of engineering review of plans and specifications and for construction inspections;
- (5) Establish the requirements and owner responsibilities for developing and executing plans for operation and maintenance, owner inspection and emergency actions; and
- (6) Establish a program for the periodic inspection by the department of existing dams, and a fee schedule for these inspections based on downstream hazard classification and frequency of inspections. This fee schedule will reflect the actual cost to the department.

[Statutory Authority: RCW 43.21A.064, 43.21A.080, 86.16.061, 90.03.350 and [90.03].470. 04-16-122 (Order 03-08), § 173-175-010, filed 8/4/04, effective 9/4/04. Statutory Authority: RCW 43.21A.064, [43.21A.]080 and 86.16.061. 92-12-055 (Order 91-17), § 173-175-010, filed 6/1/92, effective 7/2/92.]

WAC 173-175-020 Applicability. (1) These regulations are applicable to dams which can impound a volume of ten acre-feet or more of water as measured at the dam crest elevation. The ten acre-feet threshold applies to dams which can impound water on either an intermittent or permanent basis. Only water that can be stored above natural ground level or which could be released by a failure of the dam is considered in assessing the storage volume.

The ten acre-feet threshold applies to any dam which can impound water of any quality, or which contains any substance in combination with sufficient water to exist in a liquid or slurry state at the time of initial containment.

(2) For a dam whose dam height is six feet or less and which meets the conditions of subsection (1) of this section, the department may elect to exempt the dam from these regulations.

The decision by the department to exempt a dam will be made on a case-by-case basis for those dams whose failure is not judged to pose a risk to life and minimal property damage would be expected (downstream hazard class 3).

(3) These regulations do not apply to dams that are, or will be, owned, by an agency of the federal government which has oversight on operation and maintenance and has its own dam safety program for

periodic inspection and repair of safety deficiencies of completed projects. The department will continue to be the state repository for pertinent plans, reports, and other documents related to the safety of federally owned dams.

(4) These regulations do not apply to transportation facilities such as roads, highways, or rail lines which cross watercourses and exist solely for transportation purposes and which are regulated by other governmental agencies.

Those transportation facilities which cross watercourses and which have been, or will be, modified with the intention of impounding water on an intermittent or permanent basis and which meet the conditions of subsection (1) of this section shall be subject to these regulations.

(5) These regulations do not apply to dikes or levees constructed adjacent to or along a watercourse for protection from natural flooding or for purposes of floodplain management.

(6) These regulations do not apply to concrete or steel water storage tanks.

(7) These regulations do not apply to FERC licensed projects and to FERC exempted projects. The department will continue to maintain a repository for pertinent plans, reports, and other documents related to the safety of FERC licensed and FERC exempted projects.

[Statutory Authority: RCW 43.21A.064, 43.21A.080, 86.16.061, 90.03.350 and [90.03].470. 04-16-122 (Order 03-08), § 173-175-020, filed 8/4/04, effective 9/4/04. Statutory Authority: 1995 c 8. 95-22-030 (Order 94-15), § 173-175-020, filed 10/24/95, effective 11/24/95. Statutory Authority: RCW 43.21A.064, [43.21A].080 and 86.16.061. 93-01-090 (Order 92-35), § 173-175-020, filed 12/16/92, effective 1/16/93; 92-12-055 (Order 91-17), § 173-175-020, filed 6/1/92, effective 7/2/92.]

WAC 173-175-030 Definitions. As used in this chapter:

"Acceptance" means acceptance by the department that the proposed plan(s) will satisfactorily address issues associated with proper operation, maintenance, inspection, or emergency action.

"Annual exceedance probability" means the chance that a specified magnitude of some phenomenon of interest, such as a flood or earthquake, is equaled or exceeded during a given year.

"Approval" means approval by the department that the proposed design, and plans and specifications conform to accepted engineering practice and department guidelines.

"Appurtenant works" means such structures as outlet works and associated gates and valves; water conveyance structures such as spillways, channels, fish ladders, tunnels, pipelines, or penstocks; powerhouse sections; and navigation locks, either in the dam or adjacent thereto.

"Authorization" means written acknowledgement from the department to proceed with proposed actions.

"Construction change order" means a revision to the department approved plans and specifications that is initiated during construction.

"Construction permit" means the permit which authorizes construction and that the project's plans and specifications and construction inspection plan have been reviewed and approved by the department.

"Construction permit process" means the sequence of activities specified in WAC [173-175-110](#) inclusive, beginning with the application for construction permit and ending with the submission of a report summarizing construction records.

"Crest length" means the total horizontal distance measured along the axis of the dam, at the elevation of the top of the dam, between abutments or ends of the dam. Where applicable, this includes the spillway, powerhouse sections, and navigation locks, where they form a continuous part of the impounding structure.

"Critical project element" means an element of a project whose failure could result in the uncontrolled release of the reservoir.

"Dam" means any artificial barrier and/or any controlling works, together with appurtenant works that can or does impound or divert water.

"Dam abutment" means that contact location at either end and beneath the flanks of a dam where the artificial barrier joins or faces against the natural earth or rock foundation material upon which the dam is constructed.

"Dam height" means the vertical distance from the natural bed of the stream or watercourse at the downstream toe of the impounding barrier to the maximum storage elevation. If the dam is not across a stream or watercourse, the height is measured from the lowest elevation of the outside limit of the impounding barrier to the maximum storage elevation.

"Department" means the department of ecology.

"Design step level" means an integer value between one and eight used to designate increasingly stringent design loadings and conditions for design of critical project elements. Design steps have a range in annual exceedance probability from one in five hundred at Step 1 to one in one million at Step 8.

"Downstream hazard classification" means a rating to describe the potential for loss of human life and/or property damage if the dam were to fail and release the reservoir onto downstream areas. Downstream hazard classifications of 3, 2 and 1C, 1B, 1A correspond to low, significant, and high downstream hazard classes respectively.

"Emergency condition" means a situation where life and property are at imminent risk and actions are needed within minutes or hours to initiate corrective actions and/or warn the public.

"Enlargement" means any modification of a project that will result in an increase in normal pool height and/or dam height.

"Exigency condition" means a situation where the dam is significantly underdesigned according to generally accepted engineering standards or is in a deteriorated condition and life and property are clearly at risk. Although present conditions do not pose an imminent threat, if adverse conditions were to occur, the situation could quickly become an emergency.

"FERC exempted project" means a project that is classified as exempt by the Federal Energy Regulatory Commission (FERC) under provisions of the Federal Power Act.

"FERC licensed project" means a project whose operation is licensed by the Federal Energy Regulatory Commission (FERC) under provisions of the Federal Power Act.

"Freeboard" means the vertical distance between the dam crest elevation and some reservoir level of interest.

"Hydrograph" means a graphical representation of discharge, stage, or other hydraulic property with

respect to time for a particular location on a watercourse.

"Impounding barrier" means the structural element of the dam that has the primary purpose of impounding or diverting water. It may be constructed of natural and/or man-made materials.

"Incident" means the occurrence of any dam-related event where problems or conditions arise which may have posed a threat to the safety or integrity of the project or which may have posed a threat of loss of life or which resulted in loss of life.

"Inflow design flood (IDF)" means the reservoir inflow flood hydrograph used for sizing the spillways and for determining freeboard. It represents the largest flood that a given project is designed to safely accommodate.

"Maintenance" means those tasks generally accepted as routine in keeping the project and appurtenant works in a serviceable condition.

"Maximum storage elevation" means the maximum attainable water surface elevation of the reservoir pool that could occur during extreme operating conditions. This elevation normally corresponds to the crest elevation of the dam.

"Miscellaneous construction elements" means a variety of construction elements or activities such as, but not limited to: Reservoir linings; parapet walls or low berms for wave containment; minor reconstruction of isolated portions of the impounding barrier; internal drainage improvements; and erosion protection.

"Modification" means any structural alteration of a dam, its reservoir, spillway(s), outlet(s), or other appurtenant works that could significantly influence or affect the project safety.

"Normal pool height" means the vertical distance between the lowest point of the upstream toe of the impounding barrier and the normal storage elevation.

"Normal storage elevation" means the maximum elevation to which the reservoir may rise under normal operating conditions. Where the principal spillway is ungated, the normal storage elevation is usually established by the elevation of the spillway crest.

"100-year floodplain" means the area inundated during the passage of a flood with a peak discharge having a one percent chance of being equaled or exceeded in any given year at a specified location on a watercourse.

"Outlet" means a conduit and/or channel structure for the controlled release of the contents normally impounded by a dam and reservoir.

"Owner" means the person holding lawful title to the dam or any person who owns or proposes to construct a dam.

"Periodic inspection" means a detailed inspection of the dam and appurtenant works conducted on regular intervals and includes, as necessary, associated engineering analyses to confirm the continued safe operation of the project.

"Person" means any individual, firm, association, county, public or municipal or private corporation, agency, or other entity whatsoever.

"Plans and specifications" means the detailed engineering drawings and specifications used to describe the layout, materials, construction methods, etc., for assembling a project or project element. These do not include shop drawings or other drawings prepared by the construction contractor for temporary construction support systems.

"Population at risk" means the number of people who may be present in areas downstream of a dam and could be in danger in the event of a dam failure.

"Project" means a dam and its reservoir either proposed or existing.

"Project engineer" means a professional engineer licensed in Washington, having direct supervision, as defined in WAC 196-24-095, in managing the engineering aspects of the project as representative of the owner.

"Reservoir" means any basin that contains or will contain the water impounded by a dam.

"Reservoir routing" means the procedures used to determine the attenuating effect of reservoir storage on a flood as it passes through a reservoir.

"Rule curve" means the rules and procedures used to regulate reservoir levels and project operation for various reservoir inflows and for both normal and unusual seasonal conditions.

"Significant enlargement" means any modification of an existing dam that results in the dam height or normal pool height being increased by an amount greater than 5.0 feet, and which also represents a ten percent or greater increase in dam height or normal pool height over that which existed prior to the modification.

"Spillway" means a channel structure and/or conduit for the safe release of water or floodwater.

"Stop work order" means an administrative order issued to temporarily halt construction work until a problem can be resolved.

"Substantially complete" means that a plan, action, or project element requires only minor additions to be complete, and in its present state will perform the necessary functions for its intended use.

"Surficial inspection" means a visual inspection conducted to identify obvious defects or changed conditions.

[Statutory Authority: RCW 43.21A.064, 43.21A.080, 86.16.061, 90.03.350 and [90.03].470. 04-16-122 (Order 03-08), § 173-175-030, filed 8/4/04, effective 9/4/04. Statutory Authority: 1995 c 8. 95-22-030 (Order 94-15), § 173-175-030, filed 10/24/95, effective 11/24/95. Statutory Authority: RCW 43.21A.064, [43.21A].080 and 86.16.061. 93-01-090 (Order 92-35), § 173-175-030, filed 12/16/92, effective 1/16/93; 92-12-055 (Order 91-17), § 173-175-030, filed 6/1/92, effective 7/2/92.]

WAC 173-175-040 Activities that require department review, approval, acceptance, authorization, or notification. (1) Activities related to the safety of dams that require review and approval by the department as detailed in this chapter include:

- (a) Construction of a new dam;
- (b) Modification of an existing dam;

- (c) Removal or abandonment of an existing dam;
 - (d) Construction change orders for project elements that could have an effect on public safety.
- (2) Activities related to the safety of dams that require review and acceptance by the department as detailed in this chapter include:
- (a) Adoption of an operation and maintenance (O&M) plan;
 - (b) Adoption of an emergency action plan (EAP);
 - (c) Changes to existing operation and maintenance procedures or to an emergency action plan that could have an effect on public safety.
- (3) Activities related to the safety of dams that require authorization from the department before proposed actions can proceed include:
- (a) Startup of construction: For a new dam; modifications to an existing dam; or removal or abandonment of an existing dam.
 - (b) Initial controlled filling of a reservoir following new dam construction and implementation of procedures for normal reservoir operation.
 - (c) Resumption of normal reservoir operation following dam modifications or emergency action.
 - (4) Activities related to the safety of dams that require a notification to the department as detailed in this chapter include:
 - (a) Change of dam ownership;
 - (b) Advance notice of the startup of dam construction;
 - (c) Declaration by the project engineer of project completion in accordance with the department approved plans and specifications and construction change orders;
 - (d) Advance notice of periodic inspection; and
 - (e) The occurrence of an incident at the dam.

[Statutory Authority: RCW 43.21A.064, [43.21A.]080 and 86.16.061 . 92-12-055 (Order 91-17), § 173-175-040, filed 6/1/92, effective 7/2/92.]

WAC 173-175-050 Provision of guidelines. The department will develop and maintain *Dam Safety Guidelines* to aid dam owners and project engineers in complying with the department requirements in developing, producing, or conducting:

- (1) Engineering design reports;
- (2) Plans and specifications;
- (3) Construction inspection plans;

(4) Operation and maintenance plans;

(5) Periodic inspections; and

(6) Emergency action plans.

[Statutory Authority: RCW 43.21A.064, [43.21A.]080 and 86.16.061. 92-12-055 (Order 91-17), § 173-175-050, filed 6/1/92, effective 7/2/92.]

WAC 173-175-060 Change of ownership. When a change of ownership of a dam occurs, the new owner shall notify the department within ninety days following the transaction and provide:

(1) The mailing address and telephone number where the owner can be contacted.

(2) The name(s) and telephone number(s) of the individual(s) who will be responsible for operation and maintenance of the dam.

[Statutory Authority: RCW 43.21A.064, [43.21A.]080 and 86.16.061. 92-12-055 (Order 91-17), § 173-175-060, filed 6/1/92, effective 7/2/92.]

PART TWO CONSTRUCTION

PERMIT PROCESS

WAC 173-175-100 Construction permit. (1) Any person intending to construct or modify any dam shall, before beginning said construction or modification, submit plans and specifications and a construction inspection plan for review and approval by the department.

(2) The approval of these documents will be indicated by the department's plan approval stamp on the cover sheet of the plans signed by the department's professional engineer who had primary responsibility for the engineering review.

(3) The return of the construction plans to the owner will be accompanied by a construction permit which authorizes construction and which must be prominently displayed at the construction site.

(4) A copy of the department approved plans and specifications shall be maintained at the construction site.

(5) Construction work shall not proceed until the plans, specifications, and construction inspection plan have been approved by the department.

[Statutory Authority: RCW 43.21A.064, [43.21A.]080 and 86.16.061. 92-12-055 (Order 91-17), § 173-175-100, filed 6/1/92, effective 7/2/92.]

WAC 173-175-110 Sequence of permitting actions. The sequence of tasks to be completed by the owner or the project engineer, and the actions taken by the department in permitting dam construction are outlined below. A more complete description of the required tasks, reports, and plans are described in later sections, and additional guidance in meeting department requirements is contained in the department documents titled *Dam Safety Guidelines*. The following outline is listed to give an overview of the normal sequence of actions for construction of a new dam. Subsections (9), (10), and (11) of this section will not be required for modification of an existing dam where the department has previously accepted the project's operation and maintenance plan and emergency action plan.

- (1) Submission of application for construction permit, including initial nonrefundable fee payment.
- (2) Submission of engineering design report(s).
- (3) Submission of plans and specifications.
- (4) Payment of construction permit fee.
- (5) Submission of construction inspection plan.
- (6) Resolution of any outstanding engineering issues.
- (7) Department approves plans and specifications and issues construction permit.
- (8) Construction or modification of dam.
- (9) Submission of operation and maintenance (O&M) plan.

(10) Submission of emergency action plan (EAP).

(11) Department accepts O&M plan and EAP.

(12) Declaration by project engineer that project was constructed or modified in accordance with approved plans and specifications and construction change orders.

(13) Department concurs with project engineer that project was constructed or modified in accordance with approved plans and specifications and construction change orders.

(14) Department authorizes filling of reservoir at new dam or resumption of normal operations at existing dam.

(15) Submission of a report summarizing the construction records.

[Statutory Authority: RCW 43.21A.064, [43.21A.]080 and 86.16.061. 92-12-055 (Order 91-17), § 173-175-110, filed 6/1/92, effective 7/2/92.]

WAC 173-175-120 Application for construction permit. (1) The department shall supply an application form to be used to initiate the process for obtaining the construction permit.

(2) The application form shall be submitted to the department at the time that the first substantive engineering information becomes available about the proposed project.

(3) An initial, nonrefundable payment which may represent all or a portion of the construction permit fee, shall be included along with the application form. The amount of the initial construction permit fee payment is defined in WAC [173-175-390](#).

[Statutory Authority: RCW 43.21A.064, [43.21A.]080 and 86.16.061. 92-12-055 (Order 91-17), § 173-175-120, filed 6/1/92, effective 7/2/92.]

WAC 173-175-130 Engineering design reports. (1) Engineering design reports summarizing the various engineering investigations and pertinent project information are an important element of the project design documents. All pertinent engineering design reports that have been prepared during project formulation shall be submitted for review. The engineering design report(s) must bear the seal and signature of the project engineer.

(2) The engineering design reports shall be sufficiently complete so as to support the development of plans and specifications without substantial change or additional information.

(3) The engineering design report(s) shall be comprehensive in description of the various engineering investigations.

(a) For new project construction, the engineering design report(s) shall include, as a minimum, the items listed in subsection (4) of this section:

(b) For modifications of existing dams, the engineering design report(s) shall include, as a minimum, those items listed in subsection (4) of this section which represent changed conditions from original construction or which address items that have not been previously addressed in prior reports that were submitted to the department.

(4) Contents of engineering design report(s):

(a) A description of the basic purposes of the project, normal operational characteristics and any unique or important design considerations associated with the site or project configuration.

(b) A description of the site geology, seismicity and geotechnical considerations including: A presentation of the findings from subsurface explorations based on test pits and/or boring logs; field tests; laboratory testing and classification of samples; and an identification of the seismotectonic provinces that could generate earthquakes large enough to significantly affect the project site.

(c) A description of the climatic and hydrologic characteristics of the site and tributary watershed including the computation of the inflow design flood and, where applicable, a listing of the input and output data for the computer model used to determine the inflow design flood.

(d) A listing of all sources of inflow to the reservoir.

(e) The size classification of the proposed project as defined by Table 1.

TABLE 1. DAM SIZE CLASSIFICATION

SIZE CLASSIFICATION	DAM HEIGHT
Small Dam	Less than 15 feet
Intermediate Dam	15 feet or greater but less than 50 feet
Large Dam	50 feet or greater

(f) The reservoir operation classification of the proposed project as defined by Table 2.

TABLE 2. RESERVOIR OPERATION CLASSIFICATION	
RESERVOIR OPERATION CLASSIFICATION	DETERMINING FACTOR
Permanent Pool or Seasonal Pool Operation	Steady state seepage or saturated flow conditions occur in impounding barrier and foundation at or near normal pool conditions.
Intermittent Operation	Duration of normal high pool condition is insufficient for steady state seepage or saturated flow conditions to develop in impounding barrier and foundation.

(g) An assessment of the consequences of dam failure on downstream areas, including:

(i) An estimation of the magnitude of the dam break flood hydrographs resulting from hypothetical dam

failures occurring with the reservoir at normal storage elevation and maximum storage elevation;

(ii) A general description of the areas downstream of the dam that could be affected by floodwater from a dam failure;

(iii) If there is the potential for loss of life, an inundation map delineating the maximum areal extent of flooding that could be produced by a dam failure. Inundation mapping should extend to a point downstream where the inundation from the dam failure is within the 100-year floodplain for the affected watercourse;

(iv) The downstream hazard classification as defined by Table 3, which reflects the current conditions of development in downstream areas. The most serious potential consequences of failure of those listed in columns 3A, 3B, and 3C shall be used to establish the appropriate downstream hazard classification.

TABLE 3. DOWNSTREAM HAZARD CLASSIFICATION

DOWNSTREAM HAZARD POTENTIAL	DOWNSTREAM HAZARD CLASSIFICATION	COLUMN 3A POPULATION AT RISK	COLUMN 3B ECONOMIC LOSS GENERIC DESCRIPTIONS	COLUMN 3C ENVIRONMENTAL DAMAGES
Low	3	0	Minimal. No inhabited structures. Limited agricultural development.	No deleterious materials in reservoir contents
Significant	2	1 to 6	Appreciable. 1 or 2 inhabited structures. Notable agriculture or work sites. Secondary highway and/or rail lines.	Limited water quality degradation from reservoir contents and only short term consequences.
High	1C	7 to 30	Major. 3 to 10 inhabited structures. Low density suburban area with some industry and work sites. Primary highways and rail lines.	
High	1B	31-300	Extreme. 11 to 100 inhabited structures. Medium density suburban or urban area with associated industry, property and transportation features.	Severe water quality degradation potential from reservoir contents and long term effects on aquatic and human life.
High	1A	More than 300	Extreme. More than 100 inhabited structures. Highly developed, densely populated suburban or urban area with associated industry, property, transportation and community life line features.	

(h) Engineering calculations and data supporting the detailed design of project elements. This would

include, as a minimum:

(i) The design step levels used in design of the various critical project elements, based on guidance contained in the department's *Dam Safety Guidelines*;

(ii) Stability analyses corroborating the design of the proposed embankment/barrier section under static and seismic loadings and rapid drawdown conditions;

(iii) Calculations for the design of any hydraulic structures, which are subject to high lateral earth pressures, relatively large seismic loads and/or uplift pressures;

(iv) Computations for sizing the principal and emergency spillway, including, where applicable, reservoir routing computations defining the reservoir inflow and outflow design flood hydrographs.

[Statutory Authority: RCW 43.21A.064, [43.21A.]080 and 86.16.061 . 92-12-055 (Order 91-17), § 173-175-130, filed 6/1/92, effective 7/2/92.]

WAC 173-175-140 Plans and specifications. (1) Two copies of the plans and specifications, bearing the seal and signature of the project engineer, shall be submitted to the department for engineering review. Upon approval, one copy will be retained by the department and the other copy will be returned to the owner or the project engineer.

(2) For large or complex projects, one copy of the preliminary or intermediate level plans, in addition to the final plans, shall be submitted to the department for review.

(3) To be approved, the plans and specifications must contain sufficient detail to describe the proposed construction work.

(a) The following items, as a minimum, shall be included as part of the construction plans:

(i) Project location and vicinity maps;

(ii) Site map of dam, reservoir area, and appurtenances;

(iii) Sectional view along longitudinal axis of dam and foundation;

(iv) Cross-sectional view of dam at location of maximum height;

(v) Cross-sectional views and profiles of spillway(s), outlet facilities, and other appurtenances;

(vi) Steel reinforcement placement and bar sizing for concrete construction must be shown in at least one section or profile; and

(vii) The plan for diversion and control of water during construction.

(b) The following items, as a minimum, shall be included as part of the construction specifications:

(i) Type, class, or description of all materials to be used;

(ii) The requirements for fill placement, moisture conditioning, and minimum level of compaction of all earthen zones;

(iii) The requirements, procedures, and minimum standards for concrete construction and/or structural details.

[Statutory Authority: RCW 43.21A.064, [43.21A.]080 and 86.16.061 . 92-12-055 (Order 91-17), § 173-175-140, filed 6/1/92, effective 7/2/92.]

WAC 173-175-150 Construction permit fee. There is a fee for the review of plans and specifications and for construction inspections conducted by the department. The amount of the fee and owner requirements for fee payment are contained in WAC [173-175-350](#) through [173-175-400](#).

[Statutory Authority: RCW 43.21A.064, [43.21A.]080 and 86.16.061. 92-12-055 (Order 91-17), § 173-175-150, filed 6/1/92, effective 7/2/92.]

WAC 173-175-160 Review standards. The department will review engineering design reports, plans, and specifications and the construction inspection plan to ascertain that the proposed project will be designed and constructed in a manner which will reasonably secure safety to life and property.

(1) The department's review is intended to address issues of safety directly related to the structural stability and integrity of the completed project. The review is not intended to extend to more general issues of safety not directly related to the structural stability and integrity of the project which are the purview of other governmental agencies such as the Washington department of labor and industries (L&I), which administers the Washington Industrial Safety and Health Act (WISHA).

(2) In addition to the above, the department will review documents submitted pursuant to this chapter to ascertain that they conform to accepted engineering and construction practice and are in conformance with guidance contained in the department's *Dam Safety Guidelines*.

(3) Those elements of a document(s) which are found not to be in conformance with the above will be identified to the owner or the project engineer and changes may be required as appropriate to conform to accepted engineering practice.

(4) Where differences of opinion arise on the suitability of certain engineering or construction practices and cannot be readily resolved, the burden of proof will rest on the owner and the project engineer to demonstrate the suitability of the proposed plan or action.

[Statutory Authority: RCW 43.21A.064, [43.21A.]080 and 86.16.061. 92-12-055 (Order 91-17), § 173-175-160, filed 6/1/92, effective 7/2/92.]

WAC 173-175-170 Construction inspection plan. (1) A detailed plan shall be submitted to the department describing how adequate and competent construction inspection will be provided.

(2) The construction inspection plan shall be prepared by a professional engineer and shall bear his/her seal and signature.

(3) The construction inspection plan shall include, as a minimum:

(a) A listing of construction activities related to critical project elements and planned inspection effort including staffing levels, responsibilities, frequency, and duration of site visits;

(b) A description of the quality assurance testing program which describes the type of test, general frequency, acceptable results, handling of deficient materials, and the individual(s) responsible for overseeing the testing;

(c) Description of construction management organization, lines of communication, and responsibilities;

(d) Description of the change order process including who is responsible for coordinating the change order review process with the department;

(e) Description of the technical records handling and the content and frequency of construction progress reports.

[Statutory Authority: RCW 43.21A.064, [43.21A.]080 and 86.16.061. 92-12-055 (Order 91-17), § 173-175-170, filed 6/1/92, effective 7/2/92.]

WAC 173-175-180 Issuance of construction permit. (1) After the department has determined that the plans and specifications and construction inspection plan conform to accepted engineering practice, these documents will be approved and a construction permit will be issued which authorizes construction to commence.

Construction shall not commence until the construction permit has been issued by the department.

Preliminary work such as mobilization of equipment, stripping and grubbing and other site access and preparation work is allowed prior to receipt of the construction permit, provided no permanent features of the dam are initiated.

(2) Receipt of the construction permit does not relieve the owner of the responsibility to secure all other applicable permits and approvals before proceeding with construction work.

[Statutory Authority: RCW 43.21A.064, [43.21A.]080 and 86.16.061. 92-12-055 (Order 91-17), § 173-175-180, filed 6/1/92, effective 7/2/92.]

WAC 173-175-190 Construction change orders. (1) All dam projects subject to the provisions of this regulation shall be constructed in accordance with the plans and specifications approved by the department. Any proposed changes to the department-approved plans which could have an effect on structural integrity or safe operations of the project must first be presented to the department for a determination if an approval is required.

(2) If the department determines that the proposed construction change order represents a significant modification of the approved plans or specifications that could have an effect on structural integrity or safe operations of the project, then approval of the change order will be required.

The department will review the construction change order and provide a response to the project engineer in a timely manner consistent with the complexity and safety concerns of the situation.

(3) If department approval of the proposed construction change order is required, no action can be taken by the owner to make the construction change until approval is given by the department.

[Statutory Authority: RCW 43.21A.064, [43.21A.]080 and 86.16.061. 92-12-055 (Order 91-17), § 173-175-190, filed 6/1/92, effective 7/2/92.]

WAC 173-175-200 Department role in construction inspection. (1) It will be the department's role during construction to confirm that the project engineer, as representative for the owner, is properly implementing the department approved construction inspection plan.

(2) The department will periodically observe the construction work to independently confirm that conditions assumed in the design stage are valid for field conditions and that construction is proceeding in accordance with the approved plans and specifications.

(3) Changes may be required by the department to be made to the approved plans and specifications to reasonably secure safety to life and property. Reasons for changes may include, but are not limited to the following:

(a) To address unanticipated field conditions;

(b) To correct omissions or errors in the approved plans and specifications;

(c) To correct situations where the construction work clearly is not being performed in a workmanlike manner and does not, in the opinion of the department, meet the performance intent of the specifications.

(4) Where deemed necessary by the department, a stop work order may be issued to temporarily halt construction until a problem can be resolved.

[Statutory Authority: RCW 43.21A.064, [43.21A.]080 and 86.16.061. 92-12-055 (Order 91-17), § 173-175-200, filed 6/1/92, effective 7/2/92.]

WAC 173-175-210 Operation and maintenance plan. (1) An operation and maintenance (O&M) plan shall be developed and submitted to the department for review and acceptance. The O&M plan shall outline and summarize how the project is to be operated and how the basic elements of monitoring, inspection and maintenance, as listed in WAC [173-175-500](#)(1), are to be accomplished.

The department may issue an acceptance after determining the O&M plan is substantially complete.

(2) Owners are responsible for incorporating the details of the O&M plan into an O&M manual suitable for use by dam operators. Requirements associated with O&M manuals are listed in WAC [173-175-500](#).

[Statutory Authority: RCW 43.21A.064, [43.21A.]080 and 86.16.061. 92-12-055 (Order 91-17), § 173-175-210, filed 6/1/92, effective 7/2/92.]

WAC 173-175-220 Emergency action plan. In those cases where a failure of the dam could pose a risk to life based on the current level of development in downstream areas (downstream hazard classes 1A, 1B, 1C, and 2, WAC [173-175-130](#)), an emergency action plan (EAP) shall be developed and submitted to the department for review and acceptance. The purpose of the plan is to establish procedures for responding to unusual or emergency situations and procedures for detecting, evaluating, communicating and initiating notification or warning to individuals who may be at risk in downstream/upstream areas. Requirements associated with EAP's are listed in WAC [173-175-520](#).

The department may issue an acceptance after determining the EAP is substantially complete.

[Statutory Authority: RCW 43.21A.064, [43.21A.]080 and 86.16.061. 92-12-055 (Order 91-17), § 173-175-220, filed 6/1/92, effective 7/2/92.]

WAC 173-175-230 Declaration of construction completion. Within sixty days following substantial completion of construction or modification of a dam, the project engineer shall submit to the department:

A declaration stating the project was constructed in accordance with the department approved plans and specifications and construction change orders.

The department will provide a declaration form which may be used or altered, as appropriate, by the project engineer.

[Statutory Authority: RCW 43.21A.064, 43.21A.080, 86.16.061, 90.03.350 and [90.03].470. 04-16-122 (Order 03-08), § 173-175-230, filed 8/4/04, effective 9/4/04. Statutory Authority: RCW 43.21A.064, [43.21A.]080 and 86.16.061. 92-12-055 (Order 91-17), § 173-175-230, filed 6/1/92, effective 7/2/92.]

WAC 173-175-240 Authorization to commence or resume project operation. (1) Upon receipt of the project engineer's declaration of construction completion, the department will authorize the owner or the project engineer, as appropriate, to commence or resume normal project operation, provided that:

(a) The department concurs with the project engineer that the project was constructed in accordance with the approved plans and specifications and construction change orders;

(b) The proposed O&M plan is acceptable to the department;

(c) The proposed emergency action plan, if required (see WAC [173-175-220](#)), is acceptable to the department.

(2) If the above conditions are not met, the owner shall not commence or resume normal operation of the project until all outstanding issues or problems are resolved. When outstanding issues or problems are not resolved in a timely manner, the department may:

(a) Order the outlet works to remain fully open and not allow filling of the reservoir;

(b) Restrict reservoir water levels or reservoir operation;

(c) Order the breaching of the impounding barrier;

(d) Take other measures as appropriate to reasonably secure safety to life and property.

[Statutory Authority: RCW 43.21A.064, [43.21A.]080 and 86.16.061. 92-12-055 (Order 91-17), § 173-175-240, filed 6/1/92, effective 7/2/92.]

WAC 173-175-250 Construction records summary. Within one hundred twenty days following completion of construction or modification of a dam, the project engineer, as representative of the owner, shall submit a report to the department on construction activities which includes:

(1) A summary of results from field testing of materials used in construction. The summary shall identify both representative values and the range of test values;

(2) A discussion of any notable items encountered during construction;

(3) One complete set of drawings describing the as-built condition of the dam. These drawings shall be

submitted in both paper and electronic format.

[Statutory Authority: RCW 43.21A.064, 43.21A.080, 86.16.061, 90.03.350 and [90.03].470. 04-16-122 (Order 03-08), § 173-175-250, filed 8/4/04, effective 9/4/04. Statutory Authority: RCW 43.21A.064, [43.21A.]080 and 86.16.061. 92-12-055 (Order 91-17), § 173-175-250, filed 6/1/92, effective 7/2/92.]

WAC 173-175-260 Exceptions to construction permit process. If the department determines that emergency or exigency conditions exist at a dam and that it is in the best interests of public safety to expedite the construction or modification of a dam, the department may elect to temporarily suspend the normal construction permit process. To allow this exception, the department will issue a written conditional construction permit, which:

- (1) May initially be oral;
- (2) Will specify the construction activities to be allowed;
- (3) May be terminated at a time deemed appropriate by the department;
- (4) Shall incorporate, to the extent possible, and not inconsistent with the situation, all applicable requirements of this chapter.

[Statutory Authority: RCW 43.21A.064, [43.21A.]080 and 86.16.061. 92-12-055 (Order 91-17), § 173-175-260, filed 6/1/92, effective 7/2/92.]

WAC 173-175-270 Department review response time. In reviewing the various documents required in the construction permit process, the department shall respond in a timely manner to the owner or project engineer with written review comments, approval, or acceptance as appropriate.

If the department response is anticipated to occur sixty days or more beyond the date of receipt of the document(s), the department shall notify the owner and/or project engineer in writing and advise them of the expected response date.

[Statutory Authority: RCW 43.21A.064, [43.21A.]080 and 86.16.061. 92-12-055 (Order 91-17), § 173-175-270, filed 6/1/92, effective 7/2/92.]

PART THREE CONSTRUCTION

PERMIT FEES

WAC 173-175-350 Authority for construction permit fees. It is required by RCW 90.03.470(9) that fees be collected by the department for the examination of plans and specifications. The fee shall be a minimum of ten dollars or the actual cost. In addition, the department is required by RCW 43.21A.064(2) to inspect the construction of all dams. It is required by RCW 90.03.470(8) that fees be collected for the actual cost to the department for inspection including the expense incident thereto.

[Statutory Authority: RCW 43.21A.064, [43.21A.]080 and 86.16.061. 92-12-055 (Order 91-17), § 173-175-350, filed 6/1/92, effective 7/2/92.]

WAC 173-175-360 Construction permit fees for new project construction. (1) Fees for the review of plans and specifications and for construction inspection for new project construction shall be the amounts shown in Table 4 as adjusted by the fiscal growth factor, and determined by the nearest values of dam height and crest length, in feet, which correspond to the project's planned dam height and crest length.

(2) The fees in Table 4 are automatically adjusted annually on July 1st by the fiscal growth factor as calculated under chapter 43.135 RCW. After July 1st of each year, the department shall publish the adjusted fees by providing notice on its internet site and by providing written notification by mail or electronic mail to permit applicants.

(3) Fees for the review of plans and specifications and for construction inspection for new dairy waste impoundments, and conservation dams, shall be in the amount of one thousand four hundred dollars, provided the project meets the following requirements:

- (a) The facility has a low downstream hazard classification;
- (b) The maximum embankment height is less than fifteen feet;
- (c) The facility conforms with a set of standard plans and specifications prepared by the Natural Resource Conservation Service (NRCS) and approved by the department;
- (d) The NRCS or its designee provides periodic oversight of construction to ensure that the facility conforms to the standard plans.

If the project fails to meet any of the above requirements, the standard fees as described under subsection (1) of this section shall apply.

[Statutory Authority: RCW 43.21A.064, 43.21A.080, 86.16.061, 90.03.350 and [90.03].470. 04-16-122 (Order 03-08), § 173-175-360, filed 8/4/04, effective 9/4/04. Statutory Authority: RCW 43.21A.064, [43.21A.]080 and 86.16.061. 92-12-055 (Order 91-17), § 173-175-360, filed 6/1/92, effective 7/2/92.]

WAC 173-175-370 Construction permit fees for modifications of existing dams. (1) Fees for the review of plans and specifications and for construction inspections for project modifications involving significant enlargements shall be the greater of one thousand four hundred dollars or the amount determined by those applicable percentages shown in Table 5A of the fees in Table 4, as adjusted by the

fiscal growth factor. The appropriate Table 4 fee amount is to be determined using the nearest values of dam height and crest length, in feet, which correspond to the overall dimensions of the modified dam.

TABLE 4. CONSTRUCTION PERMIT FEES - NEW PROJECT CONSTRUCTION

Dam Height (ft)	CREST LENGTH (FEET)															
	50	100	150	200	250	300	350	400	500	600	700	800	1000	1500	2000	4000
400	44268	49392	51296	52444	53368	54096	54712	55244	56000	56000	56000	56000	56000	56000	56000	56000
300	38304	45416	48496	50092	51072	51800	52416	52976	53872	54600	55216	55776	56000	56000	56000	56000
250	34020	42280	45836	48132	49336	50344	50988	51520	52416	53172	53788	54320	55216	56000	56000	56000
200	28280	37128	42000	44492	46508	47964	48776	49532	50652	51380	51996	52556	53452	55076	56000	56000
180	25004	34636	39452	42700	44632	46284	47684	48384	49616	50568	51184	51716	52612	54264	55412	56000
160	21644	31892	36792	40152	42644	44212	45584	46816	48356	49336	50204	50792	51688	53340	54488	56000
150	20020	30352	35252	38640	41356	43120	44464	45668	47684	48664	49504	50260	51184	52836	53984	56000
140	18396	28224	33600	37100	39704	41972	43288	44464	46480	47936	48776	49504	50652	52276	53452	56000
130	16828	25928	31920	35336	37996	40152	42056	43204	45164	46816	47992	48720	49924	51688	52864	55664
120	15260	23520	29876	33460	36204	38304	40152	41804	43764	45388	46816	47852	49084	51072	52220	55020
110	13720	21168	27272	31500	34104	36372	38136	39704	42336	43904	45276	46480	48160	50400	51548	54348
100	12236	18872	24304	28840	31920	34076	35980	37548	40180	42308	43624	44800	46844	49364	50792	53592
95	11508	17724	22848	27328	30828	32872	34748	36428	38976	41216	42784	43932	45920	48804	50400	53200
90	10780	16604	21392	25592	29148	31696	33460	35084	37772	39928	41832	43008	44968	48244	49812	51296
85	10052	15484	19964	23884	27440	30296	32172	33740	36512	38584	40460	42084	43988	47656	48496	48496
80	9352	14392	18564	22204	25536	28448	30856	32368	35028	37240	39032	40656	42980	45696	45696	45696
75	8652	13328	17164	20552	23632	26488	28896	30968	33516	35784	37576	39144	41888	42896	42896	42896
70	7952	12264	15792	18900	21756	24360	26824	28896	31976	34132	36036	37604	40096	40096	40096	40096
65	7280	11228	14448	17304	19880	22288	24556	26684	30184	32424	34272	35924	37296	37296	37296	37296
60	6608	10192	13132	15708	18060	20244	22316	24248	27804	30660	32452	34020	34496	34496	34496	34496
55	5964	9184	11844	14168	16296	18256	20104	21840	25116	28028	30464	31696	31696	31696	31696	31696
50	5320	8204	10556	12656	14532	16296	17948	19488	22428	25116	27608	28896	28896	28896	28896	28896
46	4816	7420	9576	11452	13160	14756	16240	17668	20300	22736	25060	26656	26656	26656	26656	26656
42	4312	6664	8596	10276	11816	13244	14588	15848	18228	20412	22484	24416	24416	24416	24416	24416
38	3836	5908	7616	9128	10500	11760	12964	14084	16184	18144	19964	21728	22176	22176	22176	22176
34	3360	5208	6692	8008	9212	10332	11368	12348	14196	15904	17528	19040	19936	19936	19936	19936
30	2912	4480	5768	6916	7952	8904	9800	10668	12264	13748	15120	16436	17696	17696	17696	17696
28	2688	4144	5320	6384	7336	8232	9044	9828	11312	12684	13944	15176	16576	16576	16576	16576
26	2464	3808	4900	5852	6720	7532	8288	9016	10360	11620	12796	13916	15456	15456	15456	15456
24	2296	3444	4452	5320	6132	6860	7560	8232	9464	10584	11676	12684	14336	14336	14336	14336
22	2156	3136	4032	4816	5544	6216	6832	7448	8540	9576	10556	11452	13188	13216	13216	13216
20	1988	2800	3612	4312	4956	5572	6132	6664	7644	8596	9436	10276	11816	12096	12096	12096
18	1848	2492	3192	3836	4396	4928	5432	5908	6776	7616	8372	9100	10472	10976	10976	10976
16	1708	2240	2800	3360	3836	4312	4760	5152	5936	6636	7336	7952	9156	9856	9856	9856
15	1652	2156	2604	3108	3584	4004	4424	4788	5516	6188	6804	7392	8512	9296	9296	9296
14	1596	2044	2408	2884	3304	3696	4088	4424	5096	5712	6300	6832	7868	8736	8736	8736
13	1540	1932	2268	2660	3052	3416	3752	4088	4704	5264	5796	6300	7224	8176	8176	8176
12	1512	1820	2156	2436	2800	3108	3444	3724	4284	4816	5292	5768	6608	7616	7616	7616
11	1484	1736	2016	2268	2548	2828	3108	3388	3892	4368	4816	5236	6020	7056	7056	7056
10	1456	1652	1876	2128	2324	2548	2800	3052	3500	3920	4340	4704	5404	6496	6496	6496
9	1428	1568	1764	1960	2156	2324	2520	2716	3136	3500	3864	4200	4816	5936	5936	5936
8	1400	1512	1652	1792	1988	2128	2268	2408	2744	3080	3388	3696	4228	5376	5376	5376
7	1400	1456	1540	1680	1792	1932	2072	2184	2380	2660	2940	3192	3668	4732	4816	4816
6	1400	1428	1484	1568	1652	1764	1848	1960	2156	2296	2492	2716	3108	4004	4256	4256
5	1400	1400	1428	1484	1540	1596	1680	1736	1904	2044	2184	2296	2576	3304	3696	3696

(2) Fees for the review of plans and specifications and for construction inspection for project modifications not involving significant enlargements shall be the greater of one thousand four hundred dollars or the amount determined by those applicable percentages shown in Table 5B of the fees in Table 4, as adjusted by the fiscal growth factor. The appropriate Table 4 fee amount is to be determined using the nearest values of dam height and crest length, in feet, which correspond to the overall dimensions of the modified dam.

(3) Fees for the review of plans and specifications and for construction inspection for repair of a dam with safety deficiencies as required by the department shall be one thousand four hundred dollars.

(4) Fees for the review of plans and specifications and for construction inspection for the removal or partial removal of a dam with safety deficiencies for the purpose of eliminating a public safety hazard shall be the minimum fee of ten dollars.

(5) Fees for the review of plans and specifications and for construction inspection for the planned abandonment and reclamation of dams and reservoir areas used in mining operations shall be the minimum fee of one thousand four hundred dollars.

TABLE 5. FEES FOR MODIFICATIONS OF DAMS

MODIFICATION FEE AS PERCENTAGE OF FEE
FOR NEW DAM CONSTRUCTION

FEATURES MODIFIED	TABLE 5A	TABLE 5B
	MODIFICATIONS INVOLVING SIGNIFICANT ENLARGEMENTS	MODIFICATIONS NOT INVOLVING SIGNIFICANT ENLARGEMENTS
Spillway(s)	35%	25%
Impounding Barrier	35%	25%
Appurtenant Works and Miscellaneous Construction Elements	10%	10%

[Statutory Authority: RCW 43.21A.064, 43.21A.080, 86.16.061, 90.03.350 and [90.03].470. 04-16-122 (Order 03-08), § 173-175-370, filed 8/4/04, effective 9/4/04. Statutory Authority: RCW 43.21A.064, [43.21A.]080 and 86.16.061. 92-12-055 (Order 91-17), § 173-175-370, filed 6/1/92, effective 7/2/92.]

WAC 173-175-380 Maintenance. It will not be necessary to submit plans and specifications for review for routine maintenance, normal replacement, or repair of items to keep them in a serviceable condition, seasonal removal, or replacement of stoplogs, or other similar minor operational activities.

[Statutory Authority: RCW 43.21A.064, [43.21A.]080 and 86.16.061. 92-12-055 (Order 91-17), § 173-175-380, filed 6/1/92, effective 7/2/92.]

WAC 173-175-390 Payment of construction permit fees. (1) The amount of the construction permit fee will be determined by the department based upon procedures contained in WAC [173-175-360](#) and [173-175-370](#) and information contained in the construction plans.

(a) An initial payment, which may represent all or a portion of the construction permit fee shall be paid in conjunction with the submittal of the construction permit application described in WAC [173-175-120](#). The amount of the initial payment shall be:

(i) Ten dollars for the removal of a dam with safety deficiencies as described in WAC [173-175-370](#)(3);
or

(ii) One thousand four hundred dollars for construction of a new dam or modification of an existing dam or project.

(b) The balance of the fee amount (less the initial payment above) is to be paid following notification by the department of the balance due.

(c) All fees collected are nonrefundable.

(2) No fee shall be required for the review of conceptual plans which describe proposed repairs or improvements to existing dams to correct safety deficiencies. The normal construction permit process will apply at the time plans and specifications are submitted to the department.

(3) No additional fees shall be required for plan and specification changes and resubmittals required by the department as part of the review process.

(4) No additional fees shall be required for review of construction change orders.

[Statutory Authority: RCW 43.21A.064, 43.21A.080, 86.16.061, 90.03.350 and [90.03].470. 04-16-122 (Order 03-08), § 173-175-390, filed 8/4/04, effective 9/4/04. Statutory Authority: 1995 c 8. 95-22-030 (Order 94-15), § 173-175-390, filed 10/24/95, effective 11/24/95. Statutory Authority: RCW 43.21A.064, [43.21A].080 and 86.16.061. 93-01-090 (Order 92-35), § 173-175-390, filed 12/16/92, effective 1/16/93; 92-12-055 (Order 91-17), § 173-175-390, filed 6/1/92, effective 7/2/92.]

WAC 173-175-400 Cost of expert opinion. In resolving differences of opinion on engineering issues between the department and project engineer or owner, it may be necessary for the department to employ an expert in dam design, analysis or construction.

(1) The expert who is chosen, the assigned tasks, and the estimated cost for the expert's services shall be determined by negotiation between the owner and the department.

(2) The cost associated with employing the expert shall be paid by the owner of the proposed or existing project.

[Statutory Authority: RCW 43.21A.064, [43.21A].080 and 86.16.061. 92-12-055 (Order 91-17), § 173-175-400, filed 6/1/92, effective 7/2/92.]

PART FOUR PROJECT

OPERATION

WAC 173-175-500 Operation and maintenance. (1) The owner shall develop and maintain a current operation and maintenance (O&M) manual.

The manual shall describe procedures for operation of the project under normal and extreme reservoir inflow conditions and provide technical guidance and procedures for monitoring, inspection, and long-term maintenance. Information on the development of the O&M manual is contained in the department's *Dam Safety Guidelines*. The O&M manual shall include, as a minimum, the following items:

- (a) Identification of the individual(s) responsible for implementing the plan;
 - (b) A project data sheet describing the pertinent features of the dam and reservoir, including the spillway(s), outlet works, and appurtenant structures and their locations at the dam site;
 - (c) The rules and procedures (rule curve) used to regulate reservoir levels and project operation for various reservoir inflows and for both normal and unusual seasonal conditions;
 - (d) A description of each hydraulic element used to regulate or release water, including information on proper operation and scheduled maintenance;
 - (e) A listing of the items requiring periodic monitoring, the frequency of monitoring and procedures for monitoring, measurement, and recordkeeping;
 - (f) A listing of the items requiring periodic maintenance and procedures for conducting and documenting maintenance and recording of problems;
 - (g) A listing of items to be inspected or test operated, the frequency and procedures for conducting the same and for documenting the findings.
- (2) It shall be the duty and responsibility of the owner to, at all times, operate and maintain the dam and all appurtenant works in a safe manner and condition and follow the method and schedule of operation of the dam as outlined in the O&M manual.

(3) Any proposed changes to the O&M manual which could have an effect on public or project safety must be submitted to the department for review and acceptance before implementation.

(4) The OM manual must be updated within one hundred eighty days after a periodic inspection has been completed by the department.

[Statutory Authority: RCW 43.21A.064, 43.21A.080, 86.16.061, 90.03.350 and [90.03].470. 04-16-122 (Order 03-08), § 173-175-500, filed 8/4/04, effective 9/4/04. Statutory Authority: RCW 43.21A.064, [43.21A.]080 and 86.16.061. 92-12-055 (Order 91-17), § 173-175-500, filed 6/1/92, effective 7/2/92.]

WAC 173-175-510 Inspection by owner. Owners are required to evaluate the safety of their dam(s) and all appurtenant works and to make modifications, as become necessary, to reasonably secure safety to life and property. To accomplish this, owners are:

(1) Required to conduct annual surficial inspections and to maintain records of their findings, including records of actions taken to correct problem conditions.

The annual surficial inspections may be conducted by the owner or by agent(s) designated by the owner, or by a professional engineer.

(2) Owners are required to submit a copy of the annual inspection checklist and other documents which contain the findings resulting from the annual inspection within thirty days following the completion.

[Statutory Authority: RCW 43.21A.064, 43.21A.080, 86.16.061, 90.03.350 and [90.03].470. 04-16-122 (Order 03-08), § 173-175-510, filed 8/4/04, effective 9/4/04. Statutory Authority: RCW 43.21A.064, [43.21A.]080 and 86.16.061. 92-12-055 (Order 91-17), § 173-175-510, filed 6/1/92, effective 7/2/92.]

WAC 173-175-520 Emergency action plans. (1) In those cases where a failure of the dam could pose a threat to life (downstream hazard classes 1A, 1B, 1C, and 2), the owner shall develop and maintain an emergency action plan (EAP) acceptable to the department.

(a) The EAP shall describe procedures for responding to unusual or emergency situations and procedures for detecting, evaluating, communicating, and initiating notification or warning of individuals who may be at risk in downstream and upstream areas. Information on the development of an EAP is contained within the department's *Dam Safety Guidelines*.

(b) It shall be the duty and responsibility of the owner to implement the EAP when conditions warrant and to follow the method and schedule contained within the EAP.

(c) Owners are required to coordinate the development of the EAP with representatives from the local emergency services staff, state department of community development, emergency management division, and appropriate local authorities.

(d) Copies of the completed EAP must be provided to the state emergency management division, local emergency services office, and to the department.

(2) Any proposed changes to the EAP which could have an affect on public or project safety must be submitted to the department for review and acceptance before implementation.

(3) Owners are required to exercise components of the EAP as needed to confirm the viability of the plan.

(4) The department will coordinate and solicit review comments from the local emergency services office and the state emergency management division on the acceptability of proposed EAPs. Those comments will constitute the primary basis for accepting or requesting modifications to a proposed EAP.

(5) The EAP must be updated within one hundred eighty days after a periodic inspection has been completed by the department.

[Statutory Authority: RCW 43.21A.064, 43.21A.080, 86.16.061, 90.03.350 and [90.03].470. 04-16-122 (Order 03-08), § 173-175-520, filed 8/4/04, effective 9/4/04. Statutory Authority: RCW 43.21A.064, [43.21A.]080 and 86.16.061. 92-12-055 (Order 91-17), § 173-175-520, filed 6/1/92, effective 7/2/92.]

WAC 173-175-530 Reporting of incidents. Owners are required to notify the department when incidents occur or when problems or conditions arise which may pose a threat to life or property or a threat to the

integrity of the dam.

(1) The owner shall report by telephone to the department on any condition affecting the safety of the project or when an incident has occurred. The initial oral report must be made as soon as practicable after the condition is discovered or following any incident.

(2) A written report may be required by the department within thirty days following the discovery of the condition or after the incident. The report shall describe the condition affecting the safety of the project or the incident which has occurred and shall describe the preliminary plans for correcting the condition and for preventing the recurrence of a similar incident.

[Statutory Authority: RCW 43.21A.064, [43.21A.]080 and 86.16.061. 92-12-055 (Order 91-17), § 173-175-530, filed 6/1/92, effective 7/2/92.]

PART FIVE COMPLIANCE AND ENFORCEMENT

WAC 173-175-600 Right of entry. The department or its duly appointed agent(s) shall have the right to enter at all reasonable times in or upon property, public or private, for the purpose of inspecting and investigating conditions relating to the construction, operation, maintenance or performance of dams. The department shall comply with the owner's reasonable rules for access to the project.

[Statutory Authority: RCW 43.21A.064, [43.21A.]080 and 86.16.061. 92-12-055 (Order 91-17), § 173-175-600, filed 6/1/92, effective 7/2/92.]

WAC 173-175-610 Emergencies. (1) When, in the opinion of the department, an emergency condition exists which poses an imminent threat to life, the department may take such action as necessary to eliminate or mitigate the hazard and potential consequences. The dam owner or the owner's agent(s) may be directed to take actions, and if that failing, the department may take control of the project and take actions, including, but not limited to:

- (a) Altering the operation of the project;
- (b) Lowering the reservoir water level;
- (c) Draining the reservoir;
- (d) Making emergency repairs or modifications to the project;
- (e) Enlisting the services of federal, state, or local authorities to make emergency repairs or modifications to the project;
- (f) Breaching the dam.

(2) All costs incurred by the department as a result of taking control of the project will be charged to the owner.

[Statutory Authority: RCW 43.21A.064, [43.21A.]080 and 86.16.061. 92-12-055 (Order 91-17), § 173-175-610, filed 6/1/92, effective 7/2/92.]

WAC 173-175-620 Enforcement. (1) In enforcement of this chapter, the department may impose such sanctions as appropriate under authorities vested in it, including but not limited to, the issuance of regulatory orders under RCW 86.16.081 and 43.27A.190 and civil penalties under RCW 86.16.081 and 90.03.600.

(2) Any dam which is found to be under construction or recently constructed without prior approval of the plans and specifications is in violation of RCW 90.03.350 and will be presumed to be a public nuisance. The owner will not be allowed to fill the reservoir or continue to operate the reservoir until the structural integrity and safety of the facility can be demonstrated to the satisfaction of the department. In addition:

- (a) Regulatory orders may be issued to enforce the restriction of reservoir filling and fines may be levied

at one hundred to five thousand dollars per day;

(b) Owners are required to submit as-built drawings and all available documentation describing the manner in which the dam or portion thereof was constructed;

(c) If the structural integrity and safety of a dam project cannot be demonstrated or confirmed to the satisfaction of the department, the owner shall not commence or resume normal operation of the project until all outstanding issues or problems are resolved to the satisfaction of the department. To accomplish the above, the department may:

(i) Order the outlet works to remain fully open and not allow filling of the reservoir;

(ii) Restrict reservoir water levels or reservoir operation;

(iii) Order the breaching of the impounding barrier;

(iv) Take other measures as appropriate to reasonably assure safety to life and property.

(d) If, in the opinion of the department, the owner is unwilling or incapable of resolving the outstanding safety issues in a timely manner, the department may take action to have the dam abated as prescribed by law under RCW 90.03.350.

(3)(a) In order to correct safety deficiencies and exigency conditions as identified by the department on existing dams, owners are required to take actions as prescribed by the department to preserve the structural stability and integrity of the project and attain levels of safety in accordance with accepted engineering practice.

(b) If the owner does not take action to correct safety issues in a timely manner, regulatory orders may be issued to require modifications, and to restrict the filling of the reservoir until all outstanding issues or problems are resolved to the satisfaction of the department.

(c) If the owner continues to be unwilling or incapable of resolving the outstanding safety issues, the department may take action to have the dam abated as prescribed by law under RCW 90.03.350.

[Statutory Authority: RCW 43.21A.064, 43.21A.080, 86.16.061, 90.03.350 and [90.03].470. 04-16-122 (Order 03-08), § 173-175-620, filed 8/4/04, effective 9/4/04. Statutory Authority: RCW 43.21A.064, [43.21A.]080 and 86.16.061. 92-12-055 (Order 91-17), § 173-175-620, filed 6/1/92, effective 7/2/92.]

WAC 173-175-630 Appeals. All final written decisions of the department pertaining to permits, regulatory orders, and related decisions made pursuant to this chapter shall be subject to review by the pollution control hearings board in accordance with chapter 43.21B RCW.

[Statutory Authority: RCW 43.21A.064, [43.21A.]080 and 86.16.061. 92-12-055 (Order 91-17), § 173-175-630, filed 6/1/92, effective 7/2/92.]

PART SIX

PERIODIC INSPECTION PROGRAM

WAC 173-175-705 Periodic inspection by the department. (1) As authorized by RCW 43.21A.064, the department has the authority to conduct routine periodic inspections of all existing dams with high and significant downstream hazard classifications to reasonably secure safety to life and property.

- Dams with high downstream hazard classifications will be inspected every five years.
- Dams with significant downstream hazard classifications will be inspected every five years, or ten years if workload or staffing necessitates a longer cycle between inspections.
- Dams classified as low hazard are not included in the periodic inspection program.

(a) The department will give at least thirty days notice of the date of the periodic inspection and advise the owner of any requirements such as gates or valves that are to be operated during the inspection.

(b) Fees shall be charged for periodic inspections conducted by the department. The amount of the fee and owner requirements for the fee payment are described in WAC [173-175-755](#) through [173-175-775](#).

Dam classification

(2) The downstream hazard classification of existing dams shall be determined by the department in accordance with WAC [173-175-130](#), Table 3.

(3) The classification of each dam shall be reviewed during each periodic or other inspection and may be changed as the result of such inspection.

Components of a periodic inspection

(4) Each periodic inspection shall consist of, but not be limited to, the following:

- (a) Review and analysis of available data on the design, construction, operation, and maintenance of the dam and its appurtenances;
- (b) Visual inspection of the dam and its appurtenances, the downstream area, and all other areas affected by the structure;
- (c) Evaluation of the safety of the dam and its appurtenances, which may include assessment of the hydrologic and hydraulic capabilities, structural stabilities, seismic stabilities, and any other condition which could constitute a hazard to the integrity of the structure;
- (d) Evaluation of the downstream hazard classification;
- (e) Evaluation of the operation, maintenance, and inspection procedures employed by the owner and/or operator; and
- (f) Review of the emergency action plan for the dam including review and/or update of dam breach

inundation maps.

(5) The department shall prepare a written safety inspection report that describes the findings from the inspection and lists remedial actions that must be taken to ensure the continued safety of the dam.

(6) The department shall provide the dam owner with a copy of the written report of the periodic inspection. The dam owner must correct any identified safety deficiencies in a timely manner.

[Statutory Authority: RCW 43.21A.064, 43.21A.080, 86.16.061, 90.03.350 and [90.03].470. 04-16-122 (Order 03-08), § 173-175-705, filed 8/4/04, effective 9/4/04.]

WAC 173-175-725 Nonroutine inspections by department. (1) The department may perform nonroutine inspections of dams with any downstream hazard classification, separate from the periodic inspection program. The purposes for these inspections include, but are not limited to, the following:

- (a) Determining downstream hazard classification;
- (b) Condition inspections during or immediately after emergencies such as floods or earthquakes;
- (c) When problems or conditions arise that may pose a threat to the integrity of the dam;
- (d) Obtaining routine monitoring data and information;
- (e) Surficial inspections of low hazard dams.

(2) No fees shall be charged to the dam owner for nonroutine inspections.

[Statutory Authority: RCW 43.21A.064, 43.21A.080, 86.16.061, 90.03.350 and [90.03].470. 04-16-122 (Order 03-08), § 173-175-725, filed 8/4/04, effective 9/4/04.]

WAC 173-175-735 Inspection at public request. (1) The department may inspect a dam if a complaint from the public is received that states that a dam:

- (a) Impounds ten or more acre-feet of water at the dam crest level; and
- (b) Is endangering public safety or property, or has been constructed without prior department approval.

(2) The department shall provide a copy of the written report of findings to the complainant and dam owner.

(3) The dam owner shall be required to correct any identified safety deficiencies or exigency conditions in a timely manner.

(4) Dams found to be under construction or recently built without prior approval of the plans and specifications will be subject to enforcement actions as described under WAC [173-175-620](#)(2).

(5) No fees shall be charged to the dam owner for inspections at public request.

[Statutory Authority: RCW 43.21A.064, 43.21A.080, 86.16.061, 90.03.350 and [90.03].470. 04-16-122 (Order 03-08), § 173-175-735, filed 8/4/04, effective 9/4/04.]

PART SEVEN

PERIODIC INSPECTION FEES

WAC 173-175-755 Periodic inspection fees. The department is required by RCW 90.03.470(8) to collect in advance the actual cost, including the expense incident thereto, of the inspection of any dam to insure safety to life and property. Fee amounts contained in this section represent the department's true estimate of the cost of performing periodic dam safety inspections as described in WAC [173-175-705](#), and reflect the department's commitment to fully recover all eligible expenses.

[Statutory Authority: RCW 43.21A.064, 43.21A.080, 86.16.061, 90.03.350 and [90.03].470. 04-16-122 (Order 03-08), § 173-175-755, filed 8/4/04, effective 9/4/04.]

WAC 173-175-765 Periodic inspection fee schedule. (1) The inspection fee amounts are based on the downstream hazard classification of the dam, as determined by the department, and incorporate the fiscal growth factor calculated under chapter 43.135 RCW. The inspection fees for each five-year inspection are prorated on an annual basis.

(a) Equation 1 below is used to calculate the annual inspection fees.

$$\text{Annual Inspection Fee} = (\text{COSTFGF} \div (\text{Cycle})) \quad \text{Equation 1}$$

Where:

(i) Cycle = number of years between inspections, with five years being the minimum.

(ii) FGF = an annual fiscal growth factor expressed as a percentage, as determined under chapter 43.135 RCW.

(iii) COST_{FGF} = cost of inspection in dollars including a fiscal growth factor. The cost is obtained by multiplying the inspection cost in the preceding year by the current year's fiscal growth factor as follows:

$$\text{COST}_{\text{FGF}} = \text{Previous year's cost} \times [1 + (\text{FGF})] \quad \text{Equation 2}$$

(b) For implementation of the fiscal growth factor, the base year for dam inspection fees will be fiscal year 2004, ending June 30, 2004. In the base year, the FGF will be zero.

(c) The cost for an inspection by the department in the base year will be as follows:

(i) \$3440.00 for dams with high downstream hazard classifications, with a prorated annual fee of \$688.00 for a five-year inspection cycle.

(ii) \$2500.00 for dams with significant downstream hazard classifications, with a prorated annual fee of \$500.00 if a five-year inspection cycle is implemented, or \$250.00 if a ten-year inspection cycle is implemented.

(2) **Inspection fee for impoundments with multiple dams.** For reservoirs or impoundments with a main dam and one or more saddle dams, a single annual inspection fee will be charged for the facility. The dam with the highest downstream hazard rating will be used for fee computation.

(3) **Inspection fee for multicell impoundments.** For multicell impoundments, such as wastewater lagoons, where two or more cells are located side-by-side or share a common embankment, a single annual inspection fee will be charged for the facility. The cell with the highest downstream hazard classification will be used for fee computation.

(4) **Inspection fee for nonroutine inspections.** For nonroutine inspections as described in WAC [173-175-725](#), no fees will be charged to the dam owner.

(5) **Inspection fee for inspections at public request.** For inspections done at public request, as described in WAC [173-175-735](#), no fees will be charged to the dam owner.

[Statutory Authority: RCW 43.21A.064, 43.21A.080, 86.16.061, 90.03.350 and [90.03].470. 04-16-122 (Order 03-08), § 173-175-765, filed 8/4/04, effective 9/4/04.]

NOTES:

Reviser's note: The brackets and enclosed material in the text of the above section occurred in the copy filed by the agency.

WAC 173-175-775 Periodic inspection fee computation. (1) The department shall charge inspection fees based on the fee schedule contained in WAC [173-175-765](#). After July 1st of each year, the department shall publish the adjusted fees by providing notice on its internet site, and by providing written notification by mail or electronic mail to owners of high and significant hazard dams. The inspection fees must be received by the department within forty-five days after the department mails a billing statement.

(2) Inspection fee computation. Computation of fees shall begin on the first day of each fiscal year. In the case of new dams not previously covered by the inspection program, fee computation begins on the first day of each fiscal year following completion of construction.

[Statutory Authority: RCW 43.21A.064, 43.21A.080, 86.16.061, 90.03.350 and [90.03].470. 04-16-122 (Order 03-08), § 173-175-775, filed 8/4/04, effective 9/4/04.]

WAC 173-175-785 Periodic inspection fee payments. (1) The applicable inspection fee shall be paid by check or money order payable to the department of ecology and mailed to the following address:

Department of Ecology
Dam Safety Inspection Fee Program
P.O. Box 5128
Lacey, Washington 98509-5128.

(2) In the event a check is returned due to insufficient funds, the department shall consider the inspection fee to be unpaid.

(3) **Delinquent accounts.** Dam owners are considered delinquent in the payment of fees if the fees are not received by the first invoice billing due date. Delinquent accounts will be processed in the following manner:

(a) Municipal and government entities shall be notified by certified mail that they have one hundred eighty days to bring the delinquent account up-to-date. Regulatory orders may be issued to enforce a restriction of reservoir filling until all delinquent fees are paid on accounts that remain delinquent after ninety days.

(b) Nonmunicipal or nongovernment dam owners shall be notified by the department by certified mail that they have one hundred eighty days to bring the delinquent account up-to-date. Accounts that remain delinquent after one hundred eighty days may be turned over for collection. In addition, a surcharge totaling twenty percent of the delinquent amount owed will also be added. The surcharge is to recover the costs for collection. If the collection agency fails to recover the delinquent fees after twelve months, the department may issue regulatory orders to enforce restriction of reservoir filling until all delinquent fees are paid.

[Statutory Authority: RCW 43.21A.064, 43.21A.080, 86.16.061, 90.03.350 and [90.03].470. 04-16-122 (Order 03-08), § 173-175-785, filed 8/4/04, effective 9/4/04.]

WAC 173-175-795 Periodic inspection fees for transfer of ownership or control. The department shall charge inspection fees from the dam owner on record with the department. In the event that ownership or control of a dam is transferred, it shall not be the responsibility of the department to transfer funds between a new and previous dam owner, and the department shall not refund fee charges prospectively in the event of a transfer. Fees paid by a previous dam owner shall be deemed to satisfy the corresponding fee payment requirements of a new dam owner. Agreements between a new and previous dam owner are not binding on the department.

[Statutory Authority: RCW 43.21A.064, 43.21A.080, 86.16.061, 90.03.350 and [90.03].470. 04-16-122 (Order 03-08), § 173-175-795, filed 8/4/04, effective 9/4/04.]