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## **Rule-by-Rule Comparison and Justification for Revision**

Rule 001      Legal Authority

8/2022 (v2.0)

These rules are adopted pursuant to Chapter 17, Section 42-1714, Idaho Code.

### **000.    LEGAL AUTHORITY (RULE 0).**

These rules are adopted pursuant to Chapter 17, Section 42-1714, Idaho Code, and implement the provisions of Sections 42-1709 through 42-1721, Idaho Code. (7-1-93)

Word reduction and rule simplification. Rule numbering sequence has been revised to eliminate zero (0) as a numbered rule as an effort to help avoid confusion.

## **Rule-by-Rule Comparison and Justification for Revision**

Rule 002      Title and Scope

8/2022 (v2.0)

1. Title.    These rules are titled IDAPA 37.03.05, "Safety of Dams Rules."
2. Scope.
  - a. These rules establish acceptable standards for design and construction, and guidelines for evaluating the safety of new or existing dams. The rules apply to all new construction including existing structures considered for enlargement, alteration, modification, or repair as specifically provided in the rules. The Director will evaluate any deviation from the standards hereinafter stated as they pertain to the safety of any given dam. The standards listed herein are not intended to restrict the application of other sound engineering design principles that will provide for the public safety.
  - b. Under no circumstances shall these rules be construed to deprive or limit the Director of any exercise of powers, duties, and jurisdiction conferred by law, nor to limit or restrict the amount or character of data, or information which may be required by the Director from any owner of a dam or for the proper administration of the law.

Rule 001.      Title and Scope (Rule 1)      (7-1-93)

01.    Title.      (7-1-93)

02.    Scope.      (7-1-93)

a.        The requirements that follow are intended as a guide to establish minimum standards for design and construction and to provide general guidelines for safety evaluation of new or existing dams. The rules apply to all new dams, to existing dams to be enlarged, altered or repaired, and maintenance of certain existing dams, as specifically provided in the rules. The Director will evaluate any deviation from the standards hereinafter stated as they pertain to the safety of any given dam. The standards are not intended to restrict the application of other sound engineering design principles. Engineers are encouraged to submit new ideas which will advance and provide for the public safety.      (7-1-93)

b.        Under no circumstances shall these rules be construed to deprive or limit the Director of the Department of Water Resources of any exercise of powers, duties and jurisdiction conferred by law, nor to limit or restrict the amount or character of data, or information which may be required by the Director from any owner of a dam for the proper administration of the law. State sovereignty as expressed in Policy 1A of the adopted State Water Plan will not be waived due to any overlapping jurisdiction from federal agencies.      (7-1-93)

Word reduction and rule simplification. Whenever possible, linking rule(s) to department policies, guidelines, plans or other potentially non-binding documents has been avoided.

## **Rule-by-Rule Comparison and Justification for Revision**

Rule 003      Administrative Appeals.

8/2022 (v2.0)

Any person aggrieved by an action of the Director and who has not previously been afforded an opportunity for a hearing on the matter is entitled to a hearing before the Director to contest the action pursuant to the provision of Section 42-1701A(3), Idaho Code, and the Department's adopted Rules of Procedure.

### **003.      ADMINISTRATIVE APPEALS (RULE 3).**

Any owner who is aggrieved by a determination or order of the Director may request a hearing pursuant to the provisions of Section 42-1701A(3), Idaho Code, and the Department's adopted Rules of Procedure. (7-1-93)

Text revision for consistency with existing Idaho Code. Substitution of the term "owner" with the word "person" is made to include all individuals eligible to request a hearing and/or appeal of all manner of decision, determination, order, or other action issued by the Director.

## **Rule-by-Rule Comparison and Justification for Revision**

Rule 4 --- 009 (RESERVED)

8/2022 (v2.0)

004. -- 009. (RESERVED)

(7-1-93)

No revision to numbering system or text.

## **Rule-by-Rule Comparison and Justification for Revision**

Rule 10. Definitions.

8/2022 (v2.0)

Unless the context otherwise requires, the following definitions govern these rules.

1. **Alterations or Repairs.** Any activity that may affect the safety or integrity of a dam. Alterations and repairs do not include routine maintenance items.
2. **Appurtenant Structures.** Ancillary features (e.g., outlets, tunnels, gates, valves, spillways, auxiliary barriers, etc.) used for operation of a dam, which are owned or for which the owner has responsible control.
3. **Artificial Barrier or embankments.** Any structure constructed to impede, obstruct, or store water.
4. **Borrowed Fill Embankment.** Any embankment constructed of borrowed earth materials, and which is designed for construction by conventional earth moving equipment.
5. **Certificate of Approval.** A certificate issued by the Director for all existing dams listing restrictions imposed by the Director, and without which none shall be allowed to impound water or mine tailings.
6. **Conduit.** A pipe or other constructed conveyance within a dam designed to release water or liquid in the reservoir.
7. **Core.** A zone of relatively low permeability material within an embankment.
8. **Cutoff Trench.** An excavation later to be filled with impervious material during construction of a dam to limit seepage beneath the structure and through the foundation.
9. **Dam.** Any artificial barrier together with appurtenant works, which is or will be ten (10) feet or more in height and has or will have an impounding capacity at maximum storage elevation of fifty (50) acre-feet or more. Height of a dam is defined as the vertical distance from the natural bed of the stream or watercourse at the downstream toe of the barrier, as determined by the Director, or from the lowest elevation of the outside limit of the barrier, if it is not across a stream channel or water course, to the maximum water storage elevation. Under Section 42-1711, Idaho Code, the following are not included as regulated dams or are not considered dams for the purposes of sections 42-1710 through 42-1721, Idaho Code:
  - a. Barriers in a canal used to raise or lower water therein or divert water therefrom.
  - b. Fills or structures determined by the Director to be designed primarily for highway or railroad traffic.
  - c. Fills, retaining dikes or structures less than twenty (20) feet in height, which are under jurisdiction of the Department of Environmental Quality or the Department of Agriculture, determined by the Director to be designed primarily for retention or treatment of municipal, livestock, or domestic wastes, or sediment and wastes from produce washing or food processing plants.
  - d. Levees, that store water regardless of storage capacity.
10. **Days.** Calendar days including Sundays, Saturdays, and holidays.
11. **Department.** The Idaho Department of Water Resources.
12. **Design Evaluation.** The engineering analysis required to evaluate the performance of a dam relative to earthquakes, floods, or other site-specific conditions anticipated to affect the safety or operation of the dam, or appurtenant facilities.
13. **Director.** The Director of the Department of Water Resources.
14. **Embankment.** An artificial barrier constructed of earth, sand, or gravel used to impound water.

## **Rule-by-Rule Comparison and Justification for Revision**

15. Emergency Action Plan (EAP). A written plan with instructions to be taken to reduce the potential for property damage and loss of life in an area affected by a dam failure or uncontrolled release of contents.
16. **Enlargement**. Any change in or addition to an existing dam which raises or may raise the elevation of the contents impounded by the dam.
17. Factor of Safety. A ratio of available shear strength to shear stress, required for stability.
18. Flashboards. Structural members of timber, concrete, steel, or tother erosion resistant material placed across a channel or entrance to a spillway to temporarily raise the surface level of the reservoir.
19. Flood. An increase in water surface elevation due to naturally occurring runoff or other rise in water levels that result in the inundation of areas not normally covered by water. As defined herein floods may be expressed in terms of average probability of exceedance per year, corresponding to values which may be described as flow rate, volume, or elevation.
20. Flood Surge. A variable volume of water temporarily detained in a reservoir, in the space (or part thereof) that is filled by excess runoff or flood water, above the approved design maximum storage elevation. Flood surge is passed through the reservoir and discharged by the spillway(s) until the reservoir level has been drawn down to the maximum storage elevation.
21. Freeboard. Vertical height between the maximum design water surface elevation and the lowest elevation along the top of the dam. Freeboard can include a provision for variables such as wave height, flood surge, and settlement.
22. **Hazard**. The potential consequences to downstream life and property resulting from a dam failure and uncontrolled release of water, exclusive of the size or the physical condition of the dam. Hazard Classifications shall be assigned to new and existing dams based on the severity of failure consequence to life and property.
23. Hydraulics. The conveyance of liquid through pipes and channels.
24. Hydrology. The study of precipitation, snowmelt, and runoff in relation to land surfaces.
25. Inflow Design Flood (IDF). The flood specified for designing a dam, or appurtenant facility. Commonly expressed inflow design flood(s) include peak rate(s) of flow and volume(s) associated with floods having a n annual exceedance probability of 1% (i.e., A100) and 0.2% (i.e. Q500), and the PMF (probable maximum flood).
26. Intermediate Dams. Artificial barriers twenty (20) feet in height or greater but less than forty (40) feet or capable of storing more hundred (100) acre-feet of water or more but less than four thousand (4,000) acre-feet.
27. Large Dams. Artificial barriers forty (40) feet or more in height or capable of storing four thousand (4,000) acre-feet or more of water.
28. **Levee**. A retaining structure alongside a natural lake which has a length two hundred (200) times greater than its greatest height measured from the lowest elevation of the toe to the maximum crest elevation of the retaining structure.
29. **Lift Construction**. Embankment enlargement by raising the elevation of the structure on a continuous or recurring basis. Such practice will be considered under construction until the structure reaches its final crest elevation.
30. Maximum Credible Earthquake. The largest theoretical earthquake capable of occurring under the conditions of the presently known geology and seismic history.

## **Rule-by-Rule Comparison and Justification for Revision**

31. **Maximum Water Storage Elevation.** The maximum design elevation of water surface which can be impounded by the dam.
32. **Operation Plan.** A specific plan that promotes the safe operation of the dam for its intended purpose, and which provides specific limits and procedures for control inflow, storage, and/or release of water or slurry.
33. **Owner.** Includes any of the following who own, control, operate, maintain, manage, or propose to construct a dam, or reservoir:
  - a. The state of Idaho and its departments, agencies, institutions, and political subdivisions;
  - b. The United States of America and any of its departments, bureaus, agencies and institutions; provided that the United States of America shall not be required to pay any of the fees required by Section 42-1713 Idaho Code, and shall submit plans, drawings and specifications as required by Section 42-1712, Idaho Code, for information purposes only;
  - c. Every municipal or quasi-municipal corporation;
  - d. Every public utility;
  - e. Every person, firm, association, organization, partnership, business trust, corporation, or company;
  - f. The duly authorized agents, lessees, or trustees of any of the foregoing; or
  - g. Receivers or trustees appointed by any court for any of the foregoing.
34. **Professional Engineer.** A person licensed as a professional engineer by the Idaho Board of Licensure of Professional Engineers and Professional Land Surveyors under chapter 12, title 4, Idaho Code. For the purposes of this rule, the use of the term engineer implies a professional engineer consistent with this definition.
35. **Release Capability.** The ability of a dam to pass excess water through the spillway(s) and outlet works.
36. **Reservoir.** Any basin which contains or will contain the water impounded by a dam.
37. **Small Dams.** Artificial barriers less than twenty (20) feet in height or that store less than one hundred (100) acre-feet of water.
38. **Spillway.** A constructed channel over, through, or around a dam, which is designed to accommodate the inflow design flood and thus prevent overtopping by the reservoir.
39. **Storage Capacity.** The total storage in acre-feet at the maximum design storage elevation.



## **Rule-by-Rule Comparison and Justification for Revision**

### **010. DEFINITIONS (RULE 10).**

Unless the context otherwise requires, the following definitions govern these rules.

(7-1-93)

**01. Active Storage.** The water volume in the reservoir stored for irrigation, water supply, power generation, flood control, or other purposes but does not include flood surcharge. Active storage is the total reservoir capacity in acre-feet, less the inactive and dead storage.

(7-1-93)

**02. Alterations, Repairs or Either of Them.** Only such alterations or repairs as may directly affect the safety of the dam or reservoir, as determined by the Director. Alterations, repairs does not include routine maintenance items. (See Rule Subsections 055.02.a. and 055.02.b.)

(7-1-93)

**03. Appurtenant Structures.** Ancillary features (e.g. outlets, tunnels, gates, valves, spillways, auxiliary barriers) used for operation of a dam, which are owned by the dam owner or the owner has responsible control.

(7-1-93)

**04. Board.** The Idaho Water Resource Board.

(7-1-93)

**05. Certificate of Approval.** A certificate issued by the Director for all dams listing restrictions imposed by the Director, and without which no new dams shall be allowed by the owner to impound water. A certificate of approval is also required for existing dams before impoundment of water is authorized.

(7-1-93)

**06. Dam.** Any artificial barrier together with appurtenant works, which is or will be ten (10) feet or more in height or has or will have an impounding capacity at maximum storage elevation of fifty (50) acre-feet or more. Height of a dam is defined as the vertical distance from the natural bed of the stream or watercourse at the downstream toe of the barrier, as determined by the Director, or from the lowest elevation of the outside limit of the barrier, if it is not across a stream channel or watercourse, to the maximum water storage elevation.

(7-1-93)

**07. Small Dams.** Artificial barriers twenty (20) feet or less in height that are capable of storing less than one hundred (100) acre-feet of water.

(7-1-93)

**08. Intermediate Dams.** Artificial barriers more than twenty (20) feet, but less than forty (40) feet in height, or are capable of storing one hundred (100) acre-feet or more, but less than four thousand (4,000) acre-feet of water.

(7-1-93)

**09. Large Dams.** Artificial barriers forty (40) feet or more in height or are capable of storing four thousand (4,000) acre-feet or more of water.

(7-1-93)

**10. Department Jurisdiction.** The following are not subject to department jurisdiction:

(7-1-93)

**a.** Artificial barriers constructed in low risk areas as determined by the Director, which are six (6) feet or less in height, regardless of storage capacity.

(7-1-93)

**b.** Artificial barriers constructed in low risk areas as determined by the Director, which impound ten (10) acre-feet or less at maximum water storage elevation, regardless of height.

(7-1-93)

**c.** Artificial barriers in a canal used to raise or lower water therein or divert water therefrom.

(7-1-93)

**d.** Fills or structures determined by the Director to be designed primarily for highway or railroad traffic.

(7-1-93)

**e.** Fills, retaining dikes or structures, which are under jurisdiction of the Department of Environmental Quality, designed primarily for retention and treatment of municipal, livestock, or domestic wastes, or sediment and wastes from produce washing or food processing plants.

(7-1-93)

## **Rule-by-Rule Comparison and Justification for Revision**

f. Levees, that store water regardless of storage capacity. Levee means a retaining structure alongside a natural lake which has a length that is two hundred (200) times or more greater than its greatest height measured from the lowest elevation of the toe to the maximum crest elevation of the retaining structure. (7-1-93)

11. **Days** Used in Establishing Deadlines. Calendar days including Sundays and holidays. (7-1-93)

12. **Dead Storage.** The water volume in the bottom of the reservoir stored below the lowest outlet and generally is not withdrawn from storage. (7-1-93)

13. **Department.** The Idaho Department of Water Resources. (7-1-93)

14. **Design Evaluation.** The engineering analysis required to evaluate the performance of a dam relative to earthquakes, floods or other site specific conditions that are anticipated to affect the safety of a dam or operation of appurtenant facilities. (7-1-93)

15. **Director.** The Director of the Idaho Department of Water Resources. (7-1-93)

16. **Engineer.** A registered professional engineer, licensed as such by the state of Idaho. (7-1-93)

17. **Enlargement.** Any change in or addition to an existing dam or reservoir, which raises or may raise the water storage elevation of the water impounded by the dam. (7-1-93)

18. **Factor of Safety.** A ratio of available shear strength to shear stress, required for stability. (7-1-93)

19. **Flood Surcharge.** A variable volume of water temporarily detained in the upper part of a reservoir, in the space (or part thereof) that is filled by excess runoff or flood water, above the maximum storage elevation. Flood surcharge cannot be retained either because of physical or administrative factors but is passed through the reservoir and discharged by the spillway(s) until the reservoir level has been drawn down to the maximum storage elevation. (7-1-93)

20. **Inflow Design Flood (IDF).** The flood specified for designing the dam and appurtenant facilities. (7-1-93)

21. **Maximum Credible Earthquake.** The largest earthquake that reasonably appears capable of occurring under the conditions of the presently known geological environment. (7-1-93)

22. **Operation Plan.** A specific plan that will assure the project is safely managed for its intended purpose and which provides reservoir operating rule curves or specific limits and procedures for controlling inflow, storage, and/or release of water, diverted into, passed through or impounded by a dam. (7-1-93)

23. **Owner.** Includes any of the following who own, control, operate, maintain, manage, hold the right to store and use water from the reservoir or propose to construct a dam or reservoir. (7-1-93)

a. The state of Idaho and any of its departments, agencies, institutions and political subdivisions; (7-1-93)

b. The United States of America and any of its departments, bureaus, agencies and institutions; provided that the United States of America shall not be required to pay any of the fees required by Section 42-1713, Idaho Code, and shall submit plans, drawings and specifications as required by Section 42-1712, Idaho Code, for information purposes only; (7-1-93)

c. Every municipal or quasi-municipal corporation. (7-1-93)

d. Every public utility; (7-1-93)

## **Rule-by-Rule Comparison and Justification for Revision**

- e. Every person, firm, association, organization, partnership, business trust, corporation or company; (7-1-93)
- f. The duly authorized agents, lessees, or trustees of any of the foregoing; (7-1-93)
- g. Receivers or trustees appointed by any court for any of the foregoing. (7-1-93)
- 24. **Reservoir.** Any basin which contains or will contain the water impounded by a dam. (7-1-93)
- 25. **Storage Capacity.** The total storage in acre-feet at the maximum storage elevation. (7-1-93)
- 26. **Water Storage Elevation.** The maximum elevation of the water surface which can be obtained by the dam or reservoir. It is further defined as the storage level attained when the reservoir is filled to capacity (i.e. to the spillway crest) or an authorized storage level attained by installing flashboards to increase the reservoir capacity, or a specified upper storage limit, which is attained by operation of moveable gates that raises the reservoir to a controlled operating level. The maximum storage elevation is an equivalent term of water storage elevation. (7-1-93)
- 27. **Release Capability.** The ability of a dam to pass excess water through the spillway(s) and outlet works and otherwise discharge. (7-1-93)

## **Rule-by-Rule Comparison and Justification for Revision**

The *draft Rules* include a total of thirty-nine definitions. Idaho Code 42.1712 contains nineteen (19) definitions. Of those nineteen (19) definitions, fifteen (15) are included in the draft Rules; illustrated by yellow highlight. The four (4) definitions that have been *removed* consist of the following:

- Mine Tailings Impoundment Structure, Mine Tailings Impoundment Elevation, Mine Tailings Slurry, and Mine Tailings Storage Capacity

Definitions *added* to those contained in I.C. 42.1712 consist of the following:

- |                          |                               |
|--------------------------|-------------------------------|
| - Appurtenant Structures | - Borrowed Fill Embankment    |
| - Conduit                | - Core                        |
| - Cutoff Trench          | - Design Elevation            |
| - Director               | - Embankment                  |
| - Emergency Action Plan  | - Factor of Safety            |
| - Flashboards            | - Flood                       |
| - Flood Surcharge        | - Freeboard                   |
| - Hydraulics             | - Hydrology                   |
| - Inflow Design Flood    | - Intermediate Dams           |
| - Large Dams             | - Maximum Credible Earthquake |
| - Operation Plan         | - Release Capability          |
| - Small Dams             | - Spillway                    |

∴ Nineteen (19) minus (4) plus (24) = Thirty-Nine (39) total definitions in the draft Rules

The *existing Rules* include a list of twenty-seven (27) definitions. Those which correspond with Idaho Code 42.1712 also similarly are highlighted (in blue), noting that the existing Rules match only twelve (11) of the nineteen definitions contained in I.C. 42.1712.

Definitions that are common to both set(s) of draft Rules and existing Rules include:

- |                            |                           |
|----------------------------|---------------------------|
| - Alterations/ Repairs     | - Certificate of Approval |
| - Dam                      | - Days                    |
| - Department               | - Engineer                |
| - Enlargement              | - Owner                   |
| - Reservoir                | - Storage Capacity        |
| - Water Storage Elevation* | - Release Capability*     |

The purpose for expanding the list of definitions in the draft Rule is to better match those that are contained in I.C. 42-1712, and to include common words or phrases that often are used in design and construction with similar, yet with a more specific and narrow meaning. The reason for the latter is to reduce the opportunity for variable interpretation due to an individual's or an organization's misunderstanding of any given word or phrase taken out of context; either accidentally or intentionally, depending on the circumstance.

\* Release Capability vs. Release Capacity

Water Storage Elevation vs. Maximum Water Storage Elevation

## **Rule-by-Rule Comparison and Justification for Revision**

Rule 11 --- 014. (RESERVED)

8/2022 (v2.0)

011. --- 024. (RESERVED)

(7-1-93)

Note the change in the section numbering system for Reserved section(s): from fourteen (14) numbers to four (4). Revision to the numbering system was justified to reduce the size of gaps to allow more consistent spacing between each occupied section. IDWR anticipates larger gaps will be used for potential future rule revision.

## **Rule-by-Rule Comparison and Justification for Revision**

Rule 015      Authority of Representative.

8/2022 (v2.0)

When plans, drawing, and specifications are filed by another person on behalf of an owner, written evidence of authority to represent the owner shall be filed with the plans, drawings, and specification.

### **030.      AUTHORITY OF REPRESENTATIVE (RULE 30).**

When plans, drawings and specifications are filed by another person on behalf of an owner, written evidence of authority to represent the owner shall be filed with the plans, drawings and specifications. (7-1-93)

No changes are made to the text of the existing Rule. The numbering schematic was revised with the result that the existing Rule 030 was moved to fill (reduce) the size of the gap which existed previously between 011-024, and subsequently renumbered draft Rule 015, as shown above.

## **Rule-by-Rule Comparison and Justification for Revision**

Rule 16 --- 019. (RESERVED)

8/2022 (v2.0)

011. --- 024. (RESERVED)

(7-1-93)

Note the change in the section numbering system for Reserved section(s): from fourteen (14) numbers to four (4). Revision to the numbering system was justified to reduce the size of gaps to allow more consistent spacing between each occupied section. IDWR anticipates larger gaps will be used for potential future rule revision.

Due to the expanse of the original gap (14 sections), draft Rule(s) were assigned to empty numbers divisible by five (5) to help optimize the format and general appearance, while still reserving vacant positions for the potential for future rule changes and/or additions.

## **Rule-by-Rule Comparison and Justification for Revision**

Rule 20. DAM SIZE CLASSIFICATION.

8/2022 (v2.0)

1. Size Classification. The following table defines the height and storage capacity limits used by the Department to classify dams:

Size Classification	Height	Storage Capacity
Small Dams and Reservoirs	Ten (10) feet or more but less than twenty (20) feet and	Fifty (50) acre-feet or more but less than hundred (100) acre-feet.
Intermediate Dams and Reservoirs	Twenty (20) feet or more but less than forty (40) feet or	One hundred (100) acre-feet or more but less than four thousand (4,000) acre-feet.
Large Dams or Reservoirs	Forty (40) feet or more or	Four thousand (4,000) acre-feet or more.

2. Determination of Size. The Director shall determine the size category of a new or existing dam.

### **025. DAM SIZE CLASSIFICATION AND RISK CATEGORY (RULE 25).**

01. **Size Classification.** The following table defines the height and storage capacity limits used by the Department to classify dams:

02.

Size Classification	Height (ft)	Storage Capacity
Small	20 ft. or less and	Less than 100 acre-ft.
Intermediate	More than 20 ft. but less than 40 ft. or	100 Acre-ft or more, but less than 4000 acre ft
Large	40 ft. or more or	4000 acre-ft., or more

(7-1-93)

03. **Risk Category.** The following table describes categories of risk used by the Department to classify losses and damages anticipated in down-stream areas, that could be attributable to failure of a dam during typical flow conditions.



## **Rule-by-Rule Comparison and Justification for Revision**

04.

<b>Risk Category</b>	<b>Dwellings</b>	<b>Economic Losses</b>
Low	No permanent structures for human habitation.	Minor damage to land, crops, agricultural, commercial or industrial facilities, transportation, utilities or other public facilities or values.
Significant	No concentrated urban development, 1 or more permanent structures for human habitation which are potentially inundated with flood water at a depth of 2 ft. or less or at a velocity of 2 ft. per second or less.	Significant damage to land, crops, agricultural, commercial or industrial facilities, loss of use and/or damage to transportation, utilities or other public facilities or values.
High	Urban development, or any permanent structure for human habitation which are potentially inundated with flood water at a depth of more than 2 ft. or at a velocity of more than 2 ft. per second.	Major damage to land, crops, agricultural, commercial or industrial facilities, loss of use and/or damage to transportation, utilities or other public facilities or values.

(7-1-93)

**03. Determination of Size and Risk Category.** The Director shall determine the size and risk category of a new or existing dam. (7-1-93)

The need to eliminate the improper use of the term "Risk Category" and to replace instead with the term "Hazard Classification" was required for compatibility with statute (Idaho Code). Although the use of the three-tier structure remains essentially the same, the definitions that previously were applied to "Risk" should have been/ were meant for "Hazard".

Although used interchangeably by the layperson, Risk and Hazard are distinct and different. Hazard is used to quantify the potential consequence to downstream life and property in the event of a catastrophic dam failure and/or uncontrolled release of water, notwithstanding the physical condition, the operating status of the project works, and/or the project size.

Risk incorporates both the downstream consequences of a dam failure (i.e. hazard) and the likelihood for failure (i.e. probability); understanding that the likelihood for failure often is heavily influenced by the physical condition and/or the maintenance and operating status of the dam.

Therefore, removing the table that itemizes Risk Category from this section is justified to help with reader comprehension regarding project size(s). And to avoid additional confusion regarding terminology related to Risk versus Hazard, the accompanying table that was formerly used to define "Risk Category" was renamed "Hazard Classification" and is now moved into a stand-alone section which occupies draft Rule 030.

## **Rule-by-Rule Comparison and Justification for Revision**

Rule 21 --- 024. (RESERVED)

8/2022 (v2.0)

011. --- 024. (RESERVED)

(7-1-93)

Note the change in the section numbering system for Reserved section(s): from fourteen (14) numbers in existing Rule to four (4) in the draft Rule. Revision to the numbering system was justified to reduce the size of gaps to allow more consistent spacing between each occupied section. IDWR anticipates larger gaps will be used for potential future rule revision.

Due to the expanse of the original gap (14 sections), draft Rule(s) were assigned to empty (reserved) numbers divisible by five (5) to help optimize the format and general appearance, while still attempting to maintain a consistent number of vacant position(s) between each rule to accommodate future rule changes and/or rule addition without disrupting the remaining text.

## **Rule-by-Rule Comparison and Justification for Revision**

### Rule 25. Hazard Classification.

8/2022 (v2.0)

1. Hazard Classification. The following table describes categories of hazard used by the Department to classify dams relative to the potential failure consequences estimated for downstream locations. The listed hazard categories are meant to serve as guidelines for implementing design, construction, and operation criteria, subject to final interpretation by the Director.

Hazard Category	Downstream Development	Estimated Loss of Life	Economic Losses
Low	Undeveloped property, no permanent or permanently occupied structures for human habitation.	No loss of life	Low probability for economic loss or damage to or disruption of essential infrastructure.
Significant	No concentrated urban development, 1 or more permanent structures for human habitation within the flood zone that are potentially inundated with flood water at a depth of two (2) feet or less.	Loss of life is unlikely to occur	Significant damage to agricultural, commercial, or industrial facilities; damage to or the disruption of transportation, utilities, or other public facilities or values including environmental loss.
High	Urban development, or any structure for permanent or temporary human habitation which are potentially inundated with flood water at a depth greater than two (2) feet	High probability for loss of life	Major damage to agricultural, commercial, or industrial facilities; damage to or the disruption of transportation, utilities, or other public facilities or values including prolonged environmental loss.

2. Determination of Hazard Classification. The Director shall determine the hazard category of a new or existing dam. Any dam classified as Significant or High hazard regardless its height and storage capacity shall meet the requirements specified in Rule 35, 45, 50, 55, and 60 of these rules.

## **Rule-by-Rule Comparison and Justification for Revision**

### **025. DAM SIZE CLASSIFICATION AND RISK CATEGORY (RULE 25).**

**01. Size Classification.** The following table defines the height and storage capacity limits used by the Department to classify dams:

**02.**

Size Classification	Height (ft)		Storage Capacity
Small	20 ft. or less	and	Less than 100 acre-ft.
Intermediate	More than 20 ft. but less than 40 ft.	or	100 Acre-ft or more, but less than 4000 acre ft
Large	40 ft. or more	or	4000 acre-ft., or more

(7-1-93)

**03. Risk Category.** The following table describes categories of risk used by the Department to classify losses and damages anticipated in down-stream areas, that could be attributable to failure of a dam during typical flow conditions.

**04.**

Risk Category	Dwellings	Economic Losses
Low	No permanent structures for human habitation.	Minor damage to land, crops, agricultural, commercial or industrial facilities, transportation, utilities or other public facilities or values.
Significant	No concentrated urban development, 1 or more permanent structures for human habitation which are potentially inundated with flood water at a depth of 2 ft. or less or at a velocity of 2 ft. per second or less.	Significant damage to land, crops, agricultural, commercial or industrial facilities, loss of use and/or damage to transportation, utilities or other public facilities or values.
High	Urban development, or any permanent structure for human habitation which are potentially inundated with flood water at a depth of more than 2 ft. or at a velocity of more than 2 ft. per second.	Major damage to land, crops, agricultural, commercial or industrial facilities, loss of use and/or damage to transportation, utilities or other public facilities or values.

(7-1-93)

**03. Determination of Size and Risk Category.** The Director shall determine the size and risk category of a new or existing dam.

(7-1-93)

## **Rule-by-Rule Comparison and Justification for Revision**

The need to eliminate the improper use of the term “Risk Category” and instead use the term “Hazard Classification” was required for compatibility with statute (Idaho Code). Although the use of the three-tier structure and the text used to describe the three divisions remains essentially the same, the definitions that accompany each term (Risk vs. Hazard) are distinct and different and must not be confused.

Hazard is used to quantify the potential consequence to downstream life and property in the event of a catastrophic dam failure and/or uncontrolled release of water despite the physical condition, operating status of the project works, and project size.

Risk incorporates both the downstream consequences of a dam failure (i.e., hazard) and the likelihood for failure (i.e., probability); understanding that the likelihood for failure often is heavily influenced by the physical condition of the dam, lack of maintenance or repair, and the overall operating status of the dam.

Therefore, the table that itemizes Risk Category was clipped from existing Rule 25 and moved into draft Rule 30 to reside as a separate table. This move is justified to help with reader comprehension, and to avoid possible confusion with common language that often uses terminology related to risk versus hazard synonymously, however incorrectly.

## **Rule-by-Rule Comparison and Justification for Revision**

Rule 26 --- 029. (RESERVED)

8/2022 (v2.0)

026. --- 029. (RESERVED)

(7-1-93)

No change in the numbering system between versions of rules for this Reserved section.

## **Rule-by-Rule Comparison and Justification for Revision**

Rule 030. Forms.

8/2022 (v2.0)

Forms required by these rules are available from the Department to interested parties upon request.

### **035. FORMS (RULE 35).**

Forms required by these rules are available from the Department to interested parties upon request. Construction of a small dam requires the filing of Form 1710 and construction of an intermediate or large dam requires the filing of Form 1712. of Section 42-1701A(3), Idaho Code, and the Department's adopted Rules of Procedure. (7-1-93)

The last sentence in the existing Rule (Rule 35) was eliminated as not being necessary for reader comprehension, and to reduce unnecessary verbiage. In addition, linking rule(s) to department forms, policies, guidelines, plans or other potentially non-binding documents has been avoided.

Note that the section number also was revised to fill expansive gaps afforded "reserved" sections in the existing rules; i.e. existing Rule 35 was renamed draft Rule 30.

## **Rule-by-Rule Comparison and Justification for Revision**

Rule 31 --- 034. (RESERVED)

8/2022 (v2.0)

031. --- 034. (RESERVED)

(7-1-93)

No change in the numbering system between versions of rules for this Reserved section.



## **Rule-by-Rule Comparison and Justification for Revision**

### 35. DESIGN REPORTS, DRAWINGS, AND SPECIFICATIONS.

8/2022 (V2.0)

The following provisions shall apply when submitting plans, drawings, and specifications for dams to the Director for review and approval, prior to commencing construction.

1. Submission of Duplicate Plans, Drawings and Specifications. Any owner desiring to construct, enlarge, alter, or repair any dam, shall submit duplicate plans, drawings and specifications prepared by an engineer for the proposed work to the Director with required fees for approval prior to commencing construction.
2. Applying for and Obtaining Written Approval. Construction of a new dam, or the enlargement, alteration, or repair of such shall not commence until the owner has applied for and obtained written approval of the plans, drawings, and specifications from the Director.
3. Preparation and Submission of Plans. Plans and drawings shall be of a sufficient scale with an adequate number of views showing proper dimensions, so that the plans and drawings may be readily interpreted and so that the structure and appurtenances can be built in conformance with the approved design. Plans and drawings shall be submitted in both printed and digital format, with the printed version consisting of paper size 11 x 17 inches. After reviewing the plans, the Director will notify the owner of any required changes.
4. Information Included with Plans. Plans for new dams or the enlargement, alteration, or repair of such shall include as much of the following information as determined necessary by the Director to adequately describe the enlargement, alteration, or repair and the effect on the existing structure or its appurtenances:
  - a. A topographic map of the project site showing the location of the proposed construction by section, township and range, and location of all borings, test pits, borrow pits and other locations of samples obtained for field or laboratory testing;
  - b. A profile depicting the locations, elevations, and depths of borings or test pits, including the visual illustration of logs of bore holes, test pits, or borrow pits;
  - c. A cross-section of the structure at maximum section showing elevation and width of crest, slopes of upstream and downstream faces, thickness of riprap, zoning of earth embankment, location of cutoff and bonding trenches, elevations and dimensional heights, size and type of conduits, valves, operating mechanism, and dimensions of all other essential elements deemed to be necessary for properly constructing the approved design;
  - d. Detailed drawings showing plans, cross and longitudinal sections of appurtenant features such as but not limited to the spillway, training walls, outlet conduits, valves, gates, trash rack, and control works;

## **Rule-by-Rule Comparison and Justification for Revision**

- e. A curve or table showing the capacity of the reservoir or tailings impoundment in acre-feet vs. gauge height referenced to a common project datum and the computations used in making such determinations;
  - f. A curve or table showing the outlet discharge capacity in cubic feet per second vs. gauge height of reservoir storage level, and the computations used in making such determinations;
  - g. A curve or table showing the spillway discharge capacity in cubic feet per second vs. gauge height of the reservoir or flood surcharge level above the spillway crest and the computations used in making such determinations;
  - h. Detailed drawings of spillway structure(s), including cross-sections of the channel entrance and exit points to and from the spillway and a spillway profile;
  - i. Plans for flow measuring devices capable of providing an accurate determination of the flow of the stream above or below the reservoir, and a permanent reservoir or staff gauge near the outlet of the reservoir plainly marked in feet and tenths of a foot referenced to an approved datum; and
  - j. Plans or drawings of instruments recommended by the owner or engineer to monitor the performance of the dam to assure safe operation, or as may be required by the Director as deemed necessary to monitor any structure for benefit of public safety regardless of size.
5. Specifications. The engineer shall prepare specifications that include instructions for construction of the approved design in accordance with accepted engineering and industry standards of care, including provision adequate observation, inspection, and control of the work by an engineer during the period of construction.
6. Changes to the Approved Design. The approved design shall not be materially changed without prior written consent of the Director. Design changes which may affect the stability, size, or integrity of the structure, while construction is underway, shall be submitted for the Director's review and approval. In emergency situations, the owner shall make the required alterations or repairs necessary to relieve the emergency, and subsequently notify the Director of all alterations or repairs implemented.
7. Inspections. The owner shall allow inspections by the Department to assure the dam and appurtenant structures are constructed in conformance with the approved plans and specifications, or as may be revised by the engineer and approved by the Director if there are unforeseen conditions discovered during site preparation or construction which potentially jeopardize the future integrity and safety of the project works. The Department may request of the owner that certain stages of construction not proceed without inspection and approval by the Director.
8. Inspection, Examination and Testing of Materials. All materials and workmanship shall be subject to review, inspection, examination, or testing by the Director.
9. Rejection of Defective Material. The Director may order the owner or engineer to reject defective material. The owner shall correct rejected workmanship and replace rejected material with approved material.

## **Rule-by-Rule Comparison and Justification for Revision**

10. Suspension of Work. The Director may order the engineer to suspend any work that is or is likely to be subject to damage by inclement weather conditions.

11. Responsibility of Engineer. These provisions shall not relieve the engineer of their responsible charge to assure that construction is accomplished in accordance with their approved plans and specifications as mandated by Sections 54-1202(10) and (15), Idaho Code, or to unilaterally suspend work as deemed necessary.

12. Design Report. Owners proposing to construct, enlarge, alter, or repair a dam shall submit an engineering or design evaluation report to accompany the plans and specifications. The engineering report shall include as much of the following information as necessary to present the technical basis for the design and to describe the analyses used to evaluate performance of the structure and appurtenances.

a. All technical reference(s), equations, calculations, and assumptions used in the design.

b. Hydrologic data used in determining runoff from the drainage areas, reservoir flood routing pertinent to the project location, and hydraulic evaluations of the outlet(s) and the spillway(s) as may be required for approval of the design plans and specifications.

c. Investigation of site and subsurface conditions, to include the engineering properties of the foundation area and of each type of material to be encountered or used in the construction of the project works.

d. A stability analysis, including an evaluation of overturning, sliding, slope, and foundation stability and a seepage analysis;

i. An evaluation of seismic design loads may be included in the stability analysis for all dams as deemed necessary by the Director for benefit of public safety. The evaluation required for large dams or high hazard structures shall use the maximum ground acceleration generated by the maximum credible earthquake which could affect the dam site.

ii. Seismic analyses may be waived by the Director for new or existing dams if the consequence of failure is demonstrated to be sufficiently low or the critical features of design are demonstrated to be sufficiently conservative to allow minor deformation(s) without releasing the contents of the impounding structure.

e. Geologic description of reservoir area, including evaluation of landslide potential;

f. Engineering properties and the weathering characteristics of the contents proposed for storage in the impoundment, if applicable;

g. Other information which would aid in evaluating the safety of the design;

## **Rule-by-Rule Comparison and Justification for Revision**

13. Additional Information/Waiver. The Director may require the filing of such additional information which in his opinion is necessary for the benefit of public safety or waive any requirement in these rules if available data demonstrates that it is unnecessary.
14. Alternate Plans. The Director may accept plans and specifications for dams, or portions thereof prepared for other agencies which are determined to meet the requirements of Rule 35, including but not limited to the following:
- a. An operation plan;
  - b. An emergency action plan to help protect downstream of life and property; or
  - c. An abandonment plan that assures the Director to his satisfaction that, upon completion of the mining operation, the site will be placed in a safe maintenance-free condition.

### **040. CONSTRUCTION PLANS, DRAWINGS AND SPECIFICATIONS (RULE 40).**

The following provisions shall apply in submitting plans, drawings and specifications.

(7-1-93)

**01. Submission of Duplicate Plans, Drawings and Specifications.** Any owner who shall desire to construct, enlarge, alter or repair any intermediate or large dam, shall submit duplicate plans, drawings and specifications prepared by an engineer for the proposed work to the Director with required fees. The Director may, however, require the submittal of plans, drawings and specifications prior to the construction of any dam. (7-1-93)

**02. Applying for and Obtaining Written Approval.** Construction of a new dam or enlargement, alteration or repairs on existing dams shall not be commenced until the owner has applied for and obtained written approval of the plans, drawings and specifications. Alteration or repairs do not include routine maintenance for which prior approval is not required. (See Rule Subsections 055.02.a and 055.02.b) (7-1-93)

**03. Plans Shall Be Prepared on a Good Quality Vellum or Mylar.** Transparent copies reproducible by standard duplicating processes, if accurate, legible and permanent, will be accepted. Plans may initially be submitted in the form of nonreproducible paper prints. After reviewing the plans, the Director will notify the owner of any required changes. (7-1-93)

## **Rule-by-Rule Comparison and Justification for Revision**

**04. Preparation and Submission of Plans.** Plans and drawings shall be of a sufficient scale with an adequate number of views showing proper dimensions, so that the plans and drawings may be readily interpreted and so that the structure and appurtenances can be built in conformance with the plans and drawings. (7-1-93)

**05. Information Included with Plans.** Plans for new dams shall include the following information and plans for enlargement, alteration or repair of an existing dam shall include as much of the following information as required by the Director to adequately describe the enlargement, alteration or repair and the effect on the existing dam or its appurtenant facilities: (7-1-93)

a. A topographic map of the dam site showing the location of the proposed dam by section, township and range, and location of spillway, outlet works, and all borings, test pits, borrow pits; (7-1-93)

b. A profile along the dam axis showing the locations, elevations, and depths of borings or test pits, including logs of bore holes and/or test pits; (7-1-93)

c. A maximum cross-section of the dam showing elevation and width of crest, slopes of upstream and downstream faces, thickness of riprap, zoning of earth embankment, location of cutoff and bonding trenches, elevations, size and type of outlet conduit, valves, operating mechanism and dimensions of all other essential structural elements such as cutoff walls, filters, embankment zones, etc.; (7-1-93)

d. Detailed drawings showing plans, cross and longitudinal sections of the outlet conduits, valves and controls for operating the same, and trash racks; (7-1-93)

e. A curve or table showing the capacity of the reservoir in acre-feet vs gauge height (referenced to a common project datum) of the reservoir storage level, and the computations used in making such determinations. (7-1-93)

f. A curve or table showing the outlet discharge capacity in cubic feet per second vs gauge height of reservoir storage level, and the equation used in making such determination; (7-1-93)

g. A curve showing the spillway discharge capacity in cubic feet per second vs gauge height of the reservoir or flood surcharge level above the spillway crest and the equation used in making such determinations; (7-1-93)

h. Detailed drawings of spillway structure(s), cross-sections of the channel heading to and from the spillway and a spillway profile; (7-1-93)

i. Plans for flow measuring devices capable of providing an accurate determination of the flow of the stream above and below the reservoir, and a permanent reservoir or staff gauge near the outlet of the reservoir plainly marked in feet and tenths of a foot referenced to a common project datum; (7-1-93)

j. Plans or drawings of instruments, recommended by the owner's engineer to monitor performance of intermediate or large dams to assure safe operation, or as may be required by the Director to monitor any dam regardless of size, that is situated upstream of a high risk area. (7-1-93)

**06. Specifications.** Specifications shall include provisions acceptable to the Director for adequate observation, inspection and control of the work by a registered professional engineer, during the period of construction. (7-1-93)

**07. Changes to Specifications.** The specifications shall not be materially changed without prior written consent of the Director. Significant design changes, while construction is underway, shall be submitted for the Director's review and approval. (7-1-93)

## **Rule-by-Rule Comparison and Justification for Revision**

**08. Inspections.** The owner shall provide for and allow inspections by the Department to assure the dam and appurtenant structures are constructed in conformance with the approved plans and specifications, or as may be revised by the engineer and approved by the Director if there are unforeseen conditions discovered during site excavation or construction of the dam which potentially jeopardize the future integrity and safety of the dam. Certain stages of construction shall not proceed without inspection and approval by the Director, including the following: (7-1-93)

- a. After clearing and excavation of the foundation area and cutoff trench and prior to placing any fill material. (7-1-93)
- b. After installation of the outlet conduit and collars and before placing any backfill material around the conduit; (7-1-93)
- c. After construction is completed and before any water is stored in the reservoir. (7-1-93)
- d. At such other times as determined necessary by the Director. The Director will, upon seven (7) days' notice, inspect and if satisfactory, approve the completed stage of construction. The Director may conduct inspections upon shorter notice upon good reason being shown or upon a schedule jointly agreed upon by the Director and the owner. (7-1-93)

**09. Inspection, Examination and Testing of Materials.** All materials and workmanship shall be subject to inspection, examination and testing by the Director at any and all times. (7-1-93)

**10. Rejection of Defective Material.** The Director shall have the right to require the owner or engineer to reject defective material and workmanship or require its removal or correction respectively. Rejected workmanship shall be corrected and rejected material shall be replaced with proper material. (7-1-93)

**11. Suspension of Work.** The Director may order the engineer to suspend any work that may be subject to damage by inclement weather conditions. (7-1-93)

**12. Responsibility of Engineer.** These provisions shall not relieve the engineer of his responsibility to assure that construction is accomplished in accordance with the approved plans and specifications or to suspend work on his own motion. (7-1-93)

**13. Detailing Provisions of Specifications.** The specifications shall state in sufficient detail, all provisions necessary to insure that construction is accomplished in an acceptable manner and provide needed control of construction to insure that a safe structure is constructed. (7-1-93)

**14. Design Report.** Owners proposing to construct, enlarge, alter or repair an intermediate or large dam shall submit an engineering or design evaluation report with the plans and specifications. The engineering report shall include as much of the following information as necessary to present the technical basis for the design and to describe the analyses used to evaluate performance of the structure and appurtenances. (7-1-93)

- a. All technical reference(s); equations and assumptions used in the design; (7-1-93)
- b. Hydrologic data used in determining runoff from the drainage areas; reservoir flood routing(s); and hydraulic evaluations of the outlet(s) and the spillway(s). (7-1-93)
- c. Engineering properties of the foundation area and of each type of material to be used in the embankment. (7-1-93)
- d. A stability analysis, including an evaluation of overturning, sliding, slope and foundation stability and a seepage analysis; (7-1-93)

## **Rule-by-Rule Comparison and Justification for Revision**

- i. Seismic design loads shall be evaluated and applied at all large dams to be located in significant or high risk areas, in Seismic Zone 3, which for purposes of these rules is the area in Idaho east of Range 22 East, Boise Meridian. The evaluation required of large dams, that are classified significant or high risk, shall use the maximum ground motion/ acceleration generated by the maximum credible earthquake, which could affect the dam site. (7-1-93)
- ii. Seismic analysis may be required as determined by the Director for large dams located above high risk areas in Seismic Zone 2, which for purposes of these rules is the area in Idaho west of Range 22 East, Boise Meridian. (7-1-93)

**15. Additional Information/Waiver.** The Director may require the filing of such additional information which in his opinion is necessary or waive any requirement herein cited if in his opinion it is unnecessary. (7-1-93)

**16. Alternate Plans.** The Director may accept plans and specifications or portions thereof prepared for other agencies which are determined to meet the requirements of Rule 40. (7-1-93)

Draft Rule 35 contains significant revision to existing Rule category: "*Design Reports, Drawings, and Specifications*". The changes were needed to address the following:

- a) Ensure compatibility with existing statute (Idaho Code)
- b) Revise or eliminate duplicate text with other sections of the dam safety rules (both existing and draft version(s))
- c) Provide language that allows the design engineer to investigate using more than a single method to determine the appropriate seismic regime and corresponding maximum ground movement for proper design input of earthquake loading conditions.
- d) Replace the term "risk" with "hazard" as appropriate.

Section numbering was changed from Rule 040 to Rule 035 to limit reserved sections to four (4) consecutive numbers (i.e., gaps). Initially, draft Rule 40 contained instruction related to bonds/bonding; however, abandoned due to negative public comment and opposition to attempts that would have combined two sets of existing Rule (i.e. Dam Safety and Mine Tailings Impoundment Structures).

## **Rule-by-Rule Comparison and Justification for Revision**

Rule 036 --- 044.

(RESERVED)

8/2022 (v2.0)

036. --- 039. (RESERVED)

(7-1-93)

*and*

041. --- 044. (RESERVED)

(7-1-93)

This Draft Rule numbering configuration does not correspond with existing Rule. Existing Rule 40 "Construction Plans, Drawings and Specifications" which formerly occupied the middle of this reserved section was renamed and moved to draft Rule 35.

Existing Rule 40 position is vacated in the draft Rules due to initial attempts to combine rule sets for dam safety (37.03.06) and mine tailings impoundment structures (37.03.05). Due to public comment and negative opinion during initial public hearing(s), that initial attempt was rejected. Therefore, Rule 40 numbering (assigned to bonds/bonding) is not included in this draft, thus the empty space for Rule 40.

Consequently, draft Rule 036-044 is now reserved for the entire 9-unit interval vs. existing Rule that includes as separate divisions Rule 036-039 (reserved) and Rule 041-044 (reserved).



## **Rule-by-Rule Comparison and Justification for Revision**

### **Rule 45. EMERGENCY ACTION AND OPERATION PLANS.**

8/2022 (v2.0)

An Emergency Action Plan (EAP) is required for all dams as described in the following rules. The EAP shall establish emergency procedures for notification and response during unexpected or non-routine events that occur naturally, or in response to mechanical issues, or due to intentional vandalism/ terrorism. The EAP may be a component of an Operation Plan that includes comprehensive guidelines and procedures for inspection, operation, maintenance, and monitoring of instruments required to record performance of the structure during normal operating cycles, critical filling, or flood periods, or as may be necessary for evaluating the effects of an earthquake. Before the initial filling of a reservoir, the owner shall file with the Director an EAP for review and approval. The Director may waive the EAP requirement of individual Low Hazard Dams upon a determination that the flood inundation zone resulting from the potential failure or uncontrolled release of contents impounded by the structure will not damage downstream life or property.

#### **045. OPERATION PLAN (RULE 45).**

An operation plan is required as described in the following rules and shall provide procedures for emergency operations and include guidelines and procedures for inspection, operation and maintenance of the dam and appurtenances, including any instruments required to monitor performance of the dam during normal operating cycles, critical filling or flood periods, or as may be required to monitor new or existing dams subject to earthquake effects. (7-1-93)

**01. New, Reconstructed or Enlarged Dams.** Prior to the initial filling of the reservoir or refilling the reservoir for a reconstructed or enlarged dam in the following categories, the owner shall file with the Director an operation plan for review and approval: (7-1-93)

- a. Small, high risk. (7-1-93)
- b. Intermediate, significant risk. (7-1-93)
- c. Intermediate, high risk. (7-1-93)
- d. Large, any risk category. (7-1-93)

**02. Existing Dams.** Unless exempted by the Director, owners of the following categories of dams shall file an operation plan with the Director on or before July 1, 1992 for review and approval: (7-1-93)

- a. Intermediate, high risk. (7-1-93)
- b. Large, significant risk. (7-1-93)
- c. Large, high risk. (7-1-93)

**03. Alternate Plans.** The Director may accept existing studies or plans in lieu of an operation plan if the Director determines the information provided fulfills the requirements of Rule 45. (7-1-93)

## **Rule-by-Rule Comparison and Justification for Revision**

The need for revision of this rule is to eliminate the improper use of the term "Risk". As previously noted, risk incorporates both the downstream consequences of a dam failure (i.e. hazard) and the likelihood for failure (i.e. probability); understanding that the likelihood for failure often is heavily dependent upon the physical condition and/or the maintenance and operating status of the dam. Apparently, the authors of existing Rule 40 mistakenly inserted "Risk" for "Hazard". Excepting the name of the draft Rule, its number corresponds exactly with that of the existing Rule 45.

In addition, revision is needed due to the importance of distinguishing the difference between an Operation Plan and Emergency Action Plan (EAP). The purpose for an EAP is to provide specific instruction to dam owners, emergency responders, and the public for their use specifically and/or to implement during the occurrence of identified naturally occurring emergencies (e.g., flood, earthquake, etc.), terrorism/ vandalism, or unexpected mechanical failure that, if left unattended, could result in dam failure, property damage or loss of life.

An Operation Plan typically is more comprehensive and provides instruction for the proper operation of the dam, reservoir, and appurtenant features during normal and/or routine site and weather conditions. Although the EAP can be a chapter of or subsection to an Operation Plan, the EAP is unique in that it requires regular testing to help ensure individuals can perform their expected duties, and revision of the communications directory as necessary so that the named individual(s) and contact information is both valid and accurate at all times.

## **Rule-by-Rule Comparison and Justification for Revision**

Rule 46 --- 049. (RESERVED)

8/2022 (v2.0)

046. --- 049. (RESERVED)

(7-1-93)

No change in the numbering system between the version(s) of rules for this Reserved section.

## **Rule-by-Rule Comparison and Justification for Revision**

### 50. NEW DAMS AND RESERVOIRS.

8/2022 (v2.0)

The following criteria shall be used by the Director as a basis to evaluate the design of new embankment dams and reservoirs. These guidelines are intended for a broad range of circumstances, and engineers should not consider them as a restriction to the use of other sound engineering design principles. Exclusion from these established criteria will be considered by the Director on a case-by-case basis during design review of plans and specifications submitted for approval prior to commencing construction. Structures which are or will be constructed of other materials, for example concrete, rock, timber, steel, or combinations thereof shall comply with these criteria as found appropriate by the Director, and with other engineering design methods and construction standards of care approved by the Director.

1. Embankment Stability. Slope stability analyses shall determine the appropriate upstream and downstream slopes. Unless a discrete slope stability analysis determines otherwise, the embankment slopes of earthen dams shall comply with the following:

Upstream slope	3:1 or flatter
Downstream slope	2.5:1 or flatter

- a. Embankments shall be designed, constructed, and maintained to assure stability under static loads and prevent instability due to seepage or uplift forces, rapid drawdown conditions, and applied seismic loads.
- b. The design analysis shall consider the need for installing filters, including but not limited to chimney drains, blanket drains, or toe drains, to stabilize the fill and protect against piping of the embankment fill material. Transmission of seepage through the embankment, abutments, and foundation shall be controlled to prevent internal erosion or the removal of material and instability where seepage emerges.
- c. The minimum factor of safety for a steady state loading condition shall be 1.5. The minimum factor of safety for rapid drawdown loading shall be 1.2. The minimum factor of safety for seismic loading shall be 1.0.
- d. Seismic Stability.
  - i. The stability of an embankment subjected to earthquake ground motions may be analyzed by the engineer using either a dynamic response or pseudo-static analyses. Pseudo-static analyses are acceptable for embankment dams and foundations composed of non-liquifiable soils that preclude the generation of excess pore water pressures due to shaking. Otherwise, the stability analysis shall employ a dynamic response method.
  - ii. Slope deformation analyses are required for structures that are constructed of cohesionless soils exhibiting fine grain-size gradation and/or on foundations that may be subject to liquefaction.

## **Rule-by-Rule Comparison and Justification for Revision**

- iii. The design analyses for large or high hazard dams shall include a geologic and seismic report. The seismic report shall identify the location of faults, evaluate landslide potential, and include a history of seismicity.
  - iv. The engineer shall include in the stability analysis peak ground accelerations obtained from Seismic Hazard Maps published by the United States Geologic Survey (USGS) using a minimum return interval of 2 percent (2%) probability of exceedance in fifty (50) years, or greater interval, as determined by the Director.
  - e. Where in the opinion of the Director, embankment design or conditions warrant, the owner may be required to instrument their embankment or foundation.
2. Top Width. The minimum top width for any embankment shall be twelve (12) feet to allow safe access by wheeled vehicles or tracked equipment for maintenance or repair.
3. Cutoff Trenches or Walls. Cutoff trenches shall be excavated through competent foundation material to bear on an approved stratum or zone.
- a. The cutoff trench shall be backfilled with suitable material free from organic matter and debris and compacted to the specified moisture and density. The cutoff trench shall extend up the sides of both abutments to the design maximum storage elevation.
  - b. Cutoff trenches shall be wide enough to allow the free movement of excavation and compaction equipment. To provide for proper compaction side slopes shall be no steeper than one to one (1:1) for shallow depths up to twelve (12) feet, and no steeper than one and one half to one (1.5:1) for greater depths. Flatter slopes may be required for safety and stability.
  - c. Concrete cutoff walls may be used in a similar manner as cutoff trenches, with the base firmly entrenched in the underlying foundation material. Where suitable bedrock exists, concrete cutoff walls shall be doweled with steel rebar into rock a minimum depth and spacing determined by the engineer necessary to create a structural bond with the underlying bedrock. Concrete walls shall have a minimum vertical projection above the rock surface of three (3) feet, oriented perpendicular to the rock surface, and shall have a minimum thickness of twelve (12) inches. Reinforcement of the concrete may be required in addition to being doweled into rock.
4. Impervious Core Material. Soils used to construct the inner sectional core of an embankment shall consist of relatively impervious cohesive materials approved by the engineer and compacted in strict accordance with the approved plans and specifications. A minimum ninety-five percent (95%) maximum dry density compacted in accordance with the American Society Testing Materials (ASTM) D-698 is required. The use of other relatively impermeable however non-cohesive material is subject to approval by the Director on a case-by- case basis.

## **Rule-by-Rule Comparison and Justification for Revision**

5. Drains. Toe, blanket, or chimney drains consisting of approved free draining material or manufactured drainage geotextile shall be installed where necessary to maintain the phreatic line at or near the design level(s) within the embankment.
  - a. Filter design for toe, blanket, or chimney drains, or any combination thereof shall be included in the design plans and specifications submitted by the engineer for review and approval by the Director.
  - b. Perforated and slotted drainpipes must be four (4) inches diameter or greater and shall be surrounded by drainage material equal to or greater than the outside pipe diameter. The maximum particle size of the drainage material shall be between one-half (1/2) inch to three-fourths (3/4) inch. Underdrains and collection pipes must be constructed of noncorrosive material, taking care to ensure slots and perforations are appropriately sized to avoid long- term migration of the drain material into the pipe.
6. Freeboard. The elevation of the top of the embankment shall be constructed and maintained above the design flood surcharge level, including the vertical height of wind generated waves estimated for the greatest distance of open water measured perpendicular to the major axis of the dam. Camber estimated for post-construction settlement shall be included in the design and incorporated in the construction of the top of the embankment.
  - a. The minimum freeboard shall be two (2) feet plus wave height as calculated for the design spillway flow capacity during passage of the one percent (1%) flood, or greater to equal the surcharge elevation of the reservoir during passage of the inflow design flood.
7. Riprap. All embankments which are subject to erosion on either the upstream and downstream slope(s) shall be protected using riprap or other approved material. Pipes, cables, brush, tree growth, dead growth, logs, or floating debris are not acceptable substitutes for approved riprap. The engineer, with approval of the Director, shall determine the extent of slope protection as deemed necessary for existing site, seasonal, and operating conditions.
  - a. Where rock riprap or other approved material is used for erosion protection on the upstream slope, it shall be placed on an approved thickness of well-graded and free-draining granular bedding material. Riprap or other approved erosion protection material shall extend up the slope a sufficient height.
8. Outlet Conduits. All reservoirs impounding water shall have an outlet conduit of sufficient capacity to prevent interference with natural streamflow through the reservoir to the injury of downstream appropriators. In addition to any natural flow releases, the outlet conduit should be of sufficient capacity to pass at the same time, the maximum water requirement of the owner. A larger outlet conduit may be required to provide adequate release capability as determined by the Director.

## **Rule-by-Rule Comparison and Justification for Revision**

a. Outlet conduits shall be laid on a firm and stable foundation material to avoid the likelihood of differential settlement or consolidation causing the separation or misalignment of the conduit. Outlet conduits shall be encased on all sides by concrete of approved compressive strength and having a minimum thickness of twelve (12) inches. During construction outlet conduits shall be properly aligned on an established grade and adequately supported to prevent movement or damage caused by placement of concrete or by compaction equipment.

b. Unless otherwise required, the outlet conduit shall have a minimum inside diameter of twelve (12) inches. The conduits shall consist of approved material and composition as approved by the Director. Exceptions may be made only where conditions warrant, but in no case shall the reasonable life expectancy of the pipe be less than the design life of the embankment.

c. The use of multiple conduits that penetrate the embankment beneath the maximum reservoir level is not allowed.

### **9. Gates.**

a. All conduits shall be gated on the upstream end to avoid pressurizing the conduit inside the embankment. All conduits shall be fitted with either a vertical or inclined gate, or other approved device.

b. All conduits shall be vented directly behind the gate.

c. All gate stem pedestals shall be made of concrete.

d. At least one (1) of the sides of the inlet structure shall be open to allow water to flow into the outlet conduit. The opening shall be covered with a trash rack.

e. Trash racks should be designed to facilitate cleaning of trash and debris. If fish screens are used, they shall be placed over the trash rack and shall be removable for cleaning or be self-cleaning.

10. Outlet Controls. Outlet controls shall be installed at a stable location, on the crest or on an elevated platform, or within an enclosure when required, but secured to prevent unauthorized operation. Reservoirs storing water during the winter and subject to severe ice conditions shall have inclined gate stems or other controlling mechanical or hydraulic features enclosed in a protective sleeve which is buried beneath the upstream slope to suitable depth.

11. Release Capacity. Based on the size of the dam and the downstream hazard classification assigned by the Director, the release capability shall equal or exceed the inflow design flood as set forth in the following table. Where the table specifies an inflow design flood range, the governing inflow design flood shall be determined by the professional engineer in responsible charge of design and IDWR based on a site-specific review of the proposed dam, watershed conditions, and downstream hazard potential. The minimum flow capacity of the emergency spillway(s) shall be sized using the one-percent (1%) rate of flow

### **Rule-by-Rule Comparison and Justification for Revision**

(i.e. Q100 cfs) calculated for the contributing watershed upstream from the dam, plus two (2) feet of freeboard, plus wave height, plus camber.

Hazard Classification	Size Classification	Inflow Design Flood (IDF)
Low	All Sizes	Q100
Significant	Small	Q100
	Intermediate	Q100 to Q500
	Large	Q500
High	Small	Q100
	Intermediate	Q100 to Q500
	Large	Q500 to PMF

a. All spillways shall be stabilized for the discharge of flow using concrete, masonry, riprap, or sod, if not constructed in resistant rock.

b. Where site conditions allow, the spillway shall be constructed independent of the embankment. The spillway(s) shall guide the discharge of water away from the dam embankment.

c. The minimum base width of an open-channel spillway shall be ten (10) feet, or greater to allow access by mechanical equipment. Siphon pipes or pumps are not acceptable substitutes for an open-channel spillway.

d. The effective flow capacity of spillways shall be undiminished by bridges, fences, pipelines, or other obstructions.

e. The installation of stop logs or flashboards in the spillway is prohibited unless they are part of an approved design and included as an integral part of an operation plan.

12. Reservoir Site. Prior to filling the reservoir, the site shall be cleared of all woody material, growth or debris that is large enough to lodge in the spillway, or outlet works.

13. Inspection and Completion Reports. As construction proceeds, it is the responsibility of the engineer to submit test reports (e.g., soil material analyses, density tests, concrete strength tests, etc.) along with periodic inspection and progress reports to the Director.

a. Upon completion of construction the owner or his engineer shall provide the Director a written narrative account of all items of construction. Record drawings (i.e., as-builts or as-constructed drawings) and revised specifications shall be submitted to the Director to accurately reflect the completed project works.

b. The engineer, acting on behalf of and representing the owner, shall certify that the construction, reconstruction, enlargement, replacement, or repair of the embankment and appurtenances was completed in accordance with the record drawings and specifications.



## **Rule-by-Rule Comparison and Justification for Revision**

### **050. NEW INTERMEDIATE OR LARGE DAMS (RULE 50).**

The following minimum criteria shall be used to evaluate the design of intermediate or large earthfill dams in Idaho. These standards are intended to serve as guidelines for a broad range of circumstances, and engineers should not consider them as a restriction to the use of other sound engineering design principles. Exclusion from this established criteria will be considered by the Director on a case-by-case basis in approving plans and specifications and evaluating dams. Dams constructed of other materials shall comply with these criteria as found appropriate by the Director and with other engineering criteria approved by the Director. (7-1-93)

- 01. Embankment Stability.** Slope stability analyses shall determine the appropriate upstream and downstream slopes. Unless slope stability analysis determines otherwise, the embankment slopes shall be:

Upstream slope	3:1 or flatter
Downstream slope	2:1 or flatter

(7-1-93)

**a.** For large high and significant hazard dams and intermediate high hazard dams the embankment shall be designed, constructed and maintained to assure stability under static loads and prevent instability due to seepage or uplift forces, or drawdown conditions. Transmission of seepage through the embankment, abutments and foundation shall be controlled to prevent internal removal of material and instability where seepage erodes or emerges. (7-1-93)

**b.** The design analysis shall consider the need for installing filters, filter fabric and/or toe drains to stabilize the fill and protect against piping of the embankment fill material. (7-1-93)

**c.** The minimum factor of safety for a dam under steady state condition shall be 1.5. During rapid drawdown of the reservoir, the minimum factor of safety for the embankment shall be 1.2. For dams constructed in Seismic Zone 3, the minimum factor of safety under seismic load shall be 1.0. (7-1-93)

**d.** The stability of an embankment subjected to earthquake ground motions can be analyzed by dynamic response or pseudo-static analyses. Pseudo-static analyses are acceptable for embankment dams constructed of soils that will not build-up excess pore pressures due to shaking, nor sustain more than fifteen percent (15%) strength loss during earthquake events, otherwise the stability of an embankment dam shall be analyzed by a dynamic response method. A pseudo-static analysis simplifies the structural analysis (i.e. the resultant force of the seismic occurrence is represented by a static horizontal force applied to the critical section to derive the factor of safety against sliding along an assumed shear surface). The value of the horizontal force used in the pseudo-static analysis, is the product of the seismic coefficient and the weight of the assumed sliding mass. (7-1-93)

**e.** Slope deformation analyses are required for dams located in Seismic Zone 3, that are constructed of cohesionless soils and/or on foundations which are subject to liquefaction, when the peak acceleration at the site is anticipated to exceed 0.15g. (7-1-93)

**f.** The design analyses for new dams located in high risk areas (in Seismic Zone 2 or 3) shall include geologic and seismic reports, location of faults and history of seismicity. (7-1-93)

**g.** Where in the opinion of the Director, embankment design or conditions warrant, instrumentation of the embankment and/or foundation will be required. (7-1-93)

**h.** The design analyses for new large dams located in high risk areas (in Seismic Zone 3) shall include an evaluation of potential landslides in the vicinity of the dam or immediate area of the reservoir, which could cause damage to the dam or appurtenant structures, obstruct the spillway or suddenly displace water in the reservoir causing the dam to overtop. If potential landslides pose such a threat, they shall be stabilized against sliding, with a minimum factor of safety of 1.5. (7-1-93)

## **Rule-by-Rule Comparison and Justification for Revision**

**02. Top Width.** The crest width shall be sufficient to provide a safe percolation gradient through the embankment at the level of the maximum storage elevation. The minimum crest width (top of embankment) shall be determined by:

$$W = H / 5 + 10$$

W = Width, in feet  
H = Structural Height, in feet

The minimum top width for any dam is twelve (12) feet. (7-1-93)

**03. Cutoff Trenches or Walls.** Cutoff trenches shall be excavated through relatively pervious foundation material to an impervious stratum or zone. The trench shall be backfilled with suitable material, compacted to the specified density. The cutoff trench shall extend up the abutments to the maximum storage elevation. (7-1-93)

a. Cutoff trenches shall be wide enough to allow the free movement of excavation and compaction equipment. Side slopes shall be no steeper than one to one (1:1) for depths up to twelve (12) feet, and no steeper than one and one half to one (1 1/2:1) for greater depths to provide for proper compaction. Flatter slopes may be required for safety and stability. (7-1-93)

b. Concrete cutoff walls may be used to bond fills to smooth rock surfaces in a similar manner as cutoff trenches and shall be entrenched in the rock to a depth approximately one-half the thickness of the cutoff wall. Concrete cutoff walls shall be doweled into the rock a minimum of eight (8) inches with a maximum spacing of eighteen (18) inches for three-fourths (3/4) inch steel dowels. Concrete walls shall have a minimum projection of three (3) feet perpendicular to the rock surface and shall have a minimum thickness of twelve (12) inches. (7-1-93)

**04. Impervious Core Material.** The approved earth materials (silt soils are seldom acceptable) shall be zoned as shown in the plans and placed in the embankment in continuous, approximately level layers, having a thickness of not more than six (6) inches before compaction. Compaction shall be based on ASTM D-698. A minimum compaction of ninety-five percent (95%) is required. (7-1-93)

a. An acceptable working range of moisture content for the core material shall be established and maintained. (7-1-93)

b. The material shall be compacted by means of a loaded sheepfoot or pneumatic roller to the required density. (7-1-93)

c. No rock shall be left in the core material which has a maximum dimension of more than four (4) inches. The core material shall be free of organic and extraneous material. (7-1-93)

d. The core material shall be carried up simultaneously the full width and length of the dam, and the top of the core material shall be kept substantially level at all times, or slope slightly toward the reservoir. (7-1-93)

e. No frozen or cloddy material shall be used, and no material shall be placed upon frozen, muddy or unscarified surfaces. (7-1-93)

f. All materials used in the dam shall meet the stability and seepage requirements as shown by a design analysis of the structure and shall be properly installed to meet these requirements. (7-1-93)

**05. Drains.** Toe or chimney drains or free draining downstream material shall be installed where necessary to maintain the phreatic line within the downstream toe. (7-1-93)

a. Filter design for chimney drains, filter blankets and toe drains in clay and silt soils shall be selected using the following design criteria, unless deviations are substantiated by laboratory tests. All tests are subject to review and approval by the Director.

## **Rule-by-Rule Comparison and Justification for Revision**

D15 filter/D15 base > 5 but < 20

D15 filter/D85 base < 5

D50 filter/D50 base < 25

D85 filter > 2 times diameter of pipe perforations, or 1.2 times width of pipe slots. (7-1-93)

b. Filter material requirements are determined by comparing the particle size distribution of the filter to the particle size distribution of the materials to be protected;

e.g. D50 filter  
D50 material to be protected

Where D is the particle size passing a mechanical (sieve) analysis expressed as a percentage by weight. (7-1-93)

c. The base material should be analyzed considering the portion of the material passing the No. 4 sieve, for designing filters for base materials that contain gravel size particles. To assure internal stability and prevent segregation of the filter material, the coefficient of uniformity (D60/D10) shall not be greater than 20.

(7-1-93)

d. The minimum thickness of filter blankets and chimney drains shall be twelve (12) inches, with the maximum size particle passing the one (1) inch sieve. The maximum particle size may be increased with increasing thickness of the filter, by the rate of one (1) inch per foot of filter. However, the maximum particle shall not exceed three (3) inches. Zoned filters and chimney drains must not be less than twelve (12) inches thick per each zone. The width of granular filters shall not be less than the width of the installation equipment unless the plans and specifications include construction procedures adequate to insure the integrity of a narrower width.

(7-1-93)

e. Perforated drain pipes must have a minimum of six (6) inches of drain material around the pipe. The maximum particle size shall not exceed one-half (1/2) inch unless the layer thickness is increased at the rate of one (1) inch per foot of filter. Underdrains and collection pipes must be constructed of noncorrosive material.

(7-1-93)

**06. Freeboard.** The elevation of the top of the embankment shall be constructed and maintained above the flood surcharge level to prevent the dam from overtopping during passage of the inflow design flood and to provide freeboard for wind generated waves. Camber shall be included in the design and incorporated in the construction of the top of the embankment, unless waived by the Director. Camber may be estimated by multiplying the structural height of the dam by five percent (5%).

(7-1-93)

a. The height of wind generated waves (H) moving across a surcharged reservoir can be estimated by the following equation:

$H = 1.95 (F^{1/2})$  where F = fetch, the distance in miles across the reservoir, measured perpendicular to the major axis of the dam.

(7-1-93)

b. For large, high risk dams the minimum freeboard shall be two (2) feet plus wave height during passage of the one percent (1%) flood or equal to the surcharge elevation of the reservoir during passage of the inflow design flood whichever is greater.

(7-1-93)

c. Estimation of the height of the wind generated wave using the empirical equation in Rule 050.06.a. shall not preclude a more conservative design including consideration of fill materials, embankment zoning, slope surface protection, drainage or other safety factors.

(7-1-93)

**07. Riprap.** All dams which are subject to erosion shall be protected from wave action. The design engineer, with approval of the Director, shall determine whether or not rock riprap or other protection is necessary.

(7-1-93)

## **Rule-by-Rule Comparison and Justification for Revision**

a. Where rock riprap is used, it shall be placed on a granular bedding material, and extend up the slope, from three (3) feet below the normal minimum operating level to the top of the dam. (7-1-93)

b. Where riprap is required by Rule Subsection 055.07, pipes, cables, brush, tree growth, dead growth, logs, or floating debris are not acceptable substitutes for rock riprap and granular bedding material. (7-1-93)

**08. Outlet Conduits.** All reservoirs shall be provided with an outlet conduit of sufficient capacity to prevent interference with natural streamflow through the reservoir to the injury of downstream appropriators unless waived by the Director. In addition to any natural flow releases, the outlet conduit should be of sufficient capacity to pass at the same time, the maximum water requirement of the owner. A larger outlet conduit may be required to provide adequate release capability as determined by the Director. (7-1-93)

a. Outlet conduits shall be laid on a firm, stable foundation and normally not be placed on fills which can consolidate, allow differential settlement, and cause separation or misalignment of the pipe. Unless otherwise required, the outlet shall have a minimum inside diameter of twelve (12) inches. The conduits shall be of reinforced concrete or of metal pipe encased in concrete, poured with a continuous seal between the concrete and the trench except as otherwise approved by the Director. Void spaces and uncompacted areas shall not be covered over when the outlet trench is backfilled. Outlets shall be properly aligned on an established grade and may be supported on a concrete cradle, or otherwise supported and kept aligned when the outlet is covered. (7-1-93)

b. Asphalt dipped or other metal pipe is not acceptable unless it is encased in concrete. Exceptions may be made only where conditions warrant, but in no case shall the reasonable life expectancy of the pipe be less than the design life of the dam. (7-1-93)

c. All outlet conduits shall have a seepage path through the impervious zone at least equivalent in length to the maximum head above the downstream end of the system. Only one-third (1/3) the horizontal distance through the impervious zone will be utilized when calculating the length of the seepage path. Collars may be used to satisfy this requirement but all collars shall extend a minimum of two (2) feet outside the conduit for dams up to thirty (30) feet in height and a minimum of three (3) feet for dams above that height. Collars shall be spaced at intervals of at least seven (7) times their height and no collar may be closer to the outer surface of the impervious zone than the distance it extends out from the conduit. (7-1-93)

d. The use of multiple conduits is allowed only upon the written approval of the Director. (7-1-93)

**09. Gates.** All conduits shall be gated on the upstream end, unless otherwise approved by the Director, with either a vertical or an inclined gate. All conduits shall be vented directly behind the gate unless otherwise determined by the Director. Reservoirs storing water during the winter and subject to severe ice conditions shall have inclined gate controls enclosed in a protective sleeve which is buried. All gate stem pedestals shall be made of concrete. All trash racks shall slope toward the reservoir. At least one (1) of the sides of the inlet structure shall be open to allow water to flow into the outlet conduit and shall be covered with a trash rack. Trash racks should be designed with bars primarily in one (1) direction so they can be cleaned. If fish screens are used, they shall be placed over the trash rack and shall be removable for cleaning, or of the self-cleaning type. (7-1-93)

**10. Outlet Controls.** Outlet controls shall be installed at a stable location, on the crest or on an elevated platform, or within an enclosure when required, which is readily accessible, but secured to prevent unauthorized operation. (7-1-93)

**11. Release Capability.** Based on the size of the dam and on the risk category assigned by the Director, the release capability of a dam shall equal or exceed the inflow design flood in the following table:

## **Rule-by-Rule Comparison and Justification for Revision**

<b>Downstream Risk Category</b>	<b>Size Classification</b>	<b>Inflow Design Flood</b>
Low	Small	Q50
	Intermediate	Q100
	Large	Q500
Significant	Small	Q100
	Intermediate	Q500
	Large	0.5 PMF
High	Small	Q100
	Intermediate	0.5 PMF
	Large	PMF

NOTE: The inflow design flood(s) indicated in the table include specific frequency floods (2%/50yr, 1%/100 yr.) expressed in terms of exceedance with a probability the flood will be equaled or exceeded in any given year (a fifty (50) year flood has a two percent (2%) chance of occurring in any given year and a one hundred (100) year flood has a one percent (1%) chance of occurring in any given year); or PMF - probable maximum flood, which may be expected from the most severe combination of meteorologic and hydrologic conditions that are reasonably possible in the region. The PMF is derived from the probable maximum precipitation (PMP) which is the greatest theoretical depth of precipitation for a given duration that is physically possible over a particular drainage area at a certain time of year. (7-1-93)

a. All spillways shall be stabilized for the discharge of flow by the use of concrete, masonry, riprap or sod, if not constructed in resistant rock. (7-1-93)

b. Where site conditions allow, the spillway shall be constructed independent of embankment dams. The spillway(s) shall guide the discharge of water away from the dam embankment so as not to erode or endanger the structure. (7-1-93)

c. The minimum base width of an open-channel spillway shall be ten (10) feet. Conduits or siphon pipes other than glory hole spillways are not acceptable substitutes for an open-channel spillway. (7-1-93)

d. The effectiveness of spillways shall be undiminished by bridges, fences, pipelines or other structures. (7-1-93)

e. Unless expressly authorized in writing by the Director, or approved as an integral part of an operation plan, stop logs or flashboards shall not be installed in spillways. (7-1-93)

12. **Reservoir Site.** The dam site shall be cleared of all trees, brush, large rocks, and debris unless otherwise waived by the Director. The reservoir site shall be cleared of all woody material, growth or debris that is large enough to lodge in the spillway, or outlet works, except as otherwise approved by the Director. (7-1-93)

13. **Inspection and Completion Reports.** As construction proceeds, it is the responsibility of the engineer to submit test reports (e.g. soil material analyses, density tests, concrete strength tests) along with periodic inspection and progress reports to the Director. (7-1-93)

## **Rule-by-Rule Comparison and Justification for Revision**

a. Upon completion of construction the owner or his engineer shall provide the Director a short, written narrative account of all items of work. Record drawings and revised specifications shall be submitted to the Director if the completed project has been substantially changed from the plans and construction specifications originally approved. (7-1-93)

b. The engineer representing the owner shall certify that construction, reconstruction, enlargement, replacement or repair of the dam and appurtenances was completed in accordance with the record drawings and specifications, or as revised. (7-1-93)

Significant revision occurred to existing Rule 50 relative to the draft Rule 50.

Existing Rule 50 offered prescriptive design instruction; however, only for intermediate and large size dams, apparently presuming that IDWR staff would assist in the design of smaller sized dams and reservoirs, or worse, ignoring the need for proper design of smaller sized structures. All dams and reservoirs deserving of being regulated by IDWR Dam Safety Program must be properly designed by a Professional Engineer licensed in Idaho. Although the existing Rule offered good advice for some type(s) of dams, other prescriptive instruction has since been found to be inappropriate relative to industry standard and engineering design techniques.

- Example 1: cutoff collars installed around low-level outlet conduits within an earthen embankment often result in an increased probability for catastrophic failure.
- Example 2: It is important to distinguish the difference between an Operation Plan and Emergency Action Plan (EAP). The purpose for an EAP is to provide specific instruction to dam owners, emergency responders, and the public to use and/or implement during the occurrence of identified emergencies (e.g., flood, earthquake, terrorism, etc.) that could result in property damage or loss of life.
- Example 3: The formula(s) offered for top width, filter design, wave height do not apply for many dam design(s), and portions of the text offered to explain "specific frequency floods" is incorrect, as is the use of the term "risk".

Other important revision to existing Rule 50 is the table that accompanies 50.11 "Release Capability". The existing Rule 50 may appear to require a more conservative design yet does not allow the design engineer any discretion whatsoever to prepare a design most deserving of important site conditions such as elevation, reservoir operations, or the nature of seasonal runoff. Existing Rule 50.11 ignores other design considerations such as reservoir routing, incremental flood damage, time(s) to peak flow, ratio(s) of dam height to reservoir capacity, and perhaps most important a distinction between High Hazard dams that potentially impact a single residence versus those whose failure would negatively affect tens up to hundreds of lives. By modifying the single values used in existing Rule 50.11, the design engineer is allowed a range of values and thus more latitude for selecting an appropriate inflow flood that is best fitted to the unique circumstances related to the site: location, type of construction, foundation, downstream development, height, storage capacity, appurtenant operating features, and others. During design review, the Director retains authority to require any design revision determined necessary for public safety.

Lastly, existing Rule 50.11 erodes to some degree the assumed liability that a professional engineer accepts when preparing a design for construction of a new dam, or repair of an existing structure. An unintended consequence of rules that are too prescriptive can be to insert Department staff in the role of the designer; accompanied by all the legal obligations and potential liabilities. IDWR does not have statutory authority to design any dam, reservoir, or tailings impoundment.

## **Rule-by-Rule Comparison and Justification for Revision**

Rule 51 --- 054. (RESERVED)

8/2022 (v2.0)

051. --- 054. (RESERVED)

(7-1-93)

No change in the numbering system between the version(s) of rules for this Reserved section.

## **Rule-by-Rule Comparison and Justification for Revision**

Rule 60. EXISTING DAMS AND RESERVOIRS.

8/2022 (v2.0)

All dams and reservoirs regulated by the Department shall be operated and maintained to retain the existing structural dimensions, to resist deformations or movement, and to maintain the hydraulic capacity of the outlet works, spillway, and other discharge features as designed and constructed, or as otherwise required by these rules.

1. Analyses Required. The analyses required by Rule 35 shall apply to all existing dams when the Director specifically requires the analyses. Impounding structures constructed of other than earth material shall comply with these criteria.

a. Every dam shall have an overflow spillway with a capacity that will pass an inflow design flood of one percent (1%) probability of occurrence (i.e., Q100) or more, with the reservoir or the impoundment full to the spillway crest while maintaining the freeboard required by Rule 050.06.

b. The Director may lessen or waive the spillway requirement for dams that demonstrate out-of- stream (off-channel) storage.

c. The release capability or discharge capacity can include the combined rates of flow for multiple appurtenances; for example, spillways, outlets, diversion facilities, or other constructed conveyance features. Approved operating procedures which can be shown to utilize upstream storage, diversion, and reservoir flood routing to reduce flood runoff events may also be considered. The remainder of the required release capacity, if any, may be met by the following:

i. Reconstruction, enlargement or addition of spillways, outlets, diversion facilities, or other constructed conveyance features.

ii. A showing acceptable to the Director that potential failure of the dam during a flood of the specified magnitude described in Rule 050.11 would be incrementally small in comparison to the flood being considered, and that the release of reservoir would not substantially increase downstream damages to life and property which are anticipated to result from any natural flood equal to or exceeding that magnitude.

iv. A showing acceptable to the Director that limiting physical factors unique to the project site exist that prevent construction of a spillway or other release capability mechanisms during a flood of the specified magnitude described in Rule 050.11, and provided the owner implements storage operational procedures, or restrictions, or provides for emergency warning to protect life and property as approved by the Director.

d. Seismic loads shall be evaluated and applied to dams. The evaluation of seismic loads for high hazard structures shall use the maximum ground motion/acceleration generated by the maximum credible earthquake. The Director may accept maximum ground motion/acceleration corresponding to specified return intervals using a probabilistic evaluation of earthquake history in accordance with USGS hazard maps.



## **Rule-by-Rule Comparison and Justification for Revision**

e. The Director may accept existing studies relative to requirements of Rule 060.01.a and Rule 060.01.d, if the Director determines the information provided fulfills the requirements of the rules.

f. The Director may allow the owner of an existing dam a compliance period to complete structural modifications or implement other improvements deemed necessary to provide the necessary hydraulic capability.

g. The Director may allow the owner of an existing dam a compliance period to complete structural modifications or implement other improvements deemed necessary to resolve seismic stability or safety concerns.

h. Within thirty (30) days after completing the analyses required in Rules 60.01.a or 60.01.d, the owner of an existing dam found deficient by either analyses shall file with the Director a schedule outlining the dates work or construction items will be completed.

### **2. Other Requirements.**

a. Routine maintenance items include the following:

- i. Eradication of rodents and filling animal burrows;
- ii. Removal of vegetation and debris from the dam;
- iii. Restoring original dimensions of the dam by the addition of fill material;
- iv. Addition of bedding or riprap material which will not increase the height or storage capacity;
- v. Repair or replacement of gates, gate stems, seals, valves, lift mechanisms or vent pipes with similar equipment; or
- vi. Repair or replacement of wingwalls, headwalls or aprons including spalling concrete.

b. The following are not routine maintenance items and are subject to design review and approval prior to commencing construction:

- i. Alteration or modification of embankment slopes;
- ii. Replacement, reconstruction, or extension of outlets;
- iii. Foundation stabilization;
- iv. Filter or drain construction or replacement;
- v. Spillway size alteration or modification;
- vi. Installation of instrumentation or piezometers; or
- vii. Release capability or reservoir storage modification.

## **Rule-by-Rule Comparison and Justification for Revision**

- c. Items not specifically described in rules 50.03.a, 50.03.b, and 50.03.c will be determined by the Director to be included in one rule or the other upon receipt of a written request from the owner or his representative seeking such a determination.
- d. Where riprap is required to prevent erosion and to maintain a stable embankment, pipes, cables, brush, tree growth, logs, or floating debris are not acceptable substitutes for rock riprap and granular bedding material. Dams or portions thereof which are stable without riprap, are not required to have riprap.
- e. Upon completion of reconstruction of a dam or feature of a dam included in Rule 50.03.c, the owner or his engineer shall provide the Director a written narrative account of all items of work. Record drawings and revised specifications shall be submitted to the Director if the completed project has been substantially changed from the plans and construction specifications originally approved.
- f. Upon request, the owner of every dam shall provide his name and address to the Director and shall advise the Director of future changes in ownership. If the owner does not reside in Idaho, the owner shall provide the name and address of the person residing in Idaho who is responsible for the operation, maintenance, and repair of the dam.

### **060. SMALL DAM DESIGN CRITERIA (RULE 60).**

The following provisions apply to small dams.

(7-1-93)

**01. Design and Construction of Small Dams.** Design and construction of small dams located in high risk areas as determined by the Director require submittal of fees, plans and specifications prepared by an engineer and shall follow the same general criteria established under Rules 40, 45, 50, and 55. Other small dams not determined to be in a high risk area shall follow the same general criteria established under Rules 50 and 55 or larger dams, except that submittal of plans, specifications and test results is not required.

(7-1-93)

**02. Notification Prior to Construction.** The owner shall notify the Director in writing ten (10) calendar days prior to commencing construction.

(7-1-93)

**03. Approval Required.** The owner shall not proceed with the following stages of construction without approval from the Director.

(7-1-93)

**a.** After clearing and excavation of the foundation area and cutoff trench, and prior to placing any fill material;

(7-1-93)

**b.** After installation of the outlet conduit, and before placing any backfill material around the conduit;

(7-1-93)

**c.** After construction is completed, and before any water is stored in the reservoir;

(7-1-93)

**d.** At such other times as determined necessary by the Director. The Director, will, upon seven (7) day notice, inspect and, if satisfactory, approve the completed stage of construction.

(7-1-93)

**04. Notification upon Completion of Construction.** The owner shall in writing notify the Director upon completion of construction.

(7-1-93)

## **Rule-by-Rule Comparison and Justification for Revision**

Existing Rule 60 "Small Dam Design Criteria) is replaced with draft Rule 60 "Existing Dams and Reservoirs".

Revision to this rule is justified as all regulated dams must meet basic safety requirements expected for all dams according to the perceived Hazard Classification (i.e. not just size). In addition, many profound differences can exist in the design of a new dam, and the design for repair or rehabilitation or modification of an existing structure. The objective of the revisions in Draft Rule 60 is to help provide clear distinction between design for new dams or newly constructed dams, and those existing structures which may have been built to meet the design requirements of the day. For example, a new embankment dam likely will include internal filters; however, an older existing dam may not have such features. Consequently, the lack of approved filters may require another form of design or monitoring procedures to mitigate the deficiency.

While much contained in Draft Rule 60 is referenced to and similar with corresponding design information and requirements expressed in Draft Rule 50, both owners and engineers deserve focused attention by the regulator on instructions that address remedial design of existing structures. Accordingly, Draft Rule 60 has less direction regarding new design (and construction), and instead provides the engineer discretion for design (and construction) best suited to remedy identified deficiencies at exiting dam(s). As previously noted, IDWR does not have statutory authority to provide design services to dam owners.

The intent of the legislature expressed in Idaho Code (42.1710) is "to provide ... for the protection of public safety". New dam design is accompanied with an implied longevity of many decades. Often, however, timely repair to an existing structure, with longevity much less than decades and arguably non-permanent, may provide the greatest level of protection to downstream life and property versus a more costly, time-consuming design that could demand higher quality materials and/or greater contractor experience. The latter can be counterproductive to addressing public safety expeditiously.

## **Rule-by-Rule Comparison and Justification for Revision**

Rule 61 --- 064. (RESERVED)

8/2022 (v2.0)

061. --- 064. (RESERVED)

(7-1-93)

No change in the numbering system between the version(s) of rules for this Reserved section.

## **Rule-by-Rule Comparison and Justification for Revision**

### **Rule 65. DAMS STORING TAILINGS AND WATER**

8/2022 (v2.0)

1. Construction of Mine Tailings Impoundment Structures Storing Fifty (50) Acre-Feet of Water or more. New or existing mine tailings impoundment structures intended to store fifty (50) acre-feet or more of water in addition to the water contained in the tailings material shall meet the applicable requirements specified in Rules 35, 45, and 60 of these rules. The Director may waive applicable requirements in Rule 35, 45, or 60 if, in the opinion of the Director, sound engineering design provided by the owner indicates such requirements are not applicable.
2. Abandonment Plan. An abandonment plan which provides a stable, maintenance-free condition at any time tailings are not being actively placed for an extended period of time, as determined by the Director, shall be submitted to the Director by the owner of a dam storing tailings and water. This rule may be waived by the Director if determined not to be applicable.

### **065. DAMS STORING TAILINGS AND WATER (RULE 65).**

**01. Construction of Dams Storing Fifty Acre-Feet or More.** Construction of dams intended to store or likely to store fifty (50) acre-feet or more of water in excess of the water contained in the tailings material shall meet the requirements specified in Rules 40, 45, 50 and 55 of these rules. The Director may waive any or all of these requirements if, in the opinion of the Director, sound engineering design provided by the owner indicates such requirements are not applicable. (7-1-93)

**02. Abandonment Plan.** An abandonment plan which provides a stable, maintenance-free condition at any time tailings are not being actively placed for an extended period of time, as determined by the Director, shall be submitted to the Director by the owner of a dam storing tailings and water. This rule may be waived by the Director if determined not to be applicable. (7-1-93)

No revision to the rule number. Draft Rule 65 makes minor revision to the text in existing Rule 65, primarily toward word reduction and to clarify certain language.

## **Rule-by-Rule Comparison and Justification for Revision**

Rule 66 --- 999. (RESERVED)

8/2022 (v2.0)

066. --- 999. (RESERVED)

(7-1-93)

No change in the numbering system between the version(s) of rules for this Reserved section.