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NOTICE OF PROPOSED RULEMAKING
INCLUDING STATEMENT OF NEED & FISCAL IMPACT

CHAPTER 690
WATER RESOURCES DEPARTMENT

FILED
02/27/2020 12:55 PM
ARCHIVES DIVISION
SECRETARY OF STATE

FILING CAPTION: Safety of Dams: Rules for Design, Construction, Maintenance, Corrective Action, Removal, and Emergencies

LAST DAY AND TIME TO OFFER COMMENT TO AGENCY: 04/06/2020 5:00 PM

The Agency requests public comment on whether other options should be considered for achieving the rule's substantive goals while reducing negative economic impact of the rule on business.

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Filed By:
Racquel Rancier
Rules Coordinator

HEARING(S)

Auxiliary aids for persons with disabilities are available upon advance request. Notify the contact listed above.

DATE: 03/30/2020
TIME: 1:00 PM - 3:00 PM
OFFICER: Keith Mills
ADDRESS: Jackson County
Auditorium
7529 Table Rock Road
Mosquito Lane
White City, OR 97503

DATE: 03/31/2020
TIME: 2:30 PM - 4:30 PM
OFFICER: Keith Mills
ADDRESS: Water Resources
Department
725 Summer Street NE
Room 124
Salem, OR 97301

DATE: 03/19/2020
TIME: 2:00 PM - 4:00 PM
OFFICER: Keith Mills
ADDRESS: Cook Memorial Library
2006 Fourth Street
La Grande, OR 97850

NEED FOR THE RULE(S):

Dams provide a number of benefits such as controlling floods, and capturing water for irrigation, municipal, recreation, fisheries, and other purposes. While dams provide a variety of benefits, failure of a dam can result in loss of life and damage to property, infrastructure, and natural resources. Oregon has adopted a dam safety program to ensure dams are designed and maintained to prevent failure. The Oregon Water Resources Department is the state agency charged with overseeing the safety of dams across the state that are not regulated by a federal dam safety program. In 2019, the Oregon Legislature passed legislation (House Bill 2085) to modernize the dam safety statutes. Until passage of House Bill 2085 in 2019, Oregon's dam safety statutes had remained relatively unchanged since 1929. Dams which are 10 feet or more in height and store more than 3 million gallons (9.2 acre-feet) of water are subject to the Dam Safety Program requirements, and would be subject to these proposed rules.

Under the new and existing statutes, and under the proposed rules, Oregon's Dam Safety Program determines each dam's hazard rating based on the potential threat to life and property, sets construction and maintenance standards, conducts dam inspections based on the dam hazard rating, and requires emergency action plans for high hazard dams. Of the approximately 950 dams under state jurisdiction, about 75 dams are rated as high hazard, meaning loss of human

life is expected should the dam fail, while approximately another 150 dams are rated as Significant Hazard, meaning failure is likely to result in damage to property or infrastructure. These numbers change based on ongoing analysis and changes to downstream risks. The hazard rating is not a reflection of the condition of the dam, but rather reflects the potential impacts of dam failure. A dam can be in good condition and still be assigned a highhazard rating.

Chapter 390, Oregon Laws 2019, repealed or modified existing laws and instituted new provisions for dam construction and increasing the height of dams, dam removal, coordination between owners, the Department and others, emergency actions on dams, procedures regarding maintenance and corrective actions, and other actions related to the safety of dams. Provisions of Chapter 390, Oregon Laws 2019 pertaining to dam safety are now codified in statute as ORS 540.443 to 540.491 and 540.995. Consistent with past practice, dams under the regulation of a federal dam safety program are not subject to these proposed rules. The new law requires rulemaking in order to implement certain provisions, and also necessitates updates to existing dam safety rules to conform to the new law. As a result, the Department is conducting this rulemaking, to ensure OAR Chapter 690, Division 020 is consistent with and implements the requirements of the new laws by the operative date of July 1, 2020.

DOCUMENTS RELIED UPON, AND WHERE THEY ARE AVAILABLE:

Oregon dam safety database

https://apps.wrd.state.or.us/apps/misc/dam_inventory/

Model dam safety program; Association of State Dams Safety Officials and Federal Emergency Management Agency

<https://www.fema.gov/media-library/assets/documents/14133>

Geotechnical Engineering of Dams. Fell, R., G. Bell, D. Stapledon, and P. MacGregor. Balkema Publishers. 2005.

Available for review at Oregon Water Resources Department in Salem.

FISCAL AND ECONOMIC IMPACT:

Dams provide a number of benefits such as controlling floods, and capturing water for irrigation, municipal, recreation, fisheries, and other purposes. Oregon has adopted a dam safety program to prevent failures which can result in significant economic losses, and preserve the benefits, which can have positive economic impacts. Agriculture, cities, individuals, businesses, and industries require water and store it to support direct and underlying economic activities. In addition, properly maintained dams can increase the value of a property. However, there are costs to owners associated with properly constructing, maintaining, operating, and removing a dam.

These proposed rules continue and, in some cases modify, the existing rules for department review and approval of the design of new dams, inspection of dams, emergency action plans for high hazard dams, and actions to respond to unsafe dams. New provisions describe the steps the Department and owners take concerning needed maintenance or corrective actions.

These rules require individuals constructing or modifying the dam height to hire an engineer, and to submit and receive approval for plans and specifications. The new dam safety statutes and these rules authorize the department to charge a fee for the examination of the proposed dam site, plans and specifications and other supporting information for the

construction of a new dam or to modify the height of an existing dam. Individuals seeking to build a dam or modify the dam height may incur a fee of up to \$1,750 for a low hazard dam, \$3,500 for a significant hazard dam, or \$8,500 for a high hazard dam. The fee may be less if the cost of the Department's review is less. Currently no fee for review of information by the department exists. On average, six sets of plans for dam construction are submitted a year. Increased annual revenue to the department is estimated to be between \$15,000 and \$30,000.

While owners of dams have been responsible for maintaining dams to prevent them from becoming unsafe, new provisions in the rules allow the Department to require action where maintenance issues on high and significant hazard dams have gone unaddressed. As a result, owners that have not maintained their dams, or in the future, do not maintain their dams, may see additional costs to undertake these maintenance actions. These costs may include or be associated with gopher control, weed control and removal, repairs, equipment, mowing, cleaning spillways, and other activities. These costs cannot be estimated as they will depend on the specifics of the dam and the methods the owner chooses to use to meet these requirements. Owners that have maintained their dams historically are not anticipated to see increased costs associated with these rules in regards to maintenance actions.

The new dam safety statutes and these proposed rules provide a cooperative approach and a framework for addressing specific safety deficiencies associated with potentially unsafe and unsafe dams that are rated as high hazard or significant hazard. In these cases the owner may need to hire a registered engineer to conduct the type of analysis needed to correct the deficiencies. In the short term, the cost of compliance will be the cost of an engineer or a specialist to conduct an analysis or develop a plan to repair. Engineering analysis to verify specific issues and develop solutions can cost between \$5,000 to several million dollars per dam, with limited additional planning costs for developing a corrective action timeframe. The costs to address safety issues will vary depending on the specific safety issue and the size of the dam, and can range from a few thousand dollars to millions of dollars. These potential costs may be incurred by the owners of dams with a high or significant hazard rating, where the Department alleges that the dam is unsafe or potentially unsafe. Owners of dams assigned a low hazard rating (the vast majority of dams) will not be required to hire engineers or other experts, as this portion of the laws related to corrective actions are inapplicable to low hazard dams.

In addition, owners or others seeking to remove a dam may incur costs associated with removal of a high or significant hazard dam in order to develop a removal plan, or in limited cases when the Department requires an engineer to be involved in order to protect public safety. The costs associated with developing a removal plan can be expected to range up to \$30,000.

The statutes and these rules authorize the assessment of civil penalties for specific violations. However, if compliance is achieved by the specified date, civil penalties may not be assessed. The new laws set the maximum civil penalty between \$500 and \$2,000 per occurrence based on the type of violation. In some instances, each day or month the violation continues is a new occurrence, meaning that penalty amounts can accrue over time. It is expected that assessment of civil penalties will occur infrequently. Civil penalties will be applied only when other efforts to achieve essential safety actions have been ineffective. Civil penalties will be assessed after voluntary compliance has been rejected by the owner, and there has been the opportunity and when requested, a formal hearing, followed by issuance of a formal order. Civil penalties are specific to a limited subset of the rules, and are highest where there is a higher risk posed to lives below the dam. In cases where risk is high and owners fail to take simple actions to eliminate the high risk, civil penalties could be up to \$2,000 per day while lives are at risk.

COST OF COMPLIANCE:

(1) Identify any state agencies, units of local government, and members of the public likely to be economically affected by the rule(s). (2) Effect on Small Businesses: (a) Estimate the number and type of small businesses subject to the rule(s); (b) Describe the expected reporting, recordkeeping and administrative activities and cost required to comply with the rule(s); (c) Estimate the cost of professional services, equipment supplies, labor and increased administration required to comply with the rule(s).

State agencies, cities, counties, special districts, individuals, and businesses who own dams or are proposing to build a new dam are subject to these rules if the dam is not under the jurisdiction of a federal dam safety program and the dam meets the height and volume thresholds for regulation by the department. Owners of dams may incur costs under these proposed rules to construct, maintain, remove, repair, comply with Emergency Action Plans, and to pay civil penalties if specified laws are violated. There are approximately 950 dams regulated by the Department and subject to these rules.

More than 700 of the dams regulated by the Department are low hazard dams; the rules do not provide authority to order maintenance or corrective actions on low hazard dams. However, if development occurs below a dam, this may result in a change in the hazard rating of the dam to either significant or high hazard.

In regard to publicly owned dams, based on a review of the dam safety database, there are an estimated 66 publicly owned dams rated as high or significant hazard. Of these, it is estimated that 35 are owned by cities, 23 by special districts or public utilities, 5 by counties and 3 by state agencies. Nine of these 66 have known or suspected vulnerabilities that may put the dams into the potentially unsafe condition. Owners of these dams have already been informed of the condition of their dams, and many are in various stages of planning for corrective actions. Over time, there may be additional dams found to be unsafe or potentially unsafe. The existing dam safety statutes and the new statutes authorize enforcement action for dams that pose a threat to life and property. The department is unable to determine the cost as the cost will vary depending on the nature of the corrective action and size of the dam. Customers and patrons who rely on these reservoirs for drinking water, irrigation, and other purposes may experience rate increases.

There are 161 high and significant hazard dams regulated under the dam safety program that are privately owned. Of the 161 high hazard and significant hazard privately owned dams, an estimated 105 are owned by small businesses, mostly for farm and ranch use. The remaining 56 dams are owned by corporations for manufacturing, industrial, or power generation uses; homeowner associations; or, by individuals for their personal uses. As discussed above the effect on privately owned low hazard dams is limited.

Dam owners, including small businesses, are required to notify the Department if the contact information changes, or after completing a transfer of title on the dam. This should not result in costs to the owner. The owner is also required to file copies of the emergency action plan with the department, Office of Emergency Management, and the local emergency services agency where the dam is located. Costs associated with this activity will include either the costs of copying or emailing the document. In addition, the owner is required to report an actual or potential dam failure to the department and other entities if no emergency action plan exists. The owner should keep records to track conditions of the dam. The rule does not specify the types of records. The annual fee for dam owners is not changed by these rules and currently costs \$100 for a low hazard dam, \$200 for a significant hazard dam, and \$670 for a high hazard dam. Small businesses wishing to construct a dam or increase the height of an existing dam would now be subject to a fee for

review of designs of new dams or raising the dam height. Depending on risks downstream of the dam and the complexity of design, this review fee is expected to be between \$1,750 and \$8,500.

Dam owners or individuals seeking to construct a dam, including small businesses, may incur costs for professional services, equipment and supplies, and labor in order to undertake actions in these rules related the construction, maintenance, emergency action planning, operation, repair, or removal of a dam. In general, the Department cannot estimate the costs of these services as they will differ and be specific for each dam and, in some instances, based on the preferences of the owner. Individuals that seek to construct, maintain, repair, remove, or develop an emergency action plan will, in many cases, need to engage the services of a professional engineer, particularly for high or significant hazard dams.

The laws require the dam owner, including small businesses, to evaluate the conditions of the dam to keep it in good repair, maintained, and to address any conditions that may pose a risk of failure, and may incur labor costs. Dam owners should already be maintaining their dams under the existing laws in order to prevent them from becoming unsafe. However, the new statutes and these proposed rules allow the Department to require owners to take maintenance actions. Owners that have not been maintaining their dams may see an increase in the time or cost to undertake maintenance actions.

In addition, for dams that are potentially unsafe or unsafe, many owners are already working towards improvements to those dams under the existing law or have restrictions on the amount of water that may be stored. The new law should not result in cost changes for owners to address dam safety deficiencies; however, under the new law and these proposed rules the Department has authority to work with owners to develop reasonable timeframes to address deficiencies, as well as to order action to be taken to address deficiencies. The statutes and these proposed rules also provide that in cases where there is an imminent threat for an unsafe dam, the Department may request timelier scheduling of a hearing. At the present time, there appears to be about 2 dams owned by small businesses that could be subject to a corrective action for a potentially unsafe condition. This number is likely to increase as additional assessment and analysis of dams is completed. As discussed in the fiscal and economic impact section above, these costs will vary depending on the dam and the specific risks to the dam.

Under the proposed rules, owners of high and significant hazard dams, including small businesses, that wish to remove those dams would need to have a removal plan reviewed by the Department. There is no fee for review of this plan, but there might be costs incurred to develop the plan. Owners of dams may incur costs for engineering associated with development of a plan, if required by the Department to hire an engineer. The costs associated with developing a removal plan can be up to \$30,000 for a high hazard with an engineer doing the removal plan. Costs associated with the owner doing the removal plan, where possible could be significantly less.

Owners of high hazard dams, including small businesses, are required to complete emergency action plans. Some owners of existing high hazard dams that have out of date emergency action plans may incur costs to update the emergency action plans. The costs of creating a new emergency action plan or updating an existing one will vary depending on whether the owner does the plan themselves, whether a current inundation analysis already exists, and whether any other work needs to be completed by an engineer. The estimated costs could range up to \$50,000 if a consultant is used to do all of the work; costs would be less if the owner does the work themselves.

In addition, owners of high hazard dams, including small businesses, may incur civil penalties for failure to comply as discussed in the fiscal and economic impact section above.

DESCRIBE HOW SMALL BUSINESSES WERE INVOLVED IN THE DEVELOPMENT OF THESE RULE(S):

The rules advisory committee included representatives of groups and entities that either are, or represent, small business dam owners, and also private engineers that work on dam design, rehabilitation and removal. These groups included individual entities that own dams, technical consultants and engineers, local governments, special districts, and the Oregon Farm Bureau.

WAS AN ADMINISTRATIVE RULE ADVISORY COMMITTEE CONSULTED? YES

RULES PROPOSED:

690-020-0000, 690-020-0022, 690-020-0024, 690-020-0026, 690-020-0028, 690-020-0035, 690-020-0036, 690-020-0037, 690-020-0038, 690-020-0041, 690-020-0042, 690-020-0043, 690-020-0044, 690-020-0047, 690-020-0048, 690-020-0055, 690-020-0060, 690-020-0065, 690-020-0068, 690-020-0070, 690-020-0080, 690-020-0100, 690-020-0120, 690-020-0140, 690-020-0160, 690-020-0180, 690-020-0210, 690-020-0260, 690-020-0310, 690-020-0340, 690-020-0400, 690-020-0410, 690-020-0420, 690-020-0460, 690-020-0600

AMEND: 690-020-0000

RULE SUMMARY: Amends existing rule to clarify the Water Resources Department's general responsibilities for Dam safety and for coordination with Dam owner, agencies, and others. Maintains exclusion from regulation for Dams that are not at least ten feet high and storing at least 3 million gallons of Water

CHANGES TO RULE:

690-020-0000

Purpose and Applicability ¶¶

(1) The purpose of these Division 20 rules is to implement ORS 537.400(4) and ORS 540.35040.443 through 491 and ORS 540.390995 with actions that are intended to ensure the safety of the ~~d~~Dams, insofar as ~~d~~Dams may affect possible ~~damage to~~loss of life or property. ~~The Department is authorized to review design and specifications for dam construction and modification, to e, and damage to public infrastructure. Prioritization of Dam safety actions and requirements are based on the Hazard Rating of the Dam. These rules outline processes to:~~ ¶¶

(a) Review design and specifications to Construct a Dam; ¶¶

(b) Review plans for removal of Significant Hazard and High Hazard Dams; ¶¶

(c) Conduct routine inspections; and to take enforcement actions on dams that do not ensure the safety of notify Dam owners of outcomes; ¶¶

(d) Cooperate with Dam owners over Dam safety issues; ¶¶

(e) Prescribe Maintenance Actions, corrective actions, or any other actions necessary to protect life and, property ¶¶

(2) These rules apply to dams that are subject to ORS 540.350 through 540.390 and which exceed the height and storage limits described in ORS 540.400, or public infrastructure consistent with the Department's authorities and with law, and to pursue formal enforcement as necessary; ¶¶

(f) Communicate, coordinate, and collaborate with Persons, Tribes, or other government entities regarding Dam safety; and ¶¶

(g) Plan for and respond to emergencies as necessary and as consistent with law. ¶¶

(32) These rules do not apply to:¶

(a) Dams that are less than ten feet ~~in Height~~ or that ~~store~~impound less than ~~three~~ million gallons (9.2 ~~a~~Ac-feet), ~~except for general guidance and permit requirements described in OAR 690-020-0029; or, ¶~~

(b) Water storage ~~t~~Tanks or various types of ~~t~~Tanks that are part of ~~w~~Water treatment facilities; ~~and ¶~~

(4c) ~~The dam safety fee authorized by ORS 536.050(2) shall be used to support the dam safety program as described in Dams regulated under a federal Dam safety program, except as provided in ORS 540.446 and OAR 690-020-020024. ¶~~

(53) ~~The State Engineer may delegate dam safety duties to Compliance with ORS 540.443 through 491 and these OAR Division 20 rules does not relieve the owner or operator of a Dam or an individual in immediate charge of a Dam safety engineer working for the Department for the purposes of ORS 540.350 through 540.390 from any duty, obligation, or liability regarding the ownership, maintenance, or operation of the Dam.~~

Statutory/Other Authority: ~~ORS 540.350–540.400, 536.050~~36.027, ORS 540.488

Statutes/Other Implemented: ~~ORS 183, 540, 536~~540.446, ORS 540.488, ORS 540.491

AMEND: 690-020-0022

RULE SUMMARY: Amends existing rule to reference definitions used in 2019 Oregon Laws Chapter 390. Maintains existing definition of essential Dam and Dam safety terminology used in Division 20, with references to the statutory language for definitions defined in statute

CHANGES TO RULE:

690-020-0022

Definitions ¶

Unless the context requires otherwise, the following definitions apply in OAR Chapter 690, dDivision 20:¶

- (1) "Abutment" means a natural valley or canyon side against which the dDam is built;¶
- (2) "Acre-foeFeet" means the equivalent volume of unit of volume equal to one acre covered with one foot of wW ater (325,900 gallons);¶
- (3) "Annual Exceedance Probability Flood" means the likelihood of a specific flood flow being equaled to or exceeded in any given year at that specific location, expressed as a percentage;¶
- (4) "As-built dDrawing" means an engineering drawing of a dDam as it was actually constructed, noting all differences between original design and actual constructed condition;¶
- (5) "Conduit" means a closed conveyance used to release wWater through a dDam;¶
- (6) "Core" means a soil of low permeability within an eEmbankment dDam;¶
- (7) "Construct" has the meaning given to the term in ORS 540.443;¶
- (8) "Cutoff Trench" means a trench excavated beneath the dDam fFoundation and backfilled with low permeability material to retard wWater seepage;¶
- (89) "Dam" means a hydraulic structure built above the natural ground grade line that is used to impound water. Dams include all appurtenant structures, and together are sometimes referred to as "the works." Dams include wastewater lagoons and other hydraulic structures that store water, attenuate floods, and divert water into canals has the meaning given to the term in ORS 540.443;¶
- (910) "Dam Crest" means the top of the dDam;¶
- (101) "Dam Height" means the maximum hHeight of the dDam above natural ground as measured at the maximum section along the dDam's longitudinal axis;¶
- (112) "Dam Failure" has the meaning given to the term in ORS 540.443;¶
- (13) "Department" means the Oregon Water Resources Department;¶
- (124) "Director" means the Director of the Oregon Water Resources Department;¶
- (135) "Embankment" means an engineered earth fill;¶
- (146) "Emergency Action Plan" (EAP) means a plan that assists the dam owner or operator and local emergency manager perform actions that ensure the safety of people in the event of a potential or actual dam failure or in the event of a sudden release of water; or "EAP" has the meaning given to the term in ORS 540.443;¶
- (17) "Engineer" means an individual who is registered in this state and holds a valid certificate to practice engineering in this state as provided under ORS 672.002 to 672.325.¶
- (158) "Engineer of Record" means thea professional engineer registered in Oregon working for the dam owner to retained by a Dam owner to analyze, plan, and design the da Dam to current safety standards and is responsible, to oversee safe construction of a Dam, to supervise Modification or removal of a Dam, or to oversee safe construction of the dcorrective actions identified by the Department, or to otherwise administer activities for a Dam;¶
- (169) "Foundation" means the ground surface upon which a dDam is constructed;¶
- (1720) "Freeboard" means the vertical distance between the high-water level in the reservoir and the dlow spot on the Dam eCrest;¶
- (218) "Gate" or "Valve" means a permanent device for regulating wWater flow through the dDam;¶
- (1922) "Hazard Rating" means the rating categorization of a Dam established by the Department of based on the potential damage to life and, property, or public infrastructure downstream of a dDam in the event of a dDam fE

ailure;¶

~~(203)~~ "High Hazard Rating" means that if a dam were to fail, loss of human life would be expected or "High Hazard" has the meaning given to the term in ORS 540.443;¶

~~(214)~~ "Inflow Design Flood" (or "IDF") means a volume and the peak flood flow that the Engineer of Record will design to safely pass over or through the spillway;¶

~~(225)~~ "Low Hazard Rating" or "Low Hazard" means that if a Dam were to fail, loss of life would be unlikely, and damage to property or public infrastructure would not be extensive;¶

~~(236)~~ "Pressurized Conduit" means any pipe that penetrates into a dam that may have a gate, valve Maintenance Action" has the meaning given to the term in ORS 540.443;¶

~~(27)~~ "Modification" means changes to a Dam which have a potential impact on the safety of the Dam and also do not conform to the original design, but do not include changes to Dam Height, performing Maintenance Actions, or removing a Dam;¶

~~(28)~~ "Person" includes individuals, or irrigation pipe placed in the dam or at the outlet so that all or a portion of the pipe within the dam is under hydrostatic pressure when the valve is closed;¶

~~(24)~~ corporations, associations, firms, partnerships, joint stock companies, public and municipal corporations, political subdivisions, the state and any agencies thereof, the federal government and any agencies thereof, Tribe(s) and tribal members;¶

~~(29)~~ "Potentially Unsafe" has the meaning given to the term in ORS 540.443;¶

~~(30)~~ "Pressurized Conduit" means any pipe that penetrates into a Dam so that there is hydrostatic pressure due to the location of a Gate, Valve, or pipe connection;¶

~~(31)~~ "Probable Maximum Flood" (PMF) or "PMF" means the largest flood that could occur at a specific location, determined by the most severe set of atmospheric, soil moisture, and snowpack conditions that are reasonably possible at that location;¶

~~(325)~~ "Significant Hazard Rating" means that if a dam were to fail, loss of life would be unlikely but damage to property would be extensive or "Significant Hazard" has the meaning given to the term in ORS 540.443;¶

~~(2633)~~ "Soil Filter" means soil with a gradation designed to inhibit movement of adjacent, finer grained soils;¶

~~(2734)~~ "Spillway" means any structure constructed to bypass Water, including flood water and, to prevent water overtopping the Dam Crest. Dams may have two or more spillways.¶

~~(28)~~ "State Engineer" means a registered professional engineer working for;¶

~~(35)~~ "State Engineer" means an Engineer employed by the Department, and may be that is either the Director or a principal assistant working for the Director as described in ORS 536.032;¶

~~(2936)~~ "Tank" means a fully-enclosed (bottom and sides) hydraulic structure made from metal, reinforced concrete, rigid fiberglass, or plastic that provides its own water-sealing and structural stability;¶

~~(307)~~ "Toe Drain" is a drainage structure designed to collect and remove seepage water from the toe of the Dam and to discharge this water in a manner where it can be measured;¶

~~(318)~~ "Unsafe" has the meaning given to the term in ORS 540.443;¶

~~(39)~~ "Water" means water or wastewater;¶

~~(40)~~ "Zoned Embankment" means an Embankment Dam with a Core of low permeability materials, Soil Filter materials, drainage, and other materials placed to improve performance and safety of the Dam.

Statutory/Other Authority: ORS ~~183, 540~~536.027, ORS 540.488

Statutes/Other Implemented: ORS ~~183 & 540, 536~~540.443

ADOPT: 690-020-0024

RULE SUMMARY: This new rule describes Department statutory authorities for regulation, intergovernmental coordination, accepting monies, limited actions on federal dams, and accepting reports.

CHANGES TO RULE:

690-020-0024

General Department Authorities and Intergovernmental Coordination

In addition to any other powers of the Department, in carrying out its duties, functions, and powers, under these rules and ORS 540.443 through 491 and 540.995, the Department may: ¶

(1) Enter into contracts, memorandums of understanding and intergovernmental agreements for the inspection, evaluation or study of Dams, or the response to Dam Failure or potential Dam Failure. ¶

(2) Accept moneys from any public or private source for the administration and enforcement of these rules for enhancing the safety of Dams or the protection of life, property, or public infrastructure in areas below Dams. ¶

(3) Coordinate with federal, Tribal, state, local, and private entities to enhance the safety of Dams or the protection of life, property, or public infrastructure in areas below Dams. ¶

(4) Waive or reduce fees for Dams inspected by another state agency under a memorandum of understanding with the Department. ¶

(5) Aid in the inspection of a Dam and provide advice and assistance to prevent, mitigate, or respond to a potential or actual Dam Failure if there is a potential or actual risk of Dam Failure at a Dam regulated under a federal Dam safety program. ¶

(6) Accept the reports of consulting Engineers, engineering geologists or other specialists employed by the Dam owner. ¶

(7) Employ consulting Engineers, engineering geologists, or other specialists to make special examinations and inspections, and to prepare reports for the Department if the Department concludes that existing reports are insufficient. The cost of such special examinations, inspections, and reports shall be paid by the Department, or upon mutual agreement, may be divided between the Department and the Dam owner.

Statutory/Other Authority: ORS 540.488, ORS 536.027

Statutes/Other Implemented: ORS 540.488, ORS 540.446, ORS 540.464

ADOPT: 690-020-0026

RULE SUMMARY: Describes administration of newly authorized fees for review of Dam construction documents.
Describes annual Dam safety program fees.

CHANGES TO RULE:

690-020-0026

Fees

(1) The Department may charge a fee for examination of the site, plans and specifications, features, and other supporting information regarding construction of a new Dam or construction to modify Dam Height. The fee, as provided in ORD 540.449 Oregon Laws 2019, must be paid prior to final design approval and may not exceed the lesser of the costs of providing the examination or the amounts provided in ORS 540.449 (3). ¶

(2) Dam owners subject to the Department's laws governing Dam safety shall submit to the Department an annual fee based upon the Dam's Hazard Rating as provided in ORS 536.050 (2) to support the Dam Safety Program and administration expenses.¶

(a) Dam owners who fail to pay the annual fee on or before six months after the billing date may be required to pay a late fee as provided in ORS 536.050 (2).¶

(b) If a Dam owner fails to pay the annual fee or late fee charged by the Department, the Department may, after giving the Dam owner notice by certified mail, place a lien on the real property where the Dam is located for the fees owed by the Dam owner.¶

(c) Multiple Dams directly adjacent to each other and connected together and separated only by Embankments or other manmade materials will be considered as one Dam for the purpose of determining annual fees.

Statutory/Other Authority: ORS 536.027, ORS 540.488

Statutes/Other Implemented: ORS 536.050, ORS 540.449

ADOPT: 690-020-0028

RULE SUMMARY: This rule describes initial submittal information for dams, where this is required and where it is advised.

CHANGES TO RULE:

690-020-0028

Preliminary Plans and Specifications for Construction of New Dams or to Increase Dam Height

(1) If a Dam requires a Water right, preliminary plans and specifications must be submitted to the Department at the time an application to appropriate Water is submitted to the Department pursuant to ORS 537. Preliminary plans and specifications are recommended for Dams that do not require a Water right.¶

(2) Preliminary plans and specifications must include the following at a minimum:¶

(a) A contour map of the reservoir site showing the proposed location of the Dam. The map should be no smaller than eleven inches by seventeen inches. The map must show the proposed location of the Spillway(s) and the Conduit inlet and outlet;¶

(b) Written description of the proposed Dam location both as Latitude/Longitude and Township/Range/Section;¶

(c) A cross section of the proposed Dam at the maximum section indicating the proposed Height; ¶

(d) The proposed storage of the reservoir in Acre-Feet; and¶

(e) A brief description of geologic conditions of the proposed site. Any geologic features that could impact the safety of the Dam should be clearly described.¶

(3) The preliminary plans and specifications must be submitted by an Engineer, or a certified engineering geologist that is registered in the State of Oregon and is also a Certified Water Rights Examiner.

Statutory/Other Authority: ORS 536.027, ORS 540.488

Statutes/Other Implemented: ORS 537.400

AMEND: 690-020-0035

RULE SUMMARY: Describes design submittal requirements for engineers' submission of plans, specifications, and other documents for new construction and to increase height of existing dams.

CHANGES TO RULE:

690-020-0035

Minimum Engineering ~~Design Requirements~~ Requirements for Final Design of New Dams or to Increase Dam Height ¶

(1) ~~A design report~~ No Person may build a new Dam or increase Dam Height unless the Department or multiple design reports must be submitted with the drawings ~~ment has first examined the site, plans and specifications, features, and other supporting information as prepared by an Engineer regarding the construction and specifications~~ ration of the dam ¶

(2) Final documents must be submitted by the Engineer of Record for all new dam prior to construction. Design reports may be completed by other engineer ~~Engineers other than the Engineer of Record. If multiple reports are registered to practice in Oregon, submitted, each must be stamped by the Engineer who prepared the report.~~ ¶

(3) Final documents shall include: ¶

(a) A plan for construction administration as provided in OAR 690-020-0065; ¶

(2b) ~~The design report(s) for new dam construction~~ An operations and maintenance plan if required by OAR 690-020-0350; ¶

(c) An Emergency Action Plan for Dams rated High Hazard as provided in OAR 690-020-0400; ¶

(d) Final design drawings as provided in OAR 690-020-0055; and ¶

(e) Final design reports. ¶

(4) The final design report(s) must include the following elements: ¶

(a) Site suitability evaluation as provided in OAR 690-020-0036; ¶

(b) Hydrology and inflow design flood as provided in OAR 690-020-0037; ¶

(c) Dam structure design (embankment, concrete or other) as applicable and as provided in OAR 690-020-0038 - 690-020-0041; ¶

(d) Spillway design as provided in OAR 690-020-0042; ¶

(e) Design for penetrating conduit(s) as provided in OAR 690-020-0043; and ¶

(f) Method monitoring and instrumentation for determining whether a Dam is operating properly based on the hazard rating of the Dam as provided in OAR 690-020-0044 (monitoring and instrumentation); and ¶

(3g) ~~If multiple reports are submitted, each must be stamped by the engineer who prepared the report and the engineer of record must compile and understand reports for preparation of drawings and specifications~~ A Dam Breach Inundation Analysis as provided in OAR 690-020-0120.

Statutory/Other Authority: ~~ORS 540.350-36.027, ORS 540.40088~~

Statutes/Other Implemented: ~~ORS 183, 536, 540~~ 540.449, ORS 540.488

AMEND: 690-020-0036

RULE SUMMARY: This is an existing rule with minor changes to existing rule language for clarity only and has been modified to list all applicable requirements for new construction. Provides minimum technical standards for investigation and design of geotechnical and geologic issues for dams. Specifies different standards based on Dam hazard rating (risk to persons, property, and public infrastructure) should a Dam fail.

CHANGES TO RULE:

690-020-0036

Design Requirements for New Dams or to Increase Dam Height: Site Suitability and/or Geotechnical Evaluation

The design for construction of a new Dam construction or to increase Dam Height shall characterize the soil and rock at and around the Dam site and shall include the following elements:

(1) A description of the general and local geology and geomorphology at and around the proposed Dam and reservoir site.

(a) Field investigation by a geotechnical Engineer and/or engineering geologist or both is required for all dams rated High Hazard. For dams and also for s-rated Significant Hazard dams, field investigation by a geotechnical engineer or engineering geologist or both is required where landslides, faults, dispersive soils, or liquefiable soils could reasonably be expected near or at the Dam site. All such features shall be shown on a map of the Dam site, and be described as necessary for design of the Dam.

(b) For Dams on rock, located on rock, a drawing must also contain mapping of discontinuities relevant to the safety of the Dam and include evaluation of t~~he need for~~ grouting is required.

(2) A subsurface investigation to determine the distribution of relevant earth materials. This investigation, which shall include borings or test pits; identification of springs, seeps, and groundwater encountered at the Dam site; and evaluation of the potential for landslides into the Dam or reservoir.

(a) All materials shall be logged by the Unified Soil Classification System; blow counts (for borings only); and include a description of samples taken for testing.

(b) Subsurface investigations for High Hazard Dams shall include drilling to a minimum depth of 1.5 times the Dam Height of the dam or at least 10 ten feet into bedrock, whichever is less.

(3) Soil and or rock evaluation and An evaluation of soil and rock and the testing of relevant materials. This evaluation, which may include: proctor compaction testing from all borrow areas; estimation or testing the permeability of soils to be used in Dam construction; and an assessment for the presence of dispersive soils. There must be a sufficient number of tests to characterize the variability in each borrow area. In addition, an evaluation must contain the following information as applicable and as may be required by the State Engineer.

(a) An analysis of materials in the Foundation and proposed Embankment shall be completed if materials are prone to liquefaction or significant settlement.

(b) Where suitable materials can be collected, strength tests shall be required for all High Hazard Dams, and may be required by the State Engineer for Significant Hazard Dams.

(c) Testing of dynamic soil properties may be required for High Hazard Dams in areas with large ground acceleration potential from earthquake loading, if soils have potential for significant strength loss upon seismic loading.

(4) Borrow area locations. Areas proposed for borrow shall be identified and shown on the drawings.

(5) Earthquake considerations. Seismic site characterization is required for High Hazard Dams, and may be required for Significant Hazard Dams. A seismic site characterization shall include earthquake sources, ground motion hazard, peak ground acceleration, and recommended ground motions (time histories); and

(6) Site preparation criteria. The site evaluation shall recommend a depth of stripping unsuitable materials, and also a minimum, and where necessary, maximum depth for the Cutoff Trench.

Statutory/Other Authority: ORS 540.350-36.027, ORS 540.40088

Statutes/Other Implemented: ORS 183, 536, 540540.449, ORS 540.488

AMEND: 690-020-0037

RULE SUMMARY: This is an existing rule with minor changes to existing rule language. Provides minimum technical standards for design of hydrologic parameters for Dams. Specifies different standards based on Dam hazard rating (risk to persons, property and public infrastructure) should a Dam fail

CHANGES TO RULE:

690-020-0037

Design Requirements for New Dams or to Increase Dam Height: Hydrology and Inflow Design Flood ¶

The design for construction of a new Dam or to increase Dam Height shall characterize flow into and through the reservoir and ~~the~~ Dam and shall include the following elements:¶

- (1) A topographic map delineating the drainage area contributing to the ~~the~~ Dam, with the drainage area size labeled in square miles and showing the specific location of the proposed ~~the~~ Dam;¶
- (2) For ~~the~~ Dams on stream channels, the name of the stream where the ~~the~~ Dam is located, the name of the principal watershed, and a determination of average annual inflow into reservoir and potential to fill the reservoir;¶
- (3) ~~Dam failure inundation analysis is required for any dam that might be high or significant hazard. The inundation analysis shall comply with OAR 690-020-0120.¶~~
- (4) ~~The~~ The Inflow ~~Design~~ ~~Flood~~ that is the basis of hydraulic design for the ~~the~~ Dam shall be determined based on the ~~Hazard~~ ~~Rating~~ of the ~~the~~ Dam; as follows:¶
 - (a) The ~~inflow~~ ~~Design~~ ~~Flood~~ for a ~~high~~ ~~Hazard~~ ~~the~~ Dam is the Probable Maximum Flood (PMF) unless the Engineer of Record proposes to determine an Inflow Design Flood based on a quantitative analysis of risk to people.¶
 - (b) The minimum ~~inflow~~ ~~Design~~ ~~Flood~~ for a ~~significant~~ ~~Hazard~~ ~~the~~ Dam is the 0.2 percent ~~annual~~ ~~exceedance~~ ~~probability~~ ~~flow~~.¶
 - (c) The minimum ~~inflow~~ ~~Design~~ ~~Flood~~ for a ~~low~~ ~~Hazard~~ ~~the~~ Dam is a 1.0 percent ~~annual~~ ~~exceedance~~ ~~probability~~ ~~flow~~.¶
 - (d) The ~~inflow~~ ~~Design~~ ~~Flood~~ for a lagoon or off channel reservoir is the maximum capacity of inflow pumps; or ditches plus the maximum local storm precipitation over the lagoon;¶
 - (e) For watersheds under ~~30~~ thirty square miles, the ~~Engineer of Record~~ may consider just the 24-hour storm to help determine the PMF, while for larger basins the ~~Engineer of Record~~ shall utilize at least a 72-hour storm for calculating the PMF for a general storm.¶
- (5) ~~For a high hazard dam, the engineer of record may also propose to determine an inflow design flood based on a quantitative analysis of risk to people and property.¶~~
- (6) ~~4~~ Designs shall include a description of all hydrologic parameters and the method used to determine the ~~inflow~~ ~~Design~~ ~~Flood~~ hydrograph and the volume of the ~~inflow~~ ~~Design~~ ~~Flood~~, which is to be determined considering basin size and other factors as appropriate to the watershed above the ~~the~~ Dam; and¶
- (7) ~~5~~ The design report must include the information used to develop the stage and storage capacity curve for the reservoir, including the capacity with and without excavation for construction.

Statutory/Other Authority: ~~ORS 540.350-36.027, ORS 540.40088~~

Statutes/Other Implemented: ~~ORS 183, 536, 540~~ 540.449, ORS 540.488

AMEND: 690-020-0038

RULE SUMMARY: This is an existing rule with minor changes to existing rule language for clarity. Provides minimum technical standards for design of embankment structures. Specifies different standards based on Dam hazard rating (risk to persons, property and public infrastructure) should a Dam fail.

CHANGES TO RULE:

690-020-0038

Design Requirements for New Dams or to Increase Dam Height: Embankment Dam Structures ¶

Designs for construction of a new Dam or to increase Dam Height for Embankment (soil and/or rock) ~~d~~Dams shall include the following elements:¶

(1) A determination of ~~e~~Embankment stability and stable ~~e~~Embankment slope angles: as follows:¶

(a) Embankment ~~d~~Dams shall be designed to have stable slopes during construction, and under all conditions of reservoir operation.¶

(b) Standard slopes of 3:1 upstream and 2:1 downstream may be used at the discretion of the ~~e~~Engineer of ~~r~~Record for ~~l~~Low and ~~s~~Significant ~~h~~Hazard ~~d~~Dams as long as low strength materials are not used in the ~~e~~Embankment and conditions leading to elevated pore ~~w~~Water pressures are not present.¶

~~(c) Dams that are rated h~~For High ~~h~~Hazard ~~must be designed as zoned embankment dams and/or include a chimney drain designed also as a filter.~~¶

~~(d) High hazard dams shall be analyzed for~~Dams, an analysis of static and seismic slope stability, and ~~also for of~~ deformation analysis. The State Engineer may require static and ~~or~~ seismic slope stability analysis for ~~s~~Significant ~~h~~Hazard ~~d~~Dams. At a minimum, seismic analysis shall be based on full reservoir under steady state seepage conditions. Factors of safety shall be evaluated by slope stability analyses using appropriate strength parameters based on laboratory or in situ testing. For materials that can be reasonably tested either on site or in a laboratory, soil strength values may not be based on assumptions and must be made on strength testing of the appropriate soil or rock units.¶

~~(ed)~~ High Hazard ~~d~~Dams shall be designed for the maximum credible earthquake. If the State Engineer requires seismic analysis of a ~~s~~Significant ~~h~~Hazard ~~d~~Dam, deformation analysis shall be designed for the 0.2 percent ~~a~~Annual ~~e~~Exceedance ~~p~~Probability earthquake: and¶

~~(fe)~~ Abrupt changes in depth of compressible ~~f~~Foundation material shall be identified and where present, the design shall prevent significant differential settlement.¶

(2) Analysis of seepage and leakage expected through the ~~d~~Dam and design of measures to prevent internal erosion and excess leakage: as follows:¶

(a) Steady state seepage and internal drainage conditions beneath, around and through the ~~d~~Dam shall be quantified for all ~~h~~High ~~h~~Hazard ~~d~~Dams, and may be required by the State Engineer for ~~s~~Significant ~~h~~Hazard ~~d~~Dams:¶

(b) A ~~e~~Core of low permeability material protected by a ~~s~~Soil ~~f~~Filter is required for all ~~h~~High ~~h~~Hazard ~~d~~Dams. A ~~e~~Core and ~~s~~Soil ~~f~~Filter is required for any ~~s~~Significant ~~h~~Hazard ~~d~~Dams where the ~~e~~Engineer of ~~r~~Record or State Engineer determines piping could potentially occur. All ~~e~~Core and filter zones must be of a configuration with dimensions that can be readily constructed:¶

(c) Internal drains and ~~or s~~Soil ~~f~~Filters shall be used as needed to drain ~~w~~Water and prevent internal erosion of the ~~d~~Dam. Toe ~~d~~Drains shall be standard design practice for ~~w~~Water storage ~~facilitie~~Dams, but not for most wastewater lagoons: and¶

(d) Internal drain pipes to collect and distribute seepage flows from internal filters and drains shall be comprised of material that is non-corrodible, designed to carry the overburden load, and be no smaller than 6 inches in diameter.¶

(3) A safe and accessible ~~d~~Dam ~~e~~Crest: as follows:¶

(a) The ~~d~~Dam ~~e~~Crest shall be of sufficient width to be accessible by equipment and vehicles for emergency operations and maintenance, and shall have a road to allow ~~e~~Crest access during periods when the ~~s~~Spillway is

flowing;¶

(b) The eCrest shall have a camber sufficient to maintain the design fFreeboard, based on the anticipated eCrest settlement, and in no case shall the camber be less than 0.5 feet;¶

(c) Roads located on the dDam eCrest shall have appropriate surfacing to provide a stable base that resists rutting and provides adequate traction for access and safety in wet conditions; and¶

(d) The eCrest shall have adequate cross slopes to prevent ponding.¶

(4) Measures to control wave and surface erosion as ~~needed~~ follows;¶

(a) For reservoirs large enough to generate significant waves, the design shall include a determination of minimum fFreeboard based on expected waves. The design shall also include slope protection for wave action if significant waves are likely; and¶

(b) The downstream slope shall be provided with a ~~well maintained cover of non-woody vegetative cover, or a gravel or rock surface, to prevent surface erosion. No woody vegetation shall be planted on the dam during the life of the structure unless specifically designed by the engineer of record, by demonstrating that cover plants will not affect critical dam functions.~~

Statutory/Other Authority: ~~ORS 540.350-36.027, ORS 540.40088~~

Statutes/Other Implemented: ~~ORS 183, 536, 540~~ 540.488, ORS 540.449

AMEND: 690-020-0041

RULE SUMMARY: This is an existing rule with minor changes to existing rule language for clarity. Provides minimum technical standards for design of concrete structures. Specifies different standards based on Dam hazard rating (risk to persons, property and public infrastructure) should a Dam fail.

CHANGES TO RULE:

690-020-0041

Design Requirements for New Dams or to Increase Dam Height: Concrete Dam Structures ¶

Designs for construction of a new Dam or to increase Dam Height for concrete mass ~~d~~Dams must be prepared by a structural ~~e~~Engineer and a geotechnical ~~e~~Engineer and/or engineering geologist. This rule does not apply to concrete flashboard ~~d~~Dams. Designs for all other concrete ~~d~~Dams shall include the following elements as applicable:¶

- (1) Concrete ~~d~~Dams shall be specified as gravity, arch, arch-gravity, or buttress. Gravity ~~d~~Dams can be of conventional mass concrete or roller compacted concrete.¶
- (2) Dams shall be designed to be stable during construction and under all conditions of reservoir operation.¶
 - (a) Headwater and tailwater elevations pertinent to the design shall be described with respect to both static and dynamic loading.¶
 - (b) Uplift pressure distributions assumed for design shall be provided. ~~;~~ and¶
 - (c) When ~~f~~Foundation drains are used to reduce uplift, the assumed drain efficiency shall be indicated and permanent access shall be provided at the project to inspect and maintain the drains.¶
- (3) Sliding stability shall be evaluated at lift joint surfaces, at the ~~d~~Dam ~~f~~Foundation interface, and at discontinuities in the ~~f~~Foundation materials beneath the ~~d~~Dam and ~~a~~Abutments.¶
 - (a) Factors of safety shall be based on limit equilibrium methods.¶
 - (b) For earthquake loadings, ~~the critical acceleration (acceleration required to initiate sliding) may be less than the peak ground acceleration of the design earthquake. In such cases a permanent sliding displacement shall~~ may be determined in lieu of a sliding factor of safety. ~~;~~ and¶
 - (c) Overturning of the ~~d~~Dam on its ~~f~~Foundation shall be evaluated for static and seismic loading.¶
- (4) Seismic stability analysis ~~is~~ may be required for ~~certain~~ ~~e~~Concrete ~~d~~Dams and if required shall demonstrate the ~~d~~Dam can withstand the design earthquake without loss of life or damage to property. ~~or public infrastructure~~.¶
 - (a) High ~~h~~Hazard ~~d~~Dams shall be designed for the maximum credible earthquake based on current information from the US Geological Survey or a site specific seismic evaluation. A dynamic stress analysis that considers the dynamic characteristics of the ~~d~~Dam and the ground motions of the design earthquake shall be provided for ~~h~~High ~~h~~Hazard ~~d~~Dams. ~~;~~ and¶
 - (b) Where the State Engineer requires seismic analysis on ~~s~~Significant ~~h~~Hazard ~~d~~Dams, they shall be designed for the 0.2 percent ~~a~~Annual ~~p~~Probability of ~~e~~Exceedance earthquake. The Department may require a dynamic stress analysis for ~~s~~Significant ~~h~~Hazard ~~d~~Dams.¶
- (5) When ~~f~~Foundation grouting is needed, the design for the grout curtain and ~~or~~ consolidation grouting of the ~~f~~Foundation shall be ~~requir~~ described.¶
- (6) ~~Specific properties of mass~~ Any property essential for the structural design of the concrete t ~~that can be important to design and construction include the~~ ll be included in the design documents. These may include but are not limited to compressive strength (at ~~28~~ twenty-eight days and one-year), modulus of elasticity, Poisson's ratio, shear strength, tensile strength, volume change during drying, thermal coefficient of expansion, specific heat, thermal conductivity, permeability and durability.¶
 - (a) As a minimum for static loadings, the assumed compressive and shear strengths for the parent concrete, lift joint surfaces, and the ~~d~~Dam-~~f~~Foundation contact shall be provided.¶
 - (b) In addition, tensile strength assumptions for the aforementioned regions for dynamic loadings (seismic) shall also be provided. ~~;~~ and¶
 - (c) Air entraining agents shall be provided in the concrete mix to provide freeze-thaw protection and to improve

the workability of lean mass concrete mixes. The quantity of air entrained in mass concrete shall be in the order of ~~five~~ percent.¶

(7) Mix design and construction methods used to minimize cracking due to temperature gradients between interior regions subject to heat of hydration effects and surfaces exposed to ambient temperatures shall be specified. Treatment of lift joint surfaces to achieve desired shear and tensile strengths shall be indicated. Treatment of contraction joints to prevent leakage ~~and/or~~ to transfer load between adjacent monoliths shall be described.¶

(8) When reinforcing steel is used, the strength properties of the reinforcement shall be provided and contract drawings shall clearly indicate the size, location, spacing, and cover requirements. ~~and~~¶

(9) The minimum ~~e~~Crest width must be ~~15~~fifteen feet unless otherwise approved. The ~~d~~Dam ~~e~~Crest and appurtenant structures shall be accessible by equipment and vehicles for emergency operations and maintenance.

Statutory/Other Authority: ~~ORS 540.350-36.027, ORS 540.40088~~

Statutes/Other Implemented: ~~ORS 183, 536, 540~~540.488, ORS 540.449

AMEND: 690-020-0042

RULE SUMMARY: This is an existing rule with minor changes to existing rule language related to spillways for off-channel dams. Provides minimum technical standards for design of Dam spillways. Specifies different standards based on Dam hazard rating (risk to persons, property and public infrastructure) should a Dam fail.

CHANGES TO RULE:

690-020-0042

Minimum Design Requirements for New Dams or to Increase Dam Height: Spillways

All (1) Dams on stream channels and all High Hazard Rated Dams must have a Spillway.

(2) Spillway(s) design for construction of a new Dam or to increase Dam Height shall include the following minimum elements:

(4a) Utilization of Inflow Design Flood. Determination of Inflow Design Flood as described in OAR 690-020-0037 is required to determine the required Spillway capacity.

(4b) Hydraulic evaluation of flow through control section. Flood flow through the control section must be calculated and the minimum Freeboard at the Inflow Design Flood must be ~~one~~ one foot for High Hazard Dams and ~~two~~ two feet for Significant and Low Hazard Dams.

(4c) Optional low elevation Spillway. An interior Spillway connected to the low level Conduit may be used for Low and Significant Hazard Dams, and for High Hazard Dams only with specific approval by the State Engineer. The capacity of the low elevation Spillway may be considered in design of the overflow Spillway.

(4d) Stable Spillway control section. The Spillway control section must be hydraulically and structurally stable for the Inflow Design Flood and have permanent features so that the control section is identifiable for re-measurement of cross section during routine inspections.

(4e) Spillway channel stability. Spillways shall be designed to be structurally adequate and stable under all conditions of reservoir operation. Spillway structures of High Hazard Dams shall be designed for earthquake ground motions per OAR 690-020-0036.

(4f) Reinforced concrete specifications for spillways. Structural elements of reinforced concrete shall be designed for both strength and serviceability. The ~~28~~ twenty-eight day strength of structural concrete shall be provided. The strength properties of the reinforcing materials shall also be provided and contract drawings shall clearly indicate the size, location, spacing, and cover requirements. Treatment of construction joints and contraction/expansion joints shall be described and special provisions for strength transfer and leakage prevention identified. Air entrainment shall be provided in cast-in-place concrete if needed for freeze-thaw protection, durability, and workability.

(4g) Debris booms. For High and Significant Hazard Dams, debris or log booms may be required. Where required, they shall be designed for the Spillway approach where logs and other debris may block or damage the Spillway structure. The design shall specify the necessary anchor capacity, and the design of the anchors.

(4h) Gates and Flashboards. Detailed drawings and specifications are required for Spillway Gate structures or flashboards, if present on the proposed Dam. Operations and maintenance ~~manual~~ plans are required for any Dam with a Gated Spillway, or where flashboards or stop-logs are used in the Spillway as per OAR 690-020-0350.

(4i) Energy dissipation. The design of stilling basins for High Hazard Dams, and where required by the State Engineer for Significant Hazard Dams, shall be based on calculated hydraulic forces and designed to dissipate energy from the Inflow Design Flood.

3) Low and Significant Hazard Dams constructed off channel are not required to have a Spillway, if redundant mechanisms to prevent overfilling are included in the design.

Statutory/Other Authority: ~~ORS 540.350-36.027~~, ORS 540.40088

Statutes/Other Implemented: ~~ORS 183, 536, 540~~540.488, ORS 540.449

AMEND: 690-020-0043

RULE SUMMARY: This is an existing rule with minor changes to existing rule language for clarity. Provides minimum technical standards for design of conduits through dams. Specifies different standards based on Dam hazard rating (risk to persons, property and public infrastructure) should a Dam fail.

CHANGES TO RULE:

690-020-0043

Design Requirements for New Dams or to Increase Dam Height: Penetrating Conduit-(s) and Control of Flow Through Conduits

~~All~~ ~~New~~ ~~Dams~~ on stream channels must have a low level ~~Conduit~~. All other ~~dams~~ new Dams and Dams with increases to Dam Height must have a low level ~~Conduit~~ or other means to safely drain the reservoir. The ~~Conduit~~ and related control structures must be designed to meet the following criteria:

(1) Ability to lower the reservoir. The minimum diameter of the ~~Conduit~~ should be determined through analysis of the time required to drain the ~~Dam~~ at average annual inflow:

(a) The ~~Conduits~~ for ~~High~~ ~~Hazard~~ ~~Dams~~ shall be capable of releasing the amount of Water which could be stored in the top five feet of the reservoir in five days.

(b) The ~~Conduits~~ for ~~Significant~~ and ~~Low~~ ~~Hazard~~ ~~Dams~~ must be able to release the amount of Water which could be stored in the top five feet of the reservoir in ten days.

(c) All ~~Conduits~~ must be of sufficient size to allow passage of inflows as needed.

(d) In no case shall ~~Conduits~~ be smaller than ~~eight~~ inches in diameter.

(2) Durable and water-tight ~~Conduits~~. Conduits must be made of medium to heavy gage durable materials. Pipe joints must be designed to seal and prevent leakage. Corrugated metal culverts are only acceptable for ~~Low~~ ~~Hazard~~ ~~Dams~~, and only when the ~~Conduits~~ are encased in concrete. Encasement of ~~Conduits~~ in concrete may be used to assist in the design of a durable ~~Conduit~~ and to reduce the potential for seepage and erosion adjacent to the ~~Conduit~~:

(a) Diaphragms using materials designed as an effective ~~Soil~~ ~~Filter~~ are required for any ~~Conduits~~ not designed as encased in concrete, and are required regardless of encasement for all ~~High~~ ~~Hazard~~ ~~Dams~~.

(b) Seepage collars may not be used in any ~~Dam~~.

(3) Control Mechanisms. The design for the control mechanism must be sturdy, and durable. The control mechanism must allow for air venting when needed, and allow manual operation to drain the reservoir if hydraulic or other power controls are inoperable. Hydraulic or other power controls must have redundancy if control relies on any submerged hydraulic hose or pneumatic hoses or electrical conduits. Intake structures for outlet works must have trash racks unless the ~~Engineer~~ of ~~Record~~ shows trash racks are unnecessary, or ~~Unsafe~~ to ~~Construct~~ due to conditions at the ~~Dam~~ site. For ~~High~~ and ~~Significant~~ ~~Hazard~~ ~~Dams~~, measures to prevent unauthorized use of the control mechanism must be included in this design:

(4) Outlet structure. The outlet structure must not be submerged when the inlet control ~~Gate~~ or ~~Valve~~ is fully closed. The outlet structure must be designed to protect the ~~Conduit~~ from mechanical damage and convey ~~Water~~ to the stream channel without channel erosion and cavitation near the ~~Gate~~ structure; and

(5) Pressurized operation. Conduits must be specified as suitable for pressurized operation if they are to be operated with controls other than at the inlet of the ~~conduit~~. ~~Conduits for~~ ~~Conduit~~. ~~Dams with~~ ~~Pressurized~~ ~~Conduits~~ shall have a guard ~~Gate~~ installed at the upstream end of the ~~Conduit~~. Operations and maintenance ~~manual plans~~ are required for any ~~Dam~~ designed for pressurized operation, ~~and the plans must include procedures for periodic inspections of the interior of any pressurized pipes per OAR 690-020-0350.~~

Statutory/Other Authority: ORS 540.350-36.027, ORS 540.40088

Statutes/Other Implemented: ORS 183, 536, 540540.449, ORS 540.488

AMEND: 690-020-0044

RULE SUMMARY: This is an existing rule with minor changes for clarification only. Provides minimum technical standards for design of instrumentation for general monitoring dams. Specifies different standards based on Dam hazard rating (risk to persons, property and public infrastructure) should a Dam fail.

CHANGES TO RULE:

690-020-0044

Monitoring and Instrumentation Design Requirements for New Dams or to Increase Dam Height: Instrumentation for Monitoring ¶

Designs must include methods for determining if the ~~d~~Dam is operating properly based on the ~~h~~Hazard ~~r~~Rating of the ~~d~~Dam, and include:¶

(1) A plan to share monitoring data with the Department¶

(2) Staff gage near controls for the ~~e~~Conduit or where they can be easily seen by the Dam owner or operator. The staff gage shall be clearly marked in feet and tenths of feet, and extend to within one foot of the ~~crest of the dam~~ Dam Crest. Markings and numbers on the gage rod shall be of sufficient size to be easily readable from the ~~crest of the dam.~~ Dam Crest:¶

(23) Multiple and easily accessible outlets of all ~~t~~Toe ~~d~~Drains. Toe ~~d~~Drains shall be designed to discharge into locations where flows can be evaluated and monitored. Multiple discharge points are required in order to isolate seepage to various sections of the ~~d~~Dam and ~~f~~Foundation. Discharge points must be located where routine ~~d~~Dam maintenance is not likely to damage the drains:¶

(a) For ~~h~~High ~~h~~Hazard ~~d~~Dams, drains must have a measuring weir or other device, and a basin for settling drainage ~~w~~Water so that internal erosion can be identified.¶

(b) Where drainage galleries are provided for concrete ~~d~~Dams, seepage measuring devices should be provided and accessible for making the necessary readings.¶

(34) Unique Identification. All instrumentation and exterior drains shall be labeled with a unique identifying marker designed for durability and to withstand maintenance activities:; and¶

(45) All ~~h~~High ~~h~~Hazard and, where ~~n~~ required by the ~~e~~Engineer of ~~r~~Record or State Engineer, ~~s~~Significant ~~h~~Hazard ~~d~~Dams shall have the following instrumentation:¶

(a) Monuments that allow measurement of the horizontal and vertical movements of the ~~d~~Dam. Control or benchmark monuments shall be placed in areas not subject to movement:;¶

(b) Piezometers to allow monitoring of the phreatic surface within the ~~d~~Dam or for concrete ~~d~~Dams, to determine uplift pressures. Standpipe piezometers must be installed pursuant to monitoring well standards. (OAR 690-240-0525).¶

(c) Instrumentation to measure strong ground motions for publically owned Dams in locations where the peak ground acceleration in the 0.2 percent annual probability of exceedance earthquake is greater than 0.4g at the ground surface.

Statutory/Other Authority: ~~ORS 540.350-36.027~~, ORS 540.40088

Statutes/Other Implemented: ~~ORS 183, 536, 540~~540.488, ORS 540.449

AMEND: 690-020-0047

RULE SUMMARY: This is an existing rule with minor changes to existing rule language for clarification only. Geosynthetics are excluded from certain uses in dams.

CHANGES TO RULE:

690-020-0047

Design Requirements for New Dams or to Increase Dam Height: Geosynthetics ¶

Geosynthetics shall not be used as the sole element employed to perform an ~~essential~~ Dam safety function. Redundant design features are required whenever geosynthetics are used for ~~essential~~ Dam safety functions.

Statutory/Other Authority: ~~ORS 540.350-36.027~~, ORS 540.40088

Statutes/Other Implemented: ~~ORS 183, 536, 540~~540.449, ORS 540.488

AMEND: 690-020-0048

RULE SUMMARY: This is an existing rule with no changes, other than to update the statutory authorities. Allows Engineers to adjust rule standards if demonstrated to be inapplicable to the dam.

CHANGES TO RULE:

690-020-0048

Modification of Standard Design Requirements II

Exceptions to design standards may only be obtained with written approval from the State Engineer. Where the Engineer of ~~r~~Record requests design exceptions, the request must be in writing, be affixed with the eEngineer of r ~~Record's~~ professional stamp, and include a report describing why design standards are inapplicable to the safety of the ~~d~~Dam.

Statutory/Other Authority: ORS ~~540.350-36.027~~, ORS ~~540.40088~~

Statutes/Other Implemented: ORS ~~183, 536, 540~~540.449, ORS 540.488

AMEND: 690-020-0055

RULE SUMMARY: This is an existing rule with minor changes for clarity. Describes requirements for engineer's drawings to allow Department review and approval.

CHANGES TO RULE:

690-020-0055

Design Requirements for New Dams or to Increase Dam Height: Design Drawings ¶

The eEngineer of rRecord shall submit applicable drawings when the eEngineer believes the design is ready for review and approval by the State Engineer. ¶

(1) Drawings must accurately portray the work to be accomplished and be of sufficient detail to clearly define all features of the project. After all changes required by the State Engineer are made, final design drawings must be neatly and accurately drawn to a scale sufficiently large for the drawings to be readily interpreted. ¶

(2) Drawings must be uncluttered and easy to understand for determination of design compliance by the contractor, the eEngineer of rRecord, and the State Engineer. ¶

(3) Drawings must be no larger than 24" X 36". Other acceptable sizes for drawings are 17" X 22" and 22" X 34". All drawings must have a graphic scale bar so that scale can be determined after enlargement or reduction. Each sheet shall be numbered sequentially with the first sheet being sheet number one along with the total number of sheets; e.g., 1 of 6. ¶

(4) Drawings shall include the following information: ¶

(a) An official dDam name, which must not have already been used for a dDam as indicated in the Oregon dDam sSafety dDatabase. This unique name must be affixed on each drawing; ¶

(b) The first drawing must include a location map with the drainage basin, the dDam and reservoir, streams within the drainage area, and the location of the nearest access highway. This drawing must include legal location of the dDam (including Section, Township and Range), and the location of the survey reference point with latitude, longitude, elevation, and datum elevation (in NAVD1988); ¶

(c) A contour map of the reservoir site showing the legal location of the dDam with a contour interval no greater than five feet. A plan of the dDam should be superimposed on this map. If scale permits, this drawing should show the location of the sSpillway(s), eConduit inlet and outlet, and the location, distance and direction to a government land corner or other permanent survey marker; ¶

~~(d) Area and storage capacity curves and information on the hydrology of the proposed reservoir drainage area in square miles; n area capacity curve showing the total capacity to the top of the Dam, with the Spillway Crest elevation identified. Surface area and storage capacity curves must be in acres and Acre-Feet, respectively;~~ ¶

(e) A profile of the dDam site at the center of the dDam; ¶

(f) A cross section of the dDam at maximum section; ¶

(g) Plan view(s) of dDam at maximum section, and other sections as needed; ¶

(h) Cross section(s) of dDam, including the maximum section with the official dDam hHeight; ¶

(i) Spillway details, sSpillway approach control discharge, and energy dissipation; ¶

(j) Low level eConduit details, including diameter, material, encasement; and ¶

(k) Slide gGate or vValve details including the trash rack, control stem, pedestal and wheel, or other control details, and air vent. ¶

(5) Elevations must be clearly labeled on applicable drawings and include the: ¶

(a) Base of dDam and official height of dam Dam Height; ¶

(b) Dam eCrest; ¶

(c) Spillway control section; ¶

(d) Base of sSpillway discharge; and ¶

(e) Invert of the eConduit at both the inlet and outlet. ¶

(6) All drawings must be dated and have sufficient space for State Engineer's approval stamp, at least 3" x 3" near the lower right hand corner of the drawing. ¶

(7) Drawings must be designated as final design drawings or ~~a~~As-built ~~d~~Drawings.

Statutory/Other Authority: ~~ORS 540.350-36.027~~, ORS 540.40088

Statutes/Other Implemented: ~~ORS 183, 536, 540~~540.449, ORS 540.488

AMEND: 690-020-0060

RULE SUMMARY: This is an existing rule with minor changes for clarity. Describes minimum information in engineers' submittal of specifications to allow Department review and approval.

CHANGES TO RULE:

690-020-0060

Design Requirements for New Dams or to Increase Dam Height: Construction Specifications ¶

All drawings for ~~d~~Dams must be accompanied by construction and material specifications that include the following:¶

- (1) Construction conditions. Specifications must include the construction period based on typical weather ~~for that location and in-stream work periods~~ and stream conditions for that location and if applicable, and may include a process for the eEngineer of rRecord to modify the construction period.¶
- (2) Clearing of the ~~d~~Dam site and reservoir. Specifications must include the area to be submerged by the new or enlarged reservoir and specify that the submerged area shall be cleared of logs and debris prior to filling the reservoir. The specifications must require that the footprint of the ~~d~~Dam shall be cleared of all soils containing organic materials, and that this material may not be used for ~~d~~Dam construction.¶
- (3) Cutoff ~~€~~Trench requirements. Specifications must include the minimum trench depth, width at base of the trench, and maximum side slope steepness. These specifications shall be based on the subsurface investigations and direct that the eCutoff ~~€~~Trench may not be filled if it contains standing wWater. Specifications must also include a requirement not to begin filling the eCutoff ~~€~~Trench until approved by eEngineer of rRecord, and where specified, by State Engineer or Dam Safety Engineer, must also be included approved in by the specifications Department.¶
- (4) Material specification standards. The specifications shall include material and testing specifications for ~~d~~Dam materials, eConduits, control structures, and other appurtenant structures, using an ASTM standard methodology if available.¶
- (5) Soil Compaction. The typical compaction specification is ~~95~~ninety-five percent of standard proctor density, though the eEngineer of rRecord may use a different compaction standard. Specifications shall include the types of acceptable compaction equipment, by material source if necessary. Specifications shall also include maximum lift thickness. ~~To reduce potential for leakage around the conduit, s~~Specifications shall prohibit soil compaction dry of optimum moisture content ~~f~~to reduce potential for leakage around the Conduit. For materials placed immediately above or adjacent to the eConduit-S, specifications must also include verification testing of soils, with representative samples selected for testing as directed by the eEngineer of rRecord and not the contractor. Specifications must also require verification of testing of soil compaction, with representative samples selected for testing by the Engineer of Record, or Engineer's representative.¶
- (6) Concrete placement. Specifications shall include means to prevent separation of aggregate and cement, air entrainment requirements if needed, methods for placement and vibration of concrete, required minimum ~~28~~twenty-eight day strength, slump, moisture and temperature requirements for curing. Alkali reactive aggregate shall not be used in the concrete.¶
- (7) Conduit specifications. Specifications must include the material, diameter, and thickness of the eConduit, and the length of eConduit required for the project. Methods for sealing joints must be specific. Specifications must require that all materials from a manufacturer are certified to meet this test, or that the eEngineer of rRecord has tested the materials directly.¶
- (8) Accepting and Rejecting Materials. Specifications must include tolerances for acceptable departure from material specifications and a process for rejection of defective materials or workmanship.¶
- (9) Notification by the eEngineer of rRecord to the State Engineer of changed conditions critical to the safety or operations of the ~~d~~Dam. Specifications shall include State Engineer notification if previously unidentified springs, slope movement or sand lenses are identified, or if storm or other damage occurs during construction.¶
- (10) ~~The specifications must require supervision by the engineer of record during construction and for inspection~~

by the Director or Director's authorized representative at any time during the construction period. Engineer of Record or their qualified employees must supervise construction as needed to assure compliance with the approved construction plans and specifications. ¶

(11) The specifications must also contain a provision to the effect that plans or specifications shall not be altered or changed without the written approval of the State Engineer.

Statutory/Other Authority: ~~ORS 540.350-36.027~~, ORS 540.40088

Statutes/Other Implemented: ~~ORS 183, 536, 540~~540.449, ORS 540.488

AMEND: 690-020-0065

RULE SUMMARY: This is an existing rule with no substantive changes. Describes minimum information in engineer's plan for Dam construction to allow Department review and approval.

CHANGES TO RULE:

690-020-0065

~~Dam Construction Plan Requirements for New Dams or to Increase Dam Height: Construction Administration~~

~~(1) The Engineer of Record shall submit plans for administering the construction of the Dam to the State Engineer for approval. Construction plans must include the following:~~

~~(1a) Construction of the dam shall be observed and documented by the engineer of record and employees working for the engineer of record as applicable.~~

~~(2) A provision stating that the Engineer of Record or an inspector/employee working for the Engineer of Record shall be on-site as needed for instructions to the contractor, approval of initial excavation, acceptance of materials, and general project administration.~~

~~(3b) A provision stating that the Dam owner shall cease construction activity if the Engineer of Record is no longer employed/retained or for any reason cannot complete necessary construction administration activities. Construction may resume when a new Engineer of Record is employed, the State Engineer has been notified of the new Engineer of Record, and both Engineers have discussed the project.~~

~~(4c) A provision stating that the Engineer of Record shall observe/is responsible for the construction of the Dam. It is the engineer of record's responsibility to make consistent with approved design and construction documents. This provision should describe periodic inspections to evaluate whether the construction is proceeding in accordance with the approved plans and specifications. and describe how the Engineer of Record shall endeavor/will take actions to prevent defects and deficiencies in the construction of the Dam and appurtenant structures, and shall disapprove or reject/require work identified that fails to conform to the approved plans and specifications be corrected.~~

~~(5d) The A provision stating that the Engineer of Record shall confirm Foundation design assumptions once surface materials have been stripped and the Cutoff Trench excavated. Changes in actual Foundation conditions from assumptions made in the initial site evaluation shall be communicated to the Department/State Engineer.~~

~~(62) A provision in which the Engineer of Record shall maintain a record of construction that shall include:~~

~~(a) Logs of construction inspections whenever such inspections are made by the Engineer of Record or the Engineer of Record's employee;~~

~~(b) All test results pertaining to construction;~~

~~(c) Photographs; and~~

~~(d) Construction problems and remedies.~~

~~(73) The A provision stating that the Engineer of Record shall complete and stamp As-built Drawings and a final construction report, including statements that the observations are either consistent or inconsistent with the design drawings and specifications. If key elements of construction were not observed, the construction report shall detail those specific elements that were not observed.~~

Statutory/Other Authority: ~~ORS 540.350-36.027, ORS 540.40088~~

Statutes/Other Implemented: ~~ORS 183, 536, 540540.449, ORS 540.488~~

ADOPT: 690-020-0068

RULE SUMMARY: This is an existing rule with changes for clarity. Describes minimum elements needed in Operations and Maintenance manuals submitted with design information, to allow Department review and approval.

CHANGES TO RULE:

690-020-0068

Plan Requirements for New Dams or to Increase Dam Height: Operations and Maintenance Plan

(1) The Engineer of Record shall include an operations and maintenance plan with the submittals for construction of:

(a) Any Dam rated Significant or High Hazard; and

(b) Any Low Hazard Dam with:

(i) A Gate or flashboard as part of the Spillway; or

(ii) A Valve on a Conduit that is not on the upstream side of the Dam.

(2) The Department may review implementation of the operations and maintenance plan during Dam safety inspections.

(3) Operations and maintenance plans shall include, but are not limited to:

(a) Directions for filling and emptying the reservoir when needed;

(b) Frequency of inspection of the interior of Conduits, including qualifications and guidance for Persons conducting and reporting on this inspection;

(c) Procedures for operation of all Gates and Valves;

(d) Specified minimum frequency for cycling and lubrication of all Gates and Valves;

(e) Standards for removal of trees and brush, and mowing other vegetation; including the frequency for the Dam owner to monitor vegetation and to take action to control brush if it obscures any face of the Dam, the Conduit or the Spillway;

(f) Frequency of routine Dam observations, including identification of changes in seepage and maximum permissible Dam deformations;

(g) A Water release plan in the event of a flood forecast when reservoir is above a certain level;

(h) The measurement frequency for all monitoring instrumentation installed at the Dam; and

(i) Review and evaluation of conditions of the Dam as necessary to keep the Dam in good repair and properly maintained, including actions identified in [OAR 690-0250].

Statutory/Other Authority: ORS 536.027, ORS 540.488

Statutes/Other Implemented: ORS 540.449, ORS 540.488

AMEND: 690-020-0070

RULE SUMMARY: This is an existing rule with changes for clarity. Describes all elements needed in engineers submittals of documents needed for new Dam construction or modification to increase Dam height, to allow Department review and approval.

CHANGES TO RULE:

690-020-0070

New Dams or to Increase Dam Height: Submittals and Notifications by the Engineer of Record ¶

- (1) ~~When necessary, t~~The eEngineer of rRecord must include an inundation analysis that complies with OAR 690-020-0120 prior to submitting the design report, plans and specifications and other documents, so that the Department can determine the hHazard rRating of the dDam.¶
- (2) All final designs, drawings and specifications submitted to the State Engineer for approval must be prepared and stamped by a ~~professional engineer licensed to practice in the State of Oregon~~ Engineer. The first page of the drawings, the specifications, and the construction administration plan must be stamped by the eEngineer of rRecord. All submitted materials must be addressed directly to the State Engineer and labeled as a dDam safety submission.¶
- (3) Final drawings shall be submitted on full size paper. The design reports and specifications must be submitted as packaged 8.5 x 11 inch bound documents, with ~~essential~~ maps folded within.¶
- (4) For High Hazard rated Dams, the final Emergency Action Plan and any additional inundation analysis required for the EAP as described in OAR 690-020-0400 must be submitted by the Engineer of Record prior to commencing construction.¶
- (45) A schedule of construction ~~wi~~shall be provided to the State Engineer prior to initiating construction of any sSignificant or hHigh hHazard dDam.¶
- (56) ~~Prior to completion of the cutoff trench and all stripping of foundation and embankments the e~~The Engineer of rRecord shall notify the State Engineer to allow for State Engineer inspection of the excavation Department inspection of the excavation prior to completion of the Cutoff Trench and all stripping of Foundation and Embankments. The required notice to the State Engineer is as follows:¶
 - (a) 48-hours for a lLow hHazard dDam;¶
 - (b) 120-hours for a sSignificant hHazard dDam; and¶
 - (c) ~~for high hazard dams~~, 240-hours or the time specified in the approval, whichever is longer for High Hazard Dams.¶
- (67) Any changes made to the designed location, hHeight or width of the dDam, or to materials used in dDam construction shall be reported in writing immediately to the State Engineer.¶
- (78) ~~If a~~Any slope instability is observed during construction in the eEmbankment or adjacent to the dDam or into reservoir, it shall immediately be reported to the State Engineer by phone.¶
- (89) ~~If for any reason t~~The eEngineer of record ~~ceases construction administration work, the engineer of r~~Record must immediately notify the State Engineer ~~of the situation, by phone and in writing.~~¶
- (9) ~~For high hazard rated dams, the final emergency action plan and any additional inundation analysis required for the EAP as described in OAR 690-020-0400 must be submitted by the e~~ they are no longer the Engineer of rRecord prior to or concurrent with submission of the as-built drawings and the project completion report. The notification shall be by phone and in writing.¶
- (10) The eEngineer of rRecord must submit ~~as-built drawings and a~~ project completion report upon completion of the Dam. A project completion report must include the following:¶
 - (a) ~~As-built dDrawings, i~~ As-built dDrawings shall be submitted in the form of electronic copies of all applicable drawings;¶
 - (b) ~~A completion report stating either~~ on the same sheet as the initial design drawings;¶
 - (b) Sufficient information to document that the dDam has been built according to the drawings with changes to improve safety as documented in the aAs-built dDrawings, or that essencritical safety functions are unknown;¶

- (c) A list of the days the eEngineer of rRecord was on site, the number and location of material tests, and observations of all changed conditions;¶
- (d) ~~Test~~Material testing results (compaction, strength, permeability) ~~must be summarized in the completion report;~~¶
- ~~(e) The completion report must document the o;~~¶
- (e) Observations and decisions made and communicated to the contractor or dDam owner;:¶
- (f) Photographs of key stages of construction, including but not limited to photographs of the eCutoff tTrench, borrow pit development, trenching and placement of the eConduit, the sSpillway before and after placement of concrete; and¶
- (fg) ~~The project completion report shall be stamped by~~signed professional stamp of the eEngineer of rRecord.
 Statutory/Other Authority: ORS 540.350-36.027, ORS 540.40088
 Statutes/Other Implemented: ORS 183, 536, 540540.488, ORS 540.449

AMEND: 690-020-0080

RULE SUMMARY: Describes process for determination of design requirements for construction other than for new dams or to increase Dam height.

CHANGES TO RULE:

690-020-0080

New Dams, or to Increase Dam Height, Written Approval by State Engineer.

- (1) ~~Prior to commencing construction activity, all design reports, drawings of the dam and critical appurtenant structures, specifications, and plans for construction administration must be approved by~~ No person shall Construct a Dam unless the State Engineer has indicated by the State Engineer's stamp and a written letter of approval from the State Engineer.
- (2) ~~The State Engineer's approval of design plans and specifications shall be valid only for five years. Upon request, written requests for time extensions may be granted in writing reviewed all necessary reports, drawings, plans and other information as submitted by the State Engineer.~~
- (3) ~~The following activities which involve the construction or operation of an existing permitted dam that may impair the safety of the dam require State Engineer approval of engineered designs:~~
- (a) ~~Any changes that affect storage capacity of the dam or increase dam height above that in the approved drawings for the dam, including all dam rises other than adding fill to restore crest height lost to settlement or erosion;~~
- (b) ~~Any changes to or near the spillway that may affect spillway capacity or ability to pass flows safely;~~
- (c) ~~Installation of any valve or gate on the downstream side of the dam; of Record and has approved those documents as indicated in written communication with the Engineer of Record.~~
- (d2) ~~Removing and replacing or otherwise excavating into or near the dam to place or replace any conduit or utility in the dam;~~
- (e) ~~Replacement of the conduit control structure;~~
- (f) ~~Installation of any valve on the downstream side of the low level conduit; Prior to commencing construction activity, or directly connecting irrigation pipe to the low level conduit;~~
- (g) ~~Repair of damage which has already significantly weakened the dam;~~
- (h) ~~Any activity where at least 30 percent of fill material in the dam is impacted by that activity; and~~
- (i) ~~Any other change to the dam that affects its safety as determined by the State Engineer.~~
- (4) ~~Prior written approval will not be required for replacement or lining of toe drains, relining of conduits of low hazard dams, and for specific actions required in a safety emergency. As-built drawings may be sent to the State Engineer after completion of such projects to show these projects have been completed in a safe manner~~ the Engineer of Record shall verify that all necessary documents related to the final design are approved as indicated by the State Engineer's stamp on those documents.
- (53) ~~For pre-existing dams without a valid storage permit, t~~ The State Engineer may's approval of design plans and specifications so that a permit may be issued only if the engineer of record provides the following:
- (a) ~~Drawings of the dam as it exists during the engineer's evaluation and survey of the dam. These drawings should include all the critical features as described in OAR 690-020-0035, except for those elements that cannot be evaluated such as the cutoff trench;~~
- (b) ~~Evaluation of any embankment distress, including erosion, seepage or leakage;~~
- (c) ~~Condition and function of the conduit and its controls, capacity and stability of the spillway;~~
- (d) ~~Any other safety information needed as determined by the State Engineer;~~
- (e) ~~Designs as needed to bring the dam up to the current standards based on the hazard classification of that dam; hall be valid only for five years from the date of approval. Upon request, written requests for time extensions may be granted in writing by the State Engineer.~~
- (f4) ~~As improved drawings of the dam showing that all necessary modifications have been made with a report from the engineer describing the necessary work that was completed; and~~

~~(g) The source of all information used to develop the as-improved drawings must be documented in a report submitted by the engineer. This includes but is not limited to the engineer's measurements, engineer's observations, a photographic record, and testimony of individuals.~~

~~(6) No newly constructed dam~~No newly constructed Dam or Dam that has had Height modified may store ~~w~~Water until final written approval of necessary plans, specifications or other information is received from the Department.

~~(a) Final approval may be obtained only after construction has been completed and as-built drawings and acceptance of a satisfactory project completion report have been submitted to and approved by the State Engineer~~Department.

~~(b5) The State Engineer~~Department shall notify the ~~e~~Engineer of r~~Record and d~~Dam owner in writing when ~~the final documents~~project completion report have been ~~approved~~received and accepted by the Department.

Statutory/Other Authority: ~~ORS 540.350-36.027, ORS 540.40088~~

Statutes/Other Implemented: ~~ORS 183, 536, 540~~540.488, ORS 540.449

AMEND: 690-020-0100

RULE SUMMARY: This is an existing rule with minor changes to existing rule language. Provides minimal technical criteria for establishing Dam hazard ratings. Provides general information on setting and revising Dam hazard ratings.

CHANGES TO RULE:

690-020-0100

Hazard Rating of Dams ¶

- (1) ~~Dams~~The Department shall be assigned to assign all Dams a Hazard Rating of High, Significant, or Low. ¶
- (2) ~~The Department shall utilize dam breach inundation analysis as a primary factor to determine the hazard rating of dams as described in OAR 690-020-0120.~~A High Hazard rating will be based on OAR 690-020-0120. ¶
- (3) ~~Using the dam breach inundation analysis as described in OAR 690-020-0120, the Department shall make the final determination of any hazard rating using the following criteria:~~ ¶
- (a) ~~An inundation depth of flowing water of at least two feet over the finished floors of dwellings, other frequently occupied buildings, or road surfaces where a vehicle is likely to be present establishes a "high hazard" rating.~~ ¶
- (b) ~~Any inundation depth of water over the floorboards of structural buildings in its determination of inundation depth establishes a "significant hazard" rating.~~The Department may also consider Water over the floorboards of structural buildings in its determination of inundation depth establishes a "significant hazard" rating. ¶
- (c) ~~For other roads and vulnerable utilities, an inundation depth of two feet or evidence of depth and velocity capable of creating damage establishes a "significant hazard" rating.~~ ¶
- (d) ~~Wherever heavy recreational or other frequent use occurs downstream a "high hazard" rating shall be established to prevent probable loss of life. Such designation shall not depend on an incremental increase of depth of flowing water of 1 foot where recreational or other frequent use occurs downstream to prevent probable loss of life. The Department will also use Water velocity in its determination of inundation depth establishing a High Hazard Rating.~~An incremental increase of depth of flowing Water of 1 foot where recreational or other frequent use occurs downstream to prevent probable loss of life. The Department will also use Water velocity in its determination of inundation depth establishing a High Hazard Rating. ¶
- (3) ~~A Significant Hazard Rating will be based on the Dam breach inundation analysis as described in the presence of downstream OAR 690-020-0120, using depth and velocity of the flowing Water at affected structures, public infrastructure.~~ ¶
- (e) ~~For water depths close to those listed in the subsections (a) and (c), the Department may also consider water velocity in its determination of hazard rating, and other properties which shows likely damage to property and infrastructure but no loss of life.~~ ¶
- (4) ~~Any Dam that is not rated as High or Significant by the Department will be rated as Low Hazard.~~ ¶
- (4) ~~The Hazard Rating of a Dam shall remain in effect until the rating is revised by the Department using the procedures described in OAR 690-020-0120. A dam owner may request the Department may conduct Hazard Rating reviews and Dam Breach Inundation Analyses as evidence indicates that the Department revise a hazard impacts to people, property, or infrastructure may have changed since the Hazard Rating was first set. The Dam owner must provide information in support of the request and prepared by an engineer licensed in Oregon and familiar with hydraulic and hydrologic calculations will be notified of the change and have an opportunity to meet with the Department.~~ ¶
- (6) ~~A Dam owner may request that the Department consider revision of a Hazard Rating. The owner may have an Engineer prepare and submit a Dam breach inundation analysis, in support of this request.~~A Dam owner may request that the Department consider revision of a Hazard Rating. The owner may have an Engineer prepare and submit a Dam breach inundation analysis, in support of this request.

Statutory/Other Authority: ORS 183,540536.027, ORS 540.488

Statutes/Other Implemented: ORS 183 & 536, 540540.443, ORS 540.488

AMEND: 690-020-0120

RULE SUMMARY: This is an existing rule with minor changes to existing rule language. Provides general information on Dam Breach Inundation Analysis. Provides minimum submittal requirements for Dam Breach Inundation Analysis.

CHANGES TO RULE:

690-020-0120

Dam Breach Inundation Analysis

(1) A dam breach inundation analysis must be submitted with the design for any new dam, except only for dams in a remote location far enough from buildings, high use recreation sites or high use public roads so that damage or fatalities from a dam breach would be very unlikely as determined by the State Engineer.

(2) A dam breach inundation analysis is required to change the hazard rating of an existing dam.

(3) The dam breach inundation analysis must use a breach time based on dam materials and thickness and other factors. A simplified and conservative hydraulic model may be used for that would influence the time it would take for the dam to breach from internal erosion, overtopping, or displacement.

(4) ~~Any simplified and conservative hydraulic model may be used~~ Dam breach inundation analysis to show that a Dam should be rated Low Hazard. The State Engineer may determine if the model was used appropriately and conservatively.

(5) ~~An~~ Accepted and hydraulically consistent computational models must be used to conduct the inundation analysis for ~~s~~Significant and ~~h~~High ~~h~~Hazard ~~d~~Dams, ~~as these will be used in the event of an emergency at the dam.~~ Models developed by the US Army Corps of Engineers including HEC-RAS are the preferred methods of analysis.

(3) A report summarizing the model information and results must be stamped and submitted to the Department by the Engineer of Record. The summary report shall contain sufficient information to reproduce the models that use hydrodynamic equations checked for minimum tolerances such as FLO-2D are also acceptable for conducting dam breach inundation analysis. Information and shall include at a minimum the following information:

(a) The specific proprietary model name or method used for the analysis;

(b) Details regarding the model geometry;

(c) The specific mode of failure and any assumptions made in the specific model used for analysis, deletion of the mode of failure;

(d) A list of Dam breach parameters and justification, and all assumptions made for the analysis must be included in the documentation for the inundation analysis. any assumptions made in the selection of the breach parameters. The breach parameters must be based on Dam material and thickness and any other factors that would influence the time it would take for the Dam to breach from internal erosion, overtopping, or displacement;

(6e) Inundation analysis for hazard rating of a list of all boundary and initial conditions and any assumptions in the selection of these conditions. For High and sSignificant hHazard dDams, the analysis must be conducted with the reservoir at full pool and inflow equal to the 0.2-percent-a Annual eExceedance pProbability fFlood flow. The analysis must show on a map areas inundated;

(f) A map indicating the inundation boundary, areas inundated by a depth greater than 2 feet, and all frequently occupied structures;

(7) ~~The that fo~~ all the following additional information shall also bthin or are immediately adjacent to the inundation boundary;

(g) The required for newly constructed or modified high hazard rated dams;

(a) A sunny day and a PMF inflow analysis as part of the emergency action plan;

(b) The inundation mapping must include cross sections with depth and times to flood wave arrival, and must be extended downstream to a location where no significant property damage existach flow as calculated by the model immediately downstream of the Dam. If an empirical formula was used as the basis for determining breach flow, the formula and all inputs must be clearly stated; and

(h) A sensitivity analysis evaluating the variability in model inputs may be required when the Dam breach

inundation analysis results indicate the Hazard Rating is on the border between two ratings.

Statutory/Other Authority: ORS 540.350-36.027, ORS 540.40088

Statutes/Other Implemented: ORS 183, 536, 540540.443, ORS 540.488

ADOPT: 690-020-0140

RULE SUMMARY: Major changes to an existing rule. Provides the process the Water Resources Department will use to determine approval requirements for construction of dams that modify existing dams but do not increase the height of those dams.

CHANGES TO RULE:

690-020-0140

Modification of Dams

(1) No person shall Modify a Dam unless the State Engineer has reviewed all required documents as described in the following sections and has approved those documents as indicated in written communication with the Engineer of Record or Dam owner. ¶

(2) The following Dam modifications require State Engineer approval of plans: ¶

(a) Any changes to or near the Spillway that may affect Spillway capacity or ability to pass flows safely; ¶

(b) Placing, replacing, or relining any Conduit or utility in the Dam; ¶

(c) Replacement of the Conduit control structure; ¶

(d) Installation of any Valve on the downstream side of the low level Conduit, or directly connecting a pipe to the low level Conduit; ¶

(e) Repair of damage that may have a potential impact on the safe functioning of the Dam; ¶

(f) Any activity where 10 percent or more of the fill material in the Dam is disturbed; or ¶

(g) Any other change to the Dam that results in a deviation from the original design and that affects the safe functioning of the Dam ¶

(3) Dam Modification plans shall include all details of the area of the Dam being modified. Specific modification plan requirements include, but are not limited to: ¶

(a) For major Spillway repairs, plans need to address passage of the required Inflow Design Flood based on the Hazard Rating of the Dam, with the same criteria as required for new Dams in OAR (690-020 0037); ¶

(b) For repairs of slope movement, plans require slope stability analysis and appropriate corrective measures; ¶

(c) For replacement of Conduits or installation of a Valve on the downstream side of a Dam, plans require an analysis of internal erosion potential; ¶

(d) For internal erosion, plans must address construction of a filter zone; and ¶

(e) Items required by the State Engineer pursuant to subsection 4. ¶

(4) The Dam owner shall provide sufficient notice to the Department to allow for adequate time for discussion of the proposed Modifications and the necessary design requirements. ¶

(5) The State Engineer will determine the design and submittal requirements. Submittal requirements and Department reviews may be expedited in the event of emergency or unanticipated weather-related situations. ¶

(6) Water is not to be stored in the reservoir during modification. The Engineer of Record may propose maintaining some Water in storage during Dam Modification or modifying Dam Height if it is demonstrated that it can be done in a manner that protects life, property, and infrastructure. The Department will review submitted materials for the proposed construction actions. The Department may consider the scope of the project, including how the proposed construction actions will maintain safe Water levels through the duration of construction.

Statutory/Other Authority: ORS 536.027, ORS 540.488

Statutes/Other Implemented: ORS 540.488, ORS 540.443, ORS 540.449

ADOPT: 690-020-0160

RULE SUMMARY: Describes requirements for owner submittals and department reviews of plans to remove certain dams, including necessary documentation, supervision and inspection.

CHANGES TO RULE:

690-020-0160

Removal

(1) Dam owner(s) seeking to remove or partially remove any Dam that has a High or Significant Hazard Rating must notify the Department. ¶

(2) Dam owner(s) shall provide the Department with a removal plan for evaluation prior to removing the Dam. Plans must be submitted a minimum of 60 days in advance of removal to allow reasonable time to evaluate the removal plan, unless the Department agrees to a different timeframe. ¶

(3) A removal plan must include: ¶

(a) Descriptions and assumptions for the removal or partial removal of the Dam: ¶

(b) A description of the means for removing the Dam to prevent future impoundment and a method of draining the reservoir in a controlled manner prior to the start of the removal: ¶

(c) A schedule listing the major events and corresponding time frame that will occur during the removal: ¶

(d) A plan for disposal and stabilization of Dam material; and ¶

(e) In the case of a partial removal, a drawing showing the planned removal location, breach dimensions including side slopes, and lowest elevation of the breach. For any partial removal, the removal plan must show that there will sufficient material removed and left at slopes that will allow no breach flood by erosion of remaining materials. ¶

(4) The Department may evaluate the removal plan to ensure that the plan includes appropriate safety precautions to protect life, property, and public infrastructure from temporary inundation in the area below the Dam during Dam removal. ¶

(5) The Department may require Modification of the removal plan or require that the work performed under the plan be supervised by an Engineer. If the Department requires Modification of the removal plan or requires that work be supervised by an Engineer, the Department shall notify the Dam owner and provide an opportunity to meet with the Department. ¶

(6) Upon completion of the Dam removal, the owner shall notify the Department. The Department shall make a final inspection, if appropriate, and remove it from Department Dam safety oversight.

Statutory/Other Authority: ORS 536.027, ORS 540.488

Statutes/Other Implemented: ORS 540.452, ORS 540.488

ADOPT: 690-020-0180

RULE SUMMARY: Requires Dam owner to provide contact information to the Department.

CHANGES TO RULE:

690-020-0180

Requirement of Owners to Provide Contact and Transfer of Title Information

(1) If an Emergency Action Plan exists, a Dam owner shall provide the Department with contact information in the Emergency Action Plan consistent with OAR 690-020-0400, and notify the Department of any changes in contact information, including transfer of title for the Dam.

(2) If no Emergency Action Plan exists, a Dam owner shall:

(a) Provide the Department with contact information in writing for the Dam owner, the individual in immediate charge or the Dam, and the operator of the Dam, if other than the owner; and

(b) Notify the Department of any changes in contact information, including transfer of title for the Dam.

Statutory/Other Authority: ORS 536.027, ORS 540.488

Statutes/Other Implemented: ORS 540.479, ORS 540.488

ADOPT: 690-020-0210

RULE SUMMARY: Carries forward elements of prior rules and makes updates. Identifies elements and actions for typical proper maintenance of dams.

CHANGES TO RULE:

690-020-0210

Maintenance of Dams

(1) The Dam owner shall review and evaluate conditions of the Dam as necessary to keep the Dam in good repair and properly maintained, and address any detected conditions that may pose a risk of Dam Failure. ¶

(2) Proper maintenance includes but is not limited to: ¶

(a) Removal of brush and trees from the Dam; ¶

(b) Control of burrowing animals, especially nutria near the Dam or reservoir, including filling deep burrows; ¶

(c) Restoration of areas of surface or wave erosion, and taking measures to prevent future erosion; ¶

(d) Adding or moving fill to restore Crest Height and width; ¶

(e) Clearance of soil, rock, vegetation and debris from the Spillway; ¶

(f) Proper cycling and lubrication of Valves and Gates at least once a year, unless otherwise specified in a maintenance and operations plan approved by the Department; ¶

(g) Patching, sealing, or replacing areas of cracked concrete on the Dam; ¶

(h) Removal of debris, rock, or earth from the inlet and outlet of penetrating Conduits and drains; ¶

(i) Repair or replacement of worn or damaged parts of Gates or Valves; ¶

(j) Ensuring access to the Dam is sufficient for inspection, repair and emergency actions, and that unauthorized access is controlled; ¶

(k) Securing operating equipment such as Valve controls and Spillway controls; ¶

(l) Evaluation of the Conduit and taking necessary actions to ensure the Conduit is not compromised, including patching pipes with minor corrosion; and ¶

(m) Addressing other conditions that might affect the safety of the Dam. ¶

(3) Maintain records as needed to track conditions on the dam

Statutory/Other Authority: ORS 536.027, ORS 540.488

Statutes/Other Implemented: ORS 540.479, ORS 540.488, ORS 540.455

ADOPT: 690-020-0260

RULE SUMMARY: Describes Departments Dam inspection process, and requirement to provide an inspection document to the Dam owner.

CHANGES TO RULE:

690-020-0260

Inspection of Dams

(1) The Department or representatives of the Department, may inspect a Dam and the site, plans and specifications, features and other supporting information regarding the construction, maintenance and operation of a Dam. ¶

(2) The Department will maintain a Dam inspection schedule based on the Hazard Rating of the Dam: ¶

(a) High Hazard Dams are scheduled for inspection annually, ¶

(b) Significant Hazard Dams are scheduled for inspection every 3 years, and ¶

(c) Low Hazard Dams are scheduled for inspection every 6 years. ¶

(3) Notwithstanding subsection (2), the Department may determine that a different inspection schedule is appropriate. The Department may consider staff resources and Dam risks or condition in determining that a different inspection schedule is appropriate. ¶

(4) The Department shall provide the Dam owner with an inspection document describing the general condition of the Dam and specific maintenance recommended or Maintenance Actions required by the Department.

Statutory/Other Authority: ORS 536.027, ORS 540.488

Statutes/Other Implemented: ORS 540.479, ORS 540.455, ORS 540.467

ADOPT: 690-020-0310

RULE SUMMARY: Describes process for identification, communication and evaluation of Dam maintenance actions required by the Department, including possible imposition of civil penalties.

CHANGES TO RULE:

690-020-0310

Maintenance Actions

(1) Upon inspection of a dam, the Department will determine the need for maintenance action to address conditions observed during an inspection and shall provide this information to the Dam owner in the inspection summary for low hazard dams. The Department shall use the process that follows for maintenance action on dams that are rated Significant or High Hazard. ¶

(2) Upon inspection of a Dam that is rated as High or Significant Hazard, the Department shall provide specific written notice to the Dam owner describing the observed condition of the Dam and shall inform the Dam owner of necessary maintenance actions needed to correct maintenance deficiencies. ¶

(a) The notification shall provide the Dam owner with the opportunity to meet with the Department concerning the information provided in the inspection notification. Upon request of the Dam owner, the Department may provide more specific information regarding the inspection and the maintenance needs of the Dam. In addition, the Department and the Dam owner may enter into a Stipulated Correction Plan that provides dates certain by which necessary maintenance actions are performed. ¶

(b) The Department may evaluate whether maintenance was successfully completed during the next scheduled inspection of the Dam or the Department may expedite the Dam inspection schedule for the next inspection to determine whether recommended conditions have been completed. ¶

(c) If upon inspection of the Dam the Department determines that the Dam owner has failed to take the necessary maintenance actions as identified in the inspection notification or a Stipulated Correction Plan, the Department may proceed to issue a proposed final order as provided in OAR 690-020-0460. A proposed final order may include provisions including, but not limited to provisions: ¶

(i) Requiring performance of the necessary maintenance requirements identified in the inspection notification by a date certain as specified by the Department; ¶

(ii) An assessment of civil penalties consistent with OAR 690-020-0600. ¶

(d) At any time subsequent to receipt of a proposed final order, the Dam owner may enter into a Stipulated Corrective Plan to resolve the matters asserted in the proposed final order as provided in ORS 183.417. If the Dam owner performs needed maintenance actions to the satisfaction of the Department and consistent with the Stipulated Corrective Plan, the Director may not assess or pursue civil penalties for the matters identified in the Stipulated Corrective Plan.

Statutory/Other Authority: ORS 536.027, ORS 540.488

Statutes/Other Implemented: ORS 540.467

ADOPT: 690-020-0340

RULE SUMMARY: Specifies process for determination of potentially unsafe and unsafe conditions at a Dam. Requires specific process for Department to issue proposed and final orders if the cooperative plan is not followed, or the Dam becomes unsafe.

CHANGES TO RULE:

690-020-0340

Potentially Unsafe or Unsafe Conditions

(1) The Department shall determine whether a High or Significant rated Dam is potentially unsafe or unsafe after inspection or analysis of the Dam. Potentially unsafe or unsafe conditions must be addressed by any lawful remedy available to the Department including issuance of a proposed final order as specified in this rule. ¶

(2) Potentially Unsafe conditions include, but are not limited to:¶

(a) Embankment materials highly vulnerable to internal erosion; ¶

(b) Highly variable and increasing rates of seepage; ¶

(c) Seismic analysis determines significant Crest loss with little Freeboard remaining;¶

(d) For Dams in high seismic zones, a layer of liquefiable material in the Dam or its Foundation; ¶

(e) Evidence of prior large rapidly moving landslides identified above the Dam; ¶

(f) Spillways are unable to pass the Inflow Design Flood as stated in 690-20-0037 or Probable Maximum Flood; or¶

(g) Issues on the Spillway invert that could lead to rapid loss of Spillway integrity. ¶

(3) Unsafe conditions include, but are not limited to: ¶

(a) Any reduction in Spillway capacity; ¶

(b) Movement of the Dam over a short period of time; ¶

(c) Major loss of Freeboard; ¶

(d) Wave erosion narrowing Dam Crest;¶

(e) Internal erosion with limited movement of Embankment material; ¶

(f) Seepage level rising on the downstream face of the Dam; ¶

(g) Landslide or other deformation on the Dam; ¶

(h) Rapid erosion of the Spillway; ¶

(i) Significant loss of mass of a concrete Dam; ¶

(j) Concrete Spillway with large voids or openings through the slab; ¶

(k) Conduit deteriorated to where Conduit collapse is reasonably possible; ¶

(l) A Pressurized Conduit with holes in the pipe; ¶

(m) Flashboards in place during high runoff season; ¶

(n) Animal burrows penetrating deep into the Dam; ¶

(o) Large trees growing near the Crest of the Dam; or ¶

(p) Any new Dam construction or construction of a Dam to increase Height in violation of requirements for examination and written approval of site plans, specification, and other supporting information for that Dam.¶

(4) Notification of Potentially Unsafe or Unsafe Conditions. If as a result of an inspection or analysis of a Dam that has a High or Significant Hazard rating the Department concludes that corrective action is necessary to address a condition rendering the Dam Unsafe or Potentially Unsafe, the Department shall provide written notification to the Dam owner by registered or certified mail, return receipt requested, sent to the address of record on file with the Department, as per OAR 690-020-0180, for the Dam owner. ¶

(a) The written notification shall include at least the following:¶

(i) An explanation of why the inspection or analysis of information and conditions causes the Department to conclude that the Dam is unsafe or potentially unsafe;¶

(ii) Any action the Department concludes is necessary to address the unsafe or potentially unsafe conditions;¶

(iii) Notification to the Dam owner of the opportunity to meet with the Department to discuss the notification; and¶

(iv) Notification to the Dam owner of the opportunity to explain why the Dam owner disagrees with the matters asserted in the notification. ¶

(b) Following issuance of a notification, the Department may endeavor to resolve the unsafe or potentially unsafe conditions identified in cooperation with the Dam owner. The Department and owner may enter into a consent order to address the corrective action, but only as such cooperation and agreement results in timely resolution of the unsafe or potentially unsafe conditions. In developing a consent order, the Department may consider any relevant information, including but not limited to:¶

(i) The design and construction of the specific Dam;¶

(ii) The efforts and resources of the Dam owner; and¶

(iii) The impacts associated with Dam failure.¶

(5) The Department may issue a Proposed Final Order in the event the Department and the Dam owner do not enter into a Stipulated Corrective Action agreement to address corrective actions, if the Dam owner fails to complete necessary actions as provided in the consent order, or in the event the Dam owner does not otherwise address the matters identified in the notification to the Departments satisfaction. ¶

(a) The proposed final order shall include the specific information and conditions that have caused the Department to conclude that a Dam is unsafe or potentially unsafe, shall be consistent with ORS 183.415, and shall provide notice of the opportunity for a contested case hearing pursuant to ORS 183.¶

(b) The proposed final order may include, but need not be limited to any or all of the following provisions:¶

(i) Notifying the Dam owner what information and conditions caused the Department to determine that the Dam is unsafe or potentially unsafe and the actions the Department concludes are necessary to address the unsafe or potentially unsafe conditions.¶

(ii) A requirement that the Dam owner consult with an engineer to assess the nature and extent of the unsafe or potentially unsafe conditions identified by the Department and to identify corrective actions to address the unsafe or potentially unsafe conditions.¶

(iii) Commencement and completion dates for any corrective action the Department determines is necessary to remedy the unsafe or potentially unsafe conditions.¶

(iv) Restrictions on the maximum Water level in the reservoir until corrective action has been completed to the satisfaction of the Department.¶

(v) Provisions directing that the Dam may not be used for the impoundment, restraint or conveyance of Water until corrective actions have been completed to the satisfaction of the Department.¶

(vi) Requirement to install and maintain monitoring equipment if the Department concludes that monitoring is necessary to protect life, property or public infrastructure. The provisions requiring the installation and use of monitoring equipment at a Dam to monitor the unsafe or potentially unsafe conditions shall include the ability to use the most economical monitoring equipment which is sufficient to protect life, property and public infrastructure as determined by the Department.¶

(6) Upon issuance of a proposed final order, the Dam owner and Department may enter into a Consent order to resolve the matters in the proposed final order as provided in ORS 183.417. Any such document must include conditions to address the matters in the proposed final order as determined by the Department.¶

(7) If following issuance of a proposed final order the Department receives a request for hearing from the Dam owner, the Director may request that the scheduling of any contested case hearing be expedited, and the Office of Administrative hearings shall expedite the contested case hearing to the extent that the office considers it practicable and will give the Dam owner reasonable time to prepare.¶

(a) In determining the expedited timeline practicable, the Office of Administrative Hearings shall consider, based on information provided by the Department, any conditions that may affect the urgency of the proceedings or the likelihood that unsafe or potentially unsafe conditions may pose near-term threat to life, property or public infrastructure.¶

(b) The reasonable time to prepare for a contested case hearing shall be based on the likelihood that unsafe or potentially unsafe conditions may pose a near-term risk to life, property, or public infrastructure.¶

(8) Issuance of a proposed final order does not preclude the Department from pursuing any and all lawful

remedies as the Department may determine are necessary to protect life, property or public infrastructure including but not limited seeking injunctive relief in the circuit court.¶

(9) In addition to any other available lawful remedies, if a proposed final order issued under this section becomes final by operation of law or on appeal, and the Dam owner fails to comply with the order as specified in the order, the Department may request the Attorney General or the district attorney of any county where all or part of the Dam is located to bring an action declaring the Dam a public nuisance and ordering its removal at the owner's expense.

Statutory/Other Authority: ORS 536.027, ORS 540.488

Statutes/Other Implemented: ORS 540.458, ORS 540.461

AMEND: 690-020-0400

RULE SUMMARY: Provides information for planning and response to incidents at Dam rated as High Hazard. Provides criteria for elements included in Emergency Action Plans, for updates and for exercises of plans.

CHANGES TO RULE:

690-020-0400

Emergency Action Plans (EAP) and Emergencies ¶

~~(1) Draft Emergency Action Plans are required prior to completion of new dam construction or modification as described in OAR 690-020-0300(1), and~~ All High Hazard Dams shall have an Emergency Action Plan (EAP). The EAP is to assist the Dam owner and local emergency management personnel to ensure human safety in the event of a potential or actual Dam Failure. The final EAP, for new Dams or where Dam height is modified, must be reviewed and approved by the State Engineer.¶

~~(2) A Draft EAP is required prior to completion of new Dam construction. ¶~~

~~(3) A final EAP's must be submitted prior to filling the a new reservoir. The final emergency action plan EAP must be reviewed and approved by the State Engineer. EAPs for dams constructed after March 2015 must be updated at least once every two years, including but not limited to ensuring all notificatio¶~~

~~(4) Owners of Dams which have been reclassified to a High Hazard Rating will be required to develop and submit an EAP within contacts are current.¶¶~~

~~(2) Dam owners are encouraged to complete emergency action plans for their existing high hazard damse year of being notified of the reclassification by the Department.¶~~

~~(35) An EAP shall contain, as a minimum, the following key elements:¶~~

~~(a) EMeans for emergency condition detection;¶~~

~~(b) EMeans for emergency level determination;¶~~

~~(c) NIdentification of, and information necessary for, notification and communication lists applicable to each of the to be made at each level of emergency levels;¶¶~~

~~(d) Expected condition;¶~~

~~(d) Description of actions to prevent a dDam fFailure incident or to help reduce the effects of a dDam fFailure and facilitate response to an emergency;¶~~

~~(e) Inundation mapping that normally includes both a sunny day and a probable maximum flood failure~~ A map of Dam Failure inundation zones developed using a Dam breach inundation analysis for varying conditions as specified by the Department, including, but not limited to, dry weather conditions and high flood conditions. The Department may require one inundation map if the dry weather and high flood flows are not substantially different. The inundation mapping must include cross sections at locations of concern, and a description of expected depth and velocity of maximum breach flows at each cross section; and¶

~~(f) Procedures for termination of the emergency.¶~~

~~(46) The Dam owners of high or significant hazard dams shall immediately notify the State Engineer of potential or actual dam failure situations. shall file copies of the EAP with the Department, the Office of Emergency Management, and the local emergency services agency for the county where the Dam is located. ¶~~

~~(57) Dam owners shall notify the State Engineer of an~~ The Department will, in consultation with the local Office of Emergency Management: ¶

~~(a) Periodically breach of any dam subject to these regulations.view the EAP and may require updates to the plan that recognize the actual capabilities of the local emergency managers, and ¶~~

~~(6b) If the Department observes evidence of a dam at risk of imminent failure and a risk to life or property, local public safety officials shall be not~~ Determine the appropriate frequency for conducting emergency response exercises.¶

~~(8) In the event of an actual or potential Dam Failure which creates an imminent risk to life, the Dam owner shall immediately implement the actions specified ofin the situation~~ EAP.

Statutory/Other Authority: ~~ORS 540.350-36.027, ORS 540.40088~~

Statutes/Other Implemented: ORS ~~183, 536, 540~~540.482, ORS 540.485

ADOPT: 690-020-0410

RULE SUMMARY: Describes actions for Dam owner to take for Dam rated High or Significant Hazard without an Emergency Action Plan.

CHANGES TO RULE:

690-020-0410

Emergency Actions for Significant Hazard Dams

(1) If an actual or potential Dam Failure creates an imminent risk to life, property, or public infrastructure, and no EAP exists for the Dam, the Dam owner shall immediately: ¶

(a) Notify the local emergency services agency, the Department, and Persons in areas where the potential for Dam Failure creates risk to life, property, or public infrastructure by telephone or other methods that ensure immediate notification, and ¶

(b) Take all practicable actions to prevent Dam Failure.

Statutory/Other Authority: ORS 536.027, ORS 540.488

Statutes/Other Implemented: ORS 540.482, ORS 540.485

ADOPT: 690-020-0420

RULE SUMMARY: Describes Water Resources Department actions in an emergency at a Dam rated High or Significant Hazard.

CHANGES TO RULE:

690-020-0420

Immediate Action to Prevent Dam Failure

(1) If an actual or potential failure creates an imminent risk to life, property or public infrastructure and an Emergency Action Plan exists for that Dam, a Dam owner must immediately implement the actions specific in that plan.

(2) If no emergency plan exists, and an actual or potential failure creates an imminent risk to life, property or public infrastructure, the Dam owner shall immediately notify by telephone or other method that ensures immediate notification:

(a) For Dams rated High or Significant Hazard, the local emergency services agency for the county where the Dam is located;

(b) The Department; and

(c) To the extent practicable, persons in the areas where the potential for Dam failure creates a risk to life, property or public infrastructure.

(3) In addition to providing notification as described in this rule, a Dam owner must also take any and all practicable measures to prevent Dam failure.

(4) If the Department is aware of conditions which indicate that immediate action is needed to prevent a Dam Failure, it may take any immediate action to prevent failure of the Dam. The Department may:

(a) Immediately contact and advise the owner, operator, or individual in charge of the Dam regarding necessary actions to prevent the Dam Failure;

(b) If a Dam has a Significant or High Hazard rating, the Department or its agents or representatives may enter the property without notice or permission of the pertinent landowner to access the Dam and evaluate the condition or risk or to undertake necessary actions. The Department's entry onto property pursuant to this subsection shall be to the extent entry is reasonable or necessary.

(c) If the Department observes that there is a rapidly increasing leakage risk of overtopping at a Dam that has a Significant or High Hazard rating, the Department may perform any or all of the following actions:

(i) Open Gates or Valves and siphon or pump Water to reduce the Water levels in the reservoir;

(ii) Modify approval requirements for emergency construction work;

(iii) Allow Modification of the actions prescribed in an Emergency Action Plan; and

(iv) Pursue any other lawful remedy.

Statutory/Other Authority: ORS 536.027, ORS 540.488

Statutes/Other Implemented: ORS 540.482, ORS 540.485

ADOPT: 690-020-0460

RULE SUMMARY: Implements provisions to notify Dam owners of potential non-compliance with rules. Provides procedures for issuance of proposed final orders, hearings, and final orders.

CHANGES TO RULE:

690-020-0460

Proposed Final Order, Request for Hearing, Contested Case Process

(1) Proposed Final Order, Notice of Assessment of Civil Penalty. A proposed final order or a Notice of Assessment of Civil Penalty must be consistent with the provisions of ORS 183.415, shall include notification of the right to a contested case hearing pursuant to ORS 183, and shall include any applicable or required element otherwise specified in Dam safety rules governing proposed final orders. A proposed final order or a Notice of Assessment of Civil Penalty must be served personally or by registered or certified mail.¶

(2) Request for Hearing. A Dam owner that receives a proposed final order or a Notice of Assessment of Civil Penalty has 20 calendar days from the date of service of the proposed final order in which to file a written request for hearing. The request for hearing must be filed either in person or by mail addressed to the Department's office in Salem, Oregon. The request for hearing may not be considered timely filed unless it is received in the Department consistent with this subsection. The request for hearing must include a written response that admits or denies all factual matters alleged in the notice, and must state with specificity the reasons for disagreement with the proposed final order. ¶

(3) Contested Case Procedure. Contested case hearings resolving requests for hearing to proposed final orders issued by the Department under these rules shall be heard by administrative law judges from the Office of Administrative Hearings. Hearings shall be conducted as provided in ORS 183 and the Attorney General's Uniform and Model Rules of Procedure under the Administrative Procedures Act in OAR 137-003-501 - 0700 except:¶

(a) Only a Dam owner or the Dam owner's authorized representative may request a contested case hearing and be considered a party in any contested case.¶

(b) For expedited contested case hearings regarding proposed final orders addressing unsafe or potentially unsafe conditions, discovery methods as provided in OAR 137-003-0566 shall not be allowed because the availability of other forms of discovery would unduly delay proceedings to address conditions that address a near-term risk of threat to life, property or public infrastructure. Notwithstanding, a party may request public documents pursuant to a request for public records made to the Department as described in OAR Chapter 690 Division 3. ¶

(c) Immediate review under OAR 137-003-0640 is to the Director only.¶

(4) Proposed Order in Contested Case. Following the close of the record for a contested case hearing, the administrative law judge will issue a proposed order and shall serve the proposed order on each participant to the contested case.¶

(5) Exception to Proposed Order. If the recommended action in the proposed order is adverse to any party the party may file written exceptions to the Department within 15 days after a proposed order is served. ¶

(6) Final Order. The Director may consider any exceptions received and shall issue a Final Order as provided in OAR 137-003-0665. An order adverse to a party may be issued upon default as provided in OAR 137-003-0672.¶

(7) The Department and a Dam owner may at any time use informal or alternative means to resolve a contested case hearing. When informal disposition of a contested case is made by stipulation, agreed settlement or consent order, the final order that incorporates the informal disposition is not subject to judicial review.

Statutory/Other Authority: ORS 540.488, ORS 536.027, ORS 183

Statutes/Other Implemented: ORS 540.461, ORS 540.467, ORS 540.488, ORS 540.995, ORS 183, ORS 540.458

ADOPT: 690-020-0600

RULE SUMMARY: This rule provides criteria for issuance of civil penalties as authorized by statute. Civil penalties may be issued for: failing to submit design and operation documents prior to Dam construction; impounding Water prior to final Dam documentation; not providing removal plans for Department review; not completing, updating or exercising an Emergency Action Plan; and not correcting a maintenance deficiency on a Dam. This rule provides a schedule of penalties, occurrence periods; and penalty remittance criteria.

CHANGES TO RULE:

690-020-0600

Civil Penalty Assessment for Dam Safety

(1) The Department may assess civil penalties for the following violations:¶

(a) Construction of a Dam without prior written approval from the Department of the final Dam design, construction documents and operation documents as described in 690-020-0080(1) and 0140 (1);¶

(b) Impoundment of Water behind a Dam before final documentation has been submitted and accepted by the Department as provided in in 690-020-0080 (4) and 0150(6); ¶

(c) Beginning construction to remove a High or Significant Hazard Rated Dam rated as High or Significant Hazard prior to providing notice to the Department, as provided in 690-020-0160; ¶

(d) Failure to file an Emergency Action Plan with the Department, Office of Emergency Management, and the local emergency services agency for the county where the Dam is located, as provided in 690-020-0400;¶

(e) Failure to complete needed Dam Maintenance Actions on a High or Significant Hazard Dam, as identified in a prior inspection document sent from the Department to the Dam owner, as described in 690-020-0310. ¶

(2) The civil penalty for beginning construction of a Dam prior to obtaining written approval from the Department of final Dam design, construction, and operation documents prior to Dam construction activity shall be \$2000 for a High Hazard Rated Dam, \$1,000 for a Significant Hazard Rated Dam; and \$500 for a Low Hazard Rated Dam. ¶

(3) The civil penalty for impounding Water prior to submission and acceptance by the Department of the final plans and specifications shall be \$1000 for a High Hazard Rated Dam, \$500 for a Significant Hazard Rated Dam; and \$250 for a Low Hazard Rated Dam. ¶

(a) A civil penalty may be assessed for each day of violation for the period the reservoir is impounding Water until satisfactory completion documents are accepted, or until the reservoir is emptied, whichever is sooner. ¶

(b) The Department may remit all or a portion of a civil penalty if completion documents existed but were not submitted, and those documents meet the criteria, or for Dams which are modified to be exempt from Dam safety requirements as per ORS 540.446 (1).¶

(4) The civil penalty for beginning construction work to remove a Dam rated as High or Significant Hazard prior to submission and acceptance of a Dam removal plan, failure to modify the plan if required, or failure to follow the modified plan shall be \$2000 for a High Hazard Rated Dam and \$1000 for a Significant Hazard Rated Dam ¶

(a) A civil penalty may be imposed for each day of violation beginning on the day removal activities began until the Dam is no longer storing Water and construction work to remove the Dam has ceased. ¶

(b) The Department may remit all or a portion of this civil penalty if the Department receives and accepts a Dam removal plan and determines that Dam removal was consistent with the plan and completed safely with no downstream damage.¶

(5) The civil penalty for failure to file an Emergency Action Plan for a High Hazard Rated Dam with the Department, Office of Emergency Management, and the local emergency services agency for the county where the Dam is located shall be \$2000. ¶

(a) A civil penalty may be imposed for each month of violation beginning on the date the notice of violation was first provided to the responsible party. ¶

(b) The Department may remit all or a portion of the civil penalty if development of the plan is underway and the plan is submitted within 60 days of the due date. ¶

(6) The civil penalty for failure to complete needed Maintenance Actions identified in a prior inspection document for Dams rated as High or Significant Hazard shall be: ¶

(a) A civil penalty of \$500 may be assessed for failure to perform required Maintenance Action(s) on a High Hazard Rated Dam which could result in the Dam becoming Unsafe. Each month will constitute a new violation until the required Maintenance Action(s) are completed;¶

(b) A civil penalty of \$250 may be assessed for all other required Maintenance Actions. Each month will be considered a new violation until the required Maintenance Action(s) are completed; ¶

(c) A civil penalty of \$250 may be assessed for failure to perform required maintenance on a Significant Hazard Rated Dam which could result in the Dam becoming Unsafe. Each month the violation continues will be considered a new violation; ¶

(d) A civil penalty of \$150 may be assessed for failure to complete all other required maintenance for a Significant Hazard Rated Dam. Each month that the required Maintenance Action(s) is not completed will be considered a new violation; and,¶

(e) The Department may remit all or a portion of a Civil Penalty if the Dam owner voluntarily complies with a schedule for repairs that allows necessary engineering or inspection expertise to address the maintenance issue, or allows for work during more favorable and safe weather conditions.

Statutory/Other Authority: ORS 536.027, ORS 540.488

Statutes/Other Implemented: ORS 540.467, ORS 540.482, ORS 540.488, ORS 540.449, ORS 540.452