DCR Dam Safety Technical Advisory Committee Program Briefing

May 1, 2006

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Department of Conservation & Recreation

CONSERVING VIRGINIA'S NATURAL & RECREATIONAL RESOURCES

• State Parks • Soil and Water Conservation • Natural Heritage
• Outdoor Recreation Planning • Land Conservation

• Dam Safety and Floodplain Management

• Chesapeake Bay Local Assistance

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Committee Charge

Consider improvements to the Virginia Soil and Water Conservation Board's Impounding Structure Regulations (§§ 4 VAC 50-20-10 et seq.) that will

- enhance the administration and implementation of the Dam Safety Program,
- clarify the meaning of the regulations, and
- give consideration to nonstructural criteria on a case-by-case basis that would permit a partial reduction of emergency spillway design flood requirements, provided there would be no unreasonable and/or significant reduction in public safety and the protection of life and property.

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Areas to be Discussed

1) Background leading up to the regulatory action
2) NOIRA issues
3) Tentative Regulatory Process
4) Dam Safety Program Overview
5) Code Requirements
6) Regulatory Requirements

Items in the Notebooks

1) TAC Member List
2) Ad Hoc Committee Report
3) Report Recommendations from DCR to the Board
4) NOIRA
5) Virginia Dam Safety Act
6) Virginia Impounding Structure Regulations
7) Summary of Comments Received
8) PPTs

Background Leading up to the Regulatory Action

Why this Regulatory Action

The Board recognized that:

- No regulatory changes have been made to the Virginia Impounding Structure Regulations since 1989 except to update the definition of regulated dams to match the 2001 legislation and that the regulations deserved a thorough review.
- Some dam owners had requested the consideration of amendments.
  - They had expressed concerns about the cost of repairing/ upgrading their dams to meet higher compliance standards, often resulting from increased development in the downstream dam break inundation zone
  - they perceived the risk of dam failure as low and the standards as needing to be more flexible.

Motion of the
VA Soil and Water Conservation Board
July 15, 2004

That the Virginia Soil and Water Conservation Board **establish an Ad Hoc Committee for the expressed purpose of studying the Classes of Impounding Structures**, §4VAC 50-20-40 and **Performance Standards Required for Impounding Structures**, §4VAC 50-20-50 and the attendant Table 1 established in the 2004 Virginia Impounding Structure Regulations. The Committee membership shall be set by the Department of Conservation and Recreation with concurrence of the Board Chairman. **The Committee shall complete its work by April 30, 2005**.

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Ad Hoc Dam Safety Study Committee

- The Committee was composed of thirteen individuals with substantial technical expertise on dams and dam safety.
- The Committee met four times (11/9/04; 01/19/05; 02/16/05; 03/23/05), reviewed numerous reports and studies about state programs and federal guidelines, heard from several groups concerned about the issues under study, heard presentations by several leading experts, and considered four possible alternatives.
  - Alternative 1: Treat New and Existing Dams Alike – Formalize Current Practices
  - Alternative 2: Provide an Alternate Procedure for Existing Dam
  - Alternative 3: Reduced Percentage of PMF
  - Alternative 4: Risk-based Approach

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Alternative 1: Treat New and Existing Dams Alike – Formalize Current Practices

•This Alternative would maintain those aspects of current practice that **require both new and existing dams to meet the spillway design flood standard contained in Table 1** of the regulations.

–Section 50 of the regulations would be modified to require that Table 1 applied to all dams.

– Sections 130 and 140 would be **amended to drop their pre and post 1982 date distinctions** and simply refer to all dams.

– Sections 130 A and 140, as they currently exist, would be repealed. The provisions of 130B (related to **incremental analysis) would be applicable to all existing dams**.

•Alternative 1 is one of the two scenarios recommended by the Committee for consideration by the Board.

Alternative 2: Provide an Alternate Procedure for Existing Dam

- As in Alternative 1, Alternative 2 would require that the default spillway design flood for both new and existing dams would be as specified in Table I.
- However, **for existing dams, there would also be an alternate procedure** available in cases where there would be no unreasonable hazard to life and property.
- The selection of **spillway design flood** would default to the full PMF, but **could be considered for downward adjustment** based upon the owner's historic compliance with regard to all other dam safety requirements and taking into account meaningful site specific factors such as:
  - robustness of the dam's construction
  - number and type of structures and transportation corridors in the inundation zone
  - number of people at risk
  - existence of a well coordinated and regularly exercised Emergency Action Plan
  - public education program
- Alternative 2 is the 2nd of the two scenarios recommended by the Committee for consideration by the Board.

Alternative 3: Reduced Percentage of PMF

- The idea embedded in this alternative is that **older dams**, due to the cost and practical issues with upgrading an existing dam, **would not be required to undergo the expense and possible disruption of full compliance with current standards but rather would be required to achieve some percentage of full compliance**.
- Benefits of a reduction from a full PMF include that it could be based on best policy judgment and that it would be less costly to dam owners.
- Detriments of this alternative are the **lack of technical rationale** for a reduction from a full PMF. The concern is that this alternative could be based more on a political decision than on technical analysis. It was also noted that a reduction from a full PMF could potentially reduce public safety and could lead to uneven standards of protection.
- This alternative was not recommended.

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Alternative 4: Risk-based Approach

- This alternative would involve a **much more detailed risk-based assessment** than current regulations which include a more general risk-based classification.
- Such an **approach would be highly site and dam specific**.
- The risk-based approach is **essentially an elaborate cost-benefit analysis**.
- Risk-based analyses currently employed by federal agencies are used to establish priorities for allocation of resources, and are not used to establish design standards.
- Such a risk-based approach takes into account the history of the dam, soils, and other conditions rather than assume that one size fits all.
- The risk-based approach requires increased supervision of operation and maintenance, the emergency action plan, and inspections, as well as increases the costs to the owners and the regulators for this monitoring and enforcement.
- This alternative was not recommended.

Report Review by the Board & Dept.

•May 2005 - VSWCB accepted the report from the Ad Hoc Committee and directed DCR staff to provide information regarding Alternatives #1 and #2 at the July meeting.

•July 2005 - Pursuant to that directive, DCR offered the following general recommendations that were adopted by the Board:

1) Board authorize submittal of a NOIRA to consider changes to Virginia Impounding Structures Regulations.

2) Board assemble a special Board chaired workgroup to develop regulatory concepts.

3) DCR continue to research strategies employed by other states to regulate dams and to fund their repairs.

4) Board support the development of legislation that would 1) develop a funding source for providing loans and grants to dam owners 2) add a greater suite of enforcement tools.

5) Board support development of a budget decision package to support additional dam safety engineers.

6) DCR establish and promote a dam break inundation zone model ordinance for local governments to consider.

Alternative 1: Treat New & Existing Dams Alike – Formalize Current Practice

1) **The Department agreed that the regulations be amended so that all dams will be treated per Table 1** unless otherwise specified.

2) The Department agreed that **terminologies such as existing and new should be removed from the Act and references to dates be eliminated**.

3) The Department agreed that sections 130A and 140 should be repealed. Further, the department recommended that language currently in section 130a be amended and included in section 4 VAC 50-20-50 to apply to all dams and that the provisions of section **130B also be made applicable to all dams [incremental analysis].**

4) The Department also recommended that terminologies be clarified.

Alternative 2: Provide an Alternate Procedure for Existing Dams

1) **The Department agreed that a decision matrix be developed as part of the state regulatory process** where after an applicant complies with basic program provisions in section 4 VAC 50-20-50 and Table 1, and an incremental analysis has been performed and the SDF still exceeds ½ PMF (and any reductions have not exceeded 25% of the PMF), that for class 1 and 2 high hazard dams, that an alternative procedures process be developed by regulation which may be considered where there will be no unreasonable hazard to life and property.

2) The Department recognized that there will be significant additional costs associated with implementing this new approach and noted that DCR is already understaffed for its existing dam safety responsibilities.

Motion of the VSWCB

July 21, 2005

•The Board authorized the DCR to submit a NOIRA to consider changes and solicit recommendations related to the Board's Virginia Impounding Structure Regulations. The changes may include, but not be limited to amendments:

–to address the Ad Hoc Dam Safety Committee's recommendations relative to Classes of Impounding Structures (§ 4 VAC50-20-40), Performance Standards Required for Impounding Structures (§ 4 VAC50-20-50), and the attendant Table 1 established in the 2004 Virginia Impounding Structures Regulations;

–to clarify vague words/wording (e.g. possible, probable, reasonable, appropriate, etc.);

– to make Table 1 more understandable and consistent in application;

– to eliminate the reference to "new" and "existing" dams;

–to establish alteration permit requirements similar to construction permit requirements;

– to remove DCR forms currently contained in the regulations; and

– to make other technical or administrative amendments necessary to improve and clarify the regulations.

Board Chaired Workgroup

- October 2005 – The special Board chaired workgroup met.
- Workgroup Charge – "develop a list of concepts for high hazard dams that could be used as criteria by the Department when considering a dam owner's request for an alternative means to lower their dam's spillway design flood (SDF). During an upcoming regulatory process the concept list will be considered by a technical advisory committee as potential regulatory changes to the Virginia Soil and Water Conservation Board Dam Safety Regulations."
- The Chairman emphasized that the alternative approach would need to maintain the same level of safety and that an adjustment to the level of risk would not be considered.

- Factors considered by the workgroup included:
  - –maximum depth and duration of overtopping
  - –robustness of the dam's construction
  - –potential structural/operational changes
  - –number and type of structures and transportation corridors in the inundation zone
  - –number of people at risk
  - –flood wave travel time to impact areas
  - –simplicity or complexity of evacuation provisions
  - –existence of a well coordinated and regularly exercised Emergency Action Plan
  - –public education program
  - –flood recurrence and frequency data for relevant nearby streams
  - –likelihood of prior flooding from other nearby streams or rivers affecting the inundation zone
  - –other possible site-specific factors relating to the level of risk, potential impacts of a failure and mitigating circumstances.

•Results - Each issue considered by the workgroup was rejected as it should already be standard practice or it would require increased risk which the workgroup was not willing to consider.

Regulatory Process and Notice of Intended Regulatory Action (NOIRA)

Regulatory Process

•No regulatory changes have been made since 1989 except to update the definition of regulated dams to match the legislation passed by the General Assembly in 2001.

•July 2005 - The Board authorized and directed DCR to file a NOIRA relating to the Board's Virginia Impounding Structures Regulations.

Regulatory Process

- A. NOIRA Phase
  - Notice of Intended Regulatory Action (NOIRA) published in the Virginia Register December 26, 2005 initiating a 60-day public comment period.
  - Public meeting held February 9th in Charlottesville.
  - Public comment period on the NOIRA ended February 24, 2006.
- B. 180 Day Regulatory Development Phase
  - Proposed regulation must be submitted to the Department of Planning and Budget (DPB) within 180 days of the close of the public comment period.
  - This would be August 23rd. Prior to submittal of the Regulation we will need to assemble a Technical Advisory group, hold meetings, draft the proposed regulation, seek Attorney General review, discuss with the Board and obtain approval, and acquire agreement with the Secretary to proceed.

Regulatory Process

•C. Review of Draft Regulations

- DPB review August 23rd – October 7th. - develop an economic impact analysis.
- October 7 through at least the end October – Review by the Administration
- November 8th target date to submit to the Register
- November 27, 2006 proposed regulation published initiating a 60-day public comment period.
- Public comment period, unless extended, would end on January 26th. Public hearings on the regulation would need to be held across the state beginning around January 11th which will unfortunately coincide with the beginning of the 2007 Legislative Session on January 10th.

-Should the regulation proceed on this schedule, the final regs would be due around the end of June with an anticipated effective date of the final regs around the end of September.

NOIRA Identified Issues

(1) consider the establishment of an alternative procedure (decision matrix) which would allow for the evaluation of spillway design floods (SDF) less than the probable maximum flood (PMF) where there would be no unreasonable or significant increase in hazard to life and property;

(2) establish alteration permit requirements similar to construction permit requirements;

(3) expand the requirements of an Emergency Action Plan to meet federal requirements;

(4) consider changes to ensure that all impounding structures be structurally sound and safe, and that the regulations apply to all dams, regardless of age, unless otherwise specified;

(5) improve the applicability and consistency of dam hazard/ risk assessment table [Table 1 (4 VAC 50-20-50) of the Regulations] and improve the risk classification system;

NOIRA Identified Issues

(6) establish permit application fees for the administration of the dam safety program;

(7) amend or remove the forms that are incorporated by reference to allow for more frequent revisions as federal and state requirements warrant;

(8) clarify the meanings of terminologies such as “significantly”, “appropriate”, and “reasonable” as well as the threshold at which “probable” becomes “possible”; and

(9) revise the Impounding Structure Regulations, as needed, to improve the administration and implementation of the Virginia Dam Safety Program.

Public Comments

- We had 44 people attend the public meeting in Charlottesville (not including DCR staff) and 19 people spoke (primarily dam owners, a few localities, and engineering/ contractor companies).
- In addition to the individuals who spoke at the public meeting, 37 people submitted written comments.
- Key areas that participants offered comments on included: inspections, the decision matrix, emergency action plans, fees, Table 1 modifications, definition refinement, forms, treatment of new versus existing dams, exemptions from the regulations, funding, dam break inundation zones, licensing and certification of contractors, and other general issues.

Dam Safety Program

Overview

- Dams are a major asset to the Commonwealth (water supply, power, water for fire protection, recreation, increase property values). Also serve as sediment traps to capture nutrients.
- Dam owners have liability to properly maintain dams.
- Dam Safety Act aims to protect public safety; expanded in 2001 to include many more small dams.
- 1700 known dams (& counting; could be 2-3x); nearly 600 currently under state regulation.
- Virginia's dam inventory is aging; many dams built over 50 years ago and in need of improvements.
- Development in dam break zones has triggered reclassification to a higher hazard level to reflect increased risk potential.
- Many dam owners need funding assistance in order to make needed repairs and modifications.
- Recent storm events and homeland security have raised profile of dam issues nationwide.

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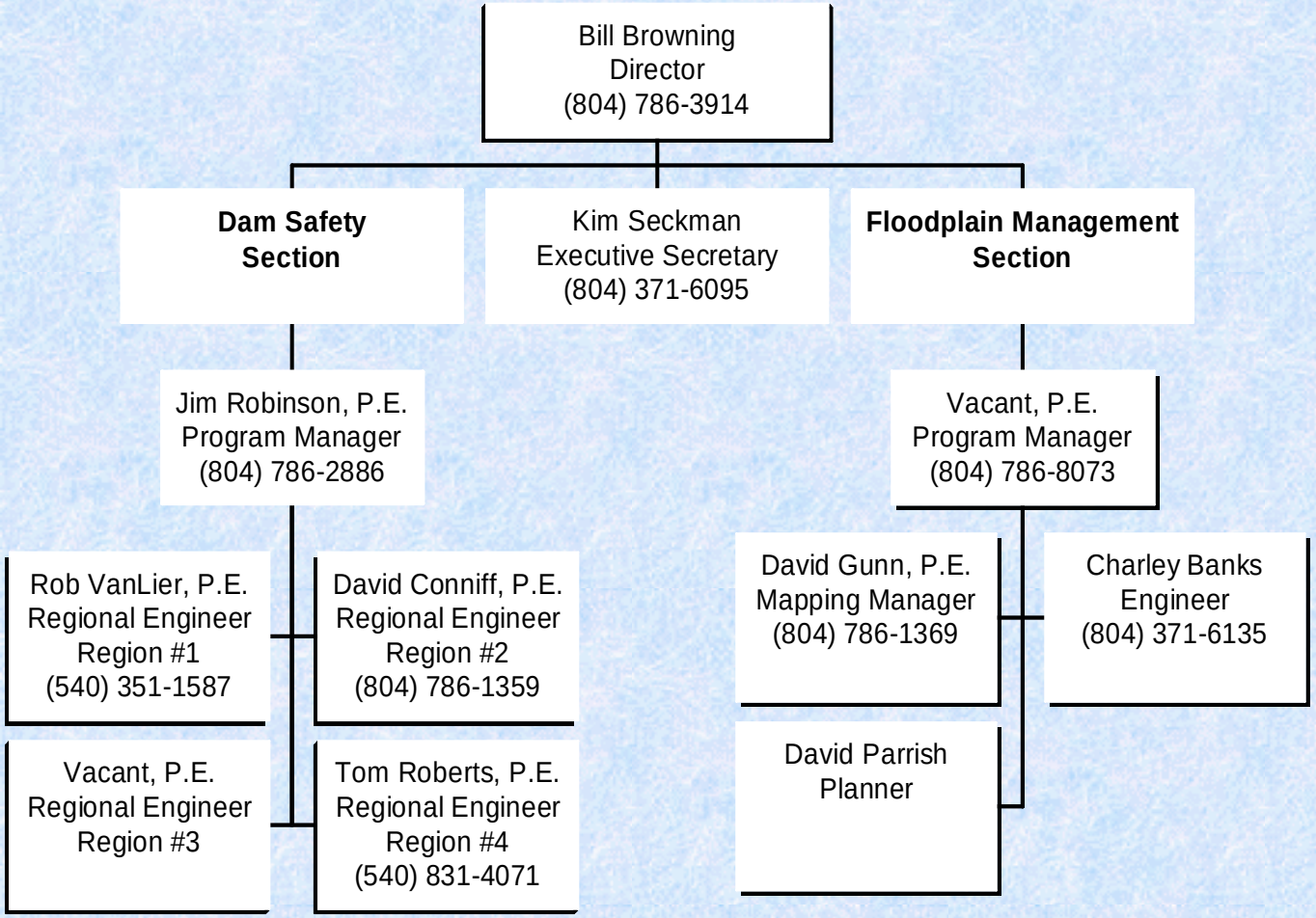
No impounding structure can ever be completely ***fail-safe***, because of incomplete understanding of / or uncertainties associated with natural and man-made destructive forces, material behavior and responses to those forces, and quality control during construction.

Dam Safety Program

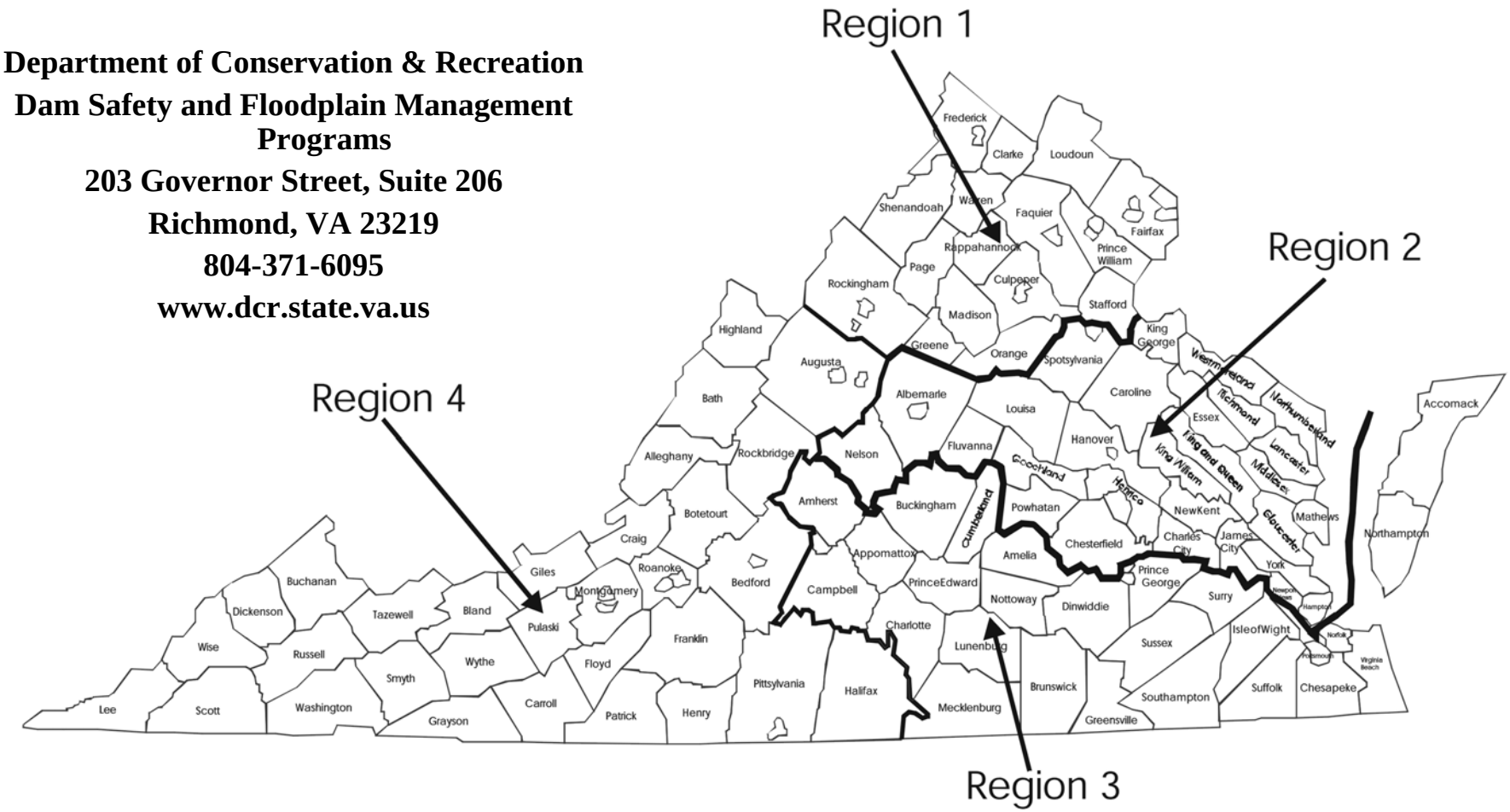
- Purpose is to reduce risks and hazards to the Commonwealth from dam failures.
- The VA Soil and Water Conservation Board (Board) shall promulgate regulations to ensure impounding structures in the Commonwealth are properly and safely constructed, maintained and operated.
- DCR Dam Safety staff provide the technical reviews, evaluations and regulatory recommendations for the Board.
- DCR's Dam Safety Program has 4 Regional Engineers and 1 Program Manager. Staff workload much higher than in other states.

Dam Safety and Floodplain Management Organization



DCR Dam Safety Regional Territories

Department of Conservation & Recreation
Dam Safety and Floodplain Management Programs
203 Governor Street, Suite 206
Richmond, VA 23219
804-371-6095
www.dcr.state.va.us



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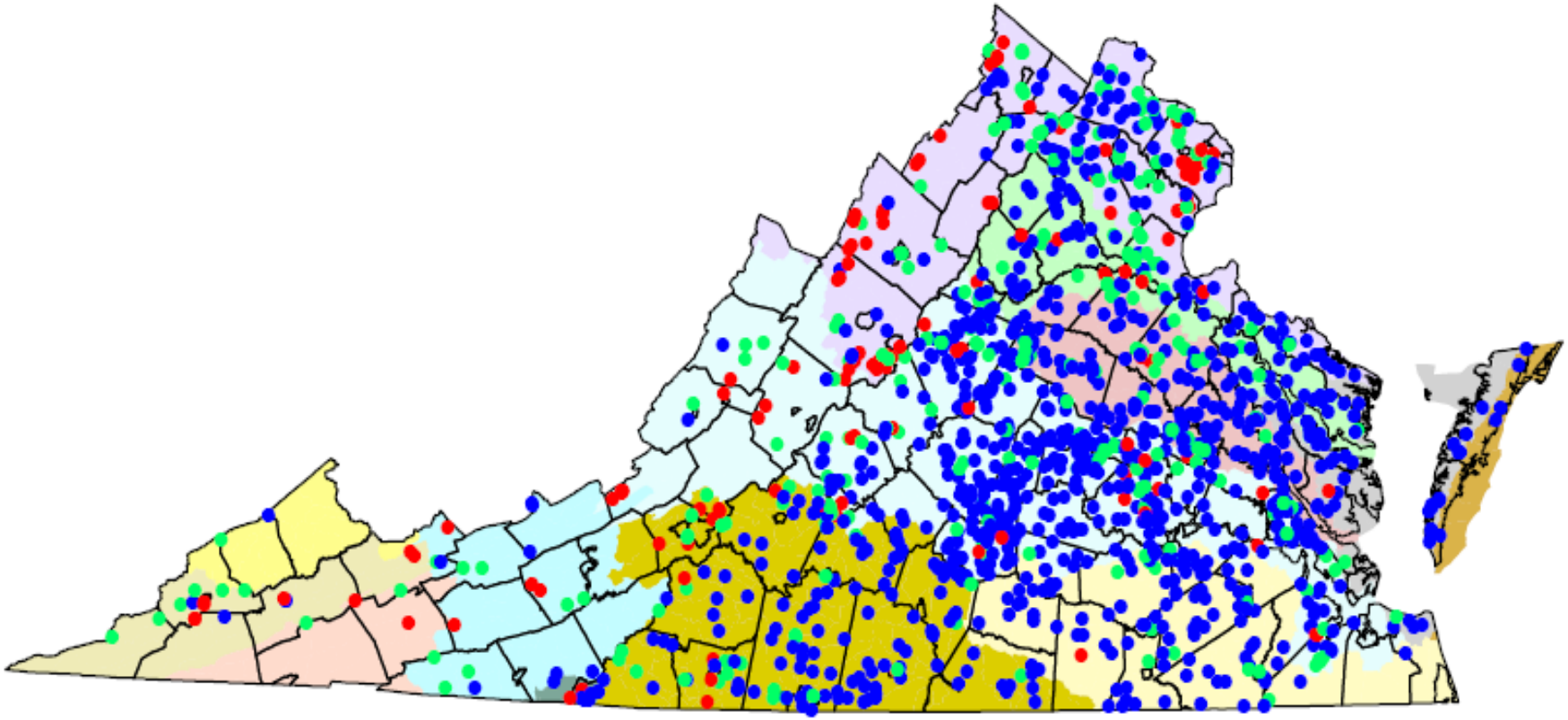
Dams Under Regulation

As of March 2006

Hazard Potential Classification	Out of Compliance	Regular O & M Certificate	Conditional O & M Certificate	Construction Permit	Total
I	1	65	48	6	120
II	5	108	38	15	166
III	3	220	31	15	269
IV	0	22	0	3	25
Totals	9	415	117	39	580

Virginia Regulatory Definition Dams



Types and Estimated Costs of Repairs

Typical Engineering Costs

Hydraulic flood routings & dam break analysis	**$2,000 to $25,000+**
Stability study of emergency spillway	**$5,000 to $40,000**
Engineering study of hazard classification	**$2,000 to $10,000+**

Examples of Construction Costs

Removal of trees and woody vegetation from dam embankment, emergency spillway	**$2,000 to $100,000**
Increase emergency spillway and/or secondary spillway capacity	**$5,000 to $1,000,000+**
Replace principal spillway drop-inlet riser	**$2,000 to $25,000+**
Repair discharge pipe (slip-line)	**$10,000 to $100,000+**
Repair outfall basin	**$5,000 to $10,000**
Install low level drain	**$5,000 to $50,000+**
Re-grade embankment slope	**$2,000 to $100,000+**
Place concrete or block into emergency spillway	**$10,000 to $100,000**

•Dam repair costs may range from a few thousand dollars for tree removal to several million dollars for spillway retrofits.

HB 596 (Sherwood) & SB 624 (Bell) – Dam Safety Funding Assistance

- Purpose to rename/enhance use of existing Flood Prevention & Protection Assistance Fund to provide low interest loans and grants to dam owners for making repairs and bringing dams into compliance with the Dam Safety Act. Priority given to high hazard dams.
- Administered jointly by the DCR (on behalf of Soil and Water Cons. Board) and by the VA. Resources Authority (would handle financial responsibilities).
- Funds could be further leveraged by VRA through investments in order to increase the amount of funds available for loans.
- Loans require a 10% match and grants require a 50% match.
- Currently, about $250,000 per year from 1% fee on flood insurance premiums NOT associated with the National Flood Insurance Program goes into Fund.
- Introduced bills would have transferred $900,000/yr. from existing fees on NFI policies from General Fund to further capitalize Fund. Removed in both bills.
- The Fund can currently be used to provide grants to local governments for mapping dam break zones, flood prevention studies & flood projects.
- Passed General Assembly; signed by Governor Kaine.
- House budget bill contained $400,000 per year.

Federal Dam Safety Legislation

•Virginia may wish to support recently introduced federal legislation.

•Two bills were introduced in March within days after a dam failure in Hawaii claimed seven lives.

•Both Bills endorsed by the National Association of State Dam Safety Officials

• H.R. 4981 - The Dam Safety Act of 2006

- Introduced by Reps. Randy Kuhl (R-NY), Jim Matheson (D-UT) and Neil Abercrombie (D-HI) to reauthorize the National Dam Safety Program
- Would provide up to $12.7 million a year for four years to assist states in improving their dam safety programs.

• S. 2444 - Dam Rehabilitation and Repair Act of 2006

– Introduced by Senators Akaka (D-HI) and Inouye (D-HI)

- Would provide up to $350 million over four years to repair and upgrade the estimated 2,600 unsafe dams in the United States.
- Focused on public entities that own dams, such as municipalities and water districts.

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Code Requirements

Virginia Dam Safety Act

- Created in 1982 to promote the proper design, construction, operation and maintenance of dams to protect public safety and property.
- Modified by 2001 General Assembly to bring VA's program into alignment with national law and neighboring states (e.g., North Carolina, Kentucky, Maryland, Tennessee, WVA.)
- Changes effective July 1, 2002 – lowered dam height and volume of water storage; resulted in a large number of dams falling under state certification for first time.
- 2005 Changes: right of entry and dam break inundation zone.
- The Act was also amended in 2006 to included additional enforcement tools.

2006 Legislation

HB 597 (Sherwood) – Enforcement Tools

- Provides new enforcement options (temporary stop work order; legal proceedings to require dam removal or modification; Class 3 misdemeanor criminal penalties; civil penalties).
- Adds technical definitions (ex: "dam break inundation zone").
- Changes exemption for agricultural dams to only those "operated" as such.
- Specifies criteria for designating a dam as unsafe: serious design deficiencies, construction flaws, threats to dam integrity.
- Prohibits trees and other woody vegetation on dams.
- Clarifies the liability of an owner for damage to the property of others or injury to persons including loss of life resulting from dam operation or failure.
- Authorizes the Board to establish and collect application fees. (Similar language already in the Appropriations Act.)
- Passed General Assembly unanimously; signed by Governor Kaine

§ 10.1-604. Definitions.

"Impounding structure" means a man-made structure, whether a dam across a watercourse or other structure outside a watercourse, used or to be used to retain or store waters or other materials. The term includes:

(i) all dams that are twenty-five feet or greater in height and that create an impoundment capacity of fifteen acre-feet or greater, and

(ii) all dams that are six feet or greater in height and that create an impoundment capacity of fifty acre-feet or greater.

The term "impounding structure" shall not include:

(a) dams licensed by the State Corporation Commission that are subject to a safety inspection program;

(b) dams owned or licensed by the United States government;

(c) dams operated primarily for agricultural purposes which are less than twenty-five feet in height or which create a maximum impoundment capacity smaller than 100 acre-feet;

(d) water or silt retaining dams approved pursuant to § 45.1-222 or § 45.1-225.1; or

(e) obstructions in a canal used to raise or lower water.

§ 10.1-606.1. Authority for localities to map dam break inundation zones.

A. **Any county, city, or town may map dam break inundation zones and is encouraged to incorporate such information into its zoning and subdivision ordinances.** Such localities may regulate or limit future development in these areas……

C. **Such maps shall be made available by the locality to the dam owner and the public.** All properties identified within the dam break inundation zone shall be incorporated into the dam safety emergency action plan of that dam so as to ensure the proper notification of persons downstream and other affected persons or property owners in the event of a flood hazard or the impending failure of the impounding structure.

§ 10.1-607. Safety inspections.

No one shall maintain a dam which unreasonably threatens the life or property of another. The Board shall cause safety inspections to be made of impounding structures on such schedule as it deems appropriate. The time of the initial inspection and the frequency of reinspection shall depend on such factors as the condition of the structure and its size, type, location and downstream hazard potential. The owners of dams found to have deficiencies which could threaten life or property if not corrected shall take the corrective actions needed to remove such deficiencies within a reasonable time…..

§ 10.1-607.1. Criteria for designating a dam as unsafe.

A. **Designation of a dam as unsafe** shall be based on one or more of the following findings:

1. The dam has serious deficiencies in its design or construction or has a physical condition that if left unaddressed could result in a failure that may result in loss of life or damage to downstream property.

2. The design, construction, operation, or maintenance of the dam is such that its expected performance during flooding conditions threatens the structural integrity of the dam.

B. After completion of the safety inspections pursuant to § 10.1-607, or as otherwise informed of an unsafe condition, **the Department shall take actions in accordance with § 10.1-608 or 10.1-609 depending on the degree of hazard and imminence of failure caused by the unsafe condition**.

For unsafe imminent situations (**§ 10.1-608)**

- Notify Dept. of Emergency Management and dam owner.
- Owner needs to take immediate and appropriate actions.
- Governor may take action without a hearing (only used once).
- Attorney General may take legal action and seek Commonwealth's expenses.

For unsafe but non-imminent situations (**§ 10.1-609)**

- Dam found "out of compliance"; letter sent outlining improvements needed and compliance date.
- Owner fails to comply; Director issues administrative order.
- Owner may petition Board for informal fact finding; Board shall afford opportunity for formal hearing and issues final order.
- An owner who fails to comply with the provisions contained in an administrative order of the Department shall be subject to procedures set out in § 10.1-613 and the penalties authorized under §§ 10.1-613.1 and 10.1-613.2.

§ 10.1-610. Right of entry.

The Board and its agents and employees shall have the right to enter any property at reasonable times and under reasonable circumstances to perform such inspections and tests or to take such other actions it deems necessary to fulfill its responsibilities under this article, including the inspection of dams that may be subject to this article, provided that the Board or its agents or employees make a reasonable effort to obtain the consent of the owner of the land prior to entry. If entry is denied, the Board or its designated agents or employees may apply to any magistrate whose territorial jurisdiction encompasses the property to be inspected or entered for a warrant authorizing such investigation, tests or other actions. Such warrant shall issue if the magistrate finds probable cause to believe that there is a dam on such property which is not known to be safe.

§ 10.1-610.1. Monitoring progress of work.

A. **During the maintenance, construction, or alteration of any dam or reservoir, the Department shall make periodic inspections** for the purpose of securing conformity with the approved plans and specifications….

B. If, after any inspections, investigations, or examinations, or at any time as the work progresses, or at any time prior to issuance of a certificate of approval, it is found by the Director that project modifications or changes are necessary to ensure conformity with the approved plans and specifications, **the Director may issue an administrative order to the owner to comply with the plans and specifications**……

§ 10.1-612.1. Temporary stop work order; hearing; injunctive relief.

A. **The Director may issue a temporary stop work order on a construction or alteration project** if he finds that an owner is constructing or altering a dam without having first obtained the necessary certificate of approval, or if the activities are not in accordance with approved plans and specifications……

§ 10.1-613. Enforcement.

Any person or legal entity failing or refusing to comply with an order issued pursuant to this article **may be compelled to comply with the order in a proceeding instituted in any appropriate court** by the Board……

§ 10.1-613.1. Criminal penalties.

A. It is unlawful for any owner to knowingly:

1. Operate, construct, or alter a dam without an approval as provided in this article;

2. Violate the terms of an approval, order, regulation, or requirement of the Board or Director under this article; or

3. Obstruct, hinder, or prevent the Board or its designated agents or employees from performing duties under this article.

A violation of any provision of this subsection or this article is a Class 3 misdemeanor.

B. Each day that any such violation occurs after notice of the original violation is served upon the violator by the Board or its designated agents or employees by registered mail shall constitute a separate offense. Upon conviction, **the violator is subject to a fine** not exceeding $500 per day for each day of the offense, not to exceed a total fine of $25,000, with costs imposed at the discretion of the court……

§ 10.1-613.2. Civil penalties.

In addition to or in lieu of any other forfeitures, remedies, or penalties authorized by law or regulations, any owner violating any provision of this article **may be assessed a civil penalty** of up to $500 per day by the Board not to exceed a maximum of $25,000……

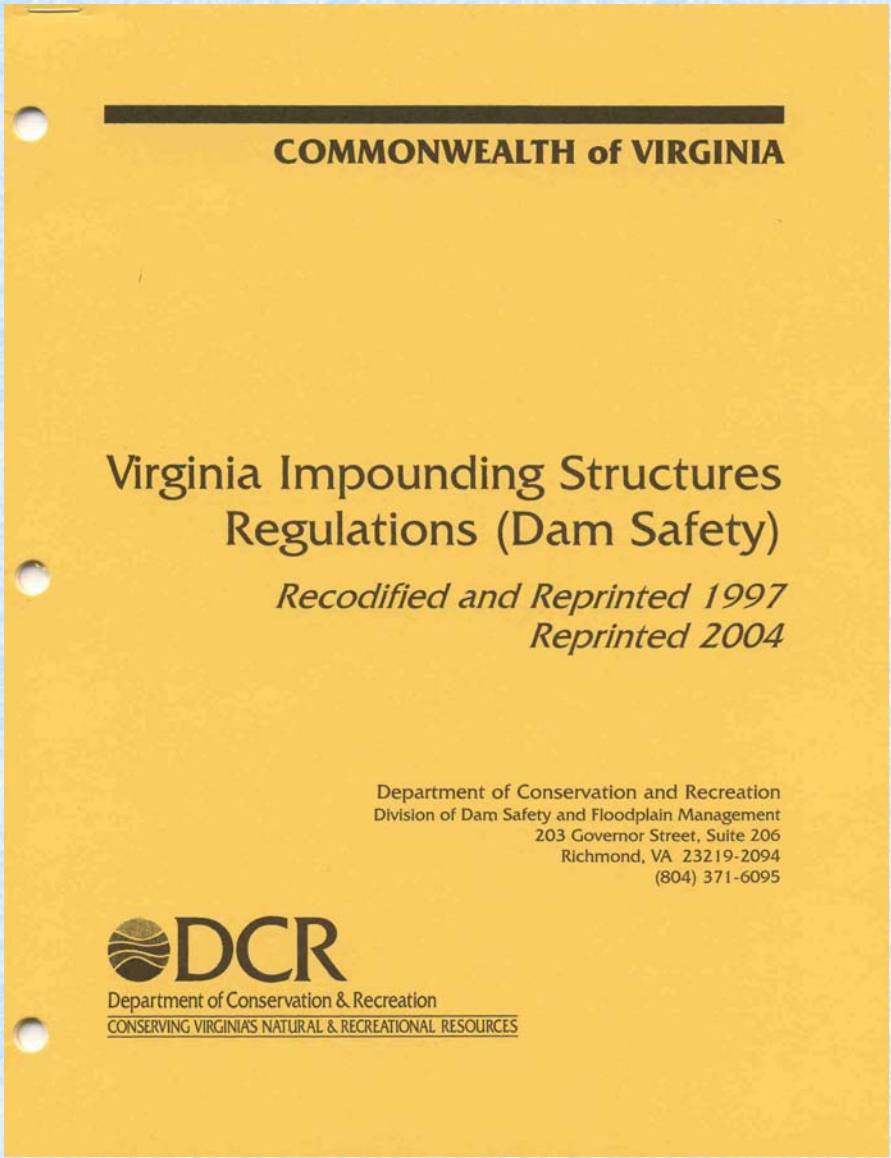
§ 10.1-613.4. Liability of owner or operator.

Nothing in this article, and no order, notice, approval, or advice of the Director or Board shall relieve any owner or operator of such a structure from any legal duties, obligations, and liabilities resulting from such ownership or operation. **The owner shall be responsible for liability for damage to the property of others or injury to persons, including, but not limited to, loss of life resulting from the operation or failure of a dam.** Compliance with this article does not guarantee the safety of a dam or relieve the owner of liability in case of a dam failure.

Regulatory Requirements

Virginia's Dam Safety Regulations are promulgated by the Virginia Soil and Water Conservation Board in accordance with the provisions of the Dam Safety Act, Article 2, Chapter 6, Title 10.1 (§10.1-604 et seq.), of the Code of Virginia.

Virginia's Dam Safety Regulations



The Department of Conservation and Recreation's Dam Safety and Floodplain Management Division acts as the field agent and technical reviewer on behalf of the Board.

4VAC50-20-40. Classes of impounding structures.

• **Impounding structures shall be classified in one of four categories according to size and hazard potential**, as defined in subsection B of this section and Table 1.

•Size classification shall be determined either by maximum impounding capacity or height, whichever gives the larger size classification.

•Hazards pertain to potential loss of human life or property damage downstream from the impounding structure in event of failure or faulty operation of the impounding structure or appurtenant facilities.

•Impounding structures in the Class I hazard potential category are located where failure will cause probable loss of life or serious damage to property.

•Impounding structures in the Class II hazard potential category are located where failure could cause possible loss of life or damage to property.

- Impounding structures in Class III hazard potential category are located where failure may cause minimal property damage to others. No loss of life is expected.
- Impounding structures in Class IV hazard potential category are located where the failure of the impounding structure would cause no property damage to others. No loss of life is expected.
- Such size and hazard potential classifications shall be proposed by the owner and shall be subject to approval by the director. Present and projected development of the inundation zones downstream from the impounding structure shall be considered in determining the classification.
- Impounding structures shall be subject to reclassification as necessary.

4VAC50-20-50. <u>Performance standards</u> required for impounding structures.

Impounding structures shall be constructed, operated and maintained such that they perform in accordance with their design and purpose throughout the life of the project. **<u>For new impounding structures, the spillway(s) capacity shall perform at a minimum to safely pass the appropriate spillway design flood as determined in Table 1.</u>**

TABLE 1 - Impounding Structure Regulations

Class of Dam	Hazard Potential If Impounding Structure Fails	SIZE CLASSIFICATION Maximum Capacity (Ac-Ft)[a]	 Height (Ft)[a]	Spillway Design Flood (SDF)[b]
I	Probable Loss of Life; Excessive Economic Loss	Large ≥ 50,000 Medium ≥ 1,000 & < 50,000 Small ≥ 50 & < 1,000	≥ 100 ≥ 40 & < 100 ≥ 25 & < 40	PMF[c] PMF ½ PMF to PMF
II	Possible Loss of Life; Appreciable Economic Loss	Large ≥ 50,000 Medium ≥ 1,000 & < 50,000 Small ≥ 50 & < 1,000	≥ 100 ≥ 40 & < 100 ≥ 25 & < 40	PMF ½ PMF to PMF 100-YR to ½ PMF
III	No Loss of Life Expected; Minimal Economic Loss	Large ≥ 50,000 Medium ≥ 1,000 & < 50,000 Small ≥ 50 & < 1,000	≥ 100 ≥ 40 & < 100 ≥ 25 & < 40	½ PMF to PMF 100 – YR to ½ PMF 50 – YR[d] to 100 – YR[e]
IV	No Loss of Life Expected; No Economic Loss to Others	≥ 50 (nonagricultural) ≥ 100 (agricultural)	≥ 25 (Both)	50 – YR to 100 – YR

a. **The factor determining the largest size classification shall govern**.

b. **The spillway design flood (SDF) represents the largest flood that need be considered in the evaluation of the performance for a given project.** The impounding structure shall perform so as to safely pass the appropriate SDF. Where a range of SDF is indicated, the magnitude that most closely relates to the involved risk should be selected. The establishment in this chapter of rigid design flood criteria or standards is not intended. Safety must be evaluated in the light of peculiarities and local conditions for each impounding structure and in recognition of the many factors involved, some of which may not be precisely known. Such can only be done by competent, experienced engineering judgment, which the values in Table 1 are intended to supplement, not supplant.

c. PMF: Probable maximum flood. **This means the flood that might be expected from the most severe combination of critical meteorologic and hydrologic conditions that are reasonably possible in the region.** The PMF is derived from the current probable maximum precipitation (PMP) available from the National Weather Service, NOAA. In some cases local topography or meteorological conditions will cause changes from the generalized PMP values; therefore, it is advisable to contact local, state or federal agencies to obtain the prevailing practice in specific cases.

d. 50-Yr: 50-year flood. **This means the flood magnitude expected to be equaled or exceeded on the average of once in 50 years.** It may also be expressed as an exceedence probability with a 2.0% chance of being equaled or exceeded in any given year.

e. 100-Yr: 100-year flood. **This means the flood magnitude expected to be equaled or exceeded on the average of once in 100 years.** It may also be expressed as an exceedence probability with a 1.0% chance of being equaled or exceeded in any given year.

4VAC50-20-60. Required permits.

A. No person or entity shall construct or begin to construct an impounding structure until the board has issued a **construction permit**.

B. No person or entity shall alter or begin to alter an existing impounding structure in a manner which would potentially affect its structural integrity until the board has issued an **alteration permit**, or in the case of an emergency, authorization obtained from the director. The permit requirement may be waived if the director determines that the alteration of improvement will not substantially alter or affect the structural integrity of the impounding structure. Alteration does not mean normal operation and maintenance……..

4VAC50-20-100. Operation and maintenance certificates.

- **Class I** Regular Operation and Maintenance Certificate
  - The certificate shall be for a term of **six years**.
  - New reinspection report certified by a professional engineer **every two years**.

- **Class II** Regular Operation and Maintenance Certificate
  - The certificate shall be for a term of **six years**.
  - New reinspection report certified by a professional engineer **every three years.**

- **Class III** Regular Operation and Maintenance Certificate
  - The certificate shall be for a term of **six years**.
  - New inventory report certified by a professional engineer **every six years**.

- The owner of a **Class I, II or III impounding structure shall provide an annual owner's inspection report** on official forms in years when no professional reinspection is required and may be done by the owner or his representative.

•If an Operation and Maintenance Certificate is not updated as required, the **board shall take appropriate enforcement action**.

•**A Class IV impounding structure will not require an operation and maintenance certificate**.

–An inventory report is to be prepared and filed by the owner on a six-year interval, and an owners inspection report filed annually.

•The owner of any impounding structure, regardless of its hazard classification, **shall notify the board** immediately of any change in either cultural features downstream from the impounding structure or of any change in the use of the area downstream that would present hazard to life or property in the event of failure.

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4VAC50-20-120. Operation and maintenance certificates for existing impounding structures.

…..The application for an operation and maintenance certificate shall be on official forms and shall include:…….

1. A reinspection report for Class I and II impounding structures….
2. An inventory report for Class III impounding structures….
3. An impoundment and impounding structure operation and maintenance plan certified by a professional engineer….
4. An emergency action plan and evidence that a copy of such plan has been filed with the local organization for emergency management and the State Department of Emergency Management….

4VAC50-20-130. Existing impounding structures <u>constructed prior to July 1, 1982</u>.

A. Many existing impoundment structures were designed and constructed prior to the enactment of the Dam Safety Act, and may not satisfy current criteria for new construction. The board may issue an operation and maintenance certificate for such structures provided that:

1. Operation and maintenance is determined by the director to be satisfactory and up to date;

2. Annual owner's inspection reports have been filed with and are considered satisfactory by the director;

3. The applicant proves in accordance with the current design procedures and references of 4VAC50-20-320 to the satisfaction of the board that the impounding structure as designed, constructed, operated and maintained does not pose an unreasonable hazard to life and property; and

4. The owner satisfies all special requirements imposed by the board.

B. When appropriate with existing impounding structures only, **<u>the spillway design flood requirement may be reduced by the board to the spillway discharge at which dam failure will not significantly increase the downstream hazard existing just prior to dam failure</u>** provided that the conditions of 4VAC50-20-130 A have been met.

4VAC50-20-140. Existing impounding structures constructed <u>after July 1, 1982</u>.

The board may issue an operation and maintenance certificate for an impounding structure having a construction permit issued after July 1, 1982, and shall not require upgrading to meet new more stringent criteria unless the board determines that the new criteria must be applied to prevent an unreasonable hazard to life or property.

4VAC50-20-150. Conditional operation and maintenance certificate.

A. During the review of any operation and maintenance application, should the director determine that the impounding structure has deficiencies of a **nonimminent danger** category, the director may recommend that the board issue a **conditional operation and maintenance certificate**.

B. The conditional operation and maintenance certificate for Class I, II and III impounding structures **shall be for a maximum term of two years**. This certificate will allow the owner to continue normal operation and maintenance of the impounding structure, and shall **require that the owner correct the deficiencies on a schedule determined by the director**…….

C. **A conditional certificate may be renewed**……

Part IV: Procedures

4VAC50-20-180. Inspections.

4VAC50-20-190. Right to hearing.

4VAC50-20-200. Enforcement.

4VAC50-20-210. Consulting boards.

4VAC50-20-220. Unsafe conditions.

4VAC50-20-230. Complaints.

Part V: Design Requirements

4VAC50-20-240. Design of structures.

4VAC50-20-250. Design flood.

4VAC50-20-260. Emergency spillway design.

4VAC50-20-270. Principal spillways and outlet works.

4VAC50-20-280. Drain requirements.

4VAC50-20-290. Life of the impounding structure.

4VAC50-20-300. Additional design requirements.

4VAC50-20-310. Plans and specifications.

4VAC50-20-320. Acceptable design procedures and references.