Virginia Soil and Water Conservation Board
Impounding Structure (Dam Safety) Technical Advisory Committee
Tuesday, October 31, 2006
Virginia Commonwealth University
Richmond, VA

Impounding Structure TAC Members Present

Sara Bell, Dominion Generation
Connie Bennett, York County and Hampton Roads PDC
William G. Browning, Department of Conservation and Recreation
David B. Campbell, Schnabel Engineering
Paul Castle, Lakefront Royal Property Owner Association
Jay R. Day, Mountain Castles Soil and Water Conservation District
J. Michael Flagg, Hanover County
Connie Houston
Richard Jacobs, Culpeper Soil and Water Conservation District
Mathew J. Lyon, Natural Resources Conservation Service
Daniel J. Mahoney, Federal Energy Regulatory Commission
Joseph H. Maroon, Department of Conservation and Recreation
Duncan McGregor
Tim Mitchell, City of Lynchburg
Mishelle R. Noble-Blair, City of Manassas
David Ogle, Virginia Department of Transportation
John Peterson, KEMPS Consulting
David Rosenthal, City of Norfolk
Peter Rainey, Lake of the Woods Association
Ray Scher

Impounding Structure TAC Members Not Present

Steve Billcheck, Virginia Department of Emergency Management
Jeff W. Booth, Western Virginia Water Authority
Douglas L. Davis, Waynesboro Police Department
Joseph S. Haugh
John W. Jones, Virginia Sheriffs Association

Facilitator

Barbara Hulburt, Director of Facilitation and Training, The McCammon Group

DCR Staff

David C. Dowling, Policy, Planning and Budget Director
Michael R. Fletcher, Director of Development

Jim Robinson, Dam Safety Program Engineer
Tom Roberts, DCR Dam Safety and Floodplain Management
Ken Turner, District Dam Engineer
Christine Watlington, Policy, Planning and Budget Analyst
Ryan Brown, Office of the Attorney General

Observers

Terri Beirne, McCandlish Holton
Kathy Jones, Richmond City Attorney's Office
Doug Rogers, Lake of the Woods Association
Robin Knepper, Fredericksburg Freelance Star

Ms. Hulburt called the meeting to order.

She explained that this would be the last scheduled meeting of the TAC. She said that Mr. Dowling would walk through the most recent draft of the Regulations so that any remaining concerns or comments may be addressed.

Ms. Hulburt said the TAC would also take a look at the draft proposed legislation and would spend time talking about funding and what members can do to help address the issue.

Ms. Hulburt referenced the minutes from the last meeting and suggested that any comments or corrections be directed to Ms. Watlington.

Mr. Dowling said that the draft proposed regulations will be posted to the website for member review. He said that Mr. Robinson would provide technical guidance during the review of the draft.

Mr. Dowling said that members were provided with two documents. The first is the October 30, 2006 version of the regulations. A copy of that version is included as Attachment #1.

The second set of documents was copies of comment e-mails received by the Department from TAC members. A copy of those e-mails is available from DCR.

Mr. Dowling said there had been several minor corrections or changes to the regulations and that he would not address each of those. Members were encouraged to review those following the meeting. He said that he would direct member discussion towards to the larger sections where changes were made.

Mr. Dowling said that at the last meeting the discussion was that the forms should be decoupled from the regulations and that any form elements should be embodied in the regulations. He noted that much work had been done on the forms and the regulations in response to this recommendation.

At the TAC's suggestion, the owner's inspection form was merged with the engineer's inspection form. Also with regard to the inspection form, much of the information has been included in the record report.

Mr. Dowling said there was also some reworking of the as-built report that was renamed at the prior meet to be the record report. There was also some reworking of the design report to parallel the record report.

Mr. Dowling said those were the areas that differ from the draft that was previously distributed.

Mr. Dowling said the best way to address the changes was to start at the beginning of the document. He noted that he would not articulate every change, but would address questions.

Mr. Dowling reviewed the changes in the document.

4VAC 50-20-20

In reviewing the section a member noted that "design, inspection and maintenance" should take into account several things including soils, geology, drainage and more. The member suggested a partial list might be problematic. The member also said "broad engineering judgment and experience" might just end with "judgment."

A member expressed concern about the statement stating that "…inspections shall be conducted by and bear the seal of a professional engineer licensed to practice in Virginia." The member said he understood the requirement for the inspection to be under the seal of a licensed engineer, but not necessarily the actual inspections.

Mr. Dowling stated that was reflective of the current regulations.

Ms. Hulburt asked the member to clarify the concern.

The member said that there were cases where work was done in partnership with an engineering firm.

Ms. Hulburt said that it could be argued that the work was sealed by a licensed engineer. Saying "conducted by or overseen by" would allow an engineer to bring in additional expertise.

A member suggested that the analysis had to bear the seal, but not the actual inspection.

4VAC 50-20-30

Mr. Dowling noted that in the definition of "Sunny Day Failure," a member had raised a question regarding sunny day failure and suggested there may be additional reasons for failure than just the piping. That phrasing was removed from the draft.

4VAC 50-20-50. Performance standards required for impounding structures.

Mr. Dowling noted that the definition of impounding structure was duplicative of other sections but staff chose to leave the verbiage there for clarity of the section.

A member raised a concern regarding silt-retaining dams. He said the issue is at what point silt is no longer silt.

Mr. Dowling noted that in this case silt dam was referring to §45.1-222 or §45.1.226.1 of the *Code of Virginia*.

The Committee discussed additional modifications to Table 1.

Mr. Dowling noted that Dr. Rainey's email had suggested eliminating the final sentence in footnote "b." That change was reflected in the 10-30-06 draft.

There was discussion regarding the classification requirements for "significant" dams.

Mr. Maroon noted that the committee had debated various aspects of Table 1 at nearly every meeting. He said that there had been significant progress and that while the Table may not be perfect, staff was confident in moving this forward to the public comment period.

Mr. Maroon noted that the Table does set up a starting point for every dam and that it allows every dam the option of incremental analysis.

A member said that the classifications of large, medium and small takes arbitrary measures and applies values that are not significant to the measurement. He said the question remains the liability that the dam produces for loss of property or life.

The member said that the hazard classification does not necessarily have anything to do with the size of the reservoir.

Mr. Maroon said that there would be a tremendous amount of impact on dams that already have different SDFs based on size if size was removed from the table.

The member said that he understood the point, however when DCR Dam Safety assesses a dam, if a structure with a large reservoir posed a sufficient liability it should be a high hazard dam. He noted that his concern was with the future interpretation.

A member noted that the two definitions of "small" in the table might be confusing.

Mr. Robinson suggested using the term "medium."

Mr. Dowling said that staff would take another look at those definitions.

At this time the committee took a break.

Following the break, the committee discussed the draft dam break inundation zone legislation and fiscal matters. Ms. Hulburt noted that Mr. Maroon had to leave for another appointment and wanted to participate in this discussion.

Mr. Dowling said the intent was not to have a detailed discussion of the legislation, but to bring it to the attention of the TAC and ask for comments. He said that DCR would like to get some thoughts on the process of moving the legislation forward.

A copy of the draft legislation is available from DCR.

Mr. Maroon said that DCR would appreciate support where appropriate. He said he was not asking for collective endorsement and would welcome any concerns of TAC members.

Mr. Maroon said the Department had submitted budget recommendations to the Secretary of Natural Resources. Those will be forwarded to the Governor. Ultimately the issues will be before the General Assembly. He said the Department had requested funding for three additional dam safety positions.

Mr. Maroon said that he had made a presentation to the Senate Agriculture, Conservation and Natural Resources Committee and had briefed them on the dam safety program.

Members expressed strong support for the legislation and the budget requests.

Mr. Maroon expressed appreciation to the TAC members for their work and for their dedication to the issue. He also expressed appreciation to Ms. Hulburt and to the DCR staff.

Mr. Maroon said the next step would be to take the draft proposed regulations before the Soil and Water Conservation Board at their November meeting. With their approval, the draft will go out for administrative review and for public comment.

Ms. Hulburt noted that before Mr. Maroon left, the committee needed to address the issue of the delayed effective date for a Spillway Design Flood.

Mr. Maroon said that the committee had looked at this issue before.

A member said that from a staffing viewpoint, there is simply not enough funding or personnel to do all that is required.

Another member said that in situations where there were eight or more years for engineering design and another eight or more years for construction there could be serious concerns.

Ms. Hulburt noted that the delayed effective date change would only apply to dams where the Spillway Design Flood had been determined to be out of compliance due to changes in the regulations.

A member said that applies to dams classified under an existing permit, but the reality is that many of these dams have not been inspected in quite some time.

At this time the committee recessed for lunch.

Mr. Dowling continued with the review of the document.

Ms. Hulburt noted that it had been the desire of the TAC that the forms not be specifically tied to the regulations.

Mr. Dowling said that the minimum requirements would be addressed within the regulations but that additional information may be requested on the forms.

When reviewing the regulatory language associated with alteration permits, a member questioned the term “including necessary repairs or structural maintenance.”

It was noted that this language was from the Code.

A member suggested using the phrase “necessary structural repairs,” so as to clarify what kind of repairs required an alteration permit.

4 VAC 50-20-175. Emergency Action Plan (EAP) for High and Significant Hazard Potential Dams.

Mr. Dowling noted that under this section the language would put the responsibility on the local dam safety emergency coordinator in cooperation with the dam owner to develop the notification process.

It was noted that the map would show the impact area as well as the structures.

Ms. Hulburt said that the EAP contemplates localities and dam owners working together, but does not require the dam owner to get the phone numbers of those in the inundation zone. She noted that there were concerns as to whether the dam owner would have the ability to obtain that information, whereas emergency management personnel might have more readily available access to that information.

A member noted a concern with the issue of an absentee owner.

Ms. Hulbert said that there were two questions: 1) who needs to be notified; and 2) who is responsible for identifying those individuals.

A member said it would be important to note that the dam owner may not have the ability to notify all potentially affected parties.

It was noted that statutorily the local government has the responsibility to help the dam owner identify those parties.

A member said that he would like to see the requirement for an EAP include making ever effort to identify the economic impact.

It was also noted that when a property is sold, it is the responsibility of the seller to note that the property exists within the inundation zone.

Ms. Hulburt asked that anyone with additional comments send them to Ms. Watlington by Friday, November 3.

She noted that the TAC members would also have the ability to continue to comment during the public comment process.

Ms. Hulburt noted that the consensus of the group was to move the document forward as discussed.

Ms. Hulburt thanked members for their participation and cooperation.

Mr. Dowling thanked members again on behalf of the Department and the Virginia Soil and Water Conservation Board.

The meeting was adjourned.

Attachment #1

Version: Monday, October 30, 2006
VIRGINIA IMPOUNDING STRUCTURE REGULATIONS (§ 4 VAC 50-20)

Part I: General

4VAC50-20-10. Authority.

This chapter is 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.

4VAC50-20-20. General provisions.

A. This chapter provides for the proper and safe design, construction, operation and maintenance of impounding structures to protect public safety. This chapter shall not be construed or interpreted to relieve the owner or operator of any impoundment or impounding structure of any legal duties, obligations or liabilities incident to ownership, design, construction, operation or maintenance.

B. Approval by the ~~board~~ Board of proposals for an impounding structure shall in no manner be construed or interpreted as approval to capture or store waters. For information concerning approval to capture or store waters, see Chapter 8 (§62.1-107) of Title 62.1of the Code of Virginia, and other provisions of law as may be applicable.

C. In promulgating this chapter, the ~~board~~ Board recognizes that no impounding structure can ever be completely "fail-safe," because of incomplete understanding of or uncertainties associated with natural (earthquakes and floods) and manmade (sabotage) destructive forces; with material behavior and response to those forces; and with quality control during construction.

D. ~~Any~~ All engineering ~~analysis~~ analyses required by this chapter, ~~such as~~ including but not limited to, plans, specifications, hydrology, hydraulics and inspections shall be conducted by and bear the seal of a professional engineer licensed to practice in Virginia.

E. Design, inspection and maintenance of impounding structures shall be conducted utilizing competent, experienced, engineering judgment that takes into consideration local topography and meteorological conditions.

~~E~~ F. The ~~official~~ forms ~~as~~ called for ~~by~~ in this chapter are available from the Department ~~director~~ at the Department's website.

4VAC50-20-30. Definitions.

The following words and terms when used in this chapter shall have the following meanings unless the context clearly indicates otherwise:

"Acre-foot" means a unit of volume equal to 43,560 cubic feet or 325,853 gallons (equivalent to one foot of depth over one acre of area).

"Agricultural purpose dams" means dams which are less than 25 feet in height or which create a maximum impoundment smaller than 100 acre-feet, and ~~certified by the owner on official forms as~~ ~~constructed, maintained or~~ operated primarily for agricultural purposes~~, and are approved by the Director~~.

"Alteration" means changes to an impounding structure that could alter or affect its structural integrity. Alterations include, but are not limited to, changing the height or otherwise enlarging the dam, increasing normal pool or principal spillway elevation or physical dimensions, changing the elevation or physical dimensions of the emergency spillway, conducting necessary structural repairs or structural maintenance, or removing the impounding structure. ~~Alterations do not include normal operation and maintenance.~~

"Alteration permit" means a permit required for ~~changes~~ any alteration to an impounding structure ~~that could alter or affect its structural integrity~~. ~~Alterations requiring a permit include, but are not limited to: changing the height, increasing the normal pool or principal spillway elevation, changing the elevation or physical dimensions of the emergency spillway or removing the impounding structure.~~

"Board" means the Virginia Soil and Water Conservation Board.

"Conditional ~~operation and maintenance certificate~~ Operation and Maintenance Certificate" means a certificate required for impounding structures with deficiencies.

"Construction" means the construction of a new impounding structure.

"Construction permit" means a permit required for the construction of a new impounding structure.

"Dam break inundation zone" means the area downstream of a dam that would be inundated or otherwise directly affected by the failure of a dam.

"Department" means the Virginia Department of Conservation and Recreation.

"Design flood" means the calculated volume of runoff and the resulting peak discharge utilized in the evaluation, design, construction, operation and maintenance of the impounding structure.

~~"Design freeboard" means the vertical distance between the maximum elevation of the design flood and the top of the impounding structure.~~

"Director" means the Director of the Department of Conservation and Recreation or his designee.

"Drill" means a type of emergency action plan exercise that tests, develops, or maintains skills in an emergency response procedure. During a drill, participants perform an in-house exercise to verify telephone numbers and other means of communication along with the owner's response. A drill is considered a necessary part of ongoing training.

"Emergency Action Plan or EAP" means a formal document that recognizes potential impounding structure emergency conditions and specifies preplanned actions to be followed to minimize loss of life and property damage. The EAP specifies actions the owner must take to minimize or alleviate emergency conditions at the impounding structure. It contains procedures and information to assist the owner in issuing early warning and notification messages to responsible emergency management authorities. It shall also contain dam break inundation zone maps as required to show emergency management authorities the critical areas for action in case of emergency.

"Emergency Action Plan Exercise" means an activity designed to promote emergency preparedness; test or evaluate EAPs, procedures, or facilities; train personnel in emergency management duties; and demonstrate operational capability. In response to a simulated event, exercises should consist of the performance of duties, tasks, or operations very similar to the way they would be performed in a real emergency. An exercise may include but not be limited to drills and tabletop exercises.

"Emergency Preparedness Plan" means a formal document prepared for Low Hazard dams that provides maps and procedures for notifying owners of downstream property that may impacted by an emergency situation at an impounding structure.

"Freeboard" means the vertical distance between the maximum water surface elevation associated with the spillway design flood and the top of the impounding structure.

"Height" means the ~~structural~~ hydraulic height of an impounding structure. If the impounding structure spans a stream or watercourse, height means the vertical distance from the natural bed of the stream or watercourse measured at the downstream toe of the impounding structure to the top of the impounding structure. If the impounding structure does not span a stream or watercourse, height means the vertical distance from the lowest elevation of the ~~outside~~ downstream limit of the barrier to the top of the impounding structure.

"Impounding structure" means a man-made ~~device~~ 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 25 feet or greater in height and that create an impoundment capacity of 15 acre-feet or greater, and (ii) all dams that are six feet or greater in height and that create an impoundment capacity of 50 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 ~~constructed, maintained or~~ operated primarily for agricultural purposes which are less than 25 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 of the Code of Virginia; or (e) obstructions in a canal used to raise or lower water.

"Impoundment" means a body of water or other materials the storage of which is caused by any impounding structure.

~~"Inundation zone" means an area that could be inundated as a result of impounding structure failure and that would not otherwise be inundated to that elevation.~~

"Life of the impounding structure" and "life of the project" mean that period of time for which the impounding structure is designed and planned to perform effectively, including the time required to remove the structure when it is no longer capable of functioning as planned and designed.

"Maximum impounding capacity" means the volume of water or other materials in acre-feet that is capable of being impounded at the top of the impounding structure.

"Normal impounding capacity" means the volume of water or other materials in acre-feet that is capable of being impounded at the elevation of the crest of the lowest ungated outlet from the impoundment.

"Operation and ~~maintenance~~ Maintenance ~~certificate~~ Certificate" means a certificate required for the operation and maintenance of all impounding structures.

"Owner" means the owner of the land on which an impounding structure is situated, the holder of an easement permitting the construction of an impounding structure and any person or entity agreeing to maintain an impounding structure. The term "owner" includes the Commonwealth or any of its political subdivisions, including but not limited to sanitation district commissions and authorities. Also included are any public or private institutions, corporations, associations, firms or companies organized or existing under the laws of this Commonwealth or any other state or country, as well as any person or group of persons acting individually or as a group.

"Spillway" means a structure to provide for the controlled release of flows from the impounding structure into a downstream area.

"Sunny Day Dam Failure" means the breaching of an impounding structure ~~caused by piping through an earthen embankment or appurtenance~~ with the initial water level at the normal reservoir level, usually at the lowest ungated principal spillway elevation or the typical operating water level.

"Tabletop Exercise" means a type of emergency action plan exercise that involves a meeting of the impounding structure owner and the state and local emergency management officials in a conference room environment. The format is usually informal with minimum stress involved. The exercise begins with the description of a simulated event and proceeds with discussions by the participants to evaluate the EAP and response procedures and to resolve concerns regarding coordination and responsibilities.

"Top of the impounding structure" means the lowest point of the nonoverflow section of the impounding structure.

"Watercourse" means a natural channel having a well-defined bed and banks and in which water normally flows ~~when it normally does flow~~.

4VAC50-20-40. Hazard Potential Classifications ~~Classes~~ of impounding structures.

A. Impounding structures shall be classified in one of ~~four~~ three hazard classifications ~~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.~~

B. For the purpose of this chapter, hazards pertain to potential loss of human life or ~~property~~ damage to the property of others downstream from the impounding structure in event of failure or faulty operation of the impounding structure or appurtenant facilities. Hazard potential ~~classes~~ classifications of dams are as follows.

1. ~~Impounding structures in the Class I hazard potential category are located where~~ High Hazard Potential is defined where an impounding structure failure will cause probable loss of life or serious economic damage. Economic damage may occur to ~~include~~, but not be limited to, occupied building(s), industrial or commercial facilities, ~~important~~ primary public utilities, ~~main highway(s) or~~ major public roadways, ~~railroad(s)~~ railroads, personal property, and agricultural interests.

2. ~~Impounding structures in the Class II hazard potential category are located where~~ Significant Hazard Potential is defined where an impounding structure failure ~~could~~ may cause ~~possible~~ the loss of life or appreciable economic damage. Economic

damage may occur to ~~include~~, but not be limited to, unoccupied building(s), industrial or commercial facilities, secondary public utilities, secondary public roadways, railroads, personal property, and agricultural interests. ~~highway(s) or railroad(s) or cause interruption of use or service of relatively important public utilities~~.

3. ~~Impounding structures in Class III hazard potential category are located where~~ Low Hazard Potential is defined where an impounding structure failure would result in no expected loss of life and would cause no more than minimal economic damage. Economic damage may occur to ~~include~~, but not be limited to, unoccupied building(s), industrial or commercial facilities, secondary public utilities, secondary public roadways, railroads ~~or~~ personal property, and agricultural interests ~~may cause minimal property damage to others. No loss of life is expected~~.

~~4. 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.~~

~~5~~C. ~~Such size and~~ The hazard potential classification and size ~~classifications~~ category for the given hazard classification shall be proposed by the owner and shall be subject to approval by the ~~director~~ Director. To ~~conclusively determine~~ support the appropriate hazard potential classification, dam break analysis shall be conducted by the owner's engineer. Present and ~~projected development of~~ planned land-use in the dam break inundation zone~~s~~ downstream from the impounding structure shall be considered in determining the classification.

~~6~~ D. Impounding structures shall be subject to reclassification by the Board as necessary.

4VAC50-20-50. Performance standards required for impounding structures.

A. In accordance with the definitions provided by Virginia Code § 10.1-604 and 4VAC50-20-30, an impounding structure shall be regulated if the dam is 25 feet or greater in height and creates a maximum impounding capacity of 15 acre-feet or greater, or the dam is six feet or greater in height and creates a maximum impounding capacity of 50 acre-feet or greater and is not otherwise exempt from regulation by the Code of Virginia. Impounding structures exempted from this chapter are those that are:

1. Licensed by the State Corporation Commission that are subject to a safety inspection program;

2. Owned or licensed by the United States government;

3. Operated primarily for agricultural purposes which are less than 25 feet in height or which create a maximum impoundment capacity smaller than 100 acre-feet;

4. Water or silt retaining dams approved pursuant to §45.1-222 or §45.1-225.1 of the Code of Virginia; or

5. Obstructions in a canal used to raise or lower water.

Impounding structures of regulated size and not exempted shall be constructed, operated and maintained such that they perform in accordance with their design and purpose throughout the life of the project. 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. For the purposes of utilizing Table 1, Maximum Impounding Capacity and Height shall be determined in accordance with the definitions

provided in 4 VAC 50-20-30 and Hazard Potential Classification shall be determined in accordance with 4VAC 50-20-40.

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[e]~~ ~~PMF~~ ~~1/2 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[D]~~ ~~1/2 PMF to PMF~~ ~~100-YR to 1/2 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~~	~~1/2 PMF to PMF~~ ~~100-YR to 1/2 PMF~~ ~~50-YR[d] to 100-YR[e]~~
~~IV~~	~~No Loss of Life Expected; No Economic Loss to Others~~	~~≥ 50 (non-agricultural)~~ ~~≥ 100 (agricultural)~~	~~≥ 25 (both)~~	~~50-YR to 100-YR~~

Hazard Potential Class of Dam	SIZE CATEGORIES[B] Maximum Impounding Capacity (Ac-Ft)	Height (Ft)	Spillway Design Flood (SDF)[C]	Minimum Threshold for Incremental Damage Assessment
HIGH	All[B]	All[B]	PMF[D]	.50 PMF
SIGNIFICANT	~~Large ≥ 1,000~~ Large ≥ 50,000 Medium > 1,000 & <50,000 Small ≥ 15 & < 1,000	~~≥ 40~~ ≥ 100 > 40 & < 100 ≥ 6 & < 40	~~PMF[D]~~ PMF[D] .75 PMF .50 PMF	~~.50 PMF~~ .50 PMF 100-YR[E] 100-YR[E]
LOW	Large ≥ 50,000 Small ≥ 15 & < 50,000	≥ 100 ≥ 6 & < 100	.50 PMF 100-YR[E]	100-YR[E] 50-YR[F]

~~a~~B. ~~The factor determining the largest size classification shall govern.~~ The appropriate size category ~~classification~~ is determined by the largest size associated with the maximum impounding capacity and height of the impounding structure.

~~b~~C. 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.~~ Reductions in the established SDF may be evaluated through the use of incremental damage assessment pursuant to 4 VAC 50-20-52. The SDF established for an impounding structure shall not be less than those standards established elsewhere ~~in regulations~~ by state law or regulations, including but not limited to the Virginia Stormwater Management Program (VSMP) Permit Regulations (4VAC50-60-10 et seq.) ~~Soil and Water Conservation Board Regulations for stormwater management impoundment structures and facilities.~~ ~~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~~D. PMF: Probable ~~maximum~~ Maximum ~~flood~~ Flood~~.~~ ~~This means~~ is 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.~~ Any deviation in the application of established developmental procedures must be explained and justified by the owner's engineer. The owner's engineer must develop PMF hydrographs for 6, 12, 24 hour durations. The hydrograph that creates the largest peak outflow is to be used to determine capacity for non-failure and failure analysis. Present and planned land-use conditions shall be considered in determining the runoff characteristics of the drainage area.

E. 100-Yr: 100-year flood represents 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. Present and planned land-use conditions shall be considered in determining the runoff characteristics of the drainage area.

~~d~~F. 50-Yr: 50-year flood~~. This means~~ represents 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. Present and planned land-use conditions shall be considered in determining the runoff characteristics of the drainage area.

~~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.~~

4VAC50-20-52. Incremental damage assessment.

A. When appropriate, the spillway design flood requirement may be reduced by the Board in accordance with this section.

B. Prior to qualifying for a spillway design flood reduction, certain maintenance conditions must be adequately addressed including, but not limited to, the following:

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

2. The impounding structure is not in need of other alteration related to the integrity of the structure;

3. Emergency Action Plan requirements set out in 4 VAC50-20-175 or Emergency Preparedness requirements set out in 4VAC50-20-177 have been satisfied;

4. ~~Reporting~~ Inspection report requirements have been met and are considered satisfactory by the Director;

5. The applicant demonstrates 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;

6. The owner satisfies all special requirements imposed by the Board: and

7. Certification by the owner that these conditions will continue to be met.

C. After meeting the criteria set out in 4VAC50-20-52B, the owner's engineer may proceed with ~~evaluating the~~ an incremental damage analysis. Once the owner's engineer has determined the required spillway design flood through application of Table 1, further analysis may be performed to evaluate the limiting flood condition for incremental damages ~~assessment~~. ~~This assessment may be used to lower the spillway design flood. Allowable reductions are set out in subsection D, however, in no situation shall be the reduction be less than the level at which the incremental increase in water surface elevation downstream due to failure of a dam is no longer considered to present an unacceptable additional downstream threat.~~ The spillway design flood requirement may be reduced to the spillway discharge at which dam failure will not significantly increase the downstream threat existing just prior to dam failure. This engineering analysis will need to present water surface elevations at each structure that may be impacted downstream of the dam. Water depths greater than two feet and overbank flow velocities greater than three feet per second shall be used to define conditions for unacceptable additional downstream threat ~~determine impacts~~ to persons or property. ~~Water depth changes less than two feet and overbank flow velocities less than three feet per second may be considered as ineffective to structures downstream of the dam.~~

~~D. Allowable reductions are as follows:~~

~~1. For High Hazard Potential impounding structures, the spillway design flood shall not be less than .50 PMF.~~

~~2. For Large Significant Hazard Potential impounding structures, the spillway design flood shall not be less than .50 PMF. For Small Significant Hazard Potential impounding structures, the spillway design flood shall not be less than 100-YR.~~

~~2. For Large Low Hazard Potential dams, the spillway design flood shall not be less than 100-YR. For Small Low Potential Hazard impounding structures, the spillway design flood shall not be less than 50-YR.~~

D. The spillway design flood shall not be reduced below the minimum threshold values as determined by Table 1.

4VAC50-20-54. Dam break inundation zone mapping

Dam break inundation zone maps shall be provided to the Department to meet the requirements set out in Hazard Potential Classifications of Impounding Structures (4VAC50-20-40), Emergency Action Plan for High and Significant Potential Hazard Dams (4VAC50-20-175), and Emergency Preparedness for Low Hazard Potential Dams (4VAC50-20-177), as applicable.

A. All inundation mapping should extend downstream ~~of~~ from the dam to a location where failure of the dam does not further constitute a hazard to downstream life or property. The location of the end of the inundation mapping should be indicated where the water surface elevation of the dam break inundation zone and the water surface elevation of the spillway design flood during a non-dam failure event ~~are~~ converge to within one foot of each other. The inundation maps shall be supplemented with water surface profiles and cross-sections at critical areas showing the peak water surface elevation prior to failure and the peak water surface elevation after failure.

B. All inundation zone map(s), except those utilized in meeting the requirements of Emergency Preparedness for Low Hazard Potential Dams (4VAC50-20-177), shall be signed and sealed by a licensed professional ~~licensed~~ engineer, however, maps prepared by a licensed professional engineer are preferred.

C. For determining the hazard potential classification, a minimum of the following shall be provided to the Department:

1. A sunny-day dam break analysis utilizing the volume retained at the normal or typical water surface elevation of the impounding structure;

2. A dam break analysis ~~utilizing the~~ under spillway design flood conditions with a dam failure; and

3. A dam break analysis ~~utilizing the~~ under spillway design flood conditions without a dam failure.

D. To meet the requirements of Emergency Preparedness set out in 4VAC50-20-177, all Low Hazard Potential impounding structures shall provide a simple map, acceptable to the Department, demonstrating the general inundation that would result from a dam failure. Such maps do not require preparation by a professional licensed engineer.

E. To meet ~~the requirements of~~ the Emergency Action Plan requirements set out in 4VAC50-20-175, all owners of High and Significant Hazard Potential impounding structures shall provide dam break inundation map(s) representing the impacts that would occur with both a sunny-day dam failure and a spillway design flood dam failure.

1. The map(s) shall be developed at a scale sufficient to graphically display downstream inhabited areas and structures, roads, and other pertinent structures ~~on the map~~ within the identified inundation area ~~that may be subject to possible danger~~. ~~The~~ A list of downstream inundation zone property owners and occupants, including ~~and~~ telephone numbers ~~of downstream residents, who are in the inundation zones,~~ should ~~whenever possible~~ be plotted on the map or provided with map for ~~easy~~ reference ~~in the case of emergencies~~ during an emergency.

~~2. Since local officials are likely to use the maps for evacuation purposes, a note should be included on the map to advise that, because of the method, procedures, and assumptions used to develop the flooded areas, the limits of flooding shown and flood~~

~~wave travel times are approximate and should be used only as a guideline for establishing evacuation zones. Actual areas inundated will depend on actual failure conditions and may differ from areas shown on the maps.~~

2. A notes shall be included on each map to state: "Mapping of flooded areas and flood wave travel times are approximate. Timing and extent of actual inundation may differ from information present on this map".

4VAC50-20-58. Local government notifications.

For each certificate issued, the impounding structure owner shall send ~~to the appropriate local government office, with planning and zoning responsibilities,~~ a copy of the certificate to the appropriate local government(s) with planning and zoning responsibilities. A project description and the map(s) required under 4VAC50-20-54 showing the area that could be affected by the impounding structure breach shall be submitted with the certificate. The Department will provide a standard form cover letter for forwarding the certificate copy and accompanying materials. ~~This notification would also serve to advise the locality that if development occurs in the dam break inundation zone that this could adversely affect the classification of the dam and require significant expenses to upgrade the impounding structure.~~

Part II: Permit Requirements

4VAC50-20-60. Required permits.

A. No person or entity shall construct or begin to construct an impounding structure until the ~~board~~ 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~~ Board has issued an alteration permit.~~, or in the case of an emergency, authorization obtained from the director~~. If an owner or the owner's engineer has determined that circumstances are impacting the integrity of the impounding structure which could result in the imminent failure of the impounding structure, temporary repairs may be initiated prior to approval from the ~~Director~~ Board. The owner shall notify the Department within 24 hours of identifying the circumstances impacting the integrity of the impounding structure. ~~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~~. Such emergency notification shall not relieve the owner of the need to obtain an alteration permit as soon as may be practicable, nor shall the owner take action beyond that necessary to address the emergency situation.

C. When the ~~board Board receives~~ owner submits an application to the Board for any permit to construct or alter an impounding structure, the ~~director~~ the owner shall also inform ~~the~~ local government ~~of any~~ jurisdiction or jurisdictions which might be affected by the permit application.

D. In evaluating construction and alteration permit applications the ~~director~~ Director shall use the ~~most current~~ design criteria and standards referenced in 4VAC50-20-320 of this chapter.

4VAC50-20-70. Construction permits.

A. Prior to preparing the complete design report for a construction permit, applicants ~~are encouraged to seek approval from the director~~ ~~shall~~ may submit ~~the~~ a preliminary design report to the Department to determine if the project concept is acceptable to the Department. ~~For this purpose the applicant should submit a~~ The preliminary design report should contain, at a minimum, a general description of ~~subdivisions~~ items 1 through ~~4~~12 of subsection B of this section and subdivisions 1 and 2 of this subsection:

1. Proposed design criteria and a description of the size of the impounding structure, ground cover conditions, extent of current upstream development ~~of~~ within the watershed, ~~jurisdictional comprehensive planning for development within the watershed~~, and the ~~hydraulics and hydrology~~ hydraulic, hydrological and structural features, geologic conditions and the geotechnical engineering assumptions used to determine the ~~foundations~~ foundation, impoundment rim stability and materials to be used.

2. Preliminary drawings of a general nature, including cross sections, plans and profiles of the impounding structure, proposed pool levels and types of spillway(s).

B. An applicant for a construction permit shall submit a design report on the ~~official forms~~ Department's form (Design Report for the Construction or Alteration of Virginia Regulated Impounding Structures). The design report shall be prepared in accordance with 4VAC50-20-240 ~~and shall include the following information: be consistent with the preliminary design report~~. The design report is a required element of a complete application for a construction permit and shall include the following information:

1. Project Information including a description of the proposed construction, name of the impounding structure, inventory number if available, name of the reservoir, and the purpose of the reservoir.

2. The proposed Hazard Potential classification in conformance with Table 1 of this chapter.

3. Location of the impounding structure including the City or County, number of feet or miles upstream or downstream of a highway and the highway number, name of the river or the stream, and the latitude and longitude.

4. Owner's name or representative if corporation, mailing address, residential and business telephone numbers, and other means of communication.

5. Owner's engineer's name, firm, professional engineer Virginia number, mailing address, and business telephone number.

6. Impounding structure data including type of material (earth, concrete, masonry or other) and the following design configurations:

a. Top of dam (elevation);

b. Downstream toe – lowest (elevation);

c. Height of dam (feet);

d. Crest length – exclusive of spillway (feet);

e. Crest width (feet);
f. Upstream slope (horizontal and vertical); and
g. Downstream slope (horizontal and vertical).
7. Reservoir data including the following:
a. Maximum capacity (acre-feet);
b. Maximum pool (elevation);
c. Maximum pool surface area (acres);
d. Normal capacity (acre-feet);
e. Normal pool (elevation);
f. Normal pool surface area (acres); and
g. Freeboard – normal pool to top of dam (feet).
8. Spillway data including the type, construction material, design configuration, and invert elevation for the low level drain, the principal spillway, and the emergency spillway.
9. Watershed data including drainage area (square miles); type and extent of watershed development; time of concentration (hours); routing procedure; spillway design flood used and state source; design inflow hydrograph volume (acre-feet), peak inflow (cfs), and rainfall duration (hours); and freeboard during passage of the spillway design flood (feet).
~~1. A description of the impounding structure and appurtenances and a proposed classification conforming with this chapter. The description shall include a statement of the purposes for which the impoundment and impounding structure are to be used.~~
~~2~~10. A description of properties located in the dam break inundation zone downstream from the site of the proposed impounding structure, including the location and number of ~~residential~~ structures, buildings, roads, utilities and other property that would be endangered should the impounding structure fail.
~~3~~11. ~~A statement from the governing body of the local political subdivision or other evidence confirming that body is aware of the proposal to build an impounding structure and that of the land use classifications applicable to the inundation zone.~~ Evidence that the local government or governments have been notified of the proposal by the owner to build an impounding structure.
~~4~~12. Maps showing the location of the proposed impounding structure that include~~:~~ the county or city in which the proposed impounding structure would be located, the location of roads~~,~~ and access to the site, and the outline of the impoundment. Existing aerial photographs or existing topographic maps may be used for this purpose.
~~5~~13. A report of the geotechnical investigations of the foundation soils, ~~or~~ bedrock, or both and of the materials to be used to construct the impounding structure.
~~6~~14. Design assumptions and analyses sufficient to indicate that the impounding structure will be stable during its construction and during the life of the impounding structure under all conditions of ~~reservoir~~ impoundment operations, including rapid filling, flood surcharge, seismic loadings, and rapid drawdown of the impoundment.
~~7~~15. Evaluation of the stability of the ~~reservoir~~ impoundment rim area ~~in order~~ to safeguard against ~~reservoir~~ impoundment rim slides of such magnitude as to create waves capable of overtopping the impounding structure and ~~confirmation~~ evaluation of rim stability during seismic activity.

~~8~~16. Design assumptions and analyses sufficient to indicate that seepage in, around, through or under the impounding structure, foundation and abutments will be reasonably and practically controlled so that internal or external forces or results thereof will not endanger the stability and integrity of the impounding structure. The design report shall also include information on graded filter design.

~~9~~17. Calculations and assumptions relative to hydraulic and structural design of the spillway or spillways and energy dissipater or dissipaters. Spillway capacity shall conform to the criteria of Table 1 and 4VAC50-20-52.

~~10~~18. Provisions to ensure that the impounding structure and appurtenances will be protected against unacceptable deterioration or erosion due to freezing and thawing, wind, wave action, and rain or any combination thereof.

~~11~~19. Other pertinent design data, assumptions and analyses commensurate with the nature of the particular impounding structure and specific site conditions, including when required by ~~the director~~ this chapter, a plan and profile of the dam break inundation zone~~s~~.

~~12. Erosion and sediment control plans to minimize soil erosion and sedimentation during all phases of construction, operation and maintenance. Projects shall be in compliance with local erosion and sediment control ordinances.~~

~~13~~20. A description of the techniques to be used to divert stream flow during construction so as to prevent hazard to life, health and property, including a detailed plan and procedures to maintain a stable impounding structure during storm events, a drawing showing temporary diversion devices, and a description of the potential impoundment during the construction. Such diversion plans shall also be in accordance with applicable environmental laws.

~~14~~21. A plan ~~of~~ for project construction monitoring and quality control testing to confirm that construction materials and ~~methods~~ performance standards meet the design requirements set forth in the specifications.

~~15. A proposed schedule indicating construction sequence and time to completion~~.

~~16~~22. Plans and specifications as required by 4VAC50-20-310.

~~17. An emergency action plan on official forms 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. The plan shall include a method of providing notification and warning to persons downstream, other affected persons or property owners and local authorities in the event of a flood hazard or the impending failure of the impounding structure.~~

~~18. A proposed impoundment and impounding structure operation and maintenance plan on official forms certified by a professional engineer. This plan shall include a safety inspection schedule and shall place particular emphasis on operating and maintaining the impounding structure in keeping with the project design, so as to maintain its structural integrity and safety during both normal and abnormal conditions which may reasonably be expected to occur during its planned life.~~

23. Certification by the owner's engineer that the information provided pursuant to this subsection is true and correct in their professional judgment. Such certification shall include the engineer's signature, printed name, Virginia number, date, and the engineer's Virginia seal.

24. Owners signature certifying receipt of the information provided pursuant to this subsection.

~~C. The director or the applicant may request a conference to facilitate review of the applicant's proposal~~.

C. A plan of construction ~~schedule~~ is a required element of a complete permit application for a construction permit and shall include:

1. A ~~detailed~~ construction ~~schedule~~ sequence with milestones ~~that has been agreed to by the owner, engineer and contractor~~.

2. Elements of the work plan that should be considered include, but are not limited to, foundation and abutment treatment, stream or river diversion, excavation and material fill processes, phased fill and compaction, testing and control procedures, construction of permanent spillway and drainage devices.

3. The erosion and sediment control plan, as approved by the local government, which minimizes soil erosion and sedimentation during all phases of construction.

4. The stormwater management plan or stormwater management facility plan, as approved by the local government, if the impounding structure is a stormwater management best management practice.

~~5. A detailed plan and procedures to maintain a stable impounding structure during storm events.~~

~~D. The owner shall certify in writing that the operation and maintenance plan as approved by the board will be adhered to during the life of the project except in cases of unanticipated emergency requiring departure therefrom in order to mitigate hazard to life and property. At such time, the owner's engineer and the director shall be notified.~~

D. A Temporary Emergency Action Plan is a required element of a complete application for a construction permit and shall include:

1. A notification list of state and local emergency response agencies~~, including any affected local governments~~;

~~2. A drawing showing temporary diversion devices:~~

~~3. Potential impoundment during the construction:~~

2~~4~~. Provisions for notification of potentially affected residences and structures;

3~~5~~. Construction site evacuation routes, and

4~~6~~. Any other special notes particular to the project.

~~E. If the submission is not acceptable, the director shall inform the applicant within 60 days and shall explain what changes are required for an acceptable submission.~~

E. Within 120 days of receipt of a complete construction permit application the Board shall act on the application. If the application is not acceptable, the Director shall inform the applicant within 60 days of receipt and shall explain what changes are required for an acceptable application. A complete construction permit application consists of the following:

1. A final design report, submitted on the ~~official~~ Department form (Design Report for the Construction or Alteration of Virginia Regulated Impounding Structures), with attachments as needed, and certified by the owner and the owner's engineer;

2. A plan of construction ~~schedule~~ which meets the requirements of subsection C above; and

3. A Temporary Emergency Action Plan which meets the requirements of subsection D above.

~~F. Within 120 days of receipt of an acceptable design report the board shall act on the application.~~

F. Prior to and during construction the owner shall ~~notify~~ provide the ~~director~~ Director ~~of~~ with any proposed changes from the approved design, plans, specifications, or ~~operation and maintenance~~ plan of construction ~~schedule~~. Approval shall be obtained from the ~~director~~ Director prior to the construction or installation of any changes that will affect the ~~stability~~ integrity or impounding capacity of the impounding structure.

G. The construction permit shall be valid for the plan of construction ~~schedule~~ specified in the ~~approved design report~~ construction permit application. ~~The construction schedule may be amended by the director for good cause at the request of the applicant.~~

H. Construction must commence within two years after the permit is issued. If construction does not commence within two years after the permit is issued, the permit shall expire, except that the applicant may petition the ~~board~~ Board for extension of the two-year period and the ~~board~~ Board may extend such period for good cause with an appropriately updated plan of construction ~~schedule~~ and temporary emergency action plan.

I. ~~The director~~ Director ~~may revoke a construction permit issue a temporary stop work order pursuant to § 10.1-612.1 of the Code of Virginia and take any other action authorized by the Dam Safety Act (§ 10.1-604 et seq. of the Code of Virginia) if any of the permit terms are violated, or if construction is conducted in a manner hazardous to downstream life or property. The director may order the owner to eliminate such hazardous conditions within a period of time limited by the order. Such corrective measures shall be at the owner's expense. The applicant may petition the board to reissue the permit with such modifications as the board determines to be necessary.~~ The Board, the Director, or both may take any necessary action consistent with the Dam Safety Act (§10.1-604 et seq. of the Code of Virginia) if any terms of this section or of the permit are violated, if the activities of the owner are not in accordance with the approved plans and specifications, if construction is conducted in a manner hazardous to downstream life or property, or for other cause as described in the Act.

~~J. The owner's licensed professional engineer shall advise the director Director when the impounding structure structure's construction is complete and may safely impound water. If an Operation and Maintenance Application and Emergency Action Plan or Emergency Preparedness requirements have been received and approved, The the director Director shall acknowledge this statement issue a letter within 10 working days, of receipt of the completion notification authorizing that after which the impoundment may be filled under the engineer's supervision direction. If the submission of the an Operation and Maintenance Application, the Emergency Action Plan or Emergency Preparedness plan requirements are not acceptable, the Director shall inform the applicant within 10 working days and shall explain what changes are required for an acceptable submission. The director's acknowledgement shall act as a temporary operation and maintenance certificate until an operation and maintenance certificate has been applied for and issued in accordance with 4VAC50-20-110~~.

J. Within 90 days after completion of the construction of an impounding structure, the owner shall submit:

1. A complete set of record drawings signed and sealed by a licensed professional engineer and signed by the owner;

2. A complete Record Report (Record Report for Virginia Regulated Impounding Structures) signed and sealed by a licensed professional engineer and signed by the owner that includes;

a. Project information including the name and inventory number of the structure, name of the reservoir, and whether the report is associated with a new or old structure;

b. Location of the impounding structure including the City or County, number of feet or miles upstream or downstream of a highway and the highway number, name of the river or the stream, and the latitude and longitude;

c. Owner's name or representative if corporation, mailing address, residential and business telephone numbers, and other means of communication;

d. Information on the Design Report for the Construction or Alteration of Virginia Regulated Impounding Structures including who it was prepared by, the date of design report preparation, whether it was for new construction or for an alteration, and the permit issuance date;

e. Owner's engineer's name, firm, professional engineer Virginia number, mailing address, and business telephone number;

f. Impounding structure data including type of material (earth, concrete, masonry or other) and the following configurations:

(1). Top of dam (elevation);
(2). Downstream toe – lowest (elevation);
(3). Height of dam (feet);
(4). Crest length – exclusive of spillway (feet);
(5). Crest width (feet);
(6). Upstream slope (horizontal and vertical); and
(7). Downstream slope (horizontal and vertical).

g. Reservoir data including the following:

(1). Maximum capacity (acre-feet);
(2). Maximum pool (elevation);
(3). Maximum pool surface area (acres);
(4). Normal capacity (acre-feet);
(5). Normal pool (elevation);
(6). Normal pool surface area (acres); and
(7). Freeboard – normal pool to top of dam (feet).

h. Spillway data including the type, construction material, design configuration, and invert elevation for the low level drain, the principal spillway, and the emergency spillway; a description of the low level drain and principal spillway including dimensions, trash guard information, and orientation of intake and discharge to dam if looking downstream; and a description of the emergency spillway including dimensions and orientation to dam if looking downstream;

i. Watershed data including drainage area (square miles); type and extent of watershed development; time of concentration (hours); routing procedure; spillway

design flood used and state source; design inflow hydrograph volume (acre-feet), peak inflow (cfs), and rainfall duration (hours); freeboard during passage of the spillway design flood (feet); and confirmation as to whether the impounding structure has ever been overtopped;

j. Impounding structure history including the date construction was completed, who it was designed by and the date, who it was built y and the date, who performed inspections and dates, description of repairs, and confirmation as to whether the impounding structure has ever been overtopped;

k. A narrative describing the impounding structure procedures for operation, maintenance, emergency action plan implementation, and structure evaluation;

l A narrative describing the hydraulic and hydrologic data on the spillway design flood, hydrologic records, flood experience, flood potential, reservoir regulation, and comments or recommendations regarding these attributes;

m. A narrative describing stability of the foundation and abutments, embankment materials, and a written evaluation of each;

n. A complete set of record drawings signed and sealed by a licensed professional engineer and signed by the owner;

o. Certification by the owner's engineer that the information provided pursuant to subsection J2 is true and correct in their professional judgment. Such certification shall include the engineer's signature, printed name, Virginia number, date, and the engineer's Virginia seal; and

p. Owners signature certifying receipt of the information provided pursuant to subsection J2.

3. Certification from the licensed professional engineer who has monitored construction of the impounding structure during construction that, to the best of the engineer's judgment, knowledge and belief, the impounding structure and its appurtenances were constructed in conformance with the plans, specifications, drawings and other requirements approved by the Board;

4.Operation and Maintenance Certificate Application (Operation and Maintenance Certificate Application for Virginia Regulated Impounding Structures) in accordance with 4VAC50-20-105; and

5. Emergency Action Plan or Emergency Preparedness Plan in accordance with 4VAC50-20-175 or 4VAC50-20-177.

K. Upon completion of construction, the impoundment may be filled upon Board issuance of an Operation and Maintenance Certificate.

4VAC50-20-80. Alterations permits.

~~A. Application for a permit to alter an impounding structure in ways which would potentially affect its structural integrity shall be made on official forms. The application shall clearly describe the proposed work with appropriately detailed plans and specifications.~~

~~B~~ A. Alterations which would potentially affect the structural integrity of an impounding structure include, but are not limited to, changing ~~its~~ the height or otherwise enlarging the dam, increasing ~~the~~ normal pool or principal spillway elevation or physical dimensions, changing the elevation or physical dimensions of the emergency spillway,

conducting necessary repairs or structural maintenance, or removing the impounding structure.

B. An applicant for an alteration permit shall submit a design report on the ~~official~~ Department form (Design Report for the Construction or Alteration of Virginia Regulated Impounding Structures). The design report shall be prepared in accordance with 4VAC50-20-240. The design report shall include, but not be limited to, the following information:

1. Project Information including a description and benefits of the proposed alteration, name of the impounding structure, inventory number if available, name of the reservoir, and the purpose of the reservoir.

2. The hazard potential classification in conformance with Table 1 of this chapter.

3. Location of the impounding structure including the City or County, number of feet or miles upstream or downstream of a highway and the highway number, name of the river or the stream, and the latitude and longitude.

4. Owner's name or representative if corporation, mailing address, residential and business telephone numbers, and other means of communication.

5. Owner's engineer's name, firm, professional engineer Virginia number, mailing address, and business telephone number.

6. Impounding structure data including type of material (earth, concrete, masonry or other) and the following configurations (note both existing and design configurations for each):

a. Top of dam (elevation);
b. Downstream toe – lowest (elevation);
c. Height of dam (feet);
d. Crest length – exclusive of spillway (feet);
e. Crest width (feet);
f. Upstream slope (horizontal and vertical); and
g. Downstream slope (horizontal and vertical).

7. Reservoir data including the following (note both existing and design configurations for each):

a. Maximum capacity (acre-feet);
b. Maximum pool (elevation);
c. Maximum pool surface area (acres);
d. Normal capacity (acre-feet);
e. Normal pool (elevation);
f. Normal pool surface area (acres); and
g. Freeboard – normal pool to top of dam (feet).

8. Spillway data including the type, construction material, design configuration, and invert elevation for the low level drain, the principal spillway, and the emergency spillway.

9. Watershed data including drainage area (square miles); type and extent of watershed development; time of concentration (hours); routing procedure; spillway design flood used and state source; design inflow hydrograph volume (acre-feet), peak inflow (cfs), and rainfall duration (hours); and freeboard during passage of the spillway design flood (feet).

~~10. A description of the proposed remedial work to be performed including a plan view of the dam site representing all significant structures and improvements that precisely illustrate the location of all proposed work.~~

~~11. A description of the benefits that the proposed remedial work will have on the impounding structure.~~

10. ~~Local government acknowledgement of alteration and repair plan~~. Evidence that the local government has been notified of the alteration and repair plan.

11. ~~Construction plans~~ Plans and specifications ~~showing details of the proposed work~~ as required by 4VAC50-20-310. The plan view of the dam site should represent all significant structures and improvements that illustrate the location of all proposed work.

12. ~~Geotechnical investigations in the areas affected by the proposed alterations as necessary.~~ A report of the geotechnical investigations of the foundation soils, bedrock, or both in the areas affected by the proposed alterations and of the materials to be used to alter the impounding structure.

13. Design assumptions and analyses sufficient to indicate that the impounding structure will be stable during the alteration ~~and during the life~~ of the impounding structure under all conditions of reservoir operations.

14. Calculations and assumptions relative to design of the improved spillway or spillways, if applicable.

15. Provisions to ensure that the impounding structure and appurtenances ~~involved in~~ during the alteration will be protected against unacceptable deterioration or erosion due to freezing and thawing, wind, wave action and rain or any combination thereof.

16. Other pertinent design data, assumptions and analyses commensurate with the nature of the particular impounding structure and specific site conditions, including when required by this chapter, a plan and profile of the dam break inundation zones.

17. If applicable, a description of the techniques to be used to divert stream flow during alteration work so as to prevent hazard to life, health and property, including a detailed plan and procedures to maintain a stable impounding structure during storm events, a drawing showing temporary diversion devices, and a description of the potential impoundment during the alteration. Such diversion plans shall be in accordance with the applicable environmental laws ~~and endorsed by the local code official~~.

18. A plan ~~of~~ for project construction monitoring and quality control testing to confirm that materials used in the alteration work and ~~the engineering methods used do~~ that performance standards meet the design requirements set forth in the specifications.

19. Certification by the owner's engineer that the information provided pursuant to this subsection is true and correct in their professional judgment. Such certification shall include the engineer's signature, printed name, Virginia number, date, and the engineer's Virginia seal.

20. Owners signature certifying receipt of the information provided pursuant to this subsection.

~~C. Where feasible an application for an alteration permit shall also include plans and specifications for a device to allow for draining the impoundment if such does not exist.~~

C. ~~The alteration schedule~~ A plan of construction is a required element of complete permit application and shall include:

1. A ~~detailed~~ construction ~~schedule~~ sequence with milestones ~~that has been agreed to by the owner, engineer and contractor~~.

2. Elements of the work plan that should be considered include, but are not limited to, foundation and abutment treatment, excavation and material fill processes, phased fill and compaction, testing and control procedures, construction of permanent spillway and drainage devices, if applicable.

3. The erosion and sediment control plan, as approved by the local government, which minimizes soil erosion and sedimentation during all phases of construction.

~~4. A detailed plan and procedures to maintain a stable impounding structure during storm events, if applicable.~~

~~D. If the submission is not acceptable, the director shall inform the applicant within 60 days and shall explain what changes are required for an acceptable submission.~~

D. Within 120 days of receipt of a complete alteration permit application, the Board shall act on the application. If the application is not acceptable, the Director shall inform the applicant within 60 days of receipt and shall explain what changes are required for an acceptable application. A complete alteration permit application consists of the following:

1. A final design report, submitted on the ~~official~~ Department form (Design Report for the Construction or Alteration of Virginia Regulated Impounding Structures), with attachments as needed, and certified by the owner,

2. A plan of construction ~~Alteration schedule~~ which meets the requirements of subsection C ~~D~~ above,

3. Any necessary interim provisions to the current Emergency Action Plan or Emergency Preparedness Plan ~~requirements~~. ~~Revisions~~ Interim provisions shall be submitted to the local organization for emergency management, the Virginia Department of Emergency Management, and the Department; and

4. If the owner is requesting the deregulation of an impounding structure, the application shall specify whether the impounding structure is to be removed so that the impounding structure is incapable of storing water, either temporarily or permanently; or whether the impounding structure is to be altered in such a manner that either the height or storage capacity of the impounding structure causes the impounding structure to be of less than regulated size.

~~E. Within 120 days of receipt of an acceptable application, the board shall act on the application.~~

E. During the alteration work, the owner shall ~~notify~~ provide the Director with ~~of~~ any proposed changes from the approved design, plans, specifications, or a plan of construction ~~alteration schedule~~ ~~work plan~~. Approval shall be obtained from the Director prior to the ~~construction~~ alteration or installation of any changes that will affect the integrity or impounding capacity of the impounding structure. ~~If an owner or the owner's engineer have determined that circumstances are impacting the integrity of the impounding structure, which could result in the imminent failure of the impounding structure, temporary repairs may be initiated prior to approval from the Director. The~~

~~owner shall notify the Department within 24 hours of identifying the circumstances impacting the integrity of the dam~~.

F. The Alteration Permit shall be valid for the ~~alteration schedule~~ construction sequence with milestones specified in the approved alteration permit application. ~~The alteration schedule may be amended by the Director for good cause at the request of the applicant~~.

G. Work identified in the Alteration Permit must commence within the time frame identified in the Alteration ~~Certificate~~ Permit. If work does not commence within the prescribed time frame, the permit shall expire, except that the applicant may petition the Board for extension of the prescribed time frame and the Board may extend such period for good cause with an ~~appropriately~~ updated construction sequence with milestones ~~alteration schedule~~.

H. ~~The Director may issue a temporary stop work order pursuant to § 10.1-612.1 of the Code of Virginia and take any other action authorized by the Dam Safety Act (§ 10.1-604 et seq. of the Code of Virginia) if any of the permit terms are violated, or if construction is conducted in a manner hazardous to downstream life or property~~. The Board, the Director, or both may take any necessary action consistent with the Dam Safety Act (§10.1-604 et seq. of the Code of Virginia) if any terms of this section or of the permit are violated, if the activities of the owner are not in accordance with the approved plans and specifications, if the alteration is conducted in a manner hazardous to downstream life or property, or for other cause as described in the Act.

I. Within 90 days after completion of the alteration of an impounding structure, the owner shall submit a complete Record Report (Record Report for Virginia Regulated Impounding Structures) signed and sealed by a licensed professional engineer and signed by the owner to the Department indicating the modifications made to the structural features of the impounding structure. This Report is not required when the alteration permit has been issued for the removal of an impounding structure. The Record Report shall include the following:

a. Project information including the name and inventory number of the structure, name of the reservoir, and whether the report is associated with a new or old structure;

b. Location of the impounding structure including the City or County, number of feet or miles upstream or downstream of a highway and the highway number, name of the river or the stream, and the latitude and longitude;

c. Owner's name or representative if corporation, mailing address, residential and business telephone numbers, and other means of communication;

d. Information on the Design Report for the Construction or Alteration of Virginia Regulated Impounding Structures including who it was prepared by, the date of design report preparation, whether it was for new construction or for an alteration, and the permit issuance date;

e. Owner's engineer's name, firm, professional engineer Virginia number, mailing address, and business telephone number;

f. Impounding structure data including type of material (earth, concrete, masonry or other) and the following configurations:

(1). Top of dam (elevation);

(2). Downstream toe – lowest (elevation);

(3). Height of dam (feet);
(4). Crest length – exclusive of spillway (feet);
(5). Crest width (feet);
(6). Upstream slope (horizontal and vertical); and
(7). Downstream slope (horizontal and vertical).
g. Reservoir data including the following:
(1). Maximum capacity (acre-feet);
(2). Maximum pool (elevation);
(3). Maximum pool surface area (acres);
(4). Normal capacity (acre-feet);
(5). Normal pool (elevation);
(6). Normal pool surface area (acres); and
(7). Freeboard – normal pool to top of dam (feet).

h. Spillway data including the type, construction material, design configuration, and invert elevation for the low level drain, the principal spillway, and the emergency spillway; a description of the low level drain and principal spillway including dimensions, trash guard information, and orientation of intake and discharge to dam if looking downstream; and a description of the emergency spillway including dimensions and orientation to dam if looking downstream;

i. Watershed data including drainage area (square miles); type and extent of watershed development; time of concentration (hours); routing procedure; spillway design flood used and state source; design inflow hydrograph volume (acre-feet), peak inflow (cfs), and rainfall duration (hours); and freeboard during passage of the spillway design flood (feet);

j. Impounding structure history including the date construction was completed, who it was designed by and the date, who it was built y and the date, who performed inspections and dates, description of repairs, and confirmation as to whether the impounding structure has ever been overtopped;

k. A narrative describing the impounding structure procedures for operation, maintenance, emergency action plan implementation, and structure evaluation;

l A narrative describing the hydraulic and hydrologic data on the spillway design flood, hydrologic records, flood experience, flood potential, reservoir regulation, and comments or recommendations regarding these attributes;

m. A narrative describing stability of the foundation and abutments, embankment materials, and a written evaluation of each;

n. A complete set of record drawings signed and sealed by a licensed professional engineer and signed by the owner;

o. Certification by the owner's engineer that the information provided pursuant to subsection I2 is true and correct in their professional judgment. Such certification shall include the engineer's signature, printed name, Virginia number, date, and the engineer's Virginia seal; and

p. Owners signature certifying receipt of the information provided pursuant to subsection I2.

J. For altered impounding structures, a certification from a licensed professional engineer who has monitored the alteration of the impounding structure that, to the best of

the engineer's judgment, knowledge, and belief, the impounding structure and its appurtenances were altered in conformance with the plans, specifications, drawings and other requirements approved by the Board.

4VAC50-20-90. Repealed.

~~**4VAC50-20-90. Transfer of permits.**~~

~~Prior to the transfer of ownership of a permitted impounding structure the permittee shall notify the director in writing and the new owner shall file a transfer application on official forms. The new owner shall amend the existing permit application as necessary and shall certify to the director that he is aware of and will comply with all of the requirements and conditions of the permit.~~

~~**4VAC50-20-95. Deregulation of impounding structures**~~

~~A. Notwithstanding the requirements of 4VAC50-20-80, if an owner wishes to deregulate an existing impounding structure, such owner shall provide a written request to initiate the deregulation of an impounding structure. The request will specify whether the impounding structure is to be:~~

~~1. Removed so that the impounding structure is incapable of storing water, either temporarily or permanently; or~~

~~2. Altered in such a manner that either the height or storage capacity of the impounding structure causes the impounding structure to be of less than regulated size.~~

~~The written request shall adequately describe and illustrate the removal or alteration of the impounding structure.~~

~~B. The Department will review the letter of intent and issue an approval if appropriate.~~

~~C. The Department's approval shall not relieve the owner from complying with all other state and federal laws and associated regulations.~~

~~D. Upon completion of the removal or alteration, the owner shall notify the Department by letter. Upon receiving the notification, the Department will make a site inspection to verify the removal or alteration work. If the works has been performed properly, the Board shall certify the deregulation to the owner.~~

Part III: Certificate Requirements

4VAC50-20-100. Repealed

~~**4VAC50-20-100. Regular Operation and Maintenance Certificates.**~~

~~A. A Class I Operation and Maintenance Certificate is required for a Class I Hazard potential impounding structure. The certificate shall be for a term of six years. It shall be updated based upon the filing of a new reinspection report certified by a professional engineer every two years.~~

~~B. A Class II Operation and Maintenance Certificate is required for a Class II Hazard potential impounding structure. The certificate shall be for a term of six years. It shall be updated based upon the filing of a new reinspection report certified by a professional engineer every three years.~~

~~C. A Class III Operation and Maintenance Certificate is required for a Class III Hazard potential impounding structure. The certificate shall be for a term of six years.~~

~~D. The owner of a Class I, II or III impounding structure shall provide the director 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.~~

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

~~F. The owner of a Class I, II or III impounding structure shall apply for the renewal of the six year operation and maintenance certificate 90 days prior to its expiration in accordance with 4VAC50-20-120 of this chapter.~~

~~G. A Class IV impounding structure will not require an operation and maintenance certificate. An inventory report is to be prepared as provided in 4VAC50-20-120 B and filed by the owner on a six-year interval, and an owners inspection report filed annually.~~

~~H. 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.~~

4VAC50-20-105. Regular Operation and Maintenance Certificates.

A. A Regular Operation and Maintenance Certificate is required for an impounding structure. Such six-year certificates shall include the following based on hazard classification:

1. High Hazard Potential Regular Operation and Maintenance Certificate;

2. Significant Hazard Potential Regular Operation and Maintenance Certificate; or

3. Low Hazard Potential Regular Operation and Maintenance Certificate.

B. The owner of an impounding structure shall apply for the renewal of the six-year Regular Operation and Maintenance Certificate 90 days prior to its expiration. If a Regular Operation and Maintenance Certificate is not renewed as required, the Board shall take appropriate enforcement action.

C. Any owner of an impounding structure that does not have a Regular Operation and Maintenance Certificate or any owner renewing a Regular Operation and Maintenance Certificate shall file an Operation and Maintenance Certificate Application (Operation and Maintenance Certificate Application for Virginia Regulated Impounding Structures). Such application shall be signed by the owner and signed and sealed by a licensed professional engineer. The following information shall be submitted on or with the application:

1. The application shall include the following required information:

a. The name of structure and inventory number;

b. The proposed hazard potential classification;

c. Owner's name or representative if corporation, mailing address, residential and business telephone numbers, and other means of communication;

d. An operating plan and schedule including a narrative on the operation of control gates and spillways and the impoundment drain;

e. For earthen embankment dams, a maintenance plan and schedule for the embankment, principal spillway, emergency spillway, low-level outlet, impoundment area, downstream channel, and staff gages;

f. For concrete dams, a maintenance plan and schedule for the upstream face, downstream face, crest of dam, galleries, tunnels, abutments, spillways, gates and outlets, and staff gages;

g. An inspection schedule for operator inspection, maintenance inspection, technical safety inspection, and overtopping situations;

f. A schedule including the rainfall amounts, emergency spillway flow levels or storm event that initiates the Emergency Action or Preparedness Plan and the frequency of observations;

g. A statement as to whether or not the current hazard potential classification for the dam is appropriate and whether or not additional work is needed to make an appropriate hazard potential designation;

h. For newly constructed or recently altered impounding structures, a certification from a licensed professional engineer who has monitored the construction or alteration of the impounding structure that, to the best of the engineer's judgment, knowledge, and belief, the impounding structure and its appurtenances were constructed or altered in conformance with the plans, specifications, drawings and other requirements approved by the Board;

i. Certification by the owner's engineer that the Operation and Maintenance Certificate Application information provided pursuant to subsection C1 is true and correct in their professional judgment. Such certification shall include the engineer's signature, printed name, Virginia number, date, and the engineer's Virginia seal; and

j. Owners signature certifying the Operation and Maintenance Certificate Application information provided pursuant to subsection C1 and that the operation and maintenance plan and schedule shall be conducted in accordance with this chapter.

2. An Inspection Report (Annual Inspection Report for Virginia Regulated Impounding Structures) in accordance with subsection E ~~or a Record Report (Record Report for Virginia Regulated Impounding Structures) in accordance with 4VAC50-20-70 J2 (construction) or 4VAC50-20-80 I (alteration);~~

3. An Emergency Action Plan in accordance with 4VAC50-20-175 or an Emergency Preparedness Plan in accordance with 4VAC50-20-177 and evidence that the required copies of such plan have been submitted to the local organization for emergency management and the State Department of Emergency Management; and

4. Any additional analysis determined necessary by the Director, the Board or the owner's engineer to address public safety concerns. Such additional analysis may include, but not be limited to, seismic stability, earthen spillway integrity, adequate freeboard allowance, stability assessment of the impoundment's foundation, potential liquefaction of the embankment, overturning or sliding of a concrete structure and other structural stress issues.

D. If the Operation and Maintenance Application submittal is found to be not complete, the Director shall inform the applicant within 30 days and shall explain what changes are required for an acceptable submission. Within 60 days of receipt of a complete application the Board shall act upon the application. Upon finding that the impounding structure as currently operating is in compliance with this chapter, the Board shall issue a Regular Operation and Maintenance Certificate. Should the Board find that the impounding structure as currently operating is not in compliance with this chapter, the Board may deny the permit application or issue a Conditional Operation and Maintenance Certificate in accordance with 4VAC50-20-150.

E. Inspections shall be performed on an impounding structure annually.

1. Inspection Reports (Annual Inspection Report for Virginia Regulated Impounding Structures) signed and sealed by a licensed professional engineer shall be submitted to the Department in accordance with the following schedule:

a. For a High Hazard Potential impounding structure, every two years

b. For a Significant Hazard Potential impounding structure, every three years

c. For a Low Hazard Potential impounding structure, every six years.

In years when an Inspection Report signed and sealed by a licensed professional engineer is not required, an owner shall submit the Annual Inspection Report for Virginia Regulated Impounding Structures.

2. The Inspection Report shall include the following required information:

a. Project Information including the name and inventory number of structure, name of the reservoir, and purpose of the reservoir;

b. City or County where the impounding structure is located;

c. Owner's name or representative if corporation, mailing address, residential and business telephone numbers, and other means of communication;;

d. Owner's engineer's name, firm, professional engineer Virginia number, mailing address, and business telephone number;

e. Inspection observation of the impounding structure including the following:

(1) Earthen embankment information including any embankment alterations; erosion; settlement, misalignments or cracks; seepage and seepage flow rate and location;

(2) Upstream slope information including notes on woody vegetation removed, rodent burrows discovered, and remedial work performed;

(3) Intake structure information including notes on deterioration of concrete structures, exposure of rebar reinforcement, need to repair or replace trash rack, any problems with debris in the reservoir, and whether the drawdown valve operated;

(4) Abutment contacts including notes on seepage and seepage flow rate and location;

(5) Earthen emergency spillway including notes on obstructions to flow and plans to correct, rodent burrows discovered, and deterioration in the approach or discharge channel;

(6) Concrete emergency spillway including notes on the deterioration of the concrete, exposure of rebar reinforcement, any leakage below concrete spillway, and obstructions to flow and plans to correct;

(7) Downstream slope information including notes on woody vegetation removed, rodent burrows discovered, whether seepage drains are working, and any seepage or wet areas;

(8) Outlet pipe information including notes on any water flowing outside of discharge pipe through the dam and a description of any reflection or damage to the pipe;

(9) Stilling basin information including notes on the deterioration of the concrete, exposure of rebar reinforcement, deterioration of the earthen basin slopes, repairs made, and any obstruction to flow;

(10) Gates information including notes on gate malfunctions or repairs, corrosion or damage, and whether any gates were operated and if so how often and to what extreme;

(11) Reservoir information including notes on new developments upstream of the dam, slides or erosion of lake banks, and general comments to include silt, algae, or other influence factors;

(12) Instruments information including any reading of instruments and any installation of new instruments; and

(13) General information including notes on new development in the downstream floodplain that would impact hazard classification, the maximum stormwater discharge or peak elevation during the previous year, whether general maintenance was performed and when, and actions that need to be completed before the next inspection;

f. Evaluation rating of the dam and appurtenances (excellent, good, or poor), general comments, and recommendations;

g. Certification by the owner and date of inspection; and

h. Certification and seal by the owner's engineer and date of inspection, as applicable.

F. The owner of an impounding structure shall notify the Department immediately of any change in the use of the area downstream that would impose hazard to life or property in the event of failure.

4VAC50-20-110. Repealed

~~**4VAC50-20-110. Operation and maintenance certificate Maintenance Certificate for newly constructed impounding structures.**~~

~~A. Within 180 days after completion of the construction of an impounding structure, the owner shall submit:~~

~~1. A complete set of as-built drawings certified by a professional engineer and an as-built report on official forms.~~

~~2. A copy of a certificate from the professional engineer who has inspected the impounding structure during construction certifying that, to the best of his judgment, knowledge and belief, the impounding structure and its appurtenances were constructed in conformance with the plans, specifications, drawings and other requirements approved by the board.~~

~~3. A copy of the operation and maintenance plan and emergency action plan submitted with the design report including any changes required by the director.~~

~~B. If the director finds that the operation and maintenance plan or emergency action plan is deficient, he shall return it to the owner within 60 days with suggestions for revision.~~

~~C. Within 60 days of receipt of the items listed in subsection A above, if the board finds that adequate provision has been made for the safe operation and maintenance of the impounding structure, the board shall issue an operation and maintenance certificate.~~

4VAC50-20-120. Repealed.

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

~~A. Any owner of an impounding structure other than a Class IV impounding structure which has already filed an inventory report that does not have an operation and maintenance certificate or any owner renewing an operation and maintenance certificate shall file an application with the board.~~

~~B. 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. The reinspection report shall include an update of conditions of the impounding structure based on a previous safety inspection as required by the board, a previous reinspection report or an as-built report.~~

~~2. An inventory report for Class III impounding structures. The inventory report shall include:~~

~~a. The name and location of the impounding structure and the name of the owner.~~

~~b. The description and dimensions of the impounding structure, the spillways, the reservoir and the drainage area.~~

~~c. The history of the impounding structure which shall include the design, construction, repairs, inspections and whether the structure has been overtopped.~~

~~d. Observations of the condition of the impounding structure, reservoir, and upstream and downstream areas.~~

~~e. Any changes in the impounding structure, reservoir, and upstream and downstream areas.~~

~~f. Recommendations for remedial work.~~

~~3. An impoundment and impounding structure operation and maintenance plan certified by a professional engineer. This plan shall place particular emphasis on operating and maintaining the impounding structure in keeping with the project design in such manner as to maintain its structural integrity and safety during both normal and abnormal conditions which may reasonably be expected to occur during its planned life. The safety inspection report required by the board should be sufficient to serve as the basis for the operation and maintenance plan for a Class I and II impounding structure. For a Class III impounding structure, the operation and maintenance plan shall be based on the data provided in the inventory report.~~

~~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. The plan shall include a method of providing notification and~~

~~warning to persons downstream, other affected persons or property owners and local authorities in the event of a flood hazard or the impending failure of the impounding structure.~~

~~C. The owner shall certify in writing that the operation and maintenance plan approved by the board will be adhered to during the life of the project except in cases of emergency requiring departure therefrom in order to mitigate hazard to life and property, at which time the owner's engineer, and the director shall be notified.~~

~~D. If the director finds that the operation and maintenance plan or emergency action plan is deficient, he shall return it to the owner within 60 days with suggestions for revision.~~

~~E. Within 60 days of receipt of an acceptable application if the board finds that adequate provision has been made for the safe operation and maintenance of the impounding structure, the board shall issue an operation and maintenance certificate~~.

4VAC50-20-125. Delayed effective date for Spillway Design Flood requirements for impounding structures.

A. If an impounding structure has been determined to have an adequate spillway capacity prior to the effective date of these regulations and is currently operating under a Regular Operation and Maintenance Certificate ~~to operate (regular or conditional certificates)~~, but will now require spillway modifications due to changes in these regulations ~~that require modifications in the spillway capacity, will have up to 5 years from the effective dates of these regulations to upgrade their spillways~~, the owner shall submit to the Board an Alteration Permit Application in accordance with 4VAC 50-20-80 to address spillway capacity at the time of the expiration of their Regular Operation and Maintenance Certificate or within 3 years of the effective date of these regulations, whichever is later. The Alteration Permit Application shall contain a construction sequence with milestones for completing the necessary improvements within 5 years of Alteration Permit issuance. The Board may approve an extension of the prescribed time frame for good cause. Should the owner be able to demonstrate that no spillway capacity change is necessary, the impounding structure may be found to be in compliance with this chapter. ~~However, those impounding structures under a regular certificate will be issued a conditional certificate until the new spillway design flood requirements are adequately addressed~~.

B. In accordance with 4VAC50-20-105, the owner shall submit the Operation and Maintenance Certificate Application (Operation and Maintenance Certificate Application for Virginia Regulated Impounding Structures), the Emergency Action Plan or Emergency Preparedness Plan, and the Inspection Report (Annual Inspection Report for Virginia Regulated Impounding Structures) 90 days prior to the expiration of the Regular Operation and Maintenance Certificate.

C. If circumstances ~~change during the 5 year period that~~ warrant more immediate repairs to the impounding structure, the Board may direct alterations to the spillway to be completed sooner. ~~The conditional certificate will contain a compliance schedule including, but not limited to, engineering studies, design efforts, financial plans, and a construction completion schedule~~.

D. During this delay period, owners are required to address other deficiencies that may exist that are not related to the SDF. ~~If warranted and the owner has demonstrated continual and substantial progress, the Board may issue a subsequent extension of the conditional permit.~~

4VAC50-20-130. Repealed.

~~**4VAC50-20-130. Existing impounding structures constructed prior to July 1, 1982.**~~

~~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, 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 provided that the conditions of 4VAC50-20-130 A have been met.~~

4VAC50-20-135. Extension of Operation and Maintenance Certificates.

The Board may extend an Operation and Maintenance Certificate for impounding structures provided that the owner submits a written request justifying an extension, the amount of time needed to comply with the requirements set out in the current Operation and Maintenance Certificate, and any required fees. The owner must have demonstrated substantial and continual progress towards meeting the requirements.

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

~~2. The dam is not in need of other alteration related to the integrity of the structure;~~

~~3. Emergency Action Plan requirements set out in 4VAC50-20-175 or Emergency Preparedness requirements set out in 4VAC50-20-177 have been satisfied;~~

~~4. Annual owner's inspection reports have been consistently filed with, and are considered satisfactory, by the Director;~~

~~5. 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~~

~~6. The owner satisfies all special requirements imposed by the Board.~~

4VAC50-20-140. Repealed.

~~**4VAC50-20-140. Existing impounding structures constructed after July 1, 1982.**~~

~~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~~ Operation and ~~maintenance~~ Maintenance ~~application~~ Application (Operation and Maintenance Certificate Application for Virginia Regulated Impounding Structures) completed in accordance with 4VAC50-20-105 should the ~~director~~ Director determine that the impounding structure has non-imminent deficiencies ~~of a nonimminent danger category~~, the ~~director~~ Director may recommend that the ~~board~~ Board issue a ~~conditional~~ Conditional ~~operation~~ Operation and ~~maintenance~~ Maintenance ~~certificate~~ Certificate.

B. The Conditional ~~operation~~ Operation and ~~maintenance~~ Maintenance ~~certificate~~ Certificate for ~~Class I, II and III~~ High, Significant, and Low Hazard Potential 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~~ Board.

C. A ~~conditional~~ Conditional ~~certificate~~ Certificate may be ~~renewed~~ extended in accordance with the procedures of ~~4VAC50-20-120~~ 4VAC50-20-135 provided that ~~annual owner inspection~~ Inspection ~~reports~~ Reports (Annual Inspection Report for Virginia Regulated Impounding Structures) are on file, and the ~~board~~ Board determines that the owner is proceeding with the necessary corrective actions.

D. Once the deficiencies are corrected, the ~~board~~ Board shall issue ~~an~~ a Regular ~~operation~~ Operation and ~~maintenance~~ Maintenance ~~certificate~~ Certificate based upon ~~any required revisions to the original application~~ meeting the requirements of ~~4VAC 50-20-100~~ 4VAC50-20-105.

~~E. The owner of any impounding structure, whether under conditional certificate or otherwise, shall meet the Emergency Action Plan requirements set out in 4VAC50-20-175 or the Emergency Preparedness requirements set out in 4VAC50-20-177.~~

4VAC50-20-160. Additional operation and maintenance requirements.

A. The owner of an impounding structure shall not, through action or inaction, cause or allow such structure to impound water following receipt of a written report from the owner's engineer that the impounding structure will not safely impound water.

B. In accordance with § 10.1-609.2 of the Code of Virginia, dam owners shall not permit the growth of trees and other woody vegetation and shall remove any such vegetation from the slopes and crest of embankments and the emergency spillway area, and within a distance of 25 feet from the toe of the embankment and abutments of the dam.

4VAC50-20-165. Agricultural Exemption.

A. Impounding structures operated primarily for agricultural purposes which are less than 25 feet in height or which create a maximum impoundment capacity smaller than 100 acre-feet are exempt from the Impounding Structure Regulations.

B. An owner seeking an agricultural exemption pursuant to §10.1-604 and 4VAC50-20-30 shall submit an Agricultural Exemption Application (Agricultural Exemption Application for Impounding Structures) ~~every 6 years~~.

C. The Agricultural Exemption Application ~~shall~~ may be verified by the Department through a possible site visit ~~and approved by the Director~~.

4VAC50-20-170. Transfer of certificates.

A. Prior to the transfer of ownership of an impounding structure the certificate holder shall notify the ~~director~~ Director in writing and the new owner shall file a transfer ~~application~~ notification on ~~official~~ the Department ~~forms~~ form (Transfer Notification for Certificate to Operate and Maintain a Virginia Regulated Impounding Structure from Past Owner to New Owner). The new owner may elect to continue the ~~current~~ existing operation and maintenance certificate for the remaining term or he may apply for a new certificate in accordance with ~~4VAC50-20-120~~ 4VAC50-20-105. If the owner elects to continue the existing certificate, he ~~shall amend the existing certificate application as necessary and~~ shall certify to the ~~director~~ Director that he is aware of and will comply with all of the requirements and conditions of the certificate.

B. The new owner's transfer notification shall include the following required information:

1. Name and inventory number of structure;

2. New owner's name and contact information, including mailing address and telephone numbers;

3. Past owner's name;

4. New owner's certification of compliance with permit or certificate with all said terms and conditions; and

5. Contact information updates for Emergency Action Plan or Emergency Preparedness Plan.

4VAC50-20-175. Emergency Action Plan (EAP) for High and Significant Hazard Potential Dams.

A. In order to protect life during potential emergency conditions at a dam, and to ensure effective, timely action is taken should a dam emergency occur, an EAP shall be required for each High and Significant Hazard Potential impounding structure. The EAP shall be coordinated with the Department of Emergency Management in accordance with §44-146.18. The EAP required by these regulations shall be incorporated into local and inter-jurisdictional emergency plans pursuant to §44-146.19.

B. It is the dam owner's responsibility to develop, maintain, exercise, and implement a site-specific EAP.

C. An EAP shall be submitted every six years. ~~For a High or Significant hazard impounding structure, the~~ The EAP shall be submitted with the ~~dam~~ owner's ~~renewal~~

submittal of their Regular Operation and Maintenance Certificate application (Operation and Maintenance Certificate Application for Virginia Regulated Impounding Structures).

D. ~~It is imperative that the~~ The ~~dam~~ owner shall update the EAP ~~furnish all holders of the EAP updates to the EAP~~ immediately upon becoming aware of necessary changes to keep the EAP workable. Should a dam be reclassified, an EAP in accordance with this section shall be submitted.

E. A drill shall be conducted annually for each High or Significant hazard impounding structure. To the extent practicable, the drill should include a face-to-face meeting with the local emergency management agencies responsible for any necessary evacuations to review the EAP and ensure the local emergency management agencies understand the actions required during an emergency. A table-top exercise shall be conducted once every 3 years. Owners shall certify to the Department annually that ~~an exercise~~ a drill, a table-top exercise, or both has been completed, provide ~~and the statement shall include~~ a critique of the exercise or exercises and any revisions or updates to the EAP or a statement that no revisions or updates are needed.

F. Dam owners shall test existing monitoring, sensing, and warning equipment at remote or unattended dams at least twice per year and maintain a record of such tests.

G. An EAP shall contain the following seven basic elements unless otherwise specified in this subsection.

1. Notification chart - A notification chart shall be included for all classes of dams that shows who is to be notified, by whom, and in what priority. The notification chart shall include contact information ~~that assures~~ providing 24-hour telephone coverage for all responsible parties.

2. Emergency Detection, Evaluation, and Classification - The EAP shall include a discussion of the procedures for timely and reliable detection, evaluation, and classification of ~~an~~ emergency situations considered to be relevant to the project setting and impounding features. Each relevant emergency situation is to be documented to provide an ~~to ensure that the~~ appropriate course of action ~~is taken~~ based on the urgency of the situation. Where appropriate, ~~the~~ situations should address dam breaks that are imminent or in progress, a situation where the potential for dam failure is rapidly developing, and a situation where the threat is slowly developing.

3. Responsibilities – The EAP shall specify responsibilities for EAP-related tasks. The EAP shall also clearly designate the responsible party for making the decision that an emergency condition no longer exists at the dam.

4. Preparedness – The EAP shall include a section that describes preparedness actions to be taken both before and following development of emergency conditions.

5. Dam Break Inundation Maps – ~~The EAP shall include an inundation map that delineates the areas that would be flooded as a result of a dam failure. All properties identified within the dam break inundation zone shall be incorporated into the EAP's dam break inundation zone map 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. Such maps shall be developed in accordance with 4VAC50-20-52~~. Dam break inundation maps developed in accordance with 4VAC50-20-54 shall be included in the EAP.

6. Appendices - The appendices shall contain information that supports and supplements the material used in the development and maintenance of the EAP such as analyses of dam break floods; plans for training, exercising, updating, and posting the EAP; and other site-specific concerns.

7. Certification – The EAP shall include a section that is signed by all parties with assigned responsibilities in the EAP pursuant to subsection G3, where they indicate their ~~approval~~ receipt of the EAP ~~and agree to their responsibilities for its execution.~~ The preparer's name, title, and contact information shall be printed in this section. The preparer's signature shall also be included in the certification section. The local organization for emergency management shall provide the owner and the Department with any deficiencies they may note.

H. The development of the EAP shall be coordinated with all entities, jurisdictions, and agencies that would be affected by a dam failure or that have statutory responsibilities for warning, evacuation, and post-flood actions. Consultation with state and local emergency management officials at appropriate levels of management responsible for warning and evacuation of the public ~~is essential~~ to ensure that there is ~~agreement~~ awareness of their individual and group responsibilities.

I. The EAP, or any updates to an existing EAP, shall ~~at a minimum~~ be ~~filed~~ submitted ~~with~~ to the Department, the local organization for emergency management, and the State Department of Emergency Management. Two copies shall be provided to the Department.

J. The following format shall be used as necessary to address the requirements of this section.

Title Page/Cover Sheet
Table of Contents
I. Certifications
II. Notification Flowchart
III. Statement of Purpose
IV. Project Description
V. Emergency Detection, Evaluation, and Classification
VI. General Responsibilities Under the EAP
    A. Dam Owner Responsibilities
    B. Responsibility for Notification
    C. Responsibility for Evacuation
    D. Responsibility for Termination and Follow-Up
    E. EAP Coordinator Responsibility
VII. Preparedness
VIII. Inundation Maps
IX Appendices
    A. Investigation and Analyses of Dam break Floods
    B. Plans for Training, Exercising, Updating, and Posting the EAP
    C. Site-Specific Concerns

4VAC50-20-177. Emergency Preparedness Plan for Low Hazard Dams.

A. Low Hazard Dams shall provide information for emergency preparedness to the Department, the local organization for emergency management and the Virginia Department of Emergency Management. The information shall be submitted on the Department form (Emergency Preparedness Plan for Virginia Regulated Impounding Structures). The information shall include, but not be limited, to the following:

1. Current contact name and contact information, including phone number;

2. Physical location of the dam;

3. A procedure for notifying any owners of downstream properties potentially impacted by the dam's failure;

4. A simple dam break inundation map, acceptable to the Director, demonstrating the general inundation that would result from a dam failure. Such maps do not require preparation by a professional licensed engineer , however, maps prepared by a licensed professional engineer are preferred; ~~and~~

5. Evidence that the required copies of such plan have been submitted to the local organization for emergency management and the State Department of Emergency Management; and

6. Certification by the owner ~~and the local organization for emergency management~~.

Part IV: Procedures

4VAC50-20-180. Inspections.

A. The ~~director~~ Director may make inspections during construction, alteration or operation and maintenance as deemed necessary to ensure that the impounding structure is being constructed, altered or operated and maintained in compliance with the permit or certificate issued by the ~~board~~ Board. ~~During the maintenance, construction, or alteration of any dam or reservoir, the Director shall require the owner to perform, at the owner's expense, such work or tests as necessary to obtain information sufficient to enable the Director to determine whether conformity with the plans and specifications approved by the certificate is being secured.~~ The ~~director~~ Director shall provide the owner a copy of the findings of these inspections. ~~This~~ The Department's inspection does not relieve the owner from the responsibility of providing adequate inspection during construction, alteration, or operation and maintenance. During the maintenance, construction, or alteration of any dam or reservoir, the Director shall require the owner to perform, at the owner's expense, such work or tests as necessary to obtain information sufficient to enable the Director to determine whether conformity with the plans and specifications approved by the certificate is being secured.

B. Periodic inspections during construction or alteration shall be conducted under the ~~supervision~~ direction of a licensed professional engineer who shall ~~propose the frequency and nature of the inspections subject to approval by the director~~ inspect provide for full-time monitoring, review of contractor submittals, and appropriate confirmatory testing of all facets of construction affecting the safety of the impounding structure in accordance with the construction or alteration permit issued by the Board.

C. ~~Periodic~~ Required inspections during operation and maintenance shall be conducted under the supervision of a licensed professional engineer at ~~an interval~~

intervals ~~not greater than that~~ designated under 4VAC50-20-105 ~~required to update the operation and maintenance certificate. At a minimum, an annual owner's inspection shall be conducted when a professional inspection is not required.~~

D. Every owner shall provide for an inspection by a licensed professional engineer after overtopping of the impounding structure or after flows cause ~~significant~~ damage to the emergency spillway. A copy of the findings of each inspection with the engineer's recommendations shall be filed with the ~~board~~ Board within a reasonable period of time not to exceed 30 days subsequent to completion of the inspection.

4VAC50-20-190. Right to hearing.

Any owner aggrieved by an action taken by the ~~director~~ Director or by the ~~board~~ Board without hearing, or by inaction of the ~~director~~ Director or the ~~board~~ Board, under the provisions of this chapter, may demand in writing a formal hearing.

4VAC50-20-200. Enforcement.

~~Any owner refusing to obey any order of the board or the director pursuant to this chapter may be compelled to obey and comply with such provisions by injunction or other appropriate remedy obtained in a court proceeding. Such proceeding shall be instituted by the board or in the case of an emergency, by the director in the court which granted approval to the owner to impound waters or, if such approval has not been granted, the proceeding shall be instituted in any appropriate court.~~ The provisions of this chapter may be enforced by the Board, the Director, or both ~~Enforcement of the provisions of this chapter~~ in any manner consistent ~~shall be in accordance~~ with the provisions of the Dam Safety Act (§ 10.1-604 et seq. of the Code of Virginia).

4VAC50-20-210. Consulting committee ~~boards~~.

A. When the ~~board~~ Board needs to satisfy questions of safety regarding plans and specifications, construction, alteration, or operation and maintenance, or when requested by the owner, the ~~board~~ Board may appoint a consulting ~~board~~ committee to report to it with respect to those questions of the impounding structure's safety ~~of an impounding structure~~. Such a ~~board~~ committee shall consist of two or more consultants, none of whom have been associated with the impounding structure.

B. The costs and expenses incurred by the consulting ~~board~~ committee, if appointed at the request of an owner, shall be paid by the owner.

C. The costs and expenses incurred by the consulting ~~board~~ committee, if initiated by the ~~board~~ Board, shall be paid by the ~~board~~ Board.

4VAC50-20-220. Unsafe conditions.

A. No owner shall ~~have the right to~~ maintain an unsafe impounding structure ~~which unreasonably threatens the life or property of another person~~. ~~The owner of any impounding structure found to have deficiencies which could threaten life or property if uncorrected shall take the corrective actions needed to remove such deficiencies within a reasonable period of time.~~ Designation of an impounding structure as unsafe shall be made in accordance with § 10.1-607.1 of the Code of Virginia.

B. Imminent danger. When the ~~director~~ Director finds that an impounding structure is unsafe and constitutes an imminent danger to life or property, he shall immediately notify the State Department of Emergency Management and confer with the owner who shall ~~and ensure that~~ activate the Emergency Action Plan or Emergency Preparedness Plan ~~requirements have been implemented~~ if appropriate to do so. The owner of an impounding structure found to constitute an imminent danger to life or property shall take immediate corrective action to remove the imminent danger as required by §10.1-608 of the Code of Virginia.

C. Nonimminent danger. The owner of an impounding structure who has been issued ~~a report by the board containing~~ findings and recommendations, by the Board, for the correction of deficiencies which may threaten life or property if not corrected, shall undertake to implement the recommendations for correction of deficiencies according to a schedule of implementation contained in that report as required by §10.1-609 of the Code of Virginia.

4VAC50-20-230. Complaints.

A. Upon receipt of a complaint alleging that the person or property of the complainant is endangered by the construction, alteration, maintenance or operation of an impounding structure, the ~~director~~ Director shall cause an inspection of the structure, unless the data, records and inspection reports on file with the ~~board~~ Board are found adequate to determine if the complaint is valid.

B. If the ~~director~~ Director finds that an unsafe condition exists, the ~~director~~ Director shall proceed under the provisions of §§10.1-608 and 10.1-609 of the Code of Virginia to render the extant condition safe.

Part V: Design Requirements

4VAC50-20-240. Design of structures.

A. The owner shall complete all necessary investigations prior to submitting the design report (Design Report for the Construction or Alteration of Virginia Regulated Impounding Structures). The design report shall contain those components outlined in 4VAC50-20-70 for construction activities ~~and~~ or those outlined in 4VAC50-20-70 for alteration activities. The scope and degree of precision required is a matter of engineering judgment based on the complexities of the site and the hazard potential classification of the proposed structure.

B. Surveys shall be made with sufficient accuracy to locate the proposed construction site and to define the total volume of storage in the impoundment. Locations of center lines and other horizontal and vertical controls shall be shown on a map of the site. The area downstream and upstream from the proposed impounding structure shall be investigated in order to delineate the areas and extent of potential damage in case of failure or backwater due to flooding.

C. The drainage area shall be determined. Present~~, projected and potential future~~ and planned land-use conditions shall be considered in determining the runoff characteristics of the drainage area. The most severe of these conditions shall be included in the design calculations which shall be submitted as part of the design report.

D. The geotechnical engineering investigation shall consist of borings, test pits and other subsurface explorations necessary to adequately define the existing conditions. The investigations shall be performed so as to appropriately define the soil, rock and ground water conditions.

E. All construction materials shall be adequately ~~explored~~ researched and selected so as to ensure that their ~~properties meet~~ as constructed behavior will reasonably conform to design criteria. If on-site materials are to be utilized, they shall be located and determined to be adequate in quantity and quality.

~~4VAC50-20-250. Design flood.~~

~~The minimum design flood to be utilized in impounding structure evaluation, design, construction, operation and maintenance shall be commensurate with the size and hazard potential of the particular impounding structure as determined in 4VAC50-20-50 and Table 1.~~

~~Competent, experienced, professional engineering judgment shall be used in applying those design and evaluation procedures referenced in 4VAC50-20-320 of this chapter.~~

4VAC50-20-260. ~~Emergency spillway~~ Spillway design.

A. Every impounding structure shall have a spillway system with adequate capacity to discharge the design flood without endangering the safety of the impounding structure.

~~B. An emergency spillway shall be required~~.

~~C~~B. Vegetated earth or an unlined emergency spillway may be approved when the applicant demonstrates that it will pass the spillway design flood without jeopardizing the safety of the impounding structure. In no case~~, however,~~ shall dam owners permit the growth of trees and other woody vegetation in the emergency spillway area.

~~D~~C. Lined emergency spillways shall include design criteria calculations, plans and specifications for suitable energy dissipators and for open channel, drop, ogee and chute spillways that include crest control structures, chutes, walls, panel lining, sills, blocks, and miscellaneous details. All joints shall be reasonably water-tight and placed on a foundation capable of sustaining applied loads without undue deformation. Provision shall be made for handling ~~leakage from the channel or~~ under seepage and uplift pressures from the foundation which might adversely affect the structural integrity and structural stability of the impounding structure.

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

A. It will be assumed that principal spillways and regulating outlets provided for special functions will operate to normal design discharge capabilities during the spillway design flood, provided appropriate analyses show:

1. That control gates and structures are suitably designed to operate reliably under maximum heads for durations likely to be involved and risks of blockage by debris are minimal;

2. That access roads and passages to gate regulating controls would be safely passable by operating personnel under spillway design flood conditions; and

3. That there are no ~~other~~ substantial reasons for concluding that outlets would not operate safely to ~~fill~~ full design capacity during the spillway design flood.

B. If there are reasons to doubt that any of the above basic requirements might not be adequately met under spillway design flood conditions, the "dependable" discharge capabilities of regulating outlets shall be assumed to be less than 100% of design ~~capabilities~~ capacities, generally as outlined in the following subsections C through G of this section.

C. Any limitations in safe operating heads, maximum velocities to be permitted through structures or approach channels, or other design limitations shall be observed in establishing "dependable" discharge rating curves to be used in routing the spillway design flood hydrograph through the reservoir.

D. If intakes to regulating outlets are likely to be exposed to ~~dangerous~~ significant quantities of floating ~~drift~~ debris, sediment depositions or ice hazards prior to or during major floods, the dependable discharge capability during the spillway design flood shall be assumed to be zero.

E. If access roads or structural passages to operating towers or controls are likely to be flooded or otherwise unusable during the spillway design flood, the dependable discharge capability of regulating outlets will be assumed to be zero for ~~those~~ the ~~period~~ periods of time during which such conditions might exist.

F. Any deficiencies in discharge performance likely to result from delays in the operation of gates before attendants could be reasonably expected to reach the control ~~for in~~ must be taken into account when estimating "dependable" discharge capabilities ~~to be assumed~~ assumptions in routing the spillway design flood through ~~reservoir~~ impoundment. Reports on design studies shall indicate the allowances made for possible delays in initiating gate operations. Normally, for projects located in small basins, where critical spillway design flood inflows may occur within several hours after intense precipitation, outflows through any regulating outlets that must be opened after the flood begins shall be assumed to be zero for an appropriate period of time subsequent to the beginning of intense rainfall.

G. All gates, valves, conduits and concrete channel outlets shall be designed and constructed to prevent significant erosion or damage to the impounding structure or to the downstream outlet or channel.

4VAC50-20-280. Drain requirements.

All new impounding structures regardless of their hazard potential classification, shall include a device to permit draining of the impoundment within a reasonable period of time as determined by the owner's licensed professional engineer, subject to approval by the ~~director~~ Director.

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

Components of the impounding structure, ~~the impoundment,~~ the outlet works, drain system and appurtenances shall be durable or replaced in keeping with the design and planned life of the impounding structure.

4VAC50-20-300. Additional design requirements.

A. Flood routings shall start at or above the elevation of the crest of the lowest ungated outlet. Freeboard determination and justification must be addressed by the owner's engineer.

B. All elements of the impounding structure ~~and impoundments~~ shall conform to sound engineering practice. Safety factors, design standards and design references that are used shall be included with the design report.

C. Inspection devices may be required by the ~~director~~ Director for use by inspectors, owners or the ~~director~~ Director in conducting inspections in the interest of structural integrity during and after completion of construction and during the life of the impounding structure.

4VAC50-20-310. Plans and specifications.

The plans and specifications for a proposed impounding structure required in 4VAC50-20-70 for construction activities and in 4VAC50-20-70 for alteration activities shall consist of a detailed engineering design report (Design Report for the Construction or Alteration of Virginia Regulated Impounding structures) ~~that includes~~ and engineering drawings and specifications, with the following as a minimum:

1. The name of the project; the name of the owner; classification of the impounding structure as set forth in this chapter; designated access to the project and the location with respect to highways, roads, streams and existing impounding structures and impoundments that would affect or be affected by the proposed impounding structure.

2. Cross-sections, plans, profiles, logs of test borings, laboratory and in situ test data, drawings of principal and emergency spillways, impounding structures, outlet works, ~~ancillary facilities~~ drain system and appurtenances, and other ~~additional drawings~~ project components in sufficient detail to indicate clearly the extent and complexity of the work to be performed.

3. Contract drawings should include, but not be limited to, foundation and abutment treatment, stream or river diversion, excavation and material fill processes, phased fill and compaction and drainage devices.

4. The erosion and sediment control plan, as approved by the local government, which minimizes soil erosion and sedimentation during all phases of construction or alteration.

~~3~~5. ~~The technical~~ Technical ~~provisions~~ specifications, as may be required to describe the materials, performance, and methods of the construction and construction quality control for the project.

~~4. Special provisions, as may be required to describe technical provisions needed to ensure that the impounding structure is constructed according to the approved plans and specifications.~~

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

Within the major engineering disciplines of hydrology, hydraulics, soils and foundations, structures, and general civic design, criteria and approaches from multiple sources shall not be mixed for developing the design of a given feature or facility. The following are acceptable as design procedures and references:

1. The design procedures, manuals and criteria used by the United States Army Corps of Engineers.

2. The design procedures, manuals and criteria used by the United States Department of Agriculture, Natural Resources Conservation Service.

3. The design procedures, manuals and criteria used by the United States Department of the Interior, Bureau of Reclamation.

4. The design procedures, manuals and criteria used by the United States Department of Commerce, National Weather Service.

5. Other design procedures, manuals and criteria that are accepted as current, sound engineering practices, as approved by the director prior to the design of the impounding structure.

4VAC50-20-330. Other applicable dam safety references.

Manuals, Guidance, and Criteria used by the Federal Emergency Management Agency, including but not limited to ~~those concerning Emergency Action Planning, Inflow Design Floods and Hazard Potential Classification Systems~~ the following:

1. Federal Guidelines for Dam Safety: Emergency Action Planning for Dam Owners, U.S. Department of Homeland Security, Federal Emergency Management Agency, October 1998, Reprinted January 2004; FEMA 64.

2. Federal Guidelines for Dam Safety: Selecting and Accommodating Inflow Design Floods for Dams, U.S. Department of Homeland Security, Federal Emergency Management Agency, October 1998, Reprinted April 2004; FEMA 94.

Part VI: Fees

4VAC 50-20-340 Authority to establish fees

Under the Code of Virginia, § 10.1-613.5, the Board is authorized to establish and collect application fees for the administration of the dam safety program, administrative review, certifications, and the repair and maintenance of dams. The fees will be deposited into the Dam Safety, Flood Prevention and Protection Assistance Fund.

4VAC 50-20-350 Fee Submittal Procedures

A. Upon the effective date of these regulations, fees for all application ~~or report~~ submittals required pursuant to 4VAC 50-20-370 through 4 VAC 50-20-390 are due ~~on the day an application for an operation and maintenance certificate or a construction permit is submitted~~ prior to issuance of a certificate or permit. No application for an Operation and Maintenance Certificate or a Construction Permit will be ~~reviewed~~ acted upon by the Board without full payment of the required fee per § 10.1-613.5.

B. Fees shall be paid by check, draft or postal money order payable to the Treasurer of Virginia, or submitted electronically (if available), and must be in U.S. currency, except that agencies and institutions of the Commonwealth of Virginia may submit Interagency Transfers for the amount of the fee. All fees shall be sent to the following address (or submitted electronically, if available): Virginia Department of Conservation and Recreation, Dam Safety Receipts Control, P.O. Box 10150, Richmond, Virginia 23240.

C. All fee payments shall be accompanied by the following information:

1. Applicant name, address and daytime phone number.

2. The name of the dam, and the dam location.

3. The type of application or report submitted.

4. Whether the submittal is for a new permit or certificate issuance or permit or certificate reissuance.

5. The amount of fee submitted.

6. ~~The existing permit~~ Dam identification number, if applicable.

F. No permit fees remitted to the Department shall be subject to refund except as credits provided for in 4 VAC 50-20-390 D.

4VAC 50-20-360 Fee Exemptions

Impounding structures owned by Virginia Soil and Water Conservation Districts shall be exempt from all fees associated with Part VI in accordance with § 10.1-613.5. There will be no fee assessed for the decommissioning of an impounding structure.

4VAC 50-20-370 Construction Permit Application Fees

A. Any application form submitted pursuant to 4VAC 50-20-70 for permitting a proposed impounding structure construction after the effective date of these regulations shall be accompanied by a payment as determined in subsection B.

B. Fees shall be as follows:

1. $2,500 for High or Significant Hazard Potential impounding structures

2. $1,000 for Low Hazard Potential impounding structures

4VAC 50-20-380 Regular Operation and Maintenance Certificate Application Fees

A. Any application for a 6-year Regular Operation and Maintenance Certificate after the effective date of these regulations, except as otherwise exempted, shall be accompanied by a payment as determined in subsection B.

B. Fees for ~~Class~~ High, Significant, or Low ~~dams~~ Hazard Potential impounding structures shall be as follows:

1. $1,500 for High Hazard Potential

2. $1,000 for Significant Hazard Potential

3. $600 for Low Hazard Potential

4VAC 50-20-390 Conditional Operation and Maintenance Certificate Application Fee

A. Fees for a Conditional Operation and Maintenance Certificate or for the extension of a Conditional Operation and Maintenance Certificate for High or Significant Hazard Potential impounding structures shall be as follows:

1. For a 2-year Certificate: ~~$600~~ $1000

2. For a 1.5-year Certificate: ~~$450~~ $750

3. For a 1-year Certificate: ~~$300~~ $500

4. For a 6-month Certificate: ~~$150~~ $250

B. Fees for a Conditional Operation and Maintenance Certificate or for the extension of a Conditional Operation and Maintenance Certificate for Low Hazard Potential impounding structures shall be as follows:

1. For a 2-year Certificate: ~~$300~~ $500
2. For a 1.5-year Certificate: ~~$225~~ $375
3. For a 1-year Certificate: ~~$150~~ $250
4. For a 6-month Certificate: ~~$75~~ $125

C. Fees for a Conditional Operation and Maintenance Certificate or for the extension of a Conditional Operation and Maintenance Certificate for any impounding structure that requires a modification in spillway capacity due to changes in the regulations and that is eligible for a delayed effective date pursuant to 4VAC50-20-125 shall be as follows:

1. For a 2-year Certificate: $200
2. For a 1.5-year Certificate: $150
3. For a 1-year Certificate: $100
4. For a 6-month Certificate: $50

~~C~~D. The Board may allow a partial credit towards the Regular Operation and Maintenance Certificate fee if the owner of the impounding structure has completed, to the Director's satisfaction, the conditions of the Conditional Certificate prior to its expiration. Credits shall only be provided to the nearest 6-month interval.

~~FORMS~~

~~Virginia Dam Owner's Annual Inspection Form Report, DCR 199-098 (rev. 12/01 11/06).~~

~~Operation and Maintenance Certificate Application Class I, II and III for Virginia Regulated Impounding Structures, DCR 199-099 (rev. 12/01 11/06).~~

~~As-Built Report for Class I, II and III Virginia Regulated Impounding Structures, DCR 199-100 (rev. 12/01 11/06).~~

~~Design Report for the Construction/ or Alteration of Virginia Regulated Impounding Structures, DCR 199-101 (rev. 12/01 11/06).~~

~~Emergency Action Plan for Class I, Class II and Class III Virginia Regulated Impounding Structures, DCR 199-103 (rev. 12/01 11/06).~~

~~Inventory Report for Class III and Class IV Low Hazard Impounding Structures, DCR 199-104 (rev. 12/01).~~

~~Reinspection Report for Class I and II High and Significant Hazard Impounding Structures, DCR 199-105 (rev. 12/01).~~

~~Agricultural Certification~~ Exemption Application ~~for Impounding Structures, DCR 199-106 (rev. 12/01~~ 11/06~~).~~

~~Transfer Application for~~ Certificate to Operate and Maintain a Virginia Regulated ~~Impounding Structures~~ Structure from Past Owner to New Owner~~, DCR 199-107 (rev. 12/01~~ 11/06~~).~~

~~Inspection Report for Virginia Regulated Impounding Structures, DCR 199-108 (11/06)~~