

DISCUSSION DRAFT – NOT APPROVED

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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.

Statutory Authority: §10.1-605 of the Code of Virginia.
Historical Notes: Derived from VR625-01-00 §1.1, eff. February 1, 1989.

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 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 62.1 of the Code of Virginia, and other provisions of law as may be applicable.

C. In promulgating this chapter, the 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 engineering analysis required by this chapter such as plans, specifications, hydrology, hydraulics and inspections shall be conducted by and bear the seal of a professional engineer licensed to practice in Virginia.

E. The official forms as called for by this chapter are available from the director.

[CHECK]

Statutory Authority: §10.1-605 of the Code of Virginia.
Historical Notes: Derived from VR625-01-00 §1.2, eff. February 1, 1989.

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44 **4VAC50-20-30. Definitions.**

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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 (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.

"Alteration permit" means a permit required for changes 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" means a certificate required for impounding structures with deficiencies.

"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 an emergency action plan exercise that tests, develops, or maintains skills in a single emergency response procedure. During a drill, participants perform an in-

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87 house exercise to verify telephone numbers and other means of communication along
88 with the dam owner’s response. A drill is considered a necessary part of ongoing
89 training. A drill is the lowest level emergency action plan exercise.

90
91 “Emergency Action Plan or EAP” means a formal document that identifies potential dam
92 emergency conditions and specifies preplanned actions to be followed to minimize loss of
93 life and property damage. The EAP specifies actions the dam owner must take to
94 minimize or alleviate safety issues at the dam. It contains procedures and information to
95 assist the dam owner in issuing early warning and notification messages to responsible
96 emergency management authorities. It shall also contain dam break inundation zone
97 maps as required to show emergency management authorities the critical areas for action
98 in case of emergency.

99
100 “Emergency Action Plan Exercise” means an activity designed to promote emergency
101 preparedness; test or evaluate EAPs, procedures, or facilities; train personnel in
102 emergency management duties; and demonstrate operational capability. In response to a
103 simulated event, exercises consist of the performance of duties, tasks, or operations very
104 similar to the way they would be performed in a real emergency.

105
106 "Height" means the structural height of an impounding structure. If the impounding
107 structure spans a stream or watercourse, height means the vertical distance from the
108 natural bed of the stream or watercourse measured at the downstream toe of the
109 impounding structure to the top of the impounding structure. If the impounding structure
110 does not span a stream or watercourse, height means the vertical distance from the lowest
111 elevation of the outside limit of the barrier to the top of the impounding structure.

112
113 "Impounding structure" means a man-made device, whether a dam across a watercourse
114 or other structure outside a watercourse, used or to be used to retain or store waters or
115 other materials. The term includes: (i) all dams that are 25 feet or greater in height and
116 that create an impoundment capacity of 15 acre-feet or greater, and (ii) all dams that are
117 six feet or greater in height and that create an impoundment capacity of 50 acre-feet or
118 greater. The term "impounding structure" shall not include: (a) dams licensed by the State
119 Corporation Commission that are subject to a safety inspection program; (b) dams owned
120 or licensed by the United States government; (c) dams ~~constructed, maintained or~~
121 operated primarily for agricultural purposes which are less than 25 feet in height or which
122 create a maximum impoundment capacity smaller than 100 acre-feet; (d) water or silt
123 retaining dams approved pursuant to §45.1-222 or §45.1-225.1 of the Code of Virginia;
124 or (e) obstructions in a canal used to raise or lower water.

125
126 "Impoundment" means a body of water or other materials the storage of which is caused
127 by any impounding structure.

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

131
132 "Life of the impounding structure" and "life of the project" mean that period of time for
133 which the impounding structure is designed and planned to perform effectively, including
134 the time required to remove the structure when it is no longer capable of functioning as
135 planned and designed.

136
137 "Maximum impounding capacity" means the volume in acre-feet that is capable of being
138 impounded at the top of the impounding structure.

139
140 "Normal impounding capacity" means the volume in acre-feet that is capable of being
141 impounded at the elevation of the crest of the lowest ungated outlet from the
142 impoundment.

143
144 "Operation and maintenance certificate" means a certificate required for the operation and
145 maintenance of all impounding structures.

146
147 "Owner" means the owner of the land on which an impounding structure is situated, the
148 holder of an easement permitting the construction of an impounding structure and any
149 person or entity agreeing to maintain an impounding structure. The term "owner"
150 includes the Commonwealth or any of its political subdivisions, including but not limited
151 to sanitation district commissions and authorities. Also included are any public or private
152 institutions, corporations, associations, firms or companies organized or existing under
153 the laws of this Commonwealth or any other state or country, as well as any person or
154 group of persons acting individually or as a group.

155
156 "Tabletop Exercise" means an emergency action plan exercise that involves a meeting of
157 the dam owner and the state and local emergency management officials in a conference
158 room environment. The format is usually informal with minimum stress involved. The
159 exercise begins with the description of a simulated event and proceeds with discussions
160 by the participants to evaluate the EAP and response procedures and to resolve concerns
161 regarding coordination and responsibilities.

162
163 "Top of the impounding structure" means the lowest point of the nonoverflow section of
164 the impounding structure.

165
166 "Watercourse" means a natural channel having a well-defined bed and banks and in
167 which water flows when it normally does flow.

168
169 Statutory Authority: §10.1-605 of the Code of Virginia.
170 Historical Notes: Derived from VR625-01-00 §1.3, eff. February 1, 1989; Amended, Virginia Register Volume 18,
171 Issue 14, eff. July 1, 2002.
172 Effect of Amendment: The July 1, 2002 amendment revised the definitions for "director" and "impounding structure".

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

A. Impounding structures shall be classified in one of four categories according to size and hazard potential, as defined in subsection B of this section and Table 1. Size classification shall be determined either by maximum impounding capacity or height, whichever gives the larger size classification.

B. For the purpose of this chapter, hazards pertain to potential loss of human life or property damage downstream from the impounding structure in event of failure or faulty operation of the impounding structure or appurtenant facilities.

1. Impounding structures in the Class I hazard potential category are located where failure will cause probable loss of life or serious damage to occupied building(s), industrial or commercial facilities, important public utilities, main highway(s) or railroad(s).

2. Impounding structures in the Class II hazard potential category are located where failure could cause possible loss of life or damage to occupied building(s), industrial or commercial facilities, secondary 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 failure 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. Such size and hazard potential classifications shall be proposed by the owner and shall be subject to approval by the director. Present and projected development of in the dam break inundation zones downstream from the impounding structure shall be considered in determining the classification.

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

Statutory Authority: §10.1-605 of the Code of Virginia.
Historical Notes: Derived from VR625-01-00 §1.4, eff. February 1, 1989.

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

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215 Impounding structures shall be constructed, operated and maintained such that they
 216 perform in accordance with their design and purpose throughout the life of the project.
 217 For new impounding structures, the spillway(s) capacity shall perform at a minimum to
 218 safely pass the appropriate spillway design flood as determined in Table 1.
 219

220 **TABLE 1--Impounding Structure Regulations**

221

Class of Dam	Hazard Potential If Impounding Structure Fails	SIZE CLASSIFICATION		Spillway Design Flood (SDF) ^b
		Maximum Capacity (Ac-Ft) ^a	Height(Ft) ^a	
I	Probable Loss of Life; Excessive Economic Loss	Large $\geq 50,000$	≥ 100	PMF ^c
		Medium $\geq 1,000$ & $< 50,000$	≥ 40 & < 100	PMF
		Small ≥ 50 & $< 1,000$	≥ 25 & < 40	1/2 PMF to PMF
II	Possible Loss of Life; Appreciable Economic Loss	Large $\geq 50,000$	≥ 100	PMF
		Medium $\geq 1,000$ & $< 50,000$	≥ 40 & < 100	1/2 PMF to PMF
		Small ≥ 50 & $< 1,000$	≥ 25 & < 40	100-YR to 1/2 PMF
III	No Loss of Life Expected; Minimal Economic Loss	Large $\geq 50,000$	≥ 100	1/2 PMF to PMF
		Medium $\geq 1,000$ & $< 50,000$	≥ 40 & < 100	100-YR to 1/2 PMF
		Small ≥ 50 & $< 1,000$	≥ 25 & < 40	50-YR ^d to 100-YR ^e
IV	No Loss of Life Expected; No Economic Loss to Others	≥ 50 (non-agricultural)	≥ 25 (both)	50-YR to 100-YR
		≥ 100 (agricultural)		

222

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

224

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

235

236 c. PMF: Probable maximum flood. This means the flood that might be expected from the
 237 most severe combination of critical meteorologic and hydrologic conditions that are
 238 reasonably possible in the region. The PMF is derived from the current probable
 239 maximum precipitation (PMP) available from the National Weather Service, NOAA. In

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240 some cases local topography or meteorological conditions will cause changes from the
241 generalized PMP values; therefore, it is advisable to contact local, state or federal
242 agencies to obtain the prevailing practice in specific cases.
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244 d. 50-Yr: 50-year flood. This means the flood magnitude expected to be equaled or
245 exceeded on the average of once in 50 years. It may also be expressed as an exceedence
246 probability with a 2.0% chance of being equaled or exceeded in any given year.
247

248 e. 100-Yr: 100-year flood. This means the flood magnitude expected to be equaled or
249 exceeded on the average of once in 100 years. It may also be expressed as an exceedence
250 probability with a 1.0% chance of being equaled or exceeded in any given year.
251

252 Statutory Authority: §10.1-605 of the Code of Virginia.
253 Historical Notes: Derived from VR625-01-00 §1.5, eff. February 1, 1989; Amended, Virginia Register Volume 18,
254 Issue 14, eff. July 1, 2002.
255 Effect of Amendment: The July 1, 2002 amendment corrected the "greater than" and "equal than" signs in Table 1.
256

Part II: Permit Requirements

4VAC50-20-60. Required permits.

261 A. No person or entity shall construct or begin to construct an impounding structure until
262 the board has issued a construction permit.
263

264 B. No person or entity shall alter or begin to alter an existing impounding structure in **a**
265 **any** manner which would potentially affect its structural integrity until the board has
266 issued an alteration permit, or in the case of an emergency, authorization **is** obtained from
267 the director. The permit requirement may be waived if the director determines that the
268 alteration of improvement will not substantially alter or affect the structural integrity of
269 the impounding structure. Alteration does not mean normal operation and maintenance.
270

271 C. When the board receives an application for any permit to construct or alter an
272 impounding structure, the director shall inform the government of any jurisdiction which
273 might be affected by the permit application.
274

275 D. In evaluating construction and alteration permit applications the director shall use the
276 most current design criteria and standards referenced in 4VAC50-20-320 of this chapter.
277

278 Statutory Authority: §10.1-605 of the Code of Virginia.
279 Historical Notes: Derived from VR625-01-00 §2.1, eff. February 1, 1989.
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281 **4VAC50-20-70. Construction permits.**

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A. Prior to preparing the complete design report for a construction permit, applicants are encouraged to seek approval of the project concept from the director. For this purpose the applicant should submit a general description of subdivisions 1 through 4 of subsection B of this section and subdivisions 1 and 2 of this subsection:

1. Proposed design criteria and a description of the size, ground cover conditions, extent of current development of the watershed, jurisdictional comprehensive planning for development of the watershed, and the geologic and the geotechnical engineering assumptions used to determine the foundations 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 official forms. The design report shall be prepared in accordance with 4VAC50-20-240 and shall include the following information:

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. 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. 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 of the land use classifications applicable to the dam break inundation zone.
4. 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, access to the site and the outline of the impoundment. Existing aerial photographs or existing topographic maps may be used for this purpose.

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- 323 5. A report of the geotechnical investigations of the foundation soils or bedrock
324 and of the materials to be used to construct the impounding structure.
325
- 326 6. Design assumptions and analyses sufficient to indicate that the impounding
327 structure will be stable during its construction and during the life of the
328 impounding structure under all conditions of reservoir operations, including rapid
329 filling and rapid drawdown of the impoundment.
330
- 331 7. Evaluation of the stability of the reservoir rim area in order to safeguard against
332 reservoir rim slides of such magnitude as to create waves capable of overtopping
333 the impounding structure and confirmation of rim stability during seismic activity.
334
- 335 8. Design assumptions and analyses sufficient to indicate that seepage in, around,
336 through or under the impounding structure, foundation and abutments will be
337 reasonably and practically controlled so that internal or external forces or results
338 thereof will not endanger the stability of the impounding structure.
339
- 340 9. Calculations and assumptions relative to design of the spillway or spillways.
341 Spillway capacity shall conform to the criteria of Table 1.
342
- 343 10. Provisions to ensure that the impounding structure and appurtenances will be
344 protected against deterioration or erosion due to freezing and thawing, wind and
345 rain or any combination thereof.
346
- 347 11. Other pertinent design data, assumptions and analyses commensurate with the
348 nature of the particular impounding structure and specific site conditions,
349 including when required by ~~the director~~ this chapter, a plan and profile of the dam
350 break inundation zones.
351
- 352 12. Erosion and sediment control plans to minimize soil erosion and
353 sedimentation during all phases of construction, operation and maintenance.
354 Projects shall be in compliance with local erosion and sediment control
355 ordinances.
356
- 357 13. A description of the techniques to be used to divert stream flow during
358 construction so as to prevent hazard to life, health and property. Such diversion
359 plans shall also be in accordance with applicable environmental laws.
360
- 361 14. A plan of quality control testing to confirm that construction materials and
362 methods meet the design requirements set forth in the specifications.
363
- 364 15. A proposed schedule indicating construction sequence and time to completion.
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366 16. Plans and specifications as required by 4VAC50-20-310.

367
368 17. An emergency action plan ~~on official forms~~ developed in accordance with
369 4VAC50-20-175 and evidence that ~~a copy~~ the required copies of such plan ~~has~~
370 have been filed with the Department, the local organization for emergency
371 management and the State Department of Emergency Management. The plan
372 shall include a method of providing notification and warning to persons
373 downstream, other affected persons or property owners and local authorities in the
374 event of a flood hazard or the potential or impending failure of the impounding
375 structure.

376
377 18. A proposed impoundment and impounding structure operation and
378 maintenance plan on official forms certified by a licensed professional engineer.
379 This plan shall include a safety inspection schedule and shall place particular
380 emphasis on operating and maintaining the impounding structure in keeping with
381 the project design, so as to maintain its structural integrity and safety during both
382 normal and abnormal conditions which may reasonably be expected to occur
383 during its planned life.

384
385 19. Place holder for stormwater construction permit requirement language.

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387 20. Placeholder for cultural and historic resources?????????

388
389 C. The director or the applicant may request a conference to facilitate review of the
390 applicant's proposal.

391
392 D. The owner shall certify in writing that the operation and maintenance plan as approved
393 by the board will be adhered to during the life of the project except in cases of
394 unanticipated emergency requiring departure therefrom in order to mitigate hazard to life
395 and property. ~~At such time~~ In the case of an emergency, the owner's engineer, ~~and the~~
396 director, and other specified contacts shall be notified in accordance with the emergency
397 action plan developed in accordance with 4VAC50-20-175.

398
399 E. If the submission is not acceptable, the director shall inform the applicant within 60
400 days and shall explain what changes are required for an acceptable submission.

401
402 F. Within 120 days of receipt of an acceptable design report the board shall act on the
403 application.

404
405 G. Prior to and during construction the owner shall notify the director of any proposed
406 changes from the approved design, plans, specifications, or operation and maintenance
407 plan. Approval shall be obtained from the director prior to the construction or installation
408 of any changes that will affect the stability of the impounding structure.

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

I. 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 for extension of the two-year period and the board may extend such period for good cause.

J. The director may revoke a construction permit 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.

K. The owner's licensed professional engineer shall advise the director when the impounding structure may safely impound water. The director shall acknowledge this statement within 10 days after which the impoundment may be filled under the engineer's supervision. 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.

Statutory Authority: §10.1-605 of the Code of Virginia.
Historical Notes: Derived from VR625-01-00 §2.2, eff. February 1, 1989; Amended, Virginia Register Volume 18, Issue 14, eff. July 1, 2002.
Effect of Amendment: The July 1, 2002 amendment, in the second sentence of subsection A, changed "items" to "subdivisions" twice, inserted "of this section" and "of this subsection", and deleted "below" after "1 and 2"; in subsections B and K, and in paragraph B 16, deleted "of this chapter" after the VAC citation; and, in paragraph B 17, inserted "organization for emergency management", inserted "the" before "State Department", and changed "Services" to "Management" after "Emergency".

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4VAC50-20-80. Alterations permits.

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

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454 C. Where feasible an application for an alteration permit shall also include plans and
455 specifications for a device to allow for draining the impoundment if such does not exist.
456

457 D. If the submission is not acceptable, the director shall inform the applicant within 60
458 days and shall explain what changes are required for an acceptable submission.
459

460 E. Within 120 days of receipt of an acceptable application, the board shall act on the
461 application.
462

463 Statutory Authority: §10.1-605 of the Code of Virginia.
464 Historical Notes: Derived from VR625-01-00 §2.3, eff. February 1, 1989.
465

466 **4VAC50-20-90. Transfer of permits.**
467

468 Prior to the transfer of ownership of a permitted impounding structure the permittee shall
469 notify the director in writing and the new owner shall file a transfer application on
470 official forms. The new owner shall amend the existing permit application as necessary
471 and shall certify to the director that he is aware of and will comply with all of the
472 requirements and conditions of the permit.
473

474 Statutory Authority: §10.1-605 of the Code of Virginia.
475 Historical Notes: Derived from VR625-01-00 §2.4, eff. February 1, 1989.
476

477 **Part III: Certificate Requirements**
478

479 **4VAC50-20-100. Operation and maintenance certificates.**
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481 A. A Class I Operation and Maintenance Certificate is required for a Class I Hazard
482 potential impounding structure. The certificate shall be for a term of six years. It shall be
483 updated based upon the filing of a new reinspection report certified by a licensed
484 professional engineer every two years.
485

486 B. A Class II Operation and Maintenance Certificate is required for a Class II Hazard
487 potential impounding structure. The certificate shall be for a term of six years. It shall be
488 updated based upon the filing of a new reinspection report certified by a licensed
489 professional engineer every three years.
490

491 C. A Class III Operation and Maintenance Certificate is required for a Class III Hazard
492 potential impounding structure. The certificate shall be for a term of six years.
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494 D. The owner of a Class I, II or III impounding structure shall provide the director an
495 annual owner's inspection report on official forms in years when no licensed professional
496 reinspection is required and may be done by the owner or his representative.
497

498 E. If an Operation and Maintenance Certificate is not updated as required, the board shall
499 take appropriate enforcement action.
500

501 F. The owner of a Class I, II or III impounding structure shall apply for the renewal of the
502 six year operation and maintenance certificate 90 days prior to its expiration in
503 accordance with 4VAC50-20-120 of this chapter.
504

505 G. A Class IV impounding structure will not require an operation and maintenance
506 certificate. An inventory report is to be prepared as provided in 4VAC50-20-120 B and
507 filed by the owner on a six-year interval, and an owners inspection report filed annually.
508

509 H. The owner of any impounding structure, regardless of its hazard classification, shall
510 notify the board immediately of any change in either cultural features downstream from
511 the impounding structure or of any change in the use of the area downstream that would
512 present hazard to life or property in the event of failure.
513

514 I. The owner of any impounding structure shall meet the emergency action plan submittal
515 requirements setout in 4VAC50-20-175.
516

517 Statutory Authority: §10.1-605 of the Code of Virginia.
518 Historical Notes: Derived from VR625-01-00 §3.1, eff. February 1, 1989.
519

520 **4VAC50-20-110. Operation and maintenance certificate for newly constructed impounding**
521 **structures.**
522

523 A. Within 180 days after completion of the construction of an impounding structure, the
524 owner shall submit:
525

526 1. A complete set of as-built drawings certified by a licensed professional
527 engineer and an as-built report on official forms.
528

529 2. A copy of a certificate from the licensed professional engineer who has
530 inspected the impounding structure during construction certifying that, to the best
531 of his judgment, knowledge and belief, the impounding structure and its
532 appurtenances were constructed in conformance with the plans, specifications,
533 drawings and other requirements approved by the board.
534

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

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537 The emergency action plan shall also be updated as necessary and resubmitted at
538 this time.

539
540 B. If the director finds that the operation and maintenance plan or emergency action plan
541 developed in accordance with 4VAC50-20-175 is deficient, he shall return it to the owner
542 within 60 days with suggestions for revision.

543
544 C. Within 60 days of receipt of the items listed in subsection A above, if the board finds
545 that adequate provision has been made for the safe operation and maintenance of the
546 impounding structure, the board shall issue an operation and maintenance certificate.

547
548 Statutory Authority: §10.1-605 of the Code of Virginia.
549 Historical Notes: Derived from VR625-01-00 §3.2, eff. February 1, 1989.

550
551 **4VAC50-20-120. Operation and maintenance certificates for existing impounding**
552 **structures.**

553
554 A. Any owner of an impounding structure other than a Class IV impounding structure
555 which has already filed an inventory report that does not have an operation and
556 maintenance certificate or any owner renewing an operation and maintenance certificate
557 shall file an application with the board.

558
559 B. The application for an operation and maintenance certificate shall be on official forms
560 and shall include:

561
562 1. A reinspection report for Class I and II impounding structures. The reinspection
563 report shall include an update of conditions of the impounding structure based on
564 a previous safety inspection as required by the board, a previous reinspection
565 report or an as-built report.

566
567 2. An inventory report for Class III impounding structures. The inventory report
568 shall include:

569
570 a. The name and location of the impounding structure and the name of the
571 owner.

572
573 b. The description and dimensions of the impounding structure, the
574 spillways, the reservoir and the drainage area.

575
576 c. The history of the impounding structure which shall include the design,
577 construction, repairs, inspections and whether the structure has ever been
578 overtopped.

579

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- 580 d. Observations of the condition of the impounding structure, reservoir,
581 and upstream and downstream areas.
582
583 e. Any changes in the impounding structure, reservoir, and upstream and
584 downstream areas.
585
586 f. Recommendations for remedial work.
587
588 3. An impoundment and impounding structure operation and maintenance plan
589 certified by a licensed professional engineer. This plan shall place particular
590 emphasis on operating and maintaining the impounding structure in keeping with
591 the project design in such manner as to maintain its structural integrity and safety
592 during both normal and abnormal conditions which may reasonably be expected
593 to occur during its planned life. The safety inspection report required by the board
594 should be sufficient to serve as the basis for the operation and maintenance plan
595 for a Class I and Class II impounding structure. For a Class III impounding
596 structure, the operation and maintenance plan shall be based on the data provided
597 in the inventory report.
598
599 4. An emergency action plan developed in accordance with 4VAC50-20-175 and
600 evidence that ~~a copy~~ the required copies of such plan ~~has~~ have been filed with the
601 Department, the local organization for emergency management and the State
602 Department of Emergency Management. The plan shall include a method of
603 providing notification and warning to persons downstream, other affected persons
604 or property owners and local authorities in the event of a flood hazard or the
605 potential or impending failure of the impounding structure.
606
607 C. The owner shall certify in writing that the operation and maintenance plan approved
608 by the board will be adhered to during the life of the project except in cases of emergency
609 requiring departure therefrom in order to mitigate hazard to life and property, at which
610 time the owner's engineer, ~~and the director~~, and other specified contacts shall be notified
611 in accordance with the emergency action plan developed in accordance with 4VAC50-
612 20-175.
613
614 D. If the director finds that the operation and maintenance plan or emergency action plan
615 developed in accordance with 4VAC50-20-175 is deficient, he shall return it to the owner
616 within 60 days with suggestions for revision to meet the specified minimum
617 requirements.
618
619 E. Within 60 days of receipt of an acceptable application if the board finds that adequate
620 provision has been made for the safe operation and maintenance of the impounding
621 structure, the board shall issue an operation and maintenance certificate.
622
623

Statutory Authority: §10.1-605 of the Code of Virginia.

DISCUSSION DRAFT – NOT APPROVED

624 Historical Notes:Derived from VR625-01-00 §3.3, eff. February 1, 1989; Amended, Virginia Register Volume 18,
625 Issue 14, eff. July 1, 2002.

626 Effect of Amendment: The July 1, 2002 amendment, in paragraph B 1, substituted "previous safety inspection as
627 required by the board" for "Phase I or Phase II inspection as established by the U.S. Army Corps of Engineers"; in the
628 third sentence of paragraph B 3, substituted "safety inspection report required by the board" for "Phase I Inspection
629 Report"; and, in paragraph B 4, substituted "local organization for emergency management and the State Department of
630 Emergency Management" for "local and State Department of Emergency Services".

631
632 **4VAC50-20-130. Existing impounding structures constructed prior to July 1, 1982.**

633
634 A. Many existing impoundment structures were designed and constructed prior to the
635 enactment of the Dam Safety Act, and may not satisfy current criteria for new
636 construction. The board may issue an operation and maintenance certificate for such
637 structures provided that:

- 638
- 639 1. Operation and maintenance is determined by the director to be satisfactory and
640 up to date;
- 641
- 642 2. Annual owner's inspection reports have been filed with and are considered
643 satisfactory by the director;
- 644
- 645 3. The applicant proves in accordance with the current design procedures and
646 references of 4VAC50-20-320 to the satisfaction of the board that the impounding
647 structure as designed, constructed, operated and maintained does not pose an
648 unreasonable hazard to life and property; and
- 649
- 650 4. The owner satisfies all special requirements imposed by the board.

651
652 B. When appropriate with existing impounding structures only, the spillway design flood
653 requirement may be reduced by the board to the spillway discharge at which dam failure
654 will not significantly increase the downstream hazard existing just prior to dam failure
655 provided that the conditions of 4VAC50-20-130 A have been met.

656
657 Statutory Authority: §10.1-605 of the Code of Virginia.
658 Historical Notes: Derived from VR625-01-00 §3.4, eff. February 1, 1989.

659
660 **4VAC50-20-140. Existing impounding structures constructed after July 1, 1982.**

661
662 The board may issue an operation and maintenance certificate for an impounding
663 structure having a construction permit issued after July 1, 1982, and shall not require
664 upgrading to meet new more stringent criteria unless the board determines that the new
665 criteria must be applied to prevent an unreasonable hazard to life or property.

666
667 Statutory Authority: §10.1-605 of the Code of Virginia.

DISCUSSION DRAFT – NOT APPROVED

668 Historical Notes: Derived from VR625-01-00 §3.5, eff. February 1, 1989.

669

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

671

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

676

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

682

C. A conditional certificate may be renewed in accordance with the procedures of 4VAC50-20-120 provided that annual owner inspection reports are on file, and the board determines that the owner is proceeding with the necessary corrective actions.

686

D. Once the deficiencies are corrected, the board shall issue an operation and maintenance certificate based upon any required revisions to the original application.

689

E. The owner of any impounding structure, whether under conditional certificate or otherwise, shall meet the emergency action plan requirements setout in 4VAC50-20-175.

692

Statutory Authority: §10.1-605 of the Code of Virginia.
Historical Notes: Derived from VR625-01-00 §3.6, eff. February 1, 1989.

695

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

697

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.

701

Statutory Authority: §10.1-605 of the Code of Virginia.
Historical Notes: Derived from VR625-01-00 §3.7, eff. February 1, 1989.

704

4VAC50-20-170. Transfer of certificates.

706

Prior to the transfer of ownership of an impounding structure the certificate holder shall notify the director in writing and the new owner shall file a transfer application on official forms. The new owner may elect to continue the current operation and maintenance certificate for the remaining term or he may apply for a new certificate in accordance with 4VAC50-20-120. If the owner elects to continue the existing certificate

711

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712 he shall amend the existing certificate application as necessary and shall certify to the
713 director that he is aware of and will comply with all of the requirements and conditions of
714 the certificate.

715
716 Statutory Authority: §10.1-605 of the Code of Virginia.
717 Historical Notes: Derived from VR625-01-00 §3.8, eff. February 1, 1989.
718

719 **4VAC50-20-175. Emergency Action Plans.**

720 A. In order to minimize the loss of life and property damage during potential emergency
721 conditions at a dam, and to ensure effective, timely action is taken should a dam emergency
722 occur, an EAP shall be required for each impounding structure. The emergency action plans
723 shall be coordinated with the Department of Emergency Management in accordance with §44-
724 146.18. The plans required by these regulations shall be incorporated into local and inter-
725 jurisdictional emergency plans pursuant to §44-146.19.

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

728 C. An EAP shall be submitted every six years. For a Class I, II, or III impounding
729 structure, the EAP shall be submitted with the dam owner’s renewal of their operation and
730 maintenance certificate application. For a Class IV dam, the owner shall submit an EAP every
731 six years with their inventory report.

732 D. It is imperative that the dam owner furnish all holders of the EAP section updates to
733 the EAP immediately upon becoming aware of necessary changes to keep the EAP workable.
734 Should a dam be reclassified, an emergency action plan in accordance with this section shall be
735 submitted.

736 E. A drill shall be conducted annually for each Class I, II, or III impounding structure. A
737 table-top exercise shall be conducted once every 3 years for Class I and II structures. Owners
738 shall certify to the Department annually that an exercise has been completed and the statement
739 shall include a critique of the exercise and any revisions or updates to the plan or a statement that
740 no revisions or updates are needed.

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

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

745 1. Notification chart (Class I, II, III and IV) - A notification chart shall be included for all
746 classes of dams that shows who is to be notified, by whom, and in what priority. The
747 notification chart shall include contact information that assures 24-hour telephone coverage for
748 all responsible parties.

749 2. Emergency Detection, Evaluation, and Classification (Class I, II, and III) - The plan
750 shall include a discussion of the procedures for timely and reliable detection, evaluation, and
751 classification of an emergency situation to ensure that the appropriate course of action is taken
752 based on the urgency of the situation. Where appropriate, the situations should address dam
753 breaks that are imminent or in progress, a situation where the potential for dam failure is rapidly
754 developing, and a situation where the threat is slowly developing.

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755 3. Responsibilities (Class I, II, and III) – The plan shall specify a determination of
756 responsibility for EAP-related tasks. The EAP shall also clearly designate the responsible party
757 for making the decision that an emergency condition no longer exists at the dam.

758 4. Preparedness (Class I, II, and III) – The plan shall include a section that describes
759 preparedness actions to be taken both before and following development of emergency
760 conditions.

761 5. (a). Dam Break Inundation Maps (Class I and II, and III) – The plan shall include an
762 inundation map that delineates the areas that would be flooded as a result of a dam failure. Such
763 maps shall be developed in accordance with subsection H.

764 (b) Class IV dams shall provide a 7.5-minute U.S. Geological Survey topographic map
765 noting any downstream features of concern.

766 6. Appendices (Class I and II, and III) - The appendices shall contain information that
767 supports and supplements the material used in the development and maintenance of the EAP
768 such as analyses of dam break floods; plans for training, exercising, updating, and posting the
769 EAP; and other site-specific concerns.

770 7. Certification (Class I, II, III and IV) – The plan shall include a section that is signed by
771 all parties involved in the plan, where they indicate their approval of the plan and agree to their
772 responsibilities for its execution.

773 H. All properties identified within the dam break inundation zone shall be incorporated
774 into the EAP’s dam break inundation zone map to ensure the proper notification of persons
775 downstream and other affected persons or property owners in the event of a flood hazard or the
776 impending failure of the impounding structure. The requirements for a dam break inundation
777 map are as follows:

778 1. Maps shall be developed for both the sunny day failure condition and the Spillway
779 Design Flood failure condition to show the expected extremes in peak water surface elevations,
780 travel times of the front of the dam break flood wave to critical locations, and distances
781 downstream between the two scenarios. For a sunny day failure, the water level of the reservoir
782 should be assumed to be the crest of the lowest open spillway that could not be plugged by
783 debris. Inundation mapping should extend downstream until the breach flood wave would be
784 non-damaging.

785 2. The map(s) shall be developed at a scale sufficient to graphically display downstream
786 inhabited areas and structures on the map within the identified inundation area that may be
787 subject to possible danger. To the maximum extent practicable, the inundation maps should be
788 supplemented with water surface profiles at critical areas showing the water surface elevation
789 prior to failure and the peak water surface elevation after failure. The list of downstream
790 residents with their telephone numbers should whenever possible be plotted on the map for easy
791 reference in the case of emergencies.

792 3. Since local officials are likely to use the maps for evacuation purposes, a note should
793 be included on the map to advise that, because of the method, procedures, and assumptions used
794 to develop the flooded areas, the limits of flooding shown and flood wave travel times are
795 approximate and should be used only as a guideline for establishing evacuation zones. Actual
796 areas inundated will depend on actual failure conditions and may differ from areas shown on the
797 maps.

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

804 K. The EAP shall at a minimum be filed with the Department, the local organization for
805 emergency management, and the State Department of Emergency Management. Two copies
806 shall be provided to the Department.

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

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828

829 **Part IV: Procedures**

830

831 **4VAC50-20-180. Inspections.**

832

833 The director may make inspections during construction, alteration or operation and
834 maintenance as deemed necessary to ensure that the impounding structure is being
835 constructed, altered or operated and maintained in compliance with the permit or
836 certificate issued by the board. The director shall provide the owner a copy of the
837 findings of these inspections. This inspection does not relieve the owner from the
838 responsibility of providing adequate inspection during construction or operation and
839 maintenance. Periodic inspections during construction or alteration shall be conducted

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840 under the supervision of a licensed professional engineer who shall propose the frequency
841 and nature of the inspections subject to approval by the director. Periodic inspections
842 during operation and maintenance shall be conducted under the supervision of a licensed
843 professional engineer at an interval not greater than that required to update the operation
844 and maintenance certificate. At a minimum, an annual owner's inspection shall be
845 conducted when a professional inspection is not required. Every owner shall provide for
846 an inspection by a licensed professional engineer after overtopping of the impounding
847 structure. A copy of the findings of each inspection with the engineer's recommendations
848 shall be filed with the board within a reasonable period of time not to exceed 30 days
849 subsequent to completion of the inspection.

850
851 Statutory Authority: §10.1-605 of the Code of Virginia.
852 Historical Notes: Derived from VR625-01-00 §4.1, eff. February 1, 1989.

853
854 **4VAC50-20-190. Right to hearing.**

855
856 Any owner aggrieved by an action taken by the director or by the board without hearing,
857 or by inaction of the director or the board, under the provisions of this chapter, may
858 demand in writing a formal hearing.

859
860 Statutory Authority: §10.1-605 of the Code of Virginia.
861 Historical Notes: Derived from VR625-01-00 §4.2, eff. February 1, 1989.

862
863 **4VAC50-20-200. Enforcement.**

864
865 Any owner refusing to obey any order of the board or the director pursuant to this chapter
866 may be compelled to obey and comply with such provisions by injunction or other
867 appropriate remedy obtained in a court proceeding. Such proceeding shall be instituted by
868 the board or in the case of an emergency, by the director in the court which granted
869 approval to the owner to impound waters or, if such approval has not been granted, the
870 proceeding shall be instituted in any appropriate court.

871
872 Statutory Authority: §10.1-605 of the Code of Virginia.
873 Historical Notes: Derived from VR625-01-00 §4.3, eff. February 1, 1989.

874
875 **4VAC50-20-210. Consulting boards.**

876
877 A. When the board needs to satisfy questions of safety regarding plans and specifications,
878 construction or operation and maintenance, or when requested by the owner, the board
879 may appoint a consulting board to report to it with respect to those questions of the
880 impounding structure's safety ~~of an impounding structure~~. Such a board shall consist of
881 two or more consultants, none of whom have been associated with the impounding
882 structure.

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883
884 B. The costs and expenses incurred by the consulting board, if appointed at the request of
885 an owner, shall be paid by the owner.

886
887 C. The costs and expenses incurred by the consulting board, if initiated by the board,
888 shall be paid by the board.

889
890 Statutory Authority: §10.1-605 of the Code of Virginia.
891 Historical Notes: Derived from VR625-01-00 §4.4, eff. February 1, 1989.

892

893 **4VAC50-20-220. Unsafe conditions.**

894
895 A. No owner shall have the right to maintain an impounding structure which
896 unreasonably threatens the life or property of another person. The owner of any
897 impounding structure found to have deficiencies which could threaten life or property if
898 uncorrected shall take the corrective actions needed to remove such deficiencies within a
899 reasonable period of time.

900
901 B. Imminent danger. When the director finds that an impounding structure is unsafe and
902 constitutes an imminent danger to life or property, he shall immediately notify the State
903 Department of Emergency Management and confer with the owner and ensure that the
904 emergency action plan has been implemented if appropriate to do so. The owner of an
905 impounding structure found to constitute an imminent danger to life or property shall take
906 immediate corrective action to remove the imminent danger as required by §10.1-608 of
907 the Code of Virginia.

908
909 C. Nonimminent danger. The owner of an impounding structure who has been issued a
910 report by the board containing findings and recommendations for the correction of
911 deficiencies which threaten life or property if not corrected, shall undertake to implement
912 the recommendations for correction of deficiencies according to a schedule of
913 implementation contained in that report as required by §10.1-609 of the Code of Virginia.

914
915 Statutory Authority: §10.1-605 of the Code of Virginia.
916 Historical Notes: Derived from VR625-01-00 §4.5, eff. February 1, 1989; Amended, Virginia Register Volume 18,
917 Issue 14, eff. July 1, 2002.
918 Effect of Amendment: The July 1, 2002 amendment, in subsection B, changed "Emergency Services" to "Emergency
919 Management"; and, in subsection C, changed "director" to "board", following "issued a report by the".

920

921 **4VAC50-20-230. Complaints.**

922
923 A. Upon receipt of a complaint alleging that the person or property of the complainant is
924 endangered by the construction, maintenance or operation of impounding structure, the
925 director shall cause an inspection of the structure, unless the data, records and inspection
926 reports on file with the board are found adequate to determine if the complaint is valid.

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927
928 B. If the director finds that an unsafe condition exists, the director shall proceed under the
929 provisions of §§10.1-608 and 10.1-609 of the Code of Virginia to render the extant
930 condition safe.

931
932 Statutory Authority: §10.1-605 of the Code of Virginia.
933 Historical Notes: Derived from VR625-01-00 §4.6, eff. February 1, 1989.
934

Part V: Design Requirements

935
936
937 **4VAC50-20-240. Design of structures.**
938

939 A. The owner shall complete all necessary investigations prior to submitting the design
940 report. The scope and degree of precision required is a matter of engineering judgment
941 based on the complexities of the site and the hazard potential classification of the
942 proposed structure.

943
944 B. Surveys shall be made with sufficient accuracy to locate the proposed construction site
945 and to define the total volume of storage in the impoundment. Locations of center lines
946 and other horizontal and vertical controls shall be shown on a map of the site. The area
947 downstream and upstream from the proposed impounding structure shall be investigated
948 in order to delineate the areas and extent of potential damage in case of failure or
949 backwater due to flooding.

950
951 C. The drainage area shall be determined. Present, projected and potential future land-use
952 conditions shall be considered in determining the runoff characteristics of the drainage
953 area. The most severe of these conditions shall be included in the design calculations
954 which shall be submitted as part of the design report.

955
956 D. The geotechnical engineering investigation shall consist of borings, test pits and other
957 subsurface explorations necessary to adequately define the existing conditions. The
958 investigations shall be performed so as to define the soil, rock and ground water
959 conditions.

960
961 E. All construction materials shall be adequately selected so as to ensure that their
962 properties meet design criteria. If on-site materials are to be utilized, they shall be located
963 and determined to be adequate in quantity and quality.

964
965 Statutory Authority: §10.1-605 of the Code of Virginia.
966 Historical Notes: Derived from VR625-01-00 §5.1, eff. February 1, 1989.
967

968 **4VAC50-20-250. Design flood.**
969

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970 The minimum design flood to be utilized in impounding structure evaluation, design,
971 construction, operation and maintenance shall be commensurate with the size and hazard
972 potential of the particular impounding structure as determined in 4VAC50-20-50 and
973 Table 1. Competent, experienced, ~~professional~~-engineering judgment by a licensed
974 professional engineer shall be used in applying those design and evaluation procedures
975 referenced in 4VAC50-20-320 of this chapter.

976
977 Statutory Authority: §10.1-605 of the Code of Virginia.
978 Historical Notes: Derived from VR625-01-00 §5.2, eff. February 1, 1989.

979

980 **4VAC50-20-260. Emergency spillway design.**

981
982 A. Every impounding structure shall have a spillway system with adequate capacity to
983 discharge the design flood without endangering the safety of the impounding structure.

984
985 B. An emergency spillway shall be required.

986
987 C. Vegetated earth or an unlined emergency spillway may be approved when the
988 applicant demonstrates that it will pass the spillway design flood without jeopardizing the
989 safety of the impounding structure.

990
991 D. Lined emergency spillways shall include design criteria calculations, plans and
992 specifications for open channel, drop, ogee and chute spillways that include crest
993 structures, walls, panel lining and miscellaneous details. All joints shall be reasonably
994 water-tight and placed on a foundation capable of sustaining applied loads without undue
995 deformation. Provision shall be made for handling leakage from the channel or under
996 seepage from the foundation which might adversely affect the structural integrity and
997 structural stability of the impounding structure.

998
999 Statutory Authority: §10.1-605 of the Code of Virginia.
1000 Historical Notes: Derived from VR625-01-00 §5.3, eff. February 1, 1989.

1001

1002 **4VAC50-20-270. Principal spillways and outlet works.**

1003
1004 A. It will be assumed that principal spillways and regulating outlets provided for special
1005 functions will operate to normal design discharge capabilities during the spillway design
1006 flood, provided appropriate analyses show:

1007
1008 1. That control gates and structures are suitably designed to operate reliably under
1009 maximum heads for durations likely to be involved and risks of blockage by
1010 debris are minimal;

1011

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1012 2. That access roads and passages to gate regulating controls would be safely
1013 passable by operating personnel under spillway design flood conditions; and
1014

1015 3. That there are no other substantial reasons for concluding that outlets would not
1016 operate safely to fill design capacity during the spillway design flood.
1017

1018 B. If there are reasons to doubt that any of the above basic requirements might not be
1019 adequately met under spillway design flood conditions, the "dependable" discharge
1020 capabilities of regulating outlets shall be assumed to be less than 100% of design
1021 capabilities, generally as outlined in the following subsections C through G of this
1022 section.
1023

1024 C. Any limitations in safe operating heads, maximum velocities to be permitted through
1025 structures or approach channels, or other design limitations shall be observed in
1026 establishing "dependable" discharge rating curves to be used in routing the spillway
1027 design flood hydrograph through the reservoir.
1028

1029 D. If intakes to regulating outlets are likely to be exposed to dangerous quantities of
1030 floating ~~drift~~ debris, sediment depositions or ice hazards prior to or during major floods,
1031 the dependable discharge capability during the spillway design flood shall be assumed to
1032 be zero.
1033

1034 E. If access roads or structural passages to operating towers or controls are likely to be
1035 flooded or otherwise unusable during the spillway design flood, the dependable discharge
1036 capability of regulating outlets will be assumed to be zero for those period of time during
1037 which such conditions might exist.
1038

1039 F. Any deficiencies in discharge performance likely to result from delays in the operation
1040 of gates before attendants could be reasonably expected to reach the control for in
1041 estimating "dependable" discharge capabilities to be assumed in routing the spillway
1042 design flood through reservoir. Reports on design studies shall indicate the allowances
1043 made for possible delays in initiating gate operations. Normally, for projects located in
1044 small basins, where critical spillway design flood inflows may occur within several hours
1045 after intense precipitation, outflows through any regulating outlets that must be opened
1046 after the flood begins shall be assumed to be zero for an appropriate period of time
1047 subsequent to the beginning of intense rainfall.
1048

1049 G. All gates, valves, conduits and concrete channel outlets shall be designed and
1050 constructed to prevent significant erosion or damage to the impounding structure or to the
1051 downstream outlet or channel.
1052

1053 Statutory Authority: §10.1-605 of the Code of Virginia.
1054 Historical Notes: Derived from VR625-01-00 §5.4, eff. February 1, 1989.
1055

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1056 **4VAC50-20-280. Drain requirements.**

1057
1058 All new impounding structures regardless of their hazard potential classification, shall
1059 include a device to permit draining of the impoundment within a reasonable period of
1060 time as determined by the owner's licensed professional engineer, subject to approval by
1061 the director.

1062
1063 Statutory Authority: §10.1-605 of the Code of Virginia.
1064 Historical Notes: Derived from VR625-01-00 §5.5, eff. February 1, 1989.

1065
1066 **4VAC50-20-290. Life of the impounding structure.**

1067
1068 Components of the impounding structure, the impoundment, the outlet works, drain
1069 system and appurtenances shall be durable in keeping with the design and planned life of
1070 the impounding structure.

1071
1072 Statutory Authority: §10.1-605 of the Code of Virginia.
1073 Historical Notes: Derived from VR625-01-00 §5.6, eff. February 1, 1989.

1074
1075 **4VAC50-20-300. Additional design requirements.**

1076
1077 A. Flood routings shall start at or above the elevation of the crest of the lowest ungated
1078 outlet.

1079
1080 B. All elements of the impounding structure and impoundments shall conform to sound
1081 engineering practice. Safety factors, design standards and design references that are used
1082 shall be included with the design report.

1083
1084 C. Inspection devices may be required by the director for use by inspectors, owners or the
1085 director in conducting inspections in the interest of structural integrity during and after
1086 completion of construction and during the life of the impounding structure.

1087
1088 Statutory Authority: §10.1-605 of the Code of Virginia.
1089 Historical Notes: Derived from VR625-01-00 §5.7, eff. February 1, 1989.

1090
1091 **4VAC50-20-310. Plans and specifications.**

1092
1093 The plans and specifications for a proposed impounding structure shall consist of a
1094 detailed engineering design report that includes engineering drawings and specifications,
1095 with the following as a minimum:

1096

DISCUSSION DRAFT – NOT APPROVED

- 1097 1. The name of the project; the name of the owner; classification of the
- 1098 impounding structure as set forth in this chapter; designated access to the project
- 1099 and the location with respect to highways, roads, streams and existing
- 1100 impounding structures and impoundments that would affect or be affected by the
- 1101 proposed impounding structure.
- 1102
- 1103 2. Cross-sections, profiles, logs of test borings, laboratory and in situ test data,
- 1104 drawings of principal and emergency spillways and other additional drawings in
- 1105 sufficient detail to indicate clearly the extent and complexity of the work to be
- 1106 performed.
- 1107
- 1108 3. The technical provisions, as may be required to describe the methods of the
- 1109 construction and construction quality control for the project.
- 1110
- 1111 4. Special provisions, as may be required to describe technical provisions needed
- 1112 to ensure that the impounding structure is constructed according to the approved
- 1113 plans and specifications.

1114

1115 Statutory Authority: §10.1-605 of the Code of Virginia.
1116 Historical Notes: Derived from VR625-01-00 §5.8, eff. February 1, 1989.

1117

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

1119

The following are acceptable as design procedures and references:

1121

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

1124

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

1127

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

1130

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

1133

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.

1137

1138 Statutory Authority: §10.1-605 of the Code of Virginia.
1139 Historical Notes: Derived from VR625-01-00 §5.9, eff. February 1, 1989; Amended, Virginia Register Volume 18,
1140 Issue 14, eff. July 1, 2002.

DISCUSSION DRAFT – NOT APPROVED

1141 Effect of Amendment: The July 1, 2002 amendment, in paragraph 2, changed "Soil" to "Natural Resources" before
1142 "Conservation"; and, in paragraph 3, changed "or Interior" to "of the Interior".

1143

1144

FORMS

1145

Dam Owner's Annual Inspection Form, DCR 199-098 (rev. 12/01).

1147

1148 Operation and Maintenance Application Class I, II and III Impounding Structures, DCR
1149 199-099 (rev. 12/01).

1150

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

1152

1153 Design Report for the Construction/Alteration of Impounding Structures, DCR 199-101
1154 (rev. 12/01).

1155

1156 ~~Emergency Action Plan for Class I, Class II and Class III Impounding Structures, DCR~~
1157 ~~199-103 (rev. 12/01).~~

1158

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

1161

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

1163

Agricultural Certification for Impounding Structures, DCR 199-106 (rev. 12/01).

1166

Transfer Application for Impounding Structures, DCR 199-107 (rev. 12/01).

1168

1169

1170

1171

Spillway Flow Reduction Parking Lot Items

1173 Full scale exercise (every 2 years) and functional exercise (every 6 years) might be part of a
1174 reduction process.

1175 Inundation maps updated more frequently

1176 Functioning I-Flow System or other observation system

1177 Proactive – Inundation maps driving future zoning

1178 DCR in-depth review of the EAP require \$\$\$'s

1179 Automated warning/ notification system

1180

1181 Functional and full scale exercises shall be considered comprehensive exercises and shall only be
1182 required pursuant to section xxxx (spillway design reduction strategies).