

**15A NCAC 02K .0205 SPILLWAY DESIGN**

(a) All dams shall have a spillway system with capacity to pass a flow resulting from a design storm indicated in (e) of this Rule for a hazard classification appropriate for the dam, unless the applicant provides calculations, designs, and plans to show that the design flow can be stored, passed through, or passed over the dam without failure occurring.

(b) A vegetated earth or unlined emergency spillway will be approved when computations indicate that it will pass the design storm without jeopardizing the safety of the structure. The risk of recurring storms, excessive erosion, and inadequate vegetative cover will be considered acceptable in such a spillway when its average frequency of use is predicted to be no more frequent than once in 25 years for existing class B and for class A dams except for small class A dams designed in accordance with all design criteria established by the U.S.D.A., Soil Conservation Service, and as contained in Engineering Standard 378 of the U.S.D.A., Soil Conservation Service; once in 50 years for new class B, small and medium new class C, and existing class C dams; and once in 100 years for large and very large new class C dams. The dam sizes referred to in this Subsection are defined in (e) of this Rule.

(c) Lined Spillways and Channels. The design report shall include design data criteria for open channel, drop, ogee, and chute spillways and other spillway types that include crest structures, walls, channel lining, and miscellaneous details. All masonry or concrete structures shall have joints that are relatively water-tight and shall be placed on foundations capable of sustaining applied loads without undue deformation. Provisions must be made for handling leakage from the channel or underseepage from the foundation which might cause saturation of underlying materials or uplift against the undersurfaces.

(d) Within 15 days following passage of the design storm peak, the spillway system shall be capable of removing from the reservoir at least 80 percent of the water temporarily detained in the reservoir above the elevation of the primary spillway.

(e) It is recognized that the relationships between valley slope and width, total reservoir storage, drainage area, other hydrologic factors, and specific cultural features have a critical bearing on determining the safe spillway design flood. Rational selection of a safe spillway design flood for specific site conditions based on quantitative analysis is acceptable. The spillway should be sized so that the increased downstream damage resulting from overtopping failure of the dam would not be significant as compared with the damage caused by the flood in the absence of dam overtopping failure. A design storm more frequent than once in 100 years will not be acceptable for any class C dam. In lieu of quantitative analysis, the following tables shall be used as criteria for spillway design storms and permissible velocities for vegetated earth spillways:

CRITERIA FOR SPILLWAY DESIGN STORM SIZE CLASSIFICATION		
Size	Total Storage (Ac-Ft) <sup>1</sup>	Height (ft) <sup>1</sup>
Small	less than 750	less than 35
Medium	equal to or greater than 750 and less than 7,500	equal to or greater than 35 and less than 50
Large	equal to or greater than 7,500 and less than 50,000	equal to or greater than 50 and less than 100
Very Large	equal to or greater than 50,000	equal to or greater than 100

<sup>1</sup> The factor determining the largest size shall govern

MINIMUM SPILLWAY DESIGN STORMS		
Hazard	Size	Spillway Design Flood (SDF)
Low (Class A)	Small	50 year
	Medium	100 year
	Large	1/3 PMP
	Very Large	1/2 PMP
	Medium	1/3 PMP
Intermediate (Class B)	Small	100 year
	Large	1/2 PMP
	Very Large	3/4 PMP
High (Class C)	Small	1/3 PMP
	Medium	1/2 PMP
	Large	3/4 PMP
	Very Large	PMP

PERMISSIBLE VELOCITIES FOR VEGETATED EARTH SPILLWAYS			
Permissible velocity <sup>1</sup> feet per second			
Erosion resistant soils		Easily erodible soils	
Slope of exit channel Percent		Slope of exit channel Percent	
Vegetation	0 to 5	5 thru 10	0 to 5      5 thru 10

Bermuda Grass Bahia grass	8	7	6	5
Tall fescue Kentucky bluegrass Reed canary	7	6	5	4
Sod forming grass mixture	5	4	4	3
Lespedeza sericea Weeping lovegrass Alfalfa Crabgrass	3.5	Do not use	2.5	Do not use

<sup>2</sup> Increase values 10 percent when the anticipated average use of the spillway is not more frequent than once in 50 years or 25 percent when the anticipated average use is not more frequent than once in 100 years.

*History Note: Authority G.S. 143-215.26; 143-215.27; 143-215.31;  
Eff. June 15, 1980.*