EMERGENCY AND PRINCIPAL SPILLWAY PROPORTIONING GUIDE

NUMERICAL RATING	SPILLWAY FLOW DEPTH (Hp)	MAXIMUM SPILLWAY GRADES		CONDITION AT RE-ENTRANCE TO MAIN CHANNEL	VEGETATIVE COVER (Existing or Potential)	PROTECTION
		EASILY ERODED [1]	RESISTS EROSION [2]			
5	1.0' 1.5' 2.0' 2.5'	5% 2%	8% 5% 3% 2%	No "Drop Off" 300' below control section (c.s.) No concentration.	Very good stand of sod-forming grasses.	Area fenced or no live- stock.
4	1.0' 1.5' 2.0'	6% 3%	10% 6% 4%	"Drop Off" less than 3', 250' + below c.s.--No concentration,	Good stand or high potential for good stand.	Cropland adjacent - Not fenced.
3	1.0' 1.5'	7% 4%	12% 7%	"Drop Off" 3'-7', 150' + below c.s.--Shrubby banks—Slight concentration.	Medium stand or good potential for medium stand.	In pasture - Not fenced.
2	1.0' 1.5'	8% 5%	14% 8%	"Drop Off" 3'-7', 150' + below c.s.--Moderate concentration,	Fair stand or good potential for fair stand.	Dam and spillway used for crossing.
1	1.0' 1.5'	9% 8%	16% 9%	"Drop Off" 7'+, 150'+ below c.s.-- Slight concentration,	Poor stand or lacks potential for good stand.	Within farmstead area - Not fenced.

SPILLWAY CLASS RATING		EMERGENCY SPILLWAY	PRINCIPAL SPILLWAY MINIMUM DESIGN REQUIREMENTS	
ADJECTIVE	NUMERICAL	PERMISSIBLE FREQUENCY OF SPILLWAY OPERATION	Without Storage-Pipe Capacity, % of 25yr.-24hr. Peak [3]	With Storage-Storm Frequency To Be Routed Below Emergency Spillway
Excellent	20-18	See foot note 4	May be designed without principal spillway.	
Very Good	17-15	1-2 times per year	25	2 yr. - 24 hr.
Good	14-12	Once per year	35	2 yr. - 24 hr.
Fair	11-9	Once in 4 years	50	5 yr. - 24 hr.
Poor	8-6	Once in 8 years	75	10 yr. - 24 hr.
Very Poor	5-4	Once in 25 years	100 [5]	25 yr. - 24 hr.

[1] Easily eroded soil has a P.I. less than 10 or greater than 40.
[2] Soil that resists erosion has a P.I. between 10 and 40.
[3] Minimum combined capacity of the principal & emergency spillways must safely pass the peak flows of the 24-hour storm as shown in the appropriate standard.
[4] Indeterminate-Dependant upon storm frequency and net evaporation.
[5] For extreme spillway conditions, consideration may need to be given to providing for a principal spillway capacity in excess of the 25-year peak flow.

EXAMPLE:

Spillway Grade (Hp = 1.5', easily eroded soil)- 4%	3
Channel Re-Entrance - 1'"Drop Off" - 500' below c.s	5
Vegetative Cover - Medium	3
Protection - In pasture -Not fenced	3
NUMERICAL RATING:	14
ADJECTIVE RATING:	Good

Criteria are somewhat flexible. EXAMPLE: "Condition at re-entrance to main channel." (a) "Drop Off" is 4.6 ft.-Shrubby cover (Less than mid-point of permissible height for a "3" numerical rating) (b) "Drop Off" is 215 ft. below control section. (Greater than mid-point between the "3" and "4" numerical ratings) CONCLUSION: Rating may be advanced (raised) one step to "4". Same principle may be applied to other combinations such as "shrubby cover", "concentration", etc., in "raising" or "lowering" ratings. The grading of drop offs at a time of construction may be considered providing the potential for establishment of sod cover is adequate. "1 is the minimum numerical rating to be used for any element.

RATING OF EMERGENCY SPILLWAYS BELOW

(a) Control Section

This chart is intended to be used as a guide with some flexibility.

In addition to the example shown at the bottom of the table, judgment should be used in the application of a rating under each of the headings. Consideration might well be given to "grading out" the drop-off at re-entrance, plus backfilling with good topsoil and seeding to eliminate the "drop-off" hazard.

Combination of spillway flow depths and spillway grades will require some interpolation for soils ranging between those that are easily eroded and those that are erosion resistant. Generally, erosion resistant soils are heavy clays or silty clays with strong structure; moderately erosive soils are silt loamy to silty clay loams with a medium structure and easily eroded soils are light loamy sands and loamy silts with weak structure.

Seepage losses from a reservoir site may be an additional factor to those shown in the spillway classification chart and may be used in determining the need and/or size of the principal spillway. Example: Where the seepage from the reservoir over a ten-day period is equal to or exceeds the total inflow from a 2-year storm, a dam may be designed without a principal spillway even though the emergency spillway rates only as "good" (12-14 numerically).

The best criteria for determining the rate of seepage loss from reservoirs is based on local experience where observations have shown that sites on certain soil formations under certain conditions lose water at a known rate. Where silting of the reservoir will be by fine-grained soils that will tend to seal the reservoir and cause the seepage losses to become ineffective, such effects must be evaluated and reflected in the design of the structure.