Appendix C. Hydrologic Safety of Dams Surveys

C.1 Survey Content
C.2 Completed Federal Surveys
C.3 Completed State Surveys

C.1. Survey Content

HYDROLOGIC SAFETY OF DAMS QUESTIONNAIRE

On the Record

1. Respondent information:
   State/Federal Dam Safety Organization _____
   Name of Representative _____
   Title of Representative _____
   Phone number(s) _____
   Email address _____

2. Number of dams under Organization's jurisdiction by type:
   Total Dams _____
   Total Regulated Dams _____
   High Hazard Dams _____
   Significant Hazard Dams _____
   Low Hazard Dams _____
   Unregulated Dams _____
   Other _____

3. What year did your Agency adopt minimum Inflow Design Flood criteria? _____

4. How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:
   - ☐ Less than 25 feet high (from streambed) and 15 acre-feet of storage (top of dam)
   - ☐ Less than 6 feet high (from streambed) and 50 acre-feet of storage (top of dam)
   - ☐ Both of the above
   - ☐ Less than 50 acre-feet of storage (top of dam)
   - ☐ Other (Please specify) _____

5. Are there types/categories of dams (other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)
   - ☐ Yes (Please explain)
   - ☐ No

6. Does the Organization have published size classification criteria?
   - ☐ Yes
   - ☐ No

   If "Yes", check and complete as appropriate:
   Class A (Small) =<_____ feet high and stores =< _____ acre-feet
   Class B (Medium)
   Class C (Large) =>_____ feet high and stores => _____ acre-feet
   Other (Specify) _____

7. Does the Organization have published hazard classification criteria?
   - ☐ Yes (High, Significant, and Low)
   - ☐ Yes (High, Significant, Low, Limited Hazard)
   - ☐ Yes (Other)
   - ☐ No

   If "Yes" and Significant Hazard is defined, how is Significant Hazard defined?
   - ☐ Loss of life potential is "few" with "appreciable" economic loss
   - ☐ No potential for loss of life with significant but not excessive economic loss
   - ☐ Other (Please specify) _____

8. Does the Organization have guidelines for determining the spillway design flood?
   - ☐ Yes
   - ☐ No

   If "Yes", what is the status of the guidelines; do they have the force of law?
   - ☐ Published within State Laws
   - ☐ Published guidelines/regulations that are required
   - ☐ Published guidelines/regulations for consideration by the engineer/designer
   - ☐ Unpublished guidelines that are required
   - ☐ Unpublished guidelines for consideration by the engineer/designer
   - ☐ Other (Please specify) _____

9. What is the origin of the guidelines?
   - ☐ Custom developed by Organization
   - ☐ USBR guidelines
   - ☐ NRCS guidelines
   - ☐ FEMA/FERC federal guidelines
   - ☐ USACE guidelines (including Phase I Study guidelines)
   - ☐ Combination of the above (Please specify) _____
   - ☐ Other (Please specify) _____
   - ☐ Unknown

10. When were the guidelines last revised (MM/DD/YYYY)? _____

11. Are there any plans to update or revise the guidelines in the near future?
    - ☐ Yes (Please specify) _____
    - ☐ No

12. Are the guidelines different for new and existing dams?
    - ☐ Yes (Please elaborate) _____
    - ☐ No

13. Which of the following best describes your agency's role in determining the spillway design flood:
    - ☐ Agency does not review any technical information, but ensures that design is performed by qualified professionals
    - ☐ Agency reviews submitted designs
    - ☐ Agency performs independent verification of submitted designs
    - ☐ Agency acts as designer/engineer
    - ☐ Agency utilizes a combination of the above approaches, possibly on a case-by-case basis
    - ☐ Other (Please explain) _____

14. How are the guidelines applied?
    - ☐ Based on both size and hazard classification
    - ☐ Based on size classification only
    - ☐ Based on hazard classification
    - ☐ Based on risk analysis
    - ☐ Based on a combination of risk analysis and hazard/size classification
    - ☐ Based on other criteria (Please specify) _____

15. For PMP/PMF designs, is freeboard required?
    - ☐ No
    - ☐ Based on wave run up computations
    - ☐ 1.0'
    - ☐ 1.5'
    - ☐ 2.0'
    - ☐ 3.0' or more
    - ☐ Other (Please specify) _____

16. Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that must be used?
    - ☐ Yes
    - ☐ No

    If "Yes", what are the specific analysis methodologies, procedures, or computer software that must be used?
    - ☐ Must use HMRs for developing PMP
    - ☐ Must use SCS unit hydrograph
    - ☐ Must use HEC-1
    - ☐ Must use HEC-HMS
    - ☐ Must use SITES
    - ☐ Other (Please specify) _____

17. Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?
    - ☐ Yes (Please specify) _____
    - ☐ No

18. Do the guidelines specify any criteria for storm duration?
    - ☐ Yes (6-hour)
    - ☐ Yes (24-hour)
    - ☐ Yes (48-hour)
    - ☐ Yes (72-hour)
    - ☐ Yes (Based on Tc)
    - ☐ No
    - ☐ Other (Please specify) _____

19. Do the guidelines specify any criteria for temporal storm distribution?
    - ☐ Yes (HMR)
    - ☐ Yes (NRCS Standard)
    - ☐ Yes (Regional)
    - ☐ Yes (Other, Please specify) _____
    - ☐ No

20. Do the guidelines specify any criteria for spatial storm distribution?
    - ☐ Yes (Please specify) _____ _____
    - ☐ No

21. Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?
    - ☐ Yes (Please specify) _____
    - ☐ No

22. Does the organization allow development of a site specific PMP?
    - ☐ Yes
    - ☐ No
    - ☐ Unknown (never requested)

    If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?
    - ☐ Yes (Please specify) _____
    - ☐ No

23. Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?
    - ☐ Yes, a major problem
    - ☐ Yes, a moderate problem
    - ☐ Yes, a minor problem
    - ☐ No
    - ☐ Unsure

24. Do guidelines require consideration or analysis of future development?
    - ☐ Yes (Impacts of development on watershed hydrology)
    - ☐ Yes (Impacts of development on hazard classification or failure consequences)
    - ☐ Yes (Both of the above)
    - ☐ Yes (Other; please specify) _____
    - ☐ No

25. Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?
    - ☐ Yes (Please specify) _____
    - ☐ No

26. Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?
    - ☐ Yes
    - ☐ No

    If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?
    - ☐ Yes
    - ☐ No

27. Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?
    - ☐ Yes (Please specify) _____
    - ☐ No

28. Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF? If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined. _____

New High Hazard Dams must pass	_____ % of PMP, or	_____ % of PMF
Existing High Hazard Dams must pass	_____ % of PMP, or	_____ % of PMF
New Significant Hazard Dams	_____ % of PMP, or	_____ % of PMF
Existing Significant Hazard Dams	_____ % of PMP, or	_____ % of PMF

29. For low hazard dams, the spillway design requirement is:
    - ☐ 25-year flood
    - ☐ 50-year flood
    - ☐ 100-year flood
    - ☐ 500-year flood
    - ☐ Not specified
    - ☐ Other (Please specify) _____

30. Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?
    - ☐ Yes
    - ☐ No

31. Does your organization permit risk based hydrologic designs?
    - ☐ Yes; our regulations permit them
    - ☐ Yes; although our regulations do not specifically address this topic, we review risk-based designs on a case-by-case basis
    - ☐ No; our regulations forbid them
    - ☐ No; our regulations address this topic and we have made an administrative decision not to consider risk-based designs
    - ☐ Our regulations do not specifically address this topic and it has never come up for consideration
    - ☐ Other (Please explain) _____

32. Has your agency ever reviewed a risk-based hydrologic analysis?
    - ☐ Yes (Reviewed and approved)
    - ☐ Yes (Reviewed and rejected)
    - ☐ Yes (Both approved and rejected)
    - ☐ No
    - ☐ Unsure
    - ☐ Other (Please explain)

33. How difficult would it be to change your regulations? Please explain. _____
    - ☐ Difficult
    - ☐ Moderate
    - ☐ Easy

34. Are they any unique provisions in your regulations?
    - ☐ Yes (Please explain) _____
    - ☐ No

Off the Record

35. Do you agree that designing for the PMF is unreasonably conservative?
    - ☐ Strongly agree
    - ☐ Somewhat agree
    - ☐ Neutral
    - ☐ Somewhat disagree
    - ☐ Strongly disagree
    - ☐ Undecided

36. In your opinion, does the general public believe that the PMF is unreasonably conservative?
    - ☐ Yes, the general public strongly opposes the PMF design
    - ☐ Yes, the general public somewhat opposes the PMF design
    - ☐ No, the general public strongly favors the PMF design
    - ☐ No, the general public somewhat favors the PMF design
    - ☐ Undecided
    - ☐ No opinion
    - ☐ Other (Please explain) _____

37. Do you have any concerns regarding the consistency of hydrologic and hydraulic analyses?
    - ☐ Yes (Please specify) _____
    - ☐ No

38. Are you aware of the guidelines in the following documents?

a.	Safety of Dams: Flood and Earthquake Criteria – Prepared by the Committee on Safety Criteria for Dams, National Research Council (1985)	☐ Yes	☐ No
b.	Evaluation Procedures of Hydrologic Safety of Dams – Prepared by the Task Committee on Spillway Design Flood Selection of the Committee on Surface Water Hydrology of the Hydraulics Division of the American Society of Civil Engineers (1988)	☐ Yes	☐ No
c.	Guidelines on Selection of Acceptable Flood Capacity for Dams, and Guidelines on Risk Assessment – ANCOLD (2000, 2003)	☐ Yes	☐ No
d.	Guidelines for Achieving Public Protection in Dam Safety Decisionmaking - US Bureau of Reclamation (2003)	☐ Yes	☐ No
e.	Federal Guidelines for Dam Safety – Selecting and Accommodating Inflow Design Floods for Dams – FEMA (2004)	☐ Yes	☐ No
f.	Safety of Dams: Policy and Procedures (ER 1110-2-1156) – US Army Corps of Engineers (2010)	☐ Yes	☐ No

39. Do you have any concerns regarding the use of risk analyses or incremental damage assessments to determine spillway capacity requirements?
    - ☐ Yes (Please specify) _____
    - ☐ No

40. Do you agree or disagree with the following statements:

a.	Risk analysis is the best and most logical approach to selection of the appropriate SDF.	☐ Strongly agree ☐ Somewhat agree ☐ Neutral ☐ Somewhat disagree ☐ Undecided ☐ Strongly disagree
b.	The complexity of risk analysis constitutes a severe constraint on its usefulness because virtually no one other than a skilled dam safety professional can understand it.	☐ Strongly agree ☐ Somewhat agree ☐ Neutral ☐ Somewhat disagree ☐ Undecided ☐ Strongly disagree
c.	One of the big problems in developing a risk analysis is assigning probabilities to extreme flood events.	☐ Strongly agree ☐ Somewhat agree ☐ Neutral ☐ Somewhat disagree ☐ Undecided ☐ Strongly disagree
d.	There are so many intangibles and judgment decisions in the development of a risk assessment that the result is little more than an academic exercise.	☐ Strongly agree ☐ Somewhat agree ☐ Neutral ☐ Somewhat disagree ☐ Undecided ☐ Strongly disagree
e.	The practicality of risk analysis is severely constrained by changing conditions in the downstream hazard zone.	☐ Strongly agree ☐ Somewhat agree ☐ Neutral ☐ Somewhat disagree ☐ Undecided ☐ Strongly disagree
f.	The litigious nature of our society forces the professional to choose the most conservative design option.	☐ Strongly agree ☐ Somewhat agree ☐ Neutral ☐ Somewhat disagree ☐ Undecided ☐ Strongly disagree

41. Do you believe your agency has the technical ability to review the following:

Site Specific PMP Studies	☐ Yes	☐ No
Incremental Damage Assessments	☐ Yes	☐ No
Rigorous Risk Analyses	☐ Yes	☐ No

42. Do you believe your agency has the resources (availability and budget) to review the following:

Site Specific PMP Studies	☐ Yes	☐ No
Incremental Damage Assessments	☐ Yes	☐ No
Rigorous Risk Analyses	☐ Yes	☐ No

43. Would you like to see any changes in your current guidelines?
    - ☐ Yes (Please specify) _____
    - ☐ No

44. Do you believe that increased uniformity in state dam safety guidelines across the country would be beneficial?
    - ☐ Yes
    - ☐ No

45. Would you be receptive to adopting new recommended guidelines if they resulted in lower spillway design flood criteria for existing and new dams?
    - ☐ Yes
    - ☐ No

46. Would you be receptive to adopting new recommended guidelines if they resulted in higher spillway design flood criteria for existing and new dams?
    - ☐ Yes
    - ☐ No

47. Do you have any other comments? _____

C.2. Completed Federal Surveys

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Bureau of Indian Affairs
Name of Representative	John Anevski
Title of Representative	Chief, Division of Water and Power
Phone number(s)	(202) 208-5480
Email address	john.anevski@bia.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	900
Total Regulated Dams	900
High Hazard Dams	91
Significant Hazard Dams	45
Low Hazard Dams	764
Unregulated Dams	0
Other	0

3 What year did your Agency adopt minimum Inflow Design Flood criteria? 2006

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Both of the above

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

6 Does the Organization have published size classification criteria?

No

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

Loss of life potential is "few" with "appreciable" economic loss

Comments: Based on Indian Dam Safety Act of 1994 (P.L. 103-302)--Between 1 and 6 lives would be at risk or significant property damage could occur if the dam failed.

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations for consideration by the engineer/designer

Comments: The current BIA Handbook calls for the Base Safety Condition to be determined and this is the largest flood which will cause incremental dam failure flooding. However, BIA reserves the right to select something smaller based on downstream conditions. Normally, the IDF will not be greater than a 10,000 year storm.

9 What is the origin of the guidelines?

Combination of the above (Please specify)

Comments: Custom based on Bureau and USBR Guidelines

10 When were the guidelines last revised (MM/DD/YYYY)? 07/08/2007

11 Are there any plans to update or revise the guidelines in the near future?

Yes (Please specify)

Comments: Plan to include revised current guidelines in BIA Safety of Dams Handbook in FY 2012

12 Are the guidelines different for new and existing dams?

No

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency utilizes a combination of the above approaches, possibly on a case-by-case basis

14 How are the guidelines applied?

Based on a combination of risk analysis and hazard/size classification

15 For PMP/PMF designs, is freeboard required?

Based on wave run up computations

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

No

19 Do the guidelines specify any criteria for temporal storm distribution?

No

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

No

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

No

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

No

24 Do guidelines require consideration or analysis of future development?

No

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

No

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

No

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

No

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

No

Comments: The current BIA Handbook calls for the Base Safety Condition to be determined and this is the largest flood which will cause incremental dam failure flooding. However, BIA

29 For low hazard dams, the spillway design requirement is:

Not specified

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

Yes

Comments: EWS instrumentation will be installed, operated, and maintained at High or Significant Hazard dams and in the upstream basin when early detection of hydrologic events would provide additional time needed for emergency management activities.

31 Does your organization permit risk-based hydrologic designs?

Yes; although our regulations do not specifically address this topic, we review risk-based designs o

32 Has your agency ever reviewed a risk-based hydrologic analysis?

Yes (Reviewed and approved)

33 How difficult would it be to change your regulations? Please explain.

Easy

Comments: Most of our criteria for IDF development is in the form of guidelines/standards and is not found in regulations. However, we would normally consult with Tribal organizations if and when revisions occur.

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Federal Energy Regulatory Commission
Name of Representative	Daniel J. Mahoney
Title of Representative	Director, Dam Safety and Inspection
Phone number(s)	(202) 502-6743
Email address	daniel.mahoney@ferc.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	2530
Total Regulated Dams	2530
High Hazard Dams	780
Significant Hazard Dams	192
Low Hazard Dams	1558
Unregulated Dams	0
Other	0

3 When did your Organization adopt minimum Inflow Design Flood criteria? 1981

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: Every dam included in a FERC license

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

6 Does the Organization have published size classification criteria?

No

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

No potential for loss of life with significant but not excessive economic loss

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations that are required

Comments: They have the force of law.

9 What is the origin of the guidelines?

FEMA/FERC federal guidelines

10 When were the guidelines last revised (MM/DD/YYYY)?

Comments: FERC Engineering Guidelines are constantly updated and revised

11 Are there any plans to update or revise the guidelines in the near future?

Yes (Please specify)

Comments: Continually revised as necessary.

12 Are the guidelines different for new and existing dams?

No

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency utilizes a combination of the above approaches, possibly on a case-by-case basis

Comments: We review all of them, but when necessary we perform an independent verification

14 How are the guidelines applied?

Based on hazard classification only

15 For PMP/PMF designs, is freeboard required?

Other (Please specify)

Comments: On a case by case basis, anticipated wave run-up and engineering judgement

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

No

19 Do the guidelines specify any criteria for temporal storm distribution?

No

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

Yes (Please specify)

Comments: Outlet works and service spillways should be designed for frequent use and should by highly reliable. Auxiliary spillways are usually designed for infrequent use and it is acceptable to sustain limited damage during passage of the IDF. Emergency spillway may be used to obtain a high degree of hydrologic safety with minimal additional cost. Because of their infrequent use, it is acceptable for them to sustain significant damage when use and they may be designed with lower structural standards than those used for auxiliary spillways.

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

Yes (Please specify)

Comments: A BOC is normally required to oversee the development of the PMP/PMF

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

No

Comments:

24 Do guidelines require consideration or analysis of future development?

Yes (Impacts of development on hazard classification or failure consequences)

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

Yes (Please specify)

Comments: In general, if there is no allocated or planned flood control storage (i.e., run-of-river), the flood routing usually begins with the reservoir at the normal maximum pool elevation. If regulation studies show that pool levels would be lower than the normal maximum pool elevation during the critical inflow design flood (IDF) season, then the results of those specific regulation studies should be analyzed to determine the appropriate initial pool level for routing the IDF.

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

Yes

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

No

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

No

Comments: Follow FEMA's "Federal Guidelines for Dam Safety: Selecting and Accomodating Inflow Design Floods for Dams" (April 2004)

29 For low hazard dams, the spillway design requirement is:

100-year flood

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

31 Does your organization permit risk-based hydrologic designs?

Our regulations do not specifically address this topic and it has never come up for consideration

32 Has your agency ever reviewed a risk-based hydrologic analysis?

Other (Please explain)

Comments: We have considered risk based hydrologic analysis as another bit of information when reviewing IDFs

33 How difficult would it be to change your regulations? Please explain.

Moderate

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	DOL - Mine Safety and Health Administration
Name of Representative	Stanley Michalek
Title of Representative	Acting Dam Safety Officer
Phone number(s)	412-386-6974 (202-693-9476 until 4/4/11)
Email address	michalek.stanley@dol.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	2089
Total Regulated Dams	2089
High Hazard Dams	429
Significant Hazard Dams	266
Low Hazard Dams	1394
Unregulated Dams	unknown
Other	n/a

3 What year did your Agency adopt minimum Inflow Design Flood criteria? approx. 1975

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: < 5 feet high; or < 20 feet high and < 20 ac-ft. This is criteria used by Agency's coal program area. For the non-coal program area, the size criteria specified by NID is used.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

Yes (Please explain)

Comments: In some cases, flood control dams that would be classified as high hazard potential are allowed to be designed to low hazard storm event with warning system.

6 Does the Organization have published size classification criteria?

Yes

If "Yes", check and complete as appropriate:

Class A (Small)	=<	<40	feet high and stores =<	<1000	acre-feet
Class B (Medium)					
Class C (Large)	=>	40	feet high and stores =>	1,000	acre-feet
Other (Specify)					

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

No potential for loss of life with significant but not excessive economic loss

Comments: Facilties where failure would likely not result in loss of human life, but can cause economic loss, environmental damage, or disruption of lifeline facilities.

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations that are required

Comments: MSHA guidelines use the inflow design flood in the design (freeboard design flood).

9 What is the origin of the guidelines?

FEMA/FERC federal guidelines

10 When were the guidelines last revised (MM/DD/YYYY)? 10/01/2007

Comments: "Coal Mine Impoundment Inspection and Plan Review Handbook"

11 Are there any plans to update or revise the guidelines in the near future?

No

12 Are the guidelines different for new and existing dams?

No

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency reviews submitted designs

MSHA uses inflow design flood.

14 How are the guidelines applied?

Based on both size and hazard classification

15 For PMP/PMF designs, is freeboard required?

3.0' or more

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

Other (Please specify)

Comments: Designer must consider most severe storm duration up to 72 hours.

19 Do the guidelines specify any criteria for temporal storm distribution?

Yes (HMR)

Comments: Storm must be temporally and spatially distributed to produce the most severe conditions with respect to freeboard and spillway discharge.

20 Do the guidelines specify any criteria for spatial storm distribution?

No

Comments: Storm must be temporally and spatially distributed to produce the most severe conditions with respect to freeboard and spillway discharge.

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

No

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

No

Comments: While we allow it, we've never seen it done.

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

No

24 Do guidelines require consideration or analysis of future development?

Yes (Both of the above)

Comments: Question poorly worded. We do not require consideration of future development in the design plan, but do require consideration/analysis after the development takes place.

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

Yes (Please specify)

Comments: AMC III for PMF; pool at elevation of lowest ungated outlet.

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

No

Comments: inflow design flood or freeboard design flood.

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

Yes (Please specify)

Comments: Once hazard potential rating would be determined using incremental damage assessment, design storm is defined by guidelines.

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	100	% of the	PMF
Existing High Hazard Dam must pass	100	% of the	PMF
New Significant Hazard Dam must pass	50-100	% of the	PMF
Existing Significant Hazard Dam must pass	50-100	% of the	PMF

Comments: For significant hazard potential, storm depends on size classification of dam.

29 For low hazard dams, the spillway design requirement is:

Other (Please specify)

Comments: For small reservoir - 100 year, 24 hour
For large reservoir - 1/2 PMF

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

Yes

Comments: Dams constructed to control floods due to storm runoff may be designed to low hazard storm criteria and use an early warning system to evacuate downstream personnel.

31 Does your organization permit risk-based hydrologic designs?

Other (Please explain)

Comments: We do not forbid risk-based designs. We have not seen one submitted. There is some question whether our regulations would allow them.

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

33 How difficult would it be to change your regulations? Please explain.

Difficult

34 Are there any unique provisions in your regulations?

Yes (Please explain)

Comments: Not with regard to hydrologic issues. We do allow low hazard impoundments to be "abandoned" as live dams if specific criteria are met.

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	USDA - Natural Resources Conservation Service
Name of Representative	Noller P. Herbert
Title of Representative	Director, Conservation Engineering Division
Phone number(s)	(202) 720-2520
Email address	noller.herbert@wdc.usda.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	
Total Regulated Dams	27254
High Hazard Dams	2233
Significant Hazard Dams	2299
Low Hazard Dams	22722
Unregulated Dams	
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? 1930's

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Both of the above

Comments: Defined in "USDA - NRCS National Engineering Manual (NEM) Part 520, Subpart C Section F." http://directives.sc.egov.usda.gov/viewDirective.aspx?hid=27493

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

Comments: Regardless of structure purpose or type of dam, it is subject to either TR-60 or Conservation Practice Standard 378 design standards.

6 Does the Organization have published size classification criteria?

No

Comments: Design standards are based on hazard classification criteria, not size classification.

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

No potential for loss of life with significant but not excessive economic loss

Comments: Significant Hazard - Dams in predeominately rural or agriclutural areas where failure may damage isolated homes, main highways, or minor railroads, or interrupt service of relatively important utilities.

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations that are required

Comments: TR-60 contains policy on storm size; National Engineering Handbook Part 630, Chapter 21 contains procedure for developing inflow hydrograph.

9 What is the origin of the guidelines?

NRCS guidelines

Comments: SCS/NRCS guidelines were first developed in the 1930s when the first floodwater retarding dams were installed under the pilot watershed program. Since then the guidelines have evolved and are reviewed and updated on a continual basis.

10 When were the guidelines last revised (MM/DD/YYYY)? 07/01/2005

Comments: They are continually under revision and we are trying to get to the point again that they are reviewed every 5 years.

11 Are there any plans to update or revise the guidelines in the near future?

Yes (Please specify)

Comments: We are currently in the process of updating a number of standards and guidelines used in dam design and dam safety activities

12 Are the guidelines different for new and existing dams?

No

Comments: The guidelines are the same for new and existing dams except in the case of rehabilitation of structures where site constraints prohibit the use of the existing guidelines. For those situations, FEMA 94 guidelines on Inflow Design Flood is allowed.

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency utilizes a combination of the above approaches, possibly on a case-by-case basis

Approach dependent upon time and resources available as determined by NRCS State Conservationists.

14 How are the guidelines applied?

Based on hazard classification only

Comments: Based upon size, various types of materials may be allowed for certain appurtenances (for example principal spillway pipes may be either corrugated metal, pvc, steel or concrete depending upon structure size).

15 For PMP/PMF designs, is freeboard required?

No

Comments: PMP/PMF is used to set the top of dam elevation. NRCS does not include additional freeboard.

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

Yes

If "Yes", what are the specific analysis methodologies, procedures, or computer software that must be used?

Must use SITES

Comments: SITES must be used for TR-60 structures. Conservation Practice Standards 378 designs may use other analyses/methodologies/procedures/computer software dependent upon NRCS state conservation engineer guidance.

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

Comments: This is based on the professional judgment of the designer, reviewer and approver.

18 Do the guidelines specify any criteria for storm duration?

Other (Please specify)

Comments: Both a short duration (6 hour or longer) and a long duration (24 hour or longer) storm shall be analyzed and the most critical results used to check the capacity and the integrity of the auxiliary spillway.

19 Do the guidelines specify any criteria for temporal storm distribution?

Yes (Other - please specify)

Comments: Principal spillway design hydrographs use NRCS standard distributions. Spillway design hydrographs (used for auxiliary spillway design) use type B or standard distributions. PMP/PMF uses PMP distribution as defined in HMR 52 or 5-point distribution (developed based on HMR 52 methodologies).

20 Do the guidelines specify any criteria for spatial storm distribution?

No

Comments: Uniform rainfall depth assumed over the entire watershed. Rainfall depth may be adjusted based on watershed drainage area.

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

Yes (Please specify)

Comments: Spillway frequency of use criteria are provided. Also, earth and vegetated auxiliary spillways are designed on the basis that some erosion or scour will occur during passage of infrequent storms, but the spillway will not breach during passage of the freeboard storm.

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

No

Comments: NRCS encourages the use of a site-specific PMP where information is available. Site specific PMP studies must be performed by a qualified professional.

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a major problem

Comments: NRCS does not regulate any of the dams for which it provides technical or financial assistance. Changing dam classifications is a problem for our customers and sponsors.

24 Do guidelines require consideration or analysis of future development?

Yes (Both of the above)

Comments: TR-60 requires that consideration must be given to the damage that might occur to existing and future developments.

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

Yes (Please specify)

Comments: Use average antecedent runoff conditions (ARC II) or greater unless a special study shows that a different condition is justified. The initial reservoir stage for principal spillway hydrograph routing shall be at the crest of the lowest ungated inlet or (if not subtracted from the stage-storage curve) the anticipated elevation of the sediment storage, whichever is higher, except as provided below. For dams with significant base flow, principal spillway hydrograph routings must start not lower than the elevation of the water surface associated with the base flow. Significant base flow is average annual or seasonal flow that would produce at least 0.5 feet of head over the lowest principal spillway inlet immediately prior to a flood or occupy more than 10 percent of the floodwater storage capacity. For dams with joint use storage capacity, when one of the uses is floodwater detention, routing of the principal spillway hydrograph may begin at the lowest anticipated elevation of the joint use pool in accordance with the operation plan. Single purpose, low hazard class irrigation dams with gated outlets and earth or vegetated auxiliary spillways, which are located on ephemeral streams in areas where the average annual precipitation is less than 25 inches, may be considered to have discharged up to 70 percent of the storage, exclusive of sediment storage in determining the elevation to start routing. For auxiliary spillway and freeboard hydrographs, routings start at the 10-day draw-down elevation or the principal spillway hydrograph.

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

Yes

Comments: Methods in the Federal Guidelines for Dam Safety - Inflow Design Floods, FEMA 94, may alternately be used to proportion the embankment and auxiliary spillway, provided downstream land use controls exist to prevent voiding incremental risk assumptions after the dam is completed. Only for rehabiliation projects. Not allowable for new projects.

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

Yes (Please specify)

Comments: Only allowed for rehabilitation projects - not allowed for new projects. For high hazard dams, when using an IDF (FEMA 94) analysis, the minimum storm that can be used can be no less than the freeboard design storm for a significant hazard dam. (P100+0.4(PMP-P100))

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	100	% of the	PMP
Existing High Hazard Dam must pass	100	% of the	PMP
New Significant Hazard Dam must pass		% of the	
Existing Significant Hazard Dam must pass		% of the	

Comments: Significant Freeboard Design Hydrograph: P100 + 0.40(PMP - P100)

29 For low hazard dams, the spillway design requirement is:

Other (Please specify)

Comments: If product of storage and effective height is less than 30,000 and there are no upstream dams: P100 + 0.12(PMP - P100); if product of storage and effective height is greater than 30,000 and there are no upstream dams: P100 + 0.26(PMP - P100); if there is an existing or planned upstream dam: P100 + 0.40(PMP - P100)

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

Comments: NRCS might consider an early warning system as alternative, but it is not a part of design guidelines.

31 Does your organization permit risk-based hydrologic designs?

Yes; although our regulations do not specifically address this topic, we review risk-based designs o

Comments: NRCS will consider risk based designs, but they are not a part of design guidelines.

32 Has your agency ever reviewed a risk-based hydrologic analysis?

Yes (Both approved and rejected)

Comments: NRCS has both approved and rejected designs based on FEMA 94 guidelines.

33 How difficult would it be to change your regulations? Please explain.

Moderate

Comments: It takes time for review and coordination but we do not have to get any legislative approval for a change

34 Are there any unique provisions in your regulations?

No

Comments: NRCS tries to apply standards nationwide. States are allowed to revise the standards to make them more restrictive, but not less restrictive. Additionally, NRCS must meet all state and local regulations.

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Tennessee Valley Authority
Name of Representative	Michael T. Scott
Title of Representative	Dam Safety Officer
Phone number(s)	423.751.6995
Email address	mtscott2@tva.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	
Total Regulated Dams	49
High Hazard Dams	36
Significant Hazard Dams	10
Low Hazard Dams	3
Unregulated Dams	
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? circa 1978

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Both of the above

Comments: This survey has been completed for TVA's 49 regulated dams. TVA is currently creating a Dam Safety Governance organization which will implement guidelines for any impoundment within the TVA system which meets the definition of dam given in FEMA 93.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

Comments: TVA is currently creating a Dam Safety Governance organization which will implement dam safety guidelines for any impoundment (tailings, coal combustion products, etc.) which meet the definition of a dam as given in FEMA 93.

6 Does the Organization have published size classification criteria?

No

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

No potential for loss of life with significant but not excessive economic loss

Comments: TVA follows FEMA 333 for assigning hazard classifications.

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations that are required

Comments: Our historic practice has been to select the PMF as the appropriate spillway design flood for TVA dams with a high hazard classification.

9 What is the origin of the guidelines?

Combination of the above (Please specify)

Comments: FEMA (Federal Guidelines) and self imposed criteria that TVA has historically adopted

10 When were the guidelines last revised (MM/DD/YYYY)? 1/1/2008

Comments: Note that the date is approximate. TVA's self imposed criteria changed based on new information including: operating guides, orifice flow coefficients, etc.

11 Are there any plans to update or revise the guidelines in the near future?

Yes (Please specify)

Comments: TVA Dam Safety Governance organization will issue guidelines and each business unit will create implementing procedures.

12 Are the guidelines different for new and existing dams?

No

Comments: It is not expected that the hydrologic safety of dams guidelines will be different for new and existing dams.

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency acts as designer/engineer

14 How are the guidelines applied?

Based on hazard classification only

15 For PMP/PMF designs, is freeboard required?

No

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

Comments: TVA has followed specific methodologies which were not stipulated. TVA uses rainfall design basis developed by NWS under contract with TVA, estimated watershed response (inflows) using TVA developed tools used to schedule the reservoir system, and routed those inflows through the system using hydrologic models developed by TVA.

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

Other (Please specify)

Comments: TVA uses a 9-day sequence specified by a hydrometeorological design basis report developed by NWS (contracted work).

19 Do the guidelines specify any criteria for temporal storm distribution?

Yes (Other - please specify)

Comments: TVA uses a distribution specified by a hydrometeorological design basis report developed by NWS (contracted work).

20 Do the guidelines specify any criteria for spatial storm distribution?

Yes (Please specify)

Comments: TVA uses a distribution specified by a hydrometeorological design basis report developed by NWS (contracted work).

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

No

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

Yes (Please specify)

Comments: TVA uses the hydrometeorological design basis report developed by NWS (contracted work).

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

No

Comments: Historically, this has not been a problem for TVA.

24 Do guidelines require consideration or analysis of future development?

No

Comments: Most communities downstream of TVA dams participate in the FEMA flood insurance program, and so they are somewhat self-regulating.

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

Yes (Please specify)

Comments: Historic practice includes median moisture conditions and conservatively high initial reservoir pool levels.

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

No

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

Yes (Please specify)

Comments: 100-year frequency event minimum

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

No

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass		% of the	
Existing High Hazard Dam must pass		% of the	
New Significant Hazard Dam must pass		% of the	
Existing Significant Hazard Dam must pass		% of the	

Comments: Our historic practice has been to select the PMF as the appropriate spillway design flood for TVA dams with a high hazard classification. Significant hazard dams must pass the "TVA precipitation" as defined by the NWS study. This precipitation is significantly less than the PMP.

29 For low hazard dams, the spillway design requirement is:

Other (Please specify)

Comments: TVA practice is that Low hazard dams must pass the "TVA precipitation" as defined by the NWS study. This precipitation is significantly less than the PMP.

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

Yes

Comments: This practice has been adopted by TVA in the past, but was not used as the permanent solution (used as an interim measure).

31 Does your organization permit risk-based hydrologic designs?

Other (Please explain)

Comments: TVA has not practiced risk-basd hydrologic designs. However, the topic has been considered with no firm conclusions.

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

33 How difficult would it be to change your regulations? Please explain.

Moderate

Comments: Changes to Dam Safety Guidelines would have to be approved by the Dam Safety Officer, Chief Operating Officer, and possibly the TVA Board of Directors/Chief Executive Officer.

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Army Corps of Engineers
Name of Representative	Eric C. Halpin
Title of Representative	Special Assistant for Dam and Levee Safety
Phone number(s)	202-761-7662
Email address	Eric.C.Halpin@usace.army.mil

2 Number of dams under Organization's jurisdiction by type:

Total Dams	
Total Regulated Dams	697
High Hazard Dams	525
Significant Hazard Dams	138
Low Hazard Dams	34
Unregulated Dams	
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? Procedures Pertaining to Deter

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Both of the above

Comments: Criteria is per the National Dam Safety Program Act.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

6 Does the Organization have published size classification criteria?

Yes

If "Yes", check and complete as appropriate:

Class A (Small)	=<	40	feet high and stores =<	1,000	acre-feet
Class B (Medium)					
Class C (Large)	=>	100	feet high and stores =>	50,000	acre-feet
Other (Specify)					

Comments: ER 1110-2-106, "Recommended Guidelines for Safety Inspection of Dams", 26 September 1979. This regulation is no longer valid. Current USACE guidance classifies dams by hazard potential and not size.

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

Loss of life potential is "few" with "appreciable" economic loss

Comments: Loss of life not probable.

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations that are required

Comments: ER 1110-8-2(FR), "Inflow Design Floods for Dams and Reservoirs", 1 March 1991.

9 What is the origin of the guidelines?

USACE guidelines (including Phase I Study guidelines)

10 When were the guidelines last revised (MM/DD/YYYY)? 03/01/1991

11 Are there any plans to update or revise the guidelines in the near future?

Yes (Please specify)

Comments: USACE has a program for updating guidance but there are no specific dates established for this regulation.

12 Are the guidelines different for new and existing dams?

No

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency acts as designer/engineer

14 How are the guidelines applied?

Based on other criteria (Please specify)

Comments: Standard 1: Risk to life and property; Standard 2: Run of river projects; Standard 3: Base safety condition, negligible incremental impacts due to failure; Standard 4: Small Dams

15 For PMP/PMF designs, is freeboard required?

Other (Please specify)

Comments: Three feet minimum for concrete dams. Three feet minimum for embankment dams unless pool is within three feet of the maximum pool for more than 36 hours in which case the minimum is five feet. Required freeboard may be greater than the minimum based on wind setup, wave action, uncertainty in analysis procedures, or uncertainty in project function.

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

Yes

If "Yes", what are the specific analysis methodologies, procedures, or computer software that must be used?

Must use HMRs for developing PMP

Comments: Development of site specific PMPs is allowed. EM 1110-2-1417, "Flood Runoff Analysis", 31 August 1994.

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

Yes (Please specify)

Comments: USACE maintains software lists that classify software as follows: Required, Recommended, Ok to use, Retired, Not Allowed for Use.

18 Do the guidelines specify any criteria for storm duration?

Yes (Based on Tc)

19 Do the guidelines specify any criteria for temporal storm distribution?

Yes (HMR)

20 Do the guidelines specify any criteria for spatial storm distribution?

Yes (Please specify)

Comments: HMR spatial distribution with orientation adjusted to maximize peak discharge.

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

No

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

Yes (Please specify)

Comments: Site specific PMPs require approval by HQUSACE.

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a moderate problem

Comments: Although downstream development can change hazard potential classification and inflow design flood requirements, this has not been an issue for USACE dams. A more common issue relates to changes in routine operation due to downstream development. Hazard potential classification affects frequency of dam safety exercises.

24 Do guidelines require consideration or analysis of future development?

Yes (Other; please specify)

Comments: Analysis of new projects requires consideration of most likely future conditions. Existing projects based on existing conditions. Design of spillways requires consideration of potential for hazardous flow regardless of current or future development (ER 1110-2-1451).

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

Yes (Please specify)

Comments: ER 1110-8-2(FR) provides requirements for antecedent reservoir pool conditions. EM 1110-2-1417 provides guidelines for antecedent moisture conditions. Criteria can be modified at the regional (MSC) level based on regional conditions.

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

No

Comments: Applies to Standard 3 dams per ER 1110-8-2(FR).

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

Yes (Please specify)

Comments: Minimum 1/2 PMF for Standard 3 dams per ER 1110-8-2(FR).

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	100	% of the	PMF
Existing High Hazard Dam must pass	100	% of the	PMF
New Significant Hazard Dam must pass		% of the	
Existing Significant Hazard Dam must pass		% of the	

Comments: High hazard dams with potential life loss must pass 100% of the PMF per Standard 1 of ER 1110-8-2(FR). Significant hazard dams with no probable life loss must pass major floods typical of the region without excessive damage or loss of operability per Standard 2 of ER 1110-8-2(FR). Significant hazard dams with no incremental life loss due to dam failure must pass a minimum of 1/2 PMF per Standard 3 of ER 1110-8-2(FR).

29 For low hazard dams, the spillway design requirement is:

Other (Please specify)

Comments: Low hazard dams typically fall under Standard 4 of ER 1110-8-2(FR) which requires rainfall-runoff probability analyses with no specific minimum requirement.

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

Comments: Early warning can be considered as a risk reduction measure but would not be accepted in lieu of meeting minimum essential guidelines for the inflow design flood.

31 Does your organization permit risk-based hydrologic designs?

Other (Please explain)

Comments: Risk informed hydrologic designs are permitted for flood damage reduction studies (e.g. levees, channel improvements, etc) per ER 1105-2-101. Risk informed hydrologic designs are not permitted for dams. Risk informed hydrologic analyses for dams are used to prioritize risk reduction actions for dams in the USACE inventory and to inform decisions on incremental risk reduction actions for specific projects.

32 Has your agency ever reviewed a risk-based hydrologic analysis?

Yes (Both approved and rejected)

33 How difficult would it be to change your regulations? Please explain.

Difficult

Comments: A significant challenge would be establishing appropriate new/revised essential guidelines. Updating USACE regulations is a well defined process but usually takes 2-5 years to complete.

34 Are there any unique provisions in your regulations?

Yes (Please explain)

Comments: There are numerous guidelines that address/allow consideration of site-specific circumstances, regional considerations, and portfolio prioritization.

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	US Bureau of Reclamation
Name of Representative	Brian Becker
Title of Representative	Chief, Dam Safety Office
Phone number(s)	303-445-2776
Email address	bbecker@usbr.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	587
Total Regulated Dams	468
High Hazard Dams	332
Significant Hazard Dams	38
Low Hazard Dams	98
Unregulated Dams	
Other	119

3 What year did your Agency adopt minimum Inflow Design Flood criteria? Around 1951.

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: Reclamation follows definition in the Federal Guidelines for Dam Safety (FGDS). (Your pull downs use the word "and" between the 2 dimensions, when the FGDS uses "or" and your pull-downs incorrectly mixing the 2 dimensions. The way the FGDS reads is 25ft and 50 ac-ft for one jurisdiction test and 6' and 15ac-ft for the other test.)\

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

6 Does the Organization have published size classification criteria?

No

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

No potential for loss of life with significant but not excessive economic loss

Comments: Prior to adopting FEMA 333, Reclamation Dam Safety Program used the following definition for Significant: "Few Loss of Life is defined as 1 to 6 lives in jeopardy. Appreciable economics is defined as rural area with notable agriculture, industry, or worksites, or outstanding natural resources." While we now follow FEMA 333 definitions, dams that were assigned a hazard class of significant by following our 1988 guidelines and have potential life loss, these facilities have not been changed to high-hazard. It is the Reclamation's Dam Safety view that since these significant-hazard dams are treated as high-hazard.

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations for consideration by the engineer/designer

Comments: Reclamation uses the Reclamation Flood Hydrology Manual and the Reclamation Public Protection Guidelines (PPG) and uses a risk based approach.

9 What is the origin of the guidelines?

USBR guidelines

Comments: The risk assessment methodology of 1999 is superceded by the current Best Practices and used in coordination with the PPG. Reclamation has moved away from deterministic design flood standards and now uses risk-based approach. (Reclamation prefers the acronym of "Reclamation" instead of USBR or BOR.)

10 When were the guidelines last revised (MM/DD/YYYY)? 04/04/2011

Comments: Dam Safety Risk Analysis Best Practices Manual is updated as needed; approximately once or twice a year. PPG was last updated in 2010.

11 Are there any plans to update or revise the guidelines in the near future?

Yes (Please specify)

Comments: Dam Safety Risk Analysis Best Practices Manual is updated as needed; approximately once or twice a year. PPG was last updated in 2010.

12 Are the guidelines different for new and existing dams?

Yes (Please elaborate)

Comments: The application of updated design guidelines, or state-of-the-art, will vary by project. Modifications to existing structures must consider the amount of risk reduction, feasibility of the modification, and the cost/benefit when trying to apply state-of-the art.

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency acts as designer/engineer

In determining the spillway design flood, we set spillway design as case by case. It's very structure/site specific.

14 How are the guidelines applied?

Based on risk analysis

15 For PMP/PMF designs, is freeboard required?

Other (Please specify)

Comments: Following the Federal Guidelines for Dam Safety, freeboard conditions include consideration factors that can reasonably occur at the given project site but include, wave height based on fetch and wind velocity assumptions, settlement, allowance for improper gate operation, landslide-generated wave potential, and perphaps an arbitrary allowance for contingencies to provide an increased factor of safety.

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

Comments: The Dam Safety Risk Analysis Best Practice was written to guide the engineer but also allows for deviation if justifiable.

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

Comments: Duration of flood overtopping is a critical element in determining the failure probability; however, it is difficult to accurately estimate.

18 Do the guidelines specify any criteria for storm duration?

No

Comments: Basis for storm duration is the PMP hydromet reports and is dependant upon site conditions. Type of spillway is a critical factor as well size of reservoir.

19 Do the guidelines specify any criteria for temporal storm distribution?

Yes (Other - please specify)

Comments: The Reclamation Flood Hydrology Manual specifies a 2/3 PMP distribution. We vary this based on site conditions and individual extreme storms according to Reclamations's

20 Do the guidelines specify any criteria for spatial storm distribution?

Yes (Please specify)

Comments: The Flood Hydrology Manual specifies a successive subtraction for PMP over watershed subbasins. We vary this based on site conditions and individual extreme storms according to Reclamations's guidelines for estimating hydrologic hazard curves.

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

Yes (Please specify)

Comments: Reclamation uses risk analysis but most likely freeboard would be integrated with other analysis, such as gate operations.

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

No

Comments: PMPs are obtained for moderate level of effort studies such as Issue Evaluations, Corrective Action Studies, and Final Design. Reclamation uses generalized PMPs from the HMRs and according to Reclamation Flood Hydrology Manual and the Hydrologic Hazard Guidelines. Instead of site specific PMPs, Reclamation uses risk analysis.

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

No

Comments: It is not a regulatory problem since changes in downstream development are reviewed during facility exams.

24 Do guidelines require consideration or analysis of future development?

Yes (Both of the above)

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

Yes (Please specify)

Comments: The risk analysis decision tree evaluates loads at various reservoir elevations. Antecedent moisture conditions are a parameter in modeling and are considered during the risk analysis process.

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

No

Comments: The Guidelines do not require an incremental damage assessment but are used if appropriate.

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

No

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

No

Comments: Any modifications to spillway design capacity would follow a risk-based approach using Reclamation's Risk Analysis Best Practices Manual.

29 For low hazard dams, the spillway design requirement is:

Not specified

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

Comments: For new design of high hazard dam, an EWS would probably not be allowed as an alternative for the regulatory spillway design flood. In cases of risk reduction, the cost to modify up to state-of-the-art may require the use of an EWS.

31 Does your organization permit risk-based hydrologic designs?

Yes; our regulations permit them

Comments: A better answer is Yes, our guidelines permit them.

32 Has your agency ever reviewed a risk-based hydrologic analysis?

Yes (Both approved and rejected)

33 How difficult would it be to change your regulations? Please explain.

Moderate

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	US Fish and Wildlife Service
Name of Representative	Brad Iarossi
Title of Representative	Chief, Dam Bridge and Seismic Safety Branch
Phone number(s)	703-358-2211
Email address	Brad_Iarossi@fws.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	
Total Regulated Dams	259
High Hazard Dams	17
Significant Hazard Dams	18
Low Hazard Dams	224
Unregulated Dams	
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? 1991

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Both of the above

Comments: The U.S. Fish and Wildlife Service uses the definition of a dam found in the National Dam Safety Program Act to define a dam as "inventory dam". Impundment structures that do not meet these size/hazard criteria are considered "non-inventory" and are not subject to dam safety inspections etc.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

6 Does the Organization have published size classification criteria?

Yes

If "Yes", check and complete as appropriate:

Class A (Small)	=<	40	feet high and stores =<	1,000 acre-feet
Class B (Medium)				
Class C (Large)	=>	100	feet high and stores =>	50,000 acre-feet
Other (Specify)				

Comments: Intermediate (Medium) 40-100 feet high; 1000 - 50,000 acre feet

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

No potential for loss of life with significant but not excessive economic loss

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations that are required

Comments: The U.S. Fish and Wildlife Service self regulates our dams, therefore the design guidelines are followed, but are not in statute as we are not a regulator.

9 What is the origin of the guidelines?

Unknown

10 When were the guidelines last revised (MM/DD/YYYY)? 09/12/2008

11 Are there any plans to update or revise the guidelines in the near future?

Yes (Please specify)

Comments: The guidelines will likely be revised to incorporate risk assessments and updates to the EAP format.

12 Are the guidelines different for new and existing dams?

No

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency reviews submitted designs

Incremental damage assessments are often used to establish inflow design floods.

14 How are the guidelines applied?

Based on both size and hazard classification

15 For PMP/PMF designs, is freeboard required?

Other (Please specify)

Comments: Evaluated on a case by case basis

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

No

19 Do the guidelines specify any criteria for temporal storm distribution?

No

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

No

22 Does the organization allow development of a site specific PMP?

Yes

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a major problem

Comments: It is not a regulatory problem as we are not a regulator, however, as a responsible dam owner, we modify our dams appropriately based on hazard classification.

24 Do guidelines require consideration or analysis of future development?

Yes (Impacts of development on hazard classification or failure consequences)

Comments: If data is available

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

No

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

Yes

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

Yes (Please specify)

Comments: Minimum inflow design is the 100-year flood.

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	100	% of the	PMF
Existing High Hazard Dam must pass	100	% of the	PMF
New Significant Hazard Dam must pass	50-100	% of the	PMF
Existing Significant Hazard Dam must pass	50-100	% of the	PMF

Comments: Significant: Small (50% PMF), Intermediate (50% PMF), Large (50-100% PMF)

29 For low hazard dams, the spillway design requirement is:

Other (Please specify)

Comments: Small (100-year), Intermediate (100-year), Large (100-year to 500-year)

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

Comments: Absolutely NOT!

31 Does your organization permit risk-based hydrologic designs?

Yes; our regulations permit them

32 Has your agency ever reviewed a risk-based hydrologic analysis?

Yes (Reviewed and approved)

33 How difficult would it be to change your regulations? Please explain.

Easy

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Forest Service
Name of Representative	Clifford Denning
Title of Representative	Program Manager, Geotech and Dams
Phone number(s)	414-297-3305
Email address	cdenning@fs.fed.us

2 Number of dams under Organization's jurisdiction by type:

Total Dams	
Total Regulated Dams	437
High Hazard Dams	31
Significant Hazard Dams	83
Low Hazard Dams	323
Unregulated Dams	
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? s dated 1993 and minimum inf

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Both of the above

Comments: Non-inventory dams are dams with a low or undertermined hazard potential classification that do not meet: a) Equal or exceed 25 feet in height and exceed 15 acre-feet in storage or b) Exceed 6 feet in height and equal or exceed 50 acre-feet in storage.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

6 Does the Organization have published size classification criteria?

No

Comments: New Forest Service Manual does not have published size classification criteria.

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

No potential for loss of life with significant but not excessive economic loss

Comments: Would result in no probable loss of human life but could cause economic loss, disruption of lifeline facilities, or other significant impacts and would result in non-recoverable environmental damage.

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations that are required

Comments: The level of design detail increases from preliminary to final design and with increasing size, value, and hazard potential classification of the structure. The level of detail of the geological and geotechnical investigation, design, design reports, and drawings must be adequate to construct the dam within acceptable safety parameters for its size and hazard potential classification. Utilize current U. S. Army Corps of Engineers or Bureau of Reclamation standards and procedures for dams in planning, investigating, and designing dams on National Forest System lands.

9 What is the origin of the guidelines?

Combination of the above (Please specify)

Comments: FEMA and USACE guidelines were consulted in the revision of our direction.

10 When were the guidelines last revised (MM/DD/YYYY)? 05/01/2011

Comments: The Forest Service guidelines are currently being revised and the above date is an estimated date of completion.

11 Are there any plans to update or revise the guidelines in the near future?

Yes (Please specify)

Comments: They are currently being revised

12 Are the guidelines different for new and existing dams?

No

Comments: Existing dams which can accommodate at least 75 percent of the inflow design flood do not need to be modified to increase spillway capacity to the minimum requirements , until the dams undergo major reconstruction.

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency utilizes a combination of the above approaches, possibly on a case-by-case basis

14 How are the guidelines applied?

Based on hazard classification only

15 For PMP/PMF designs, is freeboard required?

No

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

Comments: At a minimum, utilize standards and procedures established by the Bureau or Reclamation, U. S. Army Corps of Engineers, or Natural Resources Conservation Service for determining the design storm event and sizing the spillway. Any appropriate Federal and State standards may be used case by case. Conduct site-specific evaluations to develop the inflow design hydrographs.

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

Comments: At a minimum, utilize standards and procedures established by the Bureau or Reclamation, U. S. Army Corps of Engineers, or Natural Resources Conservation Service for determining the design storm event and sizing the spillway. Any appropriate Federal and State standards may be used case by case. Conduct site-specific evaluations to develop the inflow design hydrographs.

18 Do the guidelines specify any criteria for storm duration?

No

Comments: At a minimum, utilize standards and procedures established by the Bureau or Reclamation, U. S. Army Corps of Engineers, or Natural Resources Conservation Service for determining the design storm event and sizing the spillway. Any appropriate Federal and State standards may be used case by case. Conduct site-specific evaluations to develop the inflow design hydrographs.

19 Do the guidelines specify any criteria for temporal storm distribution?

No

Comments: At a minimum, utilize standards and procedures established by the Bureau or Reclamation, U. S. Army Corps of Engineers, or Natural Resources Conservation Service for determining the design storm event and sizing the spillway. Any appropriate Federal and State standards may be used case by case. Conduct site-specific evaluations to develop the inflow design hydrographs.

20 Do the guidelines specify any criteria for spatial storm distribution?

No

Comments: At a minimum, utilize standards and procedures established by the Bureau or Reclamation, U. S. Army Corps of Engineers, or Natural Resources Conservation Service for determining the design storm event and sizing the spillway. Any appropriate Federal and State standards may be used case by case. Conduct site-specific evaluations to develop the inflow design hydrographs.

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

No

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

No

Comments: Conduct site-specific evaluations to develop the inflow design hydrographs.

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a moderate problem

Comments: We have had several dams change classifications because of downstream development due to lack of zoning requirements.

24 Do guidelines require consideration or analysis of future development?

Yes (Impacts of development on hazard classification or failure consequences)

Comments: Consider and document reasonably foreseeable downstream development as well as existing development in the assessment.

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

No

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

No

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

Yes (Please specify)

Comments: Under no circumstances should the spillway capacity be reduced below the applicable minimum threshold (High=0.5PMF, Significant=100-year RP, Low=50-year RP).

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	100	% of the	PMF
Existing High Hazard Dam must pass	100	% of the	PMF
New Significant Hazard Dam must pass	50	% of the	PMF
Existing Significant Hazard Dam must pass	50	% of the	PMF

Comments: Incremental Damage Analysis may allow spillway capacity to be reduced, but not any lower than the minimum threshold stated in question 27.

29 For low hazard dams, the spillway design requirement is:

100-year flood

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

Comments: While we would not accept as an alternative the new direction states "To afford the maximum opportunity to alleviate problems that could threaten the integrity or operation of a dam remote sensing is required on all Forest Service operated dams with a high hazard potential classification."

31 Does your organization permit risk-based hydrologic designs?

Our regulations do not specifically address this topic and it has never come up for consideration

32 Has your agency ever reviewed a risk-based hydrologic analysis?

Unsure

33 How difficult would it be to change your regulations? Please explain.

Moderate

Comments: While not impossible, changes require review and edits at different levels.

34 Are there any unique provisions in your regulations?

No

C.3. Completed State Surveys

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Alaska
Name of Representative	Charles Cobb
Title of Representative	State Dam Safety Engineer
Phone number(s)	(907) 269-8636
Email address	charles.cobb@alaska.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	171
Total Regulated Dams	79
High Hazard Dams	19
Significant Hazard Dams	30
Low Hazard Dams	30
Unregulated Dams	57
Other	35

3 What year did your Agency adopt minimum Inflow Design Flood criteria? 2004

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: Less than 10 feet in height and poses no threat to lives and property; less than 20 feet in height, impounding less than 50 acre-feet and poses no threat to lives and property.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

Yes (Please explain)

Comments: Certain tailings dams must meet highest design standard

6 Does the Organization have published size classification criteria?

No

If "Yes", check and complete as appropriate:

Class A (Small)	=<	feet high and stores =<		acre-feet
Class B (Medium)				
Class C (Large)	=>	feet high and stores =>		acre-feet
Other (Specify)				

Comments:

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

Other (Please specify)

Comments: failure or improper operation of the barrier will result in: Significant danger to public health; Probable loss of or probable signifcant damage to homes, occupied structures, commercial property, high-value property, major highways, primary roads, railroads or public utilities, except those which belong to the barrier owner; other probable significant property losses or damage; probable loss of or significant damage to waters identified as important for the spawning, rearing or migration of anadromous fish.

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Other (Please specify)

Comments: State published guidelines which do not have the force of law, and reference to FEMA 94 (1998) in published regulations (Alaska Administrative Code) which does have the force of law.

9 What is the origin of the guidelines?

Custom developed by Organization

Comments: Alaska Dam Safety Program

10 When were the guidelines last revised (MM/DD/YYYY)? 06/01/2005

Comments:

11 Are there any plans to update or revise the guidelines in the near future?

No

Comments:

12 Are the guidelines different for new and existing dams?

Yes (Please elaborate)

Comments: Depends

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency utilizes a combination of the above approaches, possibly on a case-by-case basis

The department will at a minimum review submitted designs, and depending on the hazard potential of the structure will on a case-by-case basis perform an independent verification. In some unusual circumstances the department may perscribe the IDF if the owner of an existing dam lacks the resources to define it themselves.

14 How are the guidelines applied?

Based on hazard classification only

Comments:

15 For PMP/PMF designs, is freeboard required?

No

Comments:

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

If "Yes", what are the specific analysis methodologies, procedures, or computer software that must be used?

Comments:

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

Comments:

18 Do the guidelines specify any criteria for storm duration?

No

Comments:

19 Do the guidelines specify any criteria for temporal storm distribution?

No

Comments:

20 Do the guidelines specify any criteria for spatial storm distribution?

No

Comments:

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

No

Comments: 100 year flood minimum IDF for all dams

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

No

Comments:

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a minor problem

Comments:

24 Do guidelines require consideration or analysis of future development?

Yes (Impacts of development on hazard classification or failure consequences)

Comments:

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

No

Comments:

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

No

Comments:

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

Yes (Please specify)

Comments: 100 year flood is minimum IDF for all dams

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

No

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass		% of the	
Existing High Hazard Dam must pass		% of the	
New Significant Hazard Dam must pass		% of the	
Existing Significant Hazard Dam must pass		% of the	

Comments: Minimum Standard for any dam: 100 year flood
Maximum Standard for any dam: PMF

29 For low hazard dams, the spillway design requirement is:

100-year flood

Comments:

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

Yes

Comments: Yes for existing dam, No for new construction

31 Does your organization permit risk-based hydrologic designs?

Yes; although our regulations do not specifically address this topic, we review risk-based designs o

Comments:

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

Comments:

33 How difficult would it be to change your regulations? Please explain.

Difficult

Comments: Requires public comment and review

34 Are there any unique provisions in your regulations?

Yes (Please explain)

Comments: Protection of anadromous fish habitat included in hazard potential classification
Design criteria specifically excluded to allow engineers to develop reasonable designs

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Arizona
Name of Representative	Nicole Spence-Gibson
Title of Representative	Engineering Section
Phone number(s)	602-771-8658
Email address	nsgibson@azwater.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	
Total Regulated Dams	252
High Hazard Dams	100
Significant Hazard Dams	36
Low Hazard Dams	116
Unregulated Dams	
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? 1978

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments:

(a) any barrier that is or will be less than six feet in height, regardless of storage capacity
(b) any barrier between 6 and 25 ft in height with a storage capacity of less than 50 AF
(c) any barrier that has or will have a storage capacity of fifteen acre-feet or less, regardless of height
(d) any barrier for the purpose of controlling liquid-borne material
(e) any barrier that is a release-contained barrier (f) any barrier that is owned, controlled, operated, maintained or managed by the United States Government or its agencies or instrumentalities if a safety program that is as least as stringent as the state safety program applies and is enforced against the agent or instrumentality.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

6 Does the Organization have published size classification criteria?

Yes

If "Yes", check and complete as appropriate:

Class A (Small)	=<	40	feet high and stores =<	1000	acre-feet
Class B (Medium)					
Class C (Large)	=>	100	feet high and stores =>	50000	acre-feet
Other (Specify)					

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, Low, Limited Hazard)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

No potential for loss of life with significant but not excessive economic loss

Comments: Significant hazard potential is defined as failure or improper operation of a dam would be unlikely to result in loss of human life but may cause significant or high economic loss, intangible damage requiring major mitigation, and disruption or impact on lifeline facilities. Property losses would occur in a predominantly rural or agricultural area with a transient population but significant infrastructure.

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations for consideration by the engineer/designer

9 What is the origin of the guidelines?

Custom developed by Organization

10 When were the guidelines last revised (MM/DD/YYYY)? 03/01/2004

11 Are there any plans to update or revise the guidelines in the near future?

No

12 Are the guidelines different for new and existing dams?

Yes (Please elaborate)

Comments: Our rules related to the magnitude of idf do differ for new and existing dams.

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency reviews submitted designs

14 How are the guidelines applied?

Based on both size and hazard classification

15 For PMP/PMF designs, is freeboard required?

Other (Please specify)

Comments: Largest of the following: i.) The sum of the inflow design flood maximum water depth above the spillway crest plus wave run up. ii.) The sum of the inflow design flood

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

Other (Please specify)

Comments: Our rules do not specifiy criteria for storm duration; however, we developed general guidelines to assist with for the evaluation of spillway adequacy. For the evaluation, we require PMF studies include the 6-hour local and 72-hour. Site-specific PMP depths and distributions are accepted if independently reviewed by a qualified third-party meteorologist.

19 Do the guidelines specify any criteria for temporal storm distribution?

Yes (Other - please specify)

Comments: Time-distribution for the 6-hour local PMP follows the HMR 49 procedure. The 72-hour general storm PMP uses: A. 1st Day - Second Largest Day uniformly distributed. B. 2nd Day - Largest Day sequenced as follows: 1. 3rd largest 6-hr period uniformly distributed 2. 2nd largest 6hr period uniformly distributed 3. Largest 6-hour period uniformly distributed and 4. 4th largest 6-hr period uniformly distributed. c. 3rd Day - Smallest day uniformly distributed. Site-specific PMP depths and distributions may be accepted if independently reviewed by a qualified third party meteorologist.

20 Do the guidelines specify any criteria for spatial storm distribution?

Yes (Please specify)

Comments: See Comment 19.

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

No

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

No

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a minor problem

24 Do guidelines require consideration or analysis of future development?

Yes (Impacts of development on hazard classification or failure consequences)

Comments: The evaluation shall include land use zoning and development projected for the affected area over the 10 year period following classification of the dam.

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

No

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

Yes

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

No

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	50-100	% of the	PMF
Existing High Hazard Dam must pass	50-100	% of the	PMF
New Significant Hazard Dam must pass	25-50	% of the	PMF
Existing Significant Hazard Dam must pass	25-50	% of the	PMF

Comments: For significant hazard, design is determined by size classification. For high hazard, design is determined based on the number of persons at risk and the potential for downstream damage.

29 For low hazard dams, the spillway design requirement is:

Other (Please specify)

Comments: 25% of the PMF, Very low hazard potential dams it is the 100-year.

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

Comments: Our regulations do not specifically address this topic and it has never come up for consideration.

31 Does your organization permit risk-based hydrologic designs?

Our regulations do not specifically address this topic and it has never come up for consideration

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

33 How difficult would it be to change your regulations? Please explain.

Difficult

Comments: Any changes to our regulations would require stakeholder meetings and would go through the Governoring Regulatory Review Council.

34 Are there any unique provisions in your regulations?

Yes (Please explain)

Comments: 1. Emergency Spillway Requirements. An applicant shall: a. Construct each spillway in a manner that avoids flooding in excess of the flooding that would have occurred in the same location under the same conditions before construction. The owner of a dam shall demonstrate that a spillway discharge would not result in incremental adverse consequences. In determining whether a spillway discharge of a dam would result in incremental adverse consequences, the Director shall evaluate whether the owner has taken any or all of the following actions: issuing public notice to downstream property owners, complying with flood insurance requirements, adopting emergency action plans, conducting mock flood drills, acquiring flow easements or other acquisitions of real property, or other actions appropriate to safeguard the dam site and flood channel. b. Include a control structure to avoid head cutting and lowering of the spillway crest for spillways excavated in soils or soft rock. In the alternative, the design may provide evidence acceptable to the Director that erosion during the inflow design flood will not result in a sudden release of the reservoir. c. Provide each spillway and channel with a minimum width of 10 feet and suitable armor to prevent erosion during the discharge resulting from the inflow design flood. d. Ensure that downstream spillway channel flows do not encroach on the dam unless suitable erosion protection is constructed.
e. Ensure that each spillway, in combination with outlets, is able to safely pass the peak discharge flow rate, as calculated on the basis of the inflow design flood. f. Not construct bridges or fences across a spillway unless the construction is approved in writing by the Director. The Director's approval may include conditions regarding the design and operation of the spillway and fencing, based on safety concerns. g. Not use a pipe or culvert as an emergency spillway unless the Director approves the use following review of the dam design and site characteristics.

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Arkansas
Name of Representative	Alvin Simmons, Jr., P.E.
Title of Representative	Engineer Supervisor
Phone number(s)	501-682-3981
Email address	alvin.simmons@arkansas.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	
Total Regulated Dams	406
High Hazard Dams	103
Significant Hazard Dams	95
Low Hazard Dams	208
Unregulated Dams	
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria?

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: Less than 25 feet dam height or less than 50 acre-feet of storage (top of dam)

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

6 Does the Organization have published size classification criteria?

Yes

If "Yes", check and complete as appropriate:

Class A (Small)	=<	40	feet high and stores =<	1000	acre-feet
Class B (Medium)					
Class C (Large)	=>	100	feet high and stores =>	50,000	acre-feet
Other (Specify)					

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

No potential for loss of life with significant but not excessive economic loss

Comments: Appreciable (Significant structures, industrial, or commercial development, or cropland); $100,000 to $500,000.

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published within State Laws

9 What is the origin of the guidelines?

Combination of the above (Please specify)

10 When were the guidelines last revised (MM/DD/YYYY)? 10/01/1993

11 Are there any plans to update or revise the guidelines in the near future?

Yes (Please specify)

Comments: Within the next 2 years

12 Are the guidelines different for new and existing dams?

Yes (Please elaborate)

Comments: Existing dams will be evaluated periodically to determine if development of downstream areas warrants change in hazard classification and review of spillway design flood (SDF). Overtopping during the SDF may be allowed if properly prepared analyses demonstrate that: (1) overtopping will have a return interval greater than 25 years; and (2) the dam will withstand the projected overtopping without failure.

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency performs independent verification of submitted designs

14 How are the guidelines applied?

Based on both size and hazard classification

15 For PMP/PMF designs, is freeboard required?

No

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

No

19 Do the guidelines specify any criteria for temporal storm distribution?

No

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

No

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

No

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a minor problem

Comments: NRCS dams

24 Do guidelines require consideration or analysis of future development?

Yes (Impacts of development on hazard classification or failure consequences)

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

No

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

Yes

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

No

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	50-100	% of the	PMF
Existing High Hazard Dam must pass	50-100	% of the	PMF
New Significant Hazard Dam must pass	25-100	% of the	PMF
Existing Significant Hazard Dam must pass	25-100	% of the	PMF

Comments: Percentage ranges are given and are based upon effective height of dam or maximum storage, whichever computed SDF is greated.

29 For low hazard dams, the spillway design requirement is:

Other (Please specify)

Comments: 0.25PMF to 0.75PMF depending on size of dam (small, intermediate, or large).

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

31 Does your organization permit risk-based hydrologic designs?

Our regulations do not specifically address this topic and it has never come up for consideration

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

33 How difficult would it be to change your regulations? Please explain.

Moderate

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	California
Name of Representative	David A. Gutierrez
Title of Representative	Chief, Division of Safety of Dams
Phone number(s)	916-227-9800
Email address	daveg@water.ca.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	
Total Regulated Dams	1247
High Hazard Dams	688
Significant Hazard Dams	274
Low Hazard Dams	285
Unregulated Dams	
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? 1930

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Both of the above

Comments: We also have other execptions to jurisdiction.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

Comments: However, dams of different consequence class have varying design standards/requirements. For instance, a PMF is applied to very high hazard dams while a 1000 year level storm is for very low potential consequence. Same with earthquakes. Flood Control dams also have different requirements.

6 Does the Organization have published size classification criteria?

No

Comments: Damage potential classification based on capacity, height, estimated evacuation, and potential d/s damage

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

Other (Please specify)

Comments: Damage potential classification based on capacity, height, estimated evacuation, and potential d/s damage

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations for consideration by the engineer/designer

Comments: The force of law is not specifically outlined but California gives dam safety program broad authority to enforce these requirements. These are not "guidelines" as defined by the State of California, but Technical Reference how it is done at DSOD.

9 What is the origin of the guidelines?

Custom developed by Organization

10 When were the guidelines last revised (MM/DD/YYYY)? 03/01/1981

11 Are there any plans to update or revise the guidelines in the near future?

Yes (Please specify)

Comments: There is no specific date yet determined

12 Are the guidelines different for new and existing dams?

Yes (Please elaborate)

Comments: The technical reference does not outline variations, but DSOD has different policy for new and existing dams.

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency performs independent verification of submitted designs

14 How are the guidelines applied?

Based on a combination of risk analysis and hazard/size classification

15 For PMP/PMF designs, is freeboard required?

1.5'

Comments: Additional freeboard is required for severe wave conditions from wind effects. In addtion 1.5 feet is required on new dams while existing dams may not be required to have more than zero residual freeboard depending on wave runup.

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

Yes

If "Yes", what are the specific analysis methodologies, procedures, or computer software that must be used?

Must use HMRs for developing PMP

Comments: Our inhouse evaluations use HEC. Statiscial requirements for dams is dependent on potential consequence.

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

Yes (72-hour)

Comments: In general, the total precipitation duration is taken to be 72 hours. If routing will not significantly affect the peak outflow, a shorter storm (e.g., 24 hours) can be considered since the peak inflow will be about the same in either case.

19 Do the guidelines specify any criteria for temporal storm distribution?

Yes (HMR)

20 Do the guidelines specify any criteria for spatial storm distribution?

No

Comments: The guidelines do not specify to this detail, but DSOD practice considers spatial storm distribution.

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

No

Comments: Spillway design criteria is based on frequency of flooding up to the PMP

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

No

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a minor problem

Comments: On occasion downstream development changes the hazard classification, but in most cases in California, most of the dams are already at the highest level.

24 Do guidelines require consideration or analysis of future development?

No

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

Yes (Please specify)

Comments: For non flood control dams, reservoir is taken at spillway level. Antecendent moisture conditions are considered in evaluating the runoff coefficient.

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

No

Comments: Guidelines don't specify, but DSOD has considered incremental damage in past and plans to develop guidelines for use.

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

No

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

No

Comments: It is prudent to a allow a continuous range of design floods corresponding to the developed Total Class Weights. The minimum allowable design event required is a 1000 year storm which corresponds with a TCW of 4. The maximum event is a storm derived from the Probable Maximum Precipitation and is equated with a TCW of 30. The design event is interpolated between these limits at the computed TCW. Typically, probable maximum precipitation storms are required only for dams that impound 1000 acre-feet or more, are at least 50 feet high, would require an estimated evacuation of at least 1000 people, and have a damage potential of $25,000,000 or greater. However, most dams require a design storm falling between the 1000 year event and the probable maximum event. Figure 2 presents a histogram of TCW (as determined by DSOD) for all jurisdictional dams within California. As can be seen, less than 8 percent of all dams require a PMF.

29 For low hazard dams, the spillway design requirement is:

Other (Please specify)

Comments: 1000-year

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

Comments: We have allowed the use of early warning systems as part of interim measures until dam is repaired.

31 Does your organization permit risk-based hydrologic designs?

Yes; although our regulations do not specifically address this topic, we review risk-based designs o

Comments: The definition of risk based hydrologic design is not defined in this question and means different things to different people. However based on the risk, DSOD applies statistical storms starting with a 1000 year level up to a PMP

32 Has your agency ever reviewed a risk-based hydrologic analysis?

Yes (Reviewed and approved)

33 How difficult would it be to change your regulations? Please explain.

Difficult

Comments: We usually apply policy and give direction based on that policy. Regulations are too stiff and do not seem the appropriate way to deal with technical issues. Statutes are even worse and should never be used to dictate technical issues.

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Colorado
Name of Representative	Mark R. Haynes
Title of Representative	Chief Dam Safety Engineer
Phone number(s)	303-866-3581
Email address	mark.haynes@state.co.us

2 Number of dams under Organization's jurisdiction by type:

Total Dams	3000
Total Regulated Dams	1935
High Hazard Dams	352
Significant Hazard Dams	322
Low Hazard Dams	1261
Unregulated Dams	1065
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? 1967

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: Less than 100 acre-feet or creates a reservoir with a surface area less than 20 acres at the high-water line, or is less than 10 feet in height.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

6 Does the Organization have published size classification criteria?

Yes

If "Yes", check and complete as appropriate:

Class A (Small)	=<	20	feet high and stores =<	100	acre-feet
Class B (Medium)					
Class C (Large)	=>	50	feet high and stores =>	4,000	acre-feet
Other (Specify)					

Comments: The three classes in increasing size are: Minor Dam, Small Dam, Large Dam.

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, Low, Limited Hazard)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

No potential for loss of life with significant but not excessive economic loss

Comments: The classfications are as follows: High, Significant, Low, and No Public Hazard (NPH).

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations that are required

9 What is the origin of the guidelines?

USBR guidelines

10 When were the guidelines last revised (MM/DD/YYYY)? 01/01/2007

11 Are there any plans to update or revise the guidelines in the near future?

No

Comments: Next update in 10 years

12 Are the guidelines different for new and existing dams?

Yes (Please elaborate)

Comments: Grandfather clause for dams built prior to 1988. Minimum IDF criteria of the 100-year storm.

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency reviews submitted designs

Have final approval of IDF

14 How are the guidelines applied?

Based on both size and hazard classification

15 For PMP/PMF designs, is freeboard required?

Based on wave run up computations

Comments: The minimum freeboard requirements for new or enlarged dams shall be based upon the dam height required to prevent overtopping by wave action, or the sum of the inflow design flood maximum water surface level plus one foot of residual freeboard, but not less than five feet unless the State Engineer approves a lesser amount. Except for concrete dams where the design engineer has demonstrated that overtopping of the dam will not be detrimental to the safety of the dam, the inflow design flood can be accommodated with zero residual freeboard or the overtopping depth at which the dam still meets the stability and stress requirements of Rule 5.9.5.

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

Yes (24-hour)

Comments: For high frequency storms.

19 Do the guidelines specify any criteria for temporal storm distribution?

Yes (HMR)

20 Do the guidelines specify any criteria for spatial storm distribution?

No

Comments: Depends on procedures in HMRs and Hydrologic Software

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

No

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

Yes (Please specify)

Comments: Site Specific Hydrometeorologic Analysis (SSHMA) may be used to determine the appropriate site specific extreme storm precipitation (SSESP) for the determination of the IDF. Site-specific evaluations are subject to approval by the State Engineer. Any procedures developed and approved by the State Engineer shall be used to determine the applicable Extreme Precipitation Event. Snowmelt conditions shall be considered as base flow when appropriate. The percentage reduction of the PMP as shown in Rule 5.9.1.5 are not applicable or allowed in the determination of site specific extreme storm precipitation or PMP values determined by the procedures and analysis provided for in this Rule for all High Hazard dams and Large Significant Hazard dams. Specific percentages of the Site-specific PMP are required based on size and hazard classification.

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a moderate problem

Comments: Constant

24 Do guidelines require consideration or analysis of future development?

No

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

Yes (Please specify)

Comments: No for antecedent moisture conditions and yes for initial reservoir pool levels.

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

No

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

Yes (Please specify)

Comments: Minimum IDF is the 100-year event

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	0.45-0.90	% of the	PMP
Existing High Hazard Dam must pass		% of the	
New Significant Hazard Dam must pass	0.45-0.68	% of the	PMP
Existing Significant Hazard Dam must pass		% of the	

Comments: Based on size classification as well. There are also percentages of the PMP for special cases involving reductions due to elevation and site specific PMPs.

29 For low hazard dams, the spillway design requirement is:

Other (Please specify)

Comments: 50 to 100 year depending on size classification.

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

31 Does your organization permit risk-based hydrologic designs?

Our regulations do not specifically address this topic and it has never come up for consideration

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

33 How difficult would it be to change your regulations? Please explain.

Moderate

Comments: Could require Statutory changes and would require public review and hearings.

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Connecticut
Name of Representative	Arthur P. Christian II, P.E.
Title of Representative	Supervising Civil Engineer
Phone number(s)	860-424-3880
Email address	art.christian@act.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	
Total Regulated Dams	3024
High Hazard Dams	242
Significant Hazard Dams	267
Low Hazard Dams	2515
Unregulated Dams	1455
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria?

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Both of the above

Comments: Or all other dams with an impoundment capacity of three (3) acre-feet or less.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

6 Does the Organization have published size classification criteria?

No

7 Does the Organization have published hazard classification criteria?

Yes (Other)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

Loss of life potential is "few" with "appreciable" economic loss

Comments: Negligible (Class AA), Low (Class A), Moderate (Class BB), Significant (Class B), and High (Class C)

8 Does the Organization have guidelines for determining the spillway design flood?

No

If "Yes", what is the status of the guidelines; do they have the force of law?

Unpublished guidelines for consideration by the engineer/designer

9 What is the origin of the guidelines?

Combination of the above (Please specify)

Comments: Written by Philip Moreschi

10 When were the guidelines last revised (MM/DD/YYYY)? n/a

Comments: Continuous revision

11 Are there any plans to update or revise the guidelines in the near future?

Comments: Continuous revision

12 Are the guidelines different for new and existing dams?

No

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency reviews submitted designs

14 How are the guidelines applied?

Based on both size and hazard classification

15 For PMP/PMF designs, is freeboard required?

No

Comments: No specific requirements although wave runup may be considered by the design engineer based on the specific dam.

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

If "Yes", what are the specific analysis methodologies, procedures, or computer software that must be used?

Comments: The agency requires standard public domain software applications such as Hec-HMS or NRCS type modeling.

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

Comments: The agency requires that the engineer demonstrates that the methodolgy/analysis is both appropriate and an accepted engineering standard.

18 Do the guidelines specify any criteria for storm duration?

No

19 Do the guidelines specify any criteria for temporal storm distribution?

No

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

No

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

No

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a minor problem

Comments: Hazard classifications get changed routinely however most changes occur within the category of low hazard dams. Therefore spillway design requirements do not need to be modified.

24 Do guidelines require consideration or analysis of future development?

No

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

No

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

No

Comments: Only if future development is known to be planned.

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

No

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	100	% of the	PMF
Existing High Hazard Dam must pass	50-100	% of the	PMF
New Significant Hazard Dam must pass	50-100	% of the	PMF
Existing Significant Hazard Dam must pass	50	% of the	PMF

Comments: The above criteria assume that the impoundment sizes are large and intermediate as defined by the ACOE spillway design criteria.

29 For low hazard dams, the spillway design requirement is:

100-year flood

Comments: With one foot of freeboard or passing two times the 100 year without overtopping.

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

31 Does your organization permit risk-based hydrologic designs?

Our regulations do not specifically address this topic and it has never come up for consideration

Comments: The agency has not considered risk-based hydrologic designs at this time.

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

Comments: The agency has not considered risk-based hydrologic designs at this time.

33 How difficult would it be to change your regulations? Please explain.

Difficult

Comments: It is a lengthy formal process that can take up to two years. It is time intensive and sensitive to deadlines and subject to the will of a legislative committee.

34 Are there any unique provisions in your regulations?

No

Comments: The agency's regulations only pertain to the periodic inspection of dams.

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Delaware
Name of Representative	David R. Twing
Title of Representative	State Dam Safety Engineer
Phone number(s)	302-834-5557
Email address	david.twing@state.de.us

2 Number of dams under Organization's jurisdiction by type:

Total Dams	49
Total Regulated Dams	49
High Hazard Dams	44
Significant Hazard Dams	5
Low Hazard Dams	0
Unregulated Dams	0
Other	0

3 What year did your Agency adopt minimum Inflow Design Flood criteria? 2009

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: any one of the following: privately owned; low hazard; less than 6 feet high; less than 15 acre-feet of storage

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

6 Does the Organization have published size classification criteria?

No

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

Loss of life potential is "few" with "appreciable" economic loss

Comments: High Hazard includes any dam whose failure or misoperation will cause probable loss of human life. Significant Hazard includes any dam whose failure or misoperation will cause possible loss of human life, economic loss, environmental damage, and disruption of lifeline facilities. Low Hazard is unlikely to cause loss of human life but may cause minor economic and/or environmental losses.

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations that are required

9 What is the origin of the guidelines?

Custom developed by Organization

10 When were the guidelines last revised (MM/DD/YYYY)? 12/11/2009

11 Are there any plans to update or revise the guidelines in the near future?

No

12 Are the guidelines different for new and existing dams?

Yes (Please elaborate)

Comments: Incremental damage assessment may be used to reduce the spillway design flood of existing dams.

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency reviews submitted designs

14 How are the guidelines applied?

Based on hazard classification only

15 For PMP/PMF designs, is freeboard required?

Based on wave run up computations

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

No

19 Do the guidelines specify any criteria for temporal storm distribution?

No

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

Yes (Please specify)

Comments: Performance criteria specified for pipe conduit spillways, vegetated auxiliary spillways, etc. Activation criteria are also specified.

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

No

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

No

Comments: Not a problem for us yet because we just started our dam safety program; the hazard classifications for all dams in the state were determined in 2008

24 Do guidelines require consideration or analysis of future development?

Yes (Impacts of development on hazard classification or failure consequences)

Comments: All Class II and III dams shall, where practicable, incorporate in the proposed design the ability to make modifications necessary to increase the spillway capacity of the facility or other alternative measures if the downstream hazard potential increases.

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

No

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

No

Comments: For existing dams only.

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

Yes (Please specify)

Comments: Minimum design storm for the dam shall be the 100-year storm.

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	100	% of the	PMF
Existing High Hazard Dam must pass	100	% of the	PMF
New Significant Hazard Dam must pass	50	% of the	PMF
Existing Significant Hazard Dam must pass	50	% of the	PMF

29 For low hazard dams, the spillway design requirement is:

100-year flood

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

31 Does your organization permit risk-based hydrologic designs?

Our regulations do not specifically address this topic and it has never come up for consideration

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

33 How difficult would it be to change your regulations? Please explain.

Moderate

Comments: Changes in the regulations that don't involve changing the enabling legislation still require public notice, so I would use "moderate" to describe that process.

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Georgia
Name of Representative	Tom Woosley
Title of Representative	Program Manager
Phone number(s)	404-362-2678
Email address	tom_woosley@dnr.state.ga.us

2 Number of dams under Organization's jurisdiction by type:

Total Dams	
Total Regulated Dams	3926
High Hazard Dams	474
Significant Hazard Dams	0
Low Hazard Dams	3452
Unregulated Dams	
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? 1978

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: Less than 25 feet or stores less than 100 acre-feet. Also those less than 6 feet in height regardless of storage capacity or which have storage capacity of less than 15 acre-feet regardless of height.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

6 Does the Organization have published size classification criteria?

Yes

If "Yes", check and complete as appropriate:

Class A (Small)	=<	25	feet high and stores =<	500	acre-feet
Class B (Medium)					
Class C (Large)	=>	35	feet high and stores =>	1000	acre-feet
Other (Specify)	Very Large Dams: > 100 feet and > 50,000 acre-feet				

7 Does the Organization have published hazard classification criteria?

Yes (Other)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

Other (Please specify)

Comments: Only two categories: Category I means the classification where improper operation or dam failure would result in probable loss of human life. Category II means the classification where improper operation or dam failure would not be expected to result in probable loss of human life.

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations that are required

Comments: The law states the requirement, the guidelines detail out how we would determine the PMP

9 What is the origin of the guidelines?

Custom developed by Organization

Comments: Developed with help of consultants in 1998

10 When were the guidelines last revised (MM/DD/YYYY)? 06/01/2007

Comments: Version 3.1

11 Are there any plans to update or revise the guidelines in the near future?

Yes (Please specify)

Comments: Talking about it, but not in the works right now.

12 Are the guidelines different for new and existing dams?

Yes (Please elaborate)

Comments: Based on visual inspection and detailed hydrologic and hydraulic evaluation, including documentation of completed design and construction procedures, up to 10 percent lower requirement (22.5, 30, 45, 90) may be accepted on existing PL566 (including RC&D structures) and PL 534 Project Dams at the discretion of the Director, provided the project is in an acceptable state of maintenance. The design storm may be reduced on existing dams if the applicant's engineer can successfully demonstrate to the Director, by engineering analysis, that the dam is sufficient to protect against probable loss of human life downstream at a lesser design storm. Earth emergency spillways shall not function until the 50 year storm.

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency reviews submitted designs

14 How are the guidelines applied?

Based on size classification only

15 For PMP/PMF designs, is freeboard required?

Based on wave run up computations

Comments: 3-foot maximum

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

Yes

If "Yes", what are the specific analysis methodologies, procedures, or computer software that must be used?

Must use HEC-1

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

Yes (Please specify)

Comments: Models other than HEC-1 must be approved prior to design.

18 Do the guidelines specify any criteria for storm duration?

Yes (6-hr)

19 Do the guidelines specify any criteria for temporal storm distribution?

Yes (HMR)

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

Yes (Please specify)

Comments: Earth emergency spillways shall not function until the 50 year storm. SITES integrity analysis is required for earthen spillway.

22 Does the organization allow development of a site specific PMP?

Unknown (never requested)

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a moderate problem

24 Do guidelines require consideration or analysis of future development?

Yes (Both of the above)

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

Yes (Please specify)

Comments: AMC-III is to be used on the 6-hr storm

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

No

Comments: For existing dams only.

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

Yes (Please specify)

Comments: Requirement can be reduced by up to 10%.

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

Comments: Very large dam (100% of PMP), Large dam (50% of PMP), Medium dam (33.3% of PMP), and Small dam (25% of PMP)

29 For low hazard dams, the spillway design requirement is:

Not specified

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

31 Does your organization permit risk-based hydrologic designs?

No; our regulations forbid them

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

33 How difficult would it be to change your regulations? Please explain.

Difficult

Comments: Extremely, especially in the current political climate

34 Are there any unique provisions in your regulations?

No

HYDROLOGIC SAFETY OF DAMS QUESTIONNAIRE

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Hawaii
Name of Representative	Edwin Matsuda
Title of Representative	Civil Engineer
Phone number(s)	808-587-0268
Email address	edwin.y.matsuda@hawaii.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	
Total Regulated Dams	138
High Hazard Dams	123
Significant Hazard Dams	3
Low Hazard Dams	12
Unregulated Dams	
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? 1992

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: < 25ft height & < 50acft volume at max water surface elevation; or < 6 ft height; or < 15 acft volume at max water surface elevation

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

6 Does the Organization have published size classification criteria?

Yes

If "Yes", check and complete as appropriate:

Class A (Small)	=<	40	feet high and stores =<	1000	acre-feet
Class B (Medium)					
Class C (Large)	=>	100	feet high and stores =>	50,000	acre-feet
Other (Specify)					

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

No potential for loss of life with significant but not excessive economic loss

Comments: "Significant hazard" means a dam's or reservoir's failure will result in no probable loss of human life but can cause major economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns. Significant hazard potential classification dams or reservoirs are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Unpublished guidelines that are required

Comments: Design flows are specified in the draft administrative rules and pending approval will have the same authority as the law.

9 What is the origin of the guidelines?

Other (Please specify)

Comments: Originally specified in our guidelines and probably based on FEMA guidance material in the early 1990s. Current draft reflects previous guidelines with some minor

10 When were the guidelines last revised (MM/DD/YYYY)? 12/01/1992

Comments: Guidelines are currently being updated. Administrative rules have been drafted, passed through public hearings and is pending final approval.

11 Are there any plans to update or revise the guidelines in the near future?

Yes (Please specify)

Comments: Currently contracted out to consultant

12 Are the guidelines different for new and existing dams?

No

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency utilizes a combination of the above approaches, possibly on a case-by-case basis

14 How are the guidelines applied?

Based on both size and hazard classification

15 For PMP/PMF designs, is freeboard required?

Based on wave run up computations

Comments: Freeboard requirement determined on case by case requirement. Proposed Rules will specify "the greater of the following: (1) Two feet above the water level during the peak spillway flow associated with the inflow design flood; (2) Sum of the wave run-up and reservoir setup resulting from a 100 mph wind speed during the peak spillway flow associated with the inflow design flood."

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

Yes

If "Yes", what are the specific analysis methodologies, procedures, or computer software that must be used?

Must use HMRs for developing PMP

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

Yes (24-hour)

19 Do the guidelines specify any criteria for temporal storm distribution?

No

Comments: Existing guidelines specify SCS type I distribution however not defined in current draft HAR. May be addressed in guidelines update.

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

No

22 Does the organization allow development of a site specific PMP?

Unknown (never requested)

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a major problem

24 Do guidelines require consideration or analysis of future development?

No

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

No

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

No

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

No

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	100	% of the	PMF
Existing High Hazard Dam must pass	100	% of the	PMF
New Significant Hazard Dam must pass	50-100	% of the	PMF
Existing Significant Hazard Dam must pass	50-100	% of the	PMF

29 For low hazard dams, the spillway design requirement is:

Other (Please specify)

Comments: 100 year for small and intermediate low hazard dams and 0.5PMF for large low hazard dams.

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

Yes

Comments: There are provisions within our draft administrative rules for our approving board to grant variances to the requirements. Sufficient justification and assurances would likely be required for these to be approved.

31 Does your organization permit risk-based hydrologic designs?

Our regulations do not specifically address this topic and it has never come up for consideration

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

33 How difficult would it be to change your regulations? Please explain.

Difficult

Comments: Changes to our regulations can either be done through statute via our state legislature or through rules which require proceeding through the rule making process. Either change or revision will likely face a large amount of questions and possible resistance and require a lot of time and resources to address.

34 Are there any unique provisions in your regulations?

Yes (Please explain)

Comments: Our revisions do allow for our approving board to grant variances to the requirements stated. This was believed to be the best method of covering many of the specific issues in the regulations that we may not have addressed adequately. Also allows for owners of existing dams some other means of mitigating deficiencies which the dam may not have been required to meet when it was designed.

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Idaho
Name of Representative	John Falk
Title of Representative	
Phone number(s)	208-287-4927 / 208-287-4800
Email address	John.Falk@idwr.idaho.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	
Total Regulated Dams	569
High Hazard Dams	107
Significant Hazard Dams	149
Low Hazard Dams	313
Unregulated Dams	
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? Last revised 2006

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: Statute definition is for Regulated Dams; i.e. 10 feet or more in height or with an impounding capacity of 50 acre-feet or more. Conversely, non-regulated dams are those less than 10' high AND less than 50 ac-ft.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

Yes (Please explain)

Comments: Mine tailings impoundment structures which are, or will be, more than 30 feet high are regulated by the state dam safety program.

6 Does the Organization have published size classification criteria?

Yes

If "Yes", check and complete as appropriate:

Class A (Small)	=<	20	feet high and stores =<	100	acre-feet
Class B (Medium)					
Class C (Large)	=>	40	feet high and stores =>	4,000	acre-feet
Other (Specify)					

Comments: Contained within Administrative Rules only

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

Other (Please specify)

Comments: In the Administrative Rules, the term "Risk" is substituted for "Hazard" inappropriately. In Rule, "Significant Risk" is based on flood depth, velocity, and consequence of significant damage to intrastructure; loss of life is not mentioned.

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published within State Laws

Comments: Contained within Administrative Rules

9 What is the origin of the guidelines?

Unknown

10 When were the guidelines last revised (MM/DD/YYYY)? 01/01/2006

Comments: Administative Rules last revised in 2006

11 Are there any plans to update or revise the guidelines in the near future?

No

Comments: Lack of staff resources to pursue revisions

12 Are the guidelines different for new and existing dams?

Yes (Please elaborate)

Comments: Exemptions if approved by Director, exemptions based on existence prior to the state's dam safety laws.

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency reviews submitted designs

…with reference to existing Administrative Rule.

14 How are the guidelines applied?

Based on both size and hazard classification

15 For PMP/PMF designs, is freeboard required?

Based on wave run up computations

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

No

19 Do the guidelines specify any criteria for temporal storm distribution?

No

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

No

22 Does the organization allow development of a site specific PMP?

Unknown (never requested)

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a moderate problem

Comments: Problem will intensify because cost for rehabilitation is increasingly costly, permitting may be Catch-22, and lack of dam safety resources likely will not allow periodic review and/or enforcement.

24 Do guidelines require consideration or analysis of future development?

No

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

No

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

No

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

No

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	Q100-100	% of the	PMF
Existing High Hazard Dam must pass	Q100-100	% of the	PMF
New Significant Hazard Dam must pass	Q100-50	% of the	PMF
Existing Significant Hazard Dam must pass	Q100-50	% of the	PMF

Comments: High hazard dam: Q100-PMF, depending on size of dam; Significant hazard dam: Q100-0.5PMF, depending on size of dam.

29 For low hazard dams, the spillway design requirement is:

Other (Please specify)

Comments: Q50-Q500 depending on size of dam; these lower and upper boundaries are prescriptive and extreme, and badly in need of revision.

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

Comments: Cannot speculate as existing Statute and Rule do not address applicability. Organization would consider revising Rules to offer the opportunity, with conditions.

31 Does your organization permit risk-based hydrologic designs?

Our regulations do not specifically address this topic and it has never come up for consideration

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

Comments: The only review has been cursory for federal dams or federal regulated hydroelectric dams in which the State is a marginal participant.

33 How difficult would it be to change your regulations? Please explain.

Difficult

Comments: The procedure appears to be moderately involved (formation of committee, legislative committee recognition, hearings/testimony prior to acceptace by legislature). However, dam safety staff has been significantly reduced making any proposed revisions unlikely without neglecting primary safety mission of routine inspection and design review.

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Illinois
Name of Representative	Jason Campbell
Title of Representative	Senior Permit Engineer
Phone number(s)	217-558-4532
Email address	jason.campbell@illinois.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	
Total Regulated Dams	1485
High Hazard Dams	187
Significant Hazard Dams	299
Low Hazard Dams	999
Unregulated Dams	
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? 1980

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Both of the above

Comments: Also, if the drainage area of the dam is 6400 acres or less in a rural area, or 640 acres in an urban area

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

6 Does the Organization have published size classification criteria?

Yes

If "Yes", check and complete as appropriate:

Class A (Small)	=<	40	feet high and stores =<	1,000	acre-feet
Class B (Medium)					
Class C (Large)	=>	100	feet high and stores =>	50,000	acre-feet
Other (Specify)					

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

Loss of life potential is "few" with "appreciable" economic loss

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations that are required

9 What is the origin of the guidelines?

Combination of the above (Please specify)

Comments: Technical publications other than the Corps Guidelines may be used to assure the use of current and applicable data for the hydrologic and hydraulic review of dam design.

10 When were the guidelines last revised (MM/DD/YYYY)? 01/01/2003

11 Are there any plans to update or revise the guidelines in the near future?

No

12 Are the guidelines different for new and existing dams?

Yes (Please elaborate)

Comments: Reduced spillway design requirements for dams built before September 2, 1980. Any submittal for variation from the reduced spillway design flood must include a detailed hydraulic risk assessment that shows that additional spillway capacity will not provide a decrease in potential loss of life or property damage or a detailed economic risk assessment that shows that the chosen spillway design alternative provides the minimum rehabilitation costs plus damage losses; a detailed early warning and emergency evacuation plan coordinated with the local ESDA; and a list (with mailing addresses) of all persons living within the dam breach wave inundation area.

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency utilizes a combination of the above approaches, possibly on a case-by-case basis

14 How are the guidelines applied?

Based on both size and hazard classification

15 For PMP/PMF designs, is freeboard required?

Other (Please specify)

Comments: Case-by-case basis considering many factors including duration of high water levels during the design flood, the effective wind fetch and reservoir depth available to support wave generation, the probability of high wind speed occurring from a critical direction, the potential wave runup on the dam based on roughness and slope, and the ability of the dam to resist erosion from overtopping waves.

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

If "Yes", what are the specific analysis methodologies, procedures, or computer software that must be used?

Must use HMRs for developing PMP

Comments: Procedures developed by US Army Corps of Engineers, US Dept of the Interior (Bureau of Reclamation), US Dept of Agriculture (Natural Resources Conservation Service), and the National Weather Service are recommended as acceptable. The programs typically used by OWR for review include: HEC-1, HEC-HMS, HEC-2, HEC-RAS and FLDWAV.

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

Other (Please specify)

Comments: At least a 24-hour duration.

19 Do the guidelines specify any criteria for temporal storm distribution?

Yes (HMR)

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

Yes (Please specify)

Comments: Regulations distinguish between principal spillway design flood and total spillway design flood.

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

No

Comments: Never been done at this point.

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

No

Comments: Changing the classification / spillway design requirements is not difficult, occasionally there is some resistance to implementation of the new classification.

24 Do guidelines require consideration or analysis of future development?

Yes (Impacts of development on hazard classification or failure consequences)

Comments: For all proposed Class II or III dams, a determination of alternatives for increasing the total spillway capacity to accommodate the PMF shall also be submitted to OWR. The initial dam design shall provide for the capability of increasing the spillway capacity. future downstream land use, land use controls, and growth projections will be considered in the review of the spillway capacity design.

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

No

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

No

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

Yes (Please specify)

Comments: No less than 100-year flood unless it is a small size, Class III structure with dam height multiplied by impounding capacity less than or equal to 300.

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	50-100	% of the	PMF
Existing High Hazard Dam must pass	30-60	% of the	PMF
New Significant Hazard Dam must pass	100yr-100	% of the	PMF
Existing Significant Hazard Dam must pass	100yr-60	% of the	PMF

Comments: Class I: 0.5PMF-1.0PMF; Class II: 100-yr-PMF; Class III: 100-yr-0.5PMF; Ranges depend on the size of dam.

29 For low hazard dams, the spillway design requirement is:

Other (Please specify)

Comments: Ranges from 100-yr for a small dam to 0.5PMF for a large dam.

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

Yes

Comments: Any submittal for variation from the above-listed spillway design flood must include a detailed hydraulic risk assessment that shows that additional spillway capacity will not

31 Does your organization permit risk-based hydrologic designs?

Yes; although our regulations do not specifically address this topic, we review risk-based designs o

32 Has your agency ever reviewed a risk-based hydrologic analysis?

Unsure

33 How difficult would it be to change your regulations? Please explain.

Difficult

Comments: Theoretically, it should not be very difficult. However given the current state of State politics it would in all likelyhood be very difficult.

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Indiana
Name of Representative	Kenneth E. Smith, P.E.
Title of Representative	Assistant Director
Phone number(s)	317-232-4224
Email address	kesmith@dnr.IN.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	
Total Regulated Dams	1088
High Hazard Dams	240
Significant Hazard Dams	249
Low Hazard Dams	599
Unregulated Dams	
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? not formally adopted

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: The drainage area above the dam site is less than one square mile; the height of the dam above the natural stream bed or the lowest point on the valley floor is less than 20 feet; the volume of water impounded by the dam to the emergency spillway level is less than 100 acre-feet; or the rights of other property owners are affected.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

Yes (Please explain)

Comments: coal mine related dams held to MSHA standards, by the Division of Reclamation

6 Does the Organization have published size classification criteria?

No

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

No potential for loss of life with significant but not excessive economic loss

Comments: Also includes a "Multiple Dams" classification. Where failure of a dam could contribute to failure of a downstream dam or dams, the minimum hazard class of the dam shall not be less than that of any such downstream structure.

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations that are required

9 What is the origin of the guidelines?

Combination of the above (Please specify)

Comments: attempted to use typical national best management practices

10 When were the guidelines last revised (MM/DD/YYYY)? 01/01/2001

11 Are there any plans to update or revise the guidelines in the near future?

Yes (Please specify)

Comments: will revise if a new unified national practice is published

12 Are the guidelines different for new and existing dams?

Yes (Please elaborate)

Comments: The design storm for existing dams can be reduced using Incremental Damage Evaluation

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency reviews submitted designs

14 How are the guidelines applied?

Based on hazard classification only

15 For PMP/PMF designs, is freeboard required?

No

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

Yes (Based on Tc)

19 Do the guidelines specify any criteria for temporal storm distribution?

Yes (NRCS Standard)

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

No

22 Does the organization allow development of a site specific PMP?

Unknown (never requested)

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a moderate problem

Comments: administrative legal processes, public notice and hearings required

24 Do guidelines require consideration or analysis of future development?

No

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

Yes (Please specify)

Comments: AMC II

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

No

Comments: For existing dams only. The owner and engineer should recognize that dam construction typically results in higher risks. If an Incremental Hazard Evaluation procedure is utilized,

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

Yes (Please specify)

Comments: 50% PMP minimum for High Hazard dams, 100-Year minimum for Low Hazard dams

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	100	% of the	PMP
Existing High Hazard Dam must pass	100	% of the	PMP
New Significant Hazard Dam must pass	50	% of the	PMP
Existing Significant Hazard Dam must pass	50	% of the	PMP

29 For low hazard dams, the spillway design requirement is:

Other (Please specify)

Comments: Ranges from 100-year to 50% PMP.

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

31 Does your organization permit risk-based hydrologic designs?

Our regulations do not specifically address this topic and it has never come up for consideration

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

33 How difficult would it be to change your regulations? Please explain.

Difficult

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Iowa
Name of Representative	Mr. Jonathan Garton
Title of Representative	Senior Dam Safety Engineer
Phone number(s)	515-281-6940
Email address	jonathan.garton@dnr.iowa.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	3568
Total Regulated Dams	3568
High Hazard Dams	99
Significant Hazard Dams	222
Low Hazard Dams	3247
Unregulated Dams	341
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? Pre 1990

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: Iowa Jurisdictional thresholds: a. Any dam designed to provide a sum of permanent and temporary storage exceeding 50 acre-feet at the top of dam elevation, or 25 acre-feet if the dam does not have an emergency spillway, and which has a height of 5 feet or more.
b. Any dam designed to provide permanent storage in excess of 18 acre-feet and which has a height of 5 feet or more.
c. Any dam across a stream draining more than 10 square miles.
d. Any dam located within 1 mile of an incorporated municipality, if the dam has a height of 10 feet or more, stores 10 acre-feet or more at the top of dam elevation, and is situated such that the discharge from the dam will flow through the incorporated area.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

Yes (Please explain)

Comments: Major Dams have special requirements and are defined as: 1. Any high hazard dam.
2. Any moderate hazard dam with a permanent storage exceeding one hundred (100) acre-feet or a total of permanent and temporary storage exceeding two hundred fifty (250) acre-feet at the top of the dam elevation. 3. Any dam, including low hazard dams, where the height of the emergency spillway crest measured above the elevation of the channel bottom at the centerline of the dam (in feet) multiplied by the total storage volume (in acre-feet) to the emergency spillway crest elevation exceeds 30,000. For dams without emergency spillways, these measurements shall be taken to the top of dam elevation.

6 Does the Organization have published size classification criteria?

Yes

If "Yes", check and complete as appropriate:

Class A (Small)	=<		feet high and stores =<	acre-feet
Class B (Medium)				
Class C (Large)	=>		feet high and stores =>	acre-feet
Other (Specify)				

Comments: See comment above concerning major dam criteria.

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

No potential for loss of life with significant but not excessive economic loss

Comments: Structures located in areas where failure may damage isolated homes or cabins, industrial or commercial buildings, moderately traveled roads or railroads, interrupt major utility services, but without substantial risk of loss of human life.

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations that are required

9 What is the origin of the guidelines?

NRCS guidelines

10 When were the guidelines last revised (MM/DD/YYYY)? 12/01/1990

11 Are there any plans to update or revise the guidelines in the near future?

Yes (Please specify)

Comments: Yes, we are beginning the process this year of updating our entire dam safety program rules.

12 Are the guidelines different for new and existing dams?

No

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency utilizes a combination of the above approaches, possibly on a case-by-case basis

14 How are the guidelines applied?

Based on both size and hazard classification

15 For PMP/PMF designs, is freeboard required?

Other (Please specify)

Comments: For dams with emergency spillways, the top of dam elevation after settlement shall not be less than the highest peak pool elevation reached during the freeboard design flood. For dams without an emergency spillway, the top of dam elevation shall be two feet higher than the peak flood elevation expected to occur during passage of the freeboard design flood, unless it is specifically designed to withstand the overflow.

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

Other (Please specify)

Comments: 6 hour, 24 hour, and 10-day storm durations are specified and recommendations are made for each.

19 Do the guidelines specify any criteria for temporal storm distribution?

Yes (Other - please specify)

Comments: Some acceptable methods of distributing the rainfall in Iowa are found in the U.S.D.A. Soil Conservation Service publication, TR-60, Earth Dams and Reservoirs; and the Illinois State Water Survey publication, Time Distribution of Rainfall In Heavy Storms by F. A. Huff.

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

Yes (Please specify)

Comments: Performance and activation criteria are given for both principal and emergency spillways.

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

Yes (Please specify)

Comments: Follow guidelines in HMR 51 and 52.

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a moderate problem

Comments: Dam owners are required to upgrade the dam if hazard classification changes.

24 Do guidelines require consideration or analysis of future development?

Yes (Impacts of development on hazard classification or failure consequences)

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

Yes (Please specify)

Comments: Conservative loss rates (interception, infiltration, etc.) and antecedent moisture conditions should be used in computing rainfall excess. Also, when applicable, snowmelt runoff rates should be estimated. The Soil Conservation Service (SCS) weighted curve number method is acceptable for determining rainfall losses and is explained in National Engineering Handbook Section 4 Hydrology, SCS, 1972.

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

No

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

No

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	100	% of the	PMF
Existing High Hazard Dam must pass	100	% of the	PMF
New Significant Hazard Dam must pass	50	% of the	PMF
Existing Significant Hazard Dam must pass	50	% of the	PMF

29 For low hazard dams, the spillway design requirement is:

Other (Please specify)

Comments: Low hazard classified as major structures must also pass 50% of the PMF. Otherwise, a. Where the height of the emergency spillway crest* measured above the elevation of the channel bottom at the centerline of the dam (in feet) multiplied by the total storage volume (in acre-feet) to the emergency spillway crest elevation* is between 3,000 and 30,000, the flood shall correspond to the rainfall calculated from the following formula developed by the USDA Soil Conservation Service. Rainfall = P100 + 0.12 (PMP – P100) b. Where the height of the emergency spillway crest* measured above the elevation of the channel bottom at the centerline of the dam (in feet) multiplied by the total storage volume (in acre-feet) to the emergency spillway crest elevation* is less than 3,000, the flood shall be that resulting from the 50- year, 24-hour precipitation.

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

31 Does your organization permit risk-based hydrologic designs?

Our regulations do not specifically address this topic and it has never come up for consideration

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

33 How difficult would it be to change your regulations? Please explain.

Moderate

Comments: There is a formal rule making process for the DNR that involves public input. It is a lengthy process but can be initiated at any time.

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Kansas
Name of Representative	Kimberly A. Feldkamp, P.E.
Title of Representative	Dam Safety Team Leader
Phone number(s)	785-296-4625
Email address	kimberly.feldkamp@kda.ks.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	
Total Regulated Dams	6058
High Hazard Dams	202
Significant Hazard Dams	238
Low Hazard Dams	5618
Unregulated Dams	
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? 1984

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: A jurisdictional "dam" means any artificial barrier including appurtenant works with the ability to impound water, waste water or other liquids that has a height of 25 feet or more; or has a height of six feet or greater and also has the capacity to impound 50 or more acre feet. Anything that does not meet this definition is non-jurisdictional.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

6 Does the Organization have published size classification criteria?

Yes

If "Yes", check and complete as appropriate:

Class A (Small)	=<		feet high and stores =<	3000 acre-feet
Class B (Medium)				
Class C (Large)	=>		feet high and stores =>	30000 acre-feet
Other (Specify)	Class 1 is less than 25 feet high and an effective storage of less			

Comments: Each dam with an effective height of less than 25 feet and an effective storage of less than 50 acre-feet shall be considered to be a class size 1 dam. The class size of all other dams shall be determined from the following table:

Class size	Size factor
2	less than 3,000
3	3,000 through 30,000
4	more than 30,000

"Effective height" means the difference in elevation between the crest of an auxiliary spillway or service spillway and the lowest point of the downstream toe of a dam. If the dam does not have an auxiliary or service spillway, the effective height means the difference in elevation between the top of the dam and the lowest point of the downstream toe of the dam.

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

Loss of life potential is "few" with "appreciable" economic loss

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations that are required

9 What is the origin of the guidelines?

NRCS guidelines

Comments: The NRCS guidelines was used as guidance to develop our own criteria

10 When were the guidelines last revised (MM/DD/YYYY)? 05/18/2007

11 Are there any plans to update or revise the guidelines in the near future?

No

12 Are the guidelines different for new and existing dams?

Yes (Please elaborate)

Comments: There could be different guidelines on existing dams depending upon when they were permitted or constructed.

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency reviews submitted designs

14 How are the guidelines applied?

Based on both size and hazard classification

15 For PMP/PMF designs, is freeboard required?

Other (Please specify)

Comments: It varies do to size class and hazard classification.

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

Yes

If "Yes", what are the specific analysis methodologies, procedures, or computer software that must be used?

Must use SCS unit hydrograph

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

Yes (6-hr)

19 Do the guidelines specify any criteria for temporal storm distribution?

No

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

Yes (Please specify)

Comments: Auxiliary spillway failure criteria are provided. The auxiliary spillway shall not fail by breaching during the spillway stability design event indicated in the following: Hazard Class A, Size 1, 2, or 3: 0.3PMP; Hazard Class A, Size 4: 0.4 PMP; Hazard Class B, All Sizes: 0.5 PMP; Hazard Class C, All Sizes: PMP.

22 Does the organization allow development of a site specific PMP?

Unknown (never requested)

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a major problem

24 Do guidelines require consideration or analysis of future development?

No

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

Yes (Please specify)

Comments: AMC II or III depending on location. The routing shall begin by assuming that the water surface elevation is at the elevation of the lowest uncontrolled spillway inlet, not including any low-flow augmentation works.

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

No

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

No

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	40	% of the	PMP
Existing High Hazard Dam must pass	40	% of the	PMP
New Significant Hazard Dam must pass	25-30	% of the	PMP
Existing Significant Hazard Dam must pass	25-30	% of the	PMP

Comments: New and existing high hazard dams must pass 40% of PMP plus have 3 feet of freeboard. Significant hazard new and existing dam size class 1 and 2 must pass 25% of PMP plus have 2 feet of freeboard and significant hazard new and existing dams class 3 and 4 must pass 30% of PMP plus have 3 feet of freeboard.

29 For low hazard dams, the spillway design requirement is:

Other (Please specify)

Comments: Size class 1 50-year with 1 foot freeboard. Size class 2 100-yr plus 2 feet freeboard. Size Class 3 100-yr 3 feet of freeboard. Size class 4 25%PMP with 3 feet of freeboard.

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

31 Does your organization permit risk-based hydrologic designs?

Our regulations do not specifically address this topic and it has never come up for consideration

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

33 How difficult would it be to change your regulations? Please explain.

Difficult

Comments: The proposed regulations would have to be approved by the following Department of Agriculture Legal, Department of Administration, Attorney General's Office, and the Administrative Rules and Regulations Joint Committee

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Kentucky
Name of Representative	Ms. Marilyn Thomas
Title of Representative	Environmental Engineer Consultant
Phone number(s)	502-564-3410
Email address	marilync.thomas@ky.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	
Total Regulated Dams	1066
High Hazard Dams	178
Significant Hazard Dams	217
Low Hazard Dams	671
Unregulated Dams	
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? pre-1978

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: Less than 25 feet in height and an impounding capacity of less than 50 acre-feet or no downstream hazard to human life.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

6 Does the Organization have published size classification criteria?

No

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

No potential for loss of life with significant but not excessive economic loss

Comments: Class A (High), Class B (Moderate), and Class C (High)

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations that are required

9 What is the origin of the guidelines?

NRCS guidelines

10 When were the guidelines last revised (MM/DD/YYYY)? 06/01/1999

11 Are there any plans to update or revise the guidelines in the near future?

12 Are the guidelines different for new and existing dams?

No

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency utilizes a combination of the above approaches, possibly on a case-by-case basis

14 How are the guidelines applied?

Based on hazard classification only

15 For PMP/PMF designs, is freeboard required?

No

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

Yes

If "Yes", what are the specific analysis methodologies, procedures, or computer software that must be used?

Other (Please specify)

Comments: SITES, HMS, NWS DAMBRK, HEC-RAS are acceptable

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

Yes (6-hr)

19 Do the guidelines specify any criteria for temporal storm distribution?

No

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

Yes (Please specify)

Comments: Criteria are given for activation, performance, and capacity of earth emergency spillways.

22 Does the organization allow development of a site specific PMP?

Unknown (never requested)

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a moderate problem

24 Do guidelines require consideration or analysis of future development?

Yes (Impacts of development on hazard classification or failure consequences)

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

Yes (Please specify)

Comments: AMCII or greater

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

No

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

No

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	100	% of the	PMP
Existing High Hazard Dam must pass	100	% of the	PMP
New Significant Hazard Dam must pass		% of the	
Existing Significant Hazard Dam must pass		% of the	

Comments: P Design (Class B, Significant) = P100 + 0.40*(PMP-P100)

29 For low hazard dams, the spillway design requirement is:

Other (Please specify)

Comments: P Design (Class A) =P100 + 0.12*(PMP-P100)

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

Comments: Dam owners may not properly maintain or operate warning systems, rendering them ineffective.

31 Does your organization permit risk-based hydrologic designs?

Our regulations do not specifically address this topic and it has never come up for consideration

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

33 How difficult would it be to change your regulations? Please explain.

Difficult

Comments: Reg changes must be approved by the legislature. If the legislature perceives the change as more demanding or expensive to dam owners that change likely won't be approved. We've worked for 10 years to get approval for Emergency Action Plans with no success.

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Louisiana
Name of Representative	Zahir "Bo" Bolourchi, P.E.
Title of Representative	Director, P.W. & Water Resources Programs
Phone number(s)	225-274-4170
Email address	Bo.Bolourchi@la.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	599
Total Regulated Dams	555
High Hazard Dams	33
Significant Hazard Dams	72
Low Hazard Dams	450
Unregulated Dams	49
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? 1981

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Both of the above

Comments: LA R.S. 38:22

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

6 Does the Organization have published size classification criteria?

No

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

Loss of life potential is "few" with "appreciable" economic loss

Comments: Appreciable damage to property or possible loss of life.

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations that are required

9 What is the origin of the guidelines?

Other (Please specify)

10 When were the guidelines last revised (MM/DD/YYYY)? 03/01/1997

11 Are there any plans to update or revise the guidelines in the near future?

No

12 Are the guidelines different for new and existing dams?

No

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency reviews submitted designs

Design storm is determined by down stream conditions

14 How are the guidelines applied?

Based on hazard classification only

15 For PMP/PMF designs, is freeboard required?

3.0' or more

Comments: Title 44, CRF 65.10 (B-1 Freeboard)

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

No

19 Do the guidelines specify any criteria for temporal storm distribution?

No

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

Yes (Please specify)

Comments: For the purpose of the Dam Safety Program, the Emergency Spillway shall be defined as being overtopped by the 100-year storm or greater and the Principal Spillway shall be defined as being overtopped by a storm less than the 100-year storm. Also, some damage to the emergency spillway is tolerable since they are activated only during major storm events.

22 Does the organization allow development of a site specific PMP?

No

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

No

Comments: Change in classification is based on down stream conditions

24 Do guidelines require consideration or analysis of future development?

Yes (Impacts of development on hazard classification or failure consequences)

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

No

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

Yes

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

No

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	50-100	% of the	PMF
Existing High Hazard Dam must pass	50-100	% of the	PMF
New Significant Hazard Dam must pass	100-yr-100	% of the	PMF
Existing Significant Hazard Dam must pass	100-yr-100	% of the	PMF

Comments: These are minimum IDFs. Regulations stipulate that an incremental assessment be performed for all High Hazard and some Significant Hazard dams. The full PMF is the maximum IDF for both of these hazard classes.

29 For low hazard dams, the spillway design requirement is:

50-year flood

Comments: Minimum IDF (no incremental assessment required)

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

31 Does your organization permit risk-based hydrologic designs?

No; our regulations forbid them

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

33 How difficult would it be to change your regulations? Please explain.

Difficult

Comments: Change in regulations could be challenging at this time.

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Maine
Name of Representative	Tony Fletcher, P.E.
Title of Representative	State Dam Inspector
Phone number(s)	207-624-4465
Email address	Tony.Fletcher@maine.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	
Total Regulated Dams	860
High Hazard Dams	29
Significant Hazard Dams	71
Low Hazard Dams	536
Unregulated Dams	191
Other	33

3 What year did your Agency adopt minimum Inflow Design Flood criteria? n/a

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Both of the above

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

6 Does the Organization have published size classification criteria?

No

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

No potential for loss of life with significant but not excessive economic loss

Comments: No probable loss of life but major economic loss, environmental damage or disruption of lifeline facilities.

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Other (Please specify)

Comments: The USACE are recommended when questions arise.

9 What is the origin of the guidelines?

USACE guidelines (including Phase I Study guidelines)

10 When were the guidelines last revised (MM/DD/YYYY)? n/a

Comments: Never revised

11 Are there any plans to update or revise the guidelines in the near future?

No

12 Are the guidelines different for new and existing dams?

No

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency reviews submitted designs

Makes recommedations

14 How are the guidelines applied?

Based on hazard classification only

15 For PMP/PMF designs, is freeboard required?

No

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

No

19 Do the guidelines specify any criteria for temporal storm distribution?

No

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

No

22 Does the organization allow development of a site specific PMP?

Unknown (never requested)

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a minor problem

24 Do guidelines require consideration or analysis of future development?

No

Comments: A hazard inspection is required every 6 years when the hazard of a dam is reviewed.

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

No

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Comments:

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

No

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	100	% of the	PMF
Existing High Hazard Dam must pass	100	% of the	PMF
New Significant Hazard Dam must pass	50	% of the	PMF
Existing Significant Hazard Dam must pass	50	% of the	PMF

29 For low hazard dams, the spillway design requirement is:

Not specified

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

Yes

31 Does your organization permit risk-based hydrologic designs?

Our regulations do not specifically address this topic and it has never come up for consideration

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

33 How difficult would it be to change your regulations? Please explain.

Difficult

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Maryland
Name of Representative	Harald W. Van Aller
Title of Representative	Geotechnical Engineer
Phone number(s)	410-901-4042
Email address	hvanaller@mde.state.md.us

2 Number of dams under Organization's jurisdiction by type:

Total Dams	406
Total Regulated Dams	382
High Hazard Dams	68
Significant Hazard Dams	87
Low Hazard Dams	227
Unregulated Dams	Unknown
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? About 1976

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: All dams in MD are juridictional regardless of size, although some low hazard dams less than 20 ft high can be approved by local soil conservation district in lieu of a state waterway construction permit.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

6 Does the Organization have published size classification criteria?

Yes

If "Yes", check and complete as appropriate:

Class A (Small)	=<	25	feet high and stores =<	1,000	acre-feet
Class B (Medium)					
Class C (Large)	=>	50	feet high and stores =>	20,000	acre-feet
Other (Specify)	Class IV, see comments.				

Comments: Category IV is reserved for small dams which have a drainage area of less than 1 square mile (640 acres), and a normal depth of water less than 15 feet above the original stream bed, a normal pool storage of less than 100 acre-feet, and a normal surface area less than 12 acres.

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

Loss of life potential is "few" with "appreciable" economic loss

Comments: "small possibility" of loss of life. Located in predominately rural or agricultural areas where failure may cause damage to isolated residences or cause interruption of use or service of public utilities or roads. Damage is within the financial capability of owner to repair

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations that are required

9 What is the origin of the guidelines?

USBR guidelines

10 When were the guidelines last revised (MM/DD/YYYY)? 07/01/1979

Comments: Some minor changes have been made since 1979, but no substantial changes have been made to hazard classification and design storm requirements

11 Are there any plans to update or revise the guidelines in the near future?

Yes (Please specify)

Comments: Current regs address only new dams. MD has been working on new regulations for about 15 years which would also include pre-existing dams.

12 Are the guidelines different for new and existing dams?

No

Comments: The new regulations would have different guidelines for pre-existing dams.

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency utilizes a combination of the above approaches, possibly on a case-by-case basis

14 How are the guidelines applied?

Based on both size and hazard classification

15 For PMP/PMF designs, is freeboard required?

Other (Please specify)

Comments: No specific freeboard is required. The design shall allow for certain freeboard as a minimum, not to be reduced under any circumstances during the operation of the dam and reservoir. The design freeboard is for that reservoir stage which will exist when the pool has reached maximum level during the inflow design flood with the outlet works and overflow spillway operating as planned. The freeboard is to be calculated to prevent overtopping and protect the dam against the destructive forces of waves, frost, settlement, and surface erosion.

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

Yes

If "Yes", what are the specific analysis methodologies, procedures, or computer software that must be used?

Other (Please specify)

Comments: For drainage areas less than or equal to 10 square miles, TR-20 or HEC-1 must be used. For drainage areas larger than 10 square miles, HMR-52 and HEC-1 is recommended.

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

Yes (Please specify)

Comments: software must be in the public domain (not proprietary) so the results can be duplicated by agency staff

18 Do the guidelines specify any criteria for storm duration?

Yes (6-hr)

Comments: For drainage areas less than or equal to 10 square miles, use a 24-hour duration for the 100-year and brim-up storm events, and a 6-hour duration for the 50%PMF and PMF.

19 Do the guidelines specify any criteria for temporal storm distribution?

Yes (HMR)

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

Yes (Please specify)

Comments: 100-year unless it is a small dam

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

No

Comments: This has only been evaluated at one dam that I am aware of. use of FERC guidelines is suggested to other dam owners who ask about this issue.

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a moderate problem

24 Do guidelines require consideration or analysis of future development?

Yes (Impacts of development on hazard classification or failure consequences)

Comments: Current regulations are based on ultimate development of land based on current zoning.

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

No

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

No

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

Yes

Comments: Although current regulations do not allow for incremental analysis, MD has been allowing this on a case by case basis

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

No

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	100	% of the	PMF
Existing High Hazard Dam must pass	100	% of the	PMF
New Significant Hazard Dam must pass	50	% of the	PMF
Existing Significant Hazard Dam must pass	50	% of the	PMF

Comments: Class II (Significant): Regulations state: The design storm shall be the "standard project flood" or the largest flood of record, whichever is greater.

29 For low hazard dams, the spillway design requirement is:

100-year flood

Comments: Plus 2 feet of freeboard, unless the design includes an open channel emergency spillway, in which case freeboard can be reduced to 1 foot.

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

Comments: At one time we allowed that, but not currently.

31 Does your organization permit risk-based hydrologic designs?

Our regulations do not specifically address this topic and it has never come up for consideration

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

Comments: However, the Corps of Engineers has recently cited a risk-based analyses for rejecting the need to upgrade a large dam designed in the 1960's and constructed in MD in 1980 to safely pass the full PMF

33 How difficult would it be to change your regulations? Please explain.

Moderate

Comments: We have been working on revised regulations for more than 15 years.

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Massachusetts
Name of Representative	Michael D. Misslin
Title of Representative	Deputy Chief Engineer
Phone number(s)	617-626-4927
Email address	Mike.Misslin@state.ma.us

2 Number of dams under Organization's jurisdiction by type:

Total Dams	
Total Regulated Dams	1545
High Hazard Dams	304
Significant Hazard Dams	727
Low Hazard Dams	514
Unregulated Dams	
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria?

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: All dams are inventoried. The following are non-jurisdictional:1) any barrier which is not in excess of six feet in height, regardless of storage capacity, or which has a storage capacity at max water storage elevation not in excess of 15 acre feet, regardless of height. 2) any barrier with low hazard potential classification in the use of agriculture.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

Yes (Please explain)

Comments: FERC regulated dams are exempt from regulation

6 Does the Organization have published size classification criteria?

Yes

If "Yes", check and complete as appropriate:

Class A (Small)	=<	15	feet high and stores =<	50	acre-feet
Class B (Medium)					
Class C (Large)	=>	40	feet high and stores =>	1,000	acre-feet
Other (Specify)					

Comments: non-jurisdictional: not in excess of 15 ac ft regardless of ht & not in excess of 6 ft regardless of storage capacity; small: >= 15 ac ft and <50 ac ft storage & >= 6 ft and < 15

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

Loss of life potential is "few" with "appreciable" economic loss

Comments: Sig Haz Pot definition: Dams located where failure may cause loss of life and damge home(s), industrial or commercial facilities, secondary highway(s) or railroad(s) or cause interruption of use or service of relatively important facilities.

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Other (Please specify)

Comments: Regulatory requirements for new and existing dams.

9 What is the origin of the guidelines?

Other (Please specify)

Comments: federal guidelines

10 When were the guidelines last revised (MM/DD/YYYY)? 11/04/2005

11 Are there any plans to update or revise the guidelines in the near future?

No

12 Are the guidelines different for new and existing dams?

Yes (Please elaborate)

Comments: Existing dams are required to pass a smaller spillway design flood.

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency reviews submitted designs

14 How are the guidelines applied?

Based on both size and hazard classification

15 For PMP/PMF designs, is freeboard required?

Other (Please specify)

Comments: case by case

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

Other (Please specify)

Comments: regulations reference US Army Corps, US Bureau of Reclamation and USDA NRCS.

19 Do the guidelines specify any criteria for temporal storm distribution?

No

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

Yes (Please specify)

Comments: Emergency spillway frequency and performance guidelines are provided.

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

No

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Unsure

24 Do guidelines require consideration or analysis of future development?

No

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

No

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

No

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

No

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	100	% of the	PMF
Existing High Hazard Dam must pass	500-yr to 50	% of the	PMF
New Significant Hazard Dam must pass	500-yr to 50	% of the	PMF
Existing Significant Hazard Dam must pass	0-yr to 500	% of the	PMF

Comments: Varies depending on hazard classification, size, and whether it's a new or existing dam. Variations range from 100 year to full PMF.

29 For low hazard dams, the spillway design requirement is:

Other (Please specify)

Comments: Ranges from 50-year to 100-year for existing dams; 100-year for new dams. Change in requirement depends on the size of dam.

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

31 Does your organization permit risk-based hydrologic designs?

Yes; although our regulations do not specifically address this topic, we review risk-based designs o

32 Has your agency ever reviewed a risk-based hydrologic analysis?

Yes (Both approved and rejected)

33 How difficult would it be to change your regulations? Please explain.

Difficult

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Michigan
Name of Representative	Byron Lane
Title of Representative	Chief, Hydrologic Studies and Dam Safety Unit
Phone number(s)	517-241-9862
Email address	LANEB@michigan.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	
Total Regulated Dams	1034
High Hazard Dams	84
Significant Hazard Dams	138
Low Hazard Dams	812
Unregulated Dams	
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? 1990

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: Less than 6 feet in height or has an impounding capacity of 5 surface acres or less.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

Yes (Please explain)

Comments: Inventory dams which have court ordered lake levels. There are 235 of them.

6 Does the Organization have published size classification criteria?

No

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

Loss of life potential is "few" with "appreciable" economic loss

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published within State Laws

9 What is the origin of the guidelines?

Unknown

10 When were the guidelines last revised (MM/DD/YYYY)? 05/24/1995

11 Are there any plans to update or revise the guidelines in the near future?

No

12 Are the guidelines different for new and existing dams?

No

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency acts as designer/engineer

14 How are the guidelines applied?

Based on both size and hazard classification

15 For PMP/PMF designs, is freeboard required?

Other (Please specify)

Comments: Michigan does not require PMP/PMF designs.

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

No

19 Do the guidelines specify any criteria for temporal storm distribution?

No

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

No

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

Yes (Please specify)

Comments: Agency must approve the design flood.

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

No

24 Do guidelines require consideration or analysis of future development?

No

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

No

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

No

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

Yes (Please specify)

Comments: No less than the 200-year flood or the flood of record, whichever is greater.

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	200 yr-50	% of the	PMF
Existing High Hazard Dam must pass	200 yr-50	% of the	PMF
New Significant Hazard Dam must pass	200-yr	% of the	
Existing Significant Hazard Dam must pass	200-yr	% of the	

Comments: High hazard dams < 40 feet shall pass the 200-year flood or the flood of record whichever is greater. High hazard dams > 40 feet shall pass 0.5PMF. Significant hazard dams shall pass the 200-year flood or the flood of record whichever is greater.

29 For low hazard dams, the spillway design requirement is:

100-year flood

Comments: Or the flood of record, whichever is greater.

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

31 Does your organization permit risk-based hydrologic designs?

Our regulations do not specifically address this topic and it has never come up for consideration

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

33 How difficult would it be to change your regulations? Please explain.

Difficult

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Minnesota
Name of Representative	Jason Boyle, P.E.
Title of Representative	State Dam Safety Engineer
Phone number(s)	651-259-5715
Email address	Jason.Boyle@state.mn.us

2 Number of dams under Organization's jurisdiction by type:

Total Dams	
Total Regulated Dams	1161
High Hazard Dams	24
Significant Hazard Dams	126
Low Hazard Dams	1012
Unregulated Dams	
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? not formally adopted yet

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: Less than 6 feet high; or less than 15 acre-feet of storage; or less than 25 feet high and less than 50 acre-feet of storage with no potential for loss of life; or Federal dam

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

Yes (Please explain)

Comments: Yes, tailings and coal ash dams are held to a different standard.

6 Does the Organization have published size classification criteria?

No

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

No potential for loss of life with significant but not excessive economic loss

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Unpublished guidelines for consideration by the engineer/designer

Comments: Regulatory has final say.

9 What is the origin of the guidelines?

Other (Please specify)

Comments: Based on California or ICODS guidelines?

10 When were the guidelines last revised (MM/DD/YYYY)?

Comments: They have not been revised.

11 Are there any plans to update or revise the guidelines in the near future?

No

Comments: It would be a good idea to update these.

12 Are the guidelines different for new and existing dams?

Yes (Please elaborate)

Comments: There is some leeway for existing dams, depending on the situation.

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency reviews submitted designs

14 How are the guidelines applied?

Based on a combination of risk analysis and hazard/size classification

15 For PMP/PMF designs, is freeboard required?

Based on wave run up computations

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

No

Comments: We try to ensure the most critical storm duration is used. Based on dam type and time of concentration.

19 Do the guidelines specify any criteria for temporal storm distribution?

No

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

Yes (Please specify)

Comments: Spillway design floods based on frequency of flooding.

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

Yes (Please specify)

Comments: Consistency with other methods.

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

No

Comments: It has not been a problem to date.

24 Do guidelines require consideration or analysis of future development?

Yes (Impacts of development on hazard classification or failure consequences)

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

No

Comments: We do check these assumptions.

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

No

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

No

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	100	% of the	PMF
Existing High Hazard Dam must pass	100	% of the	PMF
New Significant Hazard Dam must pass	100-yr-100	% of the	PMF
Existing Significant Hazard Dam must pass	100-yr-100	% of the	PMF

Comments: Class II (Significant): 100 year to PMF.

29 For low hazard dams, the spillway design requirement is:

Other (Please specify)

Comments: 50-yr to 50% PMF

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

Comments: May consider it for existing dams.

31 Does your organization permit risk-based hydrologic designs?

Yes; although our regulations do not specifically address this topic, we review risk-based designs o

32 Has your agency ever reviewed a risk-based hydrologic analysis?

Yes (Reviewed and approved)

33 How difficult would it be to change your regulations? Please explain.

Difficult

Comments: Changing regulations would be difficult, changing our internal guidelines would be fairly easy.

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Mississippi
Name of Representative	James MacLellan
Title of Representative	Director of Dam Safety Division
Phone number(s)	601-961-5061
Email address	James_MacLellan@deq.state.ms.us

2 Number of dams under Organization's jurisdiction by type:

Total Dams	3755
Total Regulated Dams	3755
High Hazard Dams	257
Significant Hazard Dams	76
Low Hazard Dams	3422
Unregulated Dams	0
Other	0

3 What year did your Agency adopt minimum Inflow Design Flood criteria? 1982

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: Less than 8 feet in height, or impounds less than 25 acre-feet, or doesn't impound a stream and doesn't present a downstream threat

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

6 Does the Organization have published size classification criteria?

Yes

If "Yes", check and complete as appropriate:

Class A (Small)	=<	25	feet high and stores =<	150	acre-feet
Class B (Medium)					
Class C (Large)	=>	50	feet high and stores =>	1000	acre-feet
Other (Specify)					

Comments: The size criteria is in the guidance for the design of dams - general guidance

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

No potential for loss of life with significant but not excessive economic loss

Comments: Significant Hazard is a class of dam in which failure poses no threat to life but may cause significant damage to public infrastructure - roads, railroads, utilities

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations that are required

9 What is the origin of the guidelines?

Combination of the above (Please specify)

Comments: The portion of the regulations that determine the spillway design flood come from NWS HMR and NRCS design hydrograph as well as the hazard classification

10 When were the guidelines last revised (MM/DD/YYYY)? 08/25/2005

11 Are there any plans to update or revise the guidelines in the near future?

No

12 Are the guidelines different for new and existing dams?

Yes (Please elaborate)

Comments: High hazard dams that were constructed prior to 1982 are allowed to remain in operation if they pass 50% of PMP and are structurally sound.

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency utilizes a combination of the above approaches, possibly on a case-by-case basis

Agency reviews submitted designs and performs independent verification if needed. Agency does independent analysis for state lakes.

14 How are the guidelines applied?

Based on hazard classification only

15 For PMP/PMF designs, is freeboard required?

No

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

Yes

If "Yes", what are the specific analysis methodologies, procedures, or computer software that must be used?

Other (Please specify)

Comments: Must use HMR and SCS unit hydrograph

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

Yes (Please specify)

Comments: Rational equation is not accepted in any case.

18 Do the guidelines specify any criteria for storm duration?

Yes (24-hour)

19 Do the guidelines specify any criteria for temporal storm distribution?

Yes (NRCS Standard)

20 Do the guidelines specify any criteria for spatial storm distribution?

Yes (Please specify)

Comments: Only if drainage area is greater than 10 square miles.

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

Yes (Please specify)

Comments: Principal spillway must pass 100 year 24 hour design storm without activating emergency spillway for High hazard dams.

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

Yes (Please specify)

Comments: Will only consider a site specific PMP if drainage area is greater than 10 square miles.

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

No

24 Do guidelines require consideration or analysis of future development?

Yes (Impacts of development on hazard classification or failure consequences)

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

No

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

No

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

No

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	100	% of the	PMP
Existing High Hazard Dam must pass	100	% of the	PMP
New Significant Hazard Dam must pass	50	% of the	PMP
Existing Significant Hazard Dam must pass	50	% of the	PMP

29 For low hazard dams, the spillway design requirement is:

Other (Please specify)

Comments: 35% of the PMP.

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

31 Does your organization permit risk-based hydrologic designs?

Our regulations do not specifically address this topic and it has never come up for consideration

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

33 How difficult would it be to change your regulations? Please explain.

Moderate

Comments: It involves a lot of work on mine and our legal department's part. The difficulty to accepting the change would depend on public opposition and justifying to our Commission.

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Missouri
Name of Representative	Paul Simon
Title of Representative	Civil Engineer - Dam Safety
Phone number(s)	573-368-2179
Email address	paul.simon@dnr.mo.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	5240
Total Regulated Dams	677
High Hazard Dams	457
Significant Hazard Dams	147
Low Hazard Dams	73
Unregulated Dams	4563
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? 1981

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: Any artificial or man-made barrier which does or may impound water and is less than 35 feet in height.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

Comments: Design requirements are based on downstream hazard classification for all regulated dams.

6 Does the Organization have published size classification criteria?

No

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

Loss of life potential is "few" with "appreciable" economic loss

Comments: They are: class I, which contains ten (10) or more permanent dwellings or any public building; class II, which contains one to nine (1–9) permanent dwellings, or one (1) or more campgrounds with permanent water, sewer and electrical services or one (1) or more industrial buildings; and class III, which is everything else.

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations that are required

Comments: class 1 = 75% pmp, class 2 = 50% pmp, class 3 = 100 year event

9 What is the origin of the guidelines?

Custom developed by Organization

Comments: NWS HMR 51 is used to define the pmp.

10 When were the guidelines last revised (MM/DD/YYYY)? 06/09/1994

11 Are there any plans to update or revise the guidelines in the near future?

No

12 Are the guidelines different for new and existing dams?

No

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency performs independent verification of submitted designs

14 How are the guidelines applied?

Based on hazard classification only

Comments: Also determined by dam type (conventional or industrial), stage of construction, and environmental class

15 For PMP/PMF designs, is freeboard required?

No

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

Other (Please specify)

Comments: The critical duration is used, normally 6, 12, or 24hr storm.

19 Do the guidelines specify any criteria for temporal storm distribution?

No

Comments: Bulletin 71, Rainfall Frequency Atlas of the Midwest is recommended in the Engineering Analysis of Dams manual for Missouri, dated August 1989. Huff distribution is used.

20 Do the guidelines specify any criteria for spatial storm distribution?

No

Comments: hmr 51 is recommended in the Engineering Analysis of Dams manual for Missouri, dated August 1989.

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

No

Comments: 50-100 yr event is the minimum recommended to activate grass lined emergency spillway in the Engineering Analysis of Dams manual for Missouri, dated August 1989.

22 Does the organization allow development of a site specific PMP?

No

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a moderate problem

Comments: All cost is on the dam owner.

24 Do guidelines require consideration or analysis of future development?

No

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

No

Comments: AMC 2 is recommended in the Engineering Analysis of Dams manual for missouri, dated August 1989.

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

No

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

No

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	75-50	% of the	PMP
Existing High Hazard Dam must pass	75-50	% of the	PMP
New Significant Hazard Dam must pass	50-20	% of the	PMP
Existing Significant Hazard Dam must pass	50-20	% of the	PMP

Comments: Ranges depending on the stage of construction

29 For low hazard dams, the spillway design requirement is:

Other (Please specify)

Comments: Ranges from 0.10PMP to 100 year depending on the stage of construction

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

31 Does your organization permit risk-based hydrologic designs?

Our regulations do not specifically address this topic and it has never come up for consideration

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

33 How difficult would it be to change your regulations? Please explain.

Difficult

Comments: We would have to go through a public hearing process.

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Montana
Name of Representative	Laurence Siroky
Title of Representative	Chief, Water Operations
Phone number(s)	(406) 444-6816
Email address	lsiroky@mt.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	
Total Regulated Dams	2893
High Hazard Dams	105
Significant Hazard Dams	152
Low Hazard Dams	2636
Unregulated Dams	
Other	

3 When did your Organization adopt minimum Inflow Design Flood criteria? 1999

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Less than 50 acre-feet of storage (top of dam)

Comments: All dams regardless of size are jurisdictional dams. Only High Hazard dams and 50 acre-feet or larger are required to be permitted.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

Yes (Please explain)

Comments: State minimum design standards apply only to HH dams.

6 Does the Organization have published size classification criteria?

Yes

Comments: We have regulations that specify the criteria for a HH dam and applies to dams 50 acre-feet or larger.

7 Does the Organization have published hazard classification criteria?

Yes (Other)

Comments: High Hazard if loss of human life is likely to occur within the breach flooded area as a result of failure of the dam. All other dams are classified separately. Significant and Low Hazard dams are not regulated or inspected by the state.

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations for consideration by the engineer/designer

Comments: We have agency regulations as well as guidelines.

9 What is the origin of the guidelines?

Custom developed by Organization

Comments: Washington State's approach was consulted in the development of these guidelines.

10 When were the guidelines last revised (MM/DD/YYYY)? 10/01/2008

11 Are there any plans to update or revise the guidelines in the near future?

No

Comments: We are in the process of adding siesmic standards.

12 Are the guidelines different for new and existing dams?

No

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency reviews submitted designs

14 How are the guidelines applied?

Based on a combination of risk analysis and hazard/size classification

Comments: IDF is determined based on estimated loss of life downstream from the dam caused by spillway failure.

15 For PMP/PMF designs, is freeboard required?

No

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

Yes

If "Yes", what are the specific analysis methodologies, procedures, or computer software that must be used?

Comments: Tech notes(guidelines are being developed)

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

No

19 Do the guidelines specify any criteria for temporal storm distribution?

Yes (Regional)

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

No

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

Yes (Please specify)

Comments: HMR

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a minor problem

24 Do guidelines require consideration or analysis of future development?

No

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

Yes (Please specify)

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

No

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

No

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

No

Comments: Minimum inflow design flood for estimated loss of life of 0.5 or less shall be the 500-year recurrence interval flood. Minimum inflow design flood for estimated loss of life greater

29 For low hazard dams, the spillway design requirement is:

Not specified

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

31 Does your organization permit risk-based hydrologic designs?

Yes; our regulations permit them

32 Has your agency ever reviewed a risk-based hydrologic analysis?

Yes (Reviewed and approved)

33 How difficult would it be to change your regulations? Please explain.

Moderate

34 Are there any unique provisions in your regulations?

Yes (Please explain)

Comments: Design standards apply to HH dams only.

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Nebraska
Name of Representative	Mr. Patrick Diederich
Title of Representative	Chief of Dam Safety
Phone number(s)	402-471-1222
Email address	

2 Number of dams under Organization's jurisdiction by type:

Total Dams	
Total Regulated Dams	2386
High Hazard Dams	134
Significant Hazard Dams	192
Low Hazard Dams	2061
Unregulated Dams	0
Other	0

3 What year did your Agency adopt minimum Inflow Design Flood criteria? unknown

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Both of the above

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

6 Does the Organization have published size classification criteria?

No

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, Low, Limited Hazard)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

No potential for loss of life with significant but not excessive economic loss

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Unpublished guidelines that are required

9 What is the origin of the guidelines?

USACE guidelines (including Phase I Study guidelines)

10 When were the guidelines last revised (MM/DD/YYYY)?

11 Are there any plans to update or revise the guidelines in the near future?

Yes (Please specify)

Comments: Currently underway

12 Are the guidelines different for new and existing dams?

Yes (Please elaborate)

Comments: Reduced spillway design flood for existing dams as outlined in Question 28

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency performs independent verification of submitted designs

14 How are the guidelines applied?

Based on both size and hazard classification

15 For PMP/PMF designs, is freeboard required?

No

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

Yes

If "Yes", what are the specific analysis methodologies, procedures, or computer software that must be used?

Must use SITES

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

Yes (Based on Tc)

19 Do the guidelines specify any criteria for temporal storm distribution?

Yes (Regional)

Comments: Site-Specific PMP Study for Nebraska by Applied Weather Associates, LLC (Ed Tomlinson)

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

Yes (Please specify)

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

Yes (Please specify)

Comments: Follow industry standards

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a moderate problem

24 Do guidelines require consideration or analysis of future development?

Yes (Both of the above)

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

Yes (Please specify)

Comments: Use normal pool with a TR-60 10-day drawdown requirement; AMC II

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

Yes

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

No

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	100	% of the	PMP
Existing High Hazard Dam must pass	50	% of the	PMP
New Significant Hazard Dam must pass		% of the	
Existing Significant Hazard Dam must pass		% of the	

Comments: NRCS guidelines on SH dams

29 For low hazard dams, the spillway design requirement is:

Other (Please specify)

Comments: NRCS TR-60

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

31 Does your organization permit risk-based hydrologic designs?

Yes; although our regulations do not specifically address this topic, we review risk-based designs o

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

33 How difficult would it be to change your regulations? Please explain.

Moderate

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Nevada
Name of Representative	Robert K. Martinez, P.E.
Title of Representative	Chief, Engineering & Dam Safety
Phone number(s)	775-684-2844
Email address	robertm@water.nv.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	962
Total Regulated Dams	792
High Hazard Dams	171
Significant Hazard Dams	145
Low Hazard Dams	476
Unregulated Dams	0
Other	170

3 What year did your Agency adopt minimum Inflow Design Flood criteria? 1951 separate statutes; 2003 codified regulations

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: All dams are "jurisdictional" so non-inventory are: Less than 20 feet in height or less than 20 feet in height and impounds less than 20 acre-feet of water. Dams permitted under an older standard (10' high and 10AF of water) are also still inventoried.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

Yes (Please explain)

Comments: Most effluent, process fluid, and tailing impoundments are exempt from having a spillway, but must be "ring dikes" or divert run-on water. Storm Water Detention dams may have reduced freeboard requirement for PMF.

6 Does the Organization have published size classification criteria?

Yes

If "Yes", check and complete as appropriate:

Class A (Small)	=<	20	feet high and stores =<	100	acre-feet
Class B (Medium)					
Class C (Large)	=>	50	feet high and stores =>	10000	acre-feet
Other (Specify)					

Comments: "Class C" (Large) is "=>50 feet in height OR >= 10,000 acre feet of storage.

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

Loss of life potential is "few" with "appreciable" economic loss

Comments: Reasonably low probability of loss of human life or high probability of extensive economic loss or disruption of a lifeline.

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations that are required

9 What is the origin of the guidelines?

Combination of the above (Please specify)

Comments: Office policy was incorporated into the regulations in 2003. Guidelines are expanded upon Chapter 535 of the Nevada Revised Statutes (NRS) and Chapter 535 of the Nevada Administrative Code (NAC). Policy was developed in association with COE, USBR, FERC, FEMA, and public input.

10 When were the guidelines last revised (MM/DD/YYYY)? 01/01/2011

Comments: Minor revisions to reflect inventory numbers and changes to forms.

11 Are there any plans to update or revise the guidelines in the near future?

Yes (Please specify)

Comments: We anticipate an update commencing in SFY2012.

12 Are the guidelines different for new and existing dams?

No

Comments: However; owners of existing dams are not expected to "instantly" cure any deficiencies due to regulatory thresholds, but be working towards a solution.

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency reviews submitted designs

Models are not re-run but the asumptions/parameters and model type/suitability are reviewed.

14 How are the guidelines applied?

Based on both size and hazard classification

15 For PMP/PMF designs, is freeboard required?

Other (Please specify)

Comments: "Rule of thumb" is 3'. Wave runup calculations are preferred and required if the owner is requesting a smaller freeboard. Exceptions are tailings facilities for deposition (beach) side embankments and Storm Water detention facilities, as requested and supported by calculations then approval by this office.

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

Comments: However we are discouraging use of TR-55 under most conditions.

18 Do the guidelines specify any criteria for storm duration?

NO

Comments: Loosely based on Tc. The consultant is expected to use reasonable and prudent criteria which are reviewed. The storm duration is more closely tied to the storage regime. 6hr and 24hr local storms are most common but regional storm may control in some circumstances.

19 Do the guidelines specify any criteria for temporal storm distribution?

No

Comments: NRCS type II and type III most commonly used but HMR approach also utilized.

20 Do the guidelines specify any criteria for spatial storm distribution?

No

Comments: Areal reduction for large watersheds is allowed/expected. Generally under HMR 49 guidelines.

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

No

Comments: Individual operating criteria are developed by the owner and local jurisdictions regarding allowed flow rates/spillway activation and reviewed for adequacy. Operating criteria drives storm selection for design aspects of an individual structure. In all regards the facility must "accomodate" the IDF and the means by which that is accomplished is largely up to the owner and designer.

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

No

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a major problem

Comments: As urbanization occurs, previously compliant or what may be called "safe" structures become noncompliant or "unsafe" due to hydrologic or other inadequacy.

24 Do guidelines require consideration or analysis of future development?

Yes (Impacts of development on hazard classification or failure consequences)

Comments: Likely downstream land use is considered in determining hazard classification and IDF selection.

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

No

Comments: Again, individual operating regime drives antecedent conditions. Response to a specific recurrence interval storm and antecedent moisture are handled on a case-by-case basis. For the intermountain west, the most common antecedent moisture condition is "dry" for convection-type storms but "rain on snow" events often are most severe.

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

No

Comments: However, if in the review it is determined that the downstream area is likely to see development in the near future (10-20 years) potential impacts are expected to be discussed. It is largely a local government land-use planning issue. Again, it is on a case-by-case basis. Future anticipated conditions often are the driving force in new dam design.

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

Yes (Please specify)

Comments: Never less than a 1% chance of exceedence storm.

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	100	% of the	PMF
Existing High Hazard Dam must pass	100	% of the	PMF
New Significant Hazard Dam must pass	500yr-100	% of the	PMF
Existing Significant Hazard Dam must pass	500yr-100	% of the	PMF

Comments: Significant Hazard: 100% PMF if no provision for a spillway is incorporated into the design or it is classified as a "large" dam. The greater of 0.5PMF or a 500 year flood for "medium" and "small" dams.

29 For low hazard dams, the spillway design requirement is:

100-year flood

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

Comments: But we may allow one to help mitigate for certain unsafe conditions (such as an increased hazard situation at an existing dam) depending on the specific need and situation if it is proposed and is reasonable.

31 Does your organization permit risk-based hydrologic designs?

Our regulations do not specifically address this topic and it has never come up for consideration

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

33 How difficult would it be to change your regulations? Please explain.

Moderate

Comments: Although exempt from the "normal" statutory process to adopt or modify regulations, we do follow them. That requires workshops and public comment. Not impossible but time consuming and somewhat costly.

34 Are there any unique provisions in your regulations?

Yes (Please explain)

Comments: Nevada specifically prohibits use of CMP within a dam embankment unless it is the interior "form" for a CIP concrete pipe. Dam owners are prohibited from abandoning a dam. All dams are jurisdictional and notice of construction must be made for "below permitting threshold" dams. Owners of a dam are defined as any person who has a water right impounded by the dam, owns land on which the dam lies or owns land on which the reservoir lies.

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	New Hampshire Dam Bureau
Name of Representative	Jim Gallagher
Title of Representative	Chief Engineer
Phone number(s)	(603) 271-1961
Email address	James.Gallagher@des.nh.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	
Total Regulated Dams	2615
High Hazard Dams	134
Significant Hazard Dams	164
Low Hazard Dams	554
Unregulated Dams	
Other	1773

3 When did your Organization adopt minimum Inflow Design Flood criteria? 1981

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: Less than 6 feet high.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

6 Does the Organization have published size classification criteria?

No

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, Low, Limited Hazard)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

No potential for loss of life with significant but not excessive economic loss

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations that are required

9 What is the origin of the guidelines?

Combination of the above (Please specify)

Comments: FEMA guidelines customized by program

10 When were the guidelines last revised (MM/DD/YYYY)? 08/20/2005

11 Are there any plans to update or revise the guidelines in the near future?

Yes (Please specify)

Comments: Reviewed and updated or readopted every 5 to 7 years. Currently in the review process.

12 Are the guidelines different for new and existing dams?

Yes (Please elaborate)

Comments: Dams constructed prior to 2/19/1981 are required to pass the following flows with 1 foot of freeboard and without manual operations: Class A (50-year flood or site specific), Class B (100-year flood or site specific), Class C (250% of 100-year flood or site specific)

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency utilizes a combination of the above approaches, possibly on a case-by-case basis

Comments: A combination of the 2nd, 3rd, and 4th options. Our agency also designs and performs the repair and reconstruction of 274 state-owned dams

14 How are the guidelines applied?

Based on hazard classification only

15 For PMP/PMF designs, is freeboard required?

Based on wave run up computations

Comments: For existing dams and new Low Hazard and Non-Menace dams, owners have option of one foot of freeboard rather than maximum wave run up.

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

Yes

If "Yes", what are the specific analysis methodologies, procedures, or computer software that must be used?

Must use HMRs for developing PMP

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

Yes (Based on Tc)

19 Do the guidelines specify any criteria for temporal storm distribution?

No

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

No

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

No

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a moderate problem

Comments: Hazard Creep has caused an increase in hazard classification for some dams in the state requiring an increase in spillway discharge capacity,

24 Do guidelines require consideration or analysis of future development?

No

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

Yes (Please specify)

Comments: 50-year and 100-year storms shall incorporate antecedent moisture condition 2 as defined in the USDA NRCS NEH, 210-VI-NEH-630.10, August 1, 1969

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

No

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

No

Comments: Not currently, but we are currently evaluating whether or not tot require minimum spillway discharge standards regardless of downstream consequences.

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	100	% of the	PMF
Existing High Hazard Dam must pass		% of the	
New Significant Hazard Dam must pass	50	% of the	PMF
Existing Significant Hazard Dam must pass		% of the	

29 For low hazard dams, the spillway design requirement is:

100-year flood

Comments: 100-year for Low Hazard, 50-year for Non-Menace

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

31 Does your organization permit risk-based hydrologic designs?

Yes; our regulations permit them

32 Has your agency ever reviewed a risk-based hydrologic analysis?

Yes (Reviewed and approved)

33 How difficult would it be to change your regulations? Please explain.

Moderate

Comments: Regulations are reviewed and updated if necessary every 5 to 7 years. Rulemaking process includes assembling an Advisory Committee of dam owners, consultants, and other interested parties; review and approval by the Agency Legal Unit; and review and approval by Legislative Committee on Administrative Rules.

34 Are there any unique provisions in your regulations?

Yes (Please explain)

Comments: waiver provisions

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	New Jersey Office of Engineering and Construction
Name of Representative	John Moyle
Title of Representative	Manager, Dam Safety and Flood Control
Phone number(s)	609-984-0859
Email address	john.moyle@dep.state.nj.us

2 Number of dams under Organization's jurisdiction by type:

Total Dams	
Total Regulated Dams	1721
High Hazard Dams	215
Significant Hazard Dams	338
Low Hazard Dams	1168
Unregulated Dams	
Other	

3 When did your Organization adopt minimum Inflow Design Flood criteria? 1981

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: Any dam which raises the waters of a stream five feet or more above its usual, mean, low water height

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

6 Does the Organization have published size classification criteria?

No

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, Low, Limited Hazard)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

No potential for loss of life with significant but not excessive economic loss

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published within State Laws

9 What is the origin of the guidelines?

USACE guidelines (including Phase I Study guidelines)

10 When were the guidelines last revised (MM/DD/YYYY)? 06/16/2008

11 Are there any plans to update or revise the guidelines in the near future?

Yes (Please specify)

Comments: Every 5 years the state must readopt the standards.

12 Are the guidelines different for new and existing dams?

No

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency utilizes a combination of the above approaches, possibly on a case-by-case basis

14 How are the guidelines applied?

Based on hazard classification only

15 For PMP/PMF designs, is freeboard required?

1.0'

Comments: Greater than 1' is required if special conditions of severe frost damage, ice damage or wave action may occur

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

Yes (24-hour)

Comments: For Classes III and IV only

19 Do the guidelines specify any criteria for temporal storm distribution?

Yes (NRCS Standard)

Comments: Type III storm or later

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

Yes (Please specify)

Comments: Pipe conduits used as principal spillways must meet different criteria than auxiliary spillways. For example, all pipe conduits shall convey water at the maximum design velocity without damage to the interior surface. On the other hand, vegetated or unlined auxiliary spillways must be able to pass the design storm without jeopardizing the safety of the structure. Frequency of use criteria are also specified for auxiliary spillways.

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

Yes (Please specify)

Comments: Only for existing dams

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

No

24 Do guidelines require consideration or analysis of future development?

Yes (Impacts of development on hazard classification or failure consequences)

Comments: All Class II and III dams shall, where practicable incorporate in the proposed design, the ability to make modifications necessary to increase the spillway capacity of the facility or other alternative measures if the downstream hazard potential increases.

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

No

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

No

Comments: Not specified - used for existing dams only.

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

Yes (Please specify)

Comments: Minimum design storm shall be the 100 year storm.

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	100	% of the	PMP
Existing High Hazard Dam must pass	100	% of the	PMP
New Significant Hazard Dam must pass	50	% of the	PMP
Existing Significant Hazard Dam must pass	50	% of the	PMP

29 For low hazard dams, the spillway design requirement is:

100-year flood

Comments: 24-hour, Type III storm

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

31 Does your organization permit risk-based hydrologic designs?

Our regulations do not specifically address this topic and it has never come up for consideration

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

33 How difficult would it be to change your regulations? Please explain.

Difficult

Comments: There is a public notification process that takes approximately a year to change a rule.

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	New Mexico
Name of Representative	Elaine C. Pacheco, P.E.
Title of Representative	Dam Safety Bureau Chief
Phone number(s)	505-827-6111
Email address	elaine.pacheco@state.nm.us

2 Number of dams under Organization's jurisdiction by type:

Total Dams	
Total Regulated Dams	297
High Hazard Dams	149
Significant Hazard Dams	62
Low Hazard Dams	86
Unregulated Dams	101
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? 1985

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Both of the above

Comments: NM Law was changed in 2009 to mirror the National Inventory Criteria for the size of a jurisdictional dam.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

Comments: With the change in NM Law the exemptions for Stock and erosion control dams were no longer needed.

6 Does the Organization have published size classification criteria?

Yes

If "Yes", check and complete as appropriate:

Class A (Small)	=<	40	feet high and stores =<	1,000	acre-feet
Class B (Medium)					
Class C (Large)	=>	100	feet high and stores =>	50,000	acre-feet
Other (Specify)					

Comments: NM Classes are small, intermediate and large.

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

No potential for loss of life with significant but not excessive economic loss

Comments: No probable loss of life but can cause economic loss, environmental damage, disruption of lifeline facilities.

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations that are required

9 What is the origin of the guidelines?

Other (Please specify)

Comments: Combination of federal and other western states.

10 When were the guidelines last revised (MM/DD/YYYY)? 12/31/2010

Comments: Changes to the Incremental Damage Assessment language to try and clarify the process.

11 Are there any plans to update or revise the guidelines in the near future?

Yes (Please specify)

Comments: Hope to develop guidelines for evaluating incremental damage. It would be great if FEMA's proposed guidelines provided details rather than a general approach.

12 Are the guidelines different for new and existing dams?

No

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency reviews submitted designs

Agency will perform independent verification on a case by case basis.

14 How are the guidelines applied?

Based on both size and hazard classification

15 For PMP/PMF designs, is freeboard required?

Based on wave run up computations

Comments: Anticipated wave runup resulting from a 100 mph wind with reservoir level at the spillway crest will not overtop the dam; Anticipated wave runup resulting from a 50 mph wind with maximum reservoir level from routed SDF will not overtop the dam; Clay core cover and capillary rise requirements are satisfied; A minimum of 3 feet of freeboard remains after seismic deformation; In any case, at least 4 feet of freeboard shall be provided.

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

Yes (Please specify)

Comments: AHYMO a black box program customized from HYMO for hydrology in the Albuquerque area. Program is a black box hard wired and is no longer allowed because intermediate results could not be verified.

18 Do the guidelines specify any criteria for storm duration?

Other (Please specify)

Comments: NM requires that both the Local Storm (6 hours) and General Storm (72 hours) be considered and the more critical storm (results in highest routed water level in the reservoir) be used.

19 Do the guidelines specify any criteria for temporal storm distribution?

Yes (HMR)

Comments: Local Storm: HMR 55A and HMR 49 recommend the distribution in HMR5 or USACE EM 1110-2-1411. The more critical distribution is selected. General Storm: The HMRs do not specify a distribution. Center peaking or USBR 2/3 peak is acceptable.

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

Yes (Please specify)

Comments: No damage to the spillway during normal operation. Damage to the spillway during the SDF is acceptable as long as the damage does not result in an uncontrolled release of the reservoir.

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

No

Comments: However, analysis will be evaulated for appropriateness. NM is also developing a tool for site specific Extreme Precipitation for areas west of the continental divide to the eastern plains.

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a major problem

Comments: Hazard creep is a major problem for dams designed and constructed by the NRCS and for other entities

24 Do guidelines require consideration or analysis of future development?

Yes (Both of the above)

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

Yes (Please specify)

Comments: Initial reservoir pool must be at normal operation or at the crest of the spillway for permanent water storage reservoirs.

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

Yes

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

Yes (Please specify)

Comments: Lower limit is the 100-year event.

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	100	% of the	PMP
Existing High Hazard Dam must pass	100	% of the	PMP
New Significant Hazard Dam must pass	50-75	% of the	PMP
Existing Significant Hazard Dam must pass	50-75	% of the	PMP

Comments: Significant varies with size classification

29 For low hazard dams, the spillway design requirement is:

100-year flood

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

Comments: Our regulations state no, but waivers could be requested and we might consider the request if adequate justification is provided and the owner has a history of reliability

31 Does your organization permit risk-based hydrologic designs?

Our regulations do not specifically address this topic and it has never come up for consideration

Comments: We would be open to consider this option.

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

33 How difficult would it be to change your regulations? Please explain.

Moderate

Comments: Process is defined in statute. Funds would need to be identified and the change presented to stakeholders to get support (or at least no opposition) during the hearing process.

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	New York
Name of Representative	Alon Dominitz
Title of Representative	
Phone number(s)	518-402-8130
Email address	axdomini@gw.dec.state.ny.us

2 Number of dams under Organization's jurisdiction by type:

Total Dams	
Total Regulated Dams	5624
High Hazard Dams	390
Significant Hazard Dams	750
Low Hazard Dams	4484
Unregulated Dams	
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? 1970's or earlier

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: A construction permit is required unless the dam is 6 ft high or may impound less than 1 million gallons, or is less than 15 ft high AND may impound less than 3 million gallons.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

Comments: Inventory contains structures not considered dams - dams that were never built, failed, or removed.

6 Does the Organization have published size classification criteria?

Yes

If "Yes", check and complete as appropriate:

Class A (Small)	=<	40	feet high and stores =<	1,000	acre-feet
Class B (Medium)					
Class C (Large)	=>	40	feet high and stores =>	1,000	acre-feet
Other (Specify)					

Comments: No Medium Size Classification. Storage refers to normal storage

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

No potential for loss of life with significant but not excessive economic loss

Comments: A dam failure may result in damage to isolated homes, main highways, and minor railroads; may result in the interruption of important utilities, including water supply, sewage treatment, fuel, power, cable or telephone infrastructure; and/or is otherwise likely to pose the threat of personal injury and/or substantial economic loss or substantial environmental damage. Loss of human life is not expected.

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations that are required

9 What is the origin of the guidelines?

Combination of the above (Please specify)

Comments: Appear to be mostly NRCS criteria, plus for gravity dams USBR Design of Small Dams and USACE

10 When were the guidelines last revised (MM/DD/YYYY)? 01/01/1989

11 Are there any plans to update or revise the guidelines in the near future?

Yes (Please specify)

Comments: In early stages of internal development now

12 Are the guidelines different for new and existing dams?

Yes (Please elaborate)

Comments: Low (100-year), Significant (150% of 100-year), High (50% PMF)

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency utilizes a combination of the above approaches, possibly on a case-by-case basis

May do independent verification for certain projects

14 How are the guidelines applied?

Based on both size and hazard classification

15 For PMP/PMF designs, is freeboard required?

Other (Please specify)

Comments: 1 ft minimum for small dam, 2 ft minimum for large dam

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

Yes (Please specify)

Comments: Do not allow Rational Method

18 Do the guidelines specify any criteria for storm duration?

No

19 Do the guidelines specify any criteria for temporal storm distribution?

No

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

Yes (Please specify)

Comments: Service Spillway Design Flood vs. Spillway Design Flood

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

Yes (Please specify)

Comments: Have allowed a couple, combined with Incremental Hazard Assessment.

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a moderate problem

Comments: 2009 revised regulations give hazard class much more importance, so change hazard classes is a growing problem.

24 Do guidelines require consideration or analysis of future development?

Yes (Both of the above)

Comments: New guidance on Engineering Assesment Reports mentions this - DOW TOGS 3.1.4

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

No

Comments: Typically assume normal initial pool

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

No

Comments: When site-specific PMP is combined with 1/2 PMF Existing Dam spillway capacity standard, we have asked for an incremental damage assessment. In other cases, dam owners have conducted incremental damage assessment on own initiatiative, to reduce spillway design flood or hazard classification

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

No

Comments: Nothing in guidelines but have never accepted less than 100-year storm

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	50-100	% of the	PMF
Existing High Hazard Dam must pass	50	% of the	PMF
New Significant Hazard Dam must pass	225% of 100yr-40	% of the	PMF
Existing Significant Hazard Dam must pass	150% of 100yr	% of the	

Comments: Depending on size and hazard classification

29 For low hazard dams, the spillway design requirement is:

100-year flood

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

Comments: Not for new dam. Maybe for existing, if all other options were exhausted. Have never approved this.

31 Does your organization permit risk-based hydrologic designs?

Our regulations do not specifically address this topic and it has never come up for consideration

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

33 How difficult would it be to change your regulations? Please explain.

Difficult

34 Are there any unique provisions in your regulations?

Yes (Please explain)

Comments: Authority for state to regulate any dam whose failure could cause significant damage, regardless of size

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	North Carolina
Name of Representative	Steve McEvoy
Title of Representative	State Dam Safety Engineer
Phone number(s)	919-733-4574
Email address	Steve.McEvoy@ncdenr.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	
Total Regulated Dams	4640
High Hazard Dams	1125
Significant Hazard Dams	655
Low Hazard Dams	2860
Unregulated Dams	
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? 1980

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: Less than 15 feet in structural height or less than 10 acre-feet of storage at top of dam elevation unless high hazard. All high hazard dams are jurisdictional.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

Yes (Please explain)

Comments: Dams designed in accordance with NRCS Engineering Standard 378 are allowed to deviate from frequency of use criteria for unlined emergency spillways

6 Does the Organization have published size classification criteria?

Yes

If "Yes", check and complete as appropriate:

Class A (Small)	=<	35	feet high and stores =<	750	acre-feet
Class B (Medium)					
Class C (Large)	=>	50	feet high and stores =>	7500	acre-feet
Other (Specify)	Very Large: > 100 feet high and stores > 50000 acre-feet				

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, Low, Limited Hazard)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

No potential for loss of life with significant but not excessive economic loss

Comments: Includes interruption to public utilities and minor damage to isolated homes or commercial and industrial buildings

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations that are required

9 What is the origin of the guidelines?

Custom developed by Organization

Comments: Developed by state dam safety staff and codified through appropriate legal procedure

10 When were the guidelines last revised (MM/DD/YYYY)? 12/01/1994

11 Are there any plans to update or revise the guidelines in the near future?

No

12 Are the guidelines different for new and existing dams?

No

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency utilizes a combination of the above approaches, possibly on a case-by-case basis

14 How are the guidelines applied?

Based on both size and hazard classification

15 For PMP/PMF designs, is freeboard required?

No

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

No

19 Do the guidelines specify any criteria for temporal storm distribution?

No

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

Yes (Please specify)

Comments: The guidelines specify activation and performance criteria for vegetated earth or unlined emergency spillways.

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

Yes (Please specify)

Comments: Utilize Hyrdometeorological Report (HMR) Numbers 51, 52, 56

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a moderate problem

24 Do guidelines require consideration or analysis of future development?

Yes (Impacts of development on hazard classification or failure consequences)

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

No

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

Yes

Comments: 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. SDF for high hazard dams cannot be more frequent than the 100-year return frequency.

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

Yes (Please specify)

Comments: A design storm more frequent than once in 100 years will not be acceptable for any Class C dam.

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	33-100	% of the	PMP
Existing High Hazard Dam must pass	33-100	% of the	PMP
New Significant Hazard Dam must pass	100yr - 75	% of the	PMP
Existing Significant Hazard Dam must pass	100yr - 75	% of the	PMP

29 For low hazard dams, the spillway design requirement is:

Other (Please specify)

Comments: Ranges from 50 year to 1/2PMP, depending on size of dam.

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

Yes

Comments: Dams will be subject to reclassification if the Director determines that the hazard potential has changed. Non-structural provisions of adequately demonstrated effectiveness and reliability such as flood plain zoning, and early warning systems may be considered by the Director in making this determination.

31 Does your organization permit risk-based hydrologic designs?

Our regulations do not specifically address this topic and it has never come up for consideration

Comments: Our agency will review incremental damage analysis for SDF selection which could be considered as somewhat related to risk analysis

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

Comments: Nothing other than incremental damage analysis

33 How difficult would it be to change your regulations? Please explain.

Difficult

Comments: Change requires public comment process and legislative scrutiny. Process takes approximately two years.

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	North Dakota
Name of Representative	Mr. Jonathan Kelsch
Title of Representative	Engineer / Manager
Phone number(s)	701-328-4948
Email address	jkelsch@nd.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	
Total Regulated Dams	1165
High Hazard Dams	30
Significant Hazard Dams	94
Low Hazard Dams	1041
Unregulated Dams	
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? unknown

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: under 12.5 acre-feet of storage

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

Yes (Please explain)

Comments: Existing dams that are functioning correctly and built to a different standard.

6 Does the Organization have published size classification criteria?

Yes

If "Yes", check and complete as appropriate:

Class A (Small)	=<	10	feet high and stores =<	12.5	acre-feet
Class B (Medium)					
Class C (Large)	=>		feet high and stores =>		acre-feet
Other (Specify)	Five categories: Less than 10 ft, 10-24 ft, 25-39 ft, 40-55 ft, and Over 55 ft				

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

Loss of life potential is "few" with "appreciable" economic loss

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations for consideration by the engineer/designer

9 What is the origin of the guidelines?

Custom developed by Organization

10 When were the guidelines last revised (MM/DD/YYYY)? 06/01/1985

11 Are there any plans to update or revise the guidelines in the near future?

No

12 Are the guidelines different for new and existing dams?

No

Comments: Exceptions can be made for existing dams to be repaired.

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency reviews submitted designs

14 How are the guidelines applied?

Based on both size and hazard classification

15 For PMP/PMF designs, is freeboard required?

Based on wave run up computations

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

Yes (Based on Tc)

19 Do the guidelines specify any criteria for temporal storm distribution?

Yes (HMR)

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

Yes (Please specify)

Comments: Activation and damage criteria for principal vs. emergency spillways.

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

Yes (Please specify)

Comments: Recommended guidelines have been published (not required)

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a major problem

24 Do guidelines require consideration or analysis of future development?

Yes (Both of the above)

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

Yes (Please specify)

Comments: AMC II or III

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

No

Comments: Probably location dependent, not usually required for rural areas

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

No

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass		% of the	PMP
Existing High Hazard Dam must pass		% of the	PMP
New Significant Hazard Dam must pass		% of the	PMP
Existing Significant Hazard Dam must pass		% of the	PMP

Comments: Dam Design Classification I: 25-yr, II: 50-yr, III: 30% PMP, IV: 50% PMP, V: 100% PMP

29 For low hazard dams, the spillway design requirement is:

Not specified

Comments: See above criteria for five classifications.

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

31 Does your organization permit risk-based hydrologic designs?

Yes; although our regulations do not specifically address this topic, we review risk-based designs c

32 Has your agency ever reviewed a risk-based hydrologic analysis?

Yes (Both approved and rejected)

33 How difficult would it be to change your regulations? Please explain.

Difficult

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Ohio
Name of Representative	Dena Barnhouse
Title of Representative	Project Manager
Phone number(s)	614-265-6723
Email address	Dena.Barnhouse@dnr.state.oh.us

2 Number of dams under Organization's jurisdiction by type:

Total Dams	3572
Total Regulated Dams	1564
High Hazard Dams	368
Significant Hazard Dams	554
Low Hazard Dams	642
Unregulated Dams	991
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? 1967

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: Dam less than 6 feet in height OR less than 15 acre-feet in storage OR greater than 6 feet and less than 10 feet in height and less than 50 acre-feet in storage are exempt from Ohio's dam safety laws.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

Yes (Please explain)

Comments: Ohio has jurisdiction over dams less than 25 feet in height and less than 50 acre-feet in storage with downstream hazard limited to the dam itself and agricultural land (Class IV). There is no minimum inflow design flood for Class IV dams specified in Ohio's dam safety laws.

6 Does the Organization have published size classification criteria?

Yes

If "Yes", check and complete as appropriate:

Class A (Small)	=<	40	feet high and stores =<	500	acre-feet
Class B (Medium)					
Class C (Large)	=>	60	feet high and stores =>	5000	acre-feet
Other (Specify)	Small > 25 feet high and stores > 50 acre-feet				

Comments: The "other" category above is a Class IV dam as described in question 5 above.

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, Low, Limited Hazard)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

No potential for loss of life with significant but not excessive economic loss

Comments: Class I (High), Class II (Significant), Class III (Low), and Class IV (limited).

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published within State Laws

9 What is the origin of the guidelines?

Combination of the above (Please specify)

10 When were the guidelines last revised (MM/DD/YYYY)?

Comments: Critical flood guidelines added in the 1990's.

11 Are there any plans to update or revise the guidelines in the near future?

No

12 Are the guidelines different for new and existing dams?

No

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency utilizes a combination of the above approaches, possibly on a case-by-case basis

For existing dams, this agency performs rough calculations to determine whether the dam owner must hire an engineer to do further calculations. For dams being permitted, the dam owner's engineer submits an analysis which we review and sometimes perform our own calculations to verify the results.

14 How are the guidelines applied?

Based on both size and hazard classification

15 For PMP/PMF designs, is freeboard required?

No

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

Other (Please specify)

Comments: All methodologies must follow current publications from ODNR, USCOE, USGS, NOAA, or others acceptable to ODNR.

19 Do the guidelines specify any criteria for temporal storm distribution?

No

Comments: All methodologies must follow current publications from ODNR, USCOE, USGS, NOAA, or others acceptable to ODNR.

20 Do the guidelines specify any criteria for spatial storm distribution?

No

Comments: All methodologies must follow current publications from ODNR, USCOE, USGS, NOAA, or others acceptable to ODNR.

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

Yes (Please specify)

Comments: Emergency spillway channels must flow less than once in 50 years for Class I dams, once in 25 years for Class II dams, and less than once in 10 years for Class III dams.

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

Yes (Please specify)

Comments: ODNR has currently hired a consultant to provide site specific PMP study for 2 department-owned dams. The results will be used to provide revised PMP values for roughly 2/3 of the state. The study will be indepdently reviewed before adopted.

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a moderate problem

24 Do guidelines require consideration or analysis of future development?

Yes (Impacts of development on hazard classification or failure consequences)

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

No

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

Yes

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

Yes (Please specify)

Comments: Class I (40% PMF minimum), Class II (20% PMF minimum), Class III (100-year minimum)

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	100	% of the	PMF
Existing High Hazard Dam must pass	100	% of the	PMF
New Significant Hazard Dam must pass	50	% of the	PMF
Existing Significant Hazard Dam must pass	50	% of the	PMF

Comments: Can be reduced to the critical flood through an incremental damage assessment.

29 For low hazard dams, the spillway design requirement is:

Other (Please specify)

Comments: 25% PMF down to no less than 100 year based on incremental damage assessment.

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

31 Does your organization permit risk-based hydrologic designs?

No; our regulations forbid them

Comments: This type of analysis is not addressed in regulations. By omission, the regulations forbid them.

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

33 How difficult would it be to change your regulations? Please explain.

Moderate

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Oklahoma
Name of Representative	Robert S. Fabian
Title of Representative	Technical Section Program Manager
Phone number(s)	405-530-8800
Email address	rsfabian@owrb.ok.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	4672
Total Regulated Dams	4543
High Hazard Dams	320
Significant Hazard Dams	202
Low Hazard Dams	4021
Unregulated Dams	
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? 26828

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Both of the above

Comments: 15 af or less of impounding capacity irregardless of height of dam and 6 feet to 25 feet in height and with an impounding capacity of less than 50 acre-feet.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

6 Does the Organization have published size classification criteria?

Yes

If "Yes", check and complete as appropriate:

Class A (Small)	=<	50	feet high and stores =<	10,000	acre-feet
Class B (Medium)					
Class C (Large)	=>	100	feet high and stores =>	50,000	acre-feet
Other (Specify)					

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

No potential for loss of life with significant but not excessive economic loss

Comments: A written guidance document is under development describing criteria to be used for determination of a dam's hazard potential.

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations that are required

9 What is the origin of the guidelines?

Unknown

10 When were the guidelines last revised (MM/DD/YYYY)? 07/01/1995

11 Are there any plans to update or revise the guidelines in the near future?

No

12 Are the guidelines different for new and existing dams?

Yes (Please elaborate)

Comments: Any dam constructed prior to June 13, 1973 and which is classified as intermediate size and high hazard potential according to 785:25-3-3 shall be required to pass a minimum design of 50% of the PMF. Any dam constructed prior to June 13, 1973 and which is classified as large size and high hazard potential according to 785:25-3-3 shall be required to pass a minimum design flood of 75% of the PMF.

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency reviews submitted designs

14 How are the guidelines applied?

Based on both size and hazard classification

15 For PMP/PMF designs, is freeboard required?

Other (Please specify)

Comments: Minimum freeboard varies from 1 to 3 feet based on both hazard and size classification

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

Yes

If "Yes", what are the specific analysis methodologies, procedures, or computer software that must be used?

Must use HMRs for developing PMP

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

Yes (24-hour)

Comments: This is in a guidance document being develop and is not part of dam safety rules and regulations at this time.

19 Do the guidelines specify any criteria for temporal storm distribution?

No

20 Do the guidelines specify any criteria for spatial storm distribution?

Yes (Please specify)

Comments: If watershed above dam is greater than 10 sq. mi. then use concentric elipse pattern. This is in a guidance document being develop and is not part of dam safety rules and regulations at this time.

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

Yes (Please specify)

Comments: Dam safety rules specify a PMF and freeboard requirement based on size and hazard classification of the dam.

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

No

Comments: This is in a guidance document being develop and is not part of dam safety rules and regulations at this time.

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a major problem

24 Do guidelines require consideration or analysis of future development?

Yes (Impacts of development on hazard classification or failure consequences)

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

Yes (Please specify)

Comments: Specify saturated antecedent moisture condition and initial reservoir pool at normal levels.

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

No

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

No

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	50-100	% of the	PMF
Existing High Hazard Dam must pass	50-75	% of the	PMF
New Significant Hazard Dam must pass	40-75	% of the	PMF
Existing Significant Hazard Dam must pass		% of the	

29 For low hazard dams, the spillway design requirement is:

Other (Please specify)

Comments: 25-50% of PMF depending on size classification

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

Yes

Comments: A non-structural alternative will only be considered as a temporay solution until such time as structural changes could be made.

31 Does your organization permit risk-based hydrologic designs?

Yes; although our regulations do not specifically address this topic, we review risk-based designs o

32 Has your agency ever reviewed a risk-based hydrologic analysis?

Yes (Reviewed and approved)

Comments: We rarely have a request for a risk-based hydrologic analysis.

33 How difficult would it be to change your regulations? Please explain.

Moderate

Comments: This is a time consuming process that includes an analysis of impacts, including financial impacts, on the regulated community.

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Oregon
Name of Representative	Keith Mills
Title of Representative	Dam Safety Engineer
Phone number(s)	503-986-0840
Email address	millska@wrd.state.or.us

2 Number of dams under Organization's jurisdiction by type:

Total Dams	
Total Regulated Dams	1318
High Hazard Dams	126
Significant Hazard Dams	197
Low Hazard Dams	995
Unregulated Dams	
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? N/A

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: Less than 10 feet in height or that impounds less than 9.2 acre-feet.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

6 Does the Organization have published size classification criteria?

No

If "Yes", check and complete as appropriate:

Class A (Small)	=<		feet high and stores =<	acre-feet
Class B (Medium)				
Class C (Large)	=>		feet high and stores =>	acre-feet
Other (Specify)	Oregon classifies dams into two categories: large and small.			

Comments: Small dams are those less than 9.2 acre-feet and 10 feet in height. They are not subject to state dam safety oversight. All large dams must be designed by an engineer licensed in Oregon.

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

No potential for loss of life with significant but not excessive economic loss

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Unpublished guidelines for consideration by the engineer/designer

9 What is the origin of the guidelines?

Combination of the above (Please specify)

Comments: Some custom as well

10 When were the guidelines last revised (MM/DD/YYYY)? N/A

11 Are there any plans to update or revise the guidelines in the near future?

No

12 Are the guidelines different for new and existing dams?

No

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency reviews submitted designs

We ask for PMF - High Hazard; 1/2 PMF Significant Hazard; 100 year flood with 2 feet of spillway freeboard for low hazard. All are minimum design criteria.

14 How are the guidelines applied?

Based on hazard classification only

15 For PMP/PMF designs, is freeboard required?

2.0'

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

No

19 Do the guidelines specify any criteria for temporal storm distribution?

No

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

No

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

No

Comments: We need compelling evidence the analysis is appropriate.

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a minor problem

Comments: Likely to become more of a problem with new development.

24 Do guidelines require consideration or analysis of future development?

No

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

No

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

No

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

No

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	100	% of the	PMF
Existing High Hazard Dam must pass		% of the	
New Significant Hazard Dam must pass	50	% of the	PMF
Existing Significant Hazard Dam must pass		% of the	

Comments: We ask owners to upgrade spillway capacity when the hazard rating is upgraded. If it is necessary, would use a legal process to compel an owner to upgrade.

29 For low hazard dams, the spillway design requirement is:

100-year flood

Comments: 100 year with 2 feet of freeboard in the emergency spillway.

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

31 Does your organization permit risk-based hydrologic designs?

Our regulations do not specifically address this topic and it has never come up for consideration

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

33 How difficult would it be to change your regulations? Please explain.

Difficult

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Pennsylvania
Name of Representative	Roger P. Adams, P.E.
Title of Representative	Chief, Division of Dam Safety
Phone number(s)	717-772-5951
Email address	roadams@state.pa.us

2 Number of dams under Organization's jurisdiction by type:

Total Dams	Unknown
Total Regulated Dams	3213
High Hazard Dams	782
Significant Hazard Dams	277
Low Hazard Dams	2154
Unregulated Dams	Unknown
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? 1913

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: Less than or equal to 15 feet and the impounding capacity at maximum storage elevation is less than or equal to 50 acre-feet and the drainage area is less than or equal to 100

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

Yes (Please explain)

Comments: Under PA mining laws, coal waste slurry dams have added regulations on time to dewater.

6 Does the Organization have published size classification criteria?

Yes

If "Yes", check and complete as appropriate:

Class A (Small)	=<	40	feet high and stores =<	1,000	acre-feet
Class B (Medium)					
Class C (Large)	=>	100	feet high and stores =>	50,000	acre-feet
Other (Specify)					

Comments: Note: In PA, Class A is large and Class C is small.

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, Low, Limited Hazard)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

Loss of life potential is "few" with "appreciable" economic loss

Comments: Category 1 = substantial population at risk (PAR) and/or excessive economic loss (EL); Category 2 = few PAR and/or appreciable EL; Category 3 = no PAR and or significant EL; and Category 4 = no PAR and minimal EL.

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations that are required

Comments: By regulation

9 What is the origin of the guidelines?

Custom developed by Organization

10 When were the guidelines last revised (MM/DD/YYYY)? 01/08/2011

Comments: Regulations revised.

11 Are there any plans to update or revise the guidelines in the near future?

Yes (Please specify)

Comments: Developing a process to conduct an incremental dam break analysis.

12 Are the guidelines different for new and existing dams?

No

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency utilizes a combination of the above approaches, possibly on a case-by-case basis

14 How are the guidelines applied?

Based on both size and hazard classification

15 For PMP/PMF designs, is freeboard required?

No

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

Yes (Please specify)

Comments: Rational Method

18 Do the guidelines specify any criteria for storm duration?

Yes (24-hour)

Comments: By regulations.

19 Do the guidelines specify any criteria for temporal storm distribution?

No

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

Yes (Please specify)

Comments: For projects increasing spillway capacity, we may require no increase in outflows up to the 100-year frequency flood.

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

Yes (Please specify)

Comments: Must be approved by NOAA.

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a minor problem

24 Do guidelines require consideration or analysis of future development?

Yes (Impacts of development on hazard classification or failure consequences)

Comments: By Regulation

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

No

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

Yes

Comments: Incremental dam break analysis is required for high hazard dams. SDF is based on no additional impact to homes.

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

Yes (Please specify)

Comments: 100-year frequency flood is considered a minimum SDF for high hazard dam.

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	IDBA	% of the	PMF
Existing High Hazard Dam must pass	IDBA	% of the	PMF
New Significant Hazard Dam must pass	50-100	% of the	PMF
Existing Significant Hazard Dam must pass	50-100	% of the	PMF

Comments: New regulations require Incremental Dam Break Analysis (IDBA) to determine spillway design flood.

29 For low hazard dams, the spillway design requirement is:

Other (Please specify)

Comments: Medium (100-year to 1/2 PMF); Small (50-year to 100-year)

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

31 Does your organization permit risk-based hydrologic designs?

Other (Please explain)

Comments: Regulations do not address this issue; however, our procedures do not allow for this type of analysis

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

33 How difficult would it be to change your regulations? Please explain.

Moderate

Comments: We just went through a change so we are familiar with the procedure.

34 Are there any unique provisions in your regulations?

Yes (Please explain)

Comments: Requiring an incremental dam break analysis for the spillway design flood for high hazard dams.

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Puerto Rico
Name of Representative	Luis A. Suarez Sanchez
Title of Representative	Administrator, Dams & Reservoirs Safety Program
Phone number(s)	787-521-3256
Email address	l-suarez@prepa.com

2 Number of dams under Organization's jurisdiction by type:

Total Dams	36
Total Regulated Dams	36
High Hazard Dams	35
Significant Hazard Dams	0
Low Hazard Dams	1
Unregulated Dams	0
Other	0

3 What year did your Agency adopt minimum Inflow Design Flood criteria? 1979

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: Is 25 feet or less in height or has an impounding capacity at the maximum water storage elevation of 50 acre-feet or less.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

6 Does the Organization have published size classification criteria?

Yes

If "Yes", check and complete as appropriate:

Class A (Small)	=<	25	feet high and stores =<	50	acre-feet
Class B (Medium)					
Class C (Large)	=>	25	feet high and stores =>	50	acre-feet
Other (Specify)					

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

No potential for loss of life with significant but not excessive economic loss

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations that are required

9 What is the origin of the guidelines?

FEMA/FERC federal guidelines

10 When were the guidelines last revised (MM/DD/YYYY)? 01/01/1998

Comments: In 1998 the Guidelines Development Subcommittee update the FEMA Guidelines.

11 Are there any plans to update or revise the guidelines in the near future?

No

12 Are the guidelines different for new and existing dams?

No

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency utilizes a combination of the above approaches, possibly on a case-by-case basis

14 How are the guidelines applied?

Based on a combination of risk analysis and hazard/size classification

15 For PMP/PMF designs, is freeboard required?

1.0'

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

Yes

If "Yes", what are the specific analysis methodologies, procedures, or computer software that must be used?

Other (Please specify)

Comments: Can use the computer software of the Corp of Engineer and analysis methodologies developed by USBR to Puerto Rico.

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

Yes (6-hr)

Comments: We use 24-hr too.

19 Do the guidelines specify any criteria for temporal storm distribution?

Yes (HMR)

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

No

22 Does the organization allow development of a site specific PMP?

No

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

No

24 Do guidelines require consideration or analysis of future development?

No

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

Yes (Please specify)

Comments: Antecedent moisture condition III and normal pool level.

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

No

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

No

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	100	% of the	PMF
Existing High Hazard Dam must pass		% of the	
New Significant Hazard Dam must pass	100	% of the	PMF
Existing Significant Hazard Dam must pass		% of the	

29 For low hazard dams, the spillway design requirement is:

Not specified

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

Yes

31 Does your organization permit risk-based hydrologic designs?

Our regulations do not specifically address this topic and it has never come up for consideration

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

33 How difficult would it be to change your regulations? Please explain.

Difficult

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Rhode Island
Name of Representative	Paul Guglielmino
Title of Representative	Senior Sanitary Engineer
Phone number(s)	401-222-1360 xt. 7122
Email address	paul.guglielmino@dem.ri.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	671
Total Regulated Dams	538
High Hazard Dams	97
Significant Hazard Dams	83
Low Hazard Dams	492
Unregulated Dams	94
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? N/A

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: RI defines a 'regulated' dam as a low hazard dam that is six (6) feet or more in height or has fifteen (15) acre-feet or more of storage capacity; or a high hazard dam; or a significant hazard dam. 'Not regulated' doesn't meet the criteria. 'Non-jurisdictional' dams are FERC (for example), not RI, regulated. 'Non-inventory' are dams that we don't have in our database (typically small dams that wouldn't be regulated.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

Comments: RI doesn't have specific design standards.

6 Does the Organization have published size classification criteria?

No

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

No potential for loss of life with significant but not excessive economic loss

Comments: A dam where failure or misoperation results in no probable loss of human life but can cause major economic loss, disruption of lifeline facilities or impact other concerns detrimental to the public's health, safety or welfare.

8 Does the Organization have guidelines for determining the spillway design flood?

No

9 What is the origin of the guidelines?

Unknown

10 When were the guidelines last revised (MM/DD/YYYY)? n/a

11 Are there any plans to update or revise the guidelines in the near future?

No

12 Are the guidelines different for new and existing dams?

No

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency reviews submitted designs

14 How are the guidelines applied?

15 For PMP/PMF designs, is freeboard required?

No

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

No

19 Do the guidelines specify any criteria for temporal storm distribution?

No

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

No

22 Does the organization allow development of a site specific PMP?

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

No

Comments: No to changing the hazard classification. N/a to design requirements.

24 Do guidelines require consideration or analysis of future development?

No

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

No

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

No

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

No

Comments: None.

29 For low hazard dams, the spillway design requirement is:

Not specified

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

31 Does your organization permit risk-based hydrologic designs?

Our regulations do not specifically address this topic and it has never come up for consideration

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

33 How difficult would it be to change your regulations? Please explain.

Moderate

Comments: It would be more difficult if the regulation change required a change in the law.

34 Are there any unique provisions in your regulations?

Yes (Please explain)

Comments: Although dam safety law has been in place since 1800's, our first set of regulations were promulgated in 2007. We're just entering puberty.

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	South Carolina
Name of Representative	Steven M. Bradley, P.E.
Title of Representative	Dam Safety Hydrologist
Phone number(s)	803-898-4027
Email address	

2 Number of dams under Organization's jurisdiction by type:

Total Dams	
Total Regulated Dams	2317
High Hazard Dams	153
Significant Hazard Dams	481
Low Hazard Dams	1683
Unregulated Dams	
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? 1980

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: Less than 25 feet in height or shall have an impounding capacity at maximum water storage elevation of less than 50 acre-feet.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

6 Does the Organization have published size classification criteria?

Yes

If "Yes", check and complete as appropriate:

Class A (Small)	=<	40	feet high and stores =<	1,000	acre-feet
Class B (Medium)					
Class C (Large)	=>	100	feet high and stores =>	50,000	acre-feet
Other (Specify)	Very Small < 25 feet high and stores < 50 acre-feet				

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

No potential for loss of life with significant but not excessive economic loss

Comments: Published guidelines, but still subject to a lot of engineering judgment.

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations that are required

9 What is the origin of the guidelines?

FEMA/FERC federal guidelines

10 When were the guidelines last revised (MM/DD/YYYY)? n/a

11 Are there any plans to update or revise the guidelines in the near future?

No

12 Are the guidelines different for new and existing dams?

Yes (Please elaborate)

Comments: New dams are conservatively classified.

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency reviews submitted designs

14 How are the guidelines applied?

Based on both size and hazard classification

15 For PMP/PMF designs, is freeboard required?

Based on wave run up computations

Comments: For 50 mph wind. For small dams, we usually use 1 ft.

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

Comments: Usually check it using HEC-1 (transitioning to HEC-HMS)

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

Comments: Has to pass review

18 Do the guidelines specify any criteria for storm duration?

Yes (24-hour)

Comments: Great majority of drainage areas are very small (<10 square miles). For these we use 24-hour duration.

19 Do the guidelines specify any criteria for temporal storm distribution?

No

Comments: Use of SCS Type II is common.

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

Yes (Please specify)

Comments: Activation criteria for earth spillways: Low hazard (1 year), Significant Hazard (10 year), High (25 year)

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

Yes (Please specify)

Comments: Depends on credentials on person performing analysis

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

No

24 Do guidelines require consideration or analysis of future development?

No

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

Yes (Please specify)

Comments: AMC-II, Normal pool

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

No

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

No

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	50-100	% of the	PMF
Existing High Hazard Dam must pass	500yr-100	% of the	PMF
New Significant Hazard Dam must pass	100yr-50	% of the	PMF
Existing Significant Hazard Dam must pass	100yr-50	% of the	PMF

Comments: High Hazard: Very Small (100yr to 1/2PMF), Small (1/2PMF to PMF, Intermediate and Large (PMF). Significant Hazard: Small (100yr to 1/2PMF), Intermediate (1/2PMF to PMF), Large (PMF).

29 For low hazard dams, the spillway design requirement is:

Other (Please specify)

Comments: Small (50-yr to 100-yr), Intermediate (100-yr to 1/2 PMF), Large (1/2 PMF to PMF)

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

Yes

31 Does your organization permit risk-based hydrologic designs?

Our regulations do not specifically address this topic and it has never come up for consideration

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

33 How difficult would it be to change your regulations? Please explain.

Moderate

Comments: Current political climate makes it very difficult

34 Are there any unique provisions in your regulations?

Yes (Please explain)

Comments: We supply forms for EAPs to dam owners. All high hazard dams are being updated to meet FEMA rules

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	South Dakota
Name of Representative	Timothy G. Schaal
Title of Representative	Natural Resources Engineer
Phone number(s)	605-773-3352
Email address	tim.schaal@state.sd.us

2 Number of dams under Organization's jurisdiction by type:

Total Dams	
Total Regulated Dams	2349
High Hazard Dams	47
Significant Hazard Dams	144
Low Hazard Dams	2158
Unregulated Dams	
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? 1986

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: A barrier is not considered a dam if height does not exceed 6 feet regardless of storage capacity of if storage capacity does not exceed 15 acre-feet.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

Yes (Please explain)

Comments: Design requirements for category 1 tailings dams. Dams constructed to store, without discharge, tailings as defined by 45-6B-3 (14) shall be sized to retain the PMF plus at least a 100-year flood

6 Does the Organization have published size classification criteria?

Yes

If "Yes", check and complete as appropriate:

Class A (Small)	=<	40	feet high and stores =<	1,000	acre-feet
Class B (Medium)					
Class C (Large)	=>	100	feet high and stores =>	50,000	acre-feet
Other (Specify)					

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

No potential for loss of life with significant but not excessive economic loss

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published within State Laws

Comments: SDCL 46-2-5 & 46-7-3

9 What is the origin of the guidelines?

USACE guidelines (including Phase I Study guidelines)

Comments: Corps of Engineers Phase I Inspections Recommemded Guidelines

10 When were the guidelines last revised (MM/DD/YYYY)? 4/23/1989

11 Are there any plans to update or revise the guidelines in the near future?

No

Comments: not in the "Near Future"

12 Are the guidelines different for new and existing dams?

Yes (Please elaborate)

Comments: Category 3 dams constructed before October 27, 1986 are exempt from minimum spillway requirements unless the dam fails and is rebuilt.

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency reviews submitted designs

14 How are the guidelines applied?

Based on both size and hazard classification

15 For PMP/PMF designs, is freeboard required?

No

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

Yes

If "Yes", what are the specific analysis methodologies, procedures, or computer software that must be used?

Must use HMRs for developing PMP

Comments: we are open to other suggestions/methods

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

Yes (24-hour)

Comments: For 25-year, 50-year, and 100-year frequency floods.

19 Do the guidelines specify any criteria for temporal storm distribution?

Yes (HMR)

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

No

22 Does the organization allow development of a site specific PMP?

Unknown (never requested)

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

No

24 Do guidelines require consideration or analysis of future development?

Yes (Impacts of development on hazard classification or failure consequences)

Comments: 74:02:08:02 states that if the classification of a dam changes, the dam must comply with spillway requirements of the higher catergory

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

No

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

No

Comments: SDCL 46-7-5.3

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

Yes (Please specify)

Comments: SDCL -46-7-5.3

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	50-100	% of the	PMF
Existing High Hazard Dam must pass	50-100	% of the	PMF
New Significant Hazard Dam must pass	100yr-100	% of the	PMF
Existing Significant Hazard Dam must pass	100yr-100	% of the	PMF

Comments: High Hazard: Small (0.5PMF), Intermediate (0.5PMF), Large (PMF). Significant Hazard: Small (100-year), Intermediate (0.5PMF), Large (PMF).

29 For low hazard dams, the spillway design requirement is:

Other (Please specify)

Comments: Small (50-year), Intermediate (100-year), Large (0.5 PMF)

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

Comments: That would be a Water Management Board decision

31 Does your organization permit risk-based hydrologic designs?

Yes; our regulations permit them

Comments: SDCL 46-7-5.3

32 Has your agency ever reviewed a risk-based hydrologic analysis?

Yes (Reviewed and approved)

33 How difficult would it be to change your regulations? Please explain.

Difficult

Comments: Legislative Research Council review and approval, public notice and Water Management Board approval, Legislative Oversite Committee review and approval

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Tennessee
Name of Representative	Lyle Bentley
Title of Representative	Chief, Dam Safety Program
Phone number(s)	615-532-0154
Email address	Lyle.Bentley@tn.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	1227
Total Regulated Dams	662
High Hazard Dams	150
Significant Hazard Dams	210
Low Hazard Dams	302
Unregulated Dams	565
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? 1987

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: Dam means any artificial barrier, together with appurtenant works, which does or may impound or divert water, and which either (1) is or will be twenty (20) feet or more in height from the natural bed of the stream or watercourse at the downstream toe of the barrier, as determined by the Commissioner, or (2) has or will have an impounding capacity at maximum water storage elevation of thirty (30) acre-feet or more. Provided, however, that any such barrier which is or will be less than six (6) feet in height, regardless of storage capacity, or which has or will have a maximum storage capacity not in excess of fifteen (15) acre-feet, regardless of height, shall not be considered a dam, nor shall any barrier, regardless of size, be considered a dam, if, in the judgment of the Commissioner, such barrier creates an impoundment used only as a farm pond.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

Yes (Please explain)

Comments: Dams designed and mostly paid for by the federal government, such as watershed district dams, cannot be required to have changes made in the design.

6 Does the Organization have published size classification criteria?

Yes

If "Yes", check and complete as appropriate:

Class A (Small)	=<	49	feet high and stores =<	999	acre-feet
Class B (Medium)					
Class C (Large)	=>	100	feet high and stores =>	50,000	acre-feet

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

No potential for loss of life with significant but not excessive economic loss

Comments: Category 1 (High), Category 2 (Significant), and Category 3 (Low).

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations that are required

9 What is the origin of the guidelines?

USACE guidelines (including Phase I Study guidelines)

Comments: The Corps standards used in the Phase 1 investigations I the late 1970's and early 1980's.

10 When were the guidelines last revised (MM/DD/YYYY)? 02/19/2001

11 Are there any plans to update or revise the guidelines in the near future?

No

12 Are the guidelines different for new and existing dams?

Yes (Please elaborate)

Comments: Different Freeboard Design Storms for new and existing dams.

13 Which of the following best describes your agency's role in determining the spillway design flood:

It's specified in the regualtions.

14 How are the guidelines applied?

Based on both size and hazard classification

15 For PMP/PMF designs, is freeboard required?

Other (Please specify)

Comments: Sufficient freeboard shall be provided to prevent overtopping with the passage of the freeboard hydrograph plus the additional freeboard required by the site for wave action.

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

Yes (6-hr)

19 Do the guidelines specify any criteria for temporal storm distribution?

Yes (HMR)

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

Yes (Please specify)

Comments: Activation and performance guidelines are provided for vegetated earth or unlined emergency spillways

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

No

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

No

Comments: No, although it has been a source on contention at times.

24 Do guidelines require consideration or analysis of future development?

Yes (Impacts of development on hazard classification or failure consequences)

Comments: This only applies if development is actually planned - not if development could occur "one day."

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

No

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

No

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

No

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	50-100	% of the	PMP
Existing High Hazard Dam must pass	50-100	% of the	PMP
New Significant Hazard Dam must pass	50-100	% of the	PMP
Existing Significant Hazard Dam must pass	33-100	% of the	PMP

Comments: Existing, High Hazard: Large and Intermediate (PMP), Small (1/2 PMP). Significant Hazard: Large (PMP), Intermediate (1/2 PMP), Small (1/3 PMP). New (regardless of hazard class): Large and Intermediate (PMP), Small (1/2 PMP)

29 For low hazard dams, the spillway design requirement is:

Other (Please specify)

Comments: Existing: Large (1/2 PMP), Intermediate (1/3PMP), Small (100-year).
New (regardless of hazard class): Large and Intermediate (PMP), Small (1/2 PMP)

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

31 Does your organization permit risk-based hydrologic designs?

No; our regulations address this topic and we have made an administrative decision not to conside

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

33 How difficult would it be to change your regulations? Please explain.

Moderate

Comments: It can be done through our rulemaking process.

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Texas
Name of Representative	Warren D. Samuelson, P.E.
Title of Representative	Dam Safety Program Coordinator
Phone number(s)	512-239-5195
Email address	warren.samuelson@tceq.texas.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	
Total Regulated Dams	7212
High Hazard Dams	1002
Significant Hazard Dams	735
Low Hazard Dams	5485
Unregulated Dams	
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? 1986

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Both of the above

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

6 Does the Organization have published size classification criteria?

Yes

If "Yes", check and complete as appropriate:

Class A (Small)	=<	40	feet high and stores =<	1,000	acre-feet
Class B (Medium)					
Class C (Large)	=>	100	feet high and stores =>	50,000	acre-feet
Other (Specify)	Intermediate = Equal to or Greater than 1,000 AF & Less than 50,000 AF or Equal to or Greater than 40 ft & Less than 100 ft				

Comments: Small = Equal to or Greater than 15 AF & Less than 1,000 AF; Equal to or Greater than 50 AF & Less than 1,000 AF; Equal to or Greater than 25 ft & Less than 40 ft; or Greater than 6 ft & Less than 40 ft

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

Loss of life potential is "few" with "appreciable" economic loss

Comments: Loss of one to six lives or one or two habitable structures in the breach inundation area downstream of the dam

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published within State Laws

Comments: Guidelines entitled "Hydrologic and Hydraulic Guidelines for Dams in Texas"

9 What is the origin of the guidelines?

Custom developed by Organization

10 When were the guidelines last revised (MM/DD/YYYY)? 01/01/2007

11 Are there any plans to update or revise the guidelines in the near future?

No

12 Are the guidelines different for new and existing dams?

Yes (Please elaborate)

Comments: An owner of a large- or high-hazard existing dam that was required to meet 100% of the probable maximum flood (PMF) before the effective date of these rules and that is shown by an evaluation by a professional engineer to meet 75% or more of the PMF will not be required to upgrade the dam to meet minimum hydrologic criteria in paragraph (1)(A) of this subsection.

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency performs independent verification of submitted designs

14 How are the guidelines applied?

Based on both size and hazard classification

15 For PMP/PMF designs, is freeboard required?

Based on wave run up computations

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

Yes

If "Yes", what are the specific analysis methodologies, procedures, or computer software that must be used?

Other (Please specify)

Comments: HEC-HMS, HEC-1, SITES, WIN TR20, WIN TR55, HEC-RAS, and NWS Dynamic Wave Models. Other models may be acceptable upon written approval.

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

Other (Please specify)

Comments: Minimum storm duration is specified based on drainage area. All durations from the minimum up to the 72-hour duration shall be used to determine the most critical duration or the duration that produces the maximum reservoir level.

19 Do the guidelines specify any criteria for temporal storm distribution?

Yes (Other - please specify)

Comments: PMP distributions are provided for 1-hr to 72-hr duration events. More conservative distributions (such as the HMR-51 or NRCS distributions) can be used.

20 Do the guidelines specify any criteria for spatial storm distribution?

Yes (Please specify)

Comments: Based upon drainage area

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

Yes (Please specify)

Comments: It is often accepted that erosion damage will occur should the emergency spillway operate, but that the effective cost of the very infrequent repairs is much lower than the upfront capital costs of the means to prevent the erosion. Most emergency spillways are built to prevent passage of flows for less than about the 50- or 100-year flood.

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

No

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a moderate problem

Comments: We get comments from Legislative staff due to changing hazard classification. Owners also have a problem understanding floods that have "never occurred".

24 Do guidelines require consideration or analysis of future development?

No

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

Yes (Please specify)

Comments: Superimpose the PMP upon watershed soils assumed to be saturated. This will equate to losses at the beginning of the design storm equal to zero or Natural Resources Conservation Service Antecedent Runoff Conditions III (ARC III), or some other equivalent and approved assumptions. In Texas, there is no need to analyze snowmelt contributions to runoff or frozen ground conditions for infiltration for design-flood calculations.

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

No

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

No

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	75-100	% of the	PMF
Existing High Hazard Dam must pass	75-100	% of the	PMF
New Significant Hazard Dam must pass	50-75	% of the	PMF
Existing Significant Hazard Dam must pass	50-75	% of the	PMF

Comments: Significant: Small (50% PMF), Intermediate (50-75% PMF), Large (75% PMF)
High: Small (75% PMF), Intermediate (75-100% PMF), Large (100% PMF)

29 For low hazard dams, the spillway design requirement is:

Other (Please specify)

Comments: Small (25% PMF), Intermediate (25-50% PMF), Large (50-75% PMF)

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

Yes

Comments: It happened one time a number of years ago. The owners would have to provide much more justification for it to be approved today.

31 Does your organization permit risk-based hydrologic designs?

Yes; our regulations permit them

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

33 How difficult would it be to change your regulations? Please explain.

Difficult

Comments: The last change to the rules took four years and four different stakeholder meetings. The process is done internal to the agency, but takes a long time. Today, there would be considerable input from the Legislature. It would be difficult to get some of the changes we got in 2009 today.

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Utah
Name of Representative	Everett Taylor
Title of Representative	Dam Safety
Phone number(s)	801-538-7372
Email address	everetttaylor@utah.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	5031
Total Regulated Dams	5031
High Hazard Dams	196
Significant Hazard Dams	301
Low Hazard Dams	4534
Unregulated Dams	0
Other	0

3 What year did your Agency adopt minimum Inflow Design Flood criteria? 1990

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: Owned by Bureau of Reclamation

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

Yes (Please explain)

Comments: Low Hazard, Flood control, less than 20 ac-ft & not high hazard

6 Does the Organization have published size classification criteria?

No

7 Does the Organization have published hazard classification criteria?

Yes (Other)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

Other (Please specify)

Comments: Those dams which, if they fail, have a low probablility of causing loss of human life, but would cause appreciable property damage, including damage to public utilities.

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published within State Laws

Comments: Found within State Administrative Rules

9 What is the origin of the guidelines?

Other (Please specify)

Comments: HMR 49 with state approved adjustments based on commissioned studies.

10 When were the guidelines last revised (MM/DD/YYYY)? 12/31/2003

11 Are there any plans to update or revise the guidelines in the near future?

No

12 Are the guidelines different for new and existing dams?

No

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency performs independent verification of submitted designs

14 How are the guidelines applied?

Based on hazard classification only

15 For PMP/PMF designs, is freeboard required?

No

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

Yes

If "Yes", what are the specific analysis methodologies, procedures, or computer software that must be used?

Must use HMRs for developing PMP

Comments: The 72 hour SEF using HMR49/ USUL as well as the 6 hour SEF using HMR49/ USUS.

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

Comments: Reserve the right to question methodologies

18 Do the guidelines specify any criteria for storm duration?

Other (Please specify)

Comments: Route the 72 hour SEF using HMR49/ USUL as well as the 6 hour SEF using HMR49/ USUS to determine the more extreme event.

19 Do the guidelines specify any criteria for temporal storm distribution?

Yes (HMR)

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

Yes (Please specify)

Comments: In designing the spillway for a dam to pass the IDF, the State Engineer will consider the use of a principal spillway in conjunction with emergency spillways. The principal spillway must be designed so that no structural damage will occur during passage of the IDF. Emergency spillways, including Fuse Plug Spillways, may be designed so that some damage may be expected during use provided the anticipated damage does not represent a threat to the dam. Sunny day failure modeling of Fuse Plug Spillways may be required to determine if they are creating an additional unacceptable risk. Overtopping of the dam will not be considered as an emergency spillway on earthfill dams, unless it can be demonstrated that the dam is protected from erosion, and the duration of overtopping will not saturate the dam and reduce its stability.

22 Does the organization allow development of a site specific PMP?

No

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a moderate problem

24 Do guidelines require consideration or analysis of future development?

No

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

Yes (Please specify)

Comments: Reservoir pool at spillway crest (except flood control) AMC III for 100 year flood criteria

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

No

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

Yes (Please specify)

Comments: 100-year flood

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

No

Comments: The IDF for all High and Moderate Hazard Dams will be the SEF. It will be necessary to calculate both the 72 hour SEF using HMR49/ USUL as well as the 6 hour SEF using HMR49/ USUS. Both of these hydrographs must be routed through the reservoir to determine which one represents the most extreme event. Once the critical SEF has been determined, it must be compared to a flood generated by the 100 year, 6 hour (for local storms), or 100 yr, 24 hour (for general storms) precipitation applied on a saturated watershed. If the routed 100 year event, including appropriate allowances for freeboard, is more critical than the SEF it must be used as the minimum IDF.

29 For low hazard dams, the spillway design requirement is:

100-year flood

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

Yes

Comments: Possibly on upgrading existing structure to meet minimum standards. Not for new construction.

31 Does your organization permit risk-based hydrologic designs?

No; our regulations forbid them

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

33 How difficult would it be to change your regulations? Please explain.

Moderate

Comments: Changed through administrative rule process

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Vermont
Name of Representative	Stephen Bushman
Title of Representative	Environmental Engineer IV
Phone number(s)	802-241-3450
Email address	steve.bushman@state.vt.us

2 Number of dams under Organization's jurisdiction by type:

Total Dams	
Total Regulated Dams	572
High Hazard Dams	55
Significant Hazard Dams	136
Low Hazard Dams	379
Unregulated Dams	
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria?

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: Non jurisdictional: Capable of impounding 500,000 cubic feet or less of water. No non-inventory dam in VT, all dams we know of are included in inventory.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

6 Does the Organization have published size classification criteria?

No

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

Loss of life potential is "few" with "appreciable" economic loss

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations for consideration by the engineer/designer

9 What is the origin of the guidelines?

Combination of the above (Please specify)

Comments: Primarily USACE and NRCS.

10 When were the guidelines last revised (MM/DD/YYYY)?

11 Are there any plans to update or revise the guidelines in the near future?

No

12 Are the guidelines different for new and existing dams?

Yes (Please elaborate)

Comments: New dams must meet appropriate SDF. We have allowed reconstruction of existing dams to meet less than SDF required for a new dam, but at least Q100, and usually improvement over existing.

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency reviews submitted designs

14 How are the guidelines applied?

Based on hazard classification only

15 For PMP/PMF designs, is freeboard required?

Other (Please specify)

Comments: Freeboard, as appropriate, but not less than 1.5 feet with a routed Q100 inflows, and not less than 3.0 feet from principal spillway crest.

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

No

Comments: No, but typically 24-hr is used.

19 Do the guidelines specify any criteria for temporal storm distribution?

No

Comments: No, but typically HMR is used.

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

Yes (Please specify)

Comments: As appropriate (USCOE, NRCS)

22 Does the organization allow development of a site specific PMP?

Unknown (never requested)

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

No

24 Do guidelines require consideration or analysis of future development?

No

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

No

Comments: Typically use normal pool level

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

No

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

No

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

No

Comments: SDF and outlet works capacities should be consistent with guidelines or service criteria established by Federal agencies such as the Corps of Engineers, Soil Conservation Service and the Bureau of Reclamation for a given size and hazard classification, with the following additional requirements: 1) SDF, as appropriate, but in no case less than a routed Q100 (one hundred-year frequency) inflow (Ref: FERC Engineering Guidelines . . . , October 1993, Paragraph 2-3.3.). 2) Freeboard, as appropriate, but not less than 1.5 feet with a routed Q100 inflows, and not less than 3.0 feet from principal spillway crest (usually NWL). Applies to all embankment dams and other dams where appropriate.

29 For low hazard dams, the spillway design requirement is:

100-year flood

Comments: SDF

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

31 Does your organization permit risk-based hydrologic designs?

Our regulations do not specifically address this topic and it has never come up for consideration

32 Has your agency ever reviewed a risk-based hydrologic analysis?

Unsure

33 How difficult would it be to change your regulations? Please explain.

Moderate

Comments: Statute change required. Would require amendment to individual sections of the law or addition of new sections. Difficulty increases with complexity of change.

34 Are there any unique provisions in your regulations?

No

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Virginia
Name of Representative	Robert T. Bennett, P.E., R.A., C.F.M.
Title of Representative	Director, Div. of Dam Safety & Floodplain Man.
Phone number(s)	804-786-3914
Email address	Robert.Bennett@dcr.virginia.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	11,568
Total Regulated Dams	1,568
High Hazard Dams	162
Significant Hazard Dams	382
Low Hazard Dams	1024
Unregulated Dams	10,000 +/-
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? 1982

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: Owned or regulated by the Federal Government, or Permitted Mining Dam, or size exempt. Size exempt: <6', or <50 ac-ft for dams 6' - 25', or <15 ac-ft for dams >25'

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

Yes (Please explain)

Comments: Pemitted Dams by VA Dept. Mines, Minerals, & Energy, and Agricultural Use Dams that are <25' high and Agricultural Use Dams < 100ac-ft.

6 Does the Organization have published size classification criteria?

Yes

If "Yes", check and complete as appropriate:

Class A (Small)	=<	40	feet high and stores =<	1,000	acre-feet
Class B (Medium)					
Class C (Large)	=>	100	feet high and stores =>	50,000	acre-feet
Other (Specify)					

Comments: Medium is between Large and Small. Small is further defined as >=6'

7 Does the Organization have published hazard classification criteria?

Yes (Other)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

No potential for loss of life with significant but not excessive economic loss

Comments: From 4VAC50-20-40: Significant Hazard Potential is defined where an impounding structure failure may cause the loss of life or appreciable economic damage. "May cause loss of life" means that impacts will occur that could cause a loss of human life, including but not limited to impacts to facilities that are frequently utilized by humans other than residences, businesses, or other occupied structures, or to secondary roadways. Economic damage may occur to, but not be limited to, building(s), industrial or commercial facilities, public utilities, secondary roadways, railroads, personal property, and agricultural interests. "Secondary roadways" include, but are not limited to, secondary highways, low-volume urban streets, service roads, or other low-volume roadways.

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations that are required

9 What is the origin of the guidelines?

USACE guidelines (including Phase I Study guidelines)

10 When were the guidelines last revised (MM/DD/YYYY)? 12/22/2010

11 Are there any plans to update or revise the guidelines in the near future?

Yes (Please specify)

Comments: Will be forming a Technical Advisory Committee (TAC) to revise regulations in 2011, may or may not change guidelines on determining SDF.

12 Are the guidelines different for new and existing dams?

Yes (Please elaborate)

Comments: Existing high hazard dams maximum SDF required = Flood resulting from the 90%PMP, new high hazard dams maximum required SDF = PMF.

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency reviews submitted designs

Agency advises dam owners through the required certificate to operate renewal process that upgrades are needed if applicable.

14 How are the guidelines applied?

Based on hazard classification only

15 For PMP/PMF designs, is freeboard required?

Other (Please specify)

Comments: Yes, in conformance with Fed. Guidelines (See USBR Design of Small Dams) Freeboard determination and justification must be addressed by the owner's engr.

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

Yes

If "Yes", what are the specific analysis methodologies, procedures, or computer software that must be used?

Other (Please specify)

Comments: Federal guidelines unless alternate method pre-approved by Dam Safety.

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

Yes (Please specify)

Comments: Any software not approved by Fed. or non Fed. Approved and not pre-approved by Dam Safety

18 Do the guidelines specify any criteria for storm duration?

Other (Please specify)

Comments: PMF hydrographs for 6-, 12-, and 24-hr. The hydrograph that creates the largest peak outflow used to determine capacity for nonfailure and failure analysis.

19 Do the guidelines specify any criteria for temporal storm distribution?

Yes (Other - please specify)

Comments: Must comply with federal standard being used for calculations.

20 Do the guidelines specify any criteria for spatial storm distribution?

Yes (Please specify)

Comments: Must comply with federal standard being used for calculations.

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

Yes (Please specify)

Comments: Freeboard Design Flood may be used for NRCS Flood Control Struct. Only. All others must use spillway design flood and applicable Fed. Guidelines.

22 Does the organization allow development of a site specific PMP?

No

Comments: Not yet.

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a moderate problem

24 Do guidelines require consideration or analysis of future development?

Yes (Both of the above)

Comments: Both is for impacts on watershed hydrology and impacts on downstream hazards.

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

Yes (Please specify)

Comments: Regs. 4VAC50-20-50 …."C. PMF: Probable Maximum Flood 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."

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

Yes

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

Yes (Please specify)

Comments: Minimum threshold for IDA: High (100-yr), Significant (100-yr), Low (50-yr)

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	100	% of the	PMF
Existing High Hazard Dam must pass	90	% of the	PMP
New Significant Hazard Dam must pass	50	% of the	PMF
Existing Significant Hazard Dam must pass	50	% of the	PMF

Comments: The above numbers are without guidelines for incremental damage analysis reduction of spillway capacity requirements.

29 For low hazard dams, the spillway design requirement is:

100-year flood

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

31 Does your organization permit risk-based hydrologic designs?

Other (Please explain)

Comments: No

32 Has your agency ever reviewed a risk-based hydrologic analysis?

Other (Please explain)

Comments: Proposed by dam owner, but concept rejected without consideration.

33 How difficult would it be to change your regulations? Please explain.

Difficult

34 Are there any unique provisions in your regulations?

Yes (Please explain)

Comments: See: http://www.dcr.virginia.gov/dam_safety_and_floodplains/documents/dsregs.pdf

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Washington State
Name of Representative	Jerald LaVassar, P.E.
Title of Representative	Unit Lead, Dam Safety Office
Phone number(s)	360-407-6625
Email address	jlsd461@ecy.wa.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	1381
Total Regulated Dams	1217
High Hazard Dams	137
Significant Hazard Dams	224
Low Hazard Dams	856
Unregulated Dams	164
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? 1989

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: Non-jurisdictional - Less than 10 acre-feet of storage (top of dam); USACE or USBR ownership; or FERC regulation. Of the unregulated dams, 106 are high hazard USACE, USBR or FERC dams.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

6 Does the Organization have published size classification criteria?

Yes

If "Yes", check and complete as appropriate:

Class A (Small)	=<	15	feet high and stores =<		acre-feet
Class B (Medium)					
Class C (Large)	=>	50	feet high and stores =>		acre-feet

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

Loss of life potential is "few" with "appreciable" economic loss

Comments: Population at Risk = 1 to 6 people. 1 or 2 inhabited structures. Other criteria include notable agriculture or work sites, secondary highway and/or rail lines, limited water quality degradation and only short term environmental impacts.

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations that are required

Comments: Guidelines establish design minimums as a function of the downstream hazard setting.

9 What is the origin of the guidelines?

Custom developed by Organization

Comments: Dam Safety Guidelines, Technical Note 3: Design Storm Construction. Washington State Department of Ecology Publication No. 99-55G.

10 When were the guidelines last revised (MM/DD/YYYY)? 10/30/2009

11 Are there any plans to update or revise the guidelines in the near future?

No

12 Are the guidelines different for new and existing dams?

Yes (Please elaborate)

Comments: New dams typically have the rainfall depth increased by 15%.

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency performs independent verification of submitted designs

14 How are the guidelines applied?

Based on a combination of risk analysis and hazard/size classification

15 For PMP/PMF designs, is freeboard required?

Other (Please specify)

Comments: Usually based on wave run up computations; if computed freeboard is too low, may be superseded by minimum requirements; minimums depend on size of dam, range from 0.5 feet to 1.0 feet. Ref: Dam Safety Guidelines, Part IV: Dam Design and Construction. Washington State Department of Ecology Publication No. 99-55D. See Section 4.6, Reservoir Freeboard.

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

Yes

If "Yes", what are the specific analysis methodologies, procedures, or computer software that must be used?

Other (Please specify)

Comments: WSDSO's basic requirement is to use good engineering practice. Usually means using HEC-HMS with our Tech Note 3 dam safety storms. On occasion, we have accepted HSPF with our Tech Note 3 dam safety storms inserted into the rainfall record. We have also accepted NRCS storms that captured the same (or greater) total rainfall volume and peak rainfall intensity as our Tech Note 3 dam safety storms. As noted in item 13, we often do our own calculations to verify the designer's calculations.

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

Other (Please specify)

Comments: Three storm scenarios must be considered: a short 4- to 6-hour storm, an intermediate 18-hour storm, and a long 72-hour storm. The IDF is the scenario that yields the highest peak water level in the reservoir.

19 Do the guidelines specify any criteria for temporal storm distribution?

Yes (Regional)

Comments: Design storm hyetographs are provided in Technical Note 3, at 5-minute intervals for the short storms and at 15-minute intervals for the intermediate and long storms.

20 Do the guidelines specify any criteria for spatial storm distribution?

Yes (Please specify)

Comments: Again, WSDSO's basic requirement is to use good engineering practice. One method is to use Areal Adjustments to Account for Storm Spatial Distributions as a Percent of At-Site Precipitation Amount - see Dam Safety Gudelines Tech Note 3: Design Storm Construction, Section 1.2.3

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

Yes (Please specify)

Comments: Because of infrequent operation, economy in design and construction can sometimes be accomplished for small and intermediate size dams by utilizing the concept of survivability. That is, erosional damage can often be tolerated provided the damage does not jeopardize the structural integrity of the impounding barrier or allow an uncontrolled release of the reservoir waters.

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

Yes (Please specify)

Comments: Must be more conservative than Washington State DSO Design Storm Criteria as described in Tech Note 3. The 2009 update to Tech Note 3 is more recent than HMR-57 (NWS, Oct. 1994),and is based on a larger database of storms.

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a moderate problem

Comments: There are several dimensions to this issue: (a) Downstream development may require simply a reclassification based on the existing flood analysis and inundation mapping, or may require us to do a new dam breach flood study. (b) The new hazard rating will require us to do a new hydrology study to determine the spillway dimensions required to pass the new (larger) inflow design flood. (c) The dam owner must modify or reconstruct the spillway(s) to the new dimensions. The inundation and IDF studies (a, b) may be a problem for us (Dam Safety Office) depending on our other inspection and plan review workload. The physical work on the spillway (c) may be a problem for the dam owner, depending on their ability to fund the reconstruction. If we (Dam Safety) perform the engineering analyses, we have found that this fosters something of a partnership attitude with the dam owner so that they may be more willing to devote their funds to the physical construction (a more tangible product). A few dam owners may require specific enforcement action to nudge them into making the spillway modifications, which creates additional workload for the Dam Safety Office.

24 Do guidelines require consideration or analysis of future development?

No

Comments: Our Design Step Worksheet asks the engineer of record to consider the potential for future development and his/her assessment then is reflected in the minimum design level. If the engineer's assessment is grossly at odds with what we judge the potential for future development to be, we will raise the concern with the owner. Our position is that the owner is then making an informed judgment of whether to pay some more now or much more later if they ignore growth potential.

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

Yes (Please specify)

Comments: Should be representative of typical conditions during the season when the storm might occur. This usually means normal pool elevation, typical snowpack, and AMC-II soil moisture conditions.

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

Yes

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

Yes (Please specify)

Comments: Must select a Inflow Design Flood with reservoir routing through the embankment's spillways, determine the flood levels and areal extent of dam failure inundation vs stream flood inundation, proceed to the next design step if it exceeds 2 ft and assess against the US Bureau of Reclamation Hazard Assessment Curves (Ref: Dam Safety Guidelines, Part IV, Section 2.4). If any population at risk, minimum Design Step is Step 3, recurrence interval 1 in 3,000 years. (Ref: Dam Safety Guidelines Technical Note 2, Selection of Design/Performance Goals for Critical Project Elements. Washington State Department of Ecology Publication No. 99-55F. See Section 5.1.5 on page 22.)

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

No

Comments: Consquence rating points determine the design flood based on a sliding scale. The scale ranges from the 500-year flood to the PMF or theoretical maximum event.

29 For low hazard dams, the spillway design requirement is:

500-year flood

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

Comments: Generally, safety design must be passive.

31 Does your organization permit risk-based hydrologic designs?

Yes; our regulations permit them

32 Has your agency ever reviewed a risk-based hydrologic analysis?

Yes (Reviewed and approved)

33 How difficult would it be to change your regulations? Please explain.

Difficult

Comments: Administrative procedures are quite detailed and time-consuming, with considerable public involvement, at a time when we have no extra staff to devote to that effort.

34 Are there any unique provisions in your regulations?

Yes (Please explain)

Comments: Risk-based design storm levels; design storm hyetographs based on Washington State historical storms; numerical rating scheme for design/performance goals. Also, the level of detail in our guidance documents is more detailed typically than other states.

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	West Virginia Dam Safety Section
Name of Representative	Brian Long
Title of Representative	Section Manager
Phone number(s)	(304) 926-0499 ext1005
Email address	brian.r.long@wv.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	524
Total Regulated Dams	355
High Hazard Dams	253
Significant Hazard Dams	80
Low Hazard Dams	22
Unregulated Dams	44
Other	125

3 When did your Organization adopt minimum Inflow Design Flood criteria? 1982

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Both of the above

Comments: Exemptions for federal owned dam, farm pond dams, and road fills that do not normally impound water

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

Yes (Please explain)

Comments: Coal refuse dams vary in freeboard requirements

6 Does the Organization have published size classification criteria?

No

Comments: An impoundment exceeding forty (40) feet in height or four hundred (400) acre-feet storage volume shall not be classified as a Class 3 (low hazard) dam.

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, Low, Limited Hazard)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

No potential for loss of life with significant but not excessive economic loss

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations that are required

Comments: Rule guidelines are passed by Legislature, signed by Gov with force of law

9 What is the origin of the guidelines?

Other (Please specify)

Comments: NRCS & MSHA

10 When were the guidelines last revised (MM/DD/YYYY)? 06/01/2009

Comments: Revision to create a revolving loan fund

11 Are there any plans to update or revise the guidelines in the near future?

No

12 Are the guidelines different for new and existing dams?

No

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency performs independent verification of submitted designs

14 How are the guidelines applied?

Based on hazard classification only

Comments: Risk assessment is allowed with justification

15 For PMP/PMF designs, is freeboard required?

No

Comments: Coal refuse dams are required to include additional freeboard.

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

Comments: Applicant may use any procedure. WVDEP advises procedures used to review applications.

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

Comments: Applicant may use any software. WVDEP advises software used to review applications.

18 Do the guidelines specify any criteria for storm duration?

Yes (6-hr)

19 Do the guidelines specify any criteria for temporal storm distribution?

No

Comments: Type II storm distribution used in review

20 Do the guidelines specify any criteria for spatial storm distribution?

No

Comments: Point rainfall reduction assumed in review for watersheds exceeding 10 square miles

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

No

22 Does the organization allow development of a site specific PMP?

Unknown (never requested)

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a moderate problem

24 Do guidelines require consideration or analysis of future development?

Yes (Impacts of development on hazard classification or failure consequences)

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

Yes (Please specify)

Comments: AMC II unless a different condition is required by the Secretary

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

Yes

Comments: Future downstream conditions are required as part of the dam break analysis

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

Yes (Please specify)

Comments: Class I - no less than 70% of the PMP; Class II - no less than 25% of the PMP; Class III - no less than P100

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	100	% of the	PMP
Existing High Hazard Dam must pass	100	% of the	PMP
New Significant Hazard Dam must pass	50	% of the	PMP
Existing Significant Hazard Dam must pass	50	% of the	PMP

29 For low hazard dams, the spillway design requirement is:

Other (Please specify)

Comments: 25% of the PMP; Class IV required to pass P100

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

31 Does your organization permit risk-based hydrologic designs?

Yes; our regulations permit them

Comments: Rule permits reduction of hazard potential or design storm (see #27) based upon risk assessment analysis subject to agency approval

32 Has your agency ever reviewed a risk-based hydrologic analysis?

Yes (Both approved and rejected)

33 How difficult would it be to change your regulations? Please explain.

Difficult

34 Are there any unique provisions in your regulations?

Yes (Please explain)

Comments: Statute require additional "Criteria" to govern design, construction, repair, inspection & maintenance of proposed dams with annual review to consider improved technology.

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Wisconsin
Name of Representative	Meg Galloway
Title of Representative	State Dam Safety Engineer
Phone number(s)	608-266-7014
Email address	Meg.galloway@dnr.state.wi.us

2 Number of dams under Organization's jurisdiction by type:

Total Dams	
Total Regulated Dams	3653
High Hazard Dams	189
Significant Hazard Dams	170
Low Hazard Dams	3294
Unregulated Dams	
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? 1985

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Both of the above

Comments: The state definition of Large Dam matches the NID criteria.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

Yes (Please explain)

Comments: We do not have jurisdictional authority under our dam statutes over dams associated with cranberry operations, manure storage facilities, tailings facilities and dams not on watercourses.

6 Does the Organization have published size classification criteria?

Yes

Comments: Large: >6 feet and =>50 acre feet or =>25 feet and >15 acre-feet.

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

No potential for loss of life with significant but not excessive economic loss

Comments: We may also call a dam signifcant if failure would cause significant environmental harm.

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published within State Laws

Comments: Rules are in Administrative Code NR 333

9 What is the origin of the guidelines?

Unknown

10 When were the guidelines last revised (MM/DD/YYYY)? 7/1/2001

11 Are there any plans to update or revise the guidelines in the near future?

No

12 Are the guidelines different for new and existing dams?

No

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency utilizes a combination of the above approaches, possibly on a case-by-case basis

In most cases we do a review of submitted design. In some cases we may do independent analysis. Agency engineers may do analysis on department-owned dams; however, the analysis will receive an independent review by another agency engineer.

14 How are the guidelines applied?

Based on hazard classification only

15 For PMP/PMF designs, is freeboard required?

Other (Please specify)

Comments: Do not use PMP/PMF. We do not have written freeboard criteria but we will push for freeboard to be included in design on a case-by-case basis

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

Yes

If "Yes", what are the specific analysis methodologies, procedures, or computer software that must be used?

Other (Please specify)

Comments: Must use methods identified as acceptable in our Floodplain regulations (NR 116)

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

Yes (Please specify)

Comments: If it is not acceptable by the floodplain regulations the decision would be made on a case-by-case basis

18 Do the guidelines specify any criteria for storm duration?

No

Comments: We have occasionally commented on and requested a change in storm duration during the review process

19 Do the guidelines specify any criteria for temporal storm distribution?

No

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

No

22 Does the organization allow development of a site specific PMP?

No

Comments: Do not use PMP criteria

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

Yes, a minor problem

Comments: It should never be a problem as the design criteria are tied into existing land use and future land use controls. It is occasionally an issue for an existing dam if land use controls do not get put in place in a timely manner to prevent hazard creep.

24 Do guidelines require consideration or analysis of future development?

Yes (Impacts of development on hazard classification or failure consequences)

Comments: NR 333 and NR 116 tie dam safety and floodplain regulations together to try and minimize development potential in the hazard area downstream of dams.

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

No

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

Yes

If "Yes", do guidelines require analyses to include future downstream conditions within the dam failure inundation zone?

No

Comments: Any owner may provide documentation to justify a different spillway capacity from that specified in Table I. The department shall review such documentation and may approve the spillway capacity proposed by the owner if it determines that such capacity will not result in an additional hazard to life, health or property when compared to the capacity specified in Table I.

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

No

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

No

Comments: High (Q1000), Significant (Q500)

29 For low hazard dams, the spillway design requirement is:

100-year flood

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

31 Does your organization permit risk-based hydrologic designs?

Our regulations do not specifically address this topic and it has never come up for consideration

32 Has your agency ever reviewed a risk-based hydrologic analysis?

No

33 How difficult would it be to change your regulations? Please explain.

Moderate

Comments: Unless done for emergency purposes the rule making process typically takes at least 18 months.

34 Are there any unique provisions in your regulations?

Yes (Please explain)

Comments: Linking the hazard potential to both existing land use and land use controls downstream of the dam.

ON THE RECORD

1 Respondent information:

State/Federal Dam Safety Organization	Wyoming
Name of Representative	Mr. Larry L. Stockdale
Title of Representative	Safety of Dams Engineer
Phone number(s)	307-777-3500
Email address	lstock@seo.wy.gov

2 Number of dams under Organization's jurisdiction by type:

Total Dams	
Total Regulated Dams	1512
High Hazard Dams	79
Significant Hazard Dams	112
Low Hazard Dams	1321
Unregulated Dams	
Other	

3 What year did your Agency adopt minimum Inflow Design Flood criteria? n/a

4 How does the Organization define a non-inventory or non-jurisdictional dam? Minimum criteria:

Other (Please specify)

Comments: Anything less than 15 acre-feet regardless of height, less than or equal to 6 feet in height regarless of capacity, or less than 20 feet in height and less than 50 acre-feet.

5 Are there types/categories of dams(other than federally-owned or non-jurisdictional dams) that are held to different design standards than the majority of dams under your jurisdiction? (e.g. tailings dams)

No

6 Does the Organization have published size classification criteria?

No

7 Does the Organization have published hazard classification criteria?

Yes (High, Significant, and Low)

If "Yes", and Significant Hazard is defined, how is Significant Hazard defined?

No potential for loss of life with significant but not excessive economic loss

8 Does the Organization have guidelines for determining the spillway design flood?

Yes

If "Yes", what is the status of the guidelines; do they have the force of law?

Published guidelines/regulations for consideration by the engineer/designer

Comments: Regulations in draft form.

9 What is the origin of the guidelines?

Combination of the above (Please specify)

10 When were the guidelines last revised (MM/DD/YYYY)? n/a

Comments: Still in draft form.

11 Are there any plans to update or revise the guidelines in the near future?

Yes (Please specify)

Comments: Will be revised when review comments are received

12 Are the guidelines different for new and existing dams?

No

13 Which of the following best describes your agency's role in determining the spillway design flood:

Agency reviews submitted designs

14 How are the guidelines applied?

Based on hazard classification only

15 For PMP/PMF designs, is freeboard required?

No

16 Do the guidelines or Organization stipulate specific analysis methodologies, procedures or computer software that must be used?

No

17 Do the guidelines or Organization stipulate specific analysis methodologies, procedures, or computer software that cannot be used?

No

18 Do the guidelines specify any criteria for storm duration?

No

19 Do the guidelines specify any criteria for temporal storm distribution?

No

20 Do the guidelines specify any criteria for spatial storm distribution?

No

21 Do the guidelines specify spillway performance/design criteria based on the frequency of flooding (e.g. spillway design flood vs. freeboard design flood)?

Yes (Please specify)

Comments: High and Significant hazard are a performance design. Frequency is based on the 100-year.

22 Does the organization allow development of a site specific PMP?

Yes

If "Yes", are there any restrictions, requirements, or guidelines for performing a site specific PMP?

No

23 Is changing dam classifications/spillway design requirements because of downstream development a regulatory problem?

No

24 Do guidelines require consideration or analysis of future development?

No

25 Do guidelines specify antecedent moisture conditions or initial reservoir pool levels?

No

26 Do guidelines allow the use of incremental damage assessments to establish the spillway design flood?

No

27 Are there any restrictions or guidelines on the use of incremental damage assessments or risk analyses such as a minimum percent of the PMP, regardless of downstream consequences?

No

28 Do any of the guidelines specify the spillway design capacity for any dam classification as a percentage of the PMP or PMF?

Yes

If "Yes", complete as appropriate. If "No", describe below how spillway design capacity is determined.

New High Hazard Dam must pass	100	% of the	PMF
Existing High Hazard Dam must pass	100	% of the	PMF
New Significant Hazard Dam must pass	50	% of the	PMF
Existing Significant Hazard Dam must pass	50	% of the	PMF

29 For low hazard dams, the spillway design requirement is:

100-year flood

30 Would your organization accept the use of an early warning system as an alternative to designing a high hazard dam for the regulatory spillway design flood?

No

31 Does your organization permit risk-based hydrologic designs?

Yes; our regulations permit them

32 Has your agency ever reviewed a risk-based hydrologic analysis?

Yes (Reviewed and approved)

33 How difficult would it be to change your regulations? Please explain.

Moderate

Comments: Moderately difficult due to public comment, etc.

34 Are there any unique provisions in your regulations?

No